

Perceptual Analysis on the COVID-19 Digital Payment System: A Study

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Abstract: The COVID-19 pandemic accelerated the shift from cash to contactless transactions in India, building on momentum already created by the Digital India campaign, demonetisation and inexpensive mobile data. This paper examines consumer perception of digital payment systems in the post-pandemic setting. Primary data were gathered from 100 respondents through a structured questionnaire and analysed using percentage analysis and mean scores on a five-point Likert scale, supported by secondary data from RBI and NPCI publications. The study finds that ATM/debit cards and Google Pay are the most widely used instruments, that round-the-clock availability, cashless convenience and time saving are the strongest perceived benefits, and that poor connectivity, technical errors and server failures are the most severe difficulties. Ninety-four per cent of respondents intend to continue using digital payments, indicating durable acceptance.

Keywords: Digital payment system, COVID-19, consumer perception, UPI, cashless transactions, e-wallets, demonetisation.

I. INTRODUCTION

A digital payment, often known as an e-payment, is a method of making an electronic payment between a payer and a payee in which both parties complete the transaction through digital modes. India's modes of payment have evolved considerably, from barter to paper money and, in the second decade of the millennium, to cashless digital payment. Under traditional banking, customers had to visit a branch for basic requirements such as withdrawing or depositing cash, transferring funds or verifying a statement of accounts. Banks were the original commercial intermediaries that converted household savings into loans for business investment. The Indian banking sector entered the world of information technology in the early 1990s, and public sector banks, which hold more than eighty per cent of total banking assets, have shaped the character of that transition [1].

A. Modes of Digital Payment (2010–2015)

NEFT. National Electronic Funds Transfer, introduced in November 2005, is an electronic funds transfer system set up and managed by the Reserve Bank of India. It allows the online transfer of funds from one NEFT-enabled bank account to another.

RTGS. Real Time Gross Settlement is used for high-value inter-bank transactions that require instant and full clearing, and is generally operated by the central bank. Unlike NEFT, in which settlements are made in batches, RTGS settles almost instantly throughout the day, which reduces overall settlement risk but may involve higher costs for the customer.

B. Factors Influencing the Digital Payment System

Digital India campaign. With the commencement of the Digital India initiative in 2015, the Government of India pushed hard for the adoption of cashless transactions, urging businesses and citizens to embrace digital technology in daily life so as to enable paperless, faceless and cashless transactions. Several instruments were made available under the National Payments Corporation of India (NPCI) to encourage this shift [2]:

- Banking cards. Credit, debit, prepaid and RuPay, Visa and Mastercard products offer security, convenience and flexibility, with two-factor authentication through a secure PIN and an OTP.
- Mobile wallets. A mobile wallet carries cash in digital form. A card or bank account is linked to the wallet application, allowing payment through a smartphone, tablet or smartwatch. Examples include Paytm, Freecharge, MobiKwik, Oxigen, Airtel Money, Jio Money and ICICI Pockets.
- AEPS. The Aadhaar Enabled Payment System is a bank-led model permitting interoperable financial transactions at a point of sale or micro-ATM through a Business Correspondent of any bank, using Aadhaar authentication.

- UPI. The Unified Payments Interface merges several banking features, fund routing and merchant payments into a single mobile application, and also supports peer-to-peer collect requests that can be scheduled and paid at the user's convenience.

Demonetisation. The demonetisation of 8 November 2016 was a watershed moment for the Indian economy and made digital payment a necessary alternative to cash [3]. Digital wallet companies grew by 271 per cent within months, and the Government and private firms aggressively promoted the Aadhaar Payment app, UPI and the NPCI-developed Bharat Interface for Money (BHIM) [4]. Paytm grew from 125 million wallet customers before demonetisation to 185 million three months later and 280 million by November 2017. The value of NEFT transactions rose from ₹8,808 billion to ₹14,182 billion and RTGS from ₹78,179 billion to ₹1,02,348 billion, while e-wallet transactions increased from 17 lakh to 63 lakh per day [5]. Small merchants in metropolitan markets began installing point-of-sale machines to accept payments digitally.

Launch of Jio. Awareness of digital systems was not matched by digital literacy. The launch of Reliance Jio in 2016, offering one gigabyte of data per day, changed both the Indian telecom business and internet usage patterns. Jio recorded sixteen million subscribers in its first month and fifty million within eighty-three days. The resulting accessibility increased the use of social media and of digital payment, and Jio therefore played a key role in the growth of digital payments in India [6]. In the longer run UPI gained the greatest traction, increasing transaction volume by 450 per cent by the end of the financial year 2018–19, aided by the affordability of smartphones and data [5].

COVID-19. The pandemic made electronic payment more attractive because consumers came to see cash as a possible vehicle for the virus [7]. In 2020 people across cities, towns and villages began making essential payments digitally to avoid physical contact, using mobile banking applications or third-party applications such as Google Pay, PhonePe, Amazon Pay and Paytm [8]. The number of digital payment transactions almost doubled between January and February 2020, from 436.43 crore to 847.44 crore, and the total reached 4,764.28 crore transactions in December 2020. India recorded more than 44 billion digital payments in the financial year 2021. Contactless payments increased at 69 per cent of stores during the outbreak, and in-store proximity mobile payments rose by 29 per cent in 2020.

C. India's Most Popular E-Wallets

Google Pay. Launched by Google in 2015 and available on Android and iOS, Google Pay allows a user to transfer money or pay utility bills directly from a bank account through a UPI identifier. It provides two levels of protection including fingerprint security and is used by merchants, wholesalers and large corporations. The application has over 100 million users.

PhonePe. Released in 2015 and headquartered in Bengaluru, PhonePe is a UPI-based multilingual application available in eleven Indian languages. It has over 280 million users and launched a “PhonePe ATM” service in January 2020.

BHIM. The Bharat Interface for Money, developed by NPCI and launched on 30 December 2016, enables simple and quick UPI transactions through a UPI identifier or QR code, and was conceived to advance financial inclusion and a digitally empowered society.

Paytm. Founded in 2010, Paytm specialises in e-commerce, financial technology and digital wallets, offers services in eleven Indian languages, and extends into Paytm Money, Paytm Smart Retail and Paytm Payments Bank. The application has over 350 million active users.

II. REVIEW OF LITERATURE

Joshi [2] examined the impact of demonetisation on digital payments and the differences in growth across payment modes before, during and after the event. Using a descriptive research design and retail digital payment data drawn from the Reserve Bank of India website, the study concluded that the true impact of demonetisation on digital payments was realised only after the move, and that digital payments continued to rise thereafter.

Agarwal et al. [9] examined how the unavailability of cash affects consumer spending behaviour and the choice of spending mechanism in a cash-based economy, using a difference-in-difference framework to estimate the magnitude and persistence of digital channel use after the announcement. Debit card data revealed a rise of almost 28 per cent in transaction volume among existing users and of almost 400 per cent among new adopters.

Singh and Rana [3] analysed customer perception and the influence of demographic factors on the adoption of digital payment, using primary data from 150 respondents in Delhi. Analysis of variance showed no significant difference in

perception by gender, age, profession or annual income; education was the only demographic factor with a marked influence, indicating that adoption rises with the education level of the customer.

Adharsh et al. [10], studying the transformation towards e-wallet payment systems among Indian youth, reported approximately 80.5 million digital wallet users in India, of whom the youth form the largest group. From a survey of 160 respondents, they found that about two-thirds of young users make mobile recharges and ticket bookings online because it is less time-consuming, and that cashbacks, freebies and loyalty points attract them to digital payment.

Manocha et al. [4] collected secondary data from published research and reported that e-wallet transactions rose from 17 lakh to 63 lakh per day and that small merchants in metropolitan markets began installing point-of-sale machines. They concluded that although demonetisation made a significant difference, cash remains dominant, and that governments, financial intermediaries and banks must run awareness campaigns to raise the rate of cashless transactions.

Joshi and Kumar [11] investigated the impact of Digital India on the Indian economy and the challenges associated with it, finding that digitalisation has produced greater innovation, ease of operation, economic growth and new employment prospects, and has helped establish systemic transparency and the free flow of funds.

Ghosh [12] reviewed the literature and noted that digital payment is more convenient and time-saving than paper currency, that transactions can be conducted around the clock by anyone with an internet connection, and that reward and cashback schemes encourage acceptance. He observed that after COVID-19 much e-commerce and online grocery trade accepts only prepaid payment made through digital systems.

Kulkarni and Varma [5] sought to identify consumer thinking with respect to online payments and their safety, and the challenges that affect consumer perception. They acknowledged that their study is exploratory, relies on literature review and secondary information, is not exhaustive and uses no quantitative data, and that it therefore identifies thrust areas rather than testing them.

Mate and Kapdi [13] analysed the importance of digital payments during the COVID-19 pandemic and consumer perception of their use, drawing on 113 primary responses together with secondary data from Government of India digital payment portals and official reports. Respondents described the e-wallet experience during the pandemic as convenient, safe and easy to handle, and the authors observed an increase in orders placed on e-commerce platforms for food and entertainment.

Ma et al. [8] analysed the impact of COVID-19 on digital payment services in towns and villages using previously published articles, journals and government sources. They observed that the share of digital payments in the economy rose from under five per cent to roughly fifteen per cent before the pandemic, grew to between fifteen and twenty per cent in 2020 and approached twenty per cent in the financial year 2021, and projected a share of about twenty-five per cent by 2023. They attributed the acceleration at town and village level to heightened consciousness about health and safety.

A. Research Gap

The reviewed studies largely address the demonetisation period or rely on secondary data and exploratory review. Comparatively few examine consumer perception of digital payment systems after the COVID-19 disruption using primary data that measure perceived benefits and perceived difficulties on a common scale. The present study addresses that gap.

III. STATEMENT OF THE PROBLEM

Digital payment in India expanded rapidly during the pandemic, but rapid adoption does not by itself indicate satisfaction. Users continue to report failed transactions, poor connectivity, hidden charges and fear of fraud. Unless the benefits that attract consumers and the difficulties that deter them are measured together, banks and payment service providers cannot know which constraints most threaten continued use. This study therefore examines both sides of consumer perception in a single framework.

IV. OBJECTIVES OF THE STUDY

1. To study the present status of digital payments in India.
2. To examine the impact of COVID-19 on electronic payments.
3. To study consumer behaviour towards digital payments.
4. To offer suggestions for promoting the growth of digital payments.

V. RESEARCH METHODOLOGY

Nature of the study. The study is descriptive and analytical in design and is based on both primary and secondary data. Primary data. Primary data are those collected for the first time. They were gathered directly from customers through a structured questionnaire consisting of demographic items, multiple-response items on payment instruments used, and statements measured on a five-point Likert scale covering the perceived benefits of, and difficulties with, digital payment systems.

Secondary data. Secondary data are those already collected by others. They were drawn from Reserve Bank of India and National Payments Corporation of India publications, government portals, journal articles and reputed websites.

Sample. A sample of 100 respondents who use digital payment systems was selected by convenience sampling.

Tools of analysis. The data were analysed using percentage analysis, frequency distribution and weighted mean scores, and the results are presented in tabular form with interpretation.

Scope and limitations. The study is confined to 100 respondents and to their perception at the time of the survey. Because the sample was selected by convenience and is limited in size, the findings should be read as indicative rather than as generalisable to the whole population of digital payment users.

VI. RESULTS AND DISCUSSION

Table 1: Demographic Profile of the Respondents

Particulars	No. of Respondents	Percentage
Gender		
Male	50	50%
Female	50	50%
Total	100	100%
Marital status		
Single	24	24%
Married	76	76%
Total	100	100%
Educational qualification		
UG	50	50%
PG	30	30%
Others	20	20%
Total	100	100%
Occupation		
Salaried	36	36%
Professional	24	24%
Self-employed	22	22%
Others	18	18%
Total	100	100%
Age		
Below 20 years	12	12%
20–30 years	40	40%
30–40 years	30	30%
Above 40 years	18	18%
Total	100	100%

Source: Primary data

Interpretation. The sample is evenly divided by gender. Married respondents dominate the sample at 76 per cent, which suggests that individuals with household financial responsibility are more regularly involved in transactions. Half the respondents hold an undergraduate qualification and a further 30 per cent a postgraduate degree, indicating a positive association between education and digital payment use, consistent with Singh and Rana [3]. Salaried employees form the largest occupational group at 36 per cent, followed by professionals at 24 per cent, showing that persons with a regular income transact more frequently. The largest age group, at 40 per cent, is 20–30 years, followed by 30–40 years at 30 per cent, confirming that younger and middle-aged users, who are more familiar with smartphones, are the principal adopters.

Table 2: Duration of Using Digital Payment Systems

Duration	No. of Respondents	Percentage
Less than 1 year	4	4%
1–5 years	36	36%
5–10 years	40	40%
More than 10 years	20	20%
Total	100	100%

Source: Primary data

Interpretation. Forty per cent of respondents have used digital payment systems for five to ten years and 36 per cent for one to five years, while only 4 per cent are recent users. Digital payment has therefore achieved considerable acceptance, and most respondents in this study are experienced rather than new users, so their perceptions reflect sustained use rather than first impressions.

Table 3: Digital Payment Methods Used by Customers

Payment Method	No. of Respondents
ATM / Debit card	98
Credit card	21
Google Pay	83
PhonePe	36
Paytm	26
Internet banking	48

Source: Primary data. Multiple responses were permitted, so totals exceed 100.

Interpretation. The ATM or debit card is the most widely used instrument, reported by 98 respondents, followed by Google Pay with 83 and internet banking with 48. PhonePe and Paytm are used by 36 and 26 respondents respectively, and the credit card records the lowest usage at 21. Card-based transactions and UPI-based applications are therefore the dominant forms of digital payment, while the low credit card figure is consistent with the concern about hidden charges reported in Table 5.

Table 4: Usage Rate of Digital Payments

Particulars	SA	A	CS	D	SD
Bill payment	–	–	8	68	24
Shopping	–	–	12	70	18

Source: Primary data. SA = Strongly Agree, A = Agree, CS = Can't Say, D = Disagree, SD = Strongly Disagree.

Interpretation. For bill payment, 68 per cent of respondents disagree and 24 per cent strongly disagree; for shopping, 70 per cent disagree and 18 per cent strongly disagree. Taken at face value, this indicates that respondents use digital payment selectively and still prefer conventional methods for routine bill payment and retail purchases, even though they use digital instruments in other contexts. This result sits uneasily with the very high continuation intention reported in Table 7 and merits verification in a larger study.

Table 5: Benefits of Using Digital Payment Systems

Particulars	SA	A	CS	D	SD	Mean
Convenient	60	34	6	–	–	3.56
Saves time	75	25	–	–	–	3.70
24×7 service	82	10	8	–	–	3.80
Easy to use	64	24	12	5	–	3.30
Flexibility	49	36	15	2	–	3.16
Increases prestige	33	39	28	–	–	3.14
Cashless transaction	79	21	–	–	–	3.80
Benefit in non-banking hours	81	19	–	–	–	3.80

Source: Primary data

Interpretation. Round-the-clock service, cashless transaction and the ability to transact outside banking hours record the highest mean scores at 3.80, followed by time saving at 3.70 and convenience at 3.56. Ease of use, flexibility and prestige score lower, at 3.30, 3.16 and 3.14 respectively. The pattern indicates that respondents value digital payment primarily for availability and freedom from cash rather than for status, and that the strongest motivations are functional. Ease of use attracts a small number of negative responses, suggesting that a minority still finds the process demanding.

Table 6: Difficulties Faced by Customers

Particulars	SD	D	N	A	SA	Mean
Connectivity issues	–	1	20	56	23	4.24
Technical errors	–	–	15	55	30	4.10
Server problems	–	12	13	55	20	3.92
Hidden charges	–	–	26	59	15	3.90
Fear of losing money	–	–	32	65	3	3.86
Fear of fraud	–	15	35	30	20	3.70
Lack of up-to-date information	–	3	32	58	7	3.70
Lack of security	–	14	32	54	–	3.60
Complicated instructions	–	21	32	45	2	3.40
Lack of knowledge	–	25	20	30	25	3.30

Source: Primary data. SD = Strongly Disagree, D = Disagree, N = Neutral, A = Agree, SA = Strongly Agree.

Interpretation. Connectivity issues record the highest mean score at 4.24 and are the single most serious difficulty reported, followed by technical errors at 4.10, server problems at 3.92, hidden charges at 3.90 and fear of losing money at 3.86. Concerns about fraud, inadequate information and security follow at 3.70, 3.70 and 3.60. Complicated instructions and lack of knowledge score lowest, at 3.40 and 3.30. The three highest-ranked difficulties are infrastructural rather than behavioural, which indicates that the principal constraint on digital payment in this sample is the reliability of the network and the banking system rather than the willingness or ability of the user.

Table 7: Intention to Continue Using Digital Payment Systems

Particulars	No. of Respondents	Percentage
Yes	94	94%
No	6	6%
Total	100	100%

Source: Primary data

Interpretation. Ninety-four per cent of respondents intend to continue using digital payment systems and only 6 per cent do not. Despite the connectivity and technical difficulties recorded in Table 6, respondents recognise the benefits of digital payment and intend to keep using it, which indicates a high level of satisfaction, acceptance and trust.

VII. FINDINGS

- The sample is evenly divided by gender, and 76 per cent of respondents are married.
- Half the respondents are graduates and 30 per cent are postgraduates, indicating that digital payment adoption is concentrated among the educated.
- Salaried employees form the largest occupational group at 36 per cent, and 70 per cent of respondents are aged between 20 and 40 years.
- Sixty per cent of respondents have used digital payment systems for five years or more, and only 4 per cent for less than a year, showing that use is established rather than recent.
- ATM and debit cards are the most widely used instrument, reported by 98 respondents, followed by Google Pay with 83; the credit card is the least used at 21.
- Round-the-clock availability, cashless transaction and access outside banking hours are the strongest perceived benefits, each with a mean score of 3.80, followed by time saving at 3.70.
- Prestige records the lowest benefit score at 3.14, indicating that digital payment is valued for utility rather than status.
- Connectivity issues are the most severe difficulty with a mean score of 4.24, followed by technical errors at 4.10 and server problems at 3.92.
- Hidden charges score 3.90 and appear to explain the low uptake of credit cards recorded in Table 3.
- Ninety-four per cent of respondents intend to continue using digital payment systems.
- Respondents nevertheless report low agreement on using digital payment specifically for bill payment and shopping, which suggests that use is selective and concentrated in particular transaction types.

VIII. SUGGESTIONS

- Banks should concentrate on server and connectivity related issues, since these are the most severe difficulties reported, so that customers can obtain the benefits of digital payment without interruption.
- Whenever a new technique or feature is introduced, customers should be educated about it so that they receive up-to-date information.
- Banks should conduct workshops for customers, which would allow users to raise their problems and obtain solutions at the right time.
- Because customers fear fraud, the banking system should create awareness that banking details, PIN numbers and OTPs must never be shared.
- The number of credit card users is very low compared with debit card users, largely because of the fear of hidden charges; banks should therefore give detailed instructions about the charges applicable to credit cards.
- Payment service providers should strengthen grievance redress for failed transactions, since fear of losing money records a high mean score of 3.86.

IX. CONCLUSION

The study reveals that digital payment systems are widely accepted among consumers, particularly among young, educated and salaried individuals. ATM and debit cards and Google Pay are the most preferred payment methods. Convenience, time saving, cashless transaction and round-the-clock accessibility are the key benefits perceived by users, while connectivity issues, technical errors, server problems and security concerns remain the major challenges. The high continuation rate of 94 per cent nevertheless indicates strong customer confidence in the future of digital payment systems.

The Reserve Bank of India has aimed to raise digital transactions to about fifteen per cent of gross domestic product, from about ten per cent, and the Government has asked banks to encourage customers to adopt digital payment as a means of limiting physical contact during the pandemic. As the world's fastest-growing smartphone market empowers consumers to transact at the click of a button, the digital payment market is expected to grow at an annual rate of about 13.7 per cent between 2021 and 2026. Continued growth will, however, depend less on persuading consumers of the value of digital payment, which this study finds they already accept, than on removing the infrastructural constraints of connectivity, server reliability and transaction security that they identify as their principal difficulties.

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