

# Identifying the Major Demographic Factors Determining Unified Payments Interface Usage: A Study Based on West Bengal

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**Abstract** - Around 44 billion digital transactions were recorded across India during the financial year 2021. Ever since the COVID-19 pandemic hit India, a significant growth in the number of digital payments has also occurred. The value of transaction is estimated to rise up to 385 trillion Indian rupees by the financial year 2026 (Statista, 2022). Given this importance of Unified Payments Interface (UPI) usage, we surveyed 205 respondents from rural and urban West Bengal to explore the determinants of UPI usage and the impact of COVID-19 pandemic on UPI use, if any. We used logistic regression and independent sample t-test and found that males and younger individuals use UPI more than females and aged persons, while we do not see any difference in usage across income brackets and between rural and urban areas. The implication is that to make India digital, those who use UPI less, such as females and the aged, should be encouraged to participate more in UPI usage.

**Keywords:** Unified Payments Interface, Logistic Regression, T-Test, E-Wallets, COVID-19

## I. INTRODUCTION

E-wallets have easily gained popularity among the youth mainly those aged 18-25 years (Jain, & Sabharwal, 2019). Mobile wallets have shown a great scope in India especially as it has the largest number of users of smartphones. In recent years, mobile wallets have expanded by ten folds with significant growth of non-banking transactions (Sarika & Vasantha 2019). In the coming years, a cashless society will become a reality and the number of cashless transactions will outnumber the cash payments in India.

The National Payments Corporation of India (NPCI) has defined the Unified Payments Interface (UPI) as “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” (NPCI, n.d.).

According to the Reserve Bank of India, Digital Payments Index (DPI), which measures the extent of adoption of digital payments in India, stood at 304.06 in September 2021 (RBI, 2022) with March 2018 as the base year. The table below shows the index series since its beginning in March 2018.

TABLE I RESERVE BANK OF INDIA - DIGITAL PAYMENTS INDEX (RBI-DPI)

Period	RBI - DPI Index
March 2018 (Base)	100
March 2019	153.47
September 2019	173.49
March 2020	207.84
September 2020	217.74
March 2021	270.59
September 2021	304.06

(Source: Reserve Bank of India)

Since access to the internet is a major requirement for using UPI and related services, it is important to discuss the internet penetration and digital population in India. As of 2021, the internet penetration rate in India stood at 45% from just 4% in 2007. In terms of active internet users, India happens to be the 2<sup>nd</sup> top country in the world because even though the % of internet users is not too high, keeping in mind the population size of India, it still accounts for over 620 million users. The Digital India campaign does play an important role in improving internet penetration in India. The role of Reliance Jio services is significant in making internet access to people from all income levels and socio-economic classes with its schemes and offers.

Given this importance, in this study, we aim to answer the following research questions:

1. Does UPI usage depend on socio-demographic factors? and
2. Was there any impact of the COVID-19 pandemic on UPI use?

The rest of the article is arranged in the following manner. The next section describes the literature review, focusing on the existing research findings of the relevant field, followed by the research methodology in section III. The major research findings have been explained in the results and discussion section labeled section IV. Finally, we conclude in section V with some implications for UPI usage.

## II. LITERATURE REVIEW

Tripathi and Dave (2022) studied the relationship between digital payments and e-commerce in India and the impact of digital payments on cashless transactions. An important observation of the study was that the pandemic has added to the importance of e-commerce thereby inducing buyers to make cashless transactions leading to the growth of UPI. The cashless transaction was seen as a means for customers to shop for anything at any place even during the COVID-19 pandemic.

Gupta and Kumar (2020) reviewed the design, technology and parties involved in UPI along with its advantages and challenges. The study concluded that UPI is an effective tool that can make financial transactions straightforward and reasonable for customers. The shortcomings of UPI based on information collected from respondents from Meerut in that study are mainly confidence in the cashless payment system and awareness, particularly among people from rural backgrounds. The buyer's confidence and perception were found to play an important role in creating a positive impact on the adoption of digital payment systems. In conclusion, the authors mention that various demographic factors such as gender, age, occupation and yearly income, and level of education are important determinants of digital payment.

Tripathi and Dixit (2020) carried out a study on participants from the state of Gujarat to examine the adoption of digital payment using mobile wallets. The results revealed that respondents' professions had no significant impact on the decision to use mobile payment applications. The age of respondents was found to be negatively linked to the usage of mobile wallets which indicated that elderly people were not interested in using the digital payment facility. The study further finds that respondents with undergraduate and graduate levels of education were among those who adopted the mobile wallet facilities easily. Apart from the demographic factors, other factors such as rewards in the form of cashback and discounts, safety, records of spending, time-saving and convenience attracted users towards e-wallets whereas technological know-how, trust, transaction costs, and habit were some of the barriers towards effective usage of mobile wallets.

Gupta and Hakhu (2020) analyzed the data of a sample from districts of Haryana to understand the perception of specific age groups towards digital payments. The analysis of results obtained from the study indicated that the variable age had a significant impact on the perceptions of the customers of the specific age groups and attitudes toward the usage of digital payment facilities. Young individuals in the age group 26-40 years showed positive behavior towards cashless transactions and thus a strong positive relationship was observed between customers' perceptions and the usefulness of digital payments.

Eswaran, K. K. (2019) assesses the perceptions of customers and the impacts of their demographic

characteristics on the acceptance of digital payments. The study indicated that there was a positive impact of digital payment on the convenience of transferring money in rural areas, which was not possible earlier.

Jain *et al.*, (2019) reviewed the literature on the adoption of digital banking based on the articles published between January 2005 and 2018. The authors conclude that the usage of wireless banking is set to increase in the coming years with the target audience being young people. This is so because the youth is tech-savvy and can easily adopt new technologies. The study could not, however, establish a relationship between 3 components of internet banking i.e. e-payment, e-banking and m-banking due to lack of data.

Vasanth and Sarika (2019) focused on the factors of the Technology Acceptance Model (TAM) and the extent of influence that demographic variables have on the willingness to use mobile wallet facilities. The outcome of their study pointed out that age and gender had a significant impact on the usage intention towards e-wallet facility. The behavior of individuals in the age group of 50-59 years and 60 years and above was found by the authors similar with respect to social influences and personal innovation, but these behaviors were found by them varying in different other age groups. Another finding of the same study was that individuals in the age group 20-29 years had similar behavior as in the age group 30-39 years with respect to perceived enjoyment than the other age groups.

Moreover, Lonare *et al.*, (2018) studied the factors that affect the growth of user proportion and acceptance of e-wallets and the gap between users in metro cities and tier-2 cities. The study found that the percentage of e-wallet users in metropolitan cities is more than in tier-2 cities. The convenience of use was observed to be the only significant variable for the adoption of e-wallets. From the vendor's point of view, the adoption of e-wallets was considerably less.

So, based on this literature review, we hypothesize the following.

*Hypothesis 1:*

$H_0$ : UPI payments are not significantly affected by the user's age, sex, education, occupation and income.

$H_1$ : UPI payments are not significantly affected by the user's age, sex, education, occupation and income.

Use of UPI is determined by socio-demographic characteristics of individuals.

*Hypothesis 2:*

$H_0$ : Pandemic had no impact on UPI usage.

$H_1$ : Pandemic had an impact on UPI usage.

## III. METHODOLOGY

This study is based on primary data collected through a structured questionnaire from 205 respondents from rural

and urban West Bengal. As the use of UPI requires a bank account and banking habit, only adult respondents were considered in the sample. Purposive sampling method was used to collect data for the survey wherein characteristics of the respondents and objective of the study were considered.

Since usually some idea about phone banking and e banking are required for UPI use, we only considered the computer and smart phone users in the sample. The questionnaire was circulated through different social media platform like WhatsApp, Facebook and Instagram among different groups during February 1, 2022 and February 15, 2022.

$$l = \log_b \frac{p}{1-p} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 \tag{1}$$

Where,

p = probability of using UPI

1-p= probability of not using UPI

x<sub>1</sub>=age

x<sub>2</sub>=sex

x<sub>3</sub>=years of schooling

x<sub>4</sub>=salaried employee

x<sub>5</sub>=urban

x<sub>6</sub>= Ln(monthly income)=Log of monthly income

We define the above variables of (1) as follows:

UPI use=1 if the respondent has used or uses any UPI platform, 0 otherwise

Age=age in years

Sex =1 if the respondent is female, 0 otherwise

Years of schooling= No of years the respondent attended educational institution

Salaried= 1 if the respondent is a salaried employee, 0 otherwise

Urban=1 if the respondent is an urban resident, 0 otherwise

Ln(Monthly income) = Log of monthly income in Indian Rupees (INR)

Also, the independent sample t test was performed to analyze if pandemic had a positive impact on UPI use. Here, dependent variable is average monthly transactions made before and after the pandemic.

#### IV. RESULTS AND DISCUSSION

Table II indicates the demographic profile of the respondents. 61 respondents are in the age group of 18-25 years, another 55 between 25-35 years, 45 respondents between 35-45 years, and 30 respondents are in the age group of 45-55 years and the remaining 14 were above 55 years. The gender composition of the sample included 89 females and 116 males. Majority of the studied respondents were graduates (103 respondents) and other 15 were postgraduates and above while 87 respondents were non-graduates. The monthly income of 100 respondents was less than INR. 25,000 while the income of 70 respondents was between INR.25,000 and INR 50,000 per month. Out of the

The questionnaire contained two parts. The first part consisted of questions related to demographics including age, sex, education, occupation and monthly income. Apart from this, questions mainly focused on consumer awareness, respondents were asked about the frequency of usage in the pre- and post-COVID-19 scenarios respectively, ease of using UPI applications, suggestions and more.

We used different statistical and econometric methods for data analysis to test our hypotheses. Logistic regression of the following form was used to identify the major socio-demographic determinants of UPI use.

remaining respondents, 31 had income between INR 50,000 and INR 1,00,000 and 4 respondents above INR 1,00,000. Out of the 205 respondents, 138 respondents (67%) were UPI users while 67 respondents (33%) did not use any UPI.

TABLE II DEMOGRAPHIC CHARACTERISTICS OF THE SURVEY RESPONDENTS

No. of Respondents		205
Age Group	18-25	61
	25-35	55
	35-45	45
	45-55	30
	>55	14
Gender Composition	Female	89
	Male	116
Educational Qualification	Non Graduate	87
	Graduate	103
	Postgraduate and above	15
Monthly Income (INR)	<25000	100
	25000-50000	70
	50000-100000	31
	>100000	4
UPI user	Yes	138
	No	67

The popularity of different mobile applications for UPI transactions is clearly visible from the bar graph below in fig. 1. Google Pay and Bhim turned out to have the maximum usage among the 205 respondents of the survey.

Today, PayTM has become outdated among many users who initially started using PayTM as the only application for UPI payments. During the introductory stage, PayTM had good reach in rural areas. In Fig. 1, the total number of users of different UPI apps exceeds the actual sample size (205) as many people use 2-3 UPI apps simultaneously.

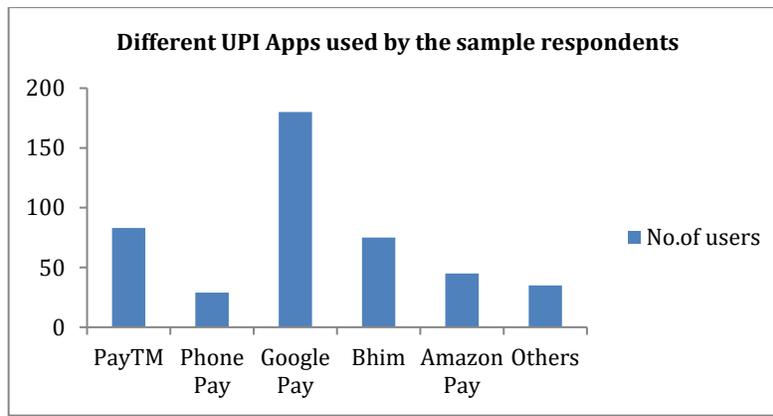


Fig. 1 Users of Different Mobile Applications for UPI Transactions

Table III below shows the factors affecting the use of UPI platforms. From Table III we see that our logistic regression model is well fitted as the Log Likelihood ratio of the fitted

model is quite high and the LR Chi Square statistic is highly significant at 1 % ( $p = .00$ ).

TABLE III LOGISTIC REGRESSION RESULT

Log likelihood = -84.419842				
Number of obs = 205				
Log likelihood = -84.419842				
LR chi2(4) = 105.99				
Prob > chi2 = 0.0000				
Pseudo R2 = 0.3857				
Dependent Variable: UPI use=1 if the respondent has used or uses any UPI platform, 0 otherwise				
Variable	Coefficient	Standard Error	z	P> z
Age	-1.805528	0.43581	4.14	1.7365E-05
Sex	-.0529536	0.027593	1.92	0.02742895
Years of schooling	0.031979	0.031884	1.00298272	0.1579346
Salaried	0.067762	0.027586	2.4564018	0.00701681
Urban	0.008198	0.011884	0.68984735	0.24514509
Ln(Monthly income)	0.057762	0.039759	1.4528253	0.07313613
Constant	11.2864	1.893801	5.959655	1.2589E-12

Regarding the determinants of UPI use, we see that both age and sex have negative but significant impact on the dependent variable, i.e., younger and male respondents are relatively more frequent users of UPI than old and female respondents. This result is in line with Jain *et al.*, (2019). Since one needs to have a bank account linked with her own phone number in order to use UPI, and in Indian societies, usually the household head's phone number is linked in this context. This finding may be linked with the patriarchy in the society. Though 30 female survey respondents were salaried working professionals who are most likely to have their own salary accounts linked with their own phone numbers, there is apparently no impact on the result. The variable years of schooling is insignificant, implying that education is not a major determinant of UPI use. Though this result contradicts Gupta and Kumar (2020), we must note that if a person is comfortable with smartphones, he or she can easily use UPI provided the phone number is linked

with the bank account. Since the questionnaire was circulated among different social media platforms, the respondents were likely to be smartphone users and thus education appeared to have no impact on UPI use. Similarly, the variable urban is also not significant. Nowadays it can be observed that even shopkeepers in remote rural areas accept UPI payments and the QR codes are displayed in shops. Our findings are in line with the observation of Eswaran, K. K. (2019).

From the above table, it also appears that salaried respondent are significant users of UPI ( $p = 0.007$ ). Since usually salaries are deposited in employees' accounts through e transfer, salaried employees appear to find UPI transactions more convenient and time-saving than cash or any other method of transactions. However, income has a weak effect on one's UPI use ( $p$  value 0.07). May be UPI payment methods are equally accepted among all income

groups. Though this result contradicts Jain et al., (2019), we must keep in mind that in current situation most of the sellers and small business owners accept UPI payments and hence they are also UPI users. Thus, UPI has become popular in the lower and middle-income groups of the society. During the pandemic, many Indian citizens, who were earlier skeptical about using UPI and other e-banking methods, started using them to make bill payment and other transactions. Even in the post pandemic era that practice continues. So, next we try to analyze the impact of pandemic on UPI transactions.

TABLE IV T TEST RESULT

t-Test: Two-Sample Assuming Unequal Variances		
Variables	Before COVID-19 pandemic	After COVID-19 pandemic
Mean	9.833333	14.75
Variance	63.60606	166.75
Observations	205	205
Hypothesized Mean Difference	0	
df	408	
t Stat	13.37	
P(T<=t) two-tail	0.00	
t Critical two-tail	1.965839	

From Table IV it appears that the number of UPI transaction per month has significantly increased after COVID-19 pandemic ( $p = 0.00$ ). Since there was an observable change in post pandemic banking and shopping habit throughout the world, people started to prefer online shopping and banking, there was a positive impact on UPI use. Our result reinforces the finding of Tripathi and Dave (2022).

### V. CONCLUSION

The study attempts to identify the major demographic factors determining UPI usage. The findings of the study based on the logistic regression test bring us to the conclusion that only the age and sex of respondents had a significant impact on the UPI usage. However, the years of schooling, monthly income and the location of residence (urban or rural residence) do influence the usage of UPI in India. The results of the study also highlight that the younger population is more inclined towards UPI payments than older people who are not as tech savvy and find online payments a difficult option compared to cash payments. We also find from the present study that salaried individuals have found it much more suitable to use UPI than other modes of payment mainly because their salaries were deposited in bank accounts which when linked to UPI made transactions hassle-free. From the T-test computation in Table IV, it is also evident that the monthly UPI usage has

gone up after the COVID-19 pandemic due to the shift in preference towards online shopping and convenient accessibility of banking services through UPI. We suggest that to make digital India, the Government needs to introduce UPI usage related training so that old and females also participate in the digital-based development of India. However, further research is required for more robust policy suggestion. Since we have covered only part of India our study is more suggestive than conclusive.

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