Digital Payment In India: A Study on Digital Transformation & Advancement in Digital payments with reference to various Banking Payment Methods

Niranjan H N*
Charles Ambrose A**

Abstract

India goes towards a cashless economy with the govt. launching a Digital India campaign to scale back the dependency of the Indian economy on cash and forestall concealing. to form a cashless India and increasing trends in using digital payment systems various payment methods are coming to trend and developing. The Indian digital payment sector has seen ascension in recent years, with the number of transactions increasing at a mean CAGR of 23% ("Transactions 2025," 2019)Growth in digital payments has led to the introduction of recent digital payment modes. Since the launch of UPI in 2016, we've got seen an exponential CAGR of 414% until 2019-2020 has become the foremost preferred mode of payment. Person to Merchant(P2M) has 40% of total UPI transactions. we discussed The new outcomes of digitalization within the financial sector Moving from cash to a cashless economy, Enhancing daily customer activities, Making transactions transparent with the govt., and Attaining global leadership with digital transactions. We analysed the relationship between dependent and independent variables using the Correlation test & we have used descriptive statistics in this study. In conclusion, We expect that UPI transactions to grow by × by 2025. except for UPI, BBPS & NETC have also seen growth at the same rate. BBPS & NETC are growing @ a CAGR of 500% & 123% respectively. (PwC India, 2020a).

Key words: Cashless Economy, Cashless India, Digital India, Future of digital payments.

Introduction

India has moved from credit cards to one-click payments, and we have made a major advancement in how payments are worn out in the past few years. there have been days after we want to carry cash on every occasion in our wallet but now the time has changed a transportable with UPI linked account can do everything adequate to the cash that's how we moved from physical wallet to digital wallet. A cashless Economy describes a state where the transactions don't seem to be conducted using physical notes or coins rather it's done through digital currency and digital payment. Digitalization is a very important part of an economy that strengthens the financial sector of the developing country with changing modern age technology it helps to fight the competition of the developing country. the normal banking industry is getting replaced with digital baking. the normal baking system uses the letter of credit, cheques & passbook, etc… now this can be replaced by internet banking facilities like E-Statemen, IMPS, NEFT & UPI, etc… AI(Artificial Intelligence) and ML(Machine Learning) have replaced the payment framework in 2022 they detect fraudulent transactions in seconds. AI is additionally developing a Voice-activated payment framework to avoid false transactions during this way AI could be a real game-changer within the Payment industry. Blockchain technology is the next new normal in relevancy millennial investors as they're in digital currency blockchain plays an important role because of the digital international ledger. Bio-metric authentication, buy now pay later, card tokenization, and wearable payment devices like NFC tags integrated with their wearables like wristbands, smartwatches, smart rings, or tap & go this is often a superb thanks to secure and error-free payments.

Evolution of Digital payment

Stage-1: The pre-intent era

The pre-card era was a time when people would use cash, debit cards, and credit cards as their primary means of making purchases. This was the state before

* PG Student, School of Business, St. Joseph's College (Autonomous), Bangalore. https://orcid.org/ 0000-0002-7593-3054
E-mail: nirunj456@gmail.com

** Assistant Professor, School of Business, St Joseph's College, Bengaluru. https://orcid.org/ 0000-0001-7223-1690
E-mail: charlez.ambrose@gmail.com

the introduction of the internet and the birth of online banking. It was a time when people would go to the bank, use their debit cards to withdraw money, and use their credit cards to make purchases. It was a time when the use of cash was limited and its use in day-to-day transactions was not necessary. The period of the pre-internet era is 1980 when credit cards were introduced in association with Master & Visa card companies.

Stage-2: The Internet Era

The Internet Era is a new era of technology in which the internet is the primary means for accessing information. It has changed the way we communicate with each other, do business, and learn. The first internet was started in India by the government-owned telephone company VSNL Ltd in 1995. It was a large-scale project that changed the way people accessed information.

Stage-3: Pay U Payments

PayUPayments in India was launched in 2011, and after this, we saw an excellent change in the number of day-to-day transactions in online mode payments.

Stage-4: UPI

The real game-changer in Indian digitalization was the introduction of UPI payments that was in 2016 by (the National Payments Corporation of India). UPI got popular among common people within a short period. Seeing the popularity of the UPI the payment gateways started to add UPI in their payment options, for an instance PAYUPAYMENTS without UPI flourished that's how popular UPI was due to its easy way to make payments and was affordable to all people with limited knowledge.

Digital Payment modes in India:

- Banking cards: They are used to make purchases in stores and online and can be used to withdraw cash from an ATM. Banking card are safer and more convenient than cash and can be used on a variety of devices, such as computers or smartphones. Bank cards can be used without internet access, but most people use them to access their bank accounts, which require the internet with two-step authentication one is a security pin, and another is OTP to a registered mobile number this makes transactions more secured and easier for your transactions. Card companies: Rupay, Visa, Mastercard, etc… This card can be used for various purposes like online payment, cash withdrawals, merchants' payments, shopping, loans & other banking facilities.
- USSD(*99#): Unstructured Supplementary Service Data is an innovative payment service that was started with the motive to make banking available to every common man in the country. This service doesn't require any internet connection for its transaction which can be done even from a basic feature phone just by dialing *99#.
- Aadhaar Enabled Payment System (AEPS) Aadhaar Enabled Payment System (AEPS) is an Aadhar Enabled Financial Innovation (AEFI) initiative by the Government of India to provide a Digital ID.
- UPI: Unified Payments Interface(UPI) is a system that allows user to connect their various bank accounts into one mobile app which helps to make payments from one bank to another seamlessly in an easy way it also allows you to make payments to any of your contact with UPI linked bank account without any bank details just by entering their mobile number.
    - o Mobile wallets: It is a form of carrying digital cash in your mobile wallet. You can link your card)information on your mobile device to a mobile wallet app to make payments without using the payment card. Ex: Paytm, & Yono app, etc…
- Bank Pre-Paid Cards is a system where you spend money that is pre-loaded to your prepaid card on a bank account. This means you can withdraw more than the limit in your bank account. Bank will charge certain fees and cost-covering overdrafts based on the amount over-drafted by the account holder.
- Point of sale: is the place where sales are made. a PoS could also be a mall, a market, or a city. On a micro level, retailers consider a PoS to be the world where a customer completes a transaction, like a counter. it's also called a degree of purchase.
- Internet Banking: is the most widely used banking system it's also known as E-Banking and online banking. Here you get one unified portal(Website) of your bank which acts as a virtual bank. It has almost all the functions that a physical bank does it can include transferring money, Bank-Statements, Balance inquiries, Credit card Payment & Many more Etc….
- NEFT: National Electronic Fund Transfer(NEFT) It's a payment model where you transfer money from one bank to another bank through electronic(Internet) means by entering the bank details of the receiver account, Details include Account Holder name, A/C Number, IFSC code & Phone number(Which is optional) NEFT can transfer up to 2Lakhs per day this facility can be availed only during the bank working days.

- RTGS: is the settlement of funds transfers individually on an order-by-order basis. 'Real Time' means the processing of instructions at the time they're received at a later time. Considering that the fund's settlement takes place within the books of the Federal Reserve Bank of India, the payments are final and irrevocable. Transferring an oversized amount of RTGS is employed. Customers can send a minimum of two lakh and also the maximum doesn't have any limit. RTGS can use during banking hours.
- ECS: Electronic Clearing System is an alternative payment model used for making payments of electricity bills, utility bills, insurance premiums, Telephone bills & Card Payments, etc.
- IMPS: Immediate Payment Service provides an immediate 24X365, interbank E- fund transfer service electronically. IMPS is a method to transfer money quickly across India using electronic applications.
- Mobile banking: Mobile banking is a technology that allows people to access banking information and make payments on their mobile phones while on the move. While some people see mobile banking simply as a means to access banking services that were previously available only at brick-and-mortar branches, mobile banking has opened up many new opportunities and enabled people in need to obtain the financial services they need.
- Micro ATM: Micro ATMs are card swipe machines through which banks can remotely hook up with their core banking industry. This machine comes with a fingerprint scanner attached thereto. In other words, micro ATMs are the handheld point of sale terminals accustomed to disbursing and take advantage of remote locations that bank branches cannot reach.

NETC: The National Electronic Toll Collection: is a system that has had a visible regular increase in a previous couple of years. Recent mandates with the aid of using the govt.. of India have positioned NETC on an exponential increase trajectory. Currently, NETC covers 390+ country-wide toll motorway plazas and seven nation toll plazas. We trust those numbers will develop in the coming years. Further, with the emergence of the various new use instances and a prolonged Government enhance the use of FASTAGs at tolls, we count on as many as 12 instances of increase in NETC transaction volumes with the aid of using 2025. NETC has proven its increase in 2021 that's due to the fact the govt. of India has made it compulsory to apply fast-Tag.

Review of Literature

Aggarwal et al., 2021, The study evaluates India's technological advancement, which has created a range of opportunities for consumers to enter the digital payment space. Demonetization in India has forced all consumers and corporations to embrace and build cashless digital payment platforms. The cashless economy scenario involves various factors for its adoption like reach, availability, and awareness.

Chandrakala, 2019, A digital transaction acquires better straightforwardness, versatility, and responsibility. This paper focuses on the concept of a cashless economy, its pros & cons, and know the modes of cashless transactions. Digital India can be the number one program of the govt. of India with a vision to convert India into a digitally authorized society and knowledge economy. "Faceless, Paperless, Cashless" is one of the declared rules of digital India. Cashless economies, as the name suggests, are people who run frequently on plastic or digital money.

Suma & Hema Divya, 2018, The demonetization brought about enormous development in digital payments. Government drives like Digital India and expanded utilization of smartphones and the internet are means to dramatic development inside the use of digital payments. This change toward digital payment benefits in extra growth in exchanges which enables the nation's economy. the objective of this exploration paper is to test the positive effect that Digitization on the payment system. This paper centers around the examination of the adoption level of these digital payment frameworks by customers information were gathered from 183 respondents in Hyderabad. The gathered information through the survey was examined measurably by utilizing the chi-square method.

Sahayaselvi, 2017, Information Technology (IT) has revolutionized various aspects of our lives; particularly it's provided a straightforward because of going for digital payments. During the Demonetization period, the government of India forced the people directly or indirectly to undertake any or all commercial transactions via Digital mode. people began to a makeover from traditional payment systems toward Digital Payments systems which ensured safe, security, and convenience.

Research Objectives

1. To know the percentage of digital payment or internet bankers in India
2. To know how popular UPI payments are in India
3. To know the factors that defray people to use Digital payments

Research Methodology

This study includes secondary data and it is a conceptual research paper on the digital payment system of India. This research is explanatory research that explains in detail the modes of digital payments.

The variables involved in the study are Dependent Variable: Digital Payment and Independent variables: Smartphone Users, Population Raise & Internet Users. It provides the background and context of the digital payment phenomenon and the current status quo of digital payments. It also discusses the various digital payment modes, their advantages and disadvantages, and the factors that influence consumers' digital payment behavior. This research is appropriate for consumers who are considering making a digital payment, as well as those who are interested in the digital payments industry. We have used the graphical representation tool Column Charts over the entire research paper. Excel 365 V.2102 for the analysis of data and tests conducted are Correlation test and descriptive statistics.

Analysis & Data Interpretation

Table 1: UPI in India for the period of 2016-2021

Year	No. Of Banks Live On UPI	Volume(Cr)	YOY Change Value(In Cr)
2021	274	341780	29446930
2020	207	188810	15511070
2019	144	107880	12509280
2018	134	37460	5286900
2017	71	4190	561280
2016	36	300	

Table 2: Descriptive statistic of UPI in India for the period of 2016- 2021

No bank UPI Live	Results	Volume of transactions	Results	YOY changes	In Millions
Mean	144.333333	Mean	113358	Mean	12663092
Median	139	Median	72670	Median	12509280
Standard Deviation	87.1336139	Standard Deviation	132982	Standard Deviation	11075806
Range	238	Range	341750	Range	28885650
Minimum	36	Minimum	300	Minimum	561280
Maximum	274	Maximum	341780	Maximum	29446930
Sum	866	Sum	680150	Sum	63315460
Largest(1)	274	Largest(1)	341780	Largest(1)	29446930
Smallest(1)	36	Smallest(1)	30	Smallest(1)	561280
Confidence Level(95.0%)	91.4411198	Confidence Level(95.0%)	139556	Confidence Level(95.0%)	13752430

The above table(ii) gives a descriptive statistic of UPI in India for the period of 2016- 2021. As we observe in the above table no (i) the UPI in India was started in 2016 with 36 banks operating live on UPI this number started to grow at a faster rate where just in 5years of time there are 274 by 2021. As per the latest data from NPCI(National payments corporations of India), 323 banks are live on UPI as of May 2022 (UPI product statistics: NPCI - National Payments Corporation of India. NPCI. (2022, May 22). Table (ii) shows that the maximum number of banks as of 2021 was 274 and latest by 2022 323 banks are offering UPI. When we look in terms of the volume of transactions in 2016 it was ₹ 300 Million in 2021 it changed to ₹ 341780 Million as per Table (ii) the maximum YOY change is reported to be ₹29446930 million by 2021 that's a high growth rate to be highlighted.

Table 3: Comparison statistics of the Mobile phone user and UPI transactions year-wise from 2016 to 2021

year	Mobile users (Mn)	UPI transaction(Mn)
2016	304.51	30
2017	394.82	4190
2018	479.34	37460
2019	634.58	107880
2020	748.3	188810
2021	844.84	341780

Source: Sun, S. (2021, September 3). Number of smartphone users in India 2015-2022. Statista.

Table 4: Correlations result

Variables	Smartphone users (Mn)	UPI transaction (Mn)
Smart phone users (Mn)	1	0.94
UPI transaction(Mn)	0.94	1

Table (iii) gives us the comparison statistics of the Mobile phone user and UPI transactions year-wise from 2016 to 2021 keeping this as a source of database we have done a correlation test to find the relationship between the independent variable smartphone users and UPI transactions and we got the correlation (r) r= 0.94 (table iv)

r =0.94 indicates a very strong correlation relationship between the variables that increase in UPI transaction is dependent on an increase in the smartphone user in India.

Table 5: Correlation Test for Internet users & UPI transaction

year	users of internet	UPI Transaction
2016	342.65	30
2017	422.2	4190
2018	493.96	37460
2019	636.73	107880
2020	749.07	188810
2021	845.68	341780

Table 6: Correlation Test result

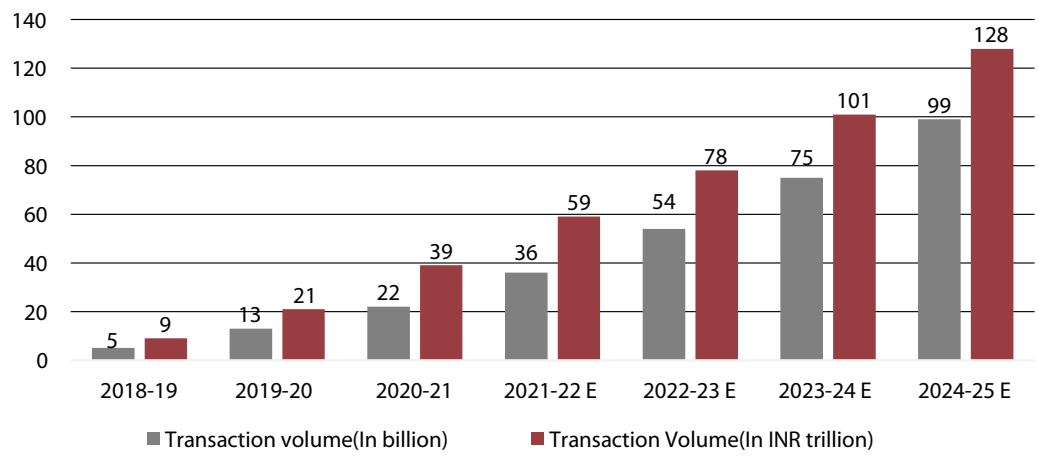
Vriables	internet users	UPI Transaction
internet users	1	0.95
UPI Transaction	0.95	1

r=0.925

Source: Sun, S. (2021, September 3). A number of smartphone users in India 2015-2022. Statista.

As we can analyze the table(vi) shows a **very strong correlation** between Internet users & UPI transactions with an **R-value of 0.95.** So, an increase in the UPI transaction is caused by the increase in internet users they both are interrelated they go hand in hand

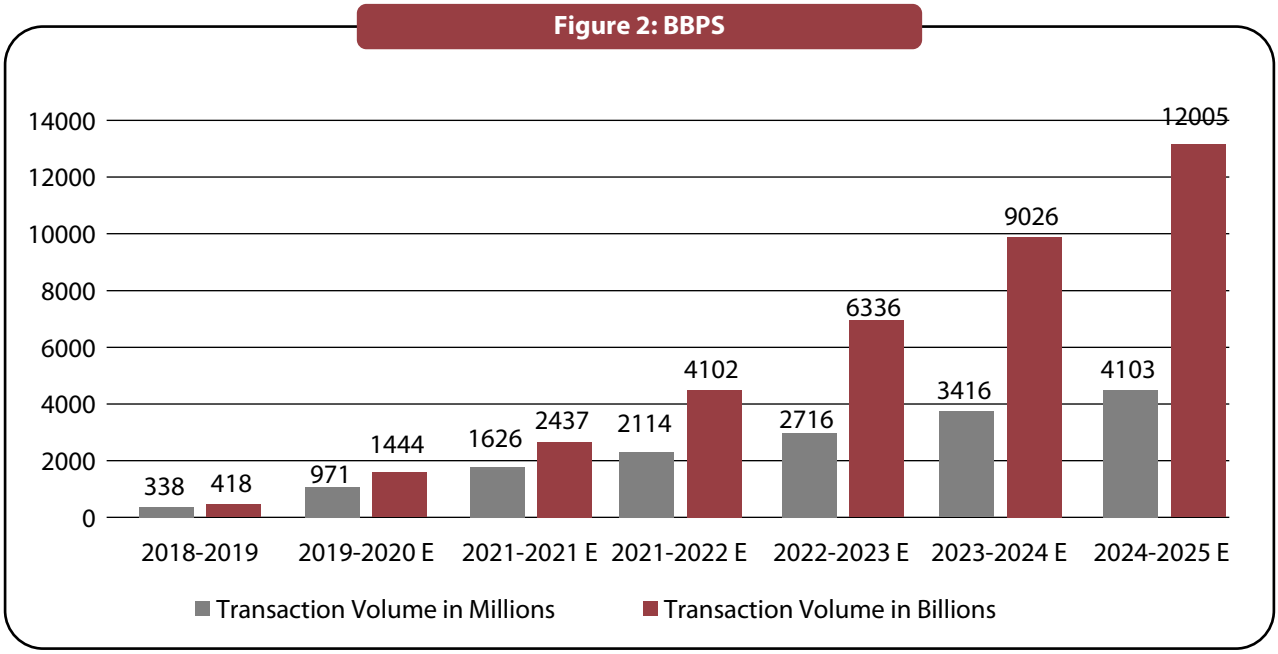
Figure 1: UPI transactions



Source: RBI Data & The Indian Payments Handbook – 2020–2025 - PWC. (2020).

	UPI Cases	Digital Payment Growth
1.	More than 20 million Offline Merchants.	The user base by 2022 will be 300Mn
2.	Applications Supported by Blocked Amount(ASBA)	UPI stands as the second-highest payment method used in India.
3.	Autopay	UPI stands as a competitor for e-wallets for Person to Merchant payments
4.	UPI attached for FASTAGs	NPCI is looking to spread UPI to International Market

Figure 2: BBPS



Source RBI Data & The Indian Payments Handbook – 2020–2025 - PWC. (2020).

UPI(Unified Payment Interface) UPI was launched in 2016 it has shown significant growth at a Compounded Annual Growth Rate(CAGR) of 414%. The growth in the sector of P2M(Person to Merchant) has been increased in 100% of UPI payments 40% is from P2M transactions. The constant growth point of UPI in India is It has 200Million active users every month that's a huge number and Pwc sources state that UPI is expected to grow 7X times more by 2025. As per the current financial year, 2021-22 UPI had a transaction value worth of ₹83.45lakh Cr. This development is dependent on the penetration of smartphone users and gives us a picture that the Indian economy is ready for the next advancement of UPI payment. ¬¬The other reasons for penetration of UPI are that it is Faster, convenient, quick refunds for failed transactions & compactable with any device.

Figure 2: NETC Transactions

Source: RBI data & estimates By Pwc The Indian Payments Handbook – 2020–2025 - PWC. (2020).

National Electronic Toll collection NETC had a constant growth in the recent period. NETC got aware among the people of India after Govt of India mandated the use of NETC (FASTAGs). It has seen rapid growth in 3years like by 2021 it has 110plus million users of NETC that's through FASTAGs. At present more than 300 National highway plazas and Seven State Toll Plazas have installed NETC. Survey Conducted by NPCI Projected growth 12X by 2025.

Figure 3: BBPS (Bharat Bill Pay System

BBPS is a unified platform that allows customers to get all payments at one application or place. BBPS was founded in 2013 by the National Payment Corporation of India. BBPS integrates all bills and helps in payments of bills across various brokers. BBPS has seen an increase in its transactions during 2019 which was 15.9 million in March 2019. It saw a slight decline post-pandemic when compared to 2019 data.

BBPS has seen growth from the following factors:

- Continues onboarding of billers under existing categories (Water and gas supply)
- Expansion into new biller categories
- Integration with banking and mobile applications.

Bill categories

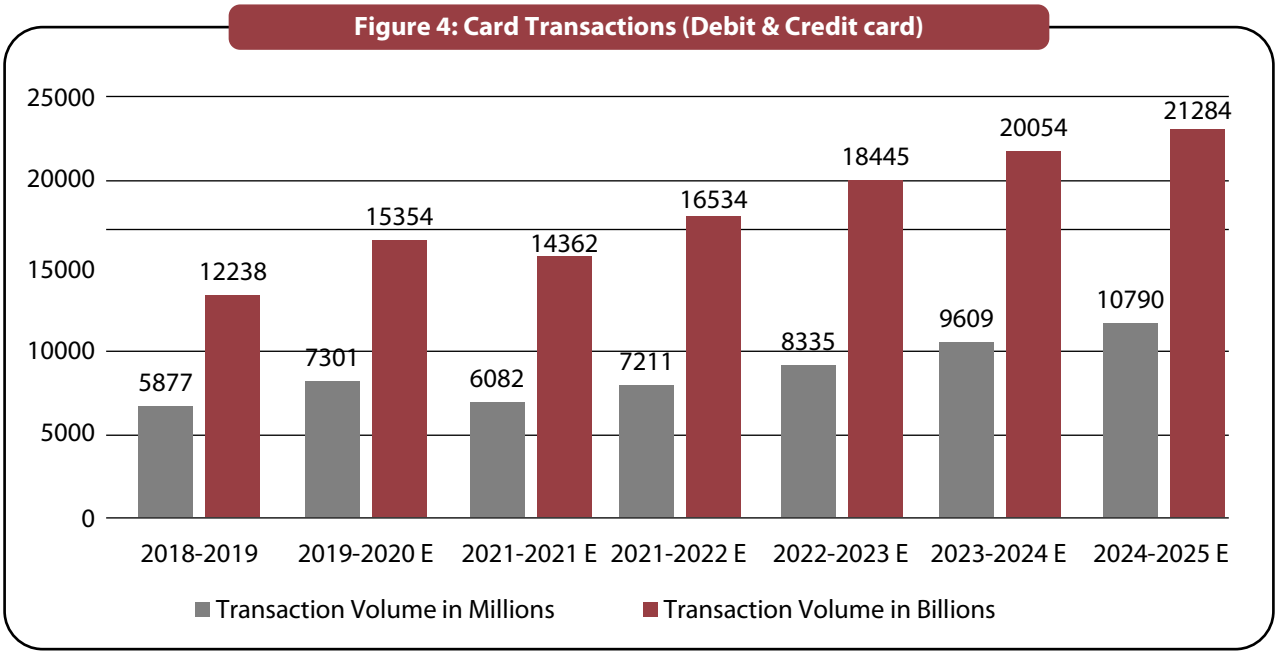
Existing categories	New categories
Direct to Home (DTH)	Life insurance
Electricity bills	Insurance on health
Post-paid Bills	Educational Institutions
Water	Local taxes
Landline bills	Gyms
Piped Gas	

Figure 3: BBPS (Bharat Bill Pay System)

- Transaction Growing@ CAGR of 123%
- 580 Million+ transactions in FY 2019-2020
- 11 Acquiring banks & 27 Issuing banks
- 18 plus million Tags CAGR of 120%

By 2025 new billers' category will contribute 3.1 times the transaction value.

Figure 4: Card Transactions (Debit & Credit card)



Source: The Indian Payments Handbook – 2020–2025 - PWC. (2020).

Figure 5 shows the card transactions

- Debit cards = 852 Million
- Credit cards= 57 Million
- CAGR of Credit card is 22%
- CAGR of Debit Card is 25%

Source: RBI Data Estimates by Pwc

Cards have been the most important medium of payment in the vision of a cashless economy.

PoS Credit cards & debit cards have increased at a compound annual growth rate of 19 and 21% respectively in the last four years. Nearly10Million new cards are added every year since 2016. Due to digitalization, the usage of debit and credit cards is expected to grow in upcoming years. When we observe figure 4.0 we can see the current transaction value of debit and credit cards are 15354Mn and it's estimated to reach 21284Mn by 2025.

Before looking into ATM Transactions let's look into the ATM's Base India currently operating with 2.34 lakhs . ATMs in which 47% were offsite ATMs (As per RBI data).

ATM Transactions have been significantly growing at a compound annual growth rate of 9% in the last 4years. Due to the pandemic, the transaction is reduced during the year 2020-21 but it is estimated to have a recovering growth in the upcoming years which not only helps in the recovery of ATM transactions but also recovering the economy of the country.

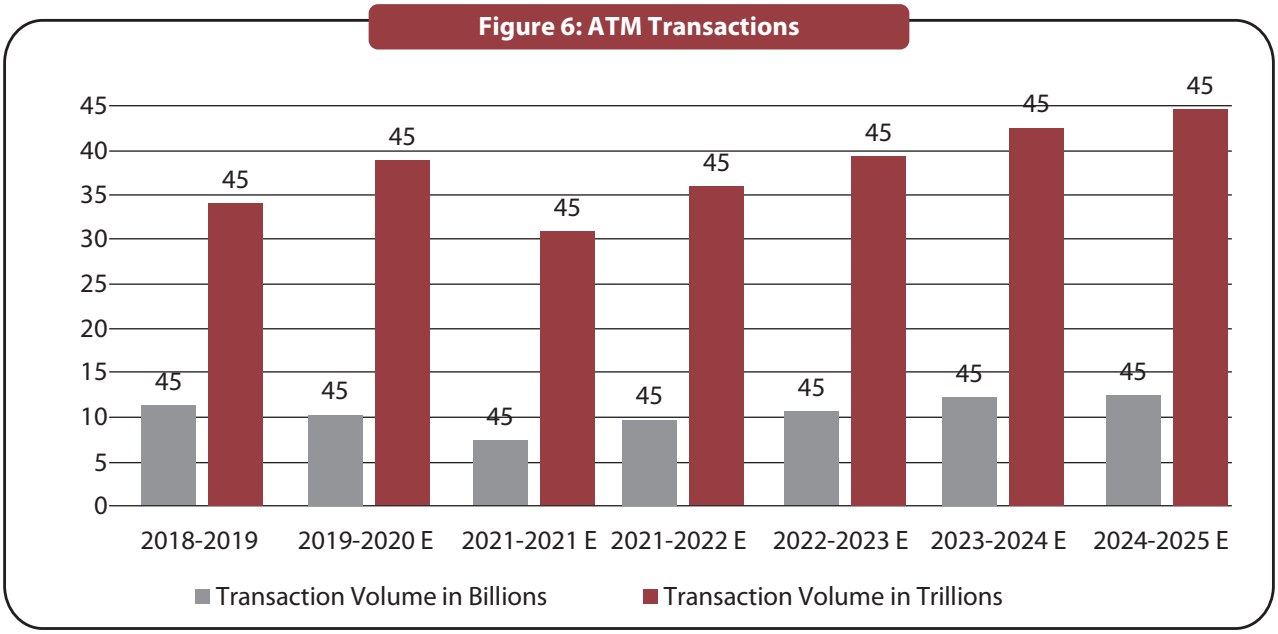
As per the RBI report income from interchange fees earned from financial transactions at ATMs is the

largest contributor to revenue in the ATM business.

As of July 2020, there were 5.08 million PoS merchants in India. A growth of 20% is increased when compared to data of 2019.

ATM has evolved into a new generation of digital transactions in India this SBI has come with Green cards for people of rural areas to deposit cash and withdraw cash. India has now updated with different modes and options in ATM to withdraw cash

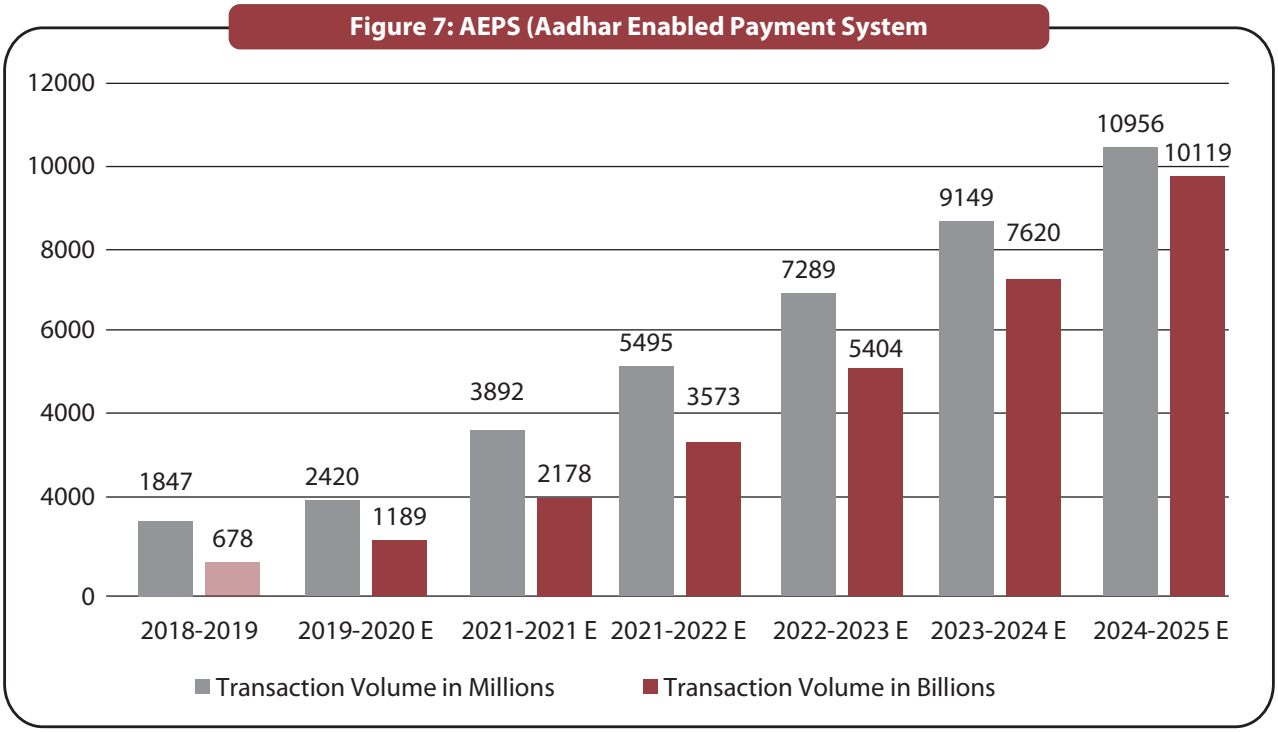
Figure 6: ATM Transactions



Source: RBI Data & Estimates by Pwc The Indian Payments Handbook – 2020–2025 - PWC. (2020).

and many more options like balance inquiry, Debit, and credit card activation, unblocking card and Activation of Net banking so ATM is not just merely for cash withdrawal, but it also works like a mini bank in 2021 digital banking generation.

Figure 7: AEPS (Aadhar Enabled Payment System



Source: RBI Data & Estimates by Pwc The Indian Payments Handbook – 2020–2025 - PWC. (2020).

AePS permit online interoperable transactions at PoS (micro-ATMs) terminals through business correspondents of any bank. AePS was launched to facilitate banking services in unbanked/rural areas and disburse Central and regime entitlements under schemes just like the National Rural Employment Guarantee Act (NREGA), welfare pension, and pension for disabled or senior citizens, using Aadhaar authentication.16 Since its launch in 2016, AePS has grown at a CAGR of 137%. It recorded over 400 million transactions in April and can 2020, because of direct disbursement under the stimulus packages announced by the govt. during the COVID-19 crisis. AePS has gained traction within the market, and we believe its adoption would increase within the approaching years. The figure above shows the expansion of AePS in terms of transaction volume and value over the years, along with expected future growth.

Banking Services Offered by AePS:

Cash withdrawal

Mini statement

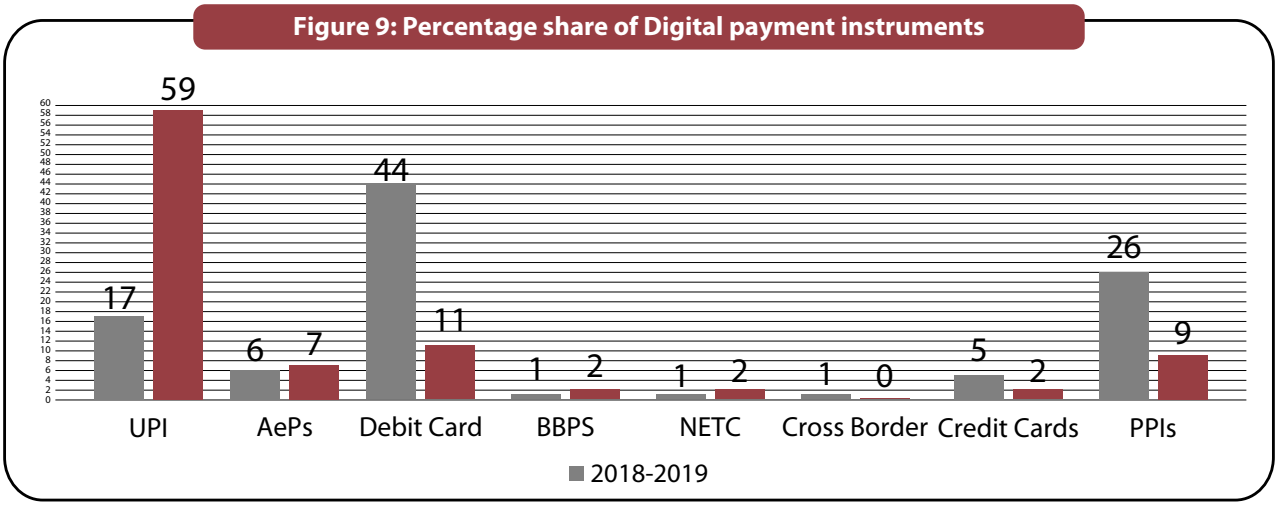
Balance enquiry

BHIM Aadhar pays

Authentication

Cash deposit

Figure 9: Percentage share of Digital payment instruments



Source: RBI Data & Estimates by Pwc The Indian Payments Handbook – 2020–2025 - PWC. (2020).

Conclusion

India is going to be the country with 80% of digitization of payment transactions by 2025, cashless transactions are estimated to be around 80-90% i.e., where hard cash changing hands only once in every five transactions people make by 2025. As per the estimates we saw in this research paper by 2025 India will have a transaction of 238 trillion(INR). The threat of digitalization is security breaches government has to look over securing the digital database, so people feel more secure and trustworthy, so it removes the myth of rural people that they lose money when they transact through a digital mode of payment. Card companies have already taken care of their security issues with two-step authentications(OTP) they have a ticket system where customers can raise a ticket when they found suspicious transactions on their account government also should come up with such plans and security techniques that ensure end-end encryption between customer and bank.

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