Project Report

On

Analysis and Future of various Payment Services and their usage patterns in India

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Submitted by:

Rohit Kumar (17103028)

Naman Gupta (17103053)

Lakshay Mittal (17103104)

Animesh Garg (17103109)

Piyush Sharma (17103110)

Submitted to:

Prof. Anju Singla

ABSTRACT

Transactions are an important part of one's life. There are multiple modes of payment and everyone prefers one over the other depending upon its ease and acceptance and with multiple technological inventions the payment's industry is changing drastically, this is also fuelled by various uncertain events in India like demonetization and Coronavirus pandemic. Demonetization led to birth of UPI (unified payments interface) which may become the largest payment mode in future for retail consumers. This paper attempts to analyze various payment modes, their growth, how Indians will react to them in the future and how the trend is changing from physical money, plastic cards to dematerialization of money and how NFC will come into picture.

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INTRODUCTION

With the advancement of technology and the Internet all over the world, a lot of services have emerged into the market. However, E-Commerce is the most popular of them. Moreover, due to the increase in mobile technology and security, users are able to perform electronic commerce transactions too. Also, in the customary way of payment using cash, cheques etc. a lot of issues were found such as bounced cheques, forged signatures etc. However, a properly planned electronic way of payment will be able to resolve most of the issues related to the customary way of payment. Moreover, the easy and fast transfer and withdrawal of cash using the online services have shifted people from paper currency to plastic currency in the past few years. The advancing technology has led to an increase in the security of these online payment services developing a good amount of trust among the users and hence an extremely large user base.

Inside the payment system, a lot of online payment services have been developed. Some of them are as follows:

1. **CREDIT CARDS:** These were firstly issued by the oil companies, hotels etc., to their customers in 1914. However, the first modern card was introduced by Diner's Club in the 1950s and is called the first modern credit card. Initially it was not widely accepted due to security issues, though the evolution of credit cards into the next 40 years has made it the most popular mode of online transaction. For every card, there is a credit card holder name, a credit card number and an expiry date, providing an authentication of the cardholder. Also, numerous systems have been made by the credit card companies to secure the data of their customers. For example, MasterCard Secure-Code and Verified by Visa.

2. **DEBIT CARDS:** Then after the successful introduction of Credit Cards, the industries came up with another kind of card service, known as the debit card. These are cards that help you make online purchases using money directly from your current account. In some countries, debit cards have a huge customer base, primarily due to their higher level of security and lower costs of use than the credit cards. However, due to their failure in satisfying international customers, they are not used on most of the merchant websites.

3. **MOBILE PAYMENTS:** Consumers believe that payments made through wireless devices like smartphones allow transactions to take place, costing a very little transaction fee while also ensuring increased security. As these methods have become so viable and user-friendly

as well, various businesses have begun the process of collecting the information regarding the purchases made by their customers. Because of the exponential growth as well as downright incursion, the various online payment systems have gone global when compared to other available telecommunication infrastructure. Mobile payments have taken over both the offline and the online markets. Carrying their huge consumer base as a big bonus, mobile phones are attracting a great number of online traders for payment purposes.

4. **MOBILE WALLETS:** According to Doan (2014), "Mobile wallet is formed when your smartphone functions as a leather wallet: it can have digital coupons, digital money (transactions), digital cards, and digital receipts". Users may install various applications for different purposes in their smartphones using their mobile wallets. They can then conduct online and offline transactions using these mobile wallets. Various upcoming and innovative technologies which connect our phones to the external world like NFC(Near Field Communication), QR Codes, Sound Waves etc. would come handy in the near future as they will aid mobile wallets thus offering more convenience and more ease of usage to the customers.

5. **ELECTRONIC CASH:** CyberCash (CC)/DigiCash (DC) were the first electronic cash systems to be proposed in the initial phase of the introduction of the online payment infrastructure. As these payment systems didn't gain much limelight, they eventually disappeared and were dropped. In today's time, smart card systems have come around as a better system and are being used by more and more businesses for paying different amounts. But there is a catch, smart cards depend on card readers and their particular hardware for its use and authentication. Also, a huge number of electronic cash infrastructures have been developed. E-Tokens/Prepaid cards have been disbursed into the ecosystem by these infrastructures, and they can be even bartered for physical money.

If we talk about plastic money, we have the credit and the debit cards. In case of a transaction using cards, let's suppose that you have a Visa Card of ICICI Bank. To make a payment, you will swipe the card on the merchant's machine. Let's suppose that the merchant is having an account in the HDFC Bank and the payment gateway is MasterCard. A payment gateway is basically a link between different financial companies. So here in this case, four parties are involved in the transaction, named the cardholder, the Merchant, the Acquiring Bank(in this case HDFC Bank) and the Issuing Bank(in this case HDFC Bank). When the cardholder swipes the card on the merchant's machine, the merchant sends an authorization request to the HDFC Bank, HDFC Bank sends the same request to the ICICI Bank through the MasterCard payment gateway to check if all the credentials of the card are correct and the customer has enough credit limit to make a transaction. After receiving a response from the Issuing Bank (ICICI Bank) through the Visa payment gateway, the Acquiring Bank sends the response to the merchant and the transaction happens. Also, the

Issuing Bank sends a transaction notification to the cardholder. This is also called the four party model of credit card companies, mainly adopted by Visa and MasterCard. However, American Express and Discover use the three party model for the transaction, in which the issuing and the acquiring bank is the same.

The Indian economy faced a huge economic crisis in 1991 forced India to introduce liberalization policies which ultimately allowed the entry of private banks such as ICICI Bank, HSBC Bank, HDFC Bank etc. inside the nation. Then the entry of these foreign banks in India also introduced the nation with plastic money, with HSBC being the first bank to establish an ATM in India in 1987. The credit and debit cards merely took a decade to gain popularity in the nation and were widely accepted.

Initially, these cards were magnetic strip cards also known as strip cards. It contained a magnetic strip on the back of the card, and the transaction was made using a magnetic stripe reader. However, there was a big problem in these cards. People were able to steal the credit card information from the magnetic strip. This problem was solved by the chip cards further introduced worldwide. The chip cards were comparatively faster and more secure than the magnetic strip cards.

NFC enabled Cards

Then the technology advanced more, ICICI and SBI were the first to introduce contactless credit cards in India, working on the technology of Near Field Communication (NFC), which is basically execution of payment without a physical contact. In this case we are having a card and a card reader, both of them NFC enabled. The card reader is able to read the card from a proximity of 5-10 cm, and wireless data transfer between the card and the card reader happens, that too without internet. The cardholder name, card number, expiry date and the CVV gets transferred and the transaction takes place. This provides extremely fast payments and is now adopted by various other credit cards by Citibank, HDFC Bank, SBI, American Express (India) etc.

Then, if we talk about the online payment options, such as Mobile Wallets and the UPI, there was a need for an easy and more comfortable inter-banks transaction system inside India. Firstly came the digital wallets such as PayTM and MobiKwik, followed by the UPI in 2016. Also, the Indian government bringing demonetization into the picture along with different schemes to make the nation a cashless economy, the process of doing the payment using the online modes picked up pace. Moreover, as the mobile wallets required multiple channels than the UPI where there was an Immediate Payment Service and peer-to-peer transaction, the UPI gained more popularity in India. Also, the use of UPI was also backed by introducing the BHIM app, which was introduced by the Prime Minister of India in April 2016, supporting his “Digital India” campaign.

This is basically how India as a country evolved from paper money to plastic money and now again to digital wallets and UPI. Also, due to the deadly pandemic that has hit the country, a new opportunity has been provided to UPI and other digital banking sectors as people are moving

towards online banking and mobile payments, which is in alignment to the thought of making India digital.

REVIEW OF LITERATURE

Digital Wallets and the Extinction of Plastic Cards

There are a lot of studies predicting the future of mode of payments. In this regard a study by Deutsche Bank (2020) mainly focused on the usage patterns regarding plastic cards and digital wallets. The study discussed the increasing adoption of mobile phones among younger generations in developed countries, which has led to a high growth rate in mobile based transactions, an increase of 30-40 percent in developed countries. As highlighted by Rajeshkumar D. Kiri (2020) the reasons for this are awareness, social influence, better internet availability and ease of use. This has also opened opportunities for traders and enterprises as they can know their customers better and can even track their spending patterns and offer discounts accordingly, so traders prefer mobile payments. Cheques are already seeing a negative growth rate along with cash in some countries. This growth rate of dematerialization of plastic cards is more in developing countries like India where due to UPI systems, cheap internet and cheap smartphones, millennials are directly shifting from cash to mobile transactions skipping plastic cards entirely. One of the reasons for this is that dematerialization can be integrated with the existing infrastructure and technology.

According to study by Dr. Anthonima K. Robin (2018) In India cash transactions declined from 59 percent in 2000 to 30 percent in 2016, though demonetization had a lot of effect on this. Digitization of currency can also shift economic power as if China comes up with a digital yen and accepts all the payments in it then the US dollar may lose its value.

However, the study by Deutsche Bank gives a different view than other researchers on the same topic by saying that "Cash is a dinosaur" and cash will stay for a long time as people have much more trust in a tangible currency cash, coins are more reliable in uncertain times. History suggests that people stock cash in uncertain times as all digital means may get compromised in times of a war. At last the study concluded by stating the future of cryptocurrency which seems uncertain due to government regulations.

Rise in payments through NFC (Near field Communication)

According to research paper by Büşra ÖZDENİZCİ1, Mehmet AYDIN2, Vedat COŞKUN2, Kerem O, now contactless plastic cards are used, with tap and pay option in which we don't have to insert the card in the machine but just bring the card near and the transaction happens. In most of the developed countries this is the primary mode of payment for youngsters, using NFC you can dematerialize your plastic card and save it in your wallet which can be connected to other devices like smart watches etc., and you can pay just by bringing your smartwatch near the payment device.

In India now most of the plastic cards being issued have NFC. According to a report by "*IndustryARC*", NFC payments market is expected to grow at 14.5 percent, which may increase after the coronavirus pandemic.
Research of 3500 clients in Deutsche Bank study established all plastic cards to become contact less in short term and become dematerialized in smartphones in long term.

Effects of demonetization on digital payments

Dinesh, T.M.1 and Kiran Kumar Reddy (2018) studied the effect of demonetization on digital payments. Just after the demonetization, the value of transactions through plastic cards increased many times along with an increase in mobile wallets. The study also analyzed the data collected from various mediums. Bhakta (2017) noted mobile transactions witnessed an increase of 110% and an increase in debit cards of 157 %. PayTM (a digital wallet) received 25000 sign-ups and Freecharge, Razorpay all had a 100 percent increase in transactions. The study concludes by showing positive results of demonetization on reducing cash transactions which have sustained even till now, demonetization made people accustomed to cashless transactions. As Mishra (2017) in her study stated that the process of demonetization was not properly planned and planning for making India truly digital has begun only post demonetization, banks were told to reach set digital targets.

Plastic Money: Prospective and challenges (February 2018)

Bhawna Mukaria in her Research Paper stated that Smartphones, Internet penetration, and e-commerce are rapidly replacing the need for credit and debit cards. Card payment volumes have also been increasing at a rate of over 25%, and this pattern is likely to continue, helped by the continued rise in debit card activation and use. Debit card purchases have been increasing at a rate of 31% per year. Competition is fierce, and current and new market players are collaborating strategically and small banks and wallets will help to scale up adoption while also encouraging more creativity, innovation, and customer choice.
She has also examined how the Indian banking sector is rising to the information technology dilemma, as both types of bankers now see it as a requirement for their potential survival and development. Despite significant advancements in e-payments, in India cash still accounts for roughly 90% of personal expenditure consumption., indicating the enormous potential for development of the country.

Analysis of the use of Plastic Money: A boon or a bane (March 2015)

Anisha Bisht, Praveen Nair, Rakshita Dubey, Tanu Hajela in their Research Paper studied the use of plastic money/credit cards has advantages and disadvantages in terms of affordability and accessibility. Plastic money, based on customer behavior, is a type of invigoration that acts as an incentive that enables a customer to spend. The study finds that preferring plastic money has a positive relationship with its ease of use since the concept of usability of credit cards is related to

the concept that people are more likely to spend cash on hand rather than credit cards, according to an occurrence in psychology.

The Paper is also focused on two types of people: those who have debts and those who do not. The Revolvers are those that are in debt, while the comfort users are those who are not. The effect of paying with a credit card versus cash on the impact of an insurance company employee eating lunch in a cafeteria was studied. When people were offered an option to pay with a credit card, their preferred payment method shifted from cash to credit card. Credit cards, it was discovered, do not boost spending.

The majority of customers choose to use a debit card over a credit card while purchasing clothes, paying utility bills/phone bills, and conducting e-commerce purchases. Many of them agree that using a debit card rather than a credit card is preferable because of the money-back guarantee, spending control, and protection. Furthermore, people who responded are pleased with the company's services and have kept the card for more than three years. The vast majority of them use it for online activities because they have a feeling of safety doing so, but they totally stop it when it comes to investment activities.

Studying BHIM App adoption using Bass Model: An Indian Perspective

Himanshu Sharma, P.K. Kapur, Anu G. Aggarwal and Abhishek Tandon in their research paper used Bass Model to study the time based adoption pattern of Bharat Interface for Money (BHIM), which was introduced by the Indian government in 2016 just before demonetization. It is a mobile application which is based on UPI(Unified Payment Interface). The authors say that this study is the first Mobile Payment Services (MPS) adoption study using a mathematical model as per their knowledge. Moreover, earlier studies mainly underlined the empirical study on the mobile wallets than the UPI based applications, making this study useful to the policymakers and the marketing strategists to design UPI-based apps.

The Bass Model states that the probability of whether an individual or a firm will take up a brand new technology depends upon the proportion of previous adopters through forces of innovation and imitation. It basically acts as a tool to determine if the failure of a new product is due to any blunder committed by the organization or due to some market factors. Moreover, this bass model works well on the products that are infrequently purchased, and we can say that our application is installed by the browser of the mobile phone once only and can be considered as a no repeat purchase. Thus, the researchers took the data from the open access website of NPCI and applied nonlinear regression on it to calculate the parameters of this Bass Model along with the value of mean square error and the coefficient of determination.

It was observed that this model provided appropriate goodness of fit to the data fed to it. The value of coefficient of imitation dominated the estimated value for the coefficient of innovation implying that the people are adopting BHIM app more due to their social interaction or word-of-mouth by people who have already adopted the technology than the influence of external media, suggesting the marketers to focus on their marketing strategies in this interface in comparison to external

media. The marketers are also suggested utilizing the various social media platforms like Facebook, twitter etc. to influence the potential installers.

Credit Card study of college students: Evidence from Louisiana State University

Rebecca C. Christofferson, Frances C. Lawrence, E. Barry Moser, Susan E. Nester, Angela C. Lyons and Jeanette A. Tucker in their study provided insights about the utilization of credit cards and self-financing of students going to Louisiana State University. The study was also carried on to promote LSU and other different colleges to know how they can help their students maintain their use of credit cards, reducing future misuse of it as the students sometimes are not at all aware of the problems they can face in long-term if they use the credit card appropriately.

A sample of 2400 undergraduate students stratified on the basis of gender and ethnicity. It was observed that the students acquire their maiden credit card primarily from a financial institute and use them to purchase the clothes, automotive food and educational expenses etc. Moreover, most students were found to have at least one credit card having some balance and more than half the students were seen not making a complete payment of the bill every month.

It was recommended to LSU after the study that they should provide online classes related to finance to students along with educational presentations by the credit card vendors that come to college.

Plastic Money : Trend, Issues and Challenges

The study discusses the rise of plastic money usage in India from the beginning of the 21st century. The study compares the volume of new cards issued in recent years. The study while discussing some advantages of plastic money states that they are convenient, keeps check on black money, increases liquidity, supports growth of e-commerce etc. With opening of new bank accounts in large numbers due to the growing middle class and Jan Dhan Yojana, the future of digital transactions looks bright.

The paper evaluates the issues and challenges faced by the plastic card system in India. The entry of private and foreign banks and rise in information technology have transformed the financial transaction system. Plastic money has emerged as a cost-effective and convenient way for daily use. The paper concludes with the fact that growing penetration of IT and mobile services and supportive policy framework of the government will be a boon for digital transactions and exponential growth in this segment will likely to continue.

Contextual facilitators and barriers influencing the continued use of mobile payment services in a developing country: insights from adopters in India

Abhipsa Pal, Tejaswini Herath, Rahul De, and H. Raghav Rao (2020) have developed a research model to identify the contextual facilitators (like price benefit, network externalities, trust, and habit) and barriers (like risk, lack of facilitating conditions, and operational constraints) which drive mobile payment usage intention. They have tried to study and find out how barriers can inhibit

usage of mobile payment services and similarly, how facilitators promote the usage of mobile payment services.

A thorough review of various constructs of mobile payment usage models was done and focus was laid on the ones specific to developing nations (as the study pertains to India). For understanding the barriers, they use Laukkanen and Kiviniemi's (2010) barriers to mobile banking, adopted from Sheth and Ram's (1989) resistance theory for new and upcoming innovations. An online survey was conducted for the research purpose. The questions in the survey were adapted from prior work. They captured four demographic characteristics (family income, gender, education and age). Other than gender, the three characteristics – age, income, and education – had uniqueness and fresh data based on existing categories in different public domains in our country. The model was tested using PLS (Partial Least Squares).

Keeping in view of the recent emergence of various mobile payment applications, many of the previous research papers have addressed the initial adoption of the technology for mobile payment, with a limitation of articles on continued usage (Zhou, 2013). In this paper, they study the users' willingness to continue using mobile payment technologies post-adoption.

Determining factors in the adoption and recommendation of mobile wallet services in India: Analysis of the effect of innovativeness, stress to use and social influence

Nidhi Singh, Neena Sinha, Francisco J. Liébana-Cabanillas (2019) have tried to study the change in the consumer outlook towards electronic (or mobile) payments and their mindset towards it. The main target that they have tried to achieve is that of comprehending parameters associated with utilization and contentment of consumers with M-Wallets and services from an Indian point of view. An online questionnaire was circulated to collect responses by the respected team in February 2018. To measure users' willingness to use and adapt to new technology, various models like TAM (Technology Acceptance Model) and UTAUT2 (Unified Theory of Acceptance and Use of Technology) have been used. In the said research paper, the researchers found UTAUT2 with some extension (adjudged risk, adjudged satisfaction, and stress to use) could be used to better understand the behavior and factors affecting technology adoption by consumers. At the time of this research, the consumer base of mobile wallet services was relatively low. To study the consumer's perceiving new technology as highly risk-bound and unsecured, meaning doubting it with their own money, it includes the effects of social norms, social pressure, and effect of innovation on the acceptance behavior of the consumer with regard to the mobile services.

Factors like stress to use, innovation and social influence have been used to moderate the link between "using intention" and "perceived intention". Multi-group analysis was done to analyze the mentioned moderating effect. In the final result, a notable difference was found between "using recommendation" and "perceived intention". Hence, it was concluded that the social influence and intensity towards the proposed relationship between satisfaction and recommendation to use were inversely related. Users with greater social influence present lower intensity in the proposed

relationship between perceived satisfaction and recommendation to use, than users with less social influence (confirms research by Liébana-Cabanillas et al., 2018).

NEED

Mobile payment services in India have advanced exponentially in recent times. Some factors contributing to it are demonetization and COVID-19. During/after the course of both these events, a sharp uprise in the use of mobile payment services was observed as a result. (as shown in reports by PwC, 2020 and Dinesh, T.M. and Kiran Kumar Reddy, 2018)

Now the need to do this analysis of the current trend of usage of mobile services like plastic money, UPI, net banking, etc. is needed in order to be able to predict how the millennials would be using these services/ spending their money in the future. Analysis of the growing reach and usage of these mobile services is important and needed because they impact our day-to-day life. Slowly and steadily, we are shifting from completely cash to completely digital modes (talking about Generation Z specifically) (cited by the PYMNTS platform in 2020).
[We need to consider the fact here that the effects of unforeseen situations like a pandemic or demonetization haven't been considered here with respect to this analysis.]

Also, this analysis is needed so that a clear trend (if one exists) can be identified as to which specific digital payment service the currently active users are shifting. Using this it can be deduced as to why certain banks/NBFCs/other firms offering these services are focusing more on certain services and why some of these are being integrated (for example, some UPI applications are now offering Credit Card addition options which completely changes its paradigm) (Dr. Naaz Gorowara1, 2020).

OBJECTIVE

Advancement in technology has changed the system of payments in India (Dr. Virshree Tungare, 2018). The main objective of this report is to analyze the current trend in terms of usage of credit cards, debit cards, UPI, and net banking services and various factors which influence their usage. The major objectives are as follows:

- To find out the most preferred mode and application for digital payments by the people.
- To find out the relation between digital payment services adaptability by different age and income groups i.e., to find out the level of awareness of the digital services and their adoption by people of different age groups and income levels.
- To find out the factors affecting the consumer's willingness to use digital payment services.

- To study the purpose of using plastic money and other mobile payment services.
- To study the awareness about Internet Banking amongst youngsters.
- To study the youngster's preference in Internet Banking in buying different products at different points of sale (like e-commerce, local vendors, etc.).
- To study the growth rate of different modes of payments and predict future values using regression models
- To analyze the value of transactions of credit and debit cards at ATMs and POS.
- To analyze the effects of demonetization and coronavirus pandemic to predict future trends.

RESEARCH METHODOLOGY

This section describes the methodology that has been adopted for research. 2 different researches have been done. On analyzing the growth rate and transaction volumes of credit cards, debits cards, mobile transactions and UPI. Second was a two-step process, including qualitative and quantitative research. We outlined a questionnaire having questions on reasons and patterns for considering different types of modes of payment.

Data Collection

The primary source of data was an online survey floated in our community. Hence, we adopted survey based-methodology. (Questionnaire of the form appears in the later section of the report) Apart from this, data for transactional value of various mobile payment services was taken from the official website of NPCI as mentioned below.

The survey received 396 responses. The responses were from a diversified group, different age groups, different income groups and different demographics.

The survey data goes as follows:

Measure	Items	Frequency	Percentage(%)
Gender	Female	183	46.21%
	Male	213	53.79%
	18-21	241	60.86%

Age	22-30	104	26.26%
	30-50	47	11.87%
	Above 50	4	1.01%
Income (INR/month)	Less than 10000	137	34.60%
	10000-30000	123	31.06%
	30000-50000	62	15.66%
	50000-100000	64	16.16%
	Above 100000	10	2.52%
Most Preferred mode of Payment	Net banking	14	3.56%
	Cards with Tap n Pay	36	9.06%
	Credit Card	10	2.53%
	Debit Card	47	11.87%
	Cash	101	25.51%
	UPI	188	47.47%

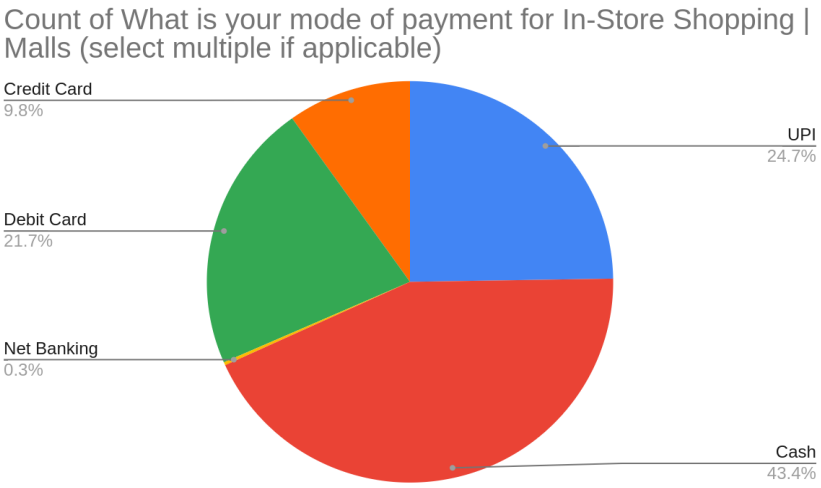


Figure 1. Responses of mode of payment used for E commerce

** When asked about the mode of payment while shopping from malls etc., respondents chose cash on delivery as the dominant one.*

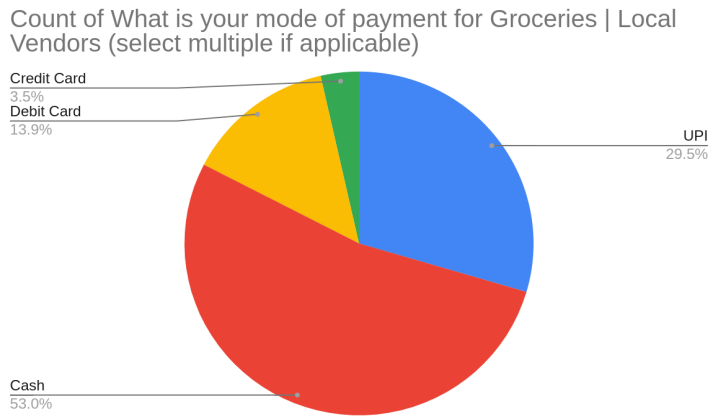


Figure 2. Payment modes used while shopping from malls

** Cash was chosen to be the most used option whenever a person needs to go for grocery shopping or to a local vendor.*

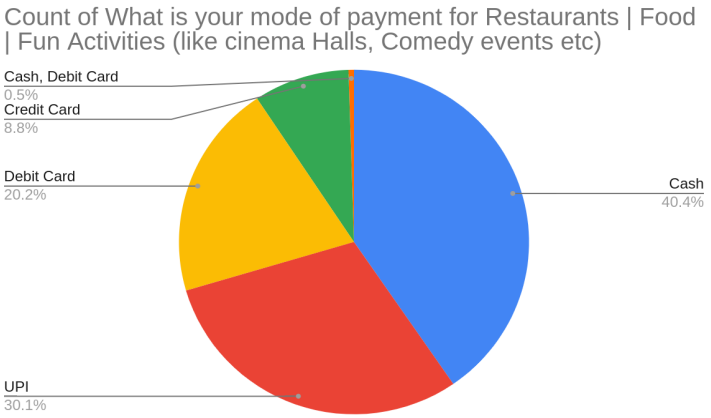


Figure 3. Pie chart for usage of different payment methods for paying of bills and recharges

** Cash followed by UPI were chosen as the primary modes of payment while a person needs to pay at a restaurant or for other fun activities.*

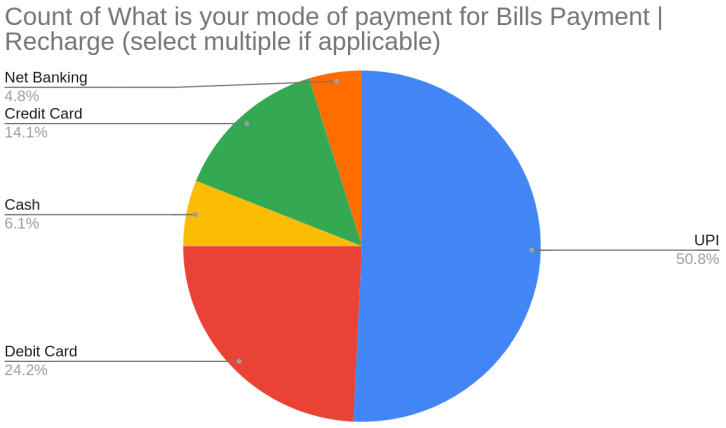


Figure 4. Count of methods of payment for grocery shopping or from a local vendor

** The respondents chose UPI as their go-to payment method whenever they need to pay their bills or recharge their devices*

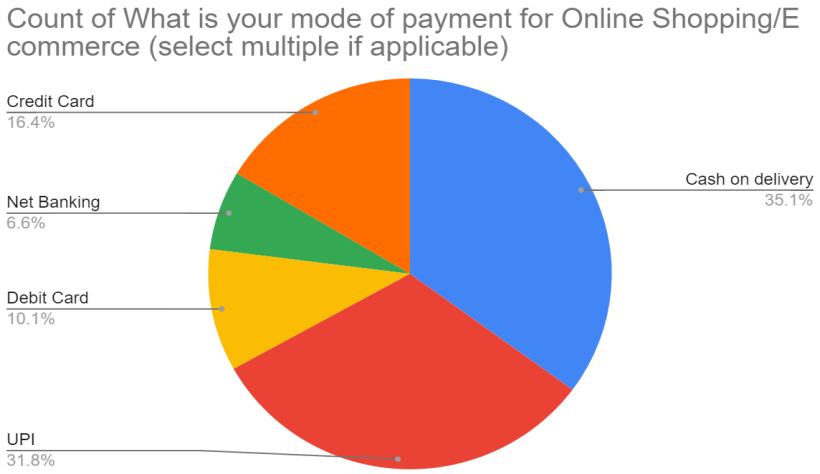


Figure 5. Percentage of different Payment modes used for paying at restaurants and for other fun activities.

** While asking the respondents about the mode of payment while shopping online, most of them chose cash on delivery and UPI as their primary option.*

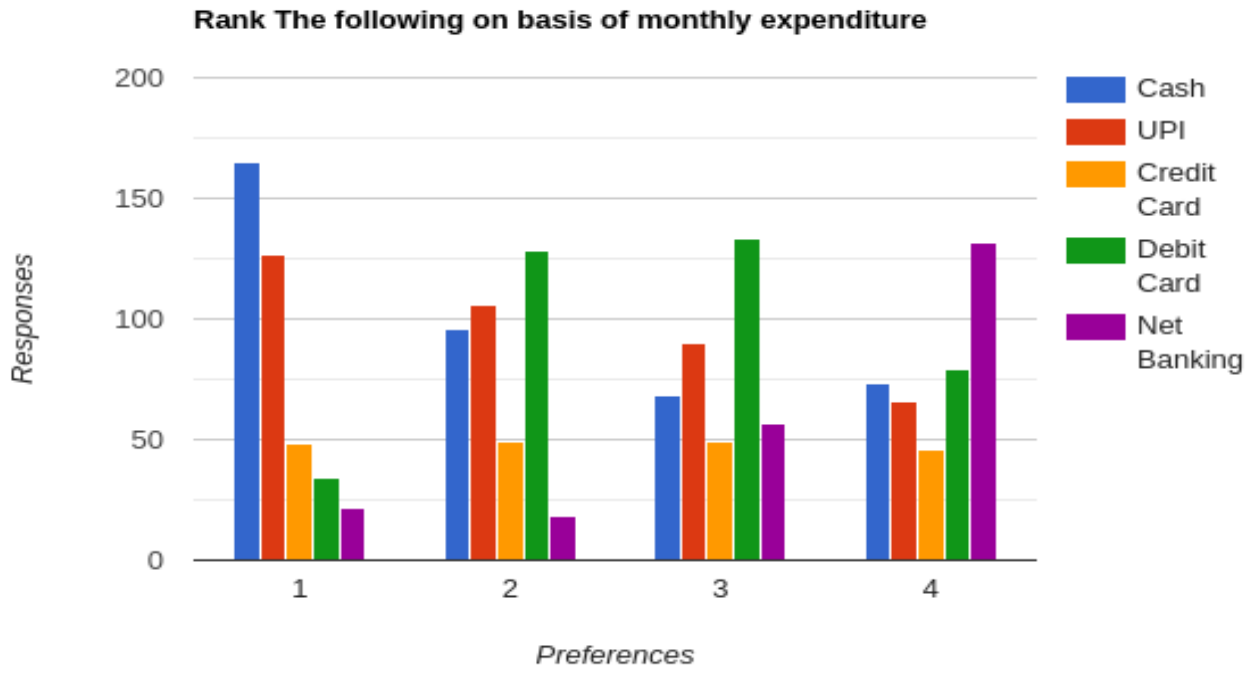


Figure 6. Ranking of payment modes for monthly expenditure

From the bar graph depicted above, we can infer that cash and UPI are the most used mode of payment transfers on the basis of monthly expenditure. Cash is used by 32% of the respondents and UPI is used by 27% of the respondents for most of their monthly expenditure. 24% and 26% of

respondents preferred cash and UPI respectively as the second most payment mode used. Debit card were preferred after cash and UPI for most monthly spending. Credit card and net banking was ranked as the least used option.

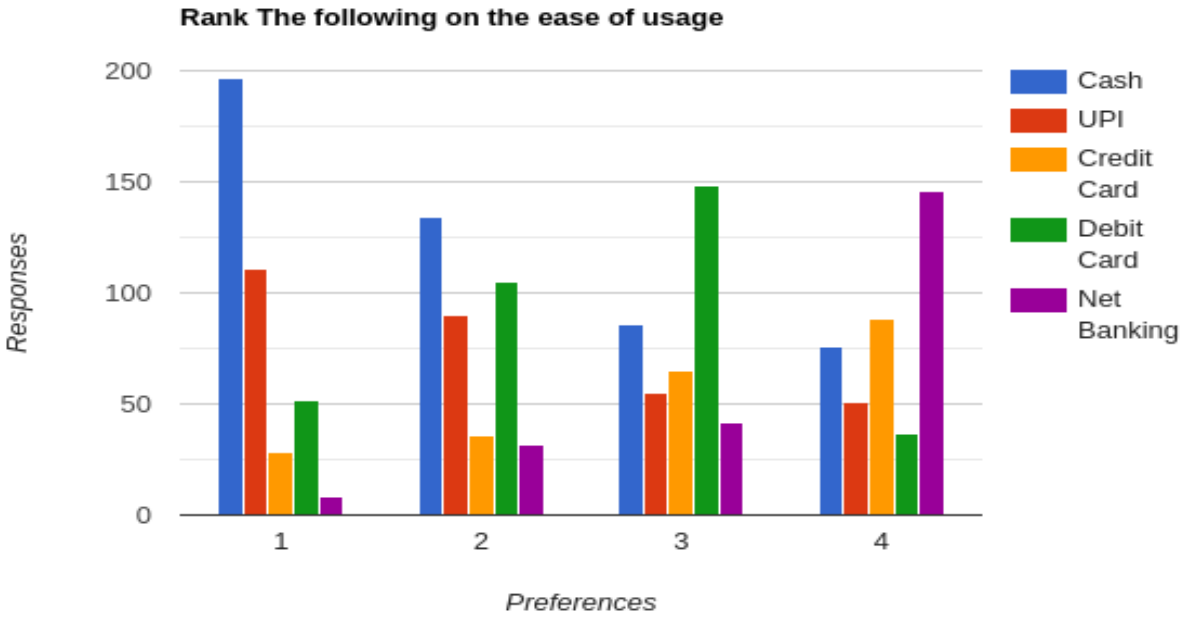


Figure 7. Ranking of methods of payment for ease of usage

From the findings of the survey, we can observe that most of the respondents ranked cash and UPI as the most easy-to-use mode of payment in comparison to others. Around 45% and 25% of respondents ranked cash and UPI respectively as the easiest mode and around 30% and 18% ranked cash and UPI as the second-easiest mode of payment transfer. Debit card, credit card and net banking were given last preferences by majority of respondents.

Data of Debit Cards, Credit Cards, UPI, and mobile banking

All the data collected on volume, transaction value, and users of debit cards, credit cards was taken from the official website of NPCI, the data was available from 2012 to 2021 month-wise, so all the monthly data available was gathered and combined. The data was available in terms of number of transactions, the value of transactions(in crores), outstanding debit and credit cards at the end of each month.

Number of banks, Volume and monthly transaction value of UPI.

Date	No of Banks providing UPI	Volume (in Lakhs)	Transaction Value (in Cr.)
Apr - 2016	21	0	0
Dec - 2016	35	19.9	707.93
Apr -2017	48	72	2,271.24

Dec - 2017	67	1456.4	13,174.24
Apr - 2018	97	1900.8	27,021.85
Dec -2018	129	6201.7	102,594.82
Apr - 2019	144	7817.9	142,034.39
Dec - 2019	143	13084	202,520.76
Apr -2020	153	9995.7	151,140.66
Dec - 2020	207	22341.6	416176.21
Mar -2021	216	27316.8	504886.44

Source: https://www.npci.org.in/what-we-do/upi/product-statistics

Volume and monthly transaction value of Mobile Banking(IMPS, NEFT).

Date	Volume (In Lakhs)	Transaction Value (in cr)
Jan - 2012	28	191
Jan - 2013	56	625
Jan - 2014	95	2625
Jan - 2015	181	12917
Jan - 2016	428	46521
Jan - 2017	1061	138305
Jan - 2018	2150	111408
Jan - 2019	7109	295974
Jan - 2020	14403	521368
Jan - 2021	25943	1020333

Source: https://rbi.org.in/scripts/NEFTView.aspx

Current Users and monthly transaction value (ATM and POS) of Credit and Debit Cards.

Date	Credit Card Users (in crores)	Monthly Transaction Value of Credit Cards (in crores)	Credit Card Users (in crores)	Monthly Transaction Value of Debit Cards (in crores)
1/1/2014	1.897416	1431.260708	38.0332001	18072.95637
1/1/2015	2.0612165	1756.726027	52.4787926	20376.3223

1/1/2016	2.3782202	2143.904091	65.3363198	23279.89053
1/1/2017	2.8845858	3286.217278	77.8565537	20064.78613
1/1/2018	3.623824	4177.804488	84.6697494	29612.4362
1/1/2019	4.5171042	5534.600665	92.3395544	31669.24277
1/1/2020	5.6120245	6740.24651	81.6726429	35720.6377
1/1/2021	6.1097889	6507.0168	88.8065146	33452.9652

Source: https://rbi.org.in/scripts/ATMView.aspx

Regression Models

Regression analysis is a method used in statistical study for investigating and modelling the relationship between variables (Douglas Montgomery, Peck, & Vinning, 2012). In the simplest of languages, regression is a statistical method which is used to determine the relationship between a dependent variable and a series of independent variables. It is really helpful in determining the strength and character of the aforementioned relationship. It is used for analysis in various different fields like investment, finance, etc. Furthermore, it can also help a firm to predict its sales by using different parameters like GDP, previous sales and various others. Regression takes a bunch of different and random variables and tries to find their relationship with the Y-axis parameter (generally). The statistical method of regression analysis is fundamental to the Capital Asset Pricing Model (CAPM). In our analysis, we have used polynomial and linear regression models to analyze existing data and predict the future of payment modes.

Polynomial Regression Models

In statistics, polynomial regression is a form of regression analysis in which the relationship between the independent variable x and the dependent variable y is modelled as a nth degree polynomial in x.

Linear Regression Models

Linear regression attempts to model the relationship between two variables by fitting a linear equation to observed data. One variable is considered to be an explanatory variable, and the other is considered to be a dependent variable. A linear regression line has an equation of the form $\boldsymbol{Y = a + bX}$, where $\boldsymbol{X}$ is the explanatory variable and $\boldsymbol{Y}$ is the dependent variable. The slope of the line is $\boldsymbol{b}$, and $\boldsymbol{a}$ is the intercept

Analysis of UPI Data

In April 2016, when UPI was founded, it had 0 volume and then the volume increased in the order of polynomial function to 27316.8 lakhs in March 2021. UPI was founded as part of digital India program and has increased rapidly after demonetization.

1) *Trend analysis of UPI Volume*

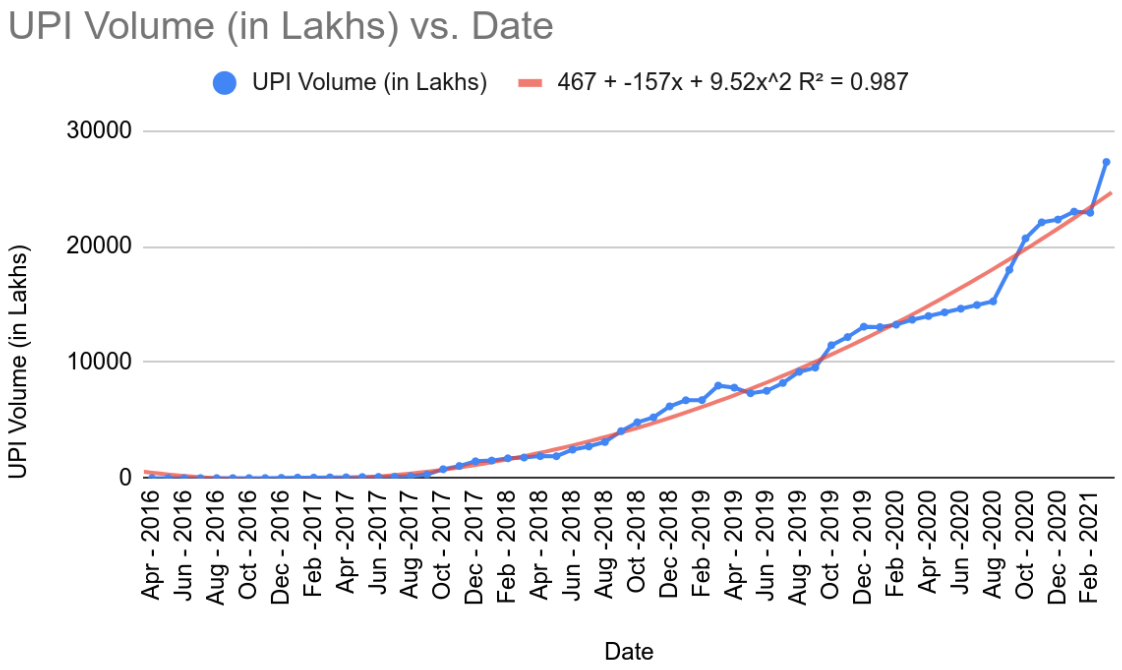


Figure 8. Graph for UPI Volume vs Date

From the graph, we can see that there is exponential growth in usage of UPI in recent years. Calculating Compound Annual Growth Rate (CAGR),

Date	UPI Volume (in lakhs)
Jan - 2017	44.6
March 2021	27316.8

$$CAGR = \left(\frac{EV}{BV}\right)^{\frac{1}{n}} - 1$$

where, EV= final value , BV = initial value and n = number of years

So here n = 4.2 years, EV= 27316, BV= 44.6

CAGR(Compound Annual Growth Rate) for the number of UPI Volume is **360 percent**. This implies that volume is becoming 3.5 times every year.

Applying Polynomial Regression of degree 2

Dependent variable - UPI Volume

Independent variable - Date or Time series

Also, applying polynomial regression of degree two on the above data this equation comes out to be $\mathbf{Y = 467 + -157x + 9.52x^2}$

With R^2 (which is a statistical measure of fit that measures variation between dependent and independent variables) being **0.987** which suggests that the dependent variable can be accurately determined by independent variable i.e. date.
According to the model it can be predicted accurately that if the same trend follows the Volume of UPI transactions in 2025 can be 94085 lakhs. So according to the trend line and CAGR, it can be concluded that volume of UPI transactions are increasing drastically and people are making UPI transactions a part of their daily life.

2) Trend analysis of UPI Transaction Value

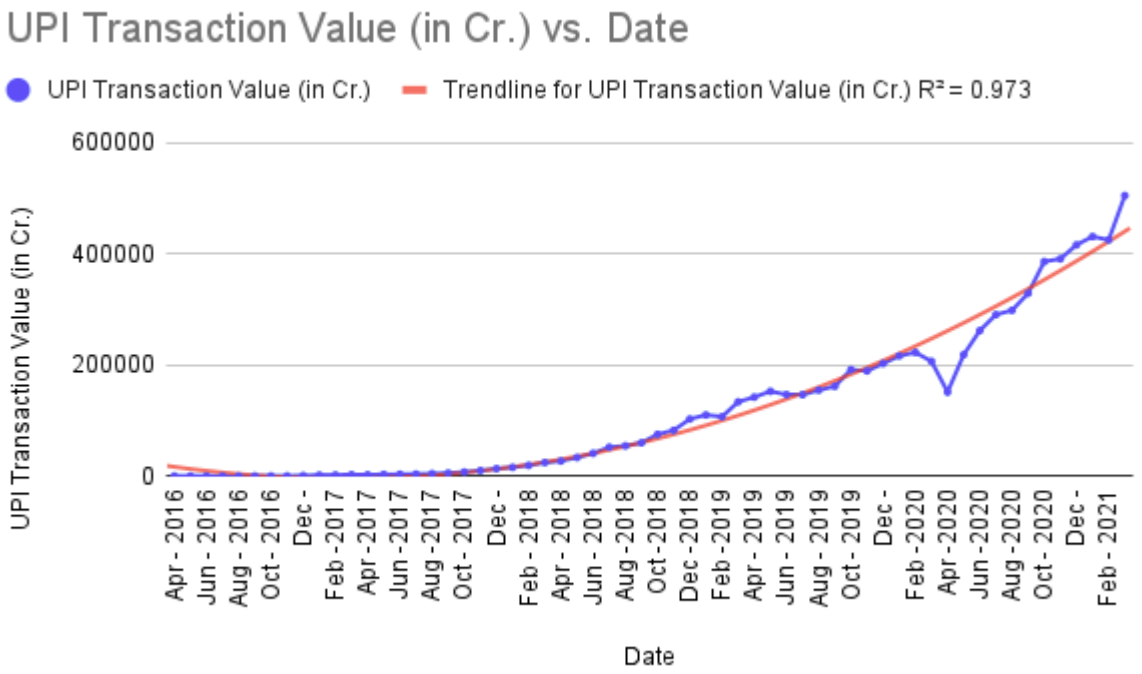


Figure 9. Graph for UPI transaction value vs Date

From the graph, we can see that there is exponential growth in usage of UPI in terms of transactional value in recent years.

Considering the beginning value and end value for the evaluation of CAGR,

Date	UPI Transaction Value (in Cr)
Jan - 2017	1696.22
March 2021	504886.44

Calculating CAGR -
n= 4.2, Beginning Value=1696, Ending Value = 504886
CAGR = **288 percent**

Applying Polynomial regression of degree 2 on above chart -
Dependent variable is UPI transaction Value
Independent Variable is Date
Applying model on data in above chart give the equation-
Y= 3.73E+08 + -17455x + 0.204x^2
With **R^2= 0.973**, which means the model is reliable and there is a strong dependence of dependent variable on independent variable.

Date	UPI Volume (in Lakhs)	UPI Transaction Value (in Cr.)
Jan - 2022	36125	942340
Jan- 2023	51605.48	1287064
Jan - 2024	71470	1721940
Jan - 2025	90791.72	2139808

Analyzing the above graphs and the prediction of models suggests that UPI payments are on rise (analysis consistent with the result of study by Bhakta (2017)) with new payment apps coming up and more millennials coming into the bracket of earring individuals, as UPI is most preferred digital payment mode by younger generation who are accustomed to technology and find it more convenient compared to cash (study by P.K. Kapur, Himanshu Sharma, Abhishek Tandon and Anu G. Aggarwal).
The curve of volume and value dips a little around March 2020 that is due to the coronavirus pandemic due to which the expenditure of consumers declined, but after August 2020 the value and volume became all-time high and are increasing. But results of April are yet to come out and if they are positive (during peak of coronavirus and no lockdowns) then it is confirmed that UPI can surpass plastic cards.

Date	Transaction Value / Volume
July-18	189.3813333
Apr-19	181.6784431
Oct-19	166.6375875
June-20	178.845501

Oct-20	186.3791332
Mar-21	184.8263486

The curve between volume and value is linear as the ratio of translation and volume is almost constant which suggests that the increase is due to rising users, not because the individuals have started to do large value transactions on UPI. Using the ratio we can also comment on the user segment of UPI as the ratio is constant that means the earnings of the users are the same, i.e. younger generations are preferring UPI more and UPI is currently being used for basic payment not for larger transactions.

Analysis of Mobile Banking Data

With the adoption of information technology by all the major financial institutions and supportive policy framework of the government, mobile banking is confirmed to rise. The following curve analyzes the historical rise in it.

Trend analysis of Mobile Volume

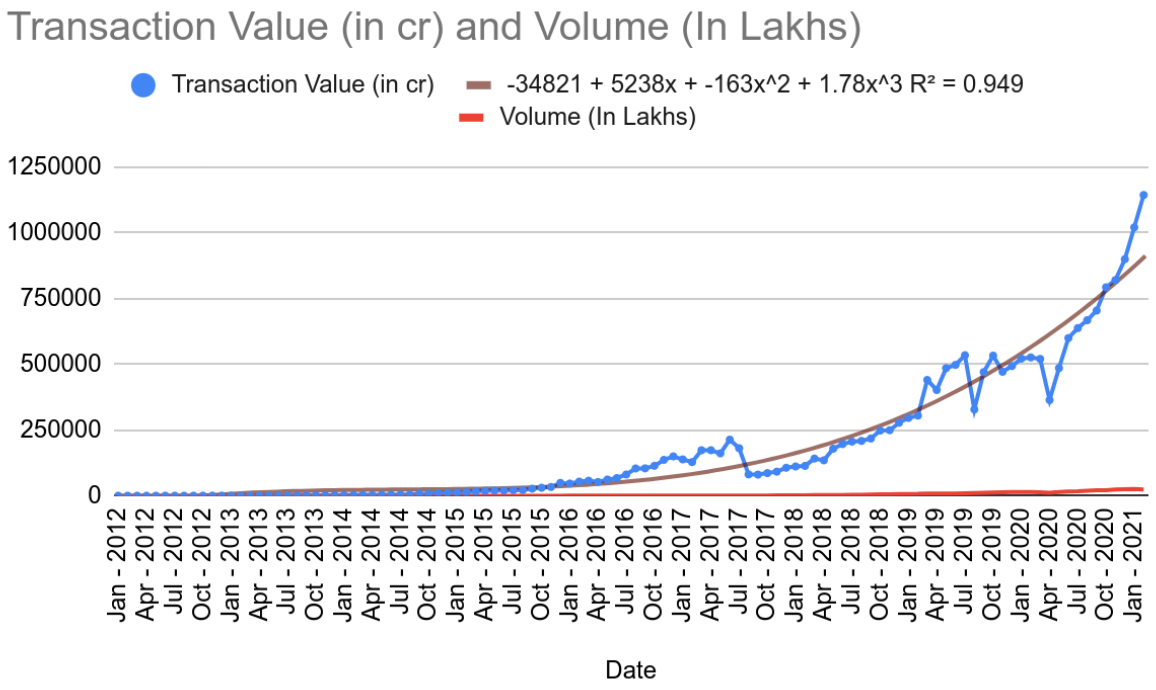


Figure 10. Graph for NEFT transaction value vs Date

DATE	Transaction Value (in Cr.)	Volume (In Lakhs)
Jan - 2012	191	28
Aug - 2016	104260	726
Feb - 2021	1143243	24274

Growth Rate	163 percent	112 percent

From Jan 2021 to Feb 2021 -
CAGR / Growth Rate of Volume is **112 percent** (Beginning Value = 28, Ending Value = 24274, n= 9.2 yrs)
CAGR / Growth Rate of Transaction Value is **163 percen**t (B.V= 191, EV= 1143243, n = 9.2 yrs).
The reasons for this high growth rate as stated by in study by Rahul Gochhwal, 2017 is mobile phones, computers are getting cheaper and digital users are increasing at a very high rate. Mobile phones have become a part of our life and all the transactions that were done using cheques are replaced by digital banking.
The digital transactions in India are approximately doubling every year over the past 10 years.
Also, the growth rate of mobile banking during the coronavirus pandemic was high because everyone was working from home so all the transactions were made digitally. Now people will be used to mobile banking and this growth will sustain for upcoming years.

Applying polynomial Regression of degree 3

Dependent variable is Transaction Value (in Crores)
Independent Variable is Date
Applying the model on data in the above chart gives the equation -
$Y= -34821 + 52386 - 163x^2 + 1.78\ x^3$
With **$R^2= 0.949$,** which means the independent variable can be predicted with greater accuracy.

Predictions of total transaction value of mobile banking

Date	Mobile Banking Transaction Value (in Crores)
Jan - 2022	1527195.58
Jan- 2023	2216262.86
Jan - 2024	3261489.5
Jan - 2025	4181330.54

Analysis of Credit and Debit Cards

Next up, we will be analyzing the data of plastic money (debit and credit cards) using different parameters like monthly usage, outstanding number of cards, etc.

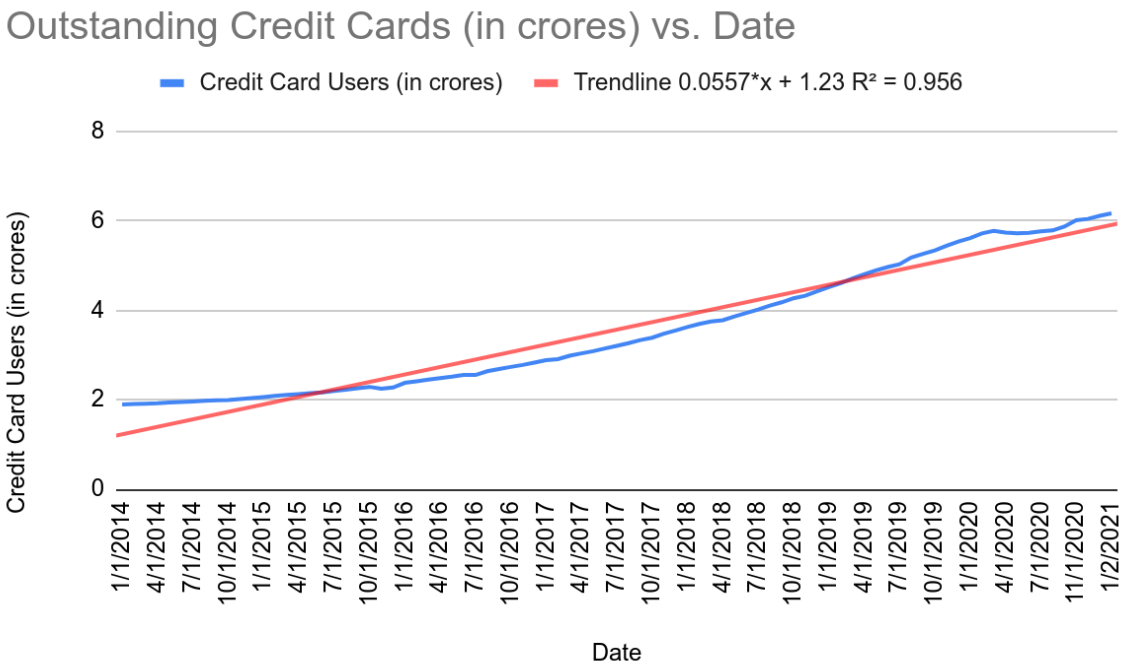


Figure 11. Graph for outstanding credit card vs Date

Date	Outstanding Credit Cards (in Cr)
Jan - 2014	1.897416
Feb - 2021	6.1647183

Calculating CAGR,

n= 7.2, Beginning Value= 1.9 Cr., Ending Value = 6.16 Cr.

CAGR/ Growth rate = **17.7 percent**

Outstanding Credit cards in India are growing linearly at a rate of 17 percent, irrespective of pandemic and demonetization so credits cards will keep growing at the same rate.

Applying linear Regression

Dependent variable is Outstanding Credit cards

Independent Variable is Date

Equation of linear regression : Y= 0.557x+1.23

R^2 = 0.956, it verifies the linear growth of credit cards users.

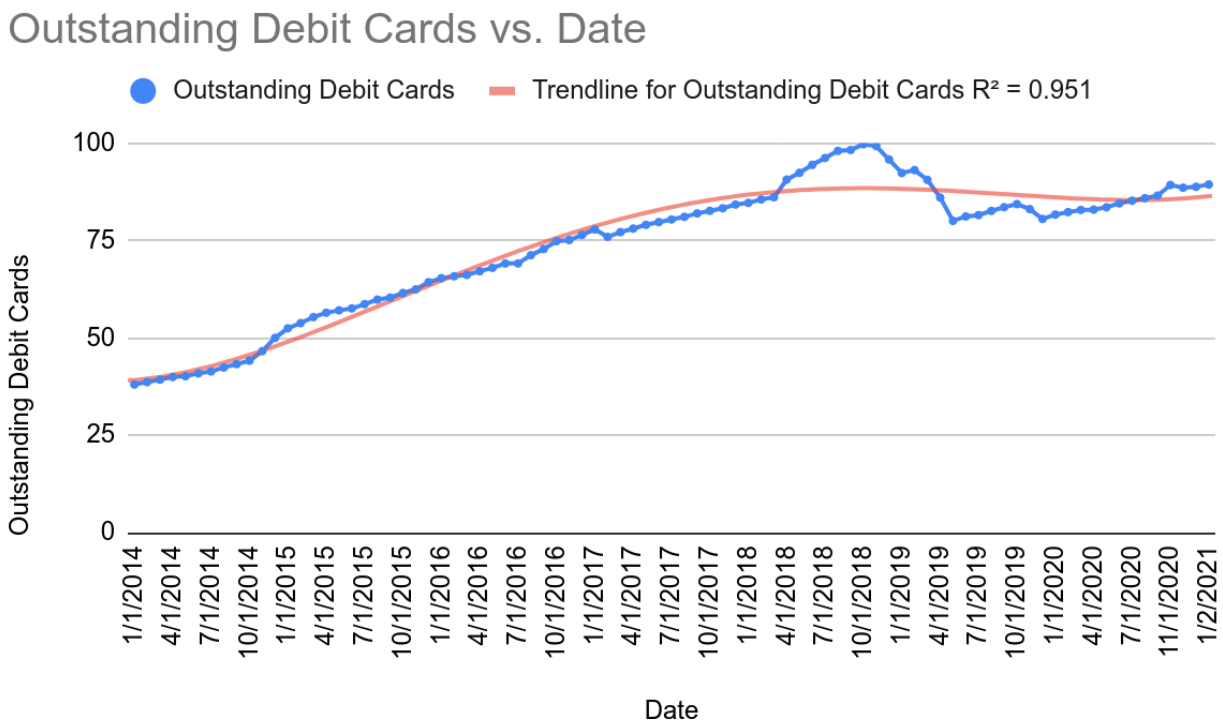


Figure 12. Graphs for outstanding debit card vs Date

Date	Outstanding Debit Cards (in Cr)
Jan - 2014	38.0332001
Feb - 2021	89.4001925

For CAGR, n= 7.2, Beginning Value= 38 Cr., Ending Value = 89.4 Cr.

CAGR/ Growth rate = **16.7 percent**

Debit cards users are growing at a rate of 16.7 percent over a span of 7.2 years but if we take a look at last 2 yr CAGR, it is -1.0 percent, which implies that people are cancelling their multiple debit cards. It is following a downward trend with a very low rate.

Applying Polynomial Regression of degree 4

Dependent variable is Outstanding Debit cards

Independent Variable is Date

Regression Equation is $\mathbf{Y = 39.2 + 0.289x + 0.0579x^2 + -1.24E\text{-}03x^3 + 6.99E\text{-}06x^4}$

And $\mathbf{R^2 = 0.951}$

On the basis of the regression models applied before, now we will be predicting the number of outstanding credit cards and debit cards for the upcoming four year.

Predictions using regression models

Date	Outstanding Credit Cards	Outstanding Debit Cards
Jan - 2022	6.4615	95.39736875
Jan- 2023	7.1299	114.913191
Jan - 2024	7.7983	140.6478478
Jan - 2025	8.4667	169.67

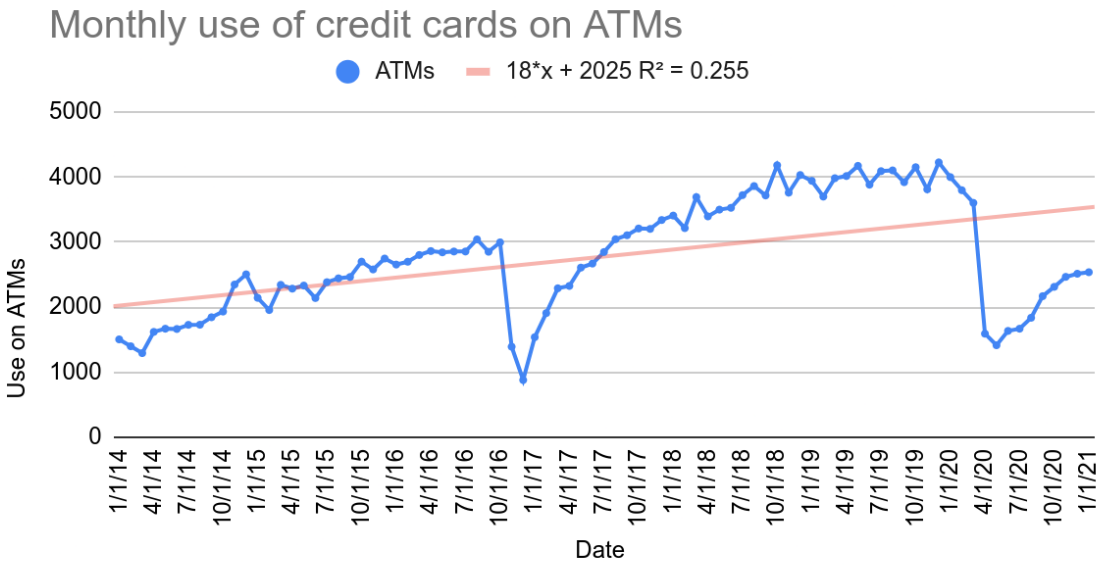


Figure 13. Monthly Credit Card usage on ATM

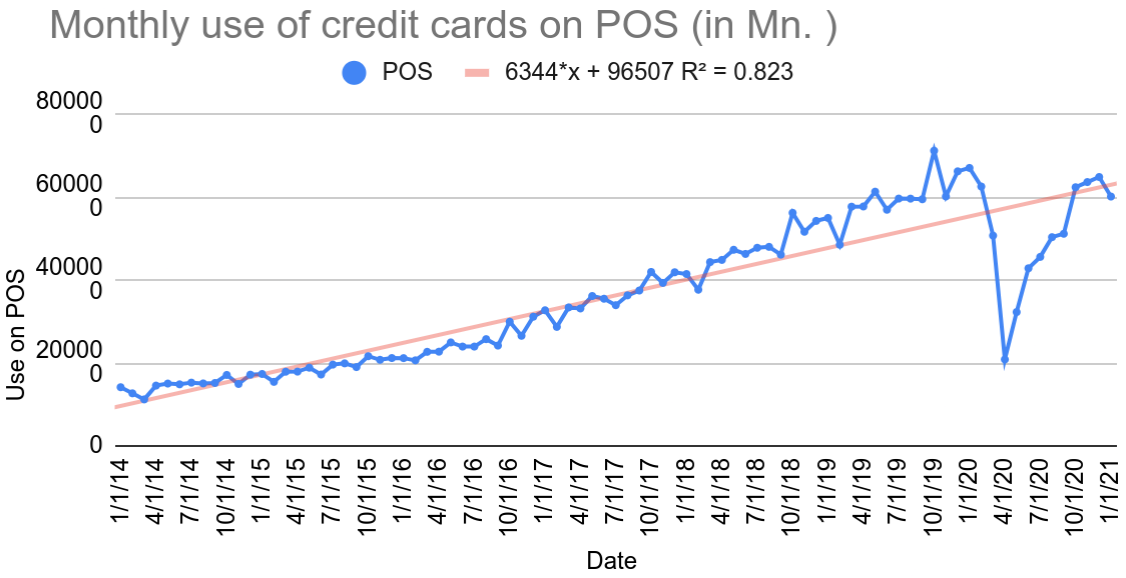


Figure 14. Monthly Credit Card usage on POS

Calculating growth rate-

Time = 7 years

Date	Credit Cards usage on ATM (in Mn.)	Credit Cards usage on POS (in Mn.)
Jan - 2014	1505.736892	141620.334
Jan - 2021	2538.201972	601034.5632
CAGR	**7.7 %**	**22.9 %**

Credit card users are increasing at a rate of 17 percent and most of the increased cards are being used on POS. In the graph of credit card usage on ATMs it can be seen that there is a dip in 2016 and 2020, but that is due to demonetization and coronavirus pandemic due to which cash withdrawal from ATMs is not possible. But in the case of POS the dip was only due to a pandemic which recovered in 4-5 months.

Primary use of credit cards is purchase of goods and not cash withdrawals.

Applying linear regression -

Dependent variable - Credit card usage on ATM, credit card usage on POS

Independent Variable - Time / Date

Equation for usage on ATM - **$Y = 18x+2025$ and $R^2= 0.225$**

Equation for usage on POS - **$Y = 6344x+96507$ and $R^2= 0.823$**

The low value of R^2 shows that there is a lot of variation in actual and predicted value, but that is due to demonetization and the coronavirus pandemic in which the usage patterns changed drastically. A model cannot accommodate uncertain times correctly.

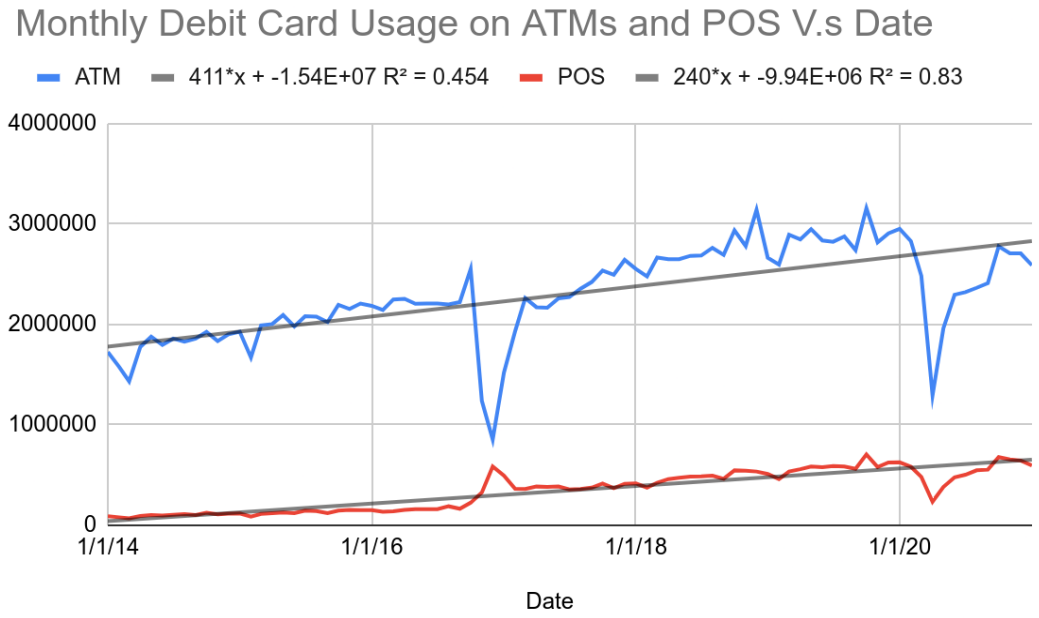


Figure 15. Monthly Debit Card usage on ATM and POS

Calculating growth rate-

Time = 7 years

Date	Debit Cards usage on ATM (in Mn.)	Debit Cards usage on POS (in Mn.)
Jan - 2014	1722318.045	84977.59171
Jan 2021	2586577.168	590344.6193
CAGR	**5.9 %**	**31.9 %**

The data in the above shows that the debit card usage at ATMs has a very low growth. (This may be due to pandemic and demonetization at certain intervals).

In the graph of debit card usage on ATMs in 2016 and 2020 we can see sharp decline due to demonetization and the coronavirus pandemic (similar movement in usage on POS). But the POS usage increased in 2016 due to less cash supply, but the increase is very less than the decrease on ATM, this implies that the primary usage of debit cards is for cash withdrawals.

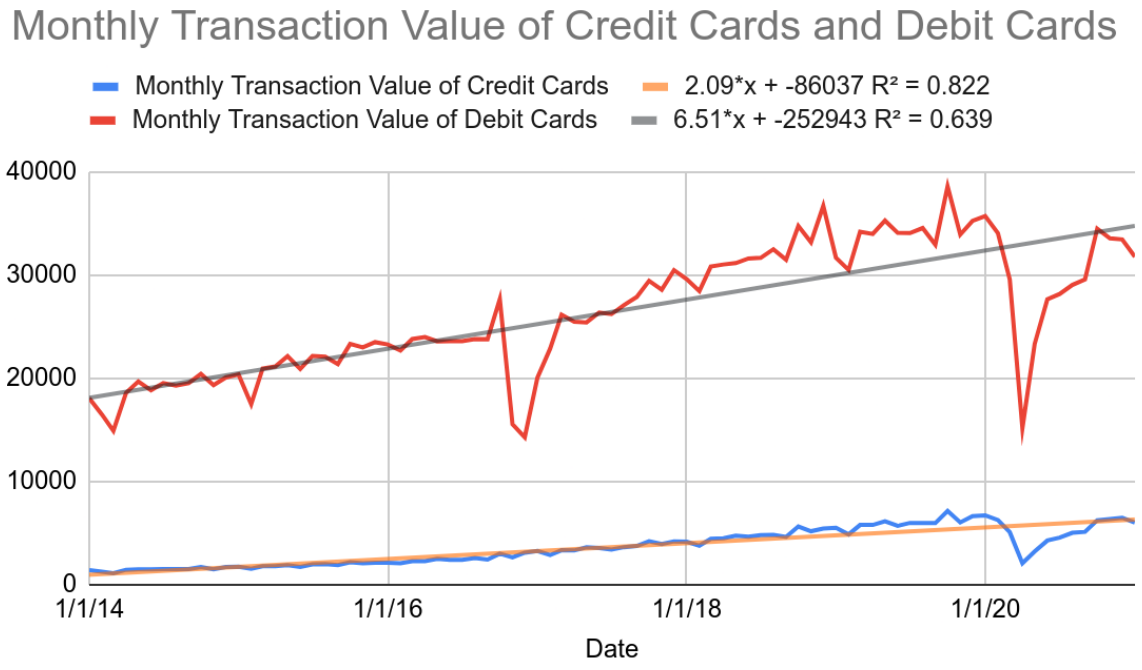
Applying linear regression

Dependent variable - Debit card usage on ATM, Debit card usage on POS

Equation for usage on ATM - Y = 411x- 1.54E+07 and $R^2 = 0.454$

Equation for usage on POS - Y = 240x- 9.94E+06 and $R^2 = 0.83$

The low value of R^2 in case of usage on ATMs is due to 2 uncertain events: demonetization and coronavirus pandemic so no certain trend could be observed.



Monthly Transaction value in crores

Figure 16. Monthly transaction value of Credit and Debit card

Calculating CAGR

Time = 7 Yrs

Date	Debit Cards Transaction Value (in Crores)	Credit Cards Transaction Value (in Crores)
Jan - 2014	18072.95637	1431.260708
Jan 2021	31769.21787	6035.727652
CAGR	**8.3 %**	**22.8 %**

We can observe from the graph that credit card transactions are increasing at a much faster rate than debit cards.

Applying linear regression

Dependent variable - Monthly transaction value of credit and debit cards

Equation for Monthly transaction value of credit - $Y = 411x - 1.54E+07$ and $R^2 = 0.454$

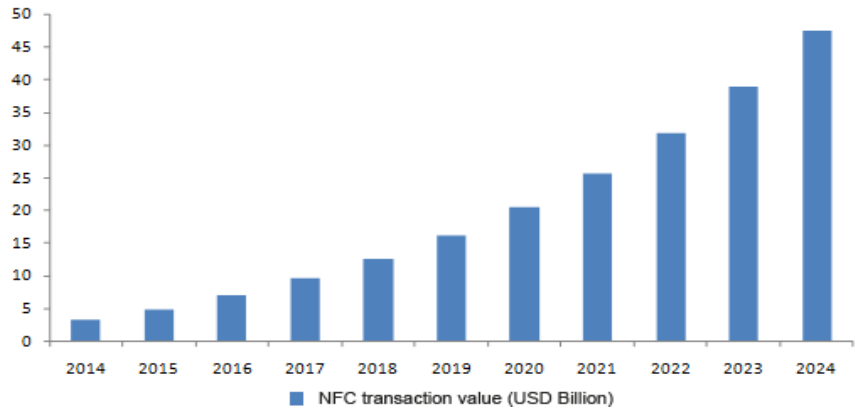
Equation Monthly transaction value debit cards POS - $Y = 240x - 9.94E+06$ and $R^2 = 0.83$

Predictions based on models

Date	Debit Cards		
	Transaction Value	Usage on ATM	Usage on POS
Jan - 2022	3711600	2975119	735824
Jan- 2023	3949200	3125443	823328
Jan - 2024	4186800	3275767	910832
Jan - 2025	4424400	3426091	998336

Date	Credit Cards		
	Transaction Value	Usage on ATM	Usage on POS
Jan - 2022	709283	3753	705530
Jan- 2023	785627	3969	781658
Jan - 2024	861971	4185	857786
Jan - 2025	938315	4401	933914

Analyzing NFC Payments



Source -https://getmoneyrich.com/nfc-enabled-contactless-credit-card-in-india/

Figure 17. Global Transaction value of NFC

NFC (near field communication) payments are contactless payments. In India NFC is not much popular, only a few banks support debit / credit cards with NFC (like HDFC's, SBI's etc. Tap N Pay cards), but the number of such cards in use is very less and also there are some restrictions like maximum value of a transaction through NFC can be 2000 (for security purposes) as NFC payments do not require pin or any form of authentication. You just have to bring the NFC enabled card near the machine and tap on it and the transaction takes place.

NFC payments are very fast

But in developed nations NFC is already in use in large volumes due to apps like Apple Pay and Google Pay that can be integrated with smartwatches, the application saves the details of credit/ debit card and then the mobile phone or smartwatch act as NFC enabled card.

Above graph analysis shows that the NFC transaction value will become 45 billion USD by 2024. So NFC will increase with a CAGR of **27 percent.**

If in future NFC's security corners are handled then all transactions (UPI, cards) may be through NFC enabled smart devices like phones, smartwatch etc. Also, coronavirus pandemic may fuel the growth rate of NFC payments.

Prediction Using K-Means Clustering Model

The K-Means Clustering Model is one of the classification of machine learning algorithms for clustering problems. The technique uses a method to classify a given data set into a set of clusters. The key concept is to create k centers, one for each cluster. This can then be used to predict the cluster into which a random data point can be classified into.

The centroids are moved to the average of the points in a cluster using K-means. To put it another way, the algorithm takes the average of all the points in a cluster and moves the centroid to that average position. All data point is assigned to it's closest cluster by calculating Euclidean distance with the centroids where euclidean distance is calculated by

$$d(\mathbf{p},\mathbf{q}) = d(\mathbf{q},\mathbf{p}) = \sqrt{(q_1 - p_1)^2 + (q_2 - p_2)^2 + \cdots + (q_n - p_n)^2}$$

$$= \sqrt{\sum_{i=1}^{n} (q_i - p_i)^2}.$$

To find the new centroid Ci for the particular cluster, we use formula:

$$c_i = \frac{1}{|S_i|} \sum_{x_i \in S_i} x_i$$

Si is the set of all points that belong to a particular cluster.
This process is repeated until the clusters do not shift and finally optimized classification in the form of different clusters is given by the model.

Here, we have used the K-Means Clustering Model on two different data. Given the independent variables like age, income and demographic area of a person, we have tried to predict the payment mode most likely to be used by the person. While applying the model, we have used K=5 i.e. five clusters each denoting different modes of payment i.e. Cash, UPI, Credit Card, Debit Card and Net Banking.

1) *Applying K-Means on Age v/s Income*

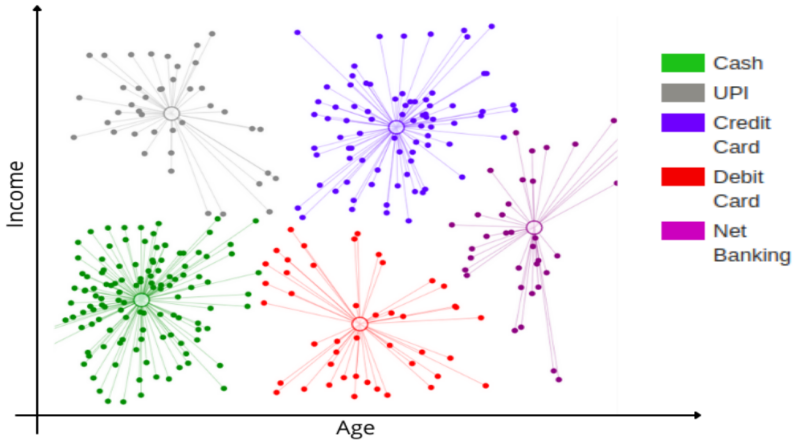


Figure 18. K Means clustering plot between age and income

We started with taking two independent variables : age and income and plot these points in accordance with primary data received from our survey. We executed K - Means model (with K=5) multiple iterations until fully optimized clusters were visible. Furthermore, we could see that the observations are tightly grouped and the clusters are reasonably “natural”. Some outliers are also visible, but the overall model gave the satisfactory result.

We can see that the younger generation with little or no income tends to use cash as the primary mode of transaction. Young generation with medium to high income tends to use UPI the most preferred way for daily transactions. The working class in the age bracket of 25-45 with lower income uses debit cards the most and high income groups in the same age bracket favors credit cards. This can be supported by the fact that lower income groups with poor CIBIL score don’t have access to credit cards while higher income groups can have access to credit cards easily. The following prediction can be inferred from the K-Means model ;

AGE	INCOME	K-MEANS PREDICTION
18-22	0 - 15,000	Cash
18-22	15,000 - 60,000	UPI
22-35	20,000 - 40,000	Debit Card
25-45	40,000 - 90,000	Credit Card
45-55	25,000 - 70,000	Net Banking

2) Applying K-Means on Age v/s Area Population

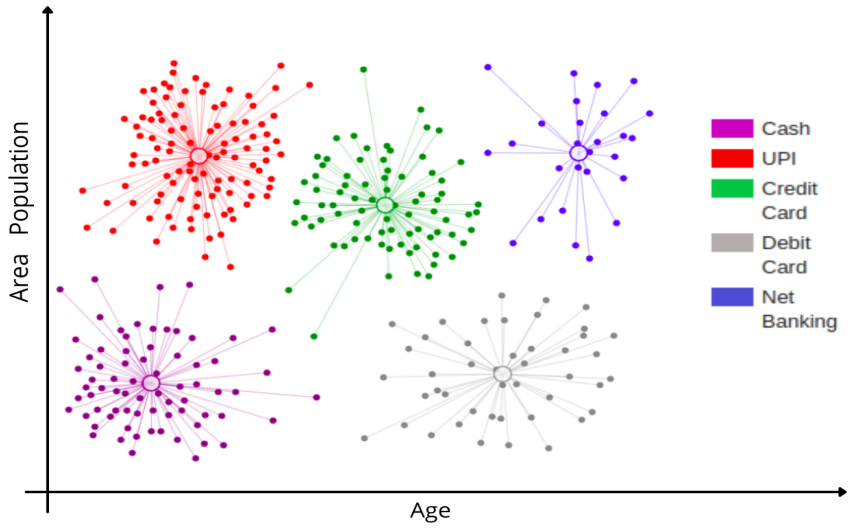


Figure 19. K Means clustering plot between area population and age

In the second K-Means model, we took age and area population/type of area as two independent variables. The demographics have a wider impact on usage of different payment modes. With K being the same as 5, we executed the model multiple times until fully optimized clusters were seen. We could see that the observations are tightly grouped and the clusters are reasonably “natural”. Some outliers are also visible, but the overall model gave the satisfactory result.

We can see that the younger generation in rural areas generally with low populations preferred to use cash for daily transactions. This can be evident from the fact that people are generally less educated and less tech-savvy in these areas. The same age group in urban areas having much more population relies on UPI as primary mode for daily transaction reasons being the ease of usage. The working age group in urban areas uses credit cards as the most preferred mode of payment. People in the working age group in less populated areas mainly towns and semi urban preferred debit cards as the primary mode of payment.

AGE	AREA POPULATION	K-MEANS PREDICTION
17-22	10,000 - 30,000 (Rural)	Cash
18-25	30,000 - 2 lacs (Town)	UPI
25-45	2 lacs - 5 lacs (Semi Urban)	Debit Card
25-45	5 lacs - 10 lacs (Urban)	Credit Card
40-55	10 lacs + (Metropolitan)	Net Banking

RESULT AND FINDINGS

Survey result

From the survey, we can easily find that the majority of the people today prefer UPI. They find it easy to use and that's the major reason for it being people’s top choice.

1) i) People who prefer cash do so majorly because of more trust (i.e. fewer chances of fraud) and the convenience that cash provides.
   ii) The major contributing factor to people using plastic money is the discounts and offers that they get for using them (both credit and debit card).
   iii) Other significant factors are interest free loan, record of all transactions and no requirement of cash (some people find it tedious to deal in cash).

iv) Reasons why people prefer using UPI services is because of the all-in-one platform that it provides (recharge, money transfer, insurance premium, etc.) and also because of the lots of cashback and offers they offer in a developing country like India.

2) The survey also reinforced the fact that the more are the number of credit/debit cards that a person owns, the more likely it is that they would prefer using Credit/Debit cards in scenarios where they get some benefits. People who own less number of cards (less than or equal to 2) are more like to use UPI and Cash wherever they can.

3) Also, as shown by the pie charts earlier, we can also see that transactions which involve physical participation of the person (like mall shopping, restaurants, local vendors, etc.) are more likely and preferred to be carried out in Cash whereas for online transaction (like E-commerce shopping, online bill payments, recharge, etc.) the person is more likely to transact using mediums like UPI and Cash on Delivery option (in case of online shopping).

4) As evident from the histograms depicted earlier, more people prefer cash as their primary source of spending for their monthly expenditure. Debit card and UPI are their next most preferred choices. When it comes to ease of usage, there again cash takes the supreme position followed by UPI which is the second most opted-for choice.

5) The survey also indicated that demographics like location play a significant role in the choice of people for the mobile payment service. People from rural, semi urban localities prefer cash and debit cards as their primary preference whereas urban and metropolitan cities' population prefers UPI, credit cards and cash.

K-means clustering result

- From the first plot of the k means clustering performed earlier we find the preference of different payment transactions being used by different age groups on the basis of their income category. We can clearly see that lower age group people having less income generally use cash as their primary means and with greater income use UPI. Similarly, people of medium age group(21-30) having lesser income use debit cards the most and with higher income use credit cards the most. Finally, people of higher age group generally use net banking and online transactions as their dominant mode of payment. So, from this plot we can also predict the payment mode which will be used by a specific person given both of the parameters - age and income.

- The second plot of k means clustering shows us a relation between modes of payment and a person’s age when taken together with the type of area a person belongs to which may be Metropolitan, Urban, Semi-urban, Town or Rural. As it is evident from the plot that people

belonging to a lesser age group and living in rural areas use cash as their most preferred mode. Furthermore, if a respondent is from a semi urban or an urban area and is in his early 20s then he/she will mostly prefer using a credit card. At last if a person is in the higher age category and belongs to urban or metropolitan area then he'll majorly use online net banking as his primary method of payment.

Regression result

Comparison of UPI and Plastic Money (Credit/Debit cards)

Mode of Payment / Parameters	Debit Cards	Credit Cards	UPI
Transaction value CAGR	8.3 %	22.8 %	288 %
Transaction Value Predicted Value in Jan 2025, according to regression models	4424400	938315	2139808
Volume, predicted according to regression models			

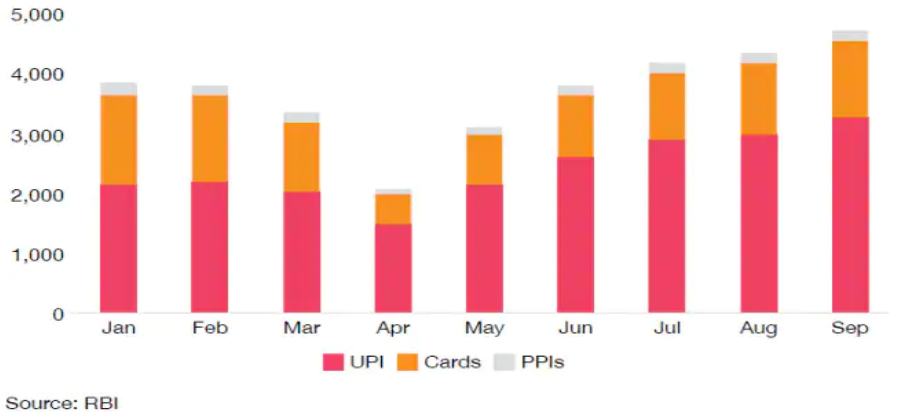


Figure 20. Volume of payment methods in 2020

As in the above bar graph and table it can be observed that the growth rate of Debit cards transaction value is just 8 percent whereas the growth rate of UPI is 288 percent, it is conclusive enough to say that people are starting to prefer UPI to debit cards. UPI is registered through a debit card only so that's why UPI is taking most of the debit cards transaction volume and not of credit card.

Even most of the IPO applications are filled by UPI.

Main reason for UPI growth rate as stated in study by Dr Mazumdar (2019) are-

1. UPI payment is accepted with more merchants than debit cards.

2. Offers and incentives along with zero transaction charge.
3. It is more convenient to carry a mobile phone than a plastic card.

The predicted transaction values of UPI plastic card also suggests that half of the debits card volumes will fall under UPI.

The results also suggest that most of the debit card transactions are used for cash withdrawal, even after increase in POS transactions during demonitization , the net transaction value decreased by a huge margin

The credit cards also have a growth rate of 22 percent three times the debit cards because credit cards cannot be registered on UPI, though Axis Bank has started it but still very few banks allow it.

Main reasons for credit card volume increase are cashback and offers, interest free loan, better CIBIL score etc.

CONCLUSION

It is fair to conclude that an exponential growth and evolution has taken place where consumers have transferred from old methods of just using cash to newer and technology enabled one's like Credit/debit cards and cheques and latest to e-commerce and mobile banking. It can be seen that online payment methods are being used extensively for both on-site and online payments and this trend seems to be continuing and growing. Furthermore, it is not hidden that there are some factors and technical and technological gaps which have hindered even more growth of these services but with time, all these issues are being taken care of and technological advancements are being made. Also, the drastic change in the behavior of the consumers demonstrating a leap from old and to an advanced online payment mode is visible in banking and retailing. The statistical data gathered through the survey as well as RBI official data signify that the number of people using online payment mode and making online transactions are growing at a steady rate, giving hints of an everlasting acceptance of online systems of payment from industry. However, the quick uprising and acceptance of several uprising technologies have loads of challenges to the implementation and carry greater risk as well as opportunities in the present day as well as in near future. To sum up, the UPI payments are going to increase along with credit cards, but if all banks allow UPI on credit cards then the figure may change, and UPI can be the clear winner.

Hence, we can say that a better integration of online payment systems with present telecommunication and financial infrastructure is really important for a great future of the mobile payment system.

QUESTIONNAIRE

1. Name
2. Gender
3. Age
4. Income Group
5. What is the population of your area you live in?
6. Number of plastic cards owned?
7. What is your mode of payment for Online Shopping/E commerce? (select multiple if applicable)
8. What is your mode of payment for In-Store Shopping | Malls (select multiple if applicable)
9. What is your mode of payment for Bills Payment | Recharge (select multiple if applicable)
10. What is your mode of payment for Restaurants | Food | Fun Activities (like cinema Halls, Comedy events etc.) (select multiple if applicable)
11. What is your mode of payment for Groceries | Local Vendors (select multiple if applicable)
12. Rank The following on the ease of usage : Cash, UPI, Debit Card, Credit Card, Net Banking
13. Rank The following on basis of monthly expenditure
14. Which of the following do you think would be your primary mode of payment
15. Reasons for preferring Cash
16. Reasons for preferring Credit / Debit cards
17. Reasons for preferring UPI

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