

Digital Financial Inclusion and Rural Transformation Through Internet Banking

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Abstract

The study investigated the transformative impact of digital financial inclusion and internet banking on the socio-economic practices within rural communities. It emphasized key areas such as economic activities, financial literacy, decision-making, and women's empowerment. Employing a mixed-method approach, the study focused on rural households in India to assess how digital tools contributed to rural development. The findings revealed that digital financial inclusion played a crucial role in stimulating economic activities, despite facing challenges from infrastructural deficiencies and socio-cultural barriers. Internet banking proved essential in enhancing financial literacy and decision-making capabilities, equipping rural populations with vital financial skills. However, significant unexplained variability suggested the necessity for complementary educational initiatives. The study advocated for integrated solutions that combined digital financial tools with educational programs, infrastructural improvements, and inclusive policies to address these issues effectively. To actualize the benefits of digital inclusion, recommendations included enhancing internet infrastructure, boosting financial literacy, and developing gender-sensitive financial products. Future research explored the long-term effects of digital financial services on individuals, the interactions of various environmental factors, and the efficacy of tailored interventions aimed at fostering inclusive rural development. The study contributed to the existing body of knowledge on digital financial inclusion by identifying critical drivers, constraints, and opportunities for leveraging digital technologies in rural transformation.

Keywords: Digital financial inclusion, Internet banking, rural transformation, financial literacy, Women's empowerment.

Internet banking is crucial for promoting digital financial inclusion in rural areas. The user may engage in many online activities, including checking account balances, moving funds, paying bills, applying for loans, and investing in financial goods (Kandpal & Mehrotra 2019). This technology diminishes the need for physical infrastructure and transportation expenses, which significantly impedes financial inclusion in remote regions (Behl & Pal 2016). Digitalization is playing an important role in the advancement of the "rural economy" in India. It has positively impacted the lives of residents in rural India (Goswami et al., 2022). The Digital India initiative, the premier program of the Government of India, has implemented a comprehensive array of measures to facilitate enduring digital transformation in rural regions by bridging the digital divide, promoting the adoption of digital technology, equipping individuals with essential digital skills, and monitoring the progress of the rural populace through specific indicators (Hasan et al., 2022).

Rural India plays a vital role in the national economy, contributing approximately 46% to the country's GDP. Notwithstanding increasing urbanization, rural India persists in comprising a significant portion of the nation's population in the forthcoming decades (Ahmed & Sur 2023). Notwithstanding the increasing population of internet users in rural India, the digital gap between urban & rural regions persists significantly. Recent TRAI data indicates that internet penetration in rural India was about 33 percent, but in urban India it reached 99 percent (Arner et al., 2018). This

<http://jier.org> 1264

discrepancy is mostly attributed to two factors: insufficient infrastructure and inadequate awareness. The Indian government has launched the "Digital India" initiative to overcome the discrepancy (Azeez & Akhtar 2021). A primary objective of the initiative is to enhance the nation's digital infrastructure, especially in rural India. Mobile banking services, integrated into Digital Payments by banks, encompass the Unified Payments Interface (UPI), including the BHIM (Bharat Interface for Money) mobile application developed by the National Payments Corporation of India (NPCI), the Bharat Bill Payment System (BPSS), mobile money, e-wallets, payment aggregation, and other initiatives aimed at extending digital banking services to a substantial rural population in India (Asif et al., 2023).

Financial inclusion is an essential catalyst for economic growth; nevertheless, rural regions in India continue to have restricted access to formal financial services (Kanungo & gupta 2021). The emergence of digital payments offers a chance to rectify this inequality and enhance the economic welfare of rural people. The extensive proliferation of mobile phones has facilitated the advent of mobile banking services, allowing individuals in distant regions to readily access financial resources (Sarkar & Sen 2022). This not only addresses infrastructure constraints but also decreases operating expenses, making it a feasible substitute for conventional brick-and-mortar banking. The government and other financial institutions acknowledge the significance of financial inclusion in fostering economic development and alleviating poverty (Kulkarni & Ghosh 2021). Programs like the Pradhan Mantri Jan Dhan Yojana (PMJDY) have been established to promote the establishment of bank accounts for everybody, particularly targeting rural regions (Pandey et al 2022). Financial literacy initiatives have been implemented to enlighten the populace about the advantages of formal banking, promoting a shift from informal channels to more secure and regulated financial activities. Notwithstanding these advancements, problems endure, including concerns about digital literacy, connection, and confidence in formal banking institutions (Amin 2023). Initiatives are in progress to overcome these obstacles, emphasizing the customization of financial products to meet the distinct requirements and preferences of rural areas. Collaborations across the governmental sector, commercial sector, and NGOs are essential for the success of these efforts (Siddik & kabiraj 2020).

Rural India faces challenges in financial inclusivity; however, advancements in technology and collaborative initiatives from diverse stakeholders provide optimism for a future where all citizens, irrespective of their location, can engage fully in the formal financial system, thereby facilitating new avenues for economic growth and prosperity (Schuetz & venkatesh 2020). Digital payment options have improved financial accessibility and decreased reliance on cash. With the advent of financial literacy initiatives and awareness campaigns alongside the digital revolution, rural populations are becoming proficient in using these technological breakthroughs to enhance their economic welfare (Kandpal & Mehrotra 2019). Mobile banking applications, digital wallets, and online payment platforms are essential instruments for financial management, promoting a culture of financial autonomy among formerly marginalized communities (Azeez & Akhtar 2021). Digital payments in rural India provide several advantages, such as accessing the unbanked demographic and revolutionizing the agriculture sector (Hasan et al., 2022). Mobile payment systems and digital wallets provide a straightforward and accessible method for users to conduct financial transactions without requiring a conventional bank account, hence promoting inclusion and engagement in the formal economy (Behl & Pal 2016).

The Indian government has initiated programs to enhance digital payments in rural regions, including the Pradhan Mantri Jan-Dhan Yojana, which ensures that each family has access to a bank account connected to Aadhar, India's biometric identity system (Sarkar & Sen 2022). Nonetheless, obstacles remain, including inadequate digital literacy, connection problems, and apprehensions over the security of digital transactions. The widespread dependence on conventional financial methods in rural India requires the surmounting of technology obstacles and the alteration of entrenched habits and views (Ahmed & Sur 2023). The absence of banking services in distant rural areas intensifies the digital divide, hindering the rural populace's adoption of digital financial instruments. Efforts to enhance financial inclusion and develop banking infrastructure in neglected regions are vital elements of a holistic approach to advance digital payments (Arner et al., 2018).

Connectivity challenges persist as a considerable obstacle, with several rural regions devoid of dependable internet connectivity (Goswami et al., 2022). Addressing this necessitates significant expenditures in enhancing network infrastructure, including the expansion of broadband services and the establishment of mobile towers in rural areas (Hasan et al., 2022). Concerns over the security of digital transactions, including fraud, data breaches, and cybercrimes, create a pervasive feeling of fear among rural inhabitants (Asif et al., 2023). To deal with the concerns, projects should focus on implementing stringent security protocols, including sophisticated encryption techniques, multi-factor authentication, and continuous monitoring systems. Establishing confidence in the security and dependability of digital transactions is essential for promoting wider acceptance (Kanungo & Gupta 2021).

This study underlines the transformative roles that digital financial inclusion and internet banking play in the socio-economic upliftment of rural communities in India. Study has focused attention on critical issues like economic activities, financial literacy, and decision-making as essential to women's empowerment, which shows how these digital tools actually transform the state of ruralness. Considering that infrastructural problems and socio-cultural barriers create substantial setbacks, the report identifies immense prospects for financial-technologies integration that reduce the gap in urban-rural development. While the study highlighted the integration potential of digitalized financial tools as part of general education, increased infrastructure, and appropriate policies in attaining a durable and just developmental scheme for the villages. It becomes very instrumental for policymakers, financial institutions, and researchers working towards the socio-economic upliftment through leverage of digital inclusion.

The study begins with an introduction where the current status and significance of digital Financial Inclusion and their application are discussed concerning rural India and this is followed by the literature review section that mainly reviews the literature and also reveals novel hypotheses. When it comes to the objectives of the study, the following has been proposed thereby highlighting areas of economic activities, financial literacy, and women. Methodology examines the ways through which qualitative and quantitative data were collected and analyzed from the rural households. This section highlights statistical data that test the correlation between the level of digital FI and the main research variables. This is then followed by a discussion that provides a literature review of the findings and underscores the practice and policy implications. Finally, the paper gives suggestions for further analysis and the integration of diverse strategies to improve the impact of digital financial solutions in contributing to rural change.

Review of literature

Dharua, G. (2024) stated that technology served as a catalyst for expediting economic advancement in the 21st century. Governments globally had progressively adopted technology as a crucial tool for effectively implementing studies that conducted a thorough survey and analysis of the impacts of the government's JAM campaign on the banking behaviors, preferences, attitudes, and aspirations of the indigenous population in the Balangir district of Odisha state. On the other hand, Wang, X., & He, G. (2020) demonstrated that farmers' utilization of digital financial services positively impacted the mitigation of their risk. Researcher indicated that these impacts mostly depended on enhancing farmers' capacity to manage risk, hence reducing their exposure to risk-induced challenges. Subsequent analysis indicated that digital financial services offered by ICT businesses significantly affected farmers' susceptibility more than those supplied by conventional banks. Another author Parvin, S. R., & Panakaje, N. (2022) demonstrated that digital financial inclusion served as a significant engine for socio-economic, sustainable, and inclusive success. Numerous obstacles related to digital financial inclusion included insufficient financial knowledge, ineffective technology used by rural populations, a lack of trust, and concerns around data protection. Furthermore, the study robustly contended that digital financial inclusion fostered socio-economic growth among citizens while simultaneously reducing costs and enhancing the efficiency and competitiveness of service providers.

Vong, J., et al., (2016) examined digital banking options, which included internet banking, SMS banking, and mobile banking. These novel technologies diminished the operational expenses of banking services and enabled banks to extend financial services to rural regions. This assisted the unbanked people in accessing financial services, rejuvenated their local economy, and ultimately enhanced the livelihoods of rural populations, contributing to the array of policy measures aimed at alleviating rural poverty in Indonesia. Similarly, Aziz, M. R. A. (2022) investigated that digitalization trends, to some degree, influenced businesses and individuals in analogous manners. Digitalization enhanced the corporate landscape by facilitating development, expanding job prospects, and expediting innovation. It aimed to investigate the comprehension and implementation of Islamic digital banking for the purpose of financial inclusion. The overall findings indicated that a comprehensive grasp of Islamic digital banking was crucial for poverty alleviation and financial inclusion. Another author, VERMA, K. S. (2015) encompassed several measures undertaken by the government and relevant institutions to promote digital inclusion in rural regions of India. The many aspects of Digital Kranti, including e-banking, e-commerce, e-learning, and e-governance, as well as specifically designed initiatives for rural transformation such as Gyandoot, Bhoomi, e-Choupal, e-Post, e-Panchayats, Drishtee, Akashganga, and Lok Mitra, were thoroughly examined. It encapsulated the essential aim of highlighting the significance of digitization in the transformation of rural India.

Modiba, F. S., et al., (2024) emphasized numerous challenges that hindered the rural population's engagement in the digital economy, including access to and reliable electricity supply, inadequate infrastructure for utilizing digital products, and gender-related constraints that restricted women's ability to leverage digital resources. The study indicated a deficiency of digital goods that were necessary to provide access to financing for all individuals in need. In the same way, Nnaomah, U. I., (2024) analyzed the function of digital banking in promoting financial inclusion in the United States and Nigeria, with the objective of identifying and contrasting practices and outcomes in these two disparate economic environments. Essential findings indicated that digital banking had markedly advanced financial inclusion by offering accessible, economical, and convenient financial services. In the United States, technological progress and a strong regulatory framework cultivated a competitive digital banking landscape, resulting in new solutions that diminished obstacles to financial access. Similarly, Akeju, K. F. (2024) discussed that fintechs, blockchain, agent network

managers, and tech service providers were recently recognized for their contributions to expanding access to digital financial services. Digital financing was used by traditional microfinance and table banking organizations that aimed to help women and people in rural areas. However, there were significant institutional barriers that made it hard for digital financing and local financial institutions to work together more quickly.

Garcia, A. H. V. (2021) Technology-driven digital transformation influenced the financial industry through the “emergence of new business models”, such as fintech and bigtech, which effectively competed by providing financial products with disruptive potential. Digital banking was the amalgamation of traditional banking with the internet, providing financial services via a website or mobile application. Digital banking significantly contributed to financial inclusion by providing new services to a greater number of Peruvians and stimulating economic growth. Another author, Gallego-Losada, M. J., et al., (2024) examined the impact of those characteristics on financial literacy. Financial literacy was generally lower in rural areas, characterized by restricted wages and inadequate educational backgrounds, hence perpetuating a detrimental cycle that exacerbated the conditions referred to as empty Spain. In the same way, Singh, B., & Kaunert, C. (2024) agreed that reaching global development goals required financial inclusion, or the expansion of banking services to previously unbanked & under banked populations. With the rise of digital banking and other financial technologies, the modern financial landscape has changed dramatically, becoming more accessible and inclusive for all. To help achieve SDG-1 compliance, it highlighted the need for electronic financial approaches and sophisticated digital banking for financial inclusion promotion.

Jiang L. (2022) investigated how the digital inclusive financial services provided by Yongzhou Rural Commercial Bank influence rural revitalization identified the challenges related to infrastructure, data collection, and possible applications, and proposed solutions to address these challenges. In contrast of this, Ooko, N. K., & Muchelule, Y. (2024) investigated how digital banking has affected the level of financial inclusion in Nairobi City County, Kenya's banking sector. The findings showed significant relationships between various factors and the outcomes of financial inclusion among banks in Nairobi City County, Kenya, as indicated by the large coefficients and corresponding p-values. Banking service automation ($\beta = 0.252$, $p = 0.018$) and financial systems integration technologies ($\beta = 0.598$, $p = 0.000$) had significant correlations with financial inclusion. In the same way, Aziz, A., & Naima, U. (2021) examined the disparity between the core beliefs of financial inclusion discussions and the concepts surrounding access to and utilization of digital technology, aiming to connect these areas by creating an all-encompassing framework for digital financial inclusion. The study uncovered that the social dynamics surrounding financial engagement with developing technologies extended beyond the simple division of individual adopters and non-adopters, as well as a 'supply-oriented' financial infrastructure.

There are various studies related to internet banking and digital financial inclusion, although many significant concerns remain unanswered, especially in the context of rural India. The significant attention paid to the positive impacts of digital financial services in other regions has left underexplored the unique cultural, infrastructural, and socio-economic challenges faced by rural households in India. Besides, despite the presence of constraints like financial illiteracy and infrastructure deficiencies, the absence of a gender-specific solution and localized constraints for rural areas is found to be absent. Internet banking, in its role of empowerment of women and promotion of financial independence, has not been adequately researched. Further, systemic barriers to integrating traditional financial systems with new digital technologies call for further analysis in the Indian context. The existing frameworks for measuring the socio-economic impacts of Internet banking on rural households are underdeveloped and therefore require more comprehensive models. However, what is more, the adaptation of global practices has not been effective enough to answer

the specific socio-economic and infrastructural characteristics of rural India. “The filling of these gaps would provide a more realistic picture of how Internet banking may strategically be used for rural transformation and financial inclusion in India.”

Objectives

- i. To evaluate the influence of digital financial inclusion on rural households' economic activities.
- ii. To explore how Internet banking influences financial literacy and decision-making in rural communities.
- iii. To examine how internet banking impacts women's empowerment and financial independence in rural areas.

Methodology

The study explores the effects of online banking and digital financial inclusion on rural development through a comprehensive mixed-methods approach that integrates both qualitative and quantitative techniques. The study centers on rural families as its primary demographic, concentrating on the rural areas of India. A total of 150 respondents are selected using stratified random sampling to guarantee a variety of representation. Structured questionnaires are the main research tool in this exploration and descriptive study design. In connection to the independent variables of digital financial inclusion & Internet banking, the study looks at important dependent factors such the economic activity of rural families, financial literacy and decision-making, and women's empowerment and financial independence. Both primary (survey) and secondary (pre-existing literature and reports) sources are used in data collecting. In order to understand correlations and derive significant conclusions, data analysis is carried out using statistical software such as Microsoft Excel and SPSS, utilizing methods including regression analysis, mean, and standard deviation.

Result

Table 1: Demographic Characters of the Respondents

Sr. no.	Demographic Variables	Freq.	%
1	Age group	20 - 30 years	33.33%
		31 - 40 years	27.33%
		Above 40 years	18.00%
		Below 20 years	21.33%
2	Gender	Female	39.33%
		Male	60.67%
3	Education Level	Higher secondary education	18.00%
		Others	34.00%
		Primary education	14.67%
		Secondary education	18.00%
		Undergraduate degree	15.33%
4	Occupation	Government employee	23.33%
		Private sector employee	13.33%
		Self-employed (non-agriculture)	8.67%
		Small business owner	18.00%
		Student	26.00%
		Unemployed	10.67%
5	Annual household Income	₹1,00,001 – ₹2,00,000	24.00%
		₹2,00,001 – ₹5,00,000	20.00%
		₹50,001 – ₹1,00,000	13.33%

		Above ₹5,00,000	27	18.00%
		Below ₹50,000	37	24.67%
6	Household Size	1 to 2 members	31	20.67%
		3 to 4 members	37	24.67%
		5 to 6 members	39	26.00%
		More than 6 members	43	28.67%
7	Access to Internet	Daily	33	22.00%
		No access	29	19.33%
		Occasionally	37	24.67%
		Rarely	25	16.67%
		Weekly	26	17.33%
8	Ownership of Digital Devices	Basic mobile phone	39	26.00%
		Computer/Laptop	39	26.00%
		None	41	27.33%
		Smartphone	31	20.67%
9	Type of Bank amount	Both savings and current accounts	43	28.67%
		Current account	29	19.33%
		No bank account	34	22.67%
		Savings account only	44	29.33%
10	Usage of Financial Services	Both traditional and digital banking services	44	29.33%
		No financial services used	37	24.67%
		Only digital banking services	30	20.00%
		Only traditional banking services	39	26.00%

The table summarizes demographic and socio-economic variables for a population sample. Overall, 33.33% are aged 20-30 years; 21.33% are below 20, 27.33% are between 31-40 years, and 18% above 40. Among the respondents, males form a majority with 60.67%, whereas females make up 39.33%. Education levels differ, as 34% is "Others," followed by higher secondary (18%), secondary (18%), undergraduate (15.33%), and primary education (14.67%). Occupations include students (26%), government employees (23.33%), small business owners (18%), unemployed (10.67%), private sector employees (13.33%), and self-employed (8.67%). Annual household incomes are distributed across five categories, with the majority in the below ₹50,000 (24.67%) and ₹1,00,001–₹2,00,000 (24%) ranges. Household sizes vary, with the largest group (28.67%) having more than six members. Internet access is mostly occasional (24.67%) or daily (22%), while 19.33% have no access. Owning digital devices shows 27.33% with none, 26% of basic phone or computer/laptop, and 20.67% own smartphones. Banking access shows 29.33% saving accounts only, 28.67% holding both current and savings accounts, 22.67% being unbanked, and 19.33% with current accounts. Accessibility to financial services has brought it to 29.33%, both using the traditional and digital, 26% with traditional, 20% with digital banking, while 24.67% uses none of them.

Obj. 1: To evaluate the influence of digital financial inclusion on rural households' economic activities.

Table 2: Regression Model Fit

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.601 ^a	.362	.357	2.89400

Table 2 of the model summary showed that there was a moderate relationship between Digital Financial Inclusion, the predictor variable, and the dependent variable, with an R-value of 0.601. Digital Financial Inclusion explains around 36.2% of the variance in the dependent variable, according to the R Squared value of 0.362. The model's capacity to explain the data is confirmed by the Adjusted R Square value dropping to 0.357 once the total number of predictors is considered. This value is still within the allowed range.

Table 3: Analysis of Variance (ANOVA) Table

Analysis of Variance						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	702.529	1	702.529	83.882	.000 ^b
	Residual	1239.531	148	8.375		
	Total	1942.060	149			

Table 3 of the analysis of variance (ANOVA) provides insight into the data and shows the overall significance of the regression model that examined the impact of digital financial inclusion on the economic activities of rural households. Unexplained variability is shown by the 1239.531 residual sum of squares, whereas model-explained variability is shown by the 702.529 regression sum of squares. A total of 1942.060 is contributed by the mean squares of the model's regression (702.529) and residuals (8.375), respectively. The economic activities of rural families are substantially correlated with digital financial inclusion (sig value = 0.000, far lower than the conventional 0.05 criterion).

Table 4: Regression Coefficients Table

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.798	1.338		4.333	.000
	Digital Financial Inclusion	.687	.075	.601	9.159	.000

Table 4 displays the results of the regression analysis that shed light on the relationship between rural households' economic activities and digital financial inclusion. The constant term, Digital Financial Inclusion, has an expected value of 5.798 when set to zero. With a standard deviation of just 0.075, this coefficient seems to be a reasonable approximation. A normalized beta value of 0.600 indicates a strong positive relationship between access to digital financial services and economic activity in rural households. The t-value of 9.159 and sig value of 0.000 further illustrate that this connection is statistically significant, further highlighting the necessity of digital financial inclusion in enhancing economic activity among rural families.

Obj. 2: To explore how Internet banking influences financial literacy and decision-making in rural communities.

Table 5: Regression Model Fit

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.463 ^a	.215	.209	3.03415

Internet banking's correlation with the dependent variable is shown in table 5 of the Summary of Regression Model Fit. There is a somewhat favorable association between Internet Banking and the outcome variable, as indicated by the correlation coefficient (R) of 0.463. With an R Squared value of 0.215, Internet Banking has a low ability to explain the dependent variable, explaining just around 21.5% of the total variance. While there is a significant association, a large percentage (78.5%) of the variance remains unexplained by this model. This is supported by the somewhat lower Adjusted R Square value of 0.209, which adjusts for the number of predictors in the model.

Table 6: Analysis of Variance (ANOVA) Table

Analysis of Variance						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	372.098	1	372.098	40.419	.000 ^b
	Residual	1362.495	148	9.206		
	Total	1734.593	149			

For the regression model that “looked at how online banking affected” people's knowledge of personal finance and their ability to make sound financial decisions in rural areas, the results are in table 6 of the analysis of variance. An amount of 372.098 is shown by the regression sum of squares, which indicates the amount of variability in the dependent variable that Internet Banking explains. The capacity of the model to foretell the dependent variable is strongly supported by the high F-statistic of 40.419. This study confirms that there is a statistically significant association b/w internet banking, financial literacy, and decision-making in rural areas. The significance value is 0.000, well below the conventional threshold of 0.05.

Table 7: Regression Coefficients Table

Table 7: Regression Coefficients Table						
Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	11.701	1.206		9.700	.000
	Internet Banking	.417	.066	.463	6.358	.000

Table 7 of the statistics shows that online banking has a substantial effect on rural residents' ability to understand and manage their money. The constant, which stands at 11,701, denotes the initial degree of financial literacy in the absence of Internet banking. Internet banking has a coefficient of 0.417, which means that there is a 0.417 unit rise in both financial literacy and decision-making for every unit increase in Internet banking. The standardized beta coefficient (Beta) of 0.463 indicates a moderate to significant connection. The results emphasize the significance of Internet Banking in improving financial literacy in rural areas, with a t-value of 6.358 and a sig value of 0.000 confirming a statistically significant association.

Obj. 3: To examine how internet banking impacts women's empowerment and financial independence in rural areas.

Table 8: Summary of Regression Model Fit

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.355 ^a	.126	.120	2.99736

Table 8 of the Summary of Regression Model Fit shows the relationship between online banking and the dependent variable is not exceptionally strong. A slight positive link is shown by the correlation coefficient (R) of 0.355. Internet banking has minimal explanatory power; its R Squared value of 0.126 shows that it can only explain around 12.6% of the dependent variable's variation. After taking into consideration the number of predictors, the somewhat lower Adjusted R Square value of 0.120 further supports this discovery. The mean difference b/w the anticipated & observed value is the “standard error of the estimate,” which comes out to 2.99736.

Table 9: Analysis of Variance (ANOVA) Table

Analysis of Variance						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	191.678	1	191.678	21.335	.000 ^b
	Residual	1329.656	148	8.984		
	Total	1521.333	149			

Table 9 is the analysis of variance which shows that the regression model examining the effect of internet banking on women's economic independence and empowerment was statistically significant. Internet banking explains 191.678 squared of the observed variability, but 1329.656 squared of the remainder variance remain unexplained. With a sig value of .000, we may conclude that Internet banking is significantly related to the dependent variable. Internet banking appears to have a good impact on women's empowerment and financial independence.

Table 10: Regression Coefficients Table

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	11.880	1.192		9.969	.000
	Internet Banking	.299	.065	.355	4.619	.000

Table 10 of the coefficients demonstrates that the use of online banking has a substantial effect on women's economic independence and empowerment. When internet banking is not available, the baseline level of empowerment is 11.880, which is the constant. Internet banking has a coefficient of 0.299, which means that women's empowerment and financial independence are boosted by 0.299 units for every unit rise in Internet banking. The results show that this link is statistically significant ($t=4.619$, $p=.000$), which emphasizes the significance of Internet banking in empowering women & giving them financial independence.

Discussion

The study emphasizes the significant yet multifaceted role of digital financial inclusion and internet banking in transforming rural socio-economic dynamics, focusing on economic activities, financial literacy, decision-making, and women's empowerment. Digital financial inclusion strongly influences rural households' economic activities, explaining 36.2% of the variability, thus emphasizing its role in enhancing financial access and productivity. Similarly, internet banking impacts financial literacy and decision-making substantially by accounting for 21.5% of the variability, although substantial unexplained factors indicate that additional strategies are required. Internet banking has a weaker influence for the empowerment and financial independence of women, with an explained variability of 12.6%. This reflects the persistence of socio-cultural and structural barriers.

A study conducted by Sharma and Kukreja (2023), showed that digital financial inclusion increases rural economic activities through increased access to credit and entrepreneurial ventures. This study also establishes a moderate positive relationship between digital financial inclusion & the economic activities of rural households, with $R = 0.601$, explaining 36.2% variability. This is consistent with the findings of Ozili, (2018), which suggested that digital financial services reduce financial transaction costs and boost economic efficiency. However, our study findings also emphasize that significant unexplained variability remains, likely attributable to factors such as infrastructural challenges and socio-cultural barriers, echoing the observations of Liu, et al., (2023).

The study's findings validate prior research by Ullah, et al., (2022), which identified the importance of digital financial tools, such as internet banking, in increasing financial literacy and decision-making. The results indicate that internet banking is moderately correlated with financial literacy ($R = 0.463$), accounting for 21.5% variability. These findings align with the recommendations of Garg and Singh (2018), where internet banking is essential to arm rural users with financial knowledge and decision-making abilities. However, the residual variation indicates that digital tool access is not sufficient; educational programs and community activities are necessary to enhance financial literacy even more, as recommended by Haq, (2019).

Current study also investigates the relationship between internet banking & women's empowerment, an area of interest in recent literature such as Zouaghi, et al., (2024), which highlighted the need for financial independence to empower women. Even though results from the current study yield a weak to moderate positive relationship ($R = 0.355$), explaining 12.6%, they are in keeping with Elmghaamez, et al., (2024); which have emphasized enabling potential of financial tools among women. The relatively weaker strength of explanatory power thus far indicates that deeply-rooted socio-cultural norms and systematic barriers still restrict the enhancement of women's empowerment-an observation that is well captured by Banerjee and Duflo (2019).

Conclusion

The study emphasizes the importance of digital financial inclusion & online banking in affecting rural regions' socio-economic conditions. Digital financial inclusion has found its place as a more crucial facilitator of economic activity, thus enhancing access to financial resources, productivity, and entrepreneurial efforts. Although its positive impacts are observable, the divergent effects indicate that supplementary factors like infrastructural issues, social and economic inequalities, and cultural factors should be considered to truly unlock the potential of such initiatives. Internet banking increases financial awareness and management skills of people in the rural areas in making rational decisions regarding money. Nonetheless, the above results point out that such digital means are not in themselves capable of filling such knowledge gaps. Proper complements in the form of

financial education and more accessible digital means are necessary for widespread benefits and equitable advantages.

Internet banking has played a crucial role in enhancing women's empowerment by enabling them to become financially independent, but it still remains limited because of the long-lasting socio-cultural and systemic barriers. While digital tools do provide a foundation for women's empowerment, changing deeply ingrained gender norms and unequal access to resources demands a more holistic approach. It goes without saying that targeted interventions, such as inclusive financial products, education programs, and supportive community initiatives are needed to enhance the role digital financial services can play for women's empowerment. As such, the study identifies integrated approaches that combine digital financial inclusion with general rural development initiatives. To take full advantage of digital financial tools, policymakers, practitioners, and stakeholders must mitigate system and network-related obstacles through enabling environments. Future research should explore the longer-term impacts of digital financial services and examine their interactions with contextual factors to direct more effective policies and programs. This can help in inclusive and sustainable pathways for socio-economic development in rural contexts.

Future study should adopt a multidimensional method to examine the long-term effects of digital financial inclusion on rural economies, looking into different socio-economic and cultural contexts. The interaction between digital literacy, availability of infrastructure, and financial behavior may offer actionable insights for the optimal deployment of digital tools in rural areas. Researches should also seek to identify more gender-related barriers that women face regarding financial empowerment, and more importantly, how customized financial products, policy frameworks, and capacity-building programs would help to bridge the gap. Also, integrating the traditional and digital financial system and the impact of public-private partnerships in promoting financial inclusion for rural areas could be of great value towards inclusive growth.

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