



OPEN ACCESS

Volume: 5

Issue: Special 1

Month: May

Year: 2026

ISSN: 2583-7117

Published: 09.05.2026

Citation:

Muskan Saha, Dr. Dr Rachna Thakkar
“Digital Payment Systems and Data
Protection: Challenges and Risk
Mitigation in Indian Commerce” Interna-
tional Journal of Innovations in Science
Engineering and Management, vol. 5, no.
S1, 2026, pp. 40-47.

DOI:

10.69968/ijsem.2026v5Si140-47



This work is licensed under a Creative
Commons Attribution-Share Alike 4.0
International License

Digital Payment Systems and Data Protection: Challenges and Risk Mitigation in Indian Commerce

Muskan Saha¹

¹*Student, Department of Commerce St. Xavier’s College of Management & Technology, Patna*

Dr. Rachna Thakkar²

²*Assistant Professor, Department of Commerce Xavier University, Patna*

Abstract

Digital payment systems have become vital to present-day commerce, instigating a mounting necessity to scrutinise their cybersecurity vulnerabilities and defences. This research focuses on empathetic understanding of the embryonic security landscape surrounding these platforms.

India's digital payment ecosystem has experienced exponential growth, driven by initiatives such as UPI and government efforts to promote a cashless economy. However, this rapid digitisation presents noteworthy challenges concerning data protection and security, necessitating a robust regulatory framework and proactive risk mitigation strategies to build and maintain consumer trust.

The objectives of this paper are to identify the major challenges and risks associated with data protection in digital payment transactions from both customer and business perspectives, and to analyse effective risk mitigation strategies for digital payment systems and data protection, keeping in view the regulatory framework for digital payment systems. The evaluation of data protection is taken into consideration. This focuses on primary data collected through a structured questionnaire, which explores these challenges, including threats like phishing attacks, identity theft, and the complexity of existing legal frameworks, and to find out the suggestions for risk mitigation strategies that combine technical, regulatory, and educational measures.

Keywords; Digital Payment, Security, Challenges, Risk Mitigation, Regulatory Framework.

INTRODUCTION

Digital payment systems have transformed what we see in Indian commerce by putting up fast, convenient, and secure options to the old cash-based transactions. With the growth of players like UPI, mobile wallets, internet banking, and card-based payments we are seeing an increase in which consumers and businesses use digital channels for every day financial transactions. But this growth has also brought out great issues related to data protection, security risks and trust which in turn means we must look into the issues of securement of sensitive financial info.

Understanding the primary challenges and risks associated with the protection of data in digital payments transactions from the perspectives of customers and businesses is one of the cores aims of this study. These risks include cyber-attacks, phishing, data breaches, identity theft, system weaknesses, and untrained users.

From the business perspective, technological constraints, compliance burden, and operational risks are all additional sources of potential weakness. This study also attempts to identify advanced analytical methods to improve the risk associated with digital payments. Some of these methods include the implementation of anti-fraud digital transactions policies, digital infrastructure protection, user training, and other practices that have been scientifically proven to improve the fraud risk in safe digital transactions.

Also, in this research we look at the regulatory structure which runs digital payment systems and data protection in India. The RBI issue of regulatory frameworks along with the Digital Personal Data Protection Act (DPDPA 2023) and cyber security criteria play key roles in the safe operation of payment systems and in also in increasing user confidence. Also, we present a full picture of the issues, risks, and protective measures related to digital payments highlighting the need for stronger security practices and robust regulatory mechanisms in India's rapidly advancing digital economy.

3. Objectives

1. To identify the major challenges and risk associated with data protection in digital payment transactions from both customer and business perspective.
2. To analyse effective risk mitigation strategies for digital payment systems and data protection.
3. To evaluate the regulatory framework for digital payment systems and data protection in India.

4. Literature Review

1. The functioning, types, issues, and challenges of electronic payment systems (EPS) in the context of e-commerce and digital finance. EPS enables financial transactions over electronic networks like the internet without paper-based instruments such as cheques which concludes that electronic payments are vital for modern commerce but face barriers related to security, trust, awareness, and accessibility. The paper emphasizes the need for improved privacy safeguards, digital literacy, and affordable technologies to enhance EPS adoption and trustworthiness. The authors advocate for the use of secure technologies (like electronic signatures) to ensure a minimum standard of online security. (Dr M. Reddi Naik, 2024)

2. A systematic review of 131 research studies (2010–2020) on electronic payment systems, focusing on e-wallets and online payments. The authors employed a systematic literature review (SLR) using multiple academic databases (IEEE, ACM, Springer, ScienceDirect, etc.). Out of 316 initial studies, 131 were selected based on relevance to e-wallets and online payments. Electronic payments are essential to digital commerce but face complex security and trust challenges. Implementing strong cryptographic mechanisms, multifactor authentication, and global security standards (like PCI-DSS, ETSI, and ENISA) is vital. The paper concludes that the success of e-payment systems depends on how effectively they integrate these security properties to enhance user trust, data protection, and system reliability. (Md Arif Hassan, 2020)

3. The growth, opportunities, and challenges of electronic payment systems (e-payments) in India, especially in the context of Digital India and demonetization. E-payments enable financial transactions through electronic networks, allowing users to pay for goods and services without physical cash or cheques. India's digital payment landscape shows strong growth potential driven by government support, increasing smartphone penetration, and improved internet access. Initiatives like BHIM, Lucky Grahak Yojana, and Digi Dhan Vyapar Yojana have further boosted adoption. The trend toward a cashless economy is expected to continue with technological innovation and policy backing. E-payments are transforming India's economy by promoting efficiency, transparency, and inclusion. However, security, awareness, and infrastructure remain critical challenges. Strengthening data protection, improving digital literacy, and fostering trust are essential for sustainable digital payment growth. (T.S, 2017)

4. The barriers to the widespread adoption of digital payments in India, despite rapid technological advancement and government efforts toward a cashless economy. The study aims to identify the challenges hindering digital payment adoption using secondary data from reports, research papers, and official publications. Despite government initiatives like PIDF, BHIM, and UPI, digital payment adoption in India remains uneven. The main obstacles are digital illiteracy, infrastructure gaps, trust deficits, and security issues. However, the authors express optimism that government support, technological improvements, and growing user awareness will drive broader adoption. The future of digital payments depends on creating a secure, user-friendly, and inclusive payment ecosystem that builds public confidence. (Hemant Trivedi,

CHALLENGES IN DIGITAL PAYMENT ADOPTION IN INDIA , 2023)

5.The concept, types, issues and challenges of electronic payment systems (EPS). Electronic payments are defined as financial transactions carried out over an electronic network (such as the internet) without the use of paper-documents like cheques. The authors conclude that E-payment systems hold promise for enhancing efficiency and competitiveness in commerce. However, successful implementation heavily depends on security, privacy, user-acceptance and trust. Until widely-accepted secured mechanisms (like digital signatures) become commonplace, payment methods must leverage existing technologies to guarantee a reasonable baseline of network security. Consumer and merchant perceptions of security & privacy are critical to market confidence and adoption. (Rachna, 2013)

6.India’s payment systems ecosystem, focusing on the transition from traditional, paper-based instruments (like cheques) to more modern, electronic payment mechanisms. The authors highlight how an efficient payment system is critical for faster movement of funds, better resource utilisation, and reduction of systemic risks (such as bank or counter-party failures) that could disrupt the broader financial system. The study benchmarks India’s payment infrastructure and regulatory environment against international standards—particularly the Bank for International Settlements (BIS) “Core Principles for Systemically Important Payment Systems” (now the “Core Principles for Financial Market Infrastructures”). It finds that while India has made significant progress (e.g., real-time gross settlement, cheque truncation, digital channels), gaps remain in areas such as liquidity risk management, operational risk controls, access and transparency of the system. In conclusion, the paper argues that India stands at a pivotal point: with the right regulatory, infrastructural, and technological enhancements, the payment system can become a key enabler of economic growth. However, if risks (especially operational and systemic) are not managed well, the benefits may be undermined. (Sahoo, 2016)

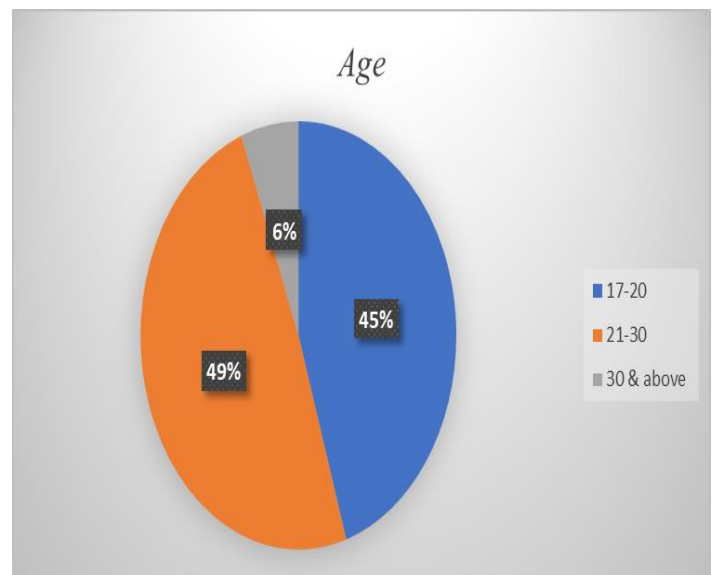
7. He studies focuses on how digital payment systems (mobile wallets, online banking, payment gateways) have expanded rapidly and how they are being confronted by cybersecurity threats — such as phishing, malware, data breaches and identity theft. The paper recommends industry and regulators to focus on: enhanced encryption, multi-factor authentication, tokenization, boosting user awareness about safe payment behaviours, and keeping up with

regulatory/compliance frameworks. (Dr. Varalakshmi, 2024)

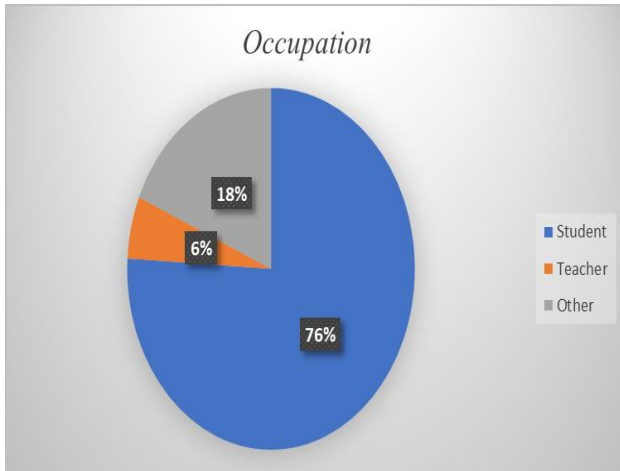
5. Research Methodology

This study employs a mixed-method approach, utilizing both primary and secondary data. Primary data is gathered through structured questionnaires distributed to friends, classmates, nearby people, online users across various respondents. The responses are analysed using sampling technique i.e. Simple Average Mean. Secondary data is sourced from published journals, books, and industry publications. This study aims to examine the challenges related to digital payment systems in India, with a focus on data protection, security risks, and user privacy concerns. It seeks to analyse how these challenges affect user trust and to identify effective risk-mitigation strategies that can strengthen the safety, reliability, and overall adoption of digital payment systems in Indian commerce.

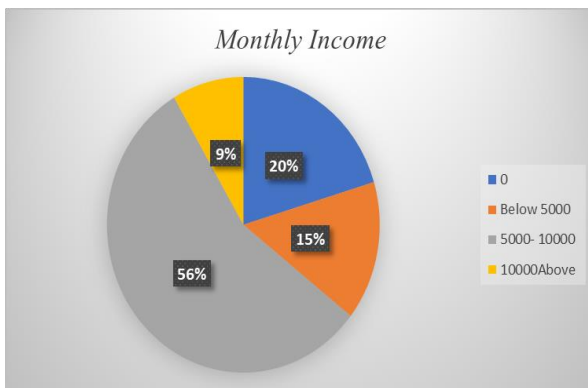
6. Analysis & Interpretation



Interpretation: This discloses a survey population largely fastened around 20 and 21 years, forming over 60% of the sample. Ages 17–22 appear moderately together forming the core of the dataset. Younger ages appear in smaller clusters, while a few older participants emerge as rare outliers. This creates a distinctly youth-centric profile, suggesting that the findings primarily represent early-adulthood perspectives.



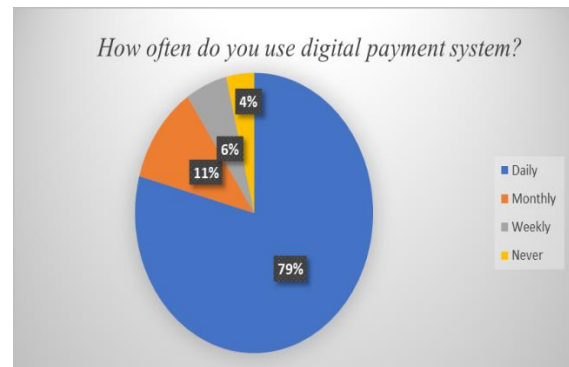
Interpretation: As per the data, it discloses that a majority number of population i.e. more than 80% of the population are students while 2% of the population have their business 10% of the population are engaged in jobs and very few are self-employed.



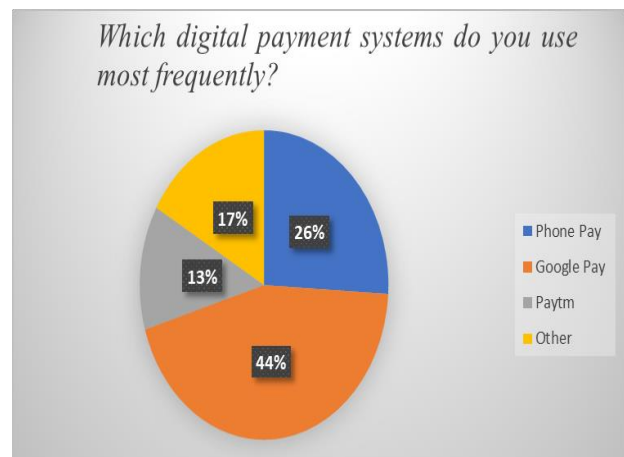
Interpretation: The income distribution shows that 42.6% of respondents fall under the “Below ₹10,000” category, making low-income individuals the dominant group in the sample. Another 16.7% report earning ₹10,000 or more, indicating a smaller but notable segment with modest earnings. Several responses such as “0,” “No income,” “Nil,” “No,” and extremely unrealistic values suggest a mix of non-earning students, unclear responses, or data-entry inconsistencies. Overall, the sample leans heavily toward low or no income, reflecting a predominantly student-dependent demographic with limited financial autonomy.

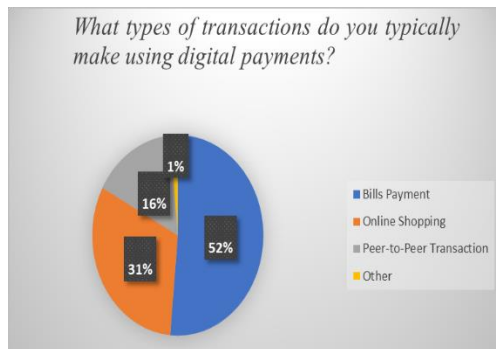
Interpretation: As per the data collected, to find the respondents usage of digital payment system, class midpoints and frequencies were calculated to find mean average time spent. A large portion of the respondents i.e. post covid a majority of the population uses digital payment system daily i.e. approx. 79.6%, while 11.1% of the

population uses the digital payment system monthly, approx. 5.6% of the population use digital payment system weekly and a very few numbers of people does not use digital payment system as Digital payment systems are used daily because they offer speed, suitability, and security that traditional cash transactions cannot match. People prefer them because they allow instant payments, reduce the need to carry cash, and make online shopping easier. They also support features like transaction history, bill reminders, and mechanization.

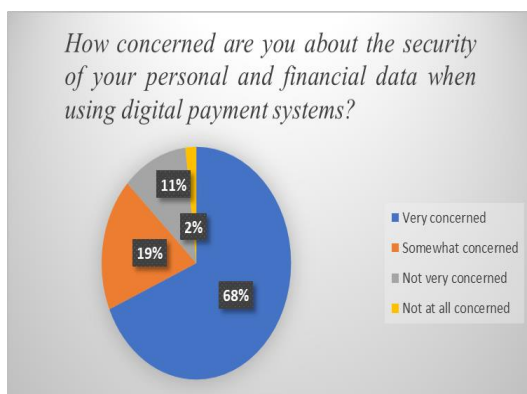


Interpretation: As per the data collected, to find the percentage of respondents uses which payment system is used, class midpoints and frequencies were calculated to find mean average time spent. A large portion of the respondents i.e. approx. 46.3% of the respondents uses Google pay, approx. 25.9% of the respondents uses Phone Pay, only 13% uses Paytm and a very few uses other app as Google Pay offers a cleaner interface, faster UPI payments, fewer transaction failures, and strong Google-backed security. Its seamless contact integration, simple design, and reliable performance make it more convenient for everyday use. It also gives gifts/vouchers to the users.

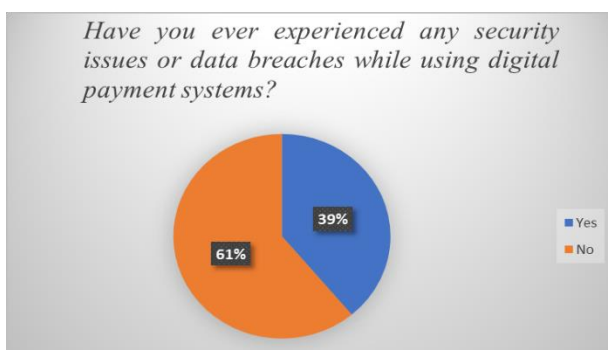




Interpretation: As per the data collected, to find the type of transactions of respondents using digital payment, class midpoints and frequencies were calculated to find mean average time spent. A large portion of the respondents i.e. people mostly use digital payment system for online shopping (approx. 68.5%) bills payment (approx. 59.3%) and peer-to-peer transfers (approx. 40.7%).



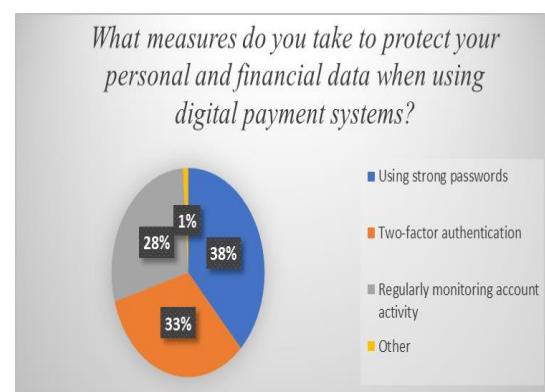
Interpretation: As per the data collected, to find the concern of respondent's security of your personal and financial data when using digital payment system, class midpoints and frequencies were calculated to find mean average time spent. A large portion of the respondents i.e. 68.5% of the respondents are very concerned about their security.



Interpretation: As per the data collected, to find experience of respondent's security issues using digital payment system, class midpoints and frequencies were calculated to find mean average time spent. A large portion of the respondents i.e. 61.1% of the respondent have not faced security issue but 38.9% of the respondents have faced security issue it may be phishing scams through fake links or messages, UPI PIN fraud where scammers trick users into entering their PIN, account hacking due to weak passwords or leaked credentials, SIM-swap attacks used to steal OTPs, malware-infected apps capturing financial data, fake customer-care scams pretending to resolve issues, public Wi-Fi risks exposing sensitive information.



Interpretation: A survey with 54 responses went in-depth regarding the difficulties in the use of digital payment systems. There was a 72.2% in result response to the biggest difficulty being the technical issues of the systems, 39 respondents in total. The 2nd biggest concern was with the system losing security and that was 38.9% of the respondents, and that is about 21 people. Next is the issue of a system being unresponsive which is the owner of 18.5% of issues of concern. Given that technical issues are the highest concern in survey respondents, this suggests that a system does need reliability and is able to be user friendly to improve the use of the technical systems.



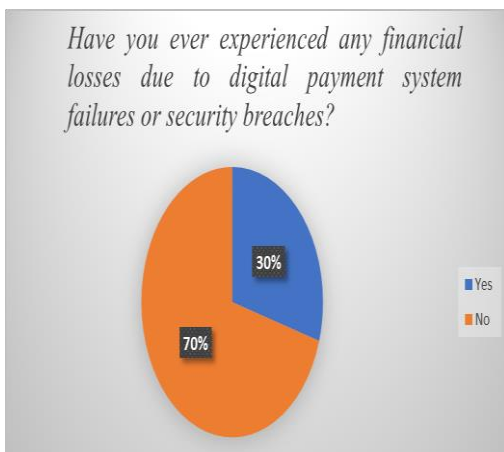
Interpretation: The respondents in this survey seem to value certain volume security protocols in particular. The

most widespread protective measure is employing strong passwords (66.7%), even then users closely fall into two-factor authentication at 61.1%. About 50% of respondents maintain a practice of keeping an eye on account activity. These significant rates show an appropriate level of security awareness with an emphasis on the most basic levels of defence. Respondents taking 'nothing' or particular other non-standard measures is practically a negligible minority (1.9% respectively).

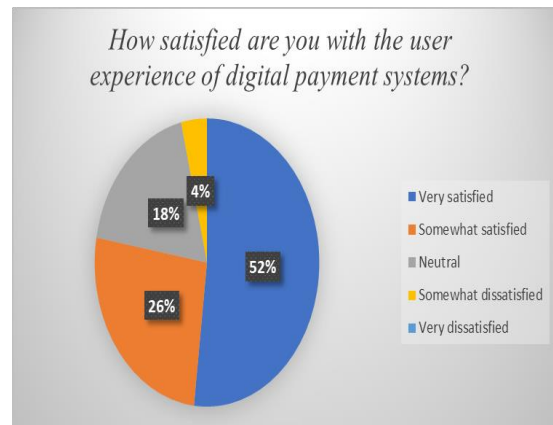
How do you think digital payment systems can be made more secure and reliable?

Advance fraud detective
More cyber security
Upgradation of security
Two or more factors password
Fingerprint password
OTP

Interpretation: The noted feedback focuses on two primary spheres: enhanced safety measures and better overall system functioning. Primary protective options involve the use of stronger authentication options such as biometrics and/or one-time passwords (OTPs); and not only keeping data secure through end-to-end encryption and tokenization, but also during transit to/from a remote computing system. Reliability can be improved significantly with respect to the problem apparent with the potential to lose payments due to network failures, with the introduction of stop-and-go functionality, and through faster response times to users' inquiries. While also more being informed, users are likely to develop more trust through increasing system functionality, improvements in security, and operational reliability.



Interpretation: From the data, it can be seen that a sizable minority has had personal incidences of financial loss, coming to 27.8%, with a total of 15 out of 54 respondents. Conversely, 38 respondents, or 70.4% of the surveyed group, do not have any losses. The last minute % of respondents 1.8%, said that a relative of theirs had a loss. The increased number of respondents who experienced a personal loss is what demonstrates the actual risk and this has to be addressed that adds to the concerns of the respondents regarding the loss and the security.



Interpretation: Overall, we see that the large majority of users are very happy which reports at 51.9% that they are very satisfied and 25.9% that are somewhat satisfied. Also, we see that a small group of users are neutral at 18.5% and a very small number that are dissatisfied which is 3.7% for somewhat dissatisfied and 0% for very dissatisfied. This may seem to contrast with reported technical and security issues but in fact it is the large majority which has had a positive experience.

What features do you like most about digital payment systems?

Secure infrastructure and software
Very easy to make payments
Instant transfer of money
Easy to carry money everywhere
Universal acceptance
Hassle free payment and fear of loss of physical money
convenience, speed, and security
Quick transfer

Interpretation: Provided responses do not report on what user's dislike; instead, they focus in to the positive aspects

of digital payment systems. Which we see to be the most is: Instantly at your service Very fast transactions (repeated three times). Security and secure payments. Simplicity and Ease of Use any time, any place (national/international). We are going cashless and we see these as very much universal. The data reports that we have great love for the speed and convenience which these systems provide

What features do you dislike most about digital payment systems?

Payment limit
Technical problems and server down problems
Lack of keeping track of balance, and more money spending
Server error
Bank transfer
Fake payment link
Digital payment systems can be risky due to chances of fraud, hacking, or technical failures.

Interpretation: Features of reliability and accountability are definitely the most disliked issue amongst customers. They really don't like the failure of the servers and the network or how sometimes transactions aren't able to work without a strong internet connection. Frustration is experienced when getting refunds of the wrong transfers. There are also security risks as well as technical issues that arise. People also seem to believe that there is a deficit of tracking of their spending/spending balance which causes overspending. These negatives are a lot different than what users of the services are complaining about. They are much faster than most people appreciate.

Do you have any additional comments or suggestions about digital payment systems and data protection?

Detects the fraud link before making payment
Digital payment system helps a lot because it, itself maintains record of every transaction after making any transaction.
There should be course related to digital payment system.
It should be more reliable and glitch free

I believe government should limit the no. Of digital payment apps because I have seen nowadays so many companies are building these apps and people have installed many payment apps which I feel is not required and somewhat is not secure.

Taking loans is getting easier and EMI system is ruining our spending behaviour

Interpretation: User comments emphasize transaction reliability and system association. A critical suggestion is implementing instant refunds for failed transactions to prevent delays and inconvenience. A contrasting view suggests limiting the number of payment apps for better security and management. Users also reiterate the need for providers to focus on stronger encryption and for users to adopt multi-factor authentication for enhanced data protection.

7. Findings and Suggestions

Key findings:

- i. Technical issues (72.2%) and security risks (38.9%) are the biggest difficulties faced by users, indicating gaps in reliability and system stability.
- ii. Despite security concerns, 77.8% of users are satisfied with digital payment systems due to speed, convenience, and 24x7 accessibility.
- iii. Server failure, network dependency, refund delays, and fear of security breaches remain major pain points.
- iv. Over 80% of respondents are students, showing that digital payments are most popular among younger, tech-savvy demographics.
- v. The majority of users are students aged 17–22, indicating that young adults are the most active digital payment users.

Suggestion:

- i. Failed payments create inconvenience as stuck transactions take up to four days to return. Introducing an instant refund feature would help users' complete payments on time.
- ii. Users should adopt multi-factor authentication, update apps regularly, use secure Wi-Fi/VPN, and enable transaction alerts to enhance safety.
- iii. Digital payment providers must improve encryption, conduct regular security updates, and prioritise user privacy to reduce risks.

iv. Stronger mechanisms are required to detect and block fraudulent or fake payment links, protecting users from phishing attacks.

v. Digital payment systems are helpful as they automatically maintain a complete record of transactions, improving transparency and financial tracking.

8. Conclusion

The research demonstrates that digital payment systems have established themselves as fundamental components of India's financial system because young users choose them because of their fast processing and user-friendly design and wide availability. The fast growth of these platforms has created new security risks and system stability problems and data protection challenges. Users show overall contentment with digital payment services yet they face ongoing problems with system failures and security concerns that prevent them from fully trusting these systems. The survey results show that users face regular threats from phishing scams and UPI frauds and transaction problems which prove the need for improved security protection systems.

Users show average security knowledge through their practice of using complex passwords and two-factor authentication and their habit of checking their transaction records. The current individual security measures need to be supported by strong institutional protection systems. The user confidence will increase through better encryption methods and enhanced authentication systems and faster technical problem resolution and simplified refund procedures. The RBI together with the Digital Personal Data Protection Act (DPDPA 2023) should establish a robust regulatory system to defend financial data and protect system stability.

The research establishes that digital payment systems bring substantial advantages to users who use them extensively but their long-term success requires ongoing development of security systems and user education and system performance improvement. The development of a secure digital payment system in India's digital economy depends on strengthening security measures and operational stability and user education programs

REFERENCES

- [1] Dr M. Reddi Naik, D. K. (2024). ISSUES AND CHALLENGES OF ELECTRONIC PAYMENT SYSTEMS. International Education & Research Journal [IERJ].
- [2] Dr. Varalakshmi, A. S. (2024). Cyber security in digital payments: An empirical . Asian Journal of Management and Commerce .
- [3] Hemant Trivedi, D. S. (2023). CHALLENGES IN DIGITAL PAYMENT ADOPTION IN INDIA. International Journal of Education, Modern Management, Applied Science & Social Science (IJEMMASSS), 32-38 .
- [4] Hemant Trivedi, D. S. (2023). CHALLENGES IN DIGITAL PAYMENT ADOPTION IN INDIA . International Journal of Education, Modern Management, Applied Science & Social Science (IJEMMASSS).
- [5] Md Arif Hassan, Z. S.-K. (2020). A Review on Electronic Payments Security. Center for Cyber Security, Faculty of Information Science and Technology, National University Malaysia (UKM).
- [6] Rachna, P. S. (2013). Issues and Challenges of Electronic Payment Systems. International Journal for Research in Management and Pharmacy .
- [7] Sahoo, D. R. (2016). Payment Systems in India: Opportunities and . Journal of Internet Banking and Commerce.
- [8] T.S, S. J. (2017). Opportunities and Challenges of E- Payment System in India. International Journal of Scientific Research and Management (IJSRM), 6935-6943.