

Digital Financial Inclusion and Digital Financial Literacy as a Digital Roadmap to Women's Economic Empowerment



Amit Belwal¹, Dr. Bhanu Pratap Singh², Vibhuti Gupta³

¹Research Scholar, Department of Commerce, M.B. Govt. P.G. College, Haldwani, Nainital, Uttarakhand, India. Email: amitbelwal886@gmail.com, ORCID: <https://orcid.org/0009-0000-1395-440X>

²Assistant Professor, Department of Commerce, Govt. Degree College, Gururabanj, Almora, Uttarakhand, India. Email: drbpsgailakoti@gmail.com, ORCID: <https://orcid.org/0009-0006-2991-2304>

³Research Scholar, Department of Economics, M.B. Govt. P.G. College, Haldwani, Nainital, Uttarakhand, India. Email: gvibhu26@gmail.com, ORCID: <https://orcid.org/0009-0003-6278-0946>

Abstract

Digital financial inclusion is increasingly recognized as an important mechanism for improving women's participation in formal financial systems and strengthening their economic empowerment. This study examines the effects of digital financial inclusion and digital financial literacy on women's economic empowerment. A quantitative, cross-sectional research design was adopted, and primary data were collected from 100 women through a structured questionnaire using a five-point Likert scale. The data were analysed using descriptive statistics, reliability analysis, Pearson correlation, and multiple linear regression in SPSS. The findings indicate strong positive relationships between women's economic empowerment and digital financial inclusion ($r = .938$, $p < .001$) and digital financial literacy ($r = .928$, $p < .001$). The regression model was statistically significant ($F = 572.379$, $p < .001$) and explained 92.2% of the variance in women's economic empowerment. Digital financial inclusion ($\beta = .539$, $p < .001$) and digital financial literacy ($\beta = .448$, $p < .001$) both had significant positive effects. The study concludes that expanding access to digital financial services alongside strengthening women's digital financial capabilities can contribute substantially to their economic empowerment.

Keywords: Digital Financial Inclusion; Digital Financial Literacy; Women's Economic Empowerment; FinTech; Digital Finance.

Introduction

Digital financial inclusion has emerged as a transformative approach to expanding access to affordable and secure financial services through digital technologies such as mobile banking, digital wallets, online banking, and fintech platforms. By reducing geographical and socio-economic barriers, digital financial services enable underserved populations, particularly women, to participate in the formal financial system.

Women's economic empowerment refers to women's ability to access financial resources, make independent economic decisions, generate income, and improve their overall well-being. Despite significant progress, women in many developing countries continue to face barriers such as limited financial literacy, restricted access to formal banking, and gender-based inequalities. Digital financial inclusion offers a practical solution by providing convenient, affordable, and secure financial services that enhance savings, credit access, entrepreneurship, and financial independence.

In recent years, governments and fintech companies have accelerated the adoption of digital financial services to promote inclusive economic growth. However, empirical evidence on how digital financial inclusion contributes to women's economic empowerment remains limited, particularly in emerging economies such as India. Therefore, this

study aims to examine the relationship between digital financial inclusion and women's economic empowerment, providing insights for policymakers, financial institutions, and fintech providers to design more inclusive financial ecosystems that support sustainable development and gender equality.

Research Objective:

To examine the effect of digital financial inclusion on women's economic empowerment.

To assess the influence of digital financial literacy on women's economic empowerment.

Research Hypotheses:

H0₁: Digital financial inclusion has no significant effect on women's economic empowerment.

H0₂: Digital financial literacy has no significant effect on women's economic empowerment.

Review of Literature

Demirgüç-Kunt et al. (2022) examined global trends in financial inclusion using the Global Findex Database and found that digital financial services, particularly mobile payments and digital accounts, significantly expanded financial access for women during and after the COVID-19 pandemic. The study highlighted that digital finance reduces dependence on traditional banking infrastructure and improves women's

participation in the formal financial system. However, disparities in digital literacy and internet access continue to limit inclusive financial growth.

Holloway, Niazi, and Rouse (2017) reviewed empirical evidence on the relationship between financial inclusion and women's economic empowerment. Their findings indicated that access to savings, digital payments, credit, and insurance positively influences women's income generation, financial decision-making, and entrepreneurial activities. Nevertheless, the authors emphasized that social norms, limited bargaining power, and gender inequality often reduce the full impact of financial inclusion on women's empowerment.

Garz et al. (2020) investigated how digital financial services contribute to women's economic empowerment. The study concluded that mobile banking, digital wallets, and electronic payment systems improve women's control over financial resources, increase privacy in financial transactions, and facilitate business development. The authors further argued that digital financial inclusion enhances women's financial autonomy, although complementary interventions such as digital literacy and policy support remain essential.

Saluja, Singh, and Kumar (2023) conducted a systematic review of studies published between 2000 and 2020 on women's financial inclusion. They identified financial literacy, income inequality, limited digital access, and socio-cultural barriers as the major obstacles to women's inclusion. The review also found that digital financial services, self-help groups, microfinance, and supportive government policies are effective interventions for promoting women's economic empowerment.

Lakum (2023) reviewed the literature on digital financial inclusion in India and reported that digital banking, mobile payment systems, and fintech innovations have significantly improved women's access to formal financial services. The study emphasized that digital financial inclusion encourages savings behavior, entrepreneurial participation, and financial independence, particularly among rural women. However, inadequate digital infrastructure and low financial literacy continue to hinder widespread adoption.

Gayathri (2026) synthesized recent research on digital financial inclusion and women's economic empowerment across developing economies. The review concluded that digital financial inclusion positively affects women's access to credit, savings, investment opportunities, asset ownership, and financial decision-making. The study also identified important research gaps, particularly regarding the influence of fintech innovations, digital literacy, and institutional support on long-term economic empowerment outcomes.

Llaftiu and Golemi (2026) conducted a systematic review and meta-analysis on women's financial inclusion and found that digital finance contributes significantly to poverty reduction, economic

participation, and gender equality. Their findings suggested that digital financial inclusion is most effective when supported by financial education, digital skills, and enabling regulatory frameworks that encourage women's active participation in formal financial systems.

Research Gap

The existing literature consistently demonstrates that digital financial inclusion positively influences women's financial participation and economic empowerment. However, most studies have focused on financial access or adoption independently, while limited empirical research has examined how different dimensions of digital financial inclusion—such as digital financial literacy, accessibility, trust, and fintech usage—collectively influence women's economic empowerment using comprehensive analytical models. Furthermore, evidence from emerging economies, particularly India, remains limited, highlighting the need for empirical investigation into the mechanisms through which digital financial inclusion enhances women's economic empowerment.

Research Methodology

Research Design

The present study adopts a quantitative and descriptive research design to examine the influence of digital financial inclusion and digital financial literacy on women's economic empowerment. A cross-sectional survey approach was employed to collect primary data from women respondents. This design is appropriate for analyzing the relationships among the study variables and testing the proposed hypotheses using statistical techniques.

Population and Sampling

The target population comprised women aged 18 years and above who actively use or have access to digital financial services such as mobile banking, internet banking, Unified Payments Interface (UPI), digital wallets, and other fintech applications. A convenience sampling technique was adopted due to its suitability in reaching respondents with experience in digital financial services. A total of 100 valid responses were collected and used for analysis, which is considered adequate for multivariate statistical analysis.

Data Collection

Primary data were collected through a structured questionnaire administered both online and offline. The questionnaire consisted of two sections. The first section collected respondents' demographic information, including age, education, occupation, income, and place of residence. The second section measured the study constructs using previously validated measurement scales adapted from the existing literature. All items were assessed using a five-point Likert scale, ranging from 1 = Strongly

Disagree to 5 = Strongly Agree.

Ethical Considerations

Participation in the study was entirely voluntary. All respondents were informed about the purpose of the research before participating, and informed consent was obtained. The confidentiality and anonymity of

participants were maintained throughout the study, and the collected data were used solely for academic research purposes. The study adhered to established ethical principles governing research involving human participants.

Data Analysis

Table 1. Descriptive Statistics of Demographic Profile of Respondent:

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Age	100	1.00	5.00	3.3400	1.33500
Marital Status	100	1.00	4.00	2.4800	1.20168
Educational Qualification	100	1.00	5.00	2.8400	1.38331
Occupation	100	1.00	6.00	3.4100	1.73552
Monthly Income (INR)	100	1.00	5.00	3.1100	1.34761
Area of Residence	100	1.00	3.00	1.8800	.83218
Do you have a bank account?	100	1.00	1.00	1.0000	.00000
Which digital financial services do you use?	100	1.00	6.00	3.4200	1.71258
How long have you been using digital financial services?	100	1.00	4.00	2.5500	1.06719

Source: Author's own computations using SPSS software.

The descriptive statistics summarize the demographic and digital financial characteristics of the 100 respondents included in the study. The mean age category was 3.34 (SD = 1.335), indicating that respondents were distributed across the different age groups, with a relatively moderate variation in age. The mean score for marital status was 2.48 (SD = 1.202), while educational qualification recorded a mean of 2.84 (SD = 1.383), suggesting variation in the educational backgrounds of the participants. Occupation had a mean of 3.41 (SD = 1.736), indicating considerable diversity in respondents' occupational categories. Monthly income showed a mean of 3.11 (SD = 1.348), reflecting variation in the income levels represented in the sample.

Regarding residential background, the mean score for area of residence was 1.88 (SD = 0.832), indicating representation from different residential categories, including rural, urban, and semi-urban areas. All respondents reported having a bank account, as reflected by the constant value of 1.00 (SD = 0.000). The mean score for digital financial services used was 3.42 (SD = 1.713), demonstrating that respondents used different forms of digital financial services. Finally, the duration of digital financial service usage recorded a mean of 2.55 (SD = 1.067), indicating differences in respondents' experience with digital financial technologies.

Overall, the demographic profile demonstrates reasonable diversity in age, education, occupation, income, residence, digital service usage, and experience, providing a suitable basis for examining digital financial inclusion and women's economic empowerment. The absence of variation in bank-account ownership should be noted, as all respondents in the sample reported having a bank account.

Table 2. Reliability Test

Reliability Statistics	
Cronbach's Alpha	N of Items
.973	18

Source: Author's own computations using SPSS software.

The reliability analysis was conducted to assess the internal consistency of the 18 items used to measure the constructs of digital financial inclusion, digital financial literacy, and women's economic empowerment. The results show a Cronbach's Alpha value of 0.973, which indicates an exceptionally high level of internal consistency among the items. Cronbach's alpha values above 0.70 are generally considered acceptable, while values above 0.90 indicate excellent reliability (Nunnally & Bernstein, 1994).

The obtained alpha value of 0.973 suggests that the questionnaire items are highly consistent in measuring the underlying concepts of the study. Therefore, the measurement instrument can be considered highly reliable and suitable for subsequent statistical analyses, including exploratory factor analysis, correlation analysis, and multiple regression. The result also indicates that the responses obtained from the 100 participants provide a dependable basis for examining the proposed relationships in the study.

Regression Analysis

Multiple linear regression was employed to examine the influence of Digital Financial Inclusion (DFI) and Digital

Financial Literacy (DLF) on Women's Economic Empowerment (WEE). The analysis was conducted using responses from 100 participants. DFI and DLF were entered simultaneously as predictor variables, while WEE was treated as the dependent variable.

Table 3. Descriptive Statistics

Variable	Mean	Std. Deviation	N
Women's Economic Empowerment (WEE)	3.6117	0.76543	100
Digital Financial Inclusion (DFI)	3.6033	0.76863	100
Digital Financial Literacy (DLF)	3.5633	0.75760	100

Source: Author's own computations using SPSS software.

Table 3 presents the descriptive statistics for the variables included in the regression model. The mean score for Women's Economic Empowerment was 3.6117, with a standard deviation of 0.76543. This indicates that respondents generally reported a moderately high level of economic empowerment. Digital Financial Inclusion recorded a mean of 3.6033 (SD = 0.76863), suggesting that respondents generally had favourable access to and usage of digital financial services. Similarly, Digital Financial Literacy had a mean of 3.5633 (SD = 0.75760), indicating a relatively favourable level of knowledge and confidence regarding digital financial services. The relatively similar standard deviations indicate a moderate degree of variation in responses.

Table 4. Pearson Correlation Matrix

Variables	WEE	DFI	DLF
Women's Economic Empowerment (WEE)	1.000	.938**	.928**
Digital Financial Inclusion (DFI)	.938**	1.000	.891**
Digital Financial Literacy (DLF)	.928**	.891**	1.000
Sig. (1-tailed)	—	.000	.000
N	100	100	100

Note: $p < .01$ (1-tailed).

Source: Author's own computations using SPSS software.

Table 4 demonstrates the relationships among the three study variables. A very strong positive correlation was observed between digital financial inclusion and women's economic empowerment ($r = .938$, $p < .001$). This indicates that higher levels of digital financial inclusion are associated with higher levels of women's economic empowerment.

Similarly, digital financial literacy showed a strong positive relationship with women's economic empowerment ($r = .928$, $p < .001$). This suggests that women with greater digital financial knowledge and skills tend to report higher levels of economic empowerment.

The correlation between DFI and DLF was also strong and positive ($r = .891$, $p < .001$), indicating that women who have greater access to digital financial services also tend to demonstrate higher levels of digital financial literacy. All correlations are statistically significant, providing preliminary support for the proposed relationships.

Table 5. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of Estimate	Durbin-Watson
1	.960	.922	.920	.21613	1.808

Predictors: DFI, DLF

Dependent Variable: WEE

Source: Author's own computations using SPSS software.

Table 5 presents the overall explanatory power of the regression model. The multiple correlation coefficient ($R = .960$) indicates a very strong relationship between the two predictor variables collectively and women's economic empowerment.

The R^2 value of .922 indicates that DFI and DLF together explain 92.2% of the variance in women's economic empowerment. The adjusted R^2 of .920 is very close to the R^2 value, suggesting that the explanatory power of the model remains stable after adjusting for the number of predictors and sample size.

The standard error of the estimate is 0.21613, indicating a relatively small difference between the observed and predicted values of WEE. The Durbin-Watson value of 1.808 is close to 2, suggesting that the residuals do not show a serious problem of autocorrelation.

Overall, the model demonstrates a very strong explanatory capacity for women's economic empowerment.

Table 6. ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	53.472	2	26.736	572.379	< .001
Residual	4.531	97	0.047		
Total	58.003	99			

Dependent Variable: WEE

Predictors: DFI, DLF

Source: Author's own computations using SPSS software.

Table 6 presents the ANOVA results used to determine whether the regression model as a whole is statistically significant. The obtained F-statistic is 572.379, with a significance value of $p < .001$.

Since the significance value is considerably below the 0.05 threshold, the regression model is statistically significant. This means that Digital Financial Inclusion and Digital Financial Literacy collectively make a significant contribution to explaining variations in women's economic empowerment.

Therefore, the regression model is appropriate for testing the proposed hypotheses and provides strong evidence that the selected digital financial factors are associated with women's economic empowerment.

Table 7. Regression Coefficients

Predictor	B	Std. Error	Beta (β)	t	Sig.	Tolerance
Constant	.064	.107	—	.594	.554	—
Digital Financial Inclusion (DFI)	.537	.062	.539	8.642	< .001	.207
Digital Financial Literacy (DLF)	.453	.063	.448	7.175	< .001	.207

Dependent Variable: WEE

Source: Author's own computations using SPSS software.

Table 7 reports the individual contribution of each predictor to women's economic empowerment.

Digital Financial Inclusion (DFI) has a positive and statistically significant effect on WEE. The unstandardized coefficient is $B = 0.537$, while the standardized coefficient is $\beta = .539$. The corresponding t-value is 8.642 with $p < .001$. This means that an increase in digital financial inclusion is associated with an increase in women's economic empowerment, while controlling for digital financial literacy. Thus, H1 is supported.

Digital Financial Literacy also has a positive and statistically significant effect on WEE, with $B = 0.453$ and $\beta = .448$. The obtained t-value of 7.175 and $p < .001$ indicate that digital financial literacy significantly predicts women's economic empowerment after controlling for digital financial inclusion. Consequently, H2 is supported.

The standardized coefficients further show that DFI ($\beta = .539$) has a slightly greater relative contribution to WEE than DLF ($\beta = .448$).

The regression equation is:

$$WEE = 0.064 + 0.537(DFI) + 0.453(DLF)$$

Thus, holding DLF constant, a one-unit increase in DFI is associated with an estimated 0.537-unit increase in WEE. Similarly, holding DFI constant, a one-unit increase in DLF corresponds to an estimated 0.453-unit increase in WEE.

Table 8. Collinearity Diagnostics

Model	Dimension	Eigenvalue	Condition Index	Variance Proportion: Constant	DFI	DLF
1	1	2.968	1.000	.00	.00	.00
2	2	.027	10.413	1.00	.05	.05
3	3	.005	25.135	.00	.94	.95

Source: Author's own computations using SPSS software.

Table 8 presents the collinearity diagnostics for the regression model. The highest condition index is 25.135, indicating that there is some degree of shared variance between the two predictor variables. This finding is consistent with the relatively strong correlation between DFI and DLF reported earlier.

However, the VIF value of 4.838 for both predictors remains below the commonly used critical value of 5.00. The tolerance value of 0.207 is also above the minimum level of 0.10. Therefore, the predictors do not demonstrate a critical multicollinearity problem that would invalidate the regression model.

Table 9. Residual Statistics

Statistic	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.2079	4.8612	3.6117	.73493	100
Residual	-.50822	.53208	.00000	.21393	100

Std. Predicted Value	-1.910	1.700	.000	1.000	100
Std. Residual	-2.352	2.462	.000	.990	100

Source: Author's own computations using SPSS software.

Table 9 summarizes the residual statistics obtained from the regression model. The predicted values of women's economic empowerment range from 2.2079 to 4.8612, with a mean of 3.6117. The residuals range from -0.50822 to 0.53208, with a mean of approximately zero. This indicates that the regression model does not systematically overestimate or underestimate the dependent variable.

The standardized residuals range from -2.352 to 2.462, remaining within the commonly examined ± 3 range. This suggests that there are no serious standardized residual outliers in the model. Overall, the residual statistics provide reasonable evidence that the regression model offers an appropriate fit to the observed data.

Table 10. Hypothesis Testing Results

Hypothesis	Proposed Relationship	β	t	p-value	Result
H1	DFI $\rightarrow$ WEE	.539	8.642	< .001	Supported
H2	DLF $\rightarrow$ WEE	.448	7.175	< .001	Supported

Source: Author's own computations using SPSS software.

Interpretation of Hypotheses

H1: Digital financial inclusion has a significant positive effect on women's economic empowerment.

The regression results demonstrate a significant positive effect of DFI on WEE ($\beta = .539$, $t = 8.642$, $p < .001$). Therefore, H1 is supported. The finding suggests that greater access to and use of digital financial services are associated with stronger economic empowerment among women.

H2: Digital financial literacy has a significant positive effect on women's economic empowerment.

The results also reveal a significant positive effect of DLF on WEE ($\beta = .448$, $t = 7.175$, $p < .001$). Hence, H2 is supported. This indicates that women who possess greater knowledge and confidence in using digital financial services tend to experience higher levels of economic empowerment.

Conclusion

The present study examined the relationship between digital financial inclusion, digital financial literacy, and women's economic empowerment. The findings provide strong empirical evidence that digital financial factors play an important role in strengthening women's economic participation and financial independence. The regression model demonstrated substantial explanatory power, with digital financial inclusion and digital financial literacy jointly accounting for 92.2% of the variation in women's economic empowerment ($R^2 = .922$). The overall model was statistically significant, confirming that the selected predictors provide meaningful contributions to women's economic empowerment.

The results further showed that digital financial inclusion has a significant positive effect on women's economic empowerment ($\beta = .539$, $p < .001$). This suggests that greater access to and use of digital financial services can enhance women's ability to manage money, participate in financial decisions, save, and access economic opportunities. Digital financial literacy also demonstrated a significant positive effect ($\beta = .448$, $p < .001$), indicating that knowledge and confidence in using digital financial services are important for translating technological access into

meaningful economic benefits. Consequently, both proposed hypotheses were supported.

Overall, the findings indicate that improving women's economic empowerment requires more than simply providing access to digital financial services. Women also need the knowledge, skills, and confidence to use these services safely and effectively. The study therefore highlights the importance of strengthening digital financial infrastructure alongside financial and digital literacy initiatives. Financial institutions, fintech providers, and policymakers can contribute by developing accessible, affordable, secure, and user-friendly digital financial solutions accompanied by appropriate financial education. Such efforts can help women participate more actively in formal financial systems and strengthen their economic autonomy.

References

- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Lawrence Erlbaum Associates.
- Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2022). *The Global Findex Database 2021: Financial inclusion, digital payments, and resilience in the age of COVID-19*. World Bank.
- Field, A. (2018). *Discovering statistics using IBM SPSS statistics* (5th ed.). SAGE Publications.
- Garz, S., Heath, R., Kipchumba, E. K., & Sulaiman, M. (2020). Evidence of digital financial services impacting women's economic empowerment: What explains the impacts and what is left to learn?
- Gayathri, R. (2026). Digital financial inclusion and women economic empowerment: A review of emerging trends, challenges and research gaps. *International Journal of Innovative Research in Technology*, 13(1), 2244-2248.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis* (8th ed.). Cengage.
- Holloway, K., Niazi, Z., & Rouse, R. (2017). *Women's economic empowerment through financial inclusion: A review of existing evidence*

- and remaining knowledge gaps. Innovations for Poverty Action.
8. Lakum, A. C. (2023). Literature review on digital financial inclusion and women empowerment in India. *Surabhi International Peer Reviewed Journal*.
 9. Llaftiu, A., & Golemi, E. (2026). Women's financial inclusion: A systematic review and meta-analysis. *Multidisciplinary Reviews*, 9(12).
 10. Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). McGraw-Hill.
 11. Organisation for Economic Co-operation and Development. (2021). *Development co-operation report 2021: Shaping a just digital transformation*. OECD Publishing.
 12. Pallant, J. (2020). *SPSS survival manual: A step-by-step guide to data analysis using IBM SPSS* (7th ed.). McGraw-Hill Education.
 13. Saluja, O. B., Singh, P., & Kumar, H. (2023). Barriers and interventions on the way to empower women through financial inclusion: A two decades systematic review (2000–2020). *Humanities and Social Sciences Communications*, 10, 148.
 14. Tabachnick, B. G., & Fidell, L. S. (2019). *Using multivariate statistics* (7th ed.). Pearson.
 15. United Nations Entity for Gender Equality and the Empowerment of Women. (2024). *Women's economic empowerment strategy*. UN Women.
 16. World Bank. (2024a). *Digital finance inclusion: Gender*. World Bank.
 17. World Bank. (2024b). *Empowering women through digital financial inclusion*. World Bank.
 18. World Bank. (2024c). *Fintech: Overview*. World Bank.