Status and Determinants of Digital Transactions in India: Findings from the New Global Findex Database

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Abstract

Promoting digital transactions is an announced policy priority of the Government of India. Such transactions can be comprehensively monitored and hence reduce leakages in the government's direct benefit transfers, curb circulation of fake currency and track unaccounted transactions. A digital payment environment reduces the operational costs of the financial system. In this background, understanding the current status and progress of digital transactions has crucial importance for the monetary authority of a country. Using the bank-level information from RBI, this study examines the progress of digital transactions in India in recent years. Also, the latest round of the Global Findex Survey provides information on the access and usage of digital payment instruments at the individual level. Using this information, this study identifies the factors influencing individuals' adaptation to digital transactions in India through the estimation of logistic regression models. It is found that the number of digital transactions in India has increased almost eight-fold during the last six years. The Findex database for India revealed considerable disparities in adaptation to digital transactions among individuals belonging to various socio-economic categories. A significant gender gap is also detected in digital transactions. Income and education have turned out to be significant positive contributors to digital transactions. Regression results suggest that waiving convenience fees for digital payments, special schemes for women's digital financial inclusion, promoting universal basic education and facilitating access to the internet in remote rural areas can increase the share of digital transactions in India.

Keywords: Digital transaction, Financial inclusion, Global Findex database, Logistic regression, India

1. Introduction

Promotion of digital transactions is given a high priority by the Government of India under the 'Digital India' initiative (Bhavsar & Samanta, 2022; Ministry of Finance-GOI, 2022; Vally & Divya, 2018). Rupees 1500 crore has already been allocated in the Union Budget under this initiative in the 2023-24 fiscal year (Ministry of Finance-GOI, 2023). Digital transactions refer to monetary transactions accomplished by digital or online modes without any currency note or other physical instruments like cheques or demand drafts. The Reserve Bank of India, in its 'Payments Vision 2025', aims to provide accessible and affordable digital payment services for 'Everyone, Everywhere and Everytime' (RBI, 2022). It is recognized that effective delivery of digital payment services with an enabling environment can accelerate a country's growth and help in faster achievement of Sustainable Development Goals (Bhavsar & Samanta, 2022). It benefits people as it provides quick access to their finances and facilitates instant secure payments. As digital transactions can be comprehensively monitored and recorded, they increase transparency in the monetary flows by reducing leakage in government's direct benefit transfers (DBTs), curbing the circulation of fake currency notes, tracking of financial corruption and unaccounted wealth. A digital payment environment reduces the operational costs of the financial system, increases tax revenue by reducing the scope of its evasion and fosters greater financial inclusion of the people (Lok Sabha Secretariat-GOI, 2017; Muthukumaran & Haridasan, 2022). Presently, a number of digital payment modes are

available in India, such as debit and credit cards, internet banking, mobile wallets, digital payment applications, Unified Payments Interface (UPI) service, Unstructured Supplementary Service Data (USSD), Bank prepaid cards, etc. (Garg & Devi, 2019; PIB-Delhi, 2023b).

After the demonetisation of high-value currency notes in 2016, India has witnessed a rapid expansion of digital payments (Kumar et al., 2021; Salunkhe et al., 2019; Vally & Divya, 2018). The UPI, launched in 2016, has revolutionised India's digital payment system and played a pivotal role in driving digital financial inclusion (Mahesh & Ganesh Bhat, 2022). Despite the widespread use of mobile and internet banking services, other payment modes such as micro-ATMs and debit or credit cards, have also boosted digital transactions in the country (Barik & Sharma, 2019). Over the last nine years, India's number of digital transactions has increased from 127 crores in 2013-14 to 12735 crores in 2022-23, an increase of more than a hundred-fold (PIB Chennai, 2023). The shift in mode of payments is primarily driven by the widespread use of UPI, with 26 crore users as of April 2023 (PwC India, 2023). UPI alone accounted for 62 percent of the total digital transactions made during the financial year 2022-23 (DigiDhan Dashboard). However, debit and credit cards are found to be one of the preferred payment instruments for online retail transactions (PwC India, 2023). In India, the total number of debit and credit cards in circulation as of June 2023 was 975.8 million and 88.7 million, respectively (WORLDLINE, 2023).

India is a diverse country in terms of its geography and economy. The enabling infrastructures required for digital transactions are not uniformly accessible across the country. It deprives a section of its population of digital transaction facilities (Mahesh & Bhat, 2022; Mohd. & Pal, 2020). This is mostly true for rural areas where inadequate supply of electricity, poor internet connectivity and limited access to smartphones create significant bottlenecks in the spread of digital transactions (Garg & Devi, 2019; Sonawane & Motwani, 2023; Singh et al., 2019; Trivedi & Sanchiher, 2023). Rural women are found to be most deprived in this regard. Lower literacy rates, low technology proficiency and lower income are also identified as significant barriers to the spread of digital transactions (Gelb et al., 2022; Sonawane & Motwani, 2023; Singh et al., 2019).

Digital transactions in India

Studies have attempted to estimate the status of access, usage as well as awareness regarding digital transactions in various parts of India. Most of them are primary survey-based case studies. Some such studies, conducted in various states like Karnataka, Himachal Pradesh, Maharashtra, Haryana, Delhi and Tamil Nadu have found low awareness about digital modes of payments such as UPI, mobile wallets, and USSD among the respondent individuals (Aggarwal et al., 2018; Mohd. & Pal, 2020). Cash is found to be the preferred mode of transaction for local shopping and groceries (Aggarwal et al., 2018; Kumar et al., 2021; Sinha et al., 2019). Among the payment instruments for cashless transactions, credit or debit cards are found to be most frequently used modes for digital transactions (Aggarwal et al., 2018; Kumar et al., 2021; Mohd. & Pal, 2020; Salunkhe et al., 2019; Sinha et al., 2019). Online shopping and money transfers are found to be the primary drivers of digital transactions (Kumar et al., 2021; Salunkhe et al., 2019).

Regarding access and usage, it is pointed out that awareness of digital payments does not automatically translate into its usage. A study carried out in four major cities in India (Delhi, Chennai, Ahmedabad, and Lucknow) has revealed that even though 94 percent of the

respondent adults were aware of mobile payments, only 33 percent had some preference for them, and only 19 percent had actually used them (Sinha et al., 2019).

Low usage of digital payment instruments is often a result of lack of access, which in turn depends on the enabling infrastructure. A significant rural-urban gap is identified by studies in this regard. A study from Uttar Pradesh has found that 55 percent of rural respondents have access to bank accounts, compared to 82 percent in case of their urban counterparts. It was found that less than half of the respondents have access to mobile phones that are compatible with digital transactions. Even among such smartphone users, internet accessibility was found to be as low as 42 percent in rural and 77 percent in urban locations. Only 16 percent of respondents from rural and 68 percent from urban areas had reported carrying out some digital transactions (Tiwari et al., 2019). Another study conducted among women from Mau district of Uttar Pradesh has found that only a third of the respondent women had regularly conducted digital payments, while the rest had rarely or never done it (Devi, 2023).

Studies have also investigated the status of digital transactions among people in small businesses. More than 90 million people in India are engaged in MSMEs, including 22 million women (Tambe & Jain, 2023). Digital financial inclusion for them has huge potential in boosting digital transactions in the economy. A study on 308 women (86 business owners and 222 employees) in four major Indian states has found that all owners possess bank accounts, while 11 percent of the employees do not. Most of the women have access to mobiles and internet. However, the usage of mobile or internet banking was found to be low, particularly among employees. Among the respondents, 66 percent of owners prefer digital transactions compared to 36 percent among employees (Dutta et al., 2022). Another study among merchants in Jaipur City (Rajasthan) has found that only 42 percent of them have adapted to digital payments and 80 percent of their transactions with customers are done in cash (Ligon et al., 2019).

The status check by existing studies identifies a huge potential to further boost digital financial transactions in India. It calls for appropriate policy interventions for a more inclusive and enabling digital environment. The factors affecting such digital inclusion also need to be separately looked at.

Factors influencing digital transactions

A strand of literature tried to identify the socio-economic factors responsible for individuals' access to and usage of digital payments. Most of these studies have attempted to do so with the help of binary regression models. Studies found that the age of an individual significantly influences the adaptation and regular use of digital payment instruments. Younger and middle-aged people are found to be more used to digital transactions than the older age groups (Amoah et al., 2020; Kandari et al., 2021; Rana et al., 2023; Saroy et al., 2022; Shree et al., 2021; Vally & Divya, 2018). Some studies have also found a non-linear relationship between age and digital payment adaptation, incorporating 'age-squared' as a significant regressor (Bashir et al., 2023; Amoah et al., 2020; Dar & Ahmed, 2021).

Education is also found to be an important factor in the adaptation to digital payment instruments. Individuals with higher educational attainment are found to be more likely to have access to and usage of digital payment instruments (Amoah et al., 2020; Bashir et al., 2023; Bathula & Gupta, 2021; Dar & Ahmed, 2021; Kandari et al., 2021; Rizwana et al., 2021; Saroy et al., 2022; Shree et al., 2021). Higher educational attainment implies better knowledge and

technical proficiency regarding modern financial products and services that help individuals carry out digital transactions (Bashir et al., 2023; Muthukumaran & Haridasan, 2022; Vally & Divya, 2018). Thus, better-educated individuals are expected to have favourable attitudes towards digital transactions.

Use of digital payment instruments is also influenced by individuals' income. The likelihood of accessing and using such instruments is found to increase with higher income (Bathula & Gupta, 2021; Dar & Ahmed, 2021; Kandari et al., 2021; Shree et al., 2021). Studies found that such instruments are used by people who are relatively rich, while lower-income groups prefer cash-based transactions (Bashir et al., 2023; Shree et al., 2021). Moreover, the maintenance charges for digital payment instruments also discourage lower-income groups from adapting to them (Garg & Devi, 2019; Rizwana et al., 2021; Singh et al., 2019).

Studies have also found significant gender disparities in access and usage of digital transactions (Vally & Divya, 2018; Zareena, 2023). Females are found to be less likely to have access to such instruments (Amoah et al., 2020; Bashir et al., 2023; Bathula & Gupta, 2021; Dar & Ahmed, 2021; Kandari et al., 2021; Rana et al., 2023; Shree et al., 2021).

In spite of the remarkable advancement in the digital payment environment in India, a comprehensive understanding of its country-wide disparities and identification of the demand-side bottlenecks is crucial in light of the policy priorities announced by the RBI. The Ministry of Electronics and Information Technology (Government of India) launched the 'DigiDhan Dashboard' platform in 2020 to monitor digital transactions taking place in the country (Misra et al., 2020). However, this platform only provides bank-level information and does not provide information on individuals. Such bank-level aggregative information does not shed light on individuals' access and participation rates in digital transactions. For example, a certain number of digital transactions recorded in a bank branch cannot be disaggregated into the number of individuals involved and the number of transactions per individual. But these are crucial measures to understand the state of digital transactions in an economy. It appears that there is a crucial knowledge gap in this regard. To understand the involvement of people in digital transactions, a number of studies in India have attempted to examine the status through locally confined household or individual-level surveys. But findings from such local-level studies cannot be readily extrapolated for a huge and diverse country like India. The few studies that have obtained pan-India estimates in this regard have all drawn on the World Bank's Global Findex database of 2017 round.

However, with a rapidly changing digital payment environment in India, the findings based on the 2017 database need to be updated with findings using the latest available information. The last Global Findex data was published by the World Bank in 2022. This study attempts to find the participation status of individuals in digital transactions across socio-economic categories in India using this latest information. Also, to provide some policy suggestions for promoting digital transactions, the study identifies some crucial determinants of an individual's financial inclusion status using logistic regression models.

2. Data and methodology

The study used the RBI dataset to examine the progress in the share of digital transactions in India from 2017-18 to 2022-23, following the implementation of UPI platform. Also, Data from the Global Findex Survey (World Bank, 2021), which covered a total of 3000 individuals

from all over India, has been used in this study. The World Bank survey is part of a global exercise conducted in 123 countries among individuals aged 15 years and above. This database provides country-level information on the access and usage of various financial services, including digital payment instruments, based on individuals' responses. The Findex Survey elicit responses mostly through binary (Yes/No) responses.

It might be noted that digital payment was measured in the survey as a binary variable, indicating whether the respondent had made or received any digital payment within 365 days prior to the survey. It classifies digital payments as any of the following:

- Sending and receiving remittances through any bank account or mobile money account
- Any debit or credit card-based transaction
- Use of a mobile phone to execute payments from bank accounts (using USSD)
- Internet-based transactions using any bank account or mobile money account.
- Receipt of direct benefit transfers (DBT) from the government in the respondent's bank account under social assistance programmes including pensions
- Receipt of any payment on account of agricultural sales directly to the bank or mobile money account
- Receipt of wages and salaries directly to the bank or mobile money account

Our objective is to study the extent of participation in digital transactions by individuals and to identify its determinants. The FINDEX definition (by the World Bank), as specified above, includes both voluntary and involuntary participation in digital transactions. It is clear that the last three aspects of digital transactions are involuntary on the part of the recipients. To identify individual-level determinants of digital transactions, it might be more interesting to consider self-initiated digital transactions while excluding government-initiated transfers like DBTs. So, this study considers two categories of digital transactions - one including all types of voluntary and involuntary transactions and the other considering only voluntary transactions. In the ensuing analyses, these are captured by the variables 'digital_1' and 'digital_2', respectively.

All digital transactions must be linked with a bank account or mobile money account. Therefore, the information used in this study is restricted to individuals having a bank account or mobile money account. The status of digital financial inclusion in India is measured in terms of estimated user percentages using sampling weights. While estimating the effects on an individual's adaptation to digital transactions, individual characteristics such as gender, age, education, location (rural-urban), income and employment categories are considered following the existing literature. Moreover, access to internet is also considered as a crucial enabling factor for carrying out such transactions on various online platforms. Therefore, respondent's internet access has been considered an explanatory variable that may accelerate digital transactions. Two separate logistic regressions are carried out for the two digital transaction variables ('digital_1' and 'digital_2') with these regressors.

3. Results and discussions

The findings of this study are presented in two sub-sections. The first section analyses the progress in digital transactions and their adaptation by individuals based on the data sourced from RBI and Global Findex Survey. The second section identifies factors influencing such adaptation through logit regressions using Global Findex data.

3.1 Status of digital transactions in India

The RBI regularly publishes data on the volume and value of transactions made in India using different payment instruments except in cash. The digital mode of transactions gained significance since 2016 with the launching of UPI platform. Table-1 shows that the share of cashless transactions is steadily increasing in India since 2017-18. In the first pandemic year (2020-21) with a prolonged lockdown in the economy, the total value of transactions has taken a dip. But a substantial increase in digital transactions, both in volume and in value, is recorded afterwards. The share of digital transactions to total transactions (except that made in cash) has shown a consistent increase over the last six years. In terms of the number of transactions, digital mode has recorded an almost eight-fold increase in this period.

Table 1: Status of digital transactions in India

Year	Total transactions through digital and paper-based instruments		Digital transactions (paperless)		Share of digital transactions (%)	
	No. of transactions (billion)	Value of transactions (trillion INR)	No. of transactions (billion)	Value of transactions (trillion INR)	No. of transactions	Value of transactions
2017-18	15.8	1451.8	14.6	1369.9	92.6	94.4
2018-19	24.4	1719.6	23.3	1637.1	95.4	95.2
2019-20	35.0	1697.9	34.0	1619.7	97.0	95.4
2020-21	44.4	1470.9	43.7	1414.6	98.5	96.2
2021-22	72.7	1810.5	72.0	1744.0	99.0	96.3
2022-23	114.7	2158.5	113.9	2086.9	99.4	96.7

(Source: Author's estimates using RBI data)

The higher volume of digital transactions, however, does not automatically imply its equitable distribution among all socio-economic classes. It might be interesting to look at the disparities in digital financial inclusion across people rather than deriving an overall status based on the bank-level aggregate numbers. The Global Findex Survey (2021) provides individual-level information on digital transactions made by a respondent, along with socio-economic characteristics. It allows for estimating the digital transaction status across several socio-economic categories. This is done in Table-2. The extent of individuals' participation in digital transactions is examined separately for both 'digital_1' and 'digital_2'. It might be noted that digital transactions are to be backed by a bank account or mobile money account. So, percentages that are estimated in the table have considered only those respondents who had such banking access.

Table 2: Status of individuals' participation in digital transactions in India

Characteristics	Categories	(Participation rate in percentage)	
		digital_1 (voluntary and involuntary digital transactions)	digital_2 (Only voluntary digital transactions)
	Overall (India)	45.1	33.2
Location	Rural	39.3	25.4
	Urban	51.6	42.1
Gender	Male	53.4	43.6
	Female	36.1	21.9
Age Group	Young (15-24 years)	44.0	38.8
	Middle-age (25-49 years)	44.3	34.0
	Older (>=50 years)	47.9	25.7
Earning status	In the workforce	48.7	39.4
	Out of the workforce	40.1	24.6
Education category (based on highest education)	Primary	37.7	22.9
	Secondary	54.6	47.0
	Higher than secondary	78.4	76.6
Income quintile	Poorest 20%	33.2	17.8
	Second 20%	33.3	16.9
	Middle 20%	36.6	28.7
	Fourth 20%	54.1	41.6
	Richest 20%	67.0	59.9
Access to mobile phones	Yes	51.5	41.2
	No	30.3	14.8
Access to internet	Yes	68.7	62.0
	No	34.4	20.2

(Source: Author's estimates using Global Findex database 2021, with survey weights)

The extent of individuals' participation in digital transactions across different socio-economic characteristics is shown in Table 2. The table shows that for all possible socio-economic categories, 'digital_1' reflects higher participation rates than 'digital-2'. This is expected as 'digital_2' is a subset of 'digital_1' (excluding individuals who only received payments in their accounts through DBTs, but did not carry out any self-initiated digital payment). As DBTs under various social assistance programmes are widespread in India, differences in percentages between the two types of participation are often substantial. For example, it is found that 45 percent of bank account holders in India have carried out digital transactions within the 365 days prior to the survey year (2021). But if only self-initiated digital transactions are considered (i.e., 'digital_2'), the percentage drops to 33 percent. A similar pattern of participation is observed across socio-economic groups for both digital transaction measures.

The rows in Table 2 capture participation in both types of digital transactions for different categorisations of respondent individuals. In terms of location and gender, a considerable rural-urban gap and the gender gap are detected. Following the literature (Ali & Ghildiyal, 2023), individuals are also categorised into three age groups. It is found that younger respondents are more actively engaged in self-initiated digital transactions (i.e. 'digital_2') compared to the older groups. But in the case of 'digital_1', the older group shows more participation. It confirms expectations, as DBT receipts under social security covers of the government (like old-age and widow pension schemes) are mostly targeted towards older people. Turning to the education and income levels, the table shows that usage of digital transactions steadily

increases with higher education[1] and income categories[2]. Access to internet and mobile phones is also found to be enabling factors for more digital transactions.

Also, as expected, participants in the workforce show a higher participation rate in digital transactions compared to their unemployed counterparts. However, even among the 'out of workforce' respondents, the participation rate in self-initiated digital transactions is substantial (almost a quarter of the respondents). It is conceivable that a non-earning family member can hold a bank account and can make digital payments from that account. This can happen for adult members who are pursuing their studies at home or at a distant place and mostly have bank accounts that they need to bear their regular expenses. To have a clearer understanding of the 'out of workforce' individuals who had carried out digital transactions, the age and education categories are cross-tabulated for individuals both 'in' and 'out' of the workforce. This is provided in the Appendix (Table-A). It is observed that among the younger respondents (below 25 years) the percentage of participation in digital transactions is higher for 'out of workforce' respondents compared to the employed. This observation is in conformity with the conjecture made here but cannot be statistically established due to the lack of detailed information (studentship status) in the dataset.

3.2 Determinants of digital transaction

The observations in the previous section (Table-2) call for estimating the marginal effects of individual characteristics on one's probability of carrying out digital transactions. The Findex survey records the status of an individual's vis-a-vis digital transactions ('digital_1' and 'digital_2') in a binary mode (Yes/No). It allows for estimating logistic regression models using individual characteristics as regressors. This is accomplished in this section. Table-3 describes the variables used in this exercise along with their summary statistics. Taking clue from the existing literature, age is included in its quadratic form. To avoid multicollinearity between access to mobile phones and internet connectivity, only the latter is included in the list of regressors. Two separate logistic regressions are carried out for the two digital transaction variables ('digital_1' and 'digital_2') with these regressors, and the results are described in Table-4.

Table 3: Description of variables and their summary statistics

Variables	Description	Min	Max	Mean	Std. Dev.
digital_1 (Dependent variable of the Model-1)	Whether the respondent carried out any digital transaction [considered both voluntary and involuntary digital transactions] (binary variable: 1=Yes, 0=No)	0	1	0.46	0.50
digital_2 (Dependent variable of the Model-2)	Whether the respondent carried out any digital transaction [considered only self-initiated digital transactions] (binary variable: 1=Yes, 0=No)	0	1	0.35	0.48
Explanatory variables:					
female	Gender of the respondent (1=female, 0=male)	0	1	0.46	0.50
rural	=1 if the respondent lives in a rural area, 0 otherwise	0	1	0.59	0.49
age	Age of the respondent in completed years	15	90	36.74	14.28
age_square	Squared value of 'age' variable	225	8100	1554	1206

edu_primary	=1 if the respondent completed primary education or less, 0 otherwise	0	1	0.52	0.50
edu_secondary	=1 if the respondent completed secondary education, 0 otherwise	0	1	0.36	0.48
edu_higher	=1 if the respondent completed any degree above secondary, 0 otherwise	0	1	0.12	0.32
inc_quintile_1	=1 if the respondent belongs to 1st income quintile (poorest quintile), 0 otherwise	0	1	0.18	0.39
inc_quintile_2	=1 if the respondent belongs to 2nd income quintile, 0 otherwise	0	1	0.19	0.39
inc_quintile_3	=1 if the respondent belongs to 3rd income quintile, 0 otherwise	0	1	0.19	0.39
inc_quintile_4	=1 if the respondent belongs to 4th income quintile, 0 otherwise	0	1	0.21	0.40
inc_quintile_5	=1 if the respondent belongs to 5th income quintile (richest quintile), 0 otherwise	0	1	0.23	0.42
workforce	=1 if the respondent is in the workforce, 0 otherwise	0	1	0.58	0.49
internet	=1 if the respondent has access to the internet, 0 otherwise	0	1	0.35	0.48

Table 4: Factors affecting digital transactions:
Logistic regression reporting marginal effects

Regressors	Model-1 [Dep var: digital_1]		Model-2 [Dep var: digital_2]	
female	-0.07***	(0.024)	-0.09***	(0.023)
rural	-0.02	(0.024)	-0.06**	(0.023)
age	0.01	(0.004)	0.01**	(0.004)
age_square	0.000004	(0.00005)	-0.0001*	(0.00005)
edu_secondary	0.05*	(0.028)	0.08***	(0.027)
edu_higher	0.19***	(0.042)	0.25***	(0.044)
inc_quintile_1	-0.17***	(0.036)	-0.17***	(0.028)
inc_quintile_2	-0.18***	(0.034)	-0.21***	(0.026)
inc_quintile_3	-0.18***	(0.033)	-0.14***	(0.027)
inc_quintile_4	-0.06*	(0.035)	-0.06**	(0.029)
workforce	0.06***	(0.024)	0.11***	(0.023)
internet	0.30***	(0.026)	0.29***	(0.026)
No. of observation	2372		2372	
Log likelihood	-1409.65		-1200.25	
LR chi2(12)	455.33		668.26	
Prob > chi2	0.000		0.000	
Pseudo R2	0.139		0.218	

(standard errors are in parenthesis; ***,**,* represents 1%, 5% and 10% levels of significance) (Source: Author's estimates using Global Findex database 2021)

In estimating the regressions, primary education level and the 5th income quintile (richest quintile) are taken as base categories for education and income, respectively. The regressions are estimated only for individuals having bank accounts or mobile money accounts, which is necessary for carrying out digital transactions. The results show that females are less likely to conduct digital transactions compared to males irrespective of the types of digital transactions

i.e. 'digital_1' or 'digital_2'. This is in conformity with the findings from similar other studies based on local primary surveys in India (Bathula & Gupta, 2021; Dar & Ahmed, 2021; Kandari et al., 2021; Shree et al., 2021).

It is found that the rural-urban gap in digital transactions is significant considering voluntary transactions ('digital_2'). As expected, the probability of carrying out digital transactions is less for an individual located in a rural area compared to his urban counterparts. However, when we consider the broader definition of financial transaction ('digital_1'), the rural-urban gap does not assume significance. Previously, in Table-2 we have also found that the rural-urban gap is less pronounced when we consider this broader definition of digital transaction. A similar effect is found with respect to the age of the respondent. While it is insignificant considering the broader definition of digital transactions, it is negatively and non-linearly related to the probability of carrying out self-initiated digital payments ('digital_2'). Younger respondents have shown a greater probability of making digital payments. The insignificance of 'age' for 'digital_1' might be resulting from various social security transfers (DBTs) that are mostly received by older people.

The marginal effects of all education categories are significantly positive and increase in magnitude with higher education level, irrespective of the type of digital transactions (the default education category is the lowest). This is also in conformity with the existing literature that claims people with higher education are usually more aware of digital transactions and use them more often, while people with low education generally prefer traditional methods of cash-based transactions (Rizwana et al., 2021; Saroy et al., 2022). Also, literature points out that individuals with higher education are more likely to have formal jobs and higher incomes, which in turn induces digital transactions (Trung & Quynh, 2022).

Respondent's income level also significantly and positively affects the likelihood of carrying out digital transactions in both regressions, irrespective of the type of digital transactions. Marginal effects show that compared to the richest quintile (default category), a lower income quintile indicates a lower probability of digital transactions. This might be resulting from the costs associated with accessing digital payment instruments and sometimes additional convenience fees levied on digital transactions by the bank.

Being in the workforce and having access to internet are also found to be significant factors influencing the adaptation to digital transactions. The regression analyses show that having internet access enhances the likelihood of digital transactions by approximately 30 percent. Literature finds that internet access is limited in rural and remote areas, with women and low-income groups having the least access (Dutta et al., 2022; Jain et al., 2021; Singh et al., 2019; Tiwari et al., 2019). So, improving internet access in rural and remote areas and reducing its costs may increase the use of internet among people, thereby boosting digital transactions.

4. Conclusion

Promotion of digital transactions is an announced policy priority of the Government of India. Digital financial inclusion of people could enhance the share of digital transactions and inclusive growth in the economy. Regular monitoring and evaluation of digital transactions is crucial for assessing their current status and progress. Using information from RBI, this study examines the progress in the share of digital transactions in India from 2017-18 to 2022-23.

The study also explores the factors influencing individuals' adaptation to digital transactions in India using the World Bank's Global Findex database for 2021.

Analysis reveals a marked rise in the share of digital transactions in India, specifically after 2020-21, when contactless payments became widespread after the COVID-19 pandemic. The number of digital transactions has increased almost eight-fold during 2017-18 to 2022-23 and the share of digital transactions to the total number of transactions has shown a steady increase. Using the Findex Survey, the extent of individuals' participation is examined for two types of digital transactions – one including all voluntary and involuntary transactions ('digital_1') and the other considering only voluntary transactions ('digital_2'). It is found that 45 percent of bank account holders in India have carried out digital transactions within the 365 days prior to the survey. But if only self-initiated digital transactions are considered, the percentage drops to 33 percent. A similar pattern of participation is observed across socio-economic groups for both types of digital transactions. Considerable rural-urban and gender gaps are detected in this regard. Younger individuals are more actively engaged in digital transactions compared to the older groups. It is also found that individuals in the workforce have better usage of digital payment instruments compared to the unemployed. Usage of digital transactions is also more prevalent among better-educated people with higher incomes. Access to mobile phones and internet facilitates digital transactions.

Logistic regressions are carried out using individual-level variables to identify the determinants of adaptation to digital transactions following the two definitions. Regression results found that females are less likely to carry out digital transactions than males. Rural residents are less likely to carry out self-initiated digital transactions than urban residents. Younger individuals are more likely to carry out digital payments than the older. Education and income play a significant positive role in carrying out digital transactions. Marginal effects show that compared to the richest quintile, a lower income quintile indicates a lower probability of digital transactions. This might result from the costs associated with accessing digital payment instruments and sometimes additional convenience fees levied on digital transactions by the bank. Waiving all such convenience fees for digital transactions and providing incentives to consumers in the form of additional discounts for digital transactions might be needed to boost the volume of digital transactions in the country. Being in the workforce increases the likelihood of carrying out such transactions. Internet access increases the probability of digital transactions by almost 30 percent.

To increase the share of digital transactions among women, lower-educated, and lower-income individuals in India, special schemes for women's digital financial inclusion, spread of basic education and facilitating internet access in rural and remote areas turn out to be some of the required policy measures. The RBI has been organising *Electronic Banking Awareness and Training (e-BAAT)* programmes across the country to encourage customers to adopt digital banking and create awareness about various payment products (PIB Delhi, 2023a). This study suggests the undertaking of e-BAAT programmes more intensively in rural areas, targeting women, less-educated and lower-income people.

Notes

1. Information on the educational attainment of the respondents is recorded as a categorical variable in the World Bank Findex Survey (2021), like –
    =1 if the respondent has completed primary school or less
    =2 if the respondent has completed secondary school

=3 if the respondent has completed tertiary education or more

2. The World Bank Findex Survey (2021) does not record actual household income data. Instead, it provides information on income as income quintile groups – a categorical variable. Each respondent falls under any of the income categories according to their belonging to the household income quintile groups.

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Appendix

A: Distribution of individuals carried out digital transactions across socio-economic groups

Age group	In the workforce (%)				Out the workforce (%)			
	Primary	Secondary	Higher than secondary	Total	Primary	Secondary	Higher than secondary	Total
Young (15-24 years)	5.4	14.8	3.8	24.1	9.6	20.3	6.7	36.5
Middle age (25 - 49 years)	27.0	21.1	10.6	58.7	21.6	12.9	7.5	42.0
Older (>=50 years)	12.4	4.0	0.8	17.2	15.9	4.9	0.8	21.5
Total	44.8	39.9	15.3	100	47.0	38.0	15.0	100

(Source: Author's estimates using Global Findex database 2021, with survey weights)