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## Digital Retail Payment Modes in India- A Statistical Analysis

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### ABSTRACT

In the past few years, tremendous changes have taken place in the way of doing work due to the revolution in technology and the Internet. Retail Payment System in India has also evolved in the past few years due to use and up gradation of ICT. The Government of India has also launched various promotion programmes and schemes to enhance use of digital payment modes to transfer money. Various modes of digital retail payments are used to make payments like NEFT, IMPS, UPI, Debit & Credit Cards, PPIs and UPI. Secondary data related to value and volume of payment modes has been collected from the website of RBI for the period from 2016-17 to 2022-23. The data has been examined using graphs and percentage. Value and volume of various retail digital payments modes has been analyzed. It was interpreted from the study that use of digital modes has increased during the study period and the use of paper base Instruments has declined both in terms of volume and value. Unified Payments Interface (UPI) has emerged as the most used mode for digital retail payments transactions and use of other retail digital payment modes has declined.

**Key Words:** NPCI, Digital Retail Payment (DPR), Total Retail Payments (TRP), Paper Base Retail Payment (PBRP), UPI.

## 1. INTRODUCTION

In 1986, the Internet got introduced in India but was available only to researchers and educational institutes. On 15 August 1995, Videsh Sanchar Nigam Ltd. (VSNL) launched the internet in India via modem and at that time nobody had any idea that where internet would take the world. After approximately 28 years, it is almost impossible to imagine a world without the internet. Internet and technological revolution has changed the way of doing work in each field, especially in the digital payment system. It is evident in the past few years that ICT has improved the financial system in India.

As per the Payment and Settlement Act 2007, “Electronic funds transfer means any transfer of funds which is initiated by a person by way of instruction, authorization or order to a bank to debit or credit an account maintained with bank through electronic means”<sup>1</sup>. And these types of instruction include direct deposit and withdrawals of funds, point of sale transfer, card payments, automated teller machine transfer, transfers initiated by internet and telephone.

In the last few years, several measures have been taken by the Govt. of India to make the Indian payment system digital. In the year 2015, Digital India program was started. “The digital India programme is the flagship programme of the Government of India with a vision to transform India into a digitally empowered society and knowledge economy”<sup>2</sup>. The main role of the programme Digital India is to promote cashless, paperless and faceless fund transfer transactions. The Ministry of Electronics & Information Technology (MeitY) has launched various digital payment promotion & awareness programme & schemes like Bhim-Cash back scheme for merchants, Bhim-Referral Bonus Scheme for Individuals, Digital Jagrati and DigiShala.

In the year 2022 MeitY started an incentive scheme for the promotion of low-value Bhim UPI and RuPay debit cards. To promote digital payment awareness and digital literacy in rural India, MeitY launched Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA). RBI launched “Har Payment Digital” digital payment awareness week from 6<sup>th</sup> March to 12<sup>th</sup> March, 2023 and also started the campaign “Digital Payment Apnao, Auro ko bhi Sikhao”.

India has made tremendous progress in digital payment in the past few years. The value and volume of digital payment has increased so there is a need to measure and analyze the retail payment system in India.

<sup>1</sup> <https://rbidocs.rbi.org.in/rdocs/Publications/PDFs/86706.pdf>

<sup>2</sup> [http://cashlessindia.gov.in/digital\\_payment\\_methods.html](http://cashlessindia.gov.in/digital_payment_methods.html)

## 1.1. RETAIL PAYMENT SYSTEM

Retail payment system includes the transfer of funds for purchasing goods and services. These payments are relatively low value everyday consumer transactions. This payment system is evolving day by day due to the change in technology and the internet. Retail payment modes include transfer of funds using methods like cash, internet banking, debit cards, credit cards, UPI, PPIs, and paper base instruments. “National Payments Corporation of India (NPCI) was incorporated in 2008 as an umbrella organization for operating retail payments and settlement systems in India”<sup>3</sup>.

## 1.2. MODES OF DIGITAL PAYMENTS

“The digital India programme is a flagship programme of the Government of India with a vision to transform India into a digitally empowered society and knowledge economy”<sup>4</sup>. The main objective of this flagship program is to promote Faceless, Cashless and Paperless payments. The following digital payment modes are available in India

- i. **Internet Banking:** – It is also known as virtual banking, online banking and e-banking. Internet banking enables customers of financial institutions to conduct financial transactions through the web site of banks. Online transactions include RTGS, NEFT, IMPS and ECS.
- **Real Time Gross Settlement System (RTGS)** - It was introduced in the year 2004. Real-time mean funds are transferred in real time as instruction is received from the customer and gross-settlement means funds are transferred on the basis of individual instruction without bunching the instruction. Initially, this mode was available in banks working hours but now it is available 24×7 on all days with effect from 14 December, 2020. This mode is available for large value transactions with a minimum transaction limit of rupees two lakhs and no upper ceiling<sup>5</sup>.
- **National Electronic Fund Transfer (NEFT):-** It was started in November 2005. NEFT is a nation-wide centralized payment system maintained and operated by the Reserve Bank of India. It allows customers to transfer funds from one NEFT enabled bank to another NEFT enabled bank within India. This system settles funds transfer in the batches and available throughout the year on all days with effect from January 2020. Before that, NEFT transactions could be processed between 8:00 AM to 6:30 PM from Monday to Friday and between 8:00 AM to 12:00 PM on Saturdays. There is no minimum fund transfer limit like RTGS.
- **Immediate Payment System (IMPS):-** It was launched publicly in November 2010. An IMP is a real time fund transfer facility managed by National Payments Corporation of India (NPCI). This service enables funds transfers 24×7×365, person to person (P2P) & person to account (P2A) through mobile banking and mobile money identifier (MMID) provided by the bank. It has a

<sup>3</sup> <https://www.npci.org.in/npci-profile>

<sup>4</sup> [http://cashlessindia.gov.in/digital\\_payment\\_methods.html](http://cashlessindia.gov.in/digital_payment_methods.html)

<sup>5</sup> <https://www.rbi.org.in/commonman/English/Scripts/FAQs.aspx?Id=275>

maximum fund transfer limit of rupees twenty thousand per transaction but no minimum amount transfer limit like NEFT.

➤ **National Automated Clearing House (NACH):-** To overcome from the problems of ECS (Electronic Clearing Service), National Payment Corporation of India (NPCI) stated a new system National Automated Clearing House (NACH) and on 1<sup>st</sup> May 2016, ECS got replaced by the NACH. “ECS (Debit and Credit) has been merged with NACH with effect from January 31, 2020”<sup>6</sup>. It is a secure, robust and scalable platform to perform fund transfer transactions. It is digital mode to receive or make payment of funds from one bank account to another bank account. This mode is used for the bulk transactions which are periodic and repetitive in nature. There is no minimum or maximum amount limit for the transfer of funds. NACH transactions are of two types NACH Debit and NACH Credit.

a. **NACH Credit-** This mode is used to credit a large number of beneficiary accounts by a single debit of NACH user account. Generally this mode is used by intuitions to transfer salary, interest, pension, and dividend.

b. **NACH Debit-** this mode of electronic fund transfer is used by institutes to raise debits to a large number of accounts. It is useful for the transactions like loan installment, water bill, electricity bill, telephone bill and insurance premium which are repetitive in nature.

ii. **Unified Payments Interface (UPI):-** National Payment Corporation of India developed the Unified Payment Interface and Reserve Bank of India regulates it. It was started in the year 2016. UPI is a real time digital payment system that allows users to link multiple bank accounts into a single smartphone application. Users can transfer funds round the clock 24×7×365, from one bank account to another bank account without providing bank name, account number, card number or IFSC code. UPI uses a registered mobile number with bank account, Virtual Payment Address and QR codes to allow users fund transfers.

iii. **Bank Cards:** - There are two bank cards, debit cards and credit cards. Users can use both types of cards to make payment of online purchases as well as offline purchases from stores through online payment gateway or PoS terminals. Both cards have a sixteen digit identity number, EMV (Europay, MasterCard and Visa) Chip, Expiry Date and CVV number. Debit cards are issued to savings accounts or current account holders and linked directly to bank accounts. Users of debit cards can only spend the money they have in their bank account. On the other hand, credit cards enable users to borrow money for the payments and the benefit of buying now and paying later. Banks allow users of credit cards a specific credit period after payment is done by using a credit card. Users can also transfer money to a bank account, prepaid card, other credit card, debit card and withdraw money from an ATM.

<sup>6</sup> <https://www.rbi.org.in/Scripts/PSIUserView.aspx?Id=6>

- iv. Unstructured Supplementary Service Data (USSD):-** This service was developed by the NPCI to overcome the problem of internet connectivity especially in rural areas. “Banking customers can avail this service by dialing \*99#, a [common number across all Telecom Service Providers (TSPs)] on their mobile phone and transact through an interactive menu displayed on the mobile screen”<sup>7</sup>. \*99# service also known as the National Unified USSD platform (NUUP). This mode of digital payment can be used to check account balance, transfer money and generate account statements.
- v. Aadhar Payment Bridge System (APBS):-** This electronic payment mode is based on Aadhar number and works as per NPCI mapper. “NPCI mapper is the repository of Aadhar numbers along with Institute Identification Number (IIN) of the bank to which customer has seeded his/her Aadhar number”<sup>8</sup>. Government Departments and Agencies used the APB system to transfer benefits/subsidies electronically to the intended beneficiaries in their Aadhaar enabled bank account.
- vi. Aadhar Enabled Payment System (AePS):-** It is an initiative of National Payment Corporation of India (NPCI) to promote cashless transactions. This mode of digital payment enables Aadhar card holders to make financial transactions through their Aadhar linked bank account. In this mode users can do digital transactions by providing an Aadhar number and biometric information at point of sale (PoS) and micro ATMs. AePS enables users to perform financial transactions like balance enquiry, deposit & withdrawal of cash, Aadhar to Aadhar payment and mini statement.
- vii. Prepaid Payment Instruments (PPIs):-** “PPIs are instruments that facilitate purchase of goods and services, conduct of financial services, enable remittance facilities, etc., against the value stored therein”<sup>9</sup>. Banks as well as non-banking institutes can issue prepaid payment instruments after receiving authorization from the Reserve Bank of India. PPIs include mobile wallets, payment wallets, prepaid smart cards, paper vouchers, metro cards etc. As per the master guidelines issued by the RBI in August, 2021, there are three types of PPIs, closed-system, small PPIs and full-KYC PPIs. Issuers required getting approval from the RBI before issuing small PPIs and full-KYC PPIs.

**1.3 Paper Based Payment Instruments:-** This system includes the transfer of funds by using instruments Cheques, Drafts, Bankers Cheques and Payment orders. “Use of paper-based instruments accounts for nearly 60% of the volume of total non-cash transactions in the country and in value terms, the share is presently around 11%”<sup>10</sup>. As digital fund transfer modes are gaining popularity due to the efforts of Reserve Bank of India and Govt. of India, the share of paper base instruments is decreasing day by day.

<sup>7</sup> <http://cashlessindia.gov.in/ussd.html>

<sup>8</sup> <https://www.npci.org.in/what-we-do/nach/faqs/banks>

<sup>9</sup> <https://rbi.org.in/Scripts/FAQView.aspx?Id=126>

<sup>10</sup> [https://www.rbi.org.in/scripts/PaymentSystems\\_UM.aspx](https://www.rbi.org.in/scripts/PaymentSystems_UM.aspx)



## 2. REVIEW OF LITERATURE

**Pradipta (2021)** has examined types of digital payments and challenges of the digital payment system in India. He used both primary & secondary data and the data was collected through direct as well as indirect methods. It was concluded in the study that growth of digital payments depends on various factors like smartphone penetration, payment convenience digital wallets and payment banks.

In his research **Dhruvi Bhagat (2020)** examined the effect of the pandemic on adoption of digital payments and factors forced to adopt the digital payments. She collected primary data from the 220 respondents and used descriptive statistics for the explanation. It was found in the study that the pandemic has significantly impacted the digital payment system in India. Hygiene issues, technology advancement and convenience in payment are the other factors which forced consumers to adopt digital payments.

**Sridevi and Chalam (2018)**, investigated and interpreted the value and volume of digital payments modes (RTGS, NEFT, IMPS) in India from November 2016 to February 2018. They also described the drawbacks and benefits of electronic payments. On the basis of analysis they concluded that the value of transactions and the volume of transactions of digital payments differ significantly during the study period.

In his study **Prakash M (2022)**, had analyzed consumer's perception about digital payments. He also examined the impact of demonetization on the digital payment system and the most preferred mode of digital payment by the consumers. He used both primary and secondary data. It was found in the study that demonetization positively impacted the digital payments system and UPI was the most preferred mode of payment during the study period. It was suggested that RBI should monitor private payments channels strictly.

**Bezhovski (2016)**, examined the factors affecting consumer preference to adopt mobile payment methods and evaluate the growth of digital payment systems globally. It was revealed in the study that consumers are increasing using mobile payments methods for their on-site purchases as well as online purchases. Consumers are significantly shifting from traditional methods of payments to digital payment methods. He concluded in the research that the mobile payment industry has a bright future.

## 3. RESEARCH OBJECTIVES

The prime objective of the study is to examine various electronic retail payment modes in India in terms of value and volume of the transactions. The study will also throw light on the impact of UPI on the overall retail payment system during the research period.

#### 4. RESEARCH METHODOLOGY

The present study is based on secondary data and the data related to the retail payment system has been collected from the website of Reserve Bank of India. Other information related to the study is also gathered from the websites of National Payment Corporation of India (NPCI), Ministry of Electronics & Information Technology (MeitY), various journals and newspapers. The study period is from 2016-17 to 2022-23. The data has been analyzed by using descriptive statistics, graphs and percentage.

#### 5. DATA ANALYSIS AND INTERPRETATION

**5.1. Value and Volume of RTGS and Total Retail Payments:** The following table shows the percentage of value & volume of RTGS and Total Retail Payment transaction during the study period.

**Table 1:- Percentage of Volume and Value of RTGS and Retail Payments**

Year	Volume		Value	
	RTGS	Total Retail Payments	RTGS	Total Retail Payments
2016-17	0.99	99.01	81.69	18.31
2017-18	0.79	99.21	80.40	19.60
2018-19	0.56	99.44	78.91	21.09
2019-20	0.43	99.57	77.24	22.76
2020-21	0.36	99.64	71.79	28.21
2021-22	0.29	99.71	71.06	28.94
2022-23	0.21	99.79	69.47	30.53
Mean	0.52	99.48	75.79	24.21

*Source: Calculated on the basis data extracted from www.rbi.org.in*

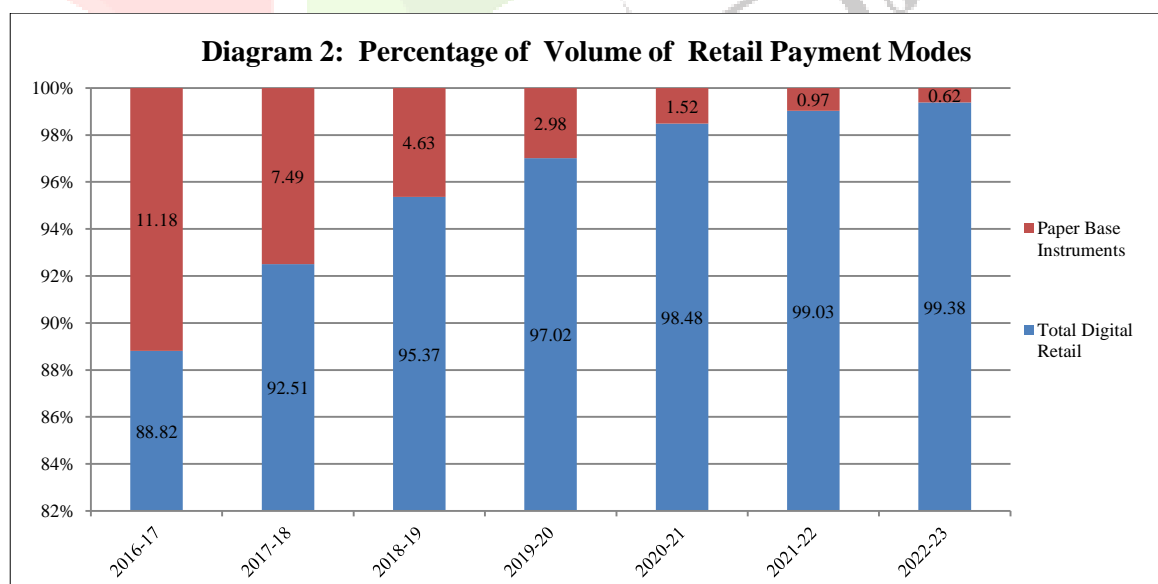
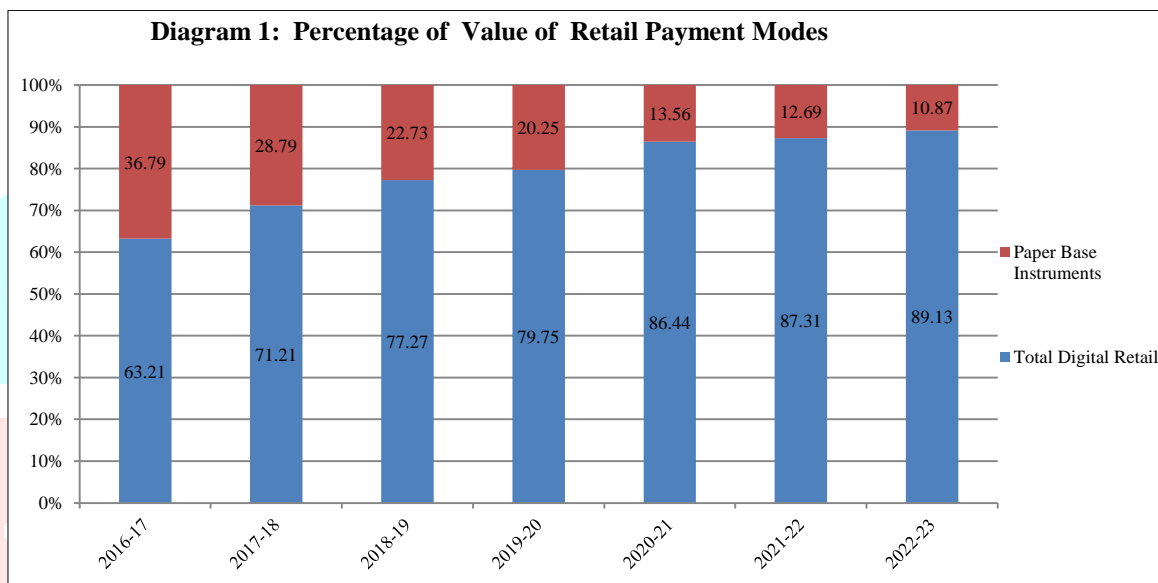
It is clear from the above table that both value and volume of retail payments is increasing day by day. In the year 2016-17 value of retail payment was 18.31 % and it increased to 30.53 % in the year 2022-23, whereas RTGS transactions value decreased from 81.69 % in the year 2016-17 to 69.47 % in the year 2022-23. In terms of volume of transactions, retail payments average volume is 99.48 % during the study period.

**5.2. Value of Retail Payment Modes:** - Total retail payment transactions are classified into categories, first Paper Base Instruments and second Digital Mode of retail payments. The following table shows the total transaction value & percentage of paper base and digital retail payment modes during the study period.

**Table 2: Value of Paper Base and Total Digital Retail Transactions**

Year	Paper Base Instruments				Total Digital Retail			
	Value		Volume		Value		Volume	
	₹ in Crores	%	Number In Lakhs	%	₹ in Crores	%	Number In Lakhs	%
2016-17	8095815.00	36.79	12066.91	11.18	13909349.88	63.21	95833.81	88.82
2017-18	8193492.80	28.79	11713.15	7.49	20265833.23	71.21	144657.26	92.51
2018-19	8246064.90	22.73	11237.61	4.63	28025238.65	77.27	231235.58	95.37
2019-20	7824821.80	20.25	10414.19	2.98	30812206.35	79.75	338648.85	97.02
2020-21	5627107.60	13.56	6703.70	1.52	35858639.64	86.44	435476.55	98.48
2021-22	6650332.60	12.69	6999.12	0.97	45743716.45	87.31	717689.91	99.03
2022-23	7162537.10	10.87	7087.81	0.62	58740711.56	89.13	1137037.12	99.38

Source: www.rbi.org.in



It can be depicted from the table number - 2 , diagram-1 and diagram -2 that both value and volume of Paper Base Instruments (PBIs) had decreased during the study period whereas Total Digital Retail (TDR) value and volume both increased. PBIs value was 36.79 % (₹ 8095815 Crores) in the year 2016-17 that decreased to 10.87 % in the year 2022-23, similarly volume of PBIs reduced to only 0.62 % from 11.18%



during the study period. On the other hand, use of digital mode in retail payment has increased from 63.21 % to 89.13 % in terms of value of transactions during the analysis period and volume of digital transactions also increased from 88.82 % to 99.38 %.

**5.3. Value of Digital Retail Payment Modes:-**There are various modes of digital retail payments. The tables and diagram mentioned below describe the detail of value of digital retail payments modes during the analysis period.

**Table 3: Value of Digital Retail Payment Modes (₹ in Crores)**

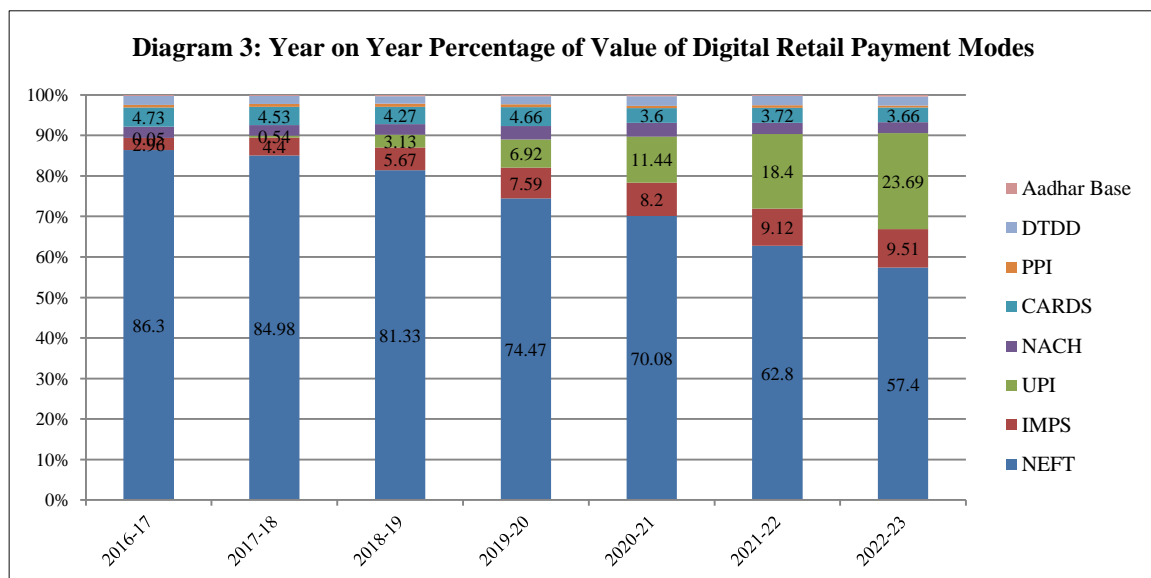
Year	NEFT	IMPS	UPI	NACH	CARDS	PPI	DTDD	Aadhar Base
2016-17	12003967.74	411105.86	6960.87	387073.70	658288.51	83801.08	308854.76	34889.09
2017-18	17222851.97	892497.48	109832.34	521000.54	919034.59	141634.21	390869.12	56248.59
2018-19	22793608.09	1590256.86	876970.72	729672.70	1196888.00	213323.34	524556.37	86727.23
2019-20	22945579.96	2337540.87	2131730.13	1037079.34	1434813.39	214860.44	605939.39	99517.25
2020-21	25130909.59	2941499.52	4103657.83	1216534.71	1291798.63	197095.27	865520.10	111623.98
2021-22	28725462.79	4171037.47	8415899.88	1281685.43	1701850.94	279416.42	1034443.54	133919.98
2022-23	33719541.06	5585441.14	13914931.61	1544341.87	2152015.51	287111.14	1289392.87	247936.36

Source: www.rbi.org.in

**Table 4: Year on Year Percentage of Value of Digital Retail Payment Modes**

Year	NEFT	IMPS	UPI	NACH	CARDS	PPI	DTDD	Aadhar Base
2016-17	86.30	2.96	0.05	2.78	4.73	0.60	2.22	0.25
2017-18	84.98	4.40	0.54	2.57	4.53	0.70	1.93	0.28
2018-19	81.33	5.67	3.13	2.60	4.27	0.76	1.87	0.31
2019-20	74.47	7.59	6.92	3.37	4.66	0.70	1.97	0.32
2020-21	70.08	8.20	11.44	3.39	3.60	0.55	2.41	0.31
2021-22	62.80	9.12	18.40	2.80	3.72	0.61	2.26	0.29
2022-23	57.40	9.51	23.69	2.63	3.66	0.49	2.20	0.42

Source: Calculated on the basis data extracted from www.rbi.org.in



It can be observed from the table number - 3 & 4 and diagram-3 that NEFT is the most used mode (86.30 %) of digital retail payment in terms of value in the year 2016-17 , Cards - Debit & Credit (4.73 %) was second preferred mode , third place occupied by mode IMPS and the least used mode of payment was Aadhar base. But after introduction of UPI as a mode of digital payment in 2016, the situation has changed year by year. In the year 2022-23, UPI emerged as the second preferred mode of digital retail payments. In this year ₹ 13914931.61 crores were transferred using UPI and UPI transaction value increased from .05 % in the year 2016-16 to 23.69 % in the year 2022-23. NEFT transaction value reduced to 57.40 % from 86.30 % in the period of analysis. Use of IMPS as mode of retail payments also increased from 2.69 % in the year 2016-17 to 9.51% in the year 2022-23. Debit and Credit cards use also noticed a decreasing trend.

**5.4. Volume of Retail Digital Payment Modes:** - Volume refers to the number of transactions of a particular mode was done in a year. Tables mentioned below show the number of retail digital transaction modes during the study period.

**Table 5: Volume of Digital Retail Payment Modes (Number in Lakhs)**

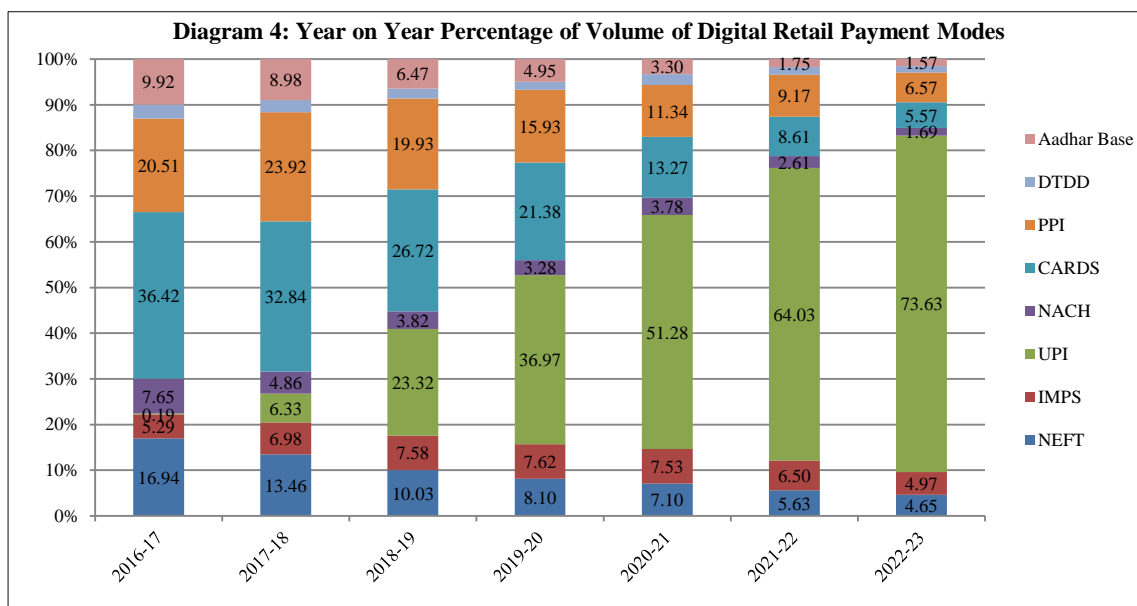
Year	NEFT	IMPS	UPI	NACH	CARDS	PPI	DTDD	Aadhar Base
2016-17	16220.96	5067.31	179.74	7319.09	34864.36	19636.55	2952.36	9492.42
2017-18	19463.57	10098.36	9152.38	7030.86	47485.52	34590.46	3788.11	12986.65
2018-19	23188.87	17529.06	53915.03	8834.38	61768.71	46072.29	4913.85	14959.82
2019-20	27444.68	25791.70	125186.19	11099.86	72383.55	53940.98	6027.01	16756.61
2020-21	30927.89	32783.47	223306.64	16465.44	57786.60	49365.67	10456.54	14384.30
2021-22	40407.29	46625.25	459561.30	18757.82	61782.93	65782.75	12189.49	12583.09
2022-23	52847.43	56532.64	837143.73	19267.00	63331.67	74667.44	15343.22	17903.99

Source: www.rbi.org.in

**Table 6: Year on Year Percentage of Volume of Digital Retail Payment Modes**

Year	NEFT	IMPS	UPI	NACH	CARDS	PPI	DTDD	Aadhar Base
2016-17	16.94	5.29	0.19	7.65	36.42	20.51	3.08	9.92
2017-18	13.46	6.98	6.33	4.86	32.84	23.92	2.62	8.98
2018-19	10.03	7.58	23.32	3.82	26.72	19.93	2.13	6.47
2019-20	8.10	7.62	36.97	3.28	21.38	15.93	1.78	4.95
2020-21	7.10	7.53	51.28	3.78	13.27	11.34	2.40	3.30
2021-22	5.63	6.50	64.03	2.61	8.61	9.17	1.70	1.75
2022-23	4.65	4.97	73.63	1.69	5.57	6.57	1.35	1.57

Source: Calculated on the basis data extracted from www.rbi.org.in



It was analyzed from the table number -5 & 6 and diagram-4 that in terms of volume Cards (Debit & Credit) was the most used (36.42%) mode of digital retail payments in the year 2016-17, as 34864.36 lakhs transactions were made using cards. Prepaid Payment Instruments (PPIs) use was 20.51 % at second place, third place occupied by NEFT- 16.94 and UPI was the least used mode of payment in the year 2016-17. But during the study period UPI has emerged as most used mode of retail digital payment as 837143.73 lakhs transactions were made by using this mode, its share has increased from 0.19 % in the year 2016-17 to 73.63 % in the year 2022-23. Use of cards reduced to 36.42 % to 5.57 % and PPIs from 20.52 % to 6.57 % during the analysis period.

## 6. CONCLUSION

Retail Payment system includes two type of mode of payment, Paper Base Instruments (PPIs) and Digital mode of transferring money from one person to another person. As technology is upgrading and accessibility of internet, use of digital modes for retail transactions has increased during the study period. In terms of volume total digital transactions has increased to 99.38 % from 88.82 % in the research period whereas Paper Base Instruments (PBI) use declined both in term of value and volume.

In Retail Digital Payment modes, in term of value NEFT occupied the first place in-spite of it use reduced from 86.30 % to 57.40 % during the research period. Unified Payments Interface (UPI) has emerged the most used mode of digital retail payment in terms of value and volume. UPI occupied first place with 73.63 % transaction volume in the year 2022-23 and the used of other retail digital payment modes had decreased during the study period.

## 7. LIMITATION

Only seven years period has been taken for the study, result may different if period will be extended. Primary data can be used to conduct the further research.

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