



Catalysts of Cashless convenience: Exploring UPI Adoption Patterns and Perceptions

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Abstract. In the era marked by rapid technological advancements and shifting financial landscapes, the adoption of digital payments has become a pivotal phenomenon. This qualitative study delves into the intricate landscape of Unified payments interface (UPI) adoption patterns and perceptions. The survey also helps us to determine whether consumers are quickly embracing the shift to a less-cash society and how respondents are utilizing digital payments. We employed a well-designed structured questionnaire as a research approach to assess the extent of public preference for UPI and various other digital payment methods. A total of 53 respondents from parts of Nagpur & Pune provided the primary data. Understanding the respondent's motivations and attitudes concerning online UPI payment apps was made easier. Among the 53 respondent's it was observed that a significant majority of 98.1% indicated that they generally prefer UPI for making various online purchases which shows us the growing popularity of UPI and its convenience and also a majority of 60.4% responded as Very satisfied using UPI. This suggests that the majority of the respondents have had highly positive experiences with UPI, finding it to be reliable. Gathering data from rural areas or various merchants across these regions poses a research constraint.

Index Terms- Unified Payments Interface (UPI), Digital Payments, Google Pay

I. Introduction

A comprehensive definition of the "digital economy," encompassing all economic activity dependent on digital means, was put forth in OECD's digital economy task force as "The Digital Economy incorporates all economic activity reliant on, or significantly enhanced by the use of digital inputs, including digital technologies, digital infrastructure, digital services, and data. It refers to all producers and consumers, including the government, that are utilizing these digital inputs in their economic activities" [*OECD Report on A roadmap towards a common framework to Measure the Digital Economy, Page 5, Ch. 2*].



India's growing use of retail digital payments and the radical reconstruction of its cash economy indicate a shift in its relationship with cash. This is evidenced by the steep growth observed in retail digital payments. Increasing acceptance and convenience of digital payments vis-à-vis cash is also reflected in a decrease in average value per digital payment transaction. Speed, convenience, and competition are shaping the future of payments. We endeavor to make digital (payments) a divine experience to the users- Cash is king but digital is divine. [*Reserve Bank of India, 2020*]

Our study is an attempt to explore the links between the growth of digital payments and the growth prospects of the Indian Economy. Apart from the other reasons for the growth of digital payments in the country, we would look at some of the important variables which are responsible for such growth of Digital payments in the country. It is expected that if the potential of digitalization is harnessed it would help in reviving India's economic landscape and positively help in economic growth, further benefiting the common man.

According to the *Digital Payments Index (DPI, 2022)*, Published by the Reserve Bank of India highlights the fact that Digital payments across the country registered a growth of 24.13 percent in a year through September 2022. DPI released in September 2021 also shows an increase of 39.64% 304.06 DPI against 217.59 in the same month. The rise of the internet, which has radically altered how businesses function as well as how people work, communicate, and transact, best captures this rapid transformation. Several significant advancements in economic statistics have occurred recently as part of an international attempt to keep up with this rapid adoption of technology due to a growing economic and statistical interest in this digitalization and the accompanying idea of a digital economy.

II. Digital Payments in India: Prospects, Opportunities & Challenges

With people giving up conventional forms of payment like cash and credit cards, India prepares to become a less-cash society. Digital payments will keep growing throughout the nation, probably reducing the need for cash flow management.

1. Unified Payments Interface (UPI)

A unified Payments Interface (UPI) is a system that powers multiple bank accounts into a single mobile application (of any participating bank), merging several banking features, seamless fund routing & merchant payments into one hood. It also caters to the "Peer to Peer" collect request which can be scheduled and paid as per requirement and convenience [*Cashless India, Govt. of India*]

The growth in Digital payments in India remains attributed to the government's efforts through digitalization, reduced transaction costs, improved efficiency, removing middlemen and reducing corruption, improved digital financial inclusion,



and the growth of various e-commerce activities. The rise in digital payments in India also points to promotions of various programs like Digital India, Make in India, and Start-up India in the Country. The rapid expansion of the use of smartphones and internet access has led to a significant increase in the use of Mobile wallets, UPI, and other digital payment methods. The Unified Payment Interface (UPI) accounted for 52% of the total 8,840 Cr financial transactions in the financial year 2021-22 and on average, between FY19-22, growth in UPI-based transactions in value and volume terms have been 121% and 115%, respectively [*Economic Survey 2022-23, Ch.10*]. Over the recent years, there has been significant growth in the usage of information and communication technology which has led to achieving strong growth in the digital payments sector which further may act as a catalyst to the growth of various other sectors of the economy.

The journey of UPI has been fascinating. The number of banks that became part of the real-time payment system increased from 35 in December 2017 to more than 380 in December 2022. Though pre-existing payment modes such as debit cards, credit cards, National Electronic Funds Transfer (NEFT), and Real-Time Gross Settlement (RTGS) have grown over time, UPI remains one of the best-preferred modes of payment. In this sense, the progress of UPI has been remarkable [*Economic Survey 2022-23, Ch.10*].

Unified Payments Interface (UPI) does not remain restricted to India alone, National Payments Corporation of India through its international portal has been working on the acceptance of UPI in various international markets such as Singapore, UAE, France, Netherlands, etc. The ICT companies remain a great contributor towards expanding the digital ecosystem in India which further has inclined towards improving financial inclusion. It is envisioned that the journey of UPI will help accelerate the process of financial inclusion and digital adoption in India by creating a more prosperous and inclusive ecosystem that can accommodate larger sections of the population in times to come. [*Economic Survey 2022-23, Ch.10*].

“Digital payments in India to reach \$1 trillion by 2023”, *Credit Suisse Report* (2018) stated, but recently as per the RBI Report, digital transactions in India reached \$2 Trillion as of January 2018. In the nearing future, this will grow at a significant rate. Numerous digital payment organizations have been founded as a result of technological advancement to extend, improve, and facilitate safe digital payment transactions. Digital payments in India have a promising future.

Technology has today encouraged creativity, with digital transformation being a critical element in gaining an advantage in this increasingly competitive industry. The Indian manufacturing sector is steadily moving toward more automated and process-driven manufacturing, which is projected to improve efficiency and enhance productivity. During the last nine years, the number of digital transactions in India has increased from a mere 127 crore in 2013-14 to 12,735 crore transactions in 2022-23 (as of March 2022), which is over 100 times increase. [*Ministry of Information and Broadcasting, Digital Revolution*]



The Open Network for Digital Commerce (ONDC) is a unique initiative that deserves special mention. This open network system will make the e-Commerce landscape more inclusive, accessible, and experience-driven for all consumers and sellers, especially for small businesses that will exercise more freedom in business decision-making.

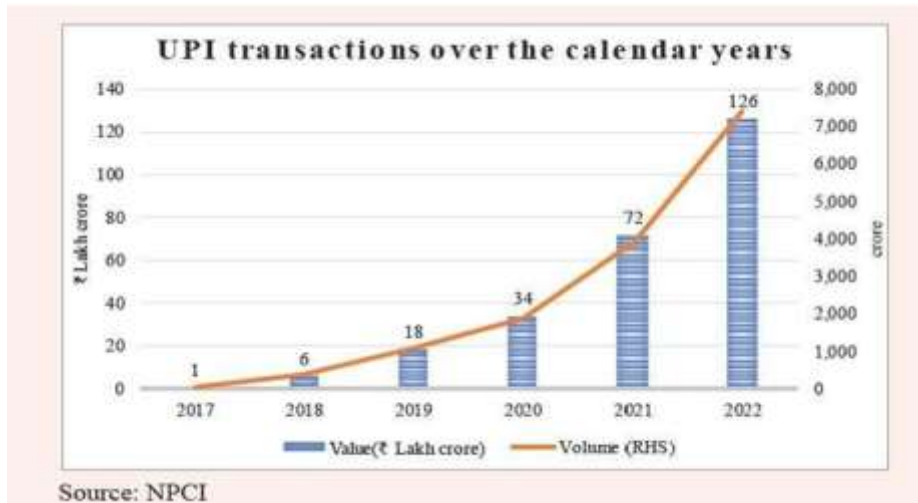


Fig. 1: - UPI transactions over the calendar years (2017-2022)

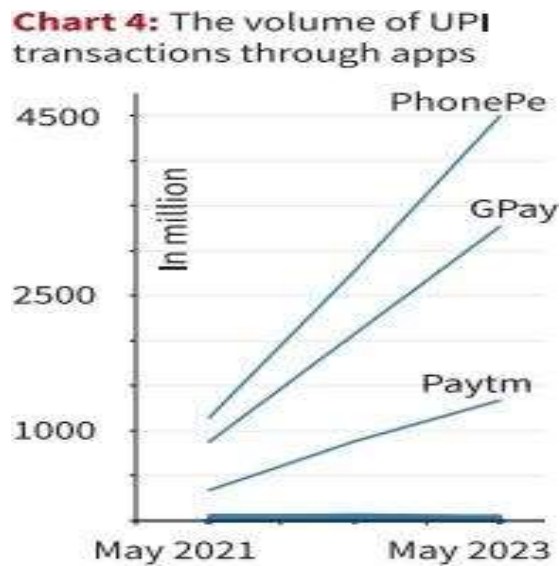


Fig 2: The Volume of UPI Transactions through various apps (2021-2023)

Approx. 74 billion transactions worth Rs 125.94 trillion were conducted using UPI in the calendar year 2022. The platform handled more than 38 billion transactions



totaling Rs 71.54 trillion in 2021. As a result, nearly 90 percent more transactions took place on the platform in a year, and their average value increased by 76 percent. A little over three years after its inception in the aftermath of demonetization in Nov-2016, UPI crossed the 1 billion transaction threshold in October 2019. By October 2020, it grew to more than 2 billion transactions per month. Throughout the course of the next 10 months, UPI handled more than 3 billion transactions per month [*National Payments Corporation of India*]. This shows as a strong indicator for the country in achieving Economic growth.

Over the next five years, UPI is expected to constitute almost 90% of total transaction volume in retail digital payments by expanding its adoption to rural areas and tier 3 and 4 cities, In FY 2022-23 the number of transactions has grown by 80% from 46 billion to 83 billion with an increase in the transaction value by 64%. This growth in transaction volumes has been complemented by growth in QR code-based payment infrastructure i.e., UPI QR and Bharat QR by 43.5%. UPI transaction volumes are predicted to grow in the future at a compound annual growth rate (CAGR) of 42% and 30% in the case of the transaction value. [*PWC India, "The Indian payments Handbook 2022-27 "Page 6]*

UPI currently constitutes 40% of all the digital payments carried out in the country [*Ministry of Finance*]. It has also boosted small businesses and has helped various small street vendors as well as migrant workers. UPI also remained a savior during the COVID-19 pandemic which allowed no physical intervention and contactless payments through each other.

2. Challenges to Digital Payments in India

As we head towards the major digital revolution, the digital payments infrastructure is bound to face certain challenges across the country mostly on the lines of lesser financial literacy, connectivity issues, adoption by the rural areas, and increasing cyber frauds which remains a major part of concern even today, data privacy issues, etc.

Consumer perceptions also may act as an important challenge that the country is facing today. Consumers in India believe cash is the faster and easier method of negotiating, and many consumers also fear that they are being charged a higher fee to pay by Card.

On the Other hand, the Indian economy depends to a large extent on the Informal sector, and a maximum of the workforce in India are employed in the informal sector and use cash payments for their local labor contracts and also for various raw material use.

Information and communication technology in itself has various benefits like greater access to information, reduction in the cost of labor etc. however digitalization is not performing at an equal rate all over the country because imbalance exists and then there arises the *problem of Digital Divide*. The problem of the digital divide



would further lead to technology discrimination which remains a form of Poverty and social exclusion which would create the problem of wealth creation.

In fact, as per the current market trajectory, under the 30% cap, the UPI market in India may likely be captured by a quadropoly. Therefore, as the high-potential UPI technology scales up, it's critical to ensure that it doesn't become a victim to a quadropoly and that there is enough market space for Indian digital-payment companies to proliferate in this Indian payment's technology. [*Thukral & Sachdeva (2022), Protecting UPI A Jewel among Indian fintech innovations, NITI Aayog*]

Hence further ensuring the following challenges are resolved on a priority basis through the active intervention of the government by setting up strong regulations of cyber frauds, a grievance redressal mechanism, and promotion of digital India schemes through certain awareness programs across various aspirational districts as well as the rural districts in the country.

III. A Brief Review of the Empirical Literature

The study identified that the variables income level, education level, and access to the Internet have a positive relationship with customer adoption and satisfaction. The intensity of the relation is strong for transaction cost and efficiency which shows a positive relationship. It helps us understand customer perception towards digital transaction mode; *Pan (2019)*.

By studying a sample size of 250 respondents age-wise it was found that 92% of the people prefer to use UPI and 94.8% of the people use smartphones, further, the app most used for UPI payments was Google Pay followed by Phone pe and Paytm. The study also derived that more than 90% of the respondents were aware of the UPI and the spread of UPI has been through word of mouth and the internet and television; *Gohil et al. (2023)*.

The study used a multiple regression model to predict the relationship between Digital Payments and economic growth in the country. Variable Y which was considered as the Dependent variable in the analysis represents the Level of growth and whereas the model also includes various independent variables such as Credit card and debit card transactions. The results indicate that among the two independent variables, debit card transactions, with a p-value of 0.00 is the variable that has a significant impact on the GDP of the country. The R-squared value stands at 93% indicating that the independent variables in this study explain the variance in the dependent variable up to the extent of 93%; *Sanghvi (2020)*.

The main aim of the paper was to understand the continuance intention of consumers towards various digital wallets post-demonetization, the study was conducted using taking variables and applying SEM (Structural Equation Modeling) and the data was collected among 600 Digital wallet users across Delhi NCR region. Further, the researcher clarifies the fact that SEM is used to confirm the statistical



allocation between various factors mentioned. The P- values obtained were also significant. Hence the model looks to be a good fit model; *Goel & Nath (2020)*.

The research study works on an online survey-based dataset to understand how factors such as 'trust' and 'perception' in Digital payments and experience with online frauds affect the payment behavior of consumers. A multiple regression model is formulated with the mode of payment taken as the dependent variable and the independent variable is adjusted accordingly to the hypothesis stated. The technique of Maximum Likelihood Estimation (MLE) is used to obtain the Parameters in the model. Demographic characteristics such as gender, age, education, income, etc. are taken as categorical independent variables and the following model is estimated. Most responses were from digitally literate people and hence this was identified as the limitation of the research; various values from the descriptive statistics were observed and conclusions were drawn; *Shree et al. (2021)*.

The study tries to assess the consumer's attitude and perception towards digital payments and UPI Interface, from an educated urban sample of 100 respondents, it is mostly observed that about 45% of the respondents believe that UPI-based digital transactions are safer and more secure than other forms of digital payments, hence there's a growing perception that UPI based apps are superior to other e-wallets.

The study also identified that 35% of the people are concerned with security while doing digital transactions and another concern is on merchant acceptance, roughly 8%. Poor internet connection and lesser technological knowledge are considered as some drawbacks of the respondents from India; *Arora (2016)*

The study is based on the frequency of usage of UPI and various observations were analyzed, the study was conducted using a structured questionnaire, and a convenience sampling technique was adopted to collect the samples. Various Null hypotheses in the study were taken, namely based on the difference of dissimilarities between age differences and usage of UPI, annual income and maximum amount of UPI, etc. It is revealed from the correlation analysis that there existed no significant relationship between the education level of respondents and the safety level of UPI ($r = .039$, $p = .672$), hence the null hypothesis was accepted at a 5% level of significance.

The chi- square analysis revealed that there existed a significant association between the age of the respondents and their satisfaction level with the usage of UPI. The results of One-way ANOVA revealed that there existed a significant difference among different categories of age groups of the respondents on the frequency of usage of UPI; *Ganapathyraman & Sugumaran (2021)*

IV. Data Analysis and Interpretation

The research was based on a small sample size of 53 respondents across Nagpur and Pune regions which serves as our foundation for Data analysis.



1. Findings and Discussions

The data analysis and interpretation were gathered using primary data which is shown below.

Q1) Do you have Wireless/ Wi-fi facility when you use the UPI or use Mobile Data?
53 responses

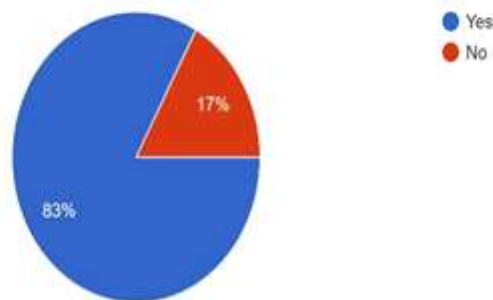


Figure 3: Do you have wireless/Wi-fi facility when you use the UPI or use Mobile Data?

According to the above Pie chart, it was observed that 83% of the respondents have access to wireless facilities or mobile data while using UPI. However, 83% of the respondents having access to Wi-fi at home reveals that public infrastructure to support mobile & internet facilities at the doorstep has materialized over the recent past and affordability has also significantly gained momentum. These results align with the general trend of increasing connectivity and smartphone penetration which has led to improved accessibility to wireless networks across regions. On the Other hand, it is crucial to acknowledge the 17% of the respondents who lack wireless facility access, as it highlights the importance of addressing various infrastructure challenges across the regions.

2. What is the frequency of using UPI transactions by you in a day?

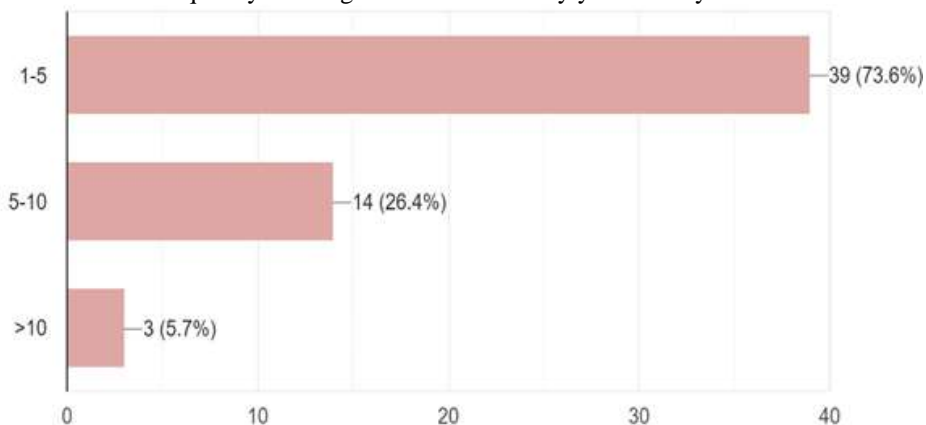


Figure 4: Frequency of UPI Transactions in a day



According to the above Bar graph, it was observed that out of the total respondents, 73.6% of them fall into the category of conducting 1-5 UPI transactions in a day, this group represents the majority of respondents, suggesting that a significant portion of the participants use UPI for a moderate number of transactions each day further showing us that UPI has become a popular and widely accepted mode of digital payment for routine transactions among the respondents. The next category is 26.4% of respondents who majorly use UPI for 5-10 transactions in a day, while this number is smaller than the previous group these results suggest that UPI is not only used for routine payments but is also being used for more frequent transactions, possibly for a broader range of expenses. The smallest category comprises 5.7% of respondents using UPI transactions >10 in a day which embraces the fact that these respondents have fully embraced UPI and depend on the same for their daily transactions.

3. Up to what maximum amount would you use UPI? (Amount in INR)



Figure 5: Maximum Amount UPI Preferences

The survey results highlight the popularity and widespread adoption of UPI for transactions up to 25,000 Rupees indicating its efficiency and ease of use for small to medium-sized transactions. However, there may be opportunities for further promoting UPI usage in the 50000-100000 range by addressing user concerns and enhancing the system capabilities for larger transactions.

4. What method of payment do you generally use while an online purchase?

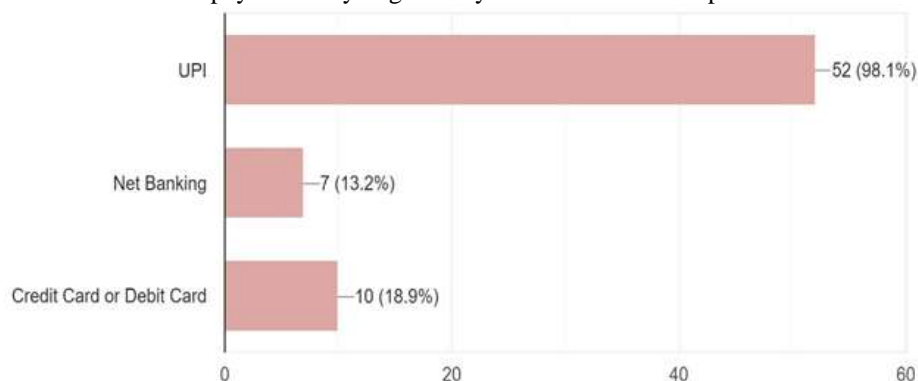


Figure 6: Method of Payment While Making an Online Purchase



A significant majority of 98.1% of respondents indicated that they generally prefer UPI for making various online purchases which shows us the growing popularity of UPI and its convenience. Its ease of use, speed, and security features have mostly made it a preferred choice for a majority of consumers. It was also seen that Net Banking and Payments and purchases through credit/debit cards still retain relevance with 13.2% and 18.9% of respondents but they seem to be facing stiff competition with the growing popularity of UPI.

5. Which app is the most preferred by you to use UPI?

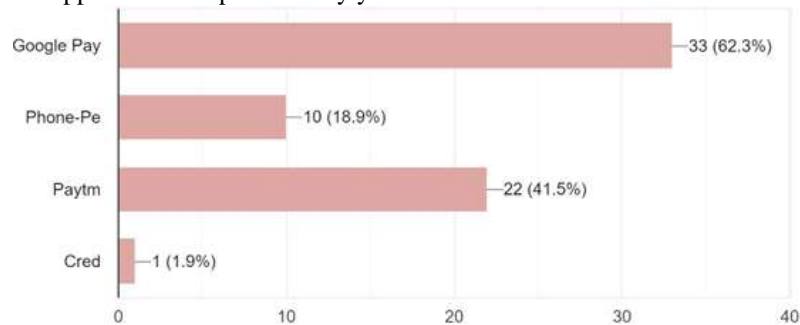


Figure 7: Application Most Preferred by respondents to use UPI

From the above bar chart, it is observed that 62.3% of respondents prefer Google Pay followed by Paytm (41.5%) and Phone-Pe (18.9%). The Potential factor contributing to Google Pay's dominance could be a user-friendly interface additionally Google's reputation for data security, trustworthiness, and its branding may have positively influenced user's decisions.

6. Which app is the fastest and most acceptable by most of the merchants etc?

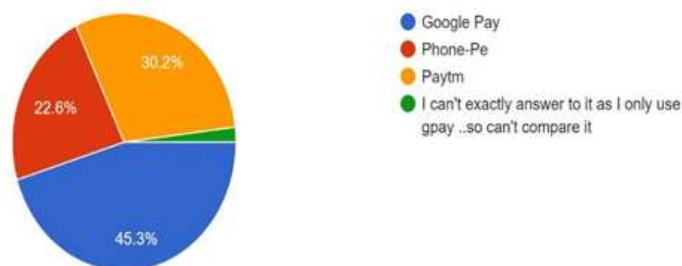


Figure 8: Fastest among the UPI payment Applications

From the above Pie chart, it was observed that 45.3% responded to Google-pay as the fastest and most acceptable by most of the merchants followed by Paytm and Phone-Pe.



7. What is your level of satisfaction using UPI?

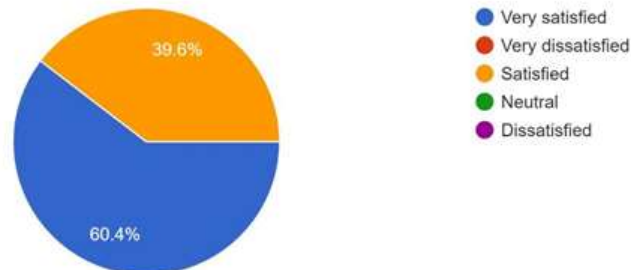


Figure 9: Satisfaction Levels of using UPI payments

The data showcases the notable level of satisfaction among UPI users, with a significant majority of 60.4% responding as Very satisfied. This suggests that the majority of the respondents have had highly positive experiences with UPI, finding it to be a reliable, efficient, and user-friendly payment method. Additionally, 39.6% of the respondents indicated being Satisfied with UPI. The Satisfied respondents likely appreciate the convenience of UPI but may have encountered occasional issues or may perceive some room for improvement in specific aspects of the services.

8. What are the certain problems faced by you while making an UPI transaction?

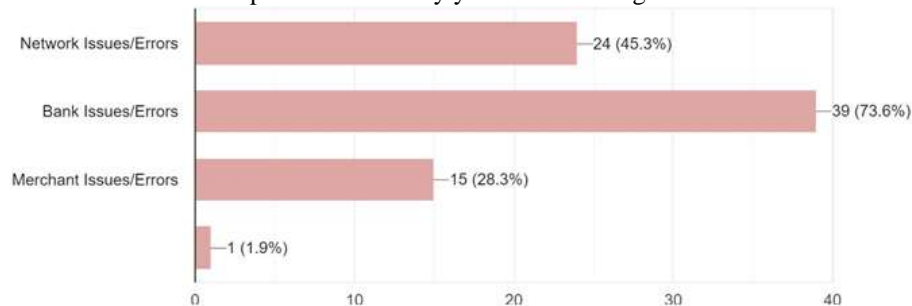


Figure 10: Issues faced while making an UPI Transaction

This data explains to us that the most common challenge faced while making a UPI transaction is related to issues on the Bank's side with 73.6% of respondents. Bank issues might include Bank transaction failures etc.

The survey also indicates 45.3% of respondents face Network issues while making a UPI transaction which could involve poor connectivity and server downtimes. 28.3% of respondents also reported experiencing merchant-related issues which could be due to payment confirmation delays etc. This high percentage of errors suggests that there's a need for closer collaboration and communication between UPI providers and Banks to streamline transaction processes and address user concerns effectively.



9. For what Kind of services do you generally use UPI?

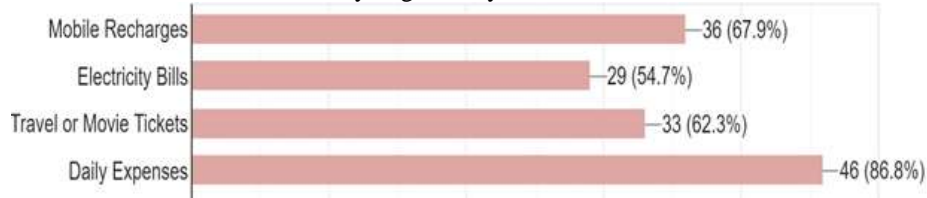


Figure 11: List of services for which UPI is used

The data indicates that the majority of UPI transactions among the respondents are utilized for daily expenses with 86.8% of individuals preferring this category. Daily expenses may include payments for groceries, dining, etc. The survey also reveals that mobile recharges and travel or movie tickets are also some popular services for UPI transactions with 67.9% of individuals and 62.3% of individuals, 54.7% of the respondents also using UPI transactions to pay their electricity bills making it another important category for UPI Utilization. These findings underscore UPI's effectiveness as a preferred payment method for a wide range of services, ranging from routine expenditures to utility bill payments and entertainment-related transactions.

10. Why do you prefer paying through these payment apps?

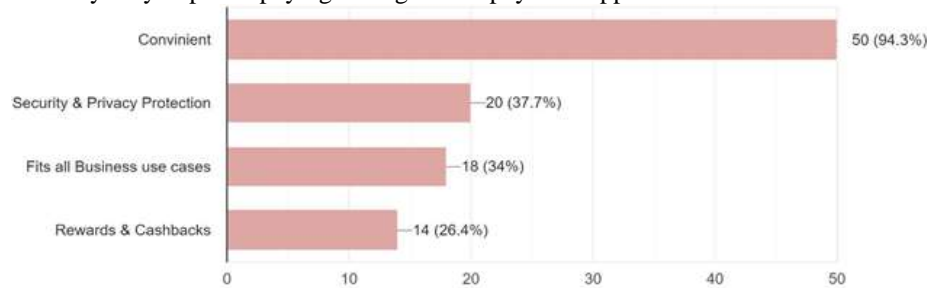


Figure 12: Preference of Payments through UPI

It is observed that the majority of the respondents i.e., 94.3% respondents prefer these payment apps or UPI due to convenience factors. This further suggests that users value the ease of conducting transactions with these payment methods including the simplicity of sending and receiving money, quicker transaction processes, and the ability to make payments anytime anywhere. It's also observed that 37.7% of respondents prioritize security and privacy protections when choosing payment apps or UPI. 34% of respondents consider the capability of payment apps or UPI to fit all business use cases as a significant factor, on the other hand, 26.4% of respondents also prefer due to various rewards and cashback offers provided by these payment apps.

IV. Conclusion

The study derived that more than 90% of the respondents are aware of UPI and prefer UPI for their various online purchases relying on its convenience and



reliability. The study also showed us that people have not just accepted UPI as their desired form of payment but have made it an important part of their daily life. The perception of the people that UPI is a safe option for transaction of money has played a significant role in adoption of UPI. Among the various UPI payment applications Google pay emerged as the most preferable. The potential factor's contributing to Google pay's dominance would be its branding and Google's recognition for its data security. The data also explains us that the most common challenge faced while making an UPI transaction is mostly related to the Server downtime's issues from the merchants or bank sides, The higher percentage of errors suggest that there's need for a closer collaboration and communication between UPI providers and banks to streamline transaction processes and address user concerns effectively to act as a catalyst towards less cash society.

The upswing or the rise of digital transactions following demonetization necessitates comprehensive backing from all stakeholders to proficiently navigate present challenges and fulfill future expectations. Amid a plethora of opportunities, there also exists an equivalent set of challenges. Genuine and complex barriers must be tackled head-on in order to successfully guide India's transformation into a society with reduced dependence on physical currency. Moreover, a collaborative partnership between the Government and private sector could remain important in constructing digital infrastructure capable of reaching rural areas, ensuring seamless interoperability, fostering healthy competition among providers, and enhancing financial literacy among citizens.

While the journey towards a fully cashless economy in India may be a gradual process, incremental steps have the potential to boost public confidence and progressively shape India into a less-cash society in the medium term.

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