

Role of Digital Financial Awareness on Economic Sustainability among SHG Women in Vulnerable Communities in Andhra Pradesh

Dr. P. A. Naidu

Asst. Professor, Dept. of Economics, Central University of Andhra Pradesh, Ananthapur

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ABSTRACT

This paper aims to explore the impact of digital financial literacy on economic sustainability among Self-Help Group (SHG) women living in destitute of hope pockets of Andhra Pradesh during 2024-25. A cross-sectional survey of 210 participants from three districts – Visakhapatnam (Coastal Andhra), Anantapur (Rayalaseema), and Kurnool (Central Region) – was administered through structured questionnaires.

The findings indicate that 58.6% of the respondents have moderate level of digital financial literacy with considerable differences based on educational level, possession of smartphone and exposure to educational programs. Education ($\beta=0.342$, $p<0.001$), having a smartphone ($\beta=0.289$, $p<0.001$) and attending digital literacy training ($\beta=0.267$, $p<0.01$) were found to be predictors of digital financial literacy based on the regression results. The research presents that digital financial literacy positively correlates with economic sustainability such as monthly income, accumulated savings, and entrepreneurship.

Findings highlight the urgent requirement for context-specific digital literacy programs for marginalized women to promote financial inclusion and sustainable livelihood results in the rural Andhra Pradesh.

Keywords: Digital financial literacy, economic sustainability, Self-Help Groups, women empowerment, financial inclusion, rural development

INTRODUCTION

India's rapidly evolving financial ecosystem has reshaped the way people get, handle and use financial services. The various schemes of the Government, viz. Digital India (2015), Pradhan Mantri Jan Dhan Yojana (2014), and the Unified Payments Interface (UPI) system are all striving to make the financial system available to all layers of society. India's digital payment transactions rose to 131 billion in 2023-24: RBI India's digital transactions grew significantly during the last year and are expected to keep rising with the rapid pace of digitalization. But even with this spectacular growth, the digital divide still exists – and it is women living in rural areas and those who are economically weak that bear the brunt of it.

Andhra Pradesh is a leading state in the SHG movement, with the Society for Elimination of Rural Poverty (SERP), now Andhra Pradesh State Rural Livelihoods Mission (APRLM) enabling more than 1,098,000 SHGs constituted by about 12.8 million rural women as of March 2024. Together, these SHGs have pooled savings to the tune of ₹9,870 crores and drawn credit linkages to the tune of ₹18,450 crores from the banking system.

However, penetration into digital financial products has so far been quite limited among these groups, with only 23 per cent of SHGs regularly transacting through digital platforms, according to NABARD's Status of Microfinance Report (2024). Knowledge of digital finance is not just literacy but a full awareness of electronic payment options, mobile banking tools, digital wallets, Internet banking rules and cybersecurity tips.

This knowledge becomes even more important for women in marginalized communities, as they are most often excluded from formal financial systems by intersecting barriers of gender discrimination, caste hierarchies, access to limited education, and mobility restrictions. Financial sustainability with regard to an SHG woman is

her willingness to generate regular flow of income, acquiring income-productive assets, mitigating financial risk by way of savings cum Insurance, and pursuing income generating ventures that ensure viability of her household in the long-run.

The relationship between digital financial literacy and economic sustainability works through several channels: Improved access to credit, lower transaction costs, better record-keeping, broader market linkages, and increased access to other aspects of the formal economy. The SCs and STs constitute the most vulnerable sections in Andhra Pradesh and they account for 16.4% and 5.3% of the state's population respectively. Women in these groups face dual inequalities as a result of patriarchal systems that limit their economic engagement, access to resources, and power to make decisions within their homes and communities.

Research Objectives

1. To document the socio - demographic and economic status of SHG women in slums and backward communities in the districts of Visakhapatnam, Anantapur and Kurnool.
2. To assess and classify the level of digital financial awareness among the respondents.
3. To study economic sustainability indicators and results of SHG women.
4. To determine the major factors affecting digital financial awareness.
5. The Challenge of Digital Financial Awareness in economic sustainability indicators.

Research Significance

This study fills an important gap in understanding the digital financial landscape of rural women from marginalized communities in Andhra Pradesh. Although literature on basic financial literacy is rich, empirical studies on financial literacy with a specific focus on digital aspects (as investigated here) for SHG women from marginalised backgrounds are limited.

The results of the study serve as an evidence to enable policy makers, financial institutions, development organizations and SHG federations for planning focused intervention for improving digital financial inclusion and economic sustainability.

REVIEW OF LITERATURE

Literature on digital financial inclusion emphasizes its women-empowering nature. Demirgüç-Kunt et al. (2018) with the aid of Global Findex, mentioned that the penetration of mobile money account brought about the diminution of the global gender gap in financial inclusion during 2014–2017.

It was also found that mobile financial services relax mobility constraints and decrease women's dependence on brokers for executing transactions. Also Suri and Jack (2016) in M-Pesa in Kenya found that exposure to mobile money led to a reduction in poverty including more so among female heads of household.

Women users saved more and switched occupations toward small business, facilitating income diversification and resilience. In India, Ghosh and Vinod (2017) studied rural women in Karnataka and they found lack of digital know-how and use. Their findings suggested that education, holding a smartphone, and participation in a financial literacy training were related with digital engagement.

Research on Self Help Groups (SHGs) exhibits their role in ensuring economic stability and social empowerment. Puhazhendi and Badatya (2002) observed that SHG membership enhanced access to institutional credit and reduced dependence on informal creditors, as well as brought better saving habits.

Tankha (2012) stressed that capacity building, leadership quality and financial literacy training are the key to sustained survival of SHGs. Swain and Varghese (2022) have lately brought out an enhancement in women's income and participation in financial decisions of household after becoming SHG members and this, in turn, contributes towards bolstering economic-self-confidence.

Mitchell (2014) and Morgan and Trinh (2019) contend that digital financial literacy is more than just possessing good basic numeracy, but it is also a matter of operational skills and risk awareness.

The results show that financial knowledge is associated with education, income, digital infrastructure, and socio-cultural barriers. However, very few studies address the dFA and its associated economic sustainability outcomes particularly for SHG women in (tribal) hilly regions. This gap must be addressed to understand the long-term economic empowerment potential of digital for women in Andhra Pradesh.

RESEARCH METHODOLOGY

Research Design

The study is a descriptive cross-sectional based on quantitative approach to explore the connection between awareness of digital finance and economic sustainability of women SHG members. This makes it possible to measure the real awareness level and its association with some selected socio-economic variables. Scatterplots are employed to examine bivariate relationships, and regression analyses are conducted to investigate significant predictors of digital financial awareness.

Study Area

The study was carried out in three districts of Andhra Pradesh, which were Visakhapatnam (Coastal Andhra), Anantpur (Rayalaseema) and Kurnool (Central Andhra) and these districts belong to different socio-economic back grounds. The districts are contrasting in terms of infrastructure, pattern of development and density of SHGs and thus provide regional representation and contextual diversity.

3.3 Sampling Framework

Multi-stage purposive sampling method was used for this study. To begin, three districts were purposively selected to represent geographical diversity. Susceptible mandals having greater concentration of SC/ ST/ Minority communities, were identified in consultation with district officials at the district level.

Self-help groups SHGs that had been in existence for a minimum of three years were selected to assure stability. From each district, 70 members were selected randomly, thus putting together a sample of 210 respondents. Active SHG women in the age group 18–60 years residing in the district for at least 5 years were considered for the study.

Data Collection and Variables

The first round of data collection was conducted from August to November 2024 via face to face interviews in the Telugu language. The questionnaire included information on socio-demographic factors, SHG participation, digital financial literacy (assessed through a 15-item Likert scale), indicators of economic sustainability, and digital access.

Statistical Analysis and Ethics

Data were processed to descriptive statistics, chi-square test and multiple regression analysis. Cronbach's alpha was used to test the reliability. The ethical considerations (informed consent and confidentiality of the information of the respondents) were upheld.

RESULTS AND DISCUSSION

Socio-demographic and Economic Profile

Table 1 shows the background characteristics of the respondents by district.

Table 1: Socio-demographic Profile of Respondents (N=210)

Variable	Category	Frequency	Percentage	Mean (SD)
Age Group	25-35 years	67	31.9%	41.2 (9.8) years
	36-45 years	89	42.4%	
	46-55 years	54	25.7%	
Education	Illiterate	48	22.9%	-
	Primary (1-5)	71	33.8%	
	Secondary (6-10)	68	32.4%	
	Above Secondary	23	10.9%	
Caste Category	Scheduled Caste	89	42.4%	-
	Scheduled Tribe	43	20.5%	
	Backward Classes	78	37.1%	
Marital Status	Married	187	89.0%	-
	Widow	19	9.1%	
	Divorced/Separated	4	1.9%	
Household Size	2-4 members	78	37.1%	4.7 (1.4) members
	5-6 members	98	46.7%	
	Above 6 members	34	16.2%	
Primary Occupation	Agriculture labour	94	44.8%	-
	Self-employed	57	27.1%	
	Animal husbandry	38	18.1%	
	Other	21	10.0%	
District	Visakhapatnam	70	33.3%	-
	Anantapur	70	33.3%	
	Kurnool	70	33.3%	

Source: Primary data.

The information indicates that most of the respondents (42.4%) are aged between 36-45 years and the mean age is 41.2 years, suggests that middle aged women are the stronghold of SHG members. The educational profile depicts disheartening gap of illiteracy as 22.9% were completely illiterate and only 10.9% were educated more than secondary level. This educational disadvantage also severely limits learning digital literacy. The caste distribution shows a skewed representation towards the marginalized section of the society (62.9 % SC/ST together) thus substantiating that the study is focused on the weaker sections. Agriculture labour is the main occupation (44.8%), indicating a non-diversified source of livelihood and hence economic vulnerability.

Table 2: Economic and SHG Participation Profile (N=210)

Variable	Category	Frequency	Percentage	Mean (SD)
Monthly Household Income	Below ₹5,000	56	26.7%	₹6,847 (2,934)
	₹5,001-₹8,000	89	42.4%	
	₹8,001-₹12,000	49	23.3%	
	Above ₹12,000	16	7.6%	
Personal Monthly Savings	Below ₹200	67	31.9%	₹287 (156)
	₹201-₹400	98	46.7%	
	Above ₹400	45	21.4%	
SHG Membership Duration	3-5 years	78	37.1%	6.2 (2.7) years
	6-8 years	87	41.4%	
	Above 8 years	45	21.5%	
Loans Availed from SHG	0-2 loans	98	46.7%	2.4 (1.3) loans
	3-4 loans	87	41.4%	
	Above 4 loans	25	11.9%	
Smartphone Ownership	Yes	134	63.8%	-
	No	76	36.2%	
Internet Access	Regular access	67	31.9%	-
	Occasional access	89	42.4%	
	No access	54	25.7%	
Digital Literacy Training	Received	78	37.1%	-
	Not received	132	62.9%	

Source: Primary data.

The economic statistics show that 69.1% of respondent households have a monthly income of less than ₹8,000, far below the rural poverty line in Andhra Pradesh of ₹1,195 per capita per month (NITI Aayog, 2023), based on 4.7 members per household on average. Personal savings are still limited as there are only limited surpluses after fulfilling the subsistence requirements, as shown by the average of ₹287 saved per month. What is encouraging is that 63.8 per cent have smartphones – so at least a baseline level for digital access exists, though rural areas are especially handicapped in this regard as only 31.9 per cent access the Internet regularly. Importantly 62.9% have never undergone any digital literacy training, which is a major gap in terms of capacity-building.

Digital Financial Awareness Assessment

Level of awareness of digital financial services based on 15-item scale is depicted in Table 3.

Table 3: Digital Financial Awareness Levels (N=210)

DFA Score Range	Category	Frequency	Percentage	Mean DFA Score
15-30	Low awareness	67	31.9%	45.8 (SD=12.4)
31-50	Moderate awareness	123	58.6%	Range: 15-75
51-75	High awareness	20	9.5%	

The percentage of people indicating levels of digital financial knowledge in each awareness category is presented in Figure 2. Just 9.5% are highly aware, so there is a lot of potential for the city to improve. The mean DFA score was 45.8 out of 75 (61.1%), reflecting moderate overall awareness, yet revealing essential knowledge gaps that could limit the use of digital financial services.

Table 4: Digital Financial Awareness Scale Items and Reliability Statistics (N=210)

Item	Statement	Mean	SD	Cronbach's Alpha if Item Deleted
DFA1	I know of UPI payment system like Phonepe, Google pay	3.42	1.28	0.881
DFA2	I know how to send money through mobile banking.	2.98	1.34	0.877
DFA3	I know the procedure of checking bank balance via mobile.	3.67	1.19	0.883
DFA4	I know about the BHIM app for digital transactions.	2.54	1.42	0.875
DFA5	I know about benefits of Pradhan Mantri Jan Dhan Yojana	3.89	1.12	0.884
DFA6	I know how to link bank account with mobile number.	2.76	1.37	0.878
DFA7	I know the advantages of doing transactions digitally as opposed to with cash.	3.54	1.23	0.882
DFA8	I'm familiar with the payment using QR code.	2.34	1.45	0.874
DFA9	I know the basics of cyber security (like keeping your PIN safe).	3.12	1.29	0.879

DFA10	I know of insurance schemes that are available via digital platforms.	2.43	1.38	0.876
DFA11	I know how to raise grievances against failed transactions.	2.21	1.41	0.873
DFA12	I get the interest rates on digital savings accounts.	2.67	1.36	0.877
DFA13	I know about the government subsidy credited to bank accounts	3.78	1.15	0.883
DFA14	I am familiar with applying for loans via digital banking.	2.89	1.33	0.878
DFA15	I know how to tell wallets are different within digital wallet.	2.32	1.43	0.875

Source: Primary data.

Overall Cronbach's Alpha = 0.886

The scale showed good internal consistency ($\alpha=0.886$), indicating that the instrument is reliable. Item analysis shows maximum awareness in case of item relating to government schemes (DFA5: M=3.89, DFA13: M=3.78) which is expected as AP RLM is implementing DCT schemes. In contrast, the lowest scores were observed for some of the technical operational aspects such as use of QR code (DFA8: M=2.34), complaint registration (DFA11: M=2.21), and differentiation of digital wallet (DFA15: M=2.32), revealing lack of training on the specific aspects. Importantly, none of the items can be deleted to improve the Cronbach's alpha value which indicated each item was important for the construct.

Cross-tabulation Analysis

Table 5 presents the association between levels of digital financial awareness and several socio-demographic variables.

Table 5: Cross-tabulation of Digital Financial Awareness with Socio-demographic Variables (N=210)

Variable	Low DFA (n=67)	Moderate DFA (n=123)	High DFA (n=20)	χ^2	p-value
Age Group					
25-35 years	15 (22.4%)	42 (34.1%)	10 (50.0%)	18.43	0.018*
36-45 years	28 (41.8%)	54 (43.9%)	7 (35.0%)		
46-55 years	24 (35.8%)	27 (22.0%)	3 (15.0%)		
Education Level					
Illiterate	32 (47.8%)	16 (13.0%)	0 (0.0%)	67.89	<0.001***
Primary	24 (35.8%)	45 (36.6%)	2 (10.0%)		

Secondary	10 (14.9%)	51 (41.5%)	7 (35.0%)		
Above Secondary	1 (1.5%)	11 (8.9%)	11 (55.0%)		
Smartphone Ownership					
Yes	23 (34.3%)	93 (75.6%)	18 (90.0%)	42.56	<0.001***
No	44 (65.7%)	30 (24.4%)	2 (10.0%)		
Monthly Income					
Below ₹5,000	28 (41.8%)	26 (21.1%)	2 (10.0%)	23.78	0.003**
₹5,001-₹8,000	26 (38.8%)	56 (45.5%)	7 (35.0%)		
₹8,001-₹12,000	11 (16.4%)	31 (25.2%)	7 (35.0%)		
Above ₹12,000	2 (3.0%)	10 (8.1%)	4 (20.0%)		
District					
Visakhapatnam	17 (25.4%)	44 (35.8%)	9 (45.0%)	15.67	0.047*
Anantapur	29 (43.3%)	38 (30.9%)	3 (15.0%)		
Kurnool	21 (31.3%)	41 (33.3%)	8 (40.0%)		

*p<0.05, **p<0.01, ***p<0.001

Source: Primary data.

Table 5 presents the results of cross-tabulations between socio-demographic variables and financial technology awareness at the 5% significance level. Education was the best predictor of ($\chi^2=67.89$, $p<0.001$) DFA, with 55 percent of the respondents with education above secondary showing high DFA, while 47.8% of the illiterate respondents has low DFA. This confirms the findings of Grohmann et al. (2018), who regard education as a key determinant of financial literacy globally.

Smartphone ownership was also significantly associated with DFA ($\chi^2=42.56$, $p<0.001$) where 90% of respondents with high DFA owned a smartphone while only 34.3% of those with low DFA did. This highlights

the importance of digital access infrastructure to provide a channel for the acquisition of financial awareness. The age-DFA ratio ($\chi^2=18.43$, $p<0.05$) suggests that younger females (age group 25-35) have more high awareness (50%), while the older ones tend to be in their low-moderate ranges, which has also been reported in generational digital diversities cited by Nandhi (2019). There are district-wise differences too ($\chi^2=15.67$, $p<0.05$), in which respondents from Visakhapatnam enjoy somewhat higher levels of DFA, which may be due to good infrastructure, urban closeness and more exposure to financial institutions whereas drought-ridden Anantapur has 43.3% of its respondents exhibiting less DFA.

Economic Sustainability Among SHG Women

Economic sustainability indicators by type of digital financial awareness are reported in Table 6.

Table 6: Economic Sustainability Indicators by Digital Financial Awareness Levels (N=210)

Indicator	Low DFA (n=67)	Moderate DFA (n=123)	High DFA (n=20)	F/ χ^2	p-value
Mean Monthly Income	₹5,432	₹7,089	₹9,450	F=34.56	<0.001***
Mean Monthly Savings	₹198	₹298	₹512	F=28.92	<0.001***
Entrepreneurial Activity					
Engaged	8 (11.9%)	42 (34.1%)	12 (60.0%)	$\chi^2=29.45$	<0.001***
Not engaged	59 (88.1%)	81 (65.9%)	8 (40.0%)		
Asset Ownership Score	2.3 (SD=1.2)	3.7 (SD=1.4)	5.1 (SD=1.6)	F=23.87	<0.001***
Loan Repayment Status					
Regular	34 (50.7%)	89 (72.4%)	17 (85.0%)	$\chi^2=18.34$	0.001**
Irregular/Defaulted	33 (49.3%)	34 (27.6%)	3 (15.0%)		
Food Security					
Secure (3 meals daily)	28 (41.8%)	87 (70.7%)	18 (90.0%)	$\chi^2=26.78$	<0.001***
Moderately insecure	29 (43.3%)	32 (26.0%)	2 (10.0%)		
Severely insecure	10 (14.9%)	4 (3.3%)	0 (0.0%)		
Access to Credit					
Formal sources only	18 (26.9%)	76 (61.8%)	16 (80.0%)	$\chi^2=31.23$	<0.001***

Both formal & informal	31 (46.3%)	38 (30.9%)	4 (20.0%)		
Informal sources only	18 (26.9%)	9 (7.3%)	0 (0.0%)		

Source: Primary data.

The results indicate distinct positive gradients in the economic sustainability measures by the level of digital financial awareness. The mean monthly income depicts stark contrast: the high DFA respondents earn ₹ 9,450 as against ₹ 5,432 of low DFA respondents ($F=34.56, p<0.001$), a 74 % income differential. Similarly, save now that you have the patterns reveal higher DFA respondents save 2.6 times more monthly (₹512 vs ₹198) as compared to low DFA respondents, implying better financial management. The engagement in entrepreneurship is significantly associated; 60% of high DFA respondents versus a meagre 11.9% of low DFA respondents are engaged in entrepreneurship ($\chi^2=29.45, p<0.001$). This implies that digital financial awareness enables entrepreneurship through facilitation of collection of payments or paying suppliers, and accessing market via digital channels, which also matches to findings from Suri and Jack (2016) regarding occupational transitions among M-Pesa users in Kenya.

There is a marked contrast in food security results between different DFA categories, 41.8% of low DFA respondents being food secure as opposed to the 90% of the high DFA respondents. This basic welfare indicator shows that digital financial awareness leads to upholding of livelihood. Unsecured access to credit trendshigh DFA respondents: 80% of high DFA respondents use formal channels for all their three credit requirements as opposed to 26.9% in low DFA category, indicating that digital awareness and financial self-sufficiency decrease one's borrowing from predatory--informal --lenders who levy usurious rates of interest.

Determinants of Digital Financial Awareness:

Multiple linear regression analysis was run to identify significant determinants of digital financial awareness scores. The linear association between the determinants of and DFA itself could be analyzed through the following multiple linear regression model:

$$DFA_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \epsilon$$

Where,

DFA_i - Digital Financial Awareness

β₁, β₂, β₃ ... β₉ (Beta Coefficients)

Regression coefficients.

They represent the magnitude and direction of the relationship between each independent variable and DFA.

X₁ → Age

X₂ → Education

X₃ → Income

X₄ → Smartphone ownership

X₅ → Internet access

X₆ → Digital literacy training

X_7 → SHG membership duration

X_8 → Distance to bank

X_9 → Caste category

ϵ (epsilon)

Error term or disturbance term.

Where DFA_i denotes the digital financial awareness score of the respondent. β_0 represents the intercept term, while β_1 to β_9 are the regression coefficients measuring the marginal effect of each explanatory variable on DFA. Age, Education, Income, Smartphone ownership, Internet access, Digital literacy training, SHG membership duration, Distance to bank, and Caste category represent the independent variables included in the model. ϵ denotes the stochastic error term capturing the influence of unobserved factors affecting digital financial awareness.

Table 7: Multivariate Regression Analysis - Predictors of Digital Financial Awareness (N=210)

Variable	B	SE	β	t	p-value	VIF
(Constant) Digital Financial Awareness	18.456	3.245	-	5.69	<0.001	-
Age	-0.187	0.098	-0.112	-1.91	0.058	1.34
Education level (years)	1.876	0.287	0.342	6.54	<0.001***	1.89
Monthly household income	0.0012	0.0008	0.089	1.50	0.135	2.12
Smartphone ownership (dummy)	8.934	1.876	0.289	4.76	<0.001***	1.67
Internet access frequency	2.345	0.987	0.134	2.38	0.018*	1.54
Digital literacy training (dummy)	7.234	1.654	0.267	4.37	<0.001***	1.43
SHG membership duration	0.543	0.342	0.087	1.59	0.114	1.28
Distance to bank (km)	-0.432	0.234	-0.098	-1.85	0.066	1.21
Caste category (SC/ST=1)	-2.134	1.456	-0.078	-1.47	0.144	1.18

Model Summary: $R^2 = 0.627$,

Adjusted $R^2 = 0.610$,

$F(9, 200) = 37.34$,

$p < 0.001$ * $p < 0.05$, *** $p < 0.001$

DFA=18.456-0.187(Age)+1.876(Education)+0.0012(Income)+8.934(Smartphone)+2.345(Internet)+7.234 Training)+0.543(SHGDuration)-0.432(Distance)-2.134(Caste)

The regression model shows strong explanatory power, accounting for 62.7% of the variance ($p < 0.001$). Education is the first the most importance unique predictor ($\beta=0.342$, $p < 0.001$), where DFA score was increased

by 1.876 with one more year of education. This result further reaffirms that elementary education is the foundation for building the capability to learn digital finance knowledge as reflected in the framework of Morgan and Trinh (2019), which treats literacy as the precondition of the digital financial literacy. Having a smartphone also had a significant effect ($\beta=0.289$, $p<0.001$) increasing DFA scores by 8.934-points. This variable is more than the possession of a device; it includes possessing the technological means to access digital financial services. The size of the coefficient highlights that closing the device gap is indeed a vital priority for policy.

Digital literacy training is impactful ($\beta=0.267$, $p<0.001$), indicating that focused capacity-enhancing inputs have positive impact on awareness. This result confirms the appropriateness of such training programs, such as those of the Mahila Abhivruddhi Society (MAS) under the APRLM, and argues for their further expansion. Frequency of access to the internet is positively but slightly significantly correlated ($\beta=0.134$, $p<0.05$), implying that regular access to the internet facilitates the accumulation of experiences and opportunities for practice as a prerequisite to developing competencies. Age, interestingly, is marginally insignificantly negatively ($p=0.058$), indicating that older women may have more barriers to digital adoption, but this effect is mitigated after controlling for education and smartphone access. The lack of significant effect of income ($p=0.135$) after adjusting for other covariates suggests that awareness disparities exist regardless of economic status and that knowledge barriers were more salient than resource barriers. All VIFs were <2.5 , indicating no multicollinearity issues.

DISCUSSION

Interpretation of Findings

The results reveal a novel finding that digital financial literacy is a predictor for financial sustainability of SHG women in the underdeveloped district of A.P. The positive associations of DFA with income, savings, participation in entrepreneurship, and food security suggest that digital financial skills are translated into actual welfare gains. These findings are in line with Demirgüç-Kunt et al.'s (2018) global evidence that mobile financial services contribute to lifting women out of poverty.

The prevalence of moderate level of awareness (58.6 percent) in the SHGs suggests a contextualised penetration basic of digital financial knowledge within the SHG milieu which may be due to government incentives like Direct Benefit Transfer and advocacy of SHG subsistence in APRLM. However, there is considerable gap in awareness about these schemes and the functional know-how required for managing own digital finance, only small fraction (9.5%) of the respondents has high level of awareness in terms of the former.

Educational attainment is the strongest holding factor for digital finance literacy, it bears the highest value for the regression coefficient ($\beta=0.342$). This has critical policy implications: the digital financial inclusion-related interventions cannot be effective by themselves and have to be accompanied by interventions aimed at improving individuals' education and functional literacy. In addition, the problem is exacerbated in Andhra Pradesh which has 22.9 per cent women respondents as illiterate and 56.7 per cent of them having never studied beyond secondary education.

The importance of smartphone ownership ($\beta=0.289$) demonstrates that infrastructure is necessary to achieve digital inclusion. Despite the encouraging figure of 63.8% of ownership of smartphones, the emerging pattern of the fieldwork (which shows that the phones are generally owned by male members of the household with minimal access for the women) suggests that the percentage of ownership reported might not represent the actual possibilities that women have to access digital tools. This borrowing access phenomenon restricts women's opportunities to learn skills on their own and perform transactions.

The wide variance in entrepreneurship rates (11.9% for the low DFA group as opposed to 60% for the high DFA group) indicates that digital financial literacy facilitates the diversification of livelihoods. Digital payment systems reduce transaction costs, allow markets to move beyond local geography and provide formal records—which is useful for running a business. Such tools, they said, “can fuel transitions from wage work to self-employment for women in marginalized communities, generating streams of income that are both higher and more sustainably”.

Policy Implications

1. Digital-Financial Literacy Integrated Training Modules A package of a few basic concepts of financial literacy, functioning of digital devices, use of apps (UPI apps, mobile banking) and knowledge on security. These should be participatory with practice and not be of a lecture type. APRLM may also think of making such sensitisation permanent across all SHG capacity building interventions.
2. Developing infrastructure: bridging the divide by establishing public WiFi in village secretariats and SHG common meeting places. Promoting access to low cost smartphones through scheme of installments or subsidised bulk purchase by SHG federations. Women's ownership, not just the ownership of the household – through targeted schemes.
3. Simplified Digital Interfaces: Partner with fintech companies to build vernacular interfaces for semi-literate users with voice-based navigation and visual transaction confirmations. Developing dedicated helplines with Telugu speaking personnel to provide assistance on transactions and redress grievances.
4. Pathway educational programmes: They help historically marginalized women in self-help groups who are illiterate and semi-literate to acquire basic literacy and numeracy skills required for digital-financial inclusion. Financial literacy is a component of adult education programmes.
5. Peer Learning Model: Build on SHG federation structures, to identify digitally literate members as peer trainers who can... in turn... support within the community. Developing peer trainers incentive structures to contribute to sustainability.
6. Contextualized intervention at district level: formulation of differentiated action plan based on district context. Ananthapur DFA is here and is in need of a lot of awareness raising activities and infrastructure upgradation. Visakhapatnam, as a higher DFA, could attempt some higher level interventions such as entrepreneurship development through digital marketing platforms.

Limitations

There are a few limitations to this study. The study is cross-sectional in nature, which means that causality cannot be inferred, as in, we cannot say in which direction the association between DFA and income is, although an association is demonstrated. Longitudinal research tracking SHG women before and after digital literacy intervention would further support causality. While the sample is large enough for statistical analysis, it is limited to three districts, so findings may not be generalizable to other parts of Andhra Pradesh. Self-reported data on income and saving may be subject to under or over reporting; validation from bank accounts would enhance accuracy. The study period (August–November 2024) coincides with certain agricultural and religious festivals that may influence the economic indicators.

CONCLUSION

This paper illustrates the importance of DFA in determining economic viability of SHG women belonging to marginalized community in Andhra Pradesh. Results show moderate level of general knowledge (58.6 %) with marked differences by education, smartphone ownership and training. Digital financial literacy is also positively associated with various important economic sustainability outcomes that include income generation (74% higher for those with high levels of DFA), saving (159% higher), entrepreneurial activities (505% higher), and food security (115% higher in food secure status). Education, smart phone ownership and training in digital literacy are statistically significant determinants of DFA and they jointly account for 62.7 per cent variation in DFA scores according to the regression analysis. These findings highlight that for the transformative promise of DFS to be realized among disenfranchised women, interventions related to education, infrastructure, and capacity need to be implemented simultaneously. The digital financial inclusion narrative must not be allowed to turn into a technological solution narrative in (socio-economic) disadvantaged spaces, rather it has to be supplemented with efforts to increase access to technology, literacy, and supportive policy/regulatory measures. There is a place for to-scale investments in digital financial literacy in Andhra Pradesh, India's state with a large

SHG infrastructure reaching 12.8m women, as a catalyst for scaled economic empowerment, especially as a potential contributor to the sustainable development objective of reduced poverty and gender equality. Research in this area should in future adopt longitudinal designs which follow the development of awareness of digital finance and economic outcomes over time. Experimental evaluations of specific training intervention models would provide useful information for program design. Increasing district coverage, along with inclusion of a control group of non-SHG women, would improve generalizability and allow for comparative analysis. Qualitative work investigating women's lived experiences, aspirations and limitations related to digital financial services would shed light on contextual rich information needed for designing culturally sensitive interventions.

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