United Payments Interface (UPI): How Indian Consumers are choosing their Payment Application Services

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Abstract

The Indian government's initiatives have created plethora of opportunities in the fintech space. The India stack not only boasts the finesse of having the latest technological advancements, ranging from the creation of digital identity through the Aadhaar initiative to digital payments via IMPS & UPI services, making India as one of the pioneers in financial technology providers across the globe. The architecture weaved by the NCPI; an RBI backed initiative which has given birth to these initiatives that has created a breakthrough in a country with more than a billion population. The two most remarkable events that led to the exponential rise in the use of UPI services were demonetisation by the government of India, to siphon out the black money out of the Indian Economy, and the second one was during the COVID-19 outbreak. These to significant milestones made UPI as one of the most promising alternatives to the traditional cash.

Keywords- India Stack, UPI, IMPS, NCPI,RBI.

Introduction

The Indian fintech journey began to take shape in 2009, when the creation of two mammoth

institutions took place. First, the National Payments Corporation of India (NPCI) which has revolutionized the retail payments & settlements sector and has increasingly reduced the load from the ATMs & banks. Second, with the creation of Unique Identification Authority of India (UIDAI) which again was a well thought product from the Government of India's Economic Planning Commission (Yadav and Sinha, 2022). The right combination of NCPI's digital payment project such as the Unified Payments Interface (UPI) and UIDAI's Aadhaar Identification & remote authentication capabilities via the utilization of the Application Programming Interface (API) has paved the wayfor what is today known as the India Stacks **(**Perannagari and Gupta, 2022**)** which is againone of the primal building blocks to India's Technological advances in the Financial & Information Technology advancements which have the capability to show the world that how acountry with 1.4 billion population has been a role model for managing is digital transactions sosmoothly and leading the way when it comes being a cashless economy. Also, the research thatwe undertook has been recorded in this paper as per the flow of the study, which included secondary research which helped us gain knowledge on the topic and to understand on howthe technology is evolving and where does our current research will help to future researchers tobridge the gap of information when carrying outfurther research on this topic. Also, this wasfollowed by defining the objectives of the study which again included finding the areas of interestwhich we wanted to explore as per the requirements of the study, and then this wasfollowed by defining a research methodology, which again meant selecting a proper surveydesign method to better understand the requirements of this research, followed by a through discussion of results and then drawing aconclusion of the research from the data that wasthoroughly analysed and then discussed in this paper.

Literature Review

The NPCI was incorporated by the Reserve Bank of India (RBI) as an umbrella organization to take care of the increasing demands of the retail payments and settlement operations in

association with the Indian Bank's Association (IBA) with the idea to create an ecosystem that would nurture the growing demand for the E- Payments space in the country. Until 2010, the only methods of digital transactions available to the common public were either through their Internet Banking (INB) services, which again involved National Electronic Funds Transfer (NEFT) and Real Times Gross Settlement (RTGS). However, the underlying problems with the available technologies at that time were, these were strictly focussed on and made available only during banking hours and because of this, the customers did not have the flexibility to exercise any transactions in the non-banking hours, as these were still unavailable for thepublic at large. RBI also introduced the Immediate Payment Service (IMPS) in August 2010, keeping in mind the accessibility to the online banking services made available 24*7*365 as interbank services (Mahesh and Ganesh, 2022). With the IMPS introduction, money not only could be transferred within one'sown banking network but also this service was extended to all the partner banks who willingly made themselves join the change bandwagon. Asexcitingly the banking sector grew both in termsof reach and accessibility, proportionately the reliance also started to grow on these technology-enabled banking services. As people started to break from their traditional approaches (where people standing in long queues in banks was not an uncommon scene given in any Government, PSUs, or Private sector banks). However, with the introduction of these technologies which heavily started to reduce the customer load frombanks specially in Tier-I cities where people hada more inclination toward utilisation of theseservices made available to them, these changes started to trickle down the masses as more and more people from being technology averse to started embrace the incoming changes as this notonly started to make their lives better but was also easy to use. Unified Payments Interface (UPI) was introduced by the National Payments Corporation of India (NPCI) in the year 2016 bythe RBI as an attempt to make India a cashless economy (Kandpal et al., 2022). Again, this enhanced the process of instant fund transferbetween two banks accounts utilising a mobile platform. The foundations of UPI were built utilising the IMPS technology with the Virtual Payment Address (VPA) which is again a UniqueIdentification provided by the bank, also the

Account Number with the Indian Financial System Code (IFSC) which is again a unique alpha-numeric code of 11 characters that is givento each bank to identify its branch that supports the electronic payments made by the user(Ingale, 2022). Along with this, the mobile number with the Mobile Money Identifier (MMID) and the Aadhaar Number, also a one- time use Virtual ID along with a layered security pin code in the form of a Mobile Banking Personal Identification Number (MPIN) which ensures a 2-factor security integration of the transaction being made (Sharma, 2016).

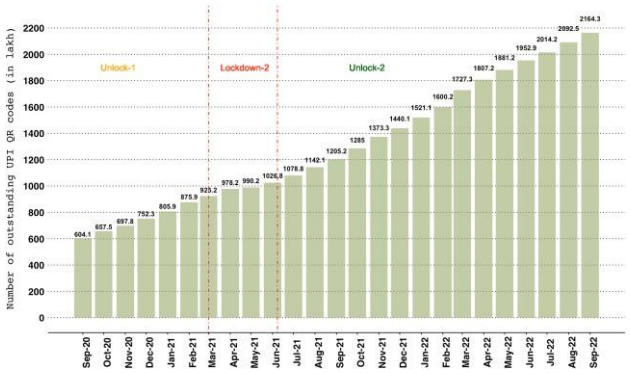


Fig. 1 - Chart showing UPI QR Codes Outstanding in India for the period of Sep-20 to Sep-22 which reflects the growth when compared to the phase of Unlock Phase 1 to Unlock Phase 2 (*Source: https://rbi.org.in/scripts*)

The introduction of UPI strategically came into light when millions of Indians were going through a state of crisis due to the Central Government's attempt to weed out the culture of black money from the Indian Economy and as a measure ₹500 and ₹1000 denominations were banned from circulations and use from the Indian Banking system following an announcement from the Government of India and thus overnightleaving the customers with no choice but to makeuse of the alternative facilities available at their discretion. During that time in 2016, with the advent of the free-internet revolution extended by Reliance Jio coupled

with the exponentialincrease in the number of smartphone users which had already marked their presence, posingit a perfect opportunity to test the market with theintroduction of such a product that will laterrevolutionise how Indian consumers change in means of their spending behaviour from carryingcash to a huge leap towards a complete cashless economy, where institutions ranging from large scale hypermarkets-supermarkets to community based millions of mom & pop stores across the

geography of the republic of India (across all States) to even the roadside vegetable vendors, imbibed the culture of accepting digital paymentsvia UPI. Something of this magnitude was neverseen in the history of the banking sector in Indiaever. As of October 2022, the number of associated banks extending this service has goneup to 365, the volume in terms of number of transactions has reached a new height of 7305.42million transactions only in the month of Octoberand the value in terms of money transacted had risen to 12,11,582.51 crores recorded during the same period (Basavaraj and Veshne, 2017).

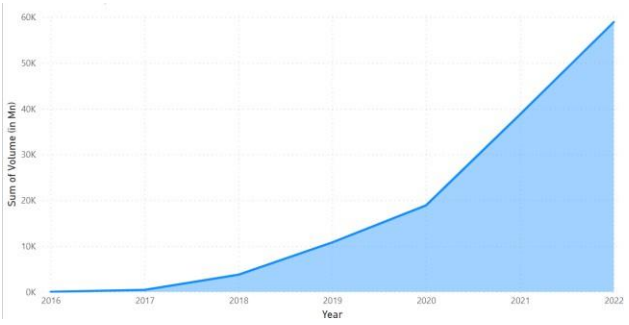


Fig. 2 – Chart showing the exponential increase in the rate of transactions since 2018 and then the growth has been non-stop, leading to the proliferation of the UPI uses all over the country *(Source: https://rbi.org.in/scripts*).

Objectives of the study

The review of the literature gave us a brief idea on how the sector has evolved over the period. Now, with multiple number of players in the market, it has really become difficult for the usersto choose a particular product & use it withcomplete trust. Also, with the entry of bigger players such as Google Pay, Phone Pe, Amazon Pay, WhatsApp Pay and many other companies,over a period, and with their dominance in the market, it becomes difficult for the end users to choose from the array of the services available. This was one of the primary objectives to understand & analyse how the UPI's market presence with so many players already competing against each other to capture theirmarket share. So, in this scenario how does an individual common man exercises their choice for the right product & also how the product positions itself as the right product market fit, became important to be analysed and hence the gaps that we found while doing the literature review helped us to focus our research specifically in those areas where we felt that it was highly necessary to understand theunderlying reason which were not very clear(Bech et al., 2020). Also, given the rate at whichthe sector is unfolding every day, we felt it was also important to have a holistic view and to connect the dots while not only focusing on the methodology but also to understand how India Stacks holds the potential to pave the way for theentire world to show how to go cashless with thegiven technology that has brewed inside India's financial powerhouses.

Research methodology

A Consumer Dipstick survey was designed based on the Longitudinal Survey Design methodologies (Levy et al. 1999). Using this, thedata was collected over a period from the same population and the data from the changes in the cohort in the same population was collected & analysed over a given period.

This research was performed to understand why & how people choose UPI applications and howare they choosing to spend their money via theseroutes of cashless transaction. Also, the

survey recorded the data from around 300 participants from all age groups and residing across various states in India, to understand the diversified utility of the consumer behaviour that makesthem utilise these channels of payment. Also, data available at the NPCI website was referred to perform an analysis to understand how the exponential growth has made the way for E-payments sector so efficiently that people have chosen UPI as a payment method over the other available resources like INB, NEFT, IMPS & also over Mobile Payment Wallets in a very shortperiod as compared to the already mentionedones. The questions were framed in such a way that the participants were able to understand the various touchpoints in their lifestyle all throughout their spending journey so that it can be analysed to understand why they choose a particular service or take a particular decision over another one. Also, while framing the questionnaire, aspects like trust, acceptability, wase of use and other parameters were considered to make best use of the data to represent statistics that can show how much people rely on a particular service and the justifies their sense of belonging as they trust their money with that application's service, specially the support that is extended when there's a potential failure or a bug that leads to crash the app during high traffic hours or seasonof increased transactions, also on how frequentlythey update their applications to make sure that their services are at par with the changing needs,demands and fit with the policies as per thenational and international standards (Gopinath et al., 2022).

Results

The results are based on the individual responsesreceived from the survey and will be discussed further based on the questions that were asked.

Before asking any behavioural questions, we preferred asking the individual one basic question to understand how the customer preference has changed over the time from usingtheir debit or credit cards or even utilising their Internet Banking services as a mode of

payment when making an online purchase. Hence, when this question was asked, the responses

were veryalike to our expectations with the currentproliferation of UPI as a payment mode. As, 56%of the respondents said they prefer UPI as their payment method when making an online purchase, followed by 17% said they preferred credit cards, 12% responded debit cards, while 10% still preferred cash on delivery (assuming mostly due to prevailing issues regarding refund or exchanges), and only 5% preferred Internet Banking services.

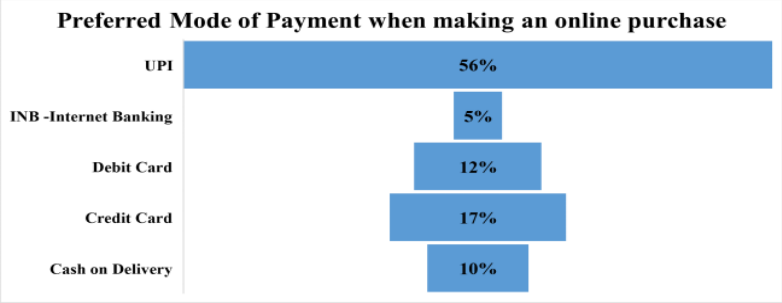


Fig. 3 - An individual's preferred mode of payment when trying to make an online purchase depicted using a funnel chart.

The first question was asked to understand how frequently individuals are using the UPI for theirday-to-day transactions in each week in theirlives. The responses were as, 40% of the population said to have used UPI almost every day and more than once (at least 2 times a day) intheir lives, 24% responded to have used UPI transactions 5-10 times a week, whereas as 20% responded with more than 10 times a week, 14%responded to have used less than 5 times a weekand the remaining 2% responded to have not usedat all.

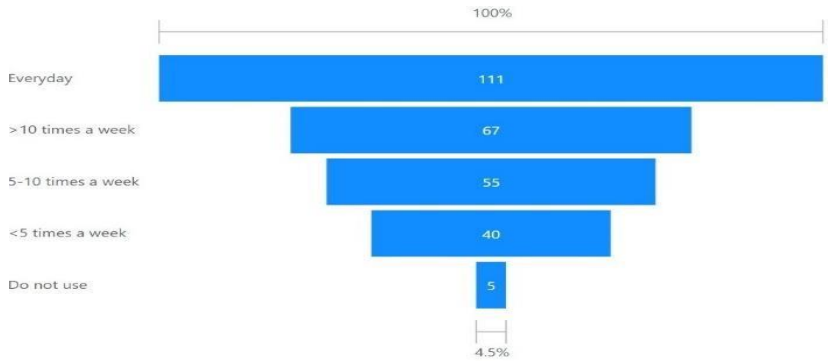


Fig. 4 Shows that out of the 278 responses, most of the people i.e., 111 have made use of UPI transactions almost every day of the week and another 67 & 55 response also depict that they haveused UPI for their transactions, that too for more than once daily.

In the second question, it involved asking the respondents that with how much money would they trust an UPI application for their transaction.For this, we had considered a categorization of higher value & lower value. Where higher valuemeant more than ₹ 1,00,000 and lower value meant less than ₹ 10,000. Further it was divided into subcategories ranging from spending behaviour via UPI such as I) more then ₹ 1,00,000 II) more than 50,000 but less than 1,00,000 III) more than 50,000 but less than10,000, and IV) less than 10,000.

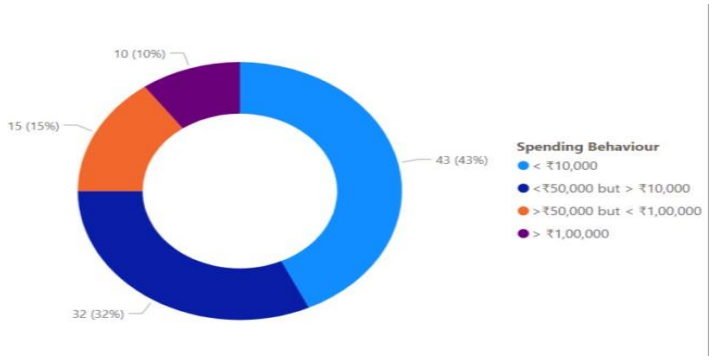


Fig.5 Shows the spending behaviour of an individual when they are using UPI as a medium to make their transactions.

The results were interesting since though India asa nation might be witnessing one of the fastest growing transformations in case of digital payments, however the amount of trust that is there is not simultaneously reciprocated. The factthat 43% of the responses were indicating that they still would choose to transact only lower amounts of money while choosing UPI as their medium of payments, at the same time only 10%of the population responded that they would trustamount of higher value while making a UPItransaction. The encouraging part was though 32% of the population also showed trust when itcame to transactions in the lower mid-range of less than ₹ 50,000 and more than ₹ 50,000. This data showed that a growing amount of trust is there when it comes to UPI Digital transactions, however the conversion rate is not at par with thegrowing rate of the UPI use, which means it would take some more time for UPI to fully takeover as the sole means monetary payments in theIndian Economy.

Third question asked among the respondents wasto understand out of all the UPI payment application services available in the market for the consumer who use it on an everyday basis, which one do they generally prefer to make theirUPI application for their choice. The responses received showed a clear winner amongst the competitors such as Google Pay which a whopping 42% share, followed by the people's next favourite payment application/service beingPhone Pe and simultaneously followed by Paytmwith 15%, Amazon Pay & BHIM with 7% and 8% consecutively and followed by WhatsApp Pay which again showed that with only 2% it hasnot picked up much as compared to its competitors though having a much more inception into people's phone, since WhatsApp is said to have overtaken the general messaging technology in the mobile phone sector. This wasfollowed by a 4% share in the other section, which meant the individual government &private banks with their own payment applications, which also added to the plethora ofthe options available to the retail customers.

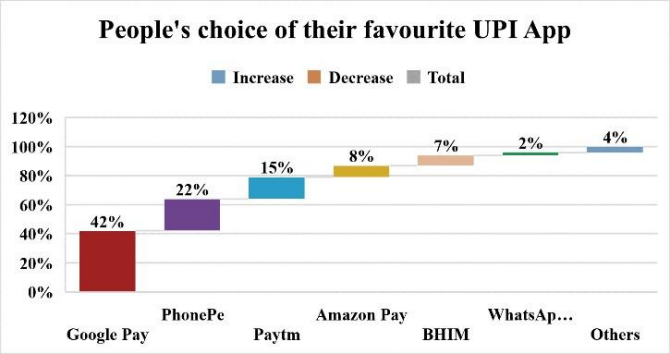


Fig 6. The waterfall graph showing the most preferred UPIapplication out of all the available options in the market currently

The fourth question was designed to understand that while traveling within the city limits, what isthe average wallet size (the amount of cash people generally carries with themselves). For this categorized the options such as I) more than
₹ 5,000, II) ₹ 5,000 to ₹ 2,000, III) less than ₹ 1,000, IV) they prefer UPI for them within the city payments.

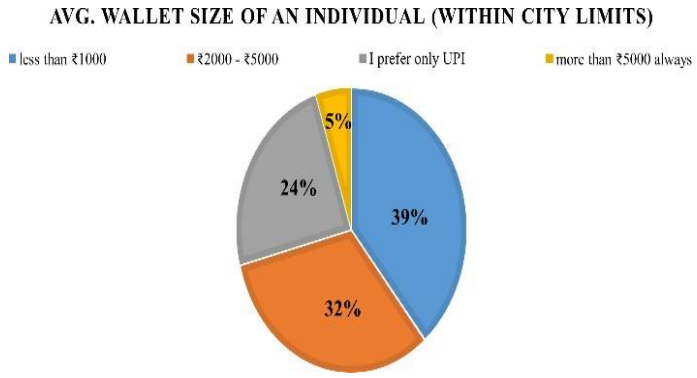


Fig 7. Average wallet size of an individual (the cash they preferto carry) when travelling inside their city limit

39% of the respondents said that they generally carry less than ₹1,000 when they are travelling

within their city limits, also another 32% showedthat they prefer carrying atleast more than ₹2000but less than ₹5000 for their monetary needswithin the city limits. Interestingly, 24% of the respondents felt that they prefer not carrying any cash while travelling or moving within their citylimits, sensing that they have embraced the new form of cashless payments and were heavily reliant on UPI for their payments. However, 5% of the population also felt that they preferred to carry cash more than ₹5,000 whenever travellingwithin their city limits. This is also an indicationthat the population is still divided between majority of the people who still prefer cash overUPI and however an increasingly ever-growing population also is ready to embrace the newer forms of payment structure (including UPI & others).

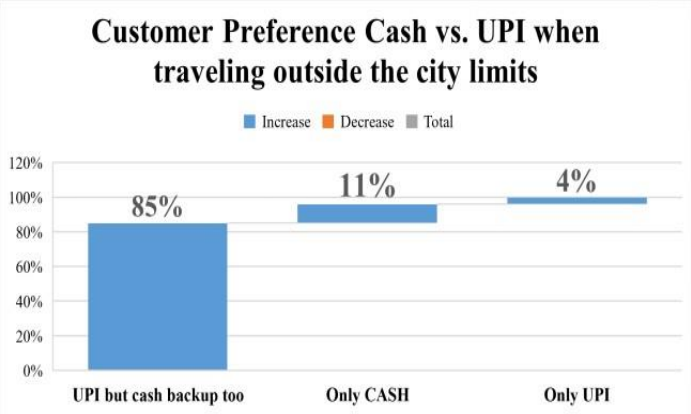


Fig 8. Cash vs. UPI as the individuals prefer when they aretraveling outside their city limits.

Also, another two generalised questions wereasked to understand how their user experience specially in lieu of their everyday UPI transactions, that can lead to a change in behaviour. For e.g., in case customer is trying tomake a payment and unfortunately due to serverissues or due to downtime they are unable to make the payment, so in order to understand the frequency of such mishaps in any given month, the individuals were asked to indicate whether they face such issues: I) in every payment using UPI, II) atleast once, III) more than once and, IV)never faced and issue. The responses received were a clear depiction of the picture that was drawn reflecting

the real scenario where, 60% responded saying that they have faced an issue more than once in any given month while using to make an UPI transaction using their favourite service. 30% responded indicating they faced andissue atleast once in any given month, 9% responding they have never faced an issue whilemaking UPI transaction, while only a negligible 1% felt they faced issue in every payment, whiletrying to make a transaction, we have consideredthis to be an outlier.

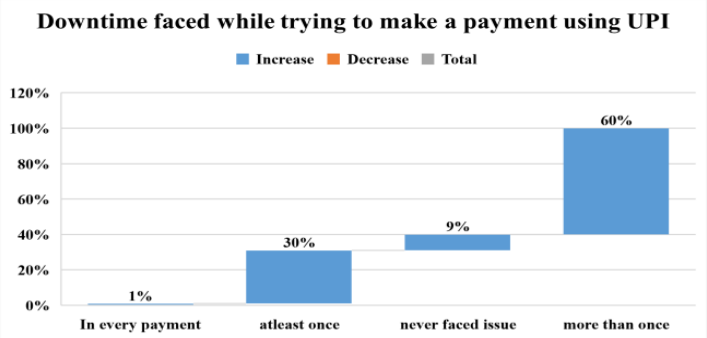
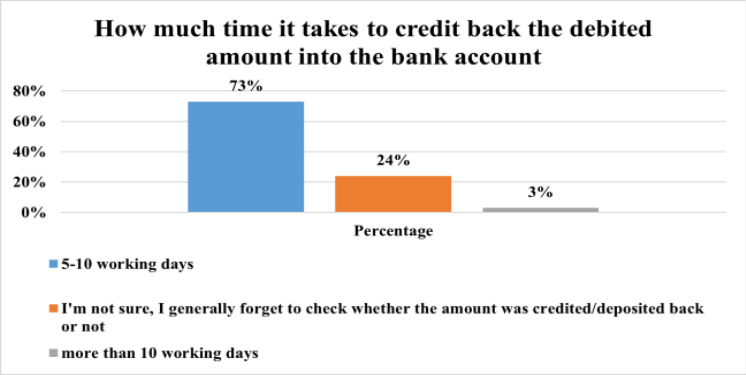


Fig. 9 – This waterfall chart shows the frequency of the downtime that is faced by the individuals in any given month

The second last question that was asked among the respondents was, that in case of amount beingdebited/deducted from one's account, how muchtime does it generally take to get it back creditedto an individual's account. This question was focused to understand the support that is receivedon behalf of the UPI service provider and how fast it is generally resolved so that the customer/individual receives their lost money back to their accounts. Though the optioned designed in the survey were focused on time- bound fixes or solutions that are extended by the service providers or service providers working in tandem with their associated banking institutions, however, to better understand the pain points of the customers involved we introduced an option which focused on the human behaviour, where often the individual forgets about the amount that is lost in transaction. For e.g., when one tried to book a train ticket, and

while making a payment using UPI the amount although deducted from the bank account however the resultant website or portal failed to execute the booking, leading to failure of the intended use in that frame of time. Thoughas a part of human nature and behaviour, generally people tend to make another transaction (usually in urgency) and thus after thesecond successful attempt, they tend to forget about the old failed attempt wherein their accountwas debited with the transaction value i.e., the money debited, however the people tend lose thetrack of the transaction, whether this credited back to the bank account within the promised time-frame. This is usually true in cases on transaction amount of lower value (₹10,000 or less); however, this varies when the transaction amount is a relatively higher value (₹25,000 or more).

Fig. 10- This clustered column chart showed how much time it takes to credit back the amount



after the amount thathas been already debited from the individual's bank account.

The last question consisted in drawing a conclusion on what are the probable parameters that people consider before using a particular UPIservice is generally being chosen by the individual users. In this case the parameters suchas the interface design (UI), the sense of security,the support that is being extended towards the issues that are faced by the customers on aneveryday basis, also the service providers that focus on periodical and timely updates on the bugfixes in order to make sure that there are no application crashes cause every application crashmeans the business is lost to their competitors asthe other service provider would providing aseamless

user experience would be always on thetop-of-mind awareness the next time that particular individual trying to make a payment.

Table 1 – The parameters that are to be considered before attempting to choose the right UPI service application

UPI	PARAMETERS (Rated on a scale of 1 to 5)					
	INTERFACE DESIGN (UI)	SECURITY	SUPPORT (24*7*365)	UPDATES/BUG FIXES	DOWNTIME MANAGEMENT	BENEFITS
Google Pay	5	5	4	5	4	5
Phone Pe	4	4	4	3	4	3
Paytm	5	4	4	5	3	3
Amazon Pay	5	4	4	4	3	3
WhatsApp Pay	3	5	3	5	3	2
Others	3	3	2	3	3	1

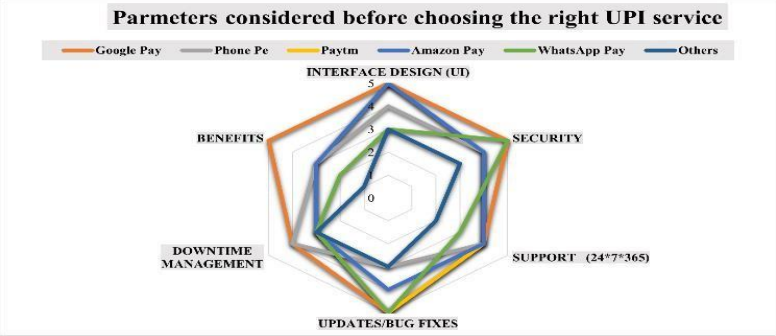


Fig. 11 – the radar chart showing all the considered parameters that are to be check listed, before choosing their right fit for UPI service provider.

Discussion

The results found using the longitudinal survey design methodology, helped us to gather the information over a period. The individual responses led to the finding that can be discussed as follows:

- When it come to the preferred mode of payment, people have moved from the traditional

methods of payment i.e., using Internet Banking, using Debit or Credit cards, and moved away to a larger extent from the limitations of cash availability

- majority of the transactions that are made nowadays are made utilizing the Unified Payments Interface services, which means again people have started to favour UPI transactions over other mediums of payment
- through the questions asked, we were tryingto understand the amount of trust that is built when making a UPI transaction. Irrespectiveof the service provider, the amount of money for any transaction using an UPI was that ofthe lower value (less than ₹ 10,000) as compared to higher value transactions (morethan ₹ 50,000). Thus, making it clear that people have still not been able to build that amount of trust over their individual internet banking account services. This means that, for higher value transactions they will still prefer a debit card of account transfer using RTGS or NEFT over UPI
- the average wallet size of any individualwhen travelling within the city limit were found and in this case the majority said theyprefer carrying cash less than ₹1000, however the interesting find was also when people responded that they have slowly started to replace the habit of carrying cash with UPI transaction because UPI seems to be available everywhere to aid them with their changing choice of their lifestyle and easy access and ease of use as with UPI, theexact denomination can be paid tothemerchants without any hassle of having to carry denominations of multiple values of currencies
- also, when a follow-up question was subjected to the respondents on what their preferred mode of payment is when an individual is travelling outside the city limits. The responses to this question made it very clear that people have not yet have had the opportunity to trust digital paymentscompletely. This can be attributed to variousreasons such as lack of proper connectivity, slow internet, or downtime in the services. Also, the majority preferred to carry cash asa back-up and wherever and whenever available, to make use of the UPI transactionmethods

- just as one of the reasons of not being able tohave complete faith in UPI/digitaltransactions, one of the major reasons can beattributed to downtime by the individual bank's servers. This means that atleast onceor more than once in a month, any given useris bound to face a hiccup while trying to make an online purchase or while trying to make an UPI transaction. Here most of the respondents when asked how frequently theyhad faced a downtime in their UPI services,to this the response was majority had faced downtime more than once in any given month
- also, linking to the issue of downtime, another major issue that prevails was amountbeing debited from the bank account, however the actual transaction to have beenfailed. This was seen as one of the major roadblocks when people made their payments using UPI services. So, when asked on the timeline on how much time it usually takes for their amount to be creditedback to the bank account, to which the majority said that it does not go beyond 5-10working days, however an interesting find was also there, where people tend to forget or not bother when it comes to failure in transactions, especially in cases of amounts of smaller value.

Conclusion

This we can see that though India as a country have done an incredible work when it comes to the reach and proliferation of the digital payment's services, especially the Unified Payments Interface network availability at everynook & corner of this country, however it wouldtake some more time to make sure that people build that amount of trust on these services simultaneously. Though making these projects being implemented in a country which is one of the most populated in the world and where the lack of awareness can also play a spoilsport,hence, it is worth a praise with the kind of reach that it has been able to advocate when it comes toUPI availability for the use

of the common public. Also, a lot of this credit can be attributedto the advent of the free internet popularised by the competitive internet providers in India, especially during the 2016-17 when the country was witnessing a lot of advances field of telecomsector. Not only internet providers, the availability of smartphones to the common public made it easier for the individuals to accessthat internet and streamline that culture of making internet as a well-accepted part of our daily lives. But the waters were tested for UPI during the rise of the COVID-19 pandemic. COVID-19 not only claimed the lives of people but also made the lives of the people pathetic, since their movements were restricted, whichmeant neither person were moving out of their home to banks to make use of the available sources to get cash, however a visit to an ATM was also next to impossible owing to the quarantine zones and curfews that restricted movement. Hence, it is during this phase, that people started to use UPI in more and more numbers as compared to any other time. Though UPI had already showcased its benefits, way before the pandemic had hit in, however the pandemic gave people a solid reason to make that cultural switchover from traditional approaches like card payments or internet banking transactions. Hence, this pandemic also helped people to adapt this new way of life, since it was easier to find one vendor along the lines with their phone numbers attached and directly paying them the required amount with the help their mobile phones having access to their bank account and transferring the money to the beneficiary accounts just within seconds of a click or a press of a button. Thus, the future behold immense potential and it is only a matter of time that UPI will completely take over the concept of physical money, as in case it has already started to further extend its potential beyond the borders of the Indian financial institutions and show the world the Indian way of going cashless.

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