

Empowering SHGs through Digital Lending: A Pathway to Atmanirbhar Bharat in Giridih District

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ABSTRACT

Digital financial literacy for women is necessary since they constitute more than half of the total population. Women living in rural areas are the most disadvantaged as they have negligible social, economic, or political power. The research aims to determine the impact of Self-Help Groups (SHGs) on the digital financial inclusion of those who are excluded from the official financial system. This study will focus on the role that self-help groups (SHGs) have in helping unbanked populations gain access to digital financial channels. The paper will detail the challenges faced by the Digital Lending sector in rural Jharkhand. Moreover, it will look into the infrastructural, cultural, and behavioural issues around digital financial literacy. The research brings to light how digital lending is extremely limited in terms of scale and spread among rural, impoverished women. There is almost no formal training available, which would ease the process of learning how to use digital financial services. The various factors, smartphone ownership and exposure to digital literacy, are predictors of digital financial literacy. Despite high access, digital financial usage among rural SHG women remains low due to confidence and financial barriers. Age and education influence adoption. Training and SHG support improve awareness but not self-reliance. Empowerment needs targeted, confidence-building interventions.

Keywords: Digital Lending; SHG; Financial Inclusion; Atmanirbhar Bharat.
JEL CLASSIFICATION: G21, O16, O17

INTRODUCTION

Financial inclusion is considered to bring the population under the umbrella of formal banking infrastructure or formal financial services (Hassouba, 2023). It aims to ensure that the uncovered and excluded section of society has access to appropriate formal financial services at an affordable cost (Claessens, 2006). In rural settings, most of the population depends on non-institutional sources of finance such as the landlords, moneylenders, traders, relatives and friends, doctors, lawyers, etc. It still lacks the most basic banking facilities (Tsai, 2004). The condition is extremely harsh for women living in the countryside, who are already disadvantaged by the factors of race, area, and poverty. Their little access to money not only limits their economic participation but also aids the persistence of social inequalities in a wider scale (Kabeer, 1999). The poor banking system, high operating costs, and unqualified manpower have made it impossible to establish a strong formal financial services network in these places (Rogerson, 2001). The integration of the weaker and marginalized groups in the formal banking system has acted as a trigger for both the inclusive economic development and poverty reduction (Kelikume, 2021; Rauniyar & Kanbur, 2010).

Digital finance means participating in the financial activities digitally. Adoption of digital payments and mobile banking have made it easy for banking and formal lending, therefore spreading the formal finance (Ozili, 2018). Digital financial literacy is the awareness and knowledge to use digital devices to participate in financial activities (Zaimovic et al., 2024). Digital financial services have been the transformational tools to finance access that had been traditionally blocked. Technology has built the digital infrastructure that has made the accessibility of remote areas with little physical connections very inexpensive through mobile banking, UPI-based payments, and Aadhaar-enabled services. The use of technology in banking has contributed to the expansion of finance to the unbanked with few Bank branches (Ivatury, 2008). However, the full utilization of these instruments is dependent on a minimum level of digital literacy, access to devices, and trust, which are unevenly distributed with regard to gender and region (Rashid, 2016; Warschauer, 2004).

The Self-Help Groups (SHGs) programs have been counted as the topmost activities of development to support women's empowerment and rural areas' financial inclusion through formal channels (Mohapatra & Sahoo, 2016). The real finance system embraces SHG members

as they get access to credit through participating in microfinance and banking activities based on their groups. The joint work makes it easier for savings, transferring money, and the adoption of livelihood practices in the case of women SHG members in rural areas (Kochar et al., 2022). The program has been a reliable source for providing microcredit to poor women in rural areas. Over 3.6 million households are to be found under the SHGs program in Jharkhand through the National Rural Livelihood Mission (NRLM). These groups have been instrumental in linking the women who live at the edge of society to the official financial services. Digital financing along with digital inclusion are the key factors to empower women in rural areas (Shylendra, 2021). They empower Self-Help Group (SHG) members by giving them more power to take decisions, more control over their money, and more chances to earn or find employment. It minimizes the risks of cash handling, facilitates women's access to credit, and ultimately leads to their financial independence. Digital financing is a tool that not only makes urban but also rural areas more financially inclusive and thus empowers women through self-help groups (SHGs). Digital financial inclusion refers to the scenario whereby SHGs utilize digital technologies in their operations. This might make their work even more effective (Roy & Singh, 2025).

Even though these digital financial tools could be quite helpful, not many SHG members in rural areas are using them yet. Factors such as low education levels, cultural restrictions on technology use, unreliable infrastructure, and fear of fraud constrain digital participation. Adopting digital technology results in real empowerment benefits such as increased earnings, improved independence, and better financial decision-making, aspects that have yet to be deeply investigated in rural areas of India. The study intends to address these gaps by investigating the challenges to digital financial inclusion encountered by women in self-help groups in the Giridih district of Jharkhand. It also evaluates the infrastructural, cultural, and behavioural challenges that hinder the use of digital financial tools and evaluates the socio-economic factors influencing their adoption. The research additionally evaluates if the interaction with digital lending platforms plays a role in women's economic empowerment which is measured by the factors of increased income, access to loans, and control over finances.

This research gives a significant contribution to the area of digital inclusion by highlighting an area that is both poor and has a poor infrastructure in terms of geography and social-economic status. The findings are indeed very beneficial to the decision-makers who are aiming to facilitate the rural women's access to FinTech, use SHGs (self-help groups) for imparting financial skills, and support the digital literacy initiatives.

2. REVIEW OF LITERATURE:

The concept of empowering Self-Help Groups (SHGs) through digital lending has gained significant traction in recent years as a mechanism to foster financial inclusion and socioeconomic development. The SHG helps women become more financially independent, promotes financial inclusion, and helps the economy grow, especially in rural

India, by giving its members reach to the conventional banking services, including savings and loans. Government programs like NRLM and DAY have helped millions of women by connecting them to official banking systems and financial institutions. The literature in the field has offered a combination of recommendations for advancement and enduring obstacles to achieving this promise. This part brings together previous research on four main themes: how aware people are of digital finance, what makes it hard to use, what social and demographic factors help, and how digital participation can lead to better outcomes.

2.1. Digital Financial Awareness Among SHG Women

The technological awareness and accessibility to technology and electronic devices like smartphones are limited in rural India (Sindakis & Showkat, 2024). The limited exposure to digital tools and the internet has hindered the finance industry in a digital mode. The backward rural areas are not reached by formal financial institutions to a great extent (Garg et al., 2025). Digital finance is still an alien concept to rural women in India, especially in Jharkhand where the population is mainly tribal and marginalized (Nag, 2025). The poor access to education and technology confined to women makes it harder for them to get acquainted with digital finance tools (S. Mishra & Sahoo, 2025). In tribal regions, around 20% of the female population can use the technology skillfully (Zaimovic et al., 2024b). Despite increased penetration of mobile devices, the actual capacity to use digital finance platforms (e.g., UPI, mobile banking) remains minimal (Ingale, 2024).

There are state and national programs that have been set up to fill this gap. Jharkhand's "Digital Didi" program, for example, teaches SHG leaders how to use smartphones and how to read and write in digital form. PMGDISHA is a countrywide program that tries to give people in rural areas basic computer skills. Roy & Singh (2025) emphasize the influence of peer-led training methods, wherein digitally taught women instruct their counterparts, hence disseminating information across SHG networks.

2.2. Challenges to Digital Finance Adoption

The existing knowledge in the domain emphasizes the numerous interrelated constraints that rural women encounter when attempting to access and utilize digital finance platforms. These are broadly classified as infrastructural, educational, cultural, and psychological.

- Infrastructure: The digital access of numerous rural regions is impeded by poor internet connectivity, unstable electricity supply, and low smartphone penetration (Mwansa et al., 2025; Hasan et al., 2023; West, 2015).
- The limited exposure to formal education and low literacy levels of women frequently prevents them from comprehending or relying on digital platforms (Roy & Singh, 2025). This is because women are less likely to have had a formal education. Because of this, their capacity to independently engage in digital transactions is hindered (Debbarma & Chinnadurai, 2023).

- **Cultural Norms:** Traditional gender norms and social restraints make it hard for women to use digital gadgets or do business directly with banks (Kulkarni & Ghosh, 2021). Women in rural communities often rely on male relatives for financial choices and telephone usage (Potnis, 2015).
- **Security and Trust Issues:** Fear of fraud, scams, and the Possibility of digital theft discourages many first-time users. Rumours and past incidents often spread distrust throughout communities (Diepeveen & Pinet, 2022; Dodel & Mesch, 2018).

2.3. Demographic and Social Factors in Digital Finance Usage

The SHG has created grassroots changes to bring marginalised women under formal finance (Reddy & Manak, 2005). Education, age, income, and SHG leadership position affect women SHG members' adoption of digital financial technologies (Roy & Singh, 2025; Mohapatra & Sahoo, 2016). Younger members of the SHGs and members having higher education are more inclined to use mobile banking applications or digital payment systems (Ahmad et al., 2020; Mohapatra & Sahoo, 2016). Saka et al. (2023) similarly confirm that smartphone access and digital exposure increase confidence and adoption rates. The members joining the groups initially, who got the formal training, often got the opportunities to hold positions of authority or act as community resource persons (CRPs), frequently become the initial adopters, setting an example for others. This is in line with peer-driven approaches to digital diffusion, where leaders facilitate the acceptance of technology use among group members.

2.4. Digital Lending Leading Women's Empowerment

Economic empowerment has been repeatedly linked to access to digital finance both in India and around the globe. The foundational work of Kabeer (1999) and Mayoux (2001) has underlined the fact that finance access is among the major factors contributing to women's increased autonomy and greater control over their lives. The recent cases in Bangladesh and Kenya have shown that bKash and M-Pesa, two of the most popular mobile banking platforms, have actually been able to bring about significant changes with respect to the women's income stability, savings behaviour, and household decision-making power (World Bank, 2024). In the case of India, there are several initiatives, one of which is the NABARD e-Shakti scheme, which allows women in SHGs to adopt online financial tools, is another program, the NRLM (National Rural Livelihood Mission) BC (Business Correspondent) Sakhi, empower women to learn how to interact with formal institutions and manage their finances (Mukherjee et al., 2019).

2.5. Identified Research Gaps

Although there have been policies and programs aimed at helping, there still exists a lack of small-scale localized studies in backward aspiration districts such as Giridih. There has been little empirical research that attempts to investigate the relationship between digital literacy, demographic factors, and empowering effects with the help of statistical correlations. This research is going to be

the one that fills that gap by collecting primary data and examining the specific reasons for the group's technology usage or non-usage Jharkhand SHG women's of digital.

3. THEORETICAL FRAMEWORK:

The research adopts a multi-theoretical approach comprising two main theoretical models, the Technology Acceptance Model (TAM) and Kabeer's Empowerment Framework, to analyze both the factors influencing the adoption of digital lending and its impact on women's empowerment through Self-Help Groups (SHGs) in rural Jharkhand.

3.1. Technology Acceptance Model (TAM)

The Technology Acceptance Model (Trisanti, 2024; Venkatesh & Bala, 2008; Davis, 1989) describes the technological adoption and user acceptance process. According to the model, there are two major beliefs that determine a person's intention to accept the technology:

- **Perceived Usefulness (PU):** This is the belief that the use of technology will result in an increase in performance or the generation of considerable benefits (Jackson et al., 2013; Jahangir & Begum, 2008; Davis, 1989).
- **Perceived Ease of Use (PEOU):** It is the belief that the new technology will be effortless or simple to use (Jackson et al., 2013; Venkatesh et al., 2003).

For women belonging to SHGs in rural areas of Jharkhand, PU translates into benefits such as easy access to loans, simplified transactions, and reduced reliance on men of their family. PEOU indicates that digital literacy, training (like Digital Didi), and mobile-friendly interfaces are the factors that help the adoption of new technologies.

The model fits quite well in rural low-literacy settings, where attitudes toward mobile banking, internet use, and formal credit are shaped by exposure, trust, and socio-technical support. Incorporating TAM helps assess why some SHG women adopt digital lending tools while others hesitate, despite shared group membership and exposure.

The hypotheses H₀₃ and H₁₃ (about the influence of socio-demographic factors) align with TAM, where age, education, smartphone access, and digital training are key determinants of behavioural intention to use digital platforms.

3.2. Kabeer Framework of Empowerment (Kabeer, 1999)

To evaluate how the adoption of digital lending affects rural women who are members of self-help groups (SHGs), the research utilizes Kabeer's Empowerment Framework from 1999, which consists of three interconnected aspects of empowerment:

- **Resources:** which encompass material, human, and social assets that improve a person's capacity to make choices. In this research, these resources comprise ownership of smartphones, digital literacy, membership in SHGs, and access to government programs and credit.
- **Agency:** The ability to define one's goals and act upon them. This may manifest in financial decision-making, independent banking,

entrepreneurship, or negotiating credit access without male intermediaries.

- **Achievements:** The outcomes of enhanced agency include increased income, improved self-confidence, mobility, and active participation in household or community-level decisions.

This paradigm assesses if and how digital financial inclusion empowers underprivileged women. Kabeer's

model is the basis for hypotheses H₀₄ and H₁₄, which are about how digital lending affects empowerment. We look at aspects like the rise of women's income, their access to credit, and their level of financial independence in order to quantify the economic and social agency of women.

CONCEPTUAL FRAMEWORK:

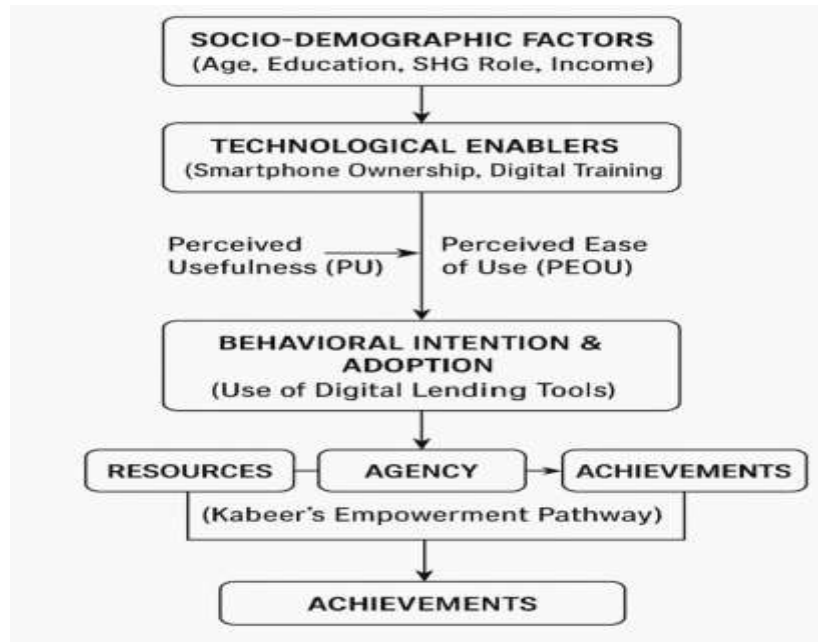


Figure 1: Flow chart for the Conceptual Framework

Source: Author's Compilation

The conceptual framework of the study, shown in Figure 2, applies the theoretical concepts of the Technology Acceptance Model (TAM) and Kabeer's Empowerment Framework (Showkat, Nagina, Nori, et al., 2024; Chatterjee et al., 2020; Al-Shafi & Weerakkody, 2010). The multi-theoretical approaches help to capture the determinants and outcomes of digital financial inclusion among rural SHG women. The two main objectives of the study, which are to examine what factors influence women's adoption of digital lending tools and how such adoption affects their economic empowerment, are explained here. Employing the integrated model in the study.

At the first level of abstraction, the model includes socio-demographic factors like education, age, household income, and leadership responsibilities in SHGs. Several factors influence a woman's ability to engage with technology and her level of exposure to it.

Showkat et al. (2024) and Yadav and Shanmugam (2024) say that the second layer of the TAM is about technical enablers, such as owning a smartphone and taking part in digital training. These aspects directly influence women's views of the usefulness (PU) and ease of use (PEOU) of digital tools, which are two of the most essential parts of the TAM. These perceptions subsequently influence the intention to behave and the adoption of digital financial services, including UPI payments, mobile banking, and app-based credit access.

The research finally integrates Kabeer's (1999) three-dimensional model of empowerment, with the adoption of digital tools viewed as a channel to greater resources (availability of credit, technology), greater empowerment (autonomous financial decision-making), and real accomplishments (increase in income, movement, and upliftment of social rank). The connection established in the investigation allows the inquiry to see the effect of digital financial services through self-help groups (SHGs) on the development of Atmanirbhar Bharat by empowering economically the underprivileged women.

4. RESEARCH METHODOLOGY:

A cross-sectional survey design is adopted in this study to measure the digital financial literacy, access, and empowerment of rural women in Jharkhand state. The structured questionnaire was given to 104 respondents, who were selected through purposive sampling from women connected to Self Help Groups (SHGs) in different blocks of Giridih district. Indispensably, the researchers have merged both quantitative and qualitative methods to clarify the impact of SHGs on rural women's empowerment. The quantitative part investigates the extent to which SHG members possess an advanced knowledge of digital finance, their comfort level with digital platforms, and the number of loans that are being provided to SHG members. The qualitative part was derived from the insights that were gathered during the

focus group discussion. These insights provide a clearer picture of the key factors that largely affect the results.

4.1. Research objectives:

1. The first goal is to assess using surveys and questionnaires how extensively and how often various digital financial technologies are used by rural women.
2. The second is to analyze the habits of digital payment methods and their respective awareness.
3. The third one establishes a social-economic and demographic map revealing the cliffs and slopes of the road leading to the acceptance of digital financial services.
4. The next goal focuses on measuring the impact of women's economic empowerment through the decision-making process as a result of their digital financial inclusion.
5. The research also plans to look at how much support the training and institutions provide in the case of women adopting digital finance applications.
6. The last but not least objective takes into consideration the financial limitations as an obstacle to the use of digital financial services/applications.

4.2. Research hypotheses:

Based on the above objectives, the following research hypotheses were formulated for the study:

Objective 1: Digital Penetration and Usage

H₀₁: There is no remarkable and considerable access to banking and digital tools by rural women.

H₁₁: A remarkable and considerable access to banking and digital tools by rural women exists.

Objective 2: Awareness & Usage Patterns

H₀₂: Most respondents are poorly aware and rarely use digital payment methods.

H₁₂: Most respondents are aware and actively use digital payment methods.

Objective 3: Socioeconomic and Demographic Influence

H₀₃: Socioeconomic factors (income, caste, education, occupation) and demographic factors (age) do not significantly influence digital financial adoption.

H₁₃: The adoption of digital finance is significantly affected by the socioeconomic and demographic factors.

Objective 4: Impact on Empowerment and Decision-Making

H₀₄: Digital financial services do not cause any increase in women's independent decision-making ability or self-reliance.

H₁₄: Digital financial services cause an increase in women's independent decision-making ability and self-reliance.

Objective 5: Training and Institutional Support

H₀₅: There is no significant relationship between the attending training programs and SHG partnerships and digital financial literacy or self-confidence.

H₁₅: There is a significant positive relationship between the attending training programs and SHG partnerships and an improvement in digital financial literacy and empowerment.

Objective 6: Financial Constraints

H₀₆: Financial constraints create no effect on the adoption of digital financial tools.

H₁₆: Financial constraints create a significant impact on the adoption of digital financial tools.

4.3. Study area and sampling design:

The research is carried out in Giridih, district in the Indian state of Jharkhand. This location is marked by socio-economic backwardness and lack of finance but on the good side, it has a vibrant participation of self-help groups (SHGs) in the DAY-NRLM campaign. The interplay of gender, digital access, and community finance can be studied in this setting as it provides a representative case. Jharkhand's rural regions have also been pointed out in government and academic reports as lacking in digital access, thus making it a very good context to analyze the obstacles to digital financial inclusion.

The study uses purposive sampling to select SHG members affiliated with JSLPS (Jharkhand State Livelihood Promotion Society). We asked 104 SHG women questions using a standard questionnaire. Although small, this sample size was thought to be big enough for a logistic regression model with a reasonable number of predictors. The requirements for selection included: (a) being a member of an operating Self-Help Group (SHG) for at least one year, and (b) living in a rural Panchayat. The purpose of the study was to guarantee that the participants had a clear understanding of the behaviours of SHGs, which is a crucial factor for the investigation that was being conducted by the study.

4.4. Data collection:

The field survey tipped over primary data to the SHGs' members, with the help of a pre-tested, structured multilingual questionnaire, that was carried out in 2025 in the Giridih district of Jharkhand. The questionnaire consisted of sections that inquired about demographics, people's acquaintance and usage of digital financial services, their issues, and so on. The use of systematic tools guaranteed uniform and relatable responses. This research analyzes the geographically remote and financially weak Giridih region where the National Rural Livelihoods Mission (NRLM) along with state-level microfinance programs are helping women-led self-help groups.

4.4.1. Variables and Indicators

Use of digital financial services is measured on a binary basis: whereby 1 denotes when an SHG member makes use of digital financial services such as mobile banking, UPI payments, and dedicated loan applications and 0 denoting the absence of the stated services.

These variables are the following:

- Smartphone ownership (binary),
- Participation in digital financial training programs (binary),

- Level of education (categorical scale),
 - Age and income bracket,
- and SHG leadership role (categorical scale),

All the variables were proudly coded for binary logistic regression.

4.4.2. Analytical Tools

The data was entered into MS Excel for cleaning, after which further analysis was carried out using STATA 17 and Python. We employed descriptive statistics to identify the sample while logistic regression was used for the identification of the most relevant factors that impact the use of digital financial services. The method was well-suited for this course of action based on the binary nature of the outcome variable and its emphasis on calculating odds ratios for categorical predictors.

The logistic model used is:

$$\text{Logit}(p) = \alpha + \beta_1 \times \text{agegrp} + \beta_2 \times \text{education} + \beta_3 \times \text{occupation} + \beta_4 \times \text{caste} + \beta_5 \times \text{hhi}$$

Where: p is the probability of using digital payment methods, α is the intercept, β_1 to β_5 are the regression coefficients for each predictor variable, agegrp, education, occupation, caste, and hhi are the independent variables.

To evaluate the performance of the model, we applied goodness-of-fit metrics such as Pseudo R^2 and AIC, while also assessing the presence of multicollinearity through Variance Inflation Factor (VIF) scores to ensure that the model's estimations were precise.

4.4.3. METHODOLOGICAL JUSTIFICATION

The use of logistic regression analysis aligns with the previous works discussing digital technology's influence on the functioning of Self-Help Groups (SHGs), where the dependent variable is of binary nature (Davis, 1989; Showkat et al., 2024). The combination of primary field research with relevant secondary data gives the research both empirical strength and contextual significance.

5. RESULTS AND DISCUSSIONS:

5.1. Profile of Respondents

The respondents were predominantly young adult women. Nearly 79% were aged 26–35, with about 18% above 35 and only 6% under 25. Education levels were modest: a majority (around 60%) had only primary schooling, ~24% reached high school, a few (7%) had higher education, and about 9% were illiterate. Most women (over 75%) identified as homemakers, with others engaged in small businesses or farming; the sample thus represents typical rural SHG members who manage household and micro-income activities. They largely belonged to socio-economically disadvantaged groups (approximately 59% OBC, 15% SC, 8% ST) and low-income households (mostly ₹5,000–20,000 monthly). Their digital participation is contextualized by their SHG membership, which promotes grassroots financial inclusion despite their low education and income.

Hypothesis 1: Rural women lack banking and digital tools.

Table 1: Access to Banking and Digital Tools

Variable	Category	Frequency	Percentage	Mean
Access to Bank Account (bankac)	Yes (1)	104	100.00%	1
	No (0)	0	0.00%	
Access to Smartphone (actosmrtphn)	Yes (1)	96	92.30%	0.92
	No (0)	8	7.70%	
Use of Internet (useinternet)	Yes (1)	93	89.40%	0.89
	No (0)	11	10.60%	

Source: *Author's Computation*

All respondents have access to bank accounts, while 92% have access to a smartphone, and 89% of respondents use the internet. This indicates a high level of access to basic financial infrastructure among the rural SHG women in Giridih.

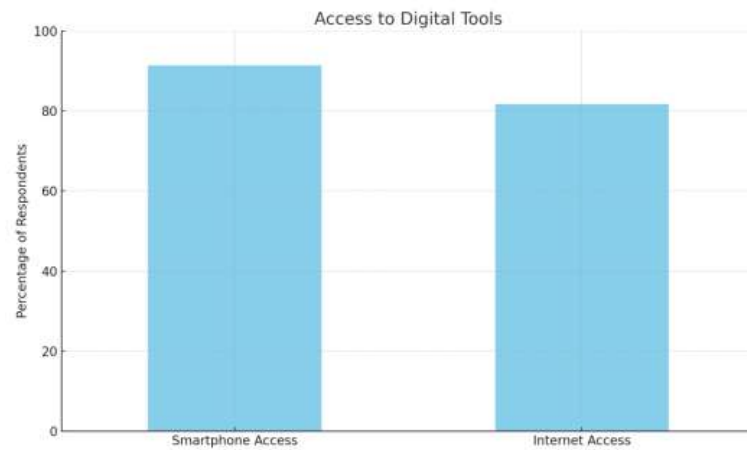


Figure 2: Access to Digital Tools

Source: *Author's Computation*

Figure 2 shows the number of people who said they could use both their smartphones and the internet. The numbers show that 92% of rural SHG women have access to a smartphone, and 89% have access to the internet. This shows that a lot of these women are ready to use technology. This wide distribution goes against Hypothesis H₀₁, which said that banking and digital tools

were hard to get to. Even though almost everyone has access, that doesn't mean they use it all the time, which means we need to learn more.

Hypothesis 2: The majority of respondents have low awareness and rarely use digital payment methods

Table 2: Awareness and Usage of Digital Payment Apps

Variable	Category / Code	Frequency	Percentage	Mean
Awareness of Digital Payment Apps (awaredpa)	Aware (1)	92	88.50%	0.88
	Not Aware (0)	12	11.50%	
Frequency of Digital Payment Method Usage (freqdpm)	Never (0)	19	18.30%	1.22
	Sometimes (1)	49	47.10%	
	Often (2)	33	31.70%	
	Very Frequently (4)	3	2.90%	

Source: *Author's Computation*

The assessment reveals that rural SHG women in Giridih possess a significant understanding of digital payment applications. However, this high awareness does not fully translate into high usage frequency. While a majority use digital payment methods, the most common reported frequencies are at lower to moderate levels, while some respondents also report no

usage. This suggests that initial barriers of awareness appear to be largely overcome for many, but some other factors still hinder usage frequency and digital payment methods.

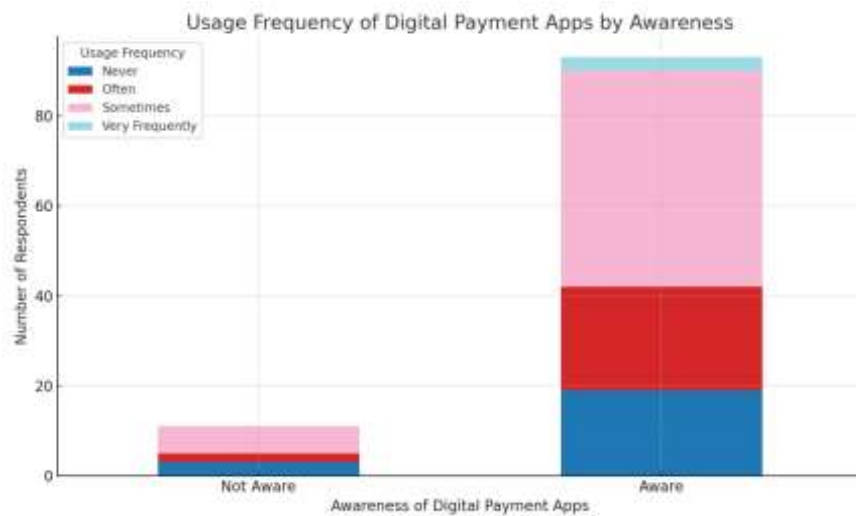


Figure 3: Usage Frequency of Digital Payment App by Awareness

Source: *Author's Computation*

Figure 3 presents the frequency of digital payment usage segmented by awareness of digital payment apps. While awareness is high (approximately 88.5%), frequent usage remains moderate. A majority of aware respondents use digital tools only "sometimes" or "often," with very few using them "very frequently." This supports Hypothesis

H₁₂ (awareness is high), but suggests that behavioural barriers or lack of confidence may prevent consistent usage. This aligns with the TAM model, where perceived usefulness does not always lead to behavioural intention.

Hypothesis 3: Socioeconomic (income, caste, education, occupation) and demographic (age) factors do not significantly influence digital financial adoption.

Table 3: Chi-Square Test Results of Socioeconomic and Demographic Factors

Variable	Chi-squared Statistic	P-value	Result
Age Group (agegrp)	19.49	0.0002	Significant ($p < 0.05$)
Education (education)	18.518	0.0003	Significant ($p < 0.05$)
Occupation (occupation)	13.108	0.0108	Significant ($p < 0.05$)
Caste (caste)	4.758	0.1904	Not Significant ($p \geq 0.05$)
Household Income (hhi)	1.322	0.5163	Not Significant ($p \geq 0.05$)

Source: *Author's Computation*

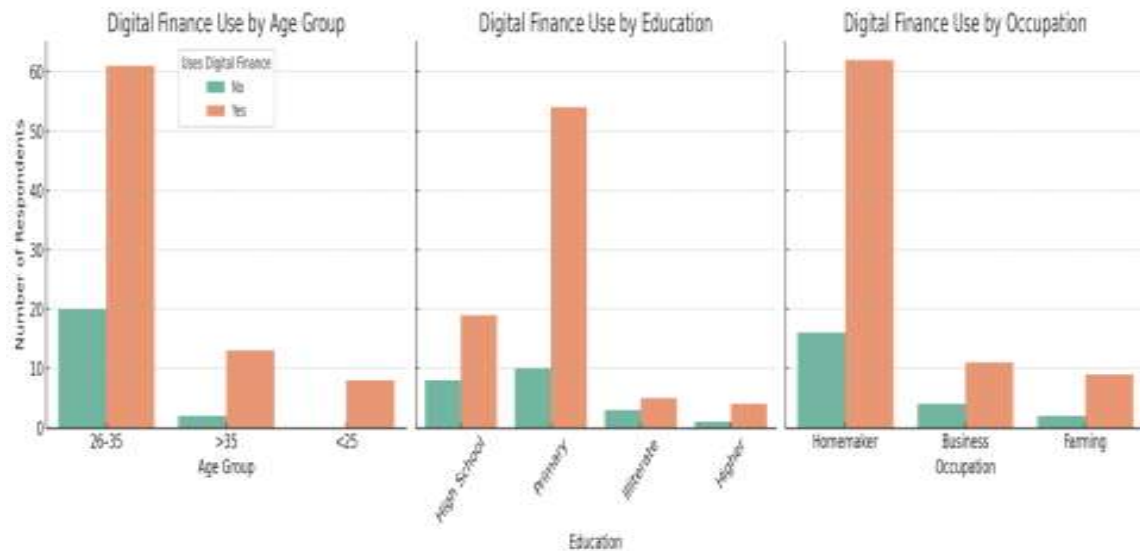


Figure 4: Adoption of digital finance by age, education level, and job

Source: Author's Computation

In Figure 5, the relationship between age, education, and employment status with the use of digital finance is shown. It is evident that the younger and more educated cohorts are the most digital savvy. This is in line with the chi-square test results (Table 3) and Hypothesis H₁₃. The differences in the TAM dimensions are most pronounced in this case—especially, older and less educated females may consider the use of digital tools as more difficult. The usage is also guided by the roles with non-homemakers showing more considerable adoption, perhaps due to more economic exposure or need.

In the analyses, the Chi-Square test was used for assessing the relationship between 'use of digital payment methods' and 'age group,' 'education,' 'occupation,' 'caste,' and 'household income.' It was found that age, education, and occupation display a significant correlation with the use of digital payment methods, whereas caste and household income do not possess any significant correlation (Showkat et al., 2024; Yadav & Shanmugam, 2024; Davis, 1989).

Hypothesis 4: The use of digital financial services does not lead to increased financial decision-making independence or self-reliance.

Table 4: Logistic Regression Results

Predictor	Coefficient (β)	Std. Error	z-value	P-value	95% CI (Lower, Upper)	Significance
Intercept	2.5467	2.126	1.198	0.231	[-1.620, 6.713]	Not Sig.
Age Group (agegrp)	-1.2659	0.579	-2.186	0.029	[-2.401, -0.131]	Significant
Education (education)	1.692	0.61	2.775	0.006	[0.497, 2.887]	Significant

Occupation (occupation)	-0.4325	0.246	-1.76	0.078	[-0.914, 0.049]	<i>Marginal</i>
Caste (caste)	-0.1835	0.39	-0.471	0.638	[-0.947, 0.580]	Not Sig.
Household Income (hhi)	0.3801	0.587	0.648	0.517	[-0.770, 1.530]	Not Sig.
Statistic	Value					
Number of Observations	104					
Degrees of Freedom (Model)	5					
Log-Likelihood (Full Model)	-37.473					
Log-Likelihood (Null Model)	-50.913					
Likelihood Ratio χ^2 Statistic	26.88					
Pseudo R-squared (McFadden)	0.264					
LLR p-value	0.00006					
Convergence Achieved	Yes					

Source: *Author's Computation*

The logistic regression model provided strong evidence for the hypothesis that at least one of the socioeconomic or demographic factors influences the likelihood of using digital payment methods. The 'age group' variable coefficient turned out to be negative and statistically significant, indicating that older people are less inclined to make payments through digital channels. Education carries a positive and significant correlation with digital payment methods' adoption, thus it can be said that if one has a higher educational qualification, he/she/it is more likely to use the digital payment. Profession reveals the statistically significant association with digital payment's use among the chi-square test at a 95% confidence level, whereas in the logistic regression model, the significance is at a 90% confidence level. Such things point to the conclusion that occupation has a non-adjusted strong association with digital payment adoption and that the effect is still slightly significant even when other socio-economic variables are taken into account. This implies that certain professions do not choose to go for the digital payment option but at the same time, the association trend turns weaker as other variables are considered.

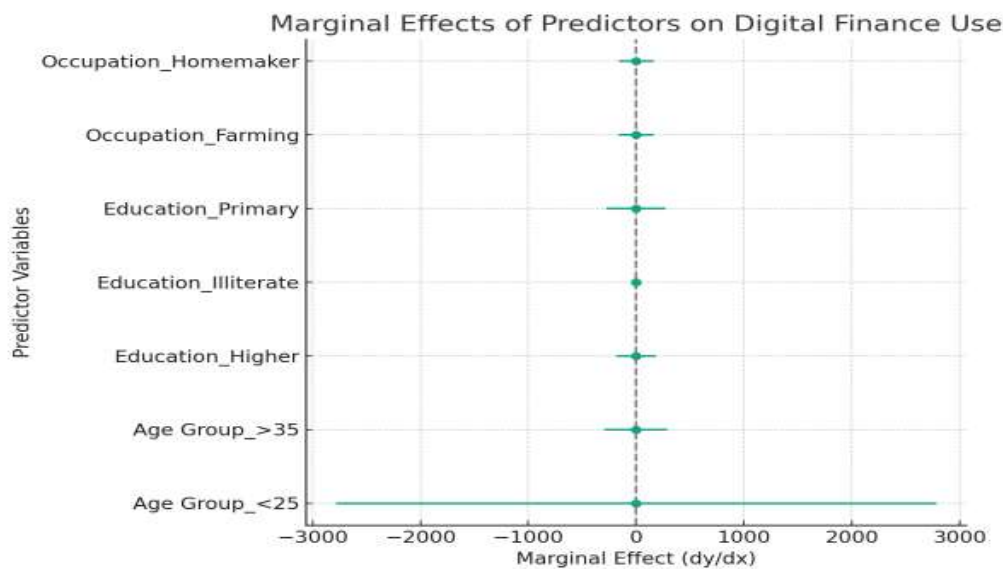


Figure 5: Marginal Effects Plot – Logistic Regression

Source: Author's Computation

The marginal effects of the logistic regression model have been illustrated in Figure 6, thereby estimating the change in probability of digital finance adoption as a result of one-unit change of each predictor. The educational level has a positive and significant marginal effect that is statistically proven, resulting in a higher probability of the adoption of digital finance by women with higher education. On the other hand, age carries a negative impact, thereby confirming that senior SHG women are more hesitant to adopt. These findings validate TAM assumptions, where perceived ease of use and self-efficacy drive adoption intentions.

Table 5: Independent t-test Sample Result

Indicator	T-statistic	P-value	Significance (p < 0.05)
Financial Decision Independence (findecindep)	1.3313	0.1861	Not Significant
Digital Self-Reliance (digselfreli)	-1.4449	0.1515	Not Significant

Source: Author's Computation

Based on the independent sample t-tests, there is no statistically significant difference between the mean levels of financial decision independence or digital self-reliance between rural SHG women who use digital payments and those who do not. Thus, the hypothesis that there is no significant relationship between the use of digital lending and the economic empowerment of SHG members is not rejected.

Hypothesis 5: Attendance in training programs and SHG partnerships has no significant effect on digital financial literacy or empowerment.

Table 6: Attendance in Training Programs and SHGs Partnership Statistics

Variable	Category	Frequency	Percentage
Participation in Training Program (trainprog)	Yes (1)	59	56.70%
	No (0)	45	43.30%
SHG Partnership with Bank (shgbnk)	Yes (1)	82	78.80%
	No (0)	22	21.20%

Source: *Author's Computation*

A majority of respondents participated in SHG–bank linkages (78.8%) and over half (56.7%) attended digital financial literacy training programs, indicating substantial institutional and educational support.

Independent sample t-tests assessed the effect of ‘training programs’ and ‘shg partnership with banks/MFIs/Fintech Co.’ on digital financial literacy (awareness of digital payment, opportunity, and confidence) and empowerment (financial independence and digital self-reliance).

Table 7: Effect of Training Program on Digital Financial Literacy and Empowerment

Indicator	T-Statistic	P-Value	Significance
Digital Financial Literacy Indicators			
Awareness of DPA (awaredpa)	-4	0.0002	***
Opportunity via DPA (oppdfa)	-4.2279	0.0001	***
Confidence in Usage (confidence)	-1.847	0.0677	* (marginal)
Economic Empowerment Indicators			
Financial Decision Independence (findecindep)	-2.6507	0.0095	**
Digital Self-Reliance (digsselfreli)	-0.6818	0.497	Ns

Source: *Author's Computation*

Attendance in training programs has a statistically significant positive effect on mean levels of awareness, perceived opportunity, and level of financial decision independence regarding digital financial applications at 5% level of confidence. This result is in line with (Yadav et al., 2022, p. 8). There is a marginally significant effect of training program attendance on mean levels of confidence at a 10% level of confidence (p-value = 0.0677). There is no statistically significant effect of training program attendance on the mean level of digital self-reliance.

Table 8: Effect of SHG Partnership on Digital Financial Literacy and Empowerment

Indicator	T-Statistic	P-Value	Significance
Digital Financial Literacy Indicators			
Awareness of DPA (awaredpa)	-2.9244	0.0076	**
Opportunity via DPA (oppdfa)	-2.795	0.0101	**
Confidence in Usage (confidence)	-3.0106	0.0048	***
Economic Empowerment Indicators			
Financial Decision Independence (findecindep)	-0.6993	0.4893	Ns
Digital Self-Reliance (digsselfreli)	-1.9737	0.0557	* (marginal)

Source: *Author's Computation*

SHGs' partnership with banks/MFIs/Fintech Companies has a statistically significant positive effect on the mean levels of awareness, perceived opportunity, and confidence in using digital financial applications (Asif et al., 2023). There is no significant effect of SHG partnership on financial decision independence and digital self-reliance.

Hypothesis 6: Financial constraints do not significantly hinder the adoption of digital financial services.

Table 9 Level of Financial Constraints and Use of Digital Payment Methods Statistics

finconstr Level → usedpm ↓	No Constraint (0)	Moderate (1)	Severe (2)	Total
Did Not Use (0)	6	3	11	20
Used (1)	29	13	42	84
Total	35	16	53	104

Source: *Author's Computation*

The table shows cross-tabulation between financial constraints levels and digital payment usage among 104 rural SHG women.

Table 10: Chi-Square Test Statistics

Statistic	Value
Chi-squared statistic	16.698
Degrees of freedom	2
P-value	0.0002
Significance	*** (Highly Significant)

Source: *Author's Computation*

The chi-squared test shows a highly significant association ($\chi^2 = 16.698$, $p = 0.0002$) between financial constraints and the use of digital payment methods, indicating that financial constraints significantly influence digital payment usage.

6. CONCLUSION

The study indicates that awareness and accessibility to digital financial tools among rural women in SHGs are relatively high, which is made possible by the widespread availability of smartphones and the internet; however, the actual use of digital payments is still very limited, which reveals the existence of gaps in digital confidence and practical engagement. Among the various factors that affected adoption, age and education were the major ones, indicating the necessity for targeted interventions aimed at the older and less-educated groups.

There is a lot of digital access, but being able to use digital financial services does not necessarily mean you are going to be financially independent or self-sufficient. This analysis points out that mere participation does not equate to actual empowerment. Financial constraints are one of the major reasons why digital payments are not widely adopted, which indicates the need to tackle the root economic issues that bring about these constraints.

Awareness, perceived opportunity, and financial decision-making capacity are all positively influenced by institutional support including training programs and SHG–bank partnerships, although the latter's influence on self-reliance is minimal. The results suggest that future initiatives should not be limited to access and awareness but rather focus on creating and nurturing confidence, tailoring support to different demographic segments, and direct financial and structural barrier removal to ensure that digital inclusion translates into true empowerment.

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