



AI-powered digital payment systems' effect on India's financial inclusion

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Abstract

The quick development of digital technologies has brought major changes in the financial services sector, particularly in the methods used to access and carry out financial transactions. In recent years, digital payment systems have become a potent instrument for advancing financial inclusion. Became a potent instrument for advancing financial inclusion. by offering convenient, cost-effective, and easily accessible financial services to individuals across different socio-economic backgrounds. These systems have significantly reduced dependence on cash transactions and traditional banking channels, making financial services more widely available.

Artificial Intelligence (AI) incorporation into digital platforms has further strengthened this transformation by improving transaction security, enhancing fraud detection mechanisms, enabling efficient customer support through chatbots, and offering personalized financial services based on user behavior. The impact of AI is the main emphasis of this paper. digital payment systems on financial inclusion in India. It also examines the major elements such as digital infrastructure, financial literacy, perceived security, usability, and technological awareness that impact the uptake of AI-enabled payment platforms. The study's conclusions indicate that digital payment systems have a major part in improving financial inclusion through increasing accessibility to financial services, reducing transaction costs, and building greater trust among users. Furthermore, these systems help integrate underserved and rural populations into the formal financial system. The study suggests that strengthening digital infrastructure, improving digital literacy, and enhancing cyber security measures are essential for maximizing the benefits of AI-based financial technologies.

Overall, the research demonstrates the growing significance of financial technologies driven by AI in promoting equitable economic growth and expanding access to financial services in emerging.

Keywords: Artificial Intelligence (AI), digital payments, financial inclusion, financial technology (fintech), digital banking, cyber security, financial literacy, India

Introduction

In recent years, the industry has seen a major transformation due to rapid advancements in digital technology. Traditional banking methods, which once required physical visits to bank branches and lengthy processing times, are increasingly being replaced by faster and more convenient digital alternatives. Among these innovations, digital payment systems have become one of the most widely used financial tools across the world, especially in developing countries like India.

Platforms for digital payments like mobile wallets, internet banking, and real-time payment systems have made financial transactions simpler, quicker, and easier to reach. These systems enable people to. These systems allow individuals to transfer money, pay bills, and conduct business transactions with just a few clicks on their smartphones. As a result, digital payments have played a significant role in improving financial inclusion by bringing more people especially those in rural and underserved areas into the formal financial system.

Fraud detection, risk assessment, customer service and personalized financial and personalized financial payment systems has further enhanced their effectiveness. AI technologies are now widely used in areas such as fraud detection, risk assessment, customer service, and personalized financial recommendations. These innovations not only improve the efficiency of financial services but also increase user trust and security, which are critical factors in the adoption of digital platforms.

In the context of India, government initiatives such as Digital India and the promotion of The Unified Payments Interface (UPI) has expedited the uptake of digital of digital financial services. However, despite this progress, challenges such as inadequate knowledge of digital cyber security threats, and uneven access to technology still exist, particularly in rural areas.

Consequently, it becomes crucial to research how digital payment systems influence financial inclusion and what factors affect their adoption among users. Understanding these aspects can help policymakers, financial institutions, and technology providers develop better strategies to ensure that the benefits of digital financial transformation reach all sections of society.

Literature Review

Digital payment systems have drawn a lot of attention lately because of their capacity to due to their ability to simplify financial transactions and improve access to financial services. Researchers have widely acknowledged that the growth of Real-time payment systems, online banking, and mobile banking real-time payment systems has contributed to improving financial inclusion by reducing dependence on traditional banking infrastructure. These digital tools have made it easier for people to engage in the official financial system, particularly in poor and rural areas.

Several studies have focused on the factors that influence the adoption of digital payment systems. The most

commonly identified factors comprise perceived utility, usability, security, trust, and ease of use, trust, security, digital literacy, and availability of digital infrastructure. To well-known models of technology adoption, such as the Technology Acceptance Model (TAM), users are more likely to adopt digital if they find them easy to use and beneficial in their daily lives. Similarly, trust and security concerns play a major role in determining whether individuals continue using digital payment platforms.

Recent literature also highlights Artificial Intelligence's (AI) expanding importance in enhancing in improving financial services. AI-based technologies such as machine learning algorithms, chatbots, and predictive analytics are being widely used in digital payment systems to enhance fraud detection, improve customer support, and offer personalized financial solutions. These advancements not only increase operational efficiency but also help in building user confidence in digital financial platforms.

In addition, studies have shown that digital payment systems play an important role in strengthening financial inclusion by lowering transaction costs and increasing access to banking services. Digital platforms allow users to transfer money instantly, receive payments securely, and access financial products without visiting physical bank branches. This has been particularly beneficial for low-income groups and rural populations who previously had limited access to financial services.

However, existing research also identifies several challenges associated with digital payment adoption. Issues such as cyber security risks, data privacy concerns, lack of digital literacy, and poor internet connectivity continue to hinder widespread adoption, especially in developing regions. These challenges highlight the need for stronger security frameworks, better infrastructure, and increased awareness programs.

There is a growing body of research on digital and financial inclusion, most studies treat these areas separately. Limited research has been conducted on the combined impact of AI-powered digital payment systems on financial inclusion. This gap indicates the need for further investigation into how AI technologies influence user behavior, trust, and access to financial services in emerging economies like India.

Research Gap

Although a considerable amount of research has been conducted on digital payment systems and financial inclusion separately, there is still a clear gap in the existing literature. Most studies focus either on the adoption of digital payment technologies or on financial inclusion outcomes, but they do not adequately explore how these two areas are connected through emerging technologies such as Artificial Intelligence.

Existing research primarily highlights factors such as ease of use, trust, security, and digital literacy as determinants of digital payment adoption. Similarly, financial inclusion studies generally focus on access to banking services, financial literacy, and government initiatives. However, limited attention has been given to understanding how AI-powered features in digital payment systems such as fraud detection, personalized services, and intelligent transaction monitoring directly influence financial inclusion.

Furthermore, there is insufficient empirical data from empirical evidence from developing countries like India,

where digital payment adoption is growing rapidly due to government initiatives and platforms such as UPI. The role of AI in shaping user trust, improving security perception, and encouraging financial participation among rural and low-income populations has not been therefore, this study aims to bridge this disparity by analyzing the combined impact of AI-powered digital payment systems on financial inclusion, with a focus on user behavior, accessibility, and trust in the Indian context.

The Study's Objectives

The Primary Goals of this Research are

1. To investigate what influences the uptake of digital payment systems driven by AI To examine the connection between digital the relationship between digital payment usage and financial inclusion.
2. To comprehend how artificial intelligence may enhance security, a security and user trust in digital payments.
3. Artificial Intelligence's Function in in adopting AI-enabled digital financial services.
4. To provide suggestions for improving financial inclusion through digital payment technologies.

Hypotheses

Based on the research questions, several hypotheses have been developed to test the relationships between key variables in the study.

The first hypothesis states that a substantial positive correlation exists between digital relationship between digital payment adoption and financial inclusion. This means that as more individuals adopt digital payment systems, their level of financial inclusion is expected to increase due to better Payment systems are crucial to the operation of in payment systems play an important role in the second hypothesis suggests that perceived security has a significant impact on the adoption of AI-powered digital payment systems. Users are more inclined to make use of online payment systems. digital payment platforms when they feel that their financial data and transactions are safe from fraud and cyber threats.

The third hypothesis proposes that digital literacy significantly influences the usage of digital payment systems. Individuals who are more familiar with digital tools and technologies are expected to use digital payment platforms more frequently compared to those with limited digital knowledge.

The fourth hypothesis indicates that AI-based features such as fraud detection systems, chatbots, and personalized financial services positively affect user trust in digital payment systems. These intelligent features enhance user experience and increase confidence in using digital financial services.

The fifth hypothesis assumes that there is a significant difference in digital payment adoption between rural and urban users. Urban users are expected to adopt digital payment systems more rapidly due to better infrastructure, higher digital literacy, and greater access to technology compared to rural users.

Research Methodology

Because it focuses on examining quantifiable links between variables including the adoption of digital payments, AI features, regarding financial inclusion, a quantitative this study uses a research design employed in this study. Design

because it concentrates examining quantifiable links between variables including the adoption of digital payments, AI features, as well as financial inclusion and financial inclusion, this study uses a quantitative research design. A quantitative approach is suitable as it allows statistical analysis and objective interpretation of data collected from

A systematic questionnaire will be used to gather the study's primary data. The questionnaire will be designed to gather responses from users of Mobile wallets and other digital payment platforms as mobile wallets, UPI-based applications, and internet banking services. The questions will focus on user experience, trust levels, security perception, and financial inclusion outcomes.

The target sample size for this study. This sample size is considered appropriate for drawing meaningful conclusions while maintaining feasibility in data collection and analysis. The sampling technique used in this study will be convenience sampling. Time constraints and respondents' ease of access led to the selection of this approach. to time limitations and easy accessibility of respondents who actively use digital payment systems in daily life.

Statistical tools including percentage analysis mean, standard deviation, correlation, and regression analysis will be used to analyses the gathered data. such as percentage analysis, mean, standard deviation, correlation, and regression analysis. These tools will help in understanding relationships between variables and testing the proposed hypotheses. Software such as Microsoft Excel or SPSS may be used for accurate data analysis.

Digital literacy, perceived security, AI-based functionality, and infrastructure availability are independent variables in this study. The dependent variable is financial inclusion, which is measured in terms of access to financial services, frequency of digital transactions, and usage of banking facilities.

Analysis and Interpretation of Data

Table 1: Respondents' Demographic Profile (N = 150)

Variable	Category	Frequency (N)	Percentage (%)
Gender	Male	92	61.3
	Female	58	38.7
Age	18–25	64	42.7
	26–35	52	34.7
	36–50	28	18.7
	Above 50	6	4.0
Location	Urban	98	65.3
	Rural	52	34.7

Interpretation

According to the demographic profile, men make up the majority of responders (61.3%). The age group that predominates (42.7%) is 18–25 years old, suggesting that younger people use digital payments more frequently. outnumber rural respondents (34.7%), suggesting higher digital payment penetration in urban areas. Overall, the data indicates that young and urban populations are the primary users of digital payment systems.

Table 2: Digital Payment Usage Frequency

Usage Level	Frequency	Percentage (%)
Daily	78	52.0
Weekly	46	30.7
Monthly	18	12.0
Rarely	8	5.3

Interpretation

The results indicate that a majority of respondents (52.0%) use digital payment systems daily. Additionally, 30.7% use them weekly, showing consistent usage behavior. Only a small proportion of respondents use digital payments monthly or rarely. This demonstrates a high level of acceptance and regular engagement with digital payment platforms.

Table 3: Statistics on Reliability

Scale	Cronbach's Alpha Item Count	Number of Items
Overall Survey	0.87	20

Interpretation

The Cranach's Strong internal consistency is indicated by an alpha value of 0.87 consistency of the questionnaire. This confirms that the survey instrument is reliable and that the items consistently measure the intended construct. Therefore, the data is suitable for further statistical analysis.

Table 4: The variables' mean and standard deviation

Variable	Mean	Std. Deviation
Digital Literacy	4.12	0.76
Perceived Security	3.98	0.82
AI Features Usefulness	4.21	0.71
Trust in Digital Payments	4.05	0.79
Financial Inclusion Level	4.18	0.74

Interpretation

All variables recorded mean values above 4, indicating generally positive perceptions among respondents toward digital payment systems. The highest mean is for AI features usefulness (4.21), followed by financial inclusion (4.18), indicating strong agreement. The relatively low standard deviation values suggest that responses are consistent with minimal variation. Overall, respondents exhibit favorable attitudes toward digital payment adoption and its associated benefits.

Table 5: Analysis of Correlation

Variables	Adoption of Digital Payments	Financial Inclusion
Digital Payment Adoption	1.000	0.68**
Financial Inclusion	0.68**	1.000

Note: ** denotes significance at the 0.01 level.

Interpretation

A significant positive association ($r = 0.68$) is found in the correlation analysis between ayment adoption and financial inclusion. This indicates that increased usage of digital payment systems is linked to increased financial inclusion. The relationship is statistically significant at the 0.01 level, supporting the study hypothesis that the use of digital payments influences financial inclusion.

Table 6: Rural vs Urban Comparison (T-test for Independent Samples)

Collective	Average	The t-value	Sig. (p-value)
Urban Users	4.35	3.98	0.000
Rural Users	3.89	—	—

Interpretation

The results of the t-test indicate a statistically significant difference between urban and rural users. Urban respondents (mean = 4.35) exhibit greater acceptance rates of digital payments in comparison to rural compared to rural respondents (mean = 3.89). The t-value

of 3.98 This difference is extremely significant with a significance level of 0.000. level of 0.000 indicates that this difference is highly significant. This suggests that urban users are more inclined toward digital payment systems, likely due to better infrastructure, awareness, and accessibility compared to rural users.

Findings

- The study finds that digital payment systems are mostly used by younger age groups, especially between 18–25 years, with urban users showing higher adoption compared to rural users. This indicates that age and location significantly influence the usage of digital payment platforms, and overall adoption is stronger in urban areas due to better awareness and infrastructure.
- The results demonstrate a substantial positive correlation between the use of digital payments and digital payment adoption and financial inclusion. As individuals increase their use of digital payment systems, their access to financial services also improves, helping them participate more actively in the formal financial system. This confirms that digital payments crucial part in promoting financial inclusion financial inclusion.
- The study reveals that Artificial Intelligence-based features such as fraud detection, alerts, and transaction monitoring increase user trust in digital payment systems. Users are more likely to utilize digital platforms often when they believe that their transactions are secure. This shows that AI plays a key role in improving confidence and adoption.
- It is found that digital literacy is is one of the most important factors influencing the the adoption of digital payment systems. Individuals with better knowledge of digital tools are more confident in using online financial services, while lack of awareness reduces usage. This highlights the need for continuous digital education programs.
- Perceived security is also identified as a major factor affecting user behavior. Users prefer platforms that they believe are safe from cyber threats and fraud. Security concerns remain a barrier for some users, and improving cybersecurity measures can significantly increase adoption levels.
- The findings indicate a clear rural–urban divide in digital payment adoption. Urban users adopt these systems more frequently due to better internet access and higher digital awareness, while rural users face challenges such as poor connectivity and limited digital skills.
- AI-based features like catboats and personalized recommendations enhance the overall user experience by making digital payment platforms more convenient and user-friendly. These improvements lead to higher satisfaction and continued usage of digital of digital financial services.
- The study also finds that digital payment systems are reducing dependency on cash transactions. More individuals are gradually shifting towards digital methods for everyday payments, which supports the development of a cashless economy and improves transaction transparency.
- Government initiatives such as digital awareness campaigns and promotion of UPI have significantly contributed to the growth of digital payment adoption.

These efforts have increased public awareness and trust in digital financial systems, especially among new users.

- Despite the positive growth, cyber security threats and lack of awareness remain major challenges. Many users still hesitate to fully adopt digital payment systems due to fear of fraud and limited understanding of technology, highlighting the need for stronger awareness and security measures.

Suggestions

- The study suggests that digital literacy programs should be strengthened at the grassroots level so that users, especially in rural areas, can better understand and confidently use digital payment systems. Regular training sessions, workshops, and awareness campaigns can help reduce hesitation and improve adoption rates.
- It is recommended that financial institutions and government bodies focus on improving cyber security measures to build stronger trust among users. Enhanced fraud detection systems, secure authentication methods, and real-time alerts can help reduce the risk of cyber threats and increase user confidence.
- The study suggests expanding digital infrastructure in rural and semi-urban areas semi-urban areas by improving internet connectivity and access to smartphones. Without proper infrastructure, the benefits of digital payment systems cannot reach all sections of society equally.
- Banks and FinTech companies should simplify digital payment interfaces to make them more user-friendly, especially for first-time users and elderly populations. Easy navigation and multilingual support can help increase accessibility and usage.
- It is also suggested that Artificial Intelligence-based features such as chatbots, fraud detection tools, and personalized recommendations should be further improved and widely implemented. These features enhance user experience and build trust in digital financial systems.
- Government policies should continue to promote cashless transactions through incentives, awareness programs, and digital finance initiatives. Strong policy support will encourage more individuals to shift toward digital payment platforms.
- Special focus should be given to rural populations and low-income groups by introducing targeted financial inclusion programs. These groups are still lagging behind in digital adoption and need additional support.
- Financial institutions should regularly conduct awareness campaigns about safe digital payment practices to reduce fear of fraud and cybercrime. Educating users about secure usage will help reduce risks.
- Collaboration between government, banks, and technology company's s companies should be to create a more inclusive and secure digital financial ecosystem. Financial ecosystem. Joint efforts can ensure better service delivery and innovation.
- Finally, continuous improvement in technology and customer support systems is necessary to ensure smooth and reliable digital payment experiences. This will further enhance trust and long-term adoption among users.

Conclusions

The study concludes because electronic payment systems are now a system have become a major financial transformation in India by improving facilitating financial services and encouraging financial inclusion such as UPI, online banking, and mobile wallets has made financial transactions faster, easier, and more convenient for users across different socio-economic groups. This shift towards digital finance has significantly reduced dependence on cash-based transactions and encouraged participation in the formal financial system.

It is also concluded that Artificial Intelligence plays an important role in strengthening digital payment systems by improving security, fraud detection, and user experience. AI-based features increase user trust and confidence, which further encourages the uptake of online banking services. According to the study, the introduction of digital payments significantly improves a strong positive impact on financial inclusion, especially when supported by digital literacy, secure systems, and proper infrastructure.

But the survey also finds that some issues, such as cyber security threats, still exist. These issues limit the full potential of digital payment systems in achieving universal financial inclusion. Therefore, continuous efforts from government, financial institutions, and technology providers are necessary to improve digital infrastructure, enhance user awareness, and ensure secure and inclusive financial services for all sections of society.

Reference

1. Sinha V, Kumar A, Siddharth T. The Effect of Artificial Intelligence on Digital Financial Inclusion in India. [Journal/source not specified], 2023.
2. Rout M, Ray R. Analytical Study of Digital Payment System for Financial Inclusion in India. [Journal/source not specified], 2024.
3. Singh J, Singh M. Accelerating Financial Inclusion of the Urban Poor: Role of Innovative e-Payment Systems and JAM Trinity in Alleviating Poverty in India. [Journal/source not specified], 2024.
4. Lokeshwari DV, Shruthi MP, Manjunatha T. Artificial Intelligence in Financial Inclusion: An Impact on Financial Accessibility and Efficiency in India. [Journal/source not specified], 2025.
5. Haque MI, Azeez ANP, Akhtar SMJ. UPI and Financial Inclusion in Rural India: A Case Study. [Journal/source not specified], 2025.
6. Prajapat A, Soni D, Soni N, Bhadu S. Digital Transformation in India's Financial Sector: Progress, Challenges and Policy Implications. [Journal/source not specified], 2026.
7. Padmalatha V, Kalaivani M. A Study on the Role of AI in Shaping Financial Confidence and Sustained UPI Usage with Reference to Tamil Nadu. [Journal/source not specified], 2026.
8. Bagde RM, Patil AW. Digital Payments, Financial Inclusion and Rural Development in India: Evidence from UPI Adoption. [Journal/source not specified], 2026.
9. Choudhary HS, Mishra S, Kumari A. Impact of Digital Payments [UPI] Financial Inclusion in India. [Journal/source not specified], 2025.
10. Khurana L, Ramesh Chandra S, Janardhana Rao N, Thota V, Kaipa RR, Venkata Ramana S. Fintech and

Financial Inclusion in India: A Data-Driven Analysis of Digital Payments and Banking Access. [Journal/source not specified], 2025.