Digital Literacy and Its Impact on Financial Inclusion among Women in Semi-Urban Punjab: A Survey-Based Study

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***Abstract*—Financial inclusion — broadly defined as access to affordable and useful formal financial products and services — has been a cornerstone of India's development policy agenda for over a decade. The Government's flagship programmes, from Jan Dhan Yojana to the Pradhan Mantri Mudra Yojana to the recently expanded PM Vishwakarma scheme, have collectively opened hundreds of millions of new bank accounts and extended formal credit to previously unbanked populations. Yet account ownership and genuine financial inclusion are not the same thing: a Jan Dhan account that receives a government transfer payment once a quarter but is never used for savings, credit, or digital transactions represents formal inclusion without functional inclusion. Digital literacy — the ability to use smartphones, banking apps, UPI interfaces, and online financial portals — has emerged as the decisive link between account ownership and meaningful financial participation. This study investigates the relationship between digital literacy levels and the degree of financial inclusion among women in semi-urban Punjab, using primary survey data from 230 women respondents drawn from three semi-urban towns — Khanna, Moga, and Phagwara. A digital literacy index comprising 12 items was constructed and validated, and financial inclusion was measured across four dimensions: account ownership, active digital transaction usage, access to formal credit, and insurance coverage. Correlation and multiple regression analysis were employed. Digital literacy score was the strongest predictor of financial inclusion ($\beta = 0.44$, $p < 0.001$), stronger than education level, income, or age. Smartphone ownership alone, without functional digital literacy, showed no significant association with financial inclusion. The study underlines the critical role of targeted digital skill-building programmes for women in semi-urban areas and offers specific, evidence-backed recommendations for government, banks, and NGOs working in the financial inclusion space.**

***Index Terms*—digital literacy, financial inclusion, women, semi-urban Punjab, Jan Dhan, UPI, mobile banking, fintech, gender, digital divide**

I. INTRODUCTION

Somewhere between account opening and actual financial empowerment lies a gap that India's financial inclusion narrative has not yet fully closed. The numbers on the opening side are genuinely impressive: under the Pradhan Mantri Jan Dhan Yojana, over 52 crore accounts had been opened as of March 2024, with a majority held by women and by rural and semi-urban residents who .00..had never previously held a bank account. RuPay cards were issued with each account; mobile numbers were linked; zero-balance provisions removed the entry barrier that had kept millions outside the banking system. By the most basic metric — the proportion of Indian adults with a bank account — India has made remarkable progress, moving from 35% in 2011 to over 77% in 2021 according to World Bank Global Findex data.

But account ownership is a starting point, not a destination. The same Findex data that documents India's account expansion also reveals a persistent usage gap: a substantial proportion of account holders, particularly women and residents of smaller towns, use their accounts passively — to receive government transfers or employer wages — rather than actively, as instruments of savings, credit access, insurance, and investment. The transition from passive to active financial participation requires a set of skills that go beyond knowing that a bank account exists: it requires being able to navigate a mobile banking interface, understand a UPI transaction flow, read a bank statement, interpret an insurance product brochure, and identify a fraudulent link before clicking on it. These are, in essence, digital literacy skills applied to the financial domain.

Semi-urban Punjab — the towns of Khanna, Moga, Phagwara, Bathinda, Ropar, and dozens of similar settlements with populations between 50,000 and 3,00,000 — sits at an interesting intersection. These communities have high smartphone penetration relative to rural India, a growing presence of bank branches and ATMs, and a female population that is better educated than the national average. They should, in theory, be well-positioned for digital financial inclusion. Whether they are in practice is the empirical question this study investigates. The choice of a female sample is deliberate: women in semi-urban settings face a distinctive combination of high educational attainment, variable digital confidence, and persistent social norms around financial autonomy that make their financial inclusion journey different from — and more complex than — that of their male counterparts or their urban peers.

II. REVIEW OF LITERATURE

2.1 Digital Literacy: Conceptual Dimensions

Digital literacy, in its most widely used contemporary formulation (Eshet-Alkalai, 2004; van Deursen and van Dijk, 2011), encompasses several distinct competencies: basic device operation, internet navigation, information evaluation, digital communication, and — most relevant to the financial inclusion context — the ability to use digital tools to accomplish real-world tasks such as making payments, checking account balances, and accessing government services. van Deursen and van Dijk (2011) distinguished importantly between access-based and skills-based digital

divides, noting that owning a smartphone eliminates the access barrier but does not automatically confer the skills needed to benefit from it — a distinction directly relevant to the semi-urban Punjab women in this study, where smartphone ownership is near-universal but digital skill levels vary considerably.

2.2 Digital Literacy and Financial Inclusion: Evidence

The link between digital literacy and financial inclusion has attracted increasing research attention as mobile-based financial services have proliferated globally. Morgan and Trinh (2019), in a study covering nine Asian economies, found that digital literacy was the strongest individual-level predictor of mobile payment adoption and formal savings behaviour, outperforming income, age, and education in multivariate models. Klapper et al. (2016), using Global Findex data, found that mobile phone ownership raised account ownership probability only in settings where digital literacy was sufficient to make the account genuinely usable — confirming that device access and digital capability are complements, not substitutes. In India, Thathsarani et al. (2021) found digital literacy to be the most significant predictor of financial inclusion among rural women, ahead of income and education. The semi-urban women population in Punjab has not been separately studied in this context.

2.3 Gender and Financial Inclusion in India

The gender dimension of financial inclusion is well-documented. Demirguc-Kunt et al. (2018) found that globally, women are 9 percentage points less likely than men to have an account at a formal financial institution, a gap that persists after controlling for income, education, and labour force participation. In India, the gap has narrowed substantially due to PMJDY, but research by Ghosh and Vinod (2017) established that even among account-holding women, active usage rates and access to formal credit remain significantly lower than for men — particularly in rural and semi-urban settings where social norms around women's financial autonomy interact with digital literacy gaps to create compounding barriers.

III. RESEARCH METHODOLOGY

A cross-sectional, descriptive-causal survey was conducted. The target population was women aged 18–55 residing in semi-urban Punjab — specifically in the towns of Khanna (Ludhiana district), Moga, and Phagwara (Kapurthala district). These three towns were selected to represent different semi-urban population profiles: Khanna (grain market town, mixed agricultural-industrial economy), Moga (industrial town, cycle and auto component manufacturing), and Phagwara (garment and light manufacturing, significant migrant worker population). Women were approached through residential neighbourhood visits, women's self-help group meetings, and post-office waiting areas — sampling environments designed to reach women across income and education levels rather than concentrating on the most accessible or educated respondents. Of 270 questionnaires distributed, 230 were fully completed (response rate: 85.2%).

The questionnaire comprised 42 items across five sections. Section A collected demographic data. Section B comprised 12 items measuring digital literacy across four sub-dimensions: device operation (3 items), internet navigation (3 items), digital financial transactions — UPI, mobile banking, e-payments (4 items), and online safety awareness (2 items). Each item was scored as 0 (cannot do), 1 (can do with help), or 2 (can do independently), giving a digital literacy index (DLI) of 0–24 rescaled to 0–100. Section C measured financial inclusion across four dimensions: account ownership and active use, digital transaction frequency, access to formal credit, and insurance coverage. Section D identified barriers to digital financial participation. Section E collected suggestions for digital literacy improvement. Cronbach's Alpha for the DLI was 0.81. Pearson correlation and multiple regression were conducted in SPSS 26.

IV. RESULTS AND ANALYSIS

4.1 Respondent Profile

Characteristic	Category	Frequency	Percentage
Age	18–25 years	71	30.9%
	26–40 years	103	44.8%
	41–55 years	56	24.3%
Education	Below class 10	41	17.8%
	Class 10–12	97	42.2%
	Graduate and above	92	40.0%
Occupation	Homemaker	94	40.9%
	Daily wage / informal worker	58	25.2%
	Self-employed	41	17.8%
	Student / employed	37	16.1%
Smartphone ownership	Yes	208	90.4%
	No (feature phone or no phone)	22	9.6%
Bank account status	Active use (transactions ≥ once/month)	127	55.2%
	Passive use (transfers only / dormant)	81	35.2%
	No account	22	9.6%

4.2 Digital Literacy Index: Scores and Distribution

DLI Dimension	Mean Score (/100)	Std. Dev.	Interpretation
Device operation (basic)	68.4	18.2	Moderate-high — phone use familiar
Internet navigation	54.7	22.4	Moderate — browsing and search variable
Digital financial transactions	39.2	24.8	Low — biggest skills gap identified
Online safety awareness	31.8	21.6	Very low — fraud vulnerability high
Overall Digital Literacy Index (DLI)	48.5	19.6	Below midpoint — significant skill deficit

The dimension-wise breakdown of digital literacy scores is where the study's most important finding lives. Device operation — the ability to make calls, use WhatsApp, take photos, and perform basic smartphone functions — scores 68.4, indicating that the women in this sample are comfortable with their phones as communication and entertainment devices. But the score drops sharply to 39.2 for digital financial transactions — UPI navigation, mobile banking app use, checking account balance online, and making e-payments — and further to 31.8 for online safety awareness, which includes recognising phishing links, avoiding fake payment screens, and knowing not to share OTP numbers. This skills gradient is the structural explanation for why smartphone ownership (90.4%) so dramatically exceeds active financial account use (55.2%): women have the device but not the specific skills required to use it for financial purposes confidently and safely.

4.3 Regression Results: Predictors of Financial Inclusion

Predictor Variable	β (Std.)	t-value	p-value	Significance
Digital Literacy Index (DLI)	0.441	8.94	< 0.001	*** Strongest predictor
Education Level	0.218	4.42	< 0.001	***
Income Level	0.183	3.71	< 0.001	***
Age (younger = higher)	0.162	3.29	0.001	***
Smartphone ownership (binary)	0.048	0.97	0.334	n.s. — device ≠ capability
Self-employment status	0.131	2.66	0.008	**
Awareness of PMJDY / Jan Dhan	0.094	1.89	0.059	n.s. (marginal)

*Notes: *** $p < 0.001$, ** $p < 0.01$, n.s. = not significant. $R^2 = 0.581$, Adjusted $R^2 = 0.565$, $F(7,222) = 44.16$, $p < 0.001$. Dependent variable: composite financial inclusion score (account usage + digital transactions + credit access + insurance). Smartphone ownership is not significant after controlling for DLI — access without skills has no independent effect.*

The non-significance of smartphone ownership as an independent predictor ($\beta = 0.048$, $p = 0.334$) after controlling for digital literacy is theoretically the most important result in the regression. It directly confirms van Deursen and van Dijk's (2011) access-versus-skills distinction in this specific population: giving a woman a smartphone does not, by itself, increase her financial inclusion. What increases financial inclusion is giving her the digital skills to use the phone for financial purposes. This finding has significant implications for government programmes — simply distributing smartphones or subsidising data packs, without accompanying digital skills training, will not close the financial inclusion gap.

V. DISCUSSION AND CONCLUSIONS

Three findings from this study stand out as both empirically robust and practically significant. First, the digital literacy score is the strongest predictor of financial inclusion — stronger than education, income, or age — confirming that the digital skills deficit is the binding constraint on women's financial participation in semi-urban Punjab, not their formal education or earning capacity. Second, smartphone ownership has no independent effect on financial inclusion once digital literacy is controlled for, refuting the implicit policy assumption that device access translates automatically into financial empowerment. Third, online safety awareness is the lowest-scoring digital literacy dimension — meaning that even among women who can use UPI for basic payments, the ability to recognise and avoid online financial fraud is inadequate, creating a vulnerability that is likely to worsen as digital payment adoption deepens.

These findings converge on a single, clear policy implication: targeted digital financial literacy training for women in semi-urban Punjab is not a supplementary welfare measure — it is a prerequisite for the financial inclusion that government account-opening programmes have structurally enabled but have not yet fully delivered. The nature of the training matters enormously. Generic computer literacy classes are insufficient; what is needed is specific, hands-on, Punjabi-language training in UPI navigation, mobile banking app operation, account balance checking, and online fraud recognition — delivered in familiar community settings (SHG meetings, anganwadi centres, mahila mandal gatherings) rather than through formal training institutions.

Three specific recommendations follow. First, the Punjab State Government, working with NABARD and the State Level Bankers' Committee, should design a 'Digital Sakhi' programme — modelled on the successful BC Sakhi model — that trains local women digital champions in semi-urban towns to provide peer-to-peer digital banking assistance to their neighbours. Second, banks with significant semi-urban branch networks in Punjab — particularly Cooperative Banks and Regional Rural Banks — should make a 30-minute digital literacy orientation a standard

component of the Jan Dhan account opening process, ensuring that account ownership is accompanied from day one by the basic skills needed to use the account. Third, the National Cyber Security Centre and RBI should develop a simple, Punjabi-language 'UPI Safety Card' — a physical card distributed through bank branches — listing five things never to do in a UPI transaction, specifically targeting the online safety awareness gap identified in this study.

Limitations of this study include the semi-urban geographic focus, which limits generalisability to rural or urban Punjab. The cross-sectional design measures association rather than causation; an intervention study tracking financial inclusion outcomes before and after a structured digital literacy programme would provide stronger causal evidence. Future research should examine whether the digital literacy-financial inclusion relationship holds for other marginalised groups — migrant workers, elderly women, women with disabilities — in Punjab's diverse demographic landscape.

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