European Economic Letters
ISSN 2323-5233
Vol 15, Issue 2 (2025)
http://eelet.org.uk

Acceptance of Digital Payment in Rural India: Challenges Ahead

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Abstract
Technology is employed by digital payment systems to enable users to make purchases on digital platforms. The adoption of digital payments is more challenging in rural areas due to a variety of factors, such as a lack of digital infrastructure, limited access to mobile phones and formal banking services, low income, cultural and socioeconomic constraints, and other factors. Urban areas, on the other hand, have a high level of digital payment usage. The digital payment systems are inaccessible to rural consumers due to their lack of financial and digital literacy. This results in substantial disparities. The objective of this study is to emphasize the factors that influence the acceptance of digital payments in rural areas. The present also identifies the present status of digital payment along with the opportunity and challenges in adoption of the digital payment system and also proposes a theoretical model to show the relationship between the factors impacting the adoption of digital payment, attitude of consumer and adoption of digital payment. The theme of the research aligns with Goal 9: Industry, Innovation, Technology and Infrastructure and Goal 11: Sustainable cities and communities of SDGs as proposed by UN in 2015

Keywords: Digital, System, Payment, Rural, Consumers, Adoption, Google Pay, UPI, BHIM, Financial Literacy

Introduction
Digital payment signifies a cohesive system of infrastructure, finance, and the internet that enables individuals to conduct digital transactions. It encompasses various services such as payment and receipt without the physical currency, fund transfers, payments for products and services, etc. The world experienced the COVID epidemic in 2019, and this pandemic has changed banking sectors globally, marked by a rapid rise in digital payments during that time. This applied even to the rural regions of India. The Government of India has widely supported this expansion of digital payments. The Indian government has implemented measures and advocated for a digital and cashless economy. The expansion of digital payment systems, along with the rise of mobile and internet users, has boosted the digital payment sector; however, rural regions still face challenges and much more needs to be accomplished in these areas to enhance support for digital payment initiatives. Digital payment systems leverage technology, allowing users to make purchases through digital platforms such as smartphones and various electronic devices (Birigozzi, Silva & Luitel, 2025). These systems highlight

numerous cashless alternatives, such as mobile wallets, online banking, card payments, and payment gateways, catering to the particular needs of users

Elements driving the rapid growth of digital payments comprise legislative measures, enhanced internet and smartphone access, improved digital infrastructure, and the growth of e-commerce (Aurazo & Gasmi, 2024). The Indian government has taken major actions to promote the use of digital technology. These initiatives include the Digital India campaign, Make in India initiatives, and Startup India (Bajaj & Damodaran, 2022). These initiatives have enabled the application of digital technology in various fields, such as healthcare, education, and agriculture. Individuals and government organizations are extensively utilizing digital payment platforms. According to the data provided by the Union Government, the digital payment systems have experienced a substantial compound annual growth rate (CAGR) of 44%, with transaction values rising from Rs. 2,071 crore (INR) during the fiscal year 2017-2018 to Rs. 18,592 crore for the fiscal year 2023-2024. With the necessary Cabinet approval, the Government has launched the "Incentive Scheme for the Promotion of RuPay Debit Cards and Low-Value BHIM-UPI Transactions (P2M)" to enhance efficient service delivery among partners within the payment ecosystem. The Government distributes the incentive to the Acquiring Bank (merchant's bank), which then assigns it to various entities: Issuer Bank (customer's bank), Payment Service Provider Bank (handles UPI onboarding/API integration), and App Providers (TPAPs)

After the financial year 2013-2014, there has been a substantial and rapid increase in digital transactions and the use of digital payment systems. In the fiscal year 2023-2024, the total has risen to ₹ 3,658 lakh crore. India's rapid embrace of digital payments is driven by four key trends: the transition to digital, an encouraging regulatory framework, the increase in possible service providers, and improved customer satisfaction (Fahad & Shahid, 2022). Government incentives, available internet, and partnerships with financial institutions have enabled this progress. This change signifies India's progress toward a cashless society, supported by a secure, efficient, and inclusive digital payment system.

The COVID-19 pandemic hastened the adoption of digital payments as contactless transactions became essential during lockdowns (Feng, Chong, Yu, Ye & Li, 2022). Rural businesses and service providers gradually adopted QR codes, while government aid was directly deposited into bank accounts, thereby encouraging the use of digital payment systems among beneficiaries (Haque, Azeez & Akhtar, 2025). Despite these advancements, rural India continues to encounter major difficulties in the extensive adoption of digital payments. Digital literacy poses a significant challenge, as many rural communities do not possess the necessary skills or confidence to engage with digital platforms, while poor internet access in isolated regions restricts the consistent use of mobile payment apps (Ghosh, 2021)

Literatures Reviewed

The literature review process has aided in pinpointing current gaps concerning the adoption of digital payments in rural regions. Rural regions face multiple challenges, such as cultural obstacles, lack of digital infrastructure, and low financial literacy, which impede the establishment of digital payment systems (Haque & Shoaib, 2025).

Although digital payments are boosting the rural economy, problems like inadequate infrastructure and low digital literacy continue to raise concerns (Leviäkangas et al., 2025). In

European Economic Letters
ISSN 2323-5233
Vol 15, Issue 2 (2025)
http://eelet.org.uk

rural regions, internet accessibility serves as a crucial obstacle to digital advancement and adoption (Hanna, Lyons & Liu, 2022). A major problem is the costly and insufficient digital infrastructure, which obstructs access to digital financial services, including online banking and mobile wallets (Islam, Tamanna & Islam, 2024). A person living in a rural area faces challenges in acquiring essential tools like mobile devices and formal banking services because of limited income and cultural and economic barriers. These problems slow down the speed of digital integration. The lack of digital and financial literacy within the rural population leads to substantial inequalities, hindering people from adopting digital payment systems (Ng, Kauffman, Griffin & Hedman, 2021). To tackle these challenges, it is vital to improve digital literacy, develop infrastructure, and make e-governance platforms more inclusive and accessible for the varied rural populace (Zhang & Gong, 2022). Strategic initiatives and continuous support are essential for lasting digital inclusion in rural areas.

Many research works on digital payment systems have explored their ability to improve financial and operational efficiency, thereby fostering economic growth and financial inclusion (Ly, & Ly, 2024). Different digital payment methods, including point-of-sale (POS) terminals, QR code payments, Google Pay, and Paytm, are excelling in rural regions and are extensively used by the rural community for everyday transactions. The integration of digital payment systems within rural economies has eliminated the necessity for physical cash in financial dealings and has provided multiple advantages, such as convenience and safety (Jaiswal, Mohan & Deshmukh, 2023). These advancements can empower local communities to enhance their entrepreneurial skills and strengthen overall economic resilience by promoting financial inclusion and improving service access (Panagariya, 2022). Additionally, as digital literacy advances in these areas, micro-financing and the growth of small businesses will become increasingly feasible, thus altering the existing economic landscape (Kajol, Singh & Paul, 2022)

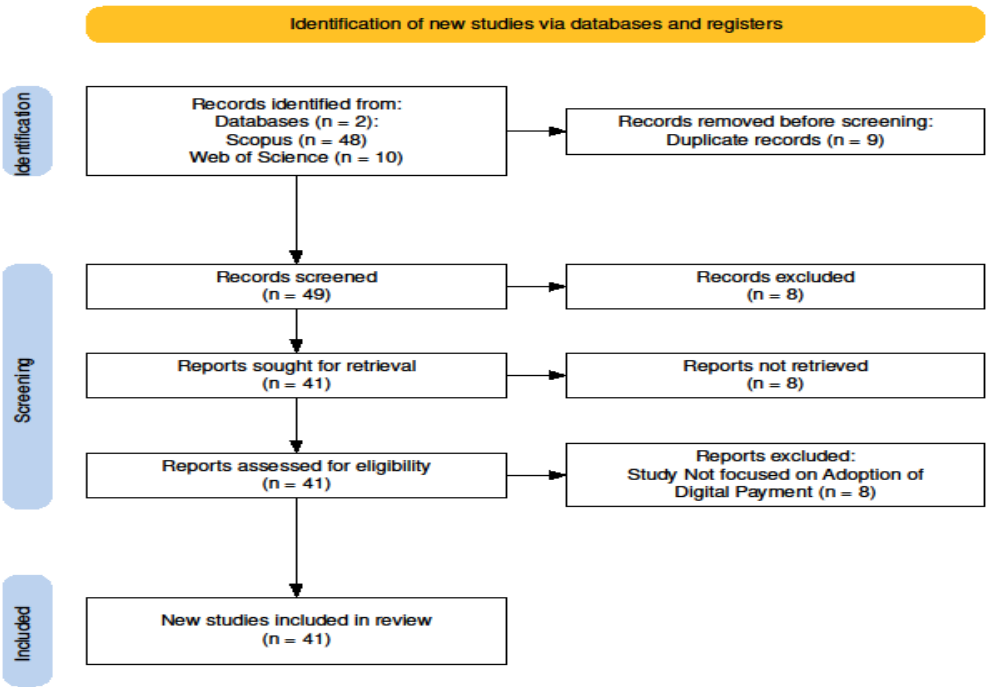

Figure – 1 - PRISMA Framework

European Economic Letters
ISSN 2323-5233
Vol 15, Issue 2 (2025)
http://eelet.org.uk

Digital payment systems facilitate cashless transactions by combining various technologies, such as smart cards, online banking, and mobile wallets (Pal, Herath, De', & Raghav, 2021). It reduces reliance on cash, providing individuals and businesses with the effectiveness and ease of digital transactions. The Indian government's goal for a cashless economy has transformed traditional payment methods into digital options (Prodan, et al. 2024). The transition from conventional to digital has resulted in the extensive use of digital wallets and debit cards (Ong, Yusri & Ibrahim, 2023). Demonetization encouraged digital wallet companies to grow their services, aligning with the government's Digital agenda focused on establishing an empowered, paperless society, thereby boosting digital transactions. The thematic map obtained from the analyzed literature is shown below

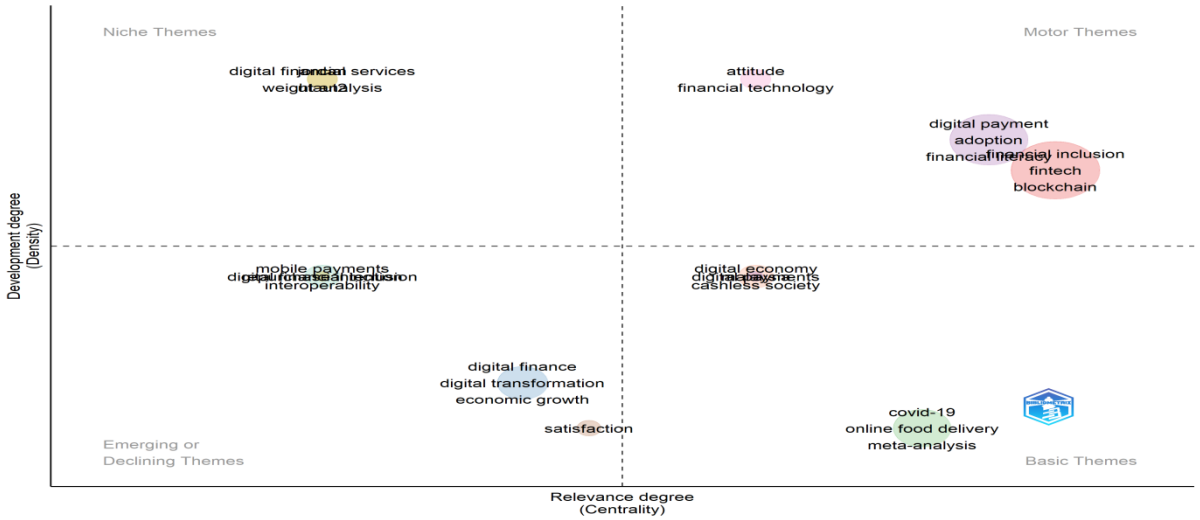

Figure – 2- Thematic Map

Drawing from the reviewed literature, several crucial terms that appear regularly in different research studies are listed below, illustrated as a word frequency over time. The frequency of words throughout time serves as a traditional framework to pinpoint the essential terms and trends associated with the subject.

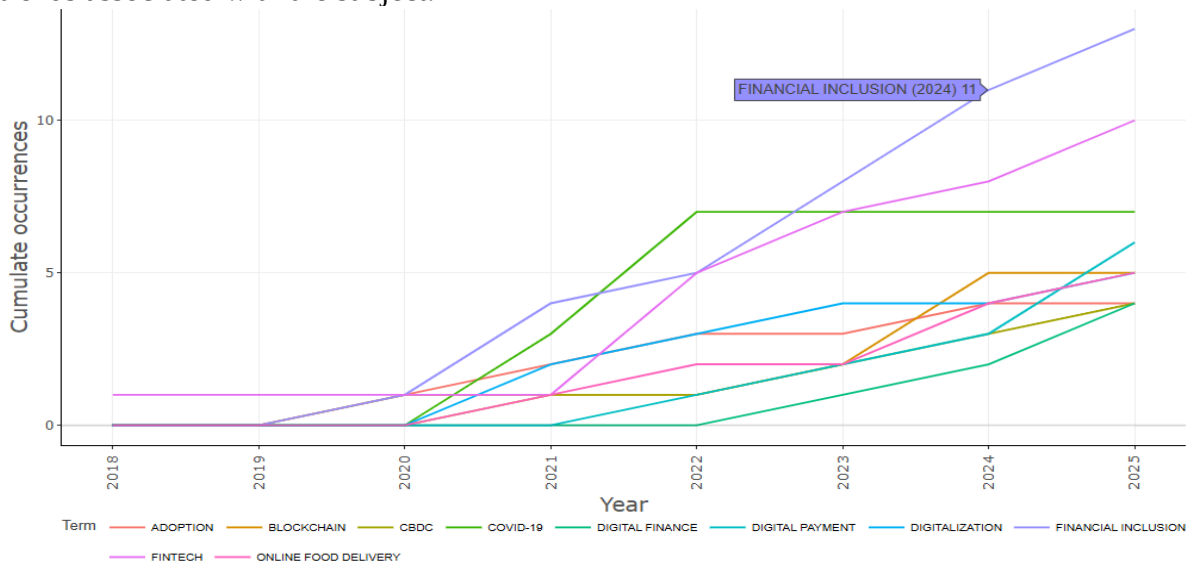

Figure – 3- Word Frequencies over Time

2.1 Present Status of Digital Payment Use by Rural Consumers

European Economic Letters
ISSN 2323-5233
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The declaration of demonetization in 2016 and the COVID-19 pandemic in 2020 have precipitated a substantial transformation in the Indian financial landscape. The adoption of digital payments has intensified due to these events, especially in rural regions. The evolution of India's digital payment infrastructure was notably influenced by the years 2010, 2014, and 2016.

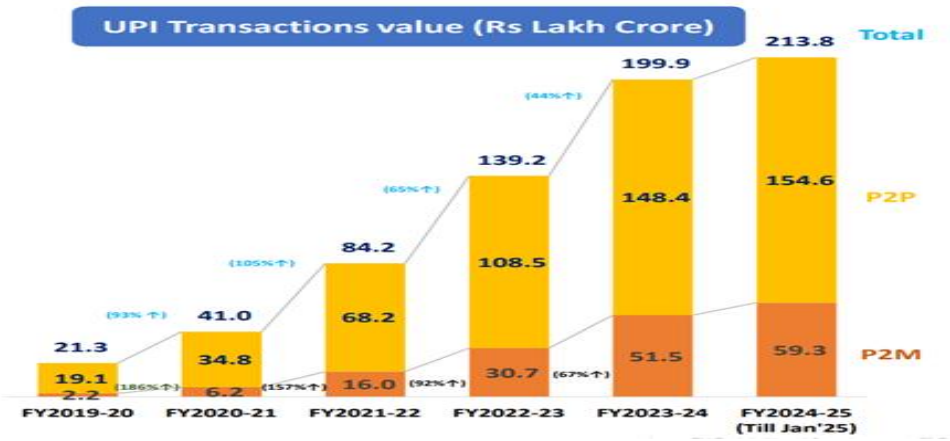

Figure – 4 –UPI Transactions Value
(Source - https://pib.gov.in/PressReleasePage.aspx?PRID=2114335)

Significant milestones encompassed the initiation of PM Jan Dhan Yojana (PMJDY) in 2014, the implementation of Aadhaar-based identification in 2010, and the introduction of RuPay Cards, BHIM, Unified Payments Interface (UPI), and BBPS in 2016.
A recent research from the Reserve Bank of India (RBI) indicates that the per capita digital transactions increased from 0.2 to 114, while the digital transactions per lakh of GDP escalated from 0.8 in FY06 to 56 in FY24. From FY14 to FY24, transactions per capita increased from an average of 0.4 lakh to 16.8 lakh. Paper-based transactions have diminished due to this transition, including about 0.4% of all retail payments in FY24, down from 81.9% in FY06.

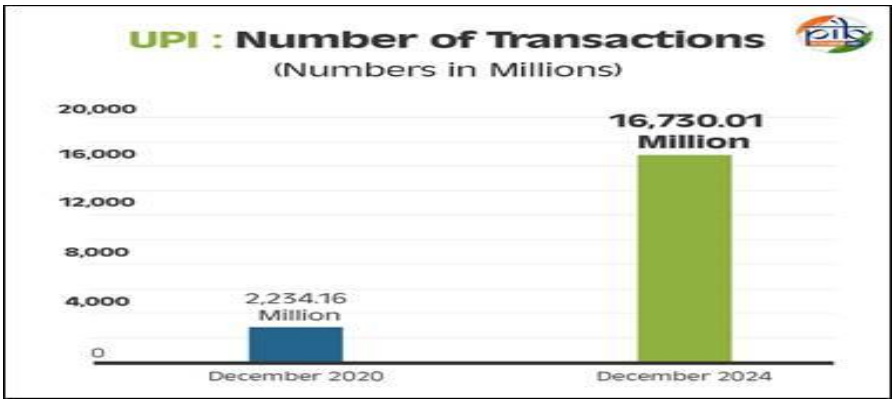

Figure – 5 – Number of UPI Transactions
(Source - https://pib.gov.in/PressReleasePage.aspx?PRID=2098487

It is noteworthy that over one-third of digital payment users in India are in rural areas, while more than half of fintech users are from either semi-urban or rural regions (Rahim, Rabbani, Uddin & Shaikh, 2024). Nonetheless, despite increasing acknowledgment, challenges such as inadequate infrastructure, cyber security concerns, and insufficient digital literacy persist. A 2022, RBI study revealed that 88.8% of businesses were cognizant of digital payments;

nevertheless, the adoption rates lagged behind this awareness, indicating significant potential for expansion.

2.2 Growth of Digital Payments in Rural India

Rural India has experienced a significant rise in digital payments, showcasing a 52% compound annual growth rate (CAGR) in transaction volume and a 12% CAGR in transaction value from 2014 to 2024. The advancement of UPI, RuPay, and AEPS has greatly aided this growth. The BharatNet program has promoted financial inclusion through improved internet access. The RBI claims that digital transactions in India have increased significantly, with their share growing from 1.3% in FY16 to 90.9% in FY24. Government subsidies, merchant promotions, and the increasing use of QR-based payments have all supported this advancement (Rahman, Ismail & Bahri, 2020). Additionally, the seamless incorporation of loan applications, KYC checks, and EMI payments leverages WhatsApp's extensive presence in rural India, presenting a chance to enhance digital repayment processes. In spite of these advancements, cash continues to be common in rural lending systems because of its reliability. The implementation of digital payments in rural areas has faced numerous obstacles, such as insufficient internet connectivity, a shortage of smartphones, and digital illiteracy (Yadav & Das, 2025). Cash is the preferred medium for credit systems in rural areas regions due to its extensive acceptance and user-friendliness (Wu & Liu, 2025).

2.3 Challenges to Adoption of Digital Payment System in Rural Areas

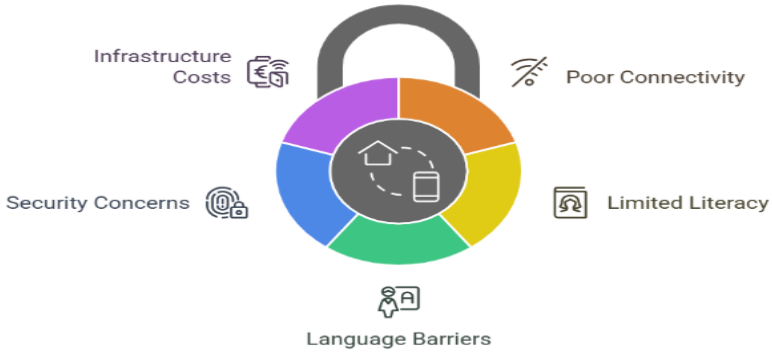

Figure – 6 – Challenges to Adoption of Digital Payment
(Source: https://www.linkedin.com/pulse/empowering-rural-india-rise-digital-banking-rrpdf/)

- **Low Literacy:** Numerous inhabitants in rural areas do not possess the essential digital abilities to utilize internet services, thus obstructing the uptake of digital payments.
- **Insufficient Internet Access:** Especially in rural and isolated regions, poor internet connectivity and unstable energy supplies hinder access to digital services.
- **Geographic Barrier:** The difficult landscapes of rural areas and the cultural skepticism towards technology heighten the obstacles to digital uptake.
- **Expenses for Infrastructure and Cultural Doubt:** Additional barriers to digital adoption include insufficient digital infrastructure and cultural doubt about technology.
- **Security Issues:** Cyber Fraud and other associated security threats are creating a major obstacle and limiting individuals from embracing digital payment systems.

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2.4 Policies of Government of India for Excelling Digital Payment in Rural India

The Indian government has launched numerous initiatives and policies to encourage the use of digital payments in rural regions. The Pradhan Mantri Jan Dhan Yojana (PMJDY) has enabled financial inclusion by creating millions of bank accounts associated with digital

transactions, while the Digital India initiative has enhanced internet access and digital literacy (Savitha, Hawaldar & Kumar, 2022). Additionally, the implementation of AEPS has enabled transactions for people who do not own mobile phones. The Reserve Bank of India (RBI) and the National Payments Corporation of India (NPCI) have played a crucial role in advancing digital transactions. Projects like debit cards, UPI, BHIM, and RuPay enable digital transactions, whereas initiatives like BharatNet have extended online interaction time for the rural community (Venkatraman & Govinda, 2021). The PM SVANidhi initiative has improved the digital interaction of street vendors, thereby fostering financial inclusion. Furthermore, to address security issues, the RBI has introduced multi-factor authentication and launched various awareness campaigns to inform rural customers about the safety measures for digital transactions. The Digital Saksharta Abhiyan (DISHA) along with the Financial Inclusion Fund (FIF) seeks to improve digital literacy (Shekhar, Manoharan & Rakshit, 2020). Nonetheless, challenges like inadequate infrastructure, service shortfalls, a lack of digital skills, and cybersecurity risks persist. It is essential to adopt strategies that encourage comprehensive digital payment options for smartphones and to broaden financial education programs to address these obstacles (Setor, Senyo & Addo, 2021).

2.5 Key Contributors

The main factors driving the expansion of digital payment in India are as follows.

- **Unified Payments Interface (UPI)** - Created by the National Payments Corporation of India (NPCI).
- **Mobile Wallets and Payment Apps** - Mobile wallets, illustrated by platforms like Paytm, PhonePe, and Google Pay, offer users an easy way to hold digital currency and perform smooth transactions.
- **Government Efforts** - The government has significantly boosted the uptake of digital payments through encouraging policies and initiatives. Programs such as Digital India and Direct Benefit Transfer (DBT) etc.
- **E-Commerce** - The rise of e-commerce, demonstrated by sites such as Amazon and Flipkart, along with the expansion of food delivery and ride-sharing services, has significantly increased the adoption of digital payment methods.
- **Banking Framework and Financial Inclusion** - Programs like the Pradhan Mantri Jan Dhan Yojana (PMJDY), designed to ensure that all households possess a bank account, have laid the groundwork for the widespread use of digital payments.
- **Technological Advancements and Fintech Partnerships**: The fintech industry in India has significantly improved the development of the digital payments landscape. Technological advancements, such as biometric identification and blockchain systems, have significantly improved transaction security and effectiveness.
- **QR Code Payments and POS Terminals** - The adoption of QR codes for payments has surged in small shops and stores due to their low setup costs. Point-of-sale (POS) systems in retail and dining establishments facilitate quick card payments, enhancing a cashless shopping experience.
- **Impact of COVID-19 on Payment Behaviour** - The health emergency caused by COVID-19 accelerated the adoption of digital payments as people and businesses sought contactless options.

2.6 Significance of the Study

- The research focuses on an in-depth examination of rural communities' use of digital payment methods. An effort is also undertaken to identify the factors that affect the adoption

of digital payments and their acceptance. This research has also pinpointed the obstacles to adopting digital payments in rural regions and clarifies how rural consumers' attitudes influence this adoption process. This study will identify the issues and opportunities associated with digital payment in rural regions and will offer insights that can aid in formulating policies to improve understanding of digital payment systems, technology adoption, and financial inclusion. The research will also offer pertinent insights into how the mindset of rural consumers influenced the uptake of digital payment. The current study will also present a detailed framework to improve the acceptance of digital transactions, ultimately providing a thorough understanding of rural people's involvement with digital platforms

3 Objectives and Hypotheses of the Study

This study aims to identify and assess the factors affecting the adoption of digital payment systems in rural regions.

- To identify the factors impacting the adoption of digital payment

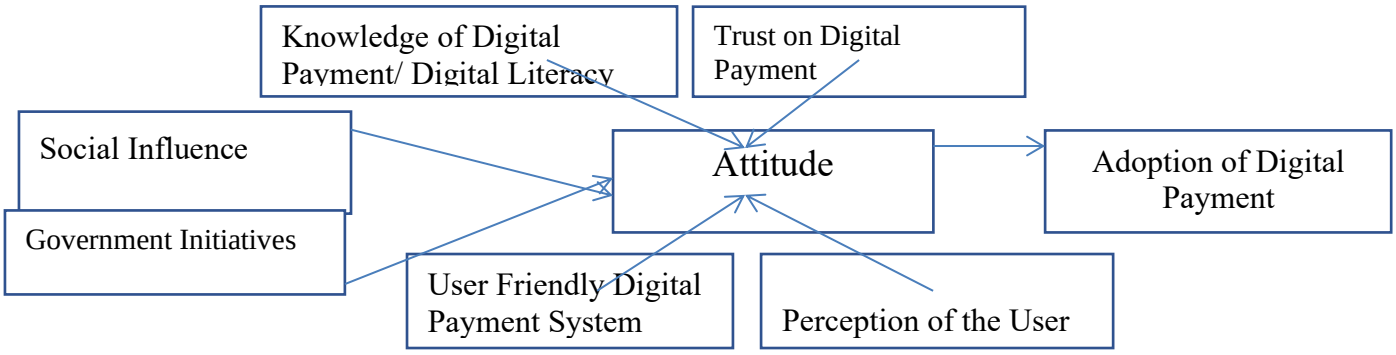
3.1 Hypotheses

- HA1: Perception of the User significantly influence the attitude of rural consumers
- HA2: User Friendly Digital Payment System significantly influence the attitude of rural consumers
- HA3: Government Initiatives significantly influence the attitude of rural consumers
- HA4: Social Influence significantly influence the attitude of rural consumers
- HA5: Knowledge of Digital Payment / Digital Literacy significantly influence the attitude of rural consumers
- HA6: Trust on Digital Payment significantly influence the attitude of rural consumers
- HA7: Attitude significantly influence the intentions of rural consumer to adopt Digital Payments

4 Research Methodology

- Research Design – Descriptive Research
- Total No. of Respondents – 400
- Data Sources: Primary and Secondary
- Primary Data Collection Tool – Questionnaire (No. of Question – 48, Chronbach`s Alpha value – 8.17, Sections – 8*)
- Statistical Test Used – Regression (SPSS Ver. – 20)

5 Conceptual Models



European Economic Letters
ISSN 2323-5233
Vol 15, Issue 2 (2025)
http://eelet.org.uk

Figure – 7 – Conceptual Model
(Source – Author)

6 Data Analysis

HA1: Perception of the User significantly influence the attitude of rural consumers

Table: 5: Model Summary , Perception of the User and Attitude

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.953a	.908	.908	.97052
a. Predictors: (Constant), Perception of the User				
b. Dependent Variable: Attitude				

Interpretation: The model indicates that the value of R is 0.953, signifying a positive and moderate correlation between the independent and dependent variables. An R-squared value of 0.908 signifies that 90.8% of the variance in attitude is elucidated by the Perception of the User. The findings are in line with the study conducted by Lu and Bai (2021).

HA2: User Friendly Digital Payment System significantly influence the attitude of rural consumers

Table-6- Model Summary , User Friendly Digital Payment System and Attitude

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.533[a]	.284	.282	2.71079
a. Predictors: (Constant), User Friendly Digital Payment System				
b. Dependent Variable: Attitude				

Interpretation: The model indicates that the value of R is 0.533, signifying a positive and moderate correlation between the predictor and the dependent variable. An R-squared score of 0.284 signifies that 28.4% of the variance in attitude is elucidated by the User Friendly Digital Payment System. This outcome parallels the findings of Alam et al. (2024).

HA3: Government Initiatives significantly influence the attitude of rural consumers

Table-7- Model Summary , Government Initiatives and Attitude

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.526a	.277	.275	2.72464
a. Predictors: (Constant), Government Initiatives				
b. Dependent Variable: Attitude				

Interpretation: The model indicates that the value of R is 0.526, signifying a positive and moderate correlation between the predictor and the dependent variable. An R-squared value of 0.277 signifies that 22.7% of the variance in attitude is elucidated by Government Initiatives. Singh & Singh (2024) have also found the similar results in their study.

HA4: Social Influence significantly influence the attitude of rural consumers

Table-8- Model Summary, Social Influence and Attitude

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.773[a]	.597	.596	2.03380
a. Predictors: (Constant), Social Influence				
b. Dependent Variable: Attitude				

Interpretation: The model indicates that the value of R is 0.773, signifying a positive and moderate correlation between the predictor and the dependent variable. An R-squared value of 0.597 signifies that 59.7% of the variance in attitude is accounted for by Social Influence.

HA5: Knowledge of Digital Payment / Digital Literacy significantly influence the attitude of rural consumers

Table-9- Model Summary, Knowledge of Digital Payment/ Digital Literacy and Attitude

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.765[a]	.585	.584	2.06415
a. Predictors: (Constant) Knowledge of Digital Payment/ Digital Literacy				
b. Dependent Variable: Attitude				

Interpretation: The model indicates a R value of 0.765, signifying a positive and moderate correlation between the predictor and the dependent variable. An R-squared score of 0.585 signifies that 58.5% of the variance in attitude is elucidated by Knowledge of Digital Payment/Digital Literacy. Sahi, Khalid, and Abbas (2021) reported comparable results.

HA6: Trust on Digital Payment significantly influence the attitude of rural consumers

Table-10- Model Summary, Trust on Digital Payment and Attitude

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.586a	.343	.325	2.72464
a. Predictors: (Constant), Trust on Digital Payment				
b. Dependent Variable: Attitude				

Interpretation: The model indicates that the value of R is 0.586, signifying a positive and moderate correlation between the independent and dependent variables. An R-squared score of 0.343 signifies that 34.3% of the variance in attitude is elucidated by Trust in Digital Payment. Kanojia and Lal (2020) similarly found the similar results.

HA7: Attitude significantly influence the intentions of rural consumer to adopt Digital Payments

Table-11- Model Summary, Attitude on Adoption of Digital Payment

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.771[a]	.594	.593	2.03370
a. Predictors: (Constant), Attitude				
b. Dependent Variable: Adoption Of Digital Payment				

Interpretation: The model indicates a R value of 0.771, signifying a positive and moderate correlation between the predictor and the dependent variable. An R-squared value of 0.594

signifies that 59.4% of the variance in the Adoption of Digital Payment is elucidated by Attitudes. The results correspond with the research conducted by Rosenlind, Söderström, Norberg, & Cripps (2023).

Findings

The acceptance of digital payments in rural regions faces obstacles such as distrust in digital platforms, worries about fraud, inadequate infrastructure, and limited mobile literacy, regardless of government and key stakeholders. Mobile devices and internet access greatly impact the acceptance of digital payment options in isolated areas. People who frequently engage with technology are more likely to opt for digital payment methods. Financial literacy plays a vital role that significantly affects the acceptance of digital payment systems. People with strong knowledge of digital platforms participate in even small transactions, unlike those with limited understanding. The government has carried out actions both separately and alongside self-help groups to enhance digital literacy and awareness. This initiative is especially vigorous in the country's rural regions, where the focus continues to be on establishing and developing essential infrastructure to enable digital payments. The improvement of socioeconomic status, educational levels, income, infrastructure, information availability, and job status has resulted in a rise in the involvement of rural individuals in digital commerce. People with higher education levels and more stable income sources tend to utilize digital payments more than the vulnerable rural population. The digital payment platform has shown to be advantageous for rural sellers and small businesses, as a higher acceptance rate of digital payment methods indicates a positive relationship with improved efficiency and convenience in transactions

Conclusions

The digital payment system has become a vital requirement in today's world, especially in rural areas; however, issues related to its reach, effectiveness, and reliability continue to be major challenges. Although digital payments in rural regions show promise, the overall reliability of the digital system has not been realized because of several obstacles, such as insufficient infrastructure, trust issues, and lack of skills. Increased awareness of digital platforms establishes a basis for growth; however, significant measures are necessary to tackle existing issues and ensure the continuous progress of this change. Study results indicate that government programs, financial literacy rates, technological availability, and socioeconomic conditions influence the uptake of digital transactions among rural communities. Studies indicate that the rise of digital payments is linked to the prevalence of smartphones and internet connectivity; therefore, public awareness initiatives and financial education programs are essential. Policies must focus on enhancing technological infrastructure, increasing financial literacy initiatives, and broadening governmental access to the most remote rural regions, thereby reinforcing the adoption process

9 Implications of the Study

- This study aims to assist in the development of policies that will improve understanding of digital payment systems, the adoption of technology, and financial inclusion.
- Financial institutions could establish training programs focused on digital literacy tailored to specific regions and disseminate these through local educational bodies and training centers.

- The Government might implement measures to subsidize smartphones in remote areas, enhance digital infrastructure by building mobile towers, and offer tax incentives to companies involved in digital payments.
- Digital Payment Providers could simplify their interfaces to enhance accessibility for remote regions by partnering with local self-help groups to boost adoption rates.
- Digital service providers may work on improving customer support systems, strengthening security protocols to mitigate fraud, and refining complaint management processes to build client trust.
- Initiatives by rural self-help groups and community development programs may be undertaken to incorporate digital payment literacy into their educational curricula.

Limitations of the study

This study does not encompass a comparative analysis of digital payment usage patterns between rural and urban regions. The study also lacks a longitudinal analysis to monitor the evolution of digital payment adoption over time. These constraints have delineated new research objectives that will be addressed thereafter.

Congruence with SDGs

The theme of the research aligns with Goal 9: Industry, Innovation, Technology and Infrastructure and Goal 11: Sustainable cities and communities of SDGs as proposed by UN in 2015

Declaration of Conflict of Interests

The authors assert that they possess no known conflicting conflicts of interest, financial interests, or personal relationships that may have influenced the work presented in this study.

Funding

No financial support was received by the authors for this work, authorship, publication.

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