Impact of FinTech Adoption on Financial Inclusion among Women in Rural India

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Abstract

The adoption of FinTech in India has significantly transformed the financial landscape, particularly in rural areas where traditional banking services are limited. This study investigates the influence of FinTech adoption on financial inclusion in rural India, emphasizing how digital financial services are closing the gap between urban and rural economies. It examines the roles of mobile banking, digital wallets, and payment platforms like UPI (Unified Payments Interface) in providing banking access to the unbanked and under-banked populations. The research explores the socio-economic factors driving FinTech adoption among women in rural regions, such as the penetration of smartphones, government initiatives like the Pradhan Mantri Jan Dhan Yojana (PMJDY), and the Digital India campaign. It also addresses challenges such as digital illiteracy, inadequate internet infrastructure, and cybersecurity concerns in these areas. Through surveys, the study assesses the impact of FinTech on enhancing financial inclusion for rural households, focusing on increased access to savings accounts, credit facilities, and insurance products. The findings indicate that while FinTech has the potential to greatly enhance financial inclusion in rural India, further efforts are necessary to improve digital literacy and infrastructure to ensure sustained and inclusive growth.

Introduction

Financial inclusion is crucial in economic development, aiming to provide marginalized groups with access to financial services and sufficient credit. Financial inclusion in India has attracted significant focus, especially when it comes to women in rural regions who have historically received limited services from conventional banking systems. Many women in rural areas have been unable to access the formal financial system due to obstacles related to society, culture, and economy, which hinders their opportunities to save, borrow, or invest. The growth of financial technology (FinTech) offers a chance to tackle these challenges and encourage broader economic development. FinTech involves utilizing technology to offer financial services in easier, more efficient, and economical ways. The quick advancement of digital banking platforms, mobile money solutions, peer-to-peer lending, and blockchain technologies has changed the delivery of financial services in emerging economies. In rural areas of India, where there is little to no traditional banking facilities available, FinTech solutions can

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help fill the void by providing mobile banking, digital wallets, and online lending services. These tools have the ability to overcome obstacles, providing financial services with reduced expenses and improved ease of use.

Rural women, who may struggle with limited mobility, lower levels of formal education, and restricted access to formal institutions, can benefit from using FinTech as a tool to overcome these obstacles. FinTech empowers women to manage their finances by allowing them to use mobile devices to access financial services, which promotes independence and economic empowerment. Women living in rural areas of India face unique challenges that hinder their ability to use financial services. Social norms often limit their participation in economic activities, and lack of financial knowledge compounds the issue. Many women living in rural areas lack the necessary documentation to set up a formal bank account or access conventional financial services, leading them to depend on informal lending circles that charge high interest rates. Many women face significant challenges due to geographical isolation, as they reside in remote areas that are far from the closest bank. Furthermore, women's ability to be financially independent is often limited by patriarchal systems, as men commonly have control over financial matters in the household. This restriction hinders women from saving, investing, or obtaining credit, all of which are essential for economic growth and reducing poverty. The emergence of FinTech has the ability to overcome numerous obstacles. Mobile banking services enable women to handle accounts and carry out transactions without the necessity of going to a physical branch. Digital wallets provide a safe way to save and make payments, while peer-to-peer lending platforms offer credit access without requiring collateral or a formal credit history. Furthermore, FinTech tools can enhance financial education by offering easy-to-use platforms in languages and interfaces tailored to specific regions. This can give women the ability to have a better grasp on their finances, enabling them to make knowledgeable choices about savings, investments, and loans. Moreover, digital financial services provide women with increased autonomy in managing their finances, without facing judgment from society or influence from family. Despite the vast potential of FinTech in advancing financial inclusion, obstacles still persist. In numerous rural areas, particularly among women, there is still a lack of digital literacy and availability of mobile devices. Challenges like unreliable internet access are also major obstacles to widespread acceptance of technology. Moreover, women are still influenced by societal norms and gender biases when interacting with financial services. Thus, implementing FinTech provides a hopeful route to enhance financial inclusivity for rural Indian women. Nevertheless, it will be crucial to tackle issues surrounding digital literacy, infrastructure, and gender norms in order to fully capitalize on this opportunity. Research can investigate how FinTech can be utilized to empower rural women, enhance their financial independence, and promote the overall economic growth of rural communities.

Review of Literature Works

This section reviews the research works related to financial inclusion, and FinTech adoption. Banking services like transferring money, opening savings accounts, and obtaining loans are essential for progress. Accounts, whether held at a bank or a regulated entity like a credit union, microfinance institution, or mobile money service provider, enable individuals to securely and inexpensively save, transfer, and receive funds for daily requirements, prepare for unforeseen circumstances, and make worthwhile long-term investments in areas like healthcare, education, and entrepreneurship. On the other hand, individuals who do not have an account need to handle their finances through unofficial means such as cash, which could be less secure, less dependable, and more costly compared to official channels (Klapper et al., 2022). Governments globally are also focusing on improving the lives of rural and underserved communities through initiatives like financial inclusion and addressing the needs of the less privileged. IT technologies can significantly help in supporting the lower levels in a financially efficient way (KPMG, 2013). Financial inclusion is when a customer can utilize various formal financial

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services, ranging from basic credit and savings options to more advanced services like insurance and pension plans (Okello Candiya Bongomin & Ntayi, 2020).

The most crucial point in India is the need to not only transition customers from traditional banking channels to digital channels, but also to include the unbanked population into the mainstream banking system through digital finance. Without a doubt, digital platforms have raised the global financial inclusion rate from 51% in 2011 to 69% in 2017 (Kaur et al., 2021). Understanding inclusive finance has the potential to shape and revamp how consumers perceive and assess financial products or services (Aisaiti et al., 2019). The financial services industry has experienced a huge change as a result of the. The rise of Industry 4.0 technologies has led to increased innovation and a stronger focus on customer needs (Saif et al., 2022).

The items are given along with financial education to enhance financial skills and promote self-sufficiency, helping individuals accumulate wealth, establish savings, and begin the journey towards financial inclusivity (Australian Government. Department of Social Services., 2016). Although big data may decrease information asymmetries between consumers and financial institutions, it may also lead to information asymmetries among financial institutions. Big financial institutions begin with a substantial customer base (Abraham et al., 2019). FinTech combines financial technologies such as mobile banking and digital financial services, reshaping the financial industry (Museba et al., 2021). The financial sector's digital transformation has resulted in increased digitization of business models and processes, along with the development of new products and services. Over the last ten years, digital advisory and trading systems, artificial intelligence and machine learning, peer-to-peer lending, crowd funding, mobile payment systems, and new forms of digital money have all become more prevalent (Jünger & Mietzner, 2020).

BigTech companies use digital technologies like cloud computing and artificial intelligence to rapidly process large amounts of loan applications and continuously adjust risk evaluation using real-time data. Moreover, the utilization of big data and machine learning allows BigTech lenders to efficiently modify a large number of loans, resulting in a substantial decrease in operational expenses (Huang et al., 2021).

Research Methods

This study examines the impact of FinTech adoption on financial inclusion of rural women in Karnataka, India. This is a descriptive study and it is based on survey method. Primary data is collected from, the unit of analysis, women in rural Karnataka, India. The adoption of FinTech products and services is independent variable, and financial inclusion is dependent variable. Adoption of FinTech is measured by sub-dimensions such as knowledge and understanding of FinTech services, availability of digital financial services, frequency of usage of FinTech services, trust on digital financial services, and user satisfaction with digital financial services. Financial inclusion is measured using access, usage, and quality of financial products and services. Sample size is 384. Convenience sampling is applied to select the sample units. A preliminary study is conducted to check reliability of the scale and reliability scores are 0.786, and 0.843 for adoption of FinTech services and financial inclusion respectively. Since the alpha scores are satisfactory, main study is conducted.

Results

The data collected through main study was analysed using the appropriate statistical tools keeping the objectives in mind. First, the collected data are tested for the normality. The tests of normality () show that the collected data are normally distributed as p-values are more than 0.05. Then, the demographic and economic characteristics of the respondents are studied. The demographic, economic, and

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financial characteristics of 384 respondents, primarily focusing on their access to financial services, FinTech adoption, and the type of FinTech products used are presented in Table 1.

Table – 1: Demographic and Economic Characteristics of the Respondents

Particulars	No. Of Respondents	Percentage
Marital Status		
Married	372	96.8
Unmarried	12	03.2
Total	384	100.00
Age Group		
Less than 35 years	124	32.29
36 to 50 years	121	31.51
51 to 60 years	92	23.95
More than 60 years	47	12.23
Total	384	100.00
Educational Qualification		
Up to HSC	207	53.90
UG	167	43.48
PG	010	02.60
Total	384	100.00
Number of Dependents		
Up to 3 members	165	42.96
4-5 members	199	51.82
More than 5 members	020	05.20
Total	384	100.00
Gross Annual Income (INR)		
Below 300000	188	48.95
300001 to 700000	93	24.21
700001 to 1000000	83	21.61
More than 1000000	20	05.20
Total	384	100.00
Adoption of Fintech Services		
No	119	30.98
Yes	265	69.02
Total	384	100.00
Access to savings Account in Bank		
No	63	16.40
Yes	321	83.60
Total	384	100.00
Access to Credit facilities in Bank		
No	93	24.21
Yes	291	75.78
Total	384	100.00
Access to Insurance services		

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No	188	48.96
Yes	196	51.04
Total	384	100.00
Type of FinTech Products and Services used		
UPI Payments	342 of 384	89.06
Mobile Banking	198 of 384	51.56
Digital Lending	162 of 384	42.18
Online insurance	145 of 384	37.76

Source: Primary data

97% of the respondents, totalling 372, are in a married status, with the remaining 3%, accounting for 12 people, being unmarried. This suggests that the majority of the participants are married, which probably impacts their financial habits, requirements, and use of FinTech solutions for handling household finances. 124 respondents, or 32.3%, are younger than 35 years old, 121 respondents, or 31.5%, are aged between 36-50 years, 92 respondents, or 24%, are in the 51-60 age group, and 47 respondents, or 12.2%, are over 60 years old. A large majority of survey participants belong to the younger and middle-aged categories (below 50 years old), possibly leading to the elevated use of FinTech services due to the younger generation's higher technological proficiency. 207 respondents, accounting for 54%, have pursued education up to HSC (higher secondary), while 167 respondents, making up 43.5%, have finished undergraduate education. Only 10 respondents, approximately 2.6%, have accomplished postgraduate education. The participants mostly have average levels of education, with a small portion having advanced degrees. This allocation could impact the level of comprehension and confidence in utilizing intricate FinTech services. 43% of the participants (165 people) have a maximum of 3 dependents, while 51.8% (199 people) have between 4 and 5 dependents, and 5.2% (20 people) have over 5 dependents. The majority of respondents have average family sizes, suggesting possible financial strains that may lead to a demand for convenient financial services, such as FinTech options. 188 respondents, accounting for 49%, earn less than ₹300,000 annually. 93 respondents, representing 24.2%, earn between ₹300,001 and ₹700,000. Additionally, 83 respondents, making up 21.6%, earn between ₹700,001 and ₹1,000,000, while 20 respondents, totaling 5.2%, earn over ₹1,000,000. Almost half of the participants are considered to have low incomes, highlighting the significance of accessible financial services. FinTech solutions could provide them with affordable options as compared to conventional financial products.

69% of respondents, which is equivalent to 265 people, have started to use FinTech services, while the remaining 31% (119 respondents) have not yet done so. A vast majority are utilizing FinTech, indicating a growing embrace of digital financial services in the area. Nevertheless, there remains a sizable portion (31%) that has not yet embraced digital inclusion, suggesting potential for growth in this area. Out of 384 respondents, 84% have a savings account and 16% do not. Having a high level of access to savings accounts indicates a good degree of basic financial inclusion. This establishes the basis for embracing higher-level financial services such as loans and insurance. 75.7% of respondents, equivalent to 291 people, have credit availability, whereas 24.3% or 93 respondents do not have access to credit. Even though most people have access to credit, approximately 25% still do not, suggesting obstacles in obtaining formal credit services. 51% of the participants (196 individuals) possess insurance, whereas 49% (188 participants) do not have insurance. The divide in insurance availability underscores a major deficiency in financial coverage, which is a space where digital insurance (InsurTech) could have an impact.

- UPI Payments are used by 89% of respondents (342 people), making it the most popular FinTech product due to its ease of use and popularity in digital transactions.

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- Mobile Banking is utilized by 51.6% of participants (198 respondents), pointing to a significant acceptance of digital banking with half of the respondents using mobile apps to address their banking requirements.
- Digital lending platforms are preferred by 42.2% of respondents (162 individuals), indicating significant interest in digital lending due to its convenience over traditional credit options.
- Online Insurance has been utilized by 37.8% of respondents (145 individuals), showcasing an increasing inclination towards buying insurance online, albeit falling behind payments and lending services.
- High adoption of FinTech (69%): Shows a strong preference for utilizing digital financial services, influenced by the widespread usage of UPI and mobile banking.
- Despite the widespread use of savings accounts and credit services, there are still notable shortcomings in access to insurance and the adoption of FinTech, especially among those with lower levels of education and lower incomes.
- Income and Education: The spread of income and educational credentials indicates that although FinTech usage is widespread, higher-level financial services (such as digital loans and internet-based insurance) may encounter obstacles among lower-income and less-educated individuals.

Further, differential analysis is carried out to find the differences between adoption of FinTech and demographic and economic characteristics of the respondents. The results are presented in Table 2. One-way ANOVA is employed.

Table 2: Variations in Adoption of FinTech

Factors	P-value	Result
Marital Status	0.544	No Variance exists
Age	0.003	Variance exists
Education	0.000	Variance exists
Number of Dependents	0.001	Variance exists
Annual income	0.021	Variance exists
Type of FinTech used	0.018	Variance exists

Source: Primary data

Table 2 presents an examination of the statistical importance (p-values) of different factors that could impact the utilization of FinTech services. Age, level of education, number of dependents, yearly income, and the specific FinTech services utilized all exhibit statistically significant differences in FinTech uptake. Being married or not does not have a major impact on the decision to use FinTech services, indicating that factors such as age, education, and income are more important than marital status in determining FinTech adoption.

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Table 3: Variations in Financial Inclusion

Factors	P-value	Result
Marital Status	0.021	Variance exists
Age	0.000	Variance exists
Education	0.158	No Variance exists
Number of Dependents	0.376	No Variance exists
Annual income	0.001	Variance exists
Type of FinTech used	0.000	Variance exists

Source: Primary data

Table 3 shows the p-values for different factors in determining financial inclusion, displaying if there are notable variations depending on these factors. Statistically significant differences in financial inclusion are observed based on marital status, age, annual income, and the type of FinTech services utilized. These variables impact people's ability to use financial services such as savings, credit, and insurance. Education and the number of dependents do not have a significant effect on financial inclusion, indicating that they do not act as barriers or cause differences in accessing financial services.

The impact of adoption of FinTech products and services on financial inclusion is analysed by applying simple regression analysis. The results are presented in Table 4.

Table – 4: Model Summary

r	r^2	MSE	F	P
0.428	0.327	0.9568	64.7249	0.000

Dependent variable: Financial Inclusion

The findings of a regression analysis in Table 5 illustrate the degree to which the adoption of FinTech accounts for the variance in Financial Inclusion. The value of r (Correlation Coefficient) is 0.428. This indicates the magnitude and orientation of the linear correlation between the independent variables and financial inclusion. A correlation coefficient of 0.428 indicates a moderate positive correlation. This indicates that as FinTech adoption varies, financial inclusion also tends to vary in a similar direction, even though the correlation is not very robust. An r^2 value of 0.327 indicates that 32.7% of the variability in financial inclusion can be accounted for by the use of FinTech in the model. This suggests that the model provides a moderate explanation for the variation in financial inclusion, with about two-thirds of the variation still not accounted for by the factors in the model. With a p value of 0.000, the model shows statistical significance, indicating a high probability that the connection between the independent variables and financial inclusion is not merely by random chance.

Discussions

This study investigates the role of FinTech adoption on financial inclusion of women in rural areas of Karnataka, India. The results of the study are discussed here. 89% of respondents use UPI Payments, establishing its dominance in digital transactions for its simplicity and popularity. 51.6% of people use Mobile Banking, showing widespread adoption of digital banking, with half of them handling banking tasks through applications. 42.2% have embraced Digital Lending, indicating a strong preference for

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online lending platforms due to their convenience compared to traditional methods. The adoption rate of Online Insurance is 37.8%, but it is increasing in popularity in comparison to other FinTech services. 69% of people have embraced FinTech, showing a strong liking for digital financial services, particularly UPI and mobile banking. However, there are still disparities in the adoption of insurance and advanced services, especially among individuals with lower education and income levels. Obstacles to Adoption: Individuals with lower incomes and less education encounter greater difficulties in adopting advanced FinTech services such as digital loans and online insurance, despite overall acceptance of FinTech.

Age, level of education, number of dependents, income, and the specific FinTech being used all play a significant role in determining FinTech adoption. Although marital status does not play a major role in FinTech adoption, it does impact financial inclusion, along with age, income, and the specific FinTech services utilized. Education and the number of dependents do not have a significant impact on financial inclusion, indicating that they are not major obstacles. The Regression Model accounts for 32.7% of the variance in financial inclusion and is statistically significant, indicating a moderate positive correlation between financial inclusion and variables such as income and FinTech adoption. Nevertheless, a relatively elevated MSE and moderate r^2 indicate that there may be other factors that could more effectively account for the remaining variance in financial inclusion.

Conclusion

This research investigates how the adoption of FinTech affects the financial inclusion of women in rural Karnataka. The results show that there is a high level of adoption of FinTech (69%), mainly due to the popularity of UPI payments (89%) and mobile banking (51.6%), which are now crucial for online transactions. Advanced services like digital lending and online insurance are becoming more popular, but they still encounter challenges in being adopted by individuals with lower income and education levels. Various factors such as age, education level, income, number of dependents, and the specific FinTech services utilized play a crucial role in shaping the adoption of FinTech. On the other hand, marital status has a greater impact on financial inclusion compared to FinTech adoption. The regression model accounts for 32.7% of the variability in financial inclusion, indicating a moderate positive correlation with factors such as income and adoption of FinTech. However, the model indicates that there may be additional unknown factors contributing to disparities in financial inclusion.

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