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Exploring the Impact of Digital Financial Inclusion on Women's Empowerment

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Abstract

Purpose: The goal of this research is to assess the features that define women's empowerment in relation to digital financial inclusion. The researcher also aims to investigate the influence of digital financial inclusion on women's empowerment.

Design\Methodology\approach: To achieve the study's aims, exploratory factor analysis was performed to investigate women's empowerment elements associated to digital financial inclusion, and primary data was acquired from 400 Haryana women by multistage purposive sampling. The reliability and validity were tested using a confirmatory factor analysis with AMOS. Hypotheses were tested through one-way ANOVA.

Findings: The study highlights the three aspects of measuring the women empowerment through digital financial inclusion. These aspects are: Social Security and Community Engagement, Financial Autonomy and Convenience, Family economic well-being. It was found that these factors have generated a positive impact on women empowerment.

Research Limitations\Implications: The study was carried out with some constraints. First, the study was limited to Haryana due to resource and time constraints. Second, the study's findings concentrate on elements of women's empowerment through digital financial inclusion.

Originality: The study fills a research gap and contributes to the literature of women empowerment through digital financial inclusion by examining the influence of digital financial inclusion on women empowerment.

Keywords: Digital financial inclusion, Exploratory factor analysis, Confirmatory factor analysis, ANOVA and Women empowerment

1. INTRODUCTION

The financial system has evolved rapidly due to advancements in telecommunication and information technology. Financial technology has the potential to drive faster economic growth in emerging nations (Telukdarie et al., 2023). Financial transactions have shifted from traditional methods to digitalized forms, such as mobile money, ATMs, and online transactions (Ojo, 2022). Two key ideas underpin our discussion: women's empowerment and digital financial inclusion.

In order to facilitate basic financial transactions, digital financial inclusion requires that the deprived population have digital access to a bank account. Digital technology access facilitates a broader range of

financial services, including online and mobile banking (Ozili, 2018). Products of technology like internet banking, e-wallets, and mobile wallets have transformed financial transactions (Durai & Stella, 2019).

Empowering women, a fundamental human rights objective, is crucial in technology, social, economic, and political domains (Richardson, 2018). Historically, women face barriers to financial services due to socioeconomic and cultural norms, lower incomes, and gender-based discrimination. Lack of financial literacy and awareness further restricts their financial access. According to the Global Findex Database 2021, approximately 740 million women are unbanked, highlighting the gender gap in financial access (Demirgüç-Kunt et al., 2022).

Digital financial inclusion is essential for reducing poverty, closing the income gap, and advancing gender equality (Demidova et al., 2022). Case studies and empirical data demonstrate how digital financial inclusion supports women's empowerment by removal of obstacles like cost and distance, (Kulkarni & Ghosh, 2021). It also addresses intra-household inequality by enhancing women's negotiating power (Han et al., 2023). In Kenya, households using M-PESA improved their informal risk-sharing networks (Karlan et al., 2016). Yang et al. (2022) found that digital financial inclusion empowers disadvantaged women, particularly in entrepreneurship. This study will explore the impact of digital financial inclusion on women's empowerment, focusing on India and related factors.

2. Literature review

The current study examines literature from both Indian and global contexts to investigate various elements of digital financial inclusion and its impact on women's empowerment. Digital finance significantly advances women's empowerment by facilitating access to financial resources for household and business purposes, enhancing their economic and leadership capabilities (Tripathi & Rajeev, 2023; Mabrouk et al., 2023). However, challenges such as lack of expertise, literacy disparities, and traditional societal expectations need to be addressed to fully leverage digital transformation (Hendricks & Olawale, 2022).

Research shows a strong correlation between financial inclusion and women's empowerment, with banking services and financial literacy playing key roles (Singh, 2018). Digital financial services, especially during the COVID-19 pandemic, empower women to take on significant economic roles and make informed decisions (Singh & Singh, 2023). Despite potential risks like excessive debt and reinforcing gender norms (Mabrouk et al., 2023), evidence supports the positive impact of digital financial inclusion on women's labour force participation and economic empowerment (Elouardighi & Oubejja, 2023).

During the pandemic, digital financial services provided women with essential financial tools, influencing their choices and decisions (Mabrouk et al., 2023). Digital platforms can enhance women's access to financial facilities and reduce gender inequality, particularly in emerging economies like India (Srivastava & Siddiqui, 2023). For example, in Nigeria, mobile phone payments increased women's spending on nutritious food and improved financial privacy (Aker et al., 2016). Financial inclusion, including digital literacy, boosts women's engagement with formal banking, reduces financial crime risk, and promotes financial inclusion (Hasan et al., 2023).

In Kenya, the M-Pesa system has enhanced women's financial access, offering insights for policymakers to develop effective digital financial inclusion strategies (Ozili, 2018). Fintech-driven services enhance transaction speed, security, transparency, and reduce costs, benefiting underprivileged populations (Pazarbasioglu et al., 2020).

Gupta and Arya (2020) found that digital finance promotes financial inclusion and women's

empowerment, with government regulation recommended to maximize benefits. Rohatgi et al. (2023) demonstrated that digital banking usage strongly correlates with women's economic empowerment. Kofman and Payne (2021) emphasized that digital financial inclusion advances women's social and economic status, contributing to their overall empowerment, as supported by George and Thomachan (2018).

3. Research Methodology

Primary data was used to acquire the relevant information from the respondents. Multistage sampling procedure was followed. In the first stage, Haryana state in India was chosen for study. In comparison to the national average, women's participation in Haryana is substantially lower. Haryana is divided on the basis of divisions. There are 6 administrative divisions in Haryana. In the second stage, out of 6 divisions, Ambala division was selected randomly. Ambala division has 4 districts i.e., Ambala, Yamuna Nagar, Kurukshetra, Panchkula. Districts were sub- divided into blocks. In the third stage, two blocks were selected randomly from each district then Purposive sampling was used to contact with the respondents.
On the basis of proportionate sampling, we have female total population is 465431 which is given in the following table. Yamene (1973) developed a method that was utilised to select the sample for this investigation.

$n = [N/1 + N (e)^2]$

Where n is the Sample Size; N total population; and e tolerable error. (0.05 or 95 percent)

$n = [465431/1 + 465431 (.05)^2]$

$n = 399.65$

$n = 400$

Table 1: Districts and Block Wise Representation of Ambala Division

Sr. No	Division	Districts	Blocks
1.	Ambala	Ambala	Barara
			Saha
		Yamuna Nagar	Jagadhri
			Radaur
		Kurukshetra	Shahbad
			Ladwa
		Panchkula	Raipur Rani
			Barwala

Table 2: Proportionate Representation of Respondents

Blocks	Population	% of population among these blocks	Male population	Female population	Number of female respondents proportionate basis
Barara	142207	14	74896	67311	58
Saha	105781	10	56038	49833	43
Jagadhri	240498	24	129896	110602	95
Radaur	116464	12	61538	54926	47

Shahbad	167766	17	88836	78930	68
Ladwa	88097	9	46446	41651	36
Raipur rani	59113	6	31716	27397	23
Barwala	77307	8	42526	34781	30
Total	977233	100	531892	465431	400

Source: Data Analysis

4. Data Analysis

4.1 Exploratory factor Analysis

Factor analysis allows an opportunity to define an amazing structure of the inter-relationships among a huge number of variables through the identification of group of strongly intercorrelated variables known as factors (Tabachnick et al. 2013). Principal component analysis is the first step in the factor analysis technique, and varimax rotation comes next. This process reduced the original 18 statements concerning women's empowerment through digital financial inclusion to 15 significant statements, explaining 58.881% of the variance. The Kaiser-Meyer-Olkin (KMO) value was 0.913, and Bartlett's test of sphericity yielded a chi-square value of 2509.098. The factor loading range from .523 to .763 and the cumulative variance range from 42.070 to 58.881.

4.1.1 Reliability of the measurement items

Lee Cronbach introduced the alpha statistic in 1951 to assess the internal consistency of a test or scale. Alpha can be expressed as a test or scale number. Internal consistency refers to how closely all of the test items assess the same concept or construct (Tavakol et al. 2011). In the present investigation, all Cronbach alpha values are larger than.70 and deemed credible.

Table 3: KMO and Barlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.913
Bartlett's Test of Sphericity	Approx. Chi-Square	2507.098
	df	105
	Sig.	.000

Table 4: Results of Factor Analysis (Factor Loading) And Reliability Test (Cronbach's Alpha)

Sr. No.	Factor Extracted	Item Label	Factor loading	%of variance explained	Cumulative variance	Cronbach alpha
1.	Social Security and Community Engagement	Easy to manage with shocks.	.715	42.07%	42.070%	.848
		Becoming Skilful	.701			

		Increase in confidence level	.683			
		Feel Empowered	.658			
		Greater Interaction	.596			
		Involved in voluntary and Community activities	.523			
2.	Financial autonomy and Convenience	Due to benefit of time saving in digital financial transactions, time can be spent on other activities	.725	9.29%	51.364%	.779
		Ability to access financial services from home	.692			
		Increase in consumption level	.686			
		Increase in control over personal finance	.631			
		Removes the need to travel and wait for cash disbursement	.621			
3.	Family Economic well-being	Spending on children education	.763	7.52%	58.881%	.755
		Increase spending on nutritious food	.701			
		Family wealth has increased	.642			
		Occupational Mobility (Shift from irregular income to regular income	.557			

4.2 Confirmatory factor Analysis

After identifying three components via exploratory factor analysis (EFA), confirmatory factor analysis (CFA) was used to evaluate the underlying factors discovered through EFA. A variety of goodness-of-fit

indices were used to assess the CFA model fit, including chi-square, GFI, AGFI, CFI, NFI, and RMSEA. Furthermore, confirmatory factor analysis is mostly used to test the fitness, reliability, and validity of constructs or factors. The measurement model for all constructs that must be estimated using specific parameters such as factor loadings, factor variance, factor covariance, and variance of measurement errors. Confirmatory factor analysis (CFA) is a subset of structural equation modelling (SEM) that focuses on the measurement model and observed measurements or indicators (such as test items, test scores and behavioural observation ratings) Brown et al. 2015).

The CFA model was to be evaluated using two specifications. The goodness-of-fit indices are employed first to measure fit, followed by the model's reliability and validity.

5.5 Model fit indices evaluation for the measurement Model

The table (5) presents the goodness-of-fit indicators for the measurement model. However, CFA evaluates the model's fit to the present data using AMOS (version 23.0) and a variety of statistical markers. The measurement model yielded a chi-square (χ^2)/degree of freedom (df) ratio of 2.97, falling within the allowed range (<3). The p-value is negligible, indicating a satisfactory model fit. The model's specification was evaluated using the other fit indices, which included the goodness-of-fit index (GFI), average goodness of fit (AGFI), comparative fit index (GFI), normal fit index (NFI), and root mean square method (RMSEA). The findings reveal that GFI =.92, CFI =.93 are all fit statistical values over the threshold value of 0.90, AGFI =.89, which is larger than the threshold value of.85, and RMSEA =.70, which is less than the fair value of 8. As a consequence, the findings show that the measurement model is strongly indicated and fits the data.

Table 5: Goodness of Fit- Indices

Model fit indices	Recommended Value		Study model value	Comments
	Good	Fair		
Absolute fit measures				
X^2			245.880	
DF			83	
X^2 Significance	P<.005		0.000	
X^2 / df	<3	<5	2.97	Achieved
GFI	>.90	>.85	.92	Achieved
AGFI	>.85	>.80	.89	Achieved
RMSEA	<.06	<.08	.07	Moderately Achieved
Incremental measures				
NFI	>.90	>.85	.90	Achieved
IFI	>.90	>.85	.93	Achieved
CFI	>.90	>.85	.93	Achieved
TLI	>.90	>.85	.91	Achieved

4.2.1. Assessment of Reliability and Validity

Standardised factor loadings, composite reliability (CR), average variance extracted (AVE), and crucial ratios (t-values) were all used to assess reliability and validity. All CR values above the criterion of 0.6,

indicating high internal consistency. AVE values were more than 0.50, demonstrating convergent validity. Table (6) presents the reliability and convergent validity data.

Validity refers to an item's capacity to represent the underlying hidden construct. It was also necessary to look at two statistical tests in order to evaluate the validity measurements. Examining CR values was the initial statistical test. Three constructs in this investigation have CR values greater than 0.6 (Fornell and Larcker, 1981). The CR for this study was 0.81, the highest value, and 0.68, the lowest. This demonstrates the underlying constructs' intrinsic consistency and accuracy. The purpose of the second test was to evaluate convergent validity by calculating the AVA value for every latent concept.

The appropriate value of AVA for each build should be more than 0.50.Several items were deleted from the scale in order to increase the average variance explained. The item "easy to manage with shocks" was eliminated from the first factor, "Social Security and Community Engagement." The elements "increase in consumption level," "increase in control over personal finance," and "removes the need to travel and wait for cash disbursements" were removed from the second category, "financial autonomy and convenience." Additionally, the items "spending on children's education" and "increasing spending on nutritious food" were eliminated from the "Family Economic Well-Being" factor.

Table 6: Results of Reliability and Validity of Measurement Model

Name of the constructs	Item label	Standardised factor loading	Critical ratio (t-value)	Sig.	CR	AVE
Social Security and Community Engagement	Becoming Skilful	.800	11.093	***	.81	.53
	Increase in confidence level	.701	11.333	***		
	Feel Empowered	.722	9.975	***		
	Greater Interaction					
	Involved in voluntary and Community activities	.681	-*	-		
Financial autonomy and Convenience	Due to benefit of time saving in digital financial transactions, time can be spent on other activities	.769	12.308	***	.68	.53
	Ability to access financial services from home	.668	10.874	***		
Family Economic well-being	Family wealth has increased	.735	8.700	***	.68	.52
	Occupational Mobility (Shift from irregular income to regular income	.705	8.561	***		

4.2.2 Discriminant validity

We applied the current Heterotrait-Monotrait ratio (HTMT) technique to investigate discriminant validity. HTMT computes the ratio of average heterotrait-heteromethod correlations (correlations between

indicators across constructs measuring various phenomena) to average monotrait-heteromethod correlations (correlations between indicators within the same construct) (Henseler et al., 2015). We determined the geometric mean of the average correlations between the two Monotrait-Heteromethod submatrices.

The discriminant validity of the HTMT is established by comparing it to a specified threshold. If the HTMT value reaches this level, discriminant validity is compromised. Some studies suggest a cutoff of 0.85, while others, such as Gold et al., advocate for a harsher criterion of 0.90. The results of discriminant validity given in the table (7).

Table 7: Discriminant Validity

	SSCE	FAC	FEWB
SSCE			
FAC	0.783		
FEWB	0.815	0.678	

Note: The values are less than the threshold value 0.85. SSCE(Social Security and Community Engagement), FAC(Financial Autonomy and Convenience),FEWB(Family Economic Well-Being)

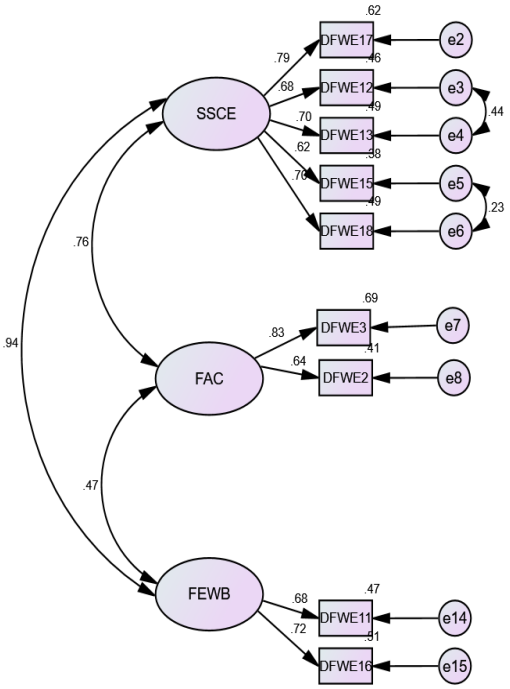

Figure 1: CFA Model Fit

4.3. One- Way ANOVA

Further, hypothesis for relationship was assessed by using one-way ANOVA. The study examines whether there is significant mean difference in women empowerment factors such as Social Security and Community Engagement, Financial autonomy and Convenience, and Family Economic Well-being and Digital financial inclusion based on usage that is Mobile Banking, RTGS/NEFT/IMPS, Aadhar Enabled Payment System, Unstructured Supplementary Services, ATM/Debit Card, Credit Card, Point of Sale,

BHIM UPI, Digital Wallets

Table 8 : Results of One-Way ANOVA

Digital financial Inclusion Usage	Dimensions of Women empowerment	F-value	P-value
Mobile Banking	Social Security and Community Engagement	1.780	.132
	Financial autonomy and Convenience	4.295	.002
	Family Economic Well-being	7.772	.000
RTGS/NEFT/IMPS	Social Security and Community Engagement	.304	.875
	Financial autonomy and Convenience	2.352	.054
	Family Economic Well-being	3.046	.017
Aadhar Enabled Payment System	Social Security and Community Engagement	.836	.503
	Financial autonomy and Convenience	.369	.831
	Family Economic Well-being	3.916	.004
Unstructured Supplementary Services	Social Security and Community Engagement	1.328	.259
	Financial autonomy and Convenience	1.363	.246
	Family Economic Well-being	3.927	.004
ATM/Debit Card	Social Security and Community Engagement	5.888	.000
	Financial autonomy and Convenience	4.718	.001
	Family Economic Well-being	2.912	.021
Credit Card	Social Security and Community Engagement	4.464	.002
	Financial autonomy and Convenience	.581	.677
	Family Economic Well-being	6.205	.000
Point of Sale	Social Security and Community Engagement	2.169	.072
	Financial autonomy and Convenience	.828	.508
	Family Economic Well-being	4.439	.002
BHIM UPI	Social Security and Community Engagement	3.156	.014
	Financial autonomy and Convenience	1.757	.137
	Family Economic Well-being	4.175	.003
Digital Wallets	Social Security and Community Engagement	2.568	.038
	Financial autonomy and Convenience	4.295	.002
	Family Economic Well-being	2.912	.021

The results of the One-Way ANOVA highlighted in the above Table () which shows that there is significant mean difference between the digital financial inclusion and women empowerment. In other words, a positive influence of digital financial inclusion on Social Security and Community Engagement, Financial autonomy and Convenience, and Family Economic Well-being was found.

5. Discussion and Results

This study examined the relationships between digital financial inclusion and women empowerment based on Social Security and Community Engagement, Financial autonomy and Convenience, and Family Economic Well-being. The proposed hypothesis was supported by the results. The outcomes reveal that distinctive components of empowerment are statistically significant. The results of the current investigations regarding the effect of digital financial inclusion on empowerment dimensions for women indicate that women with the usage of Mobile banking, ATM/ Debit Card and Digital Wallets have higher empowerment. The results suggest that even less educated women had sound awareness regarding these services due to their accessibility. However, women usage with RTGS/NEFT/IMPS, Aadhar Enabled Payment System, Unstructured Supplementary Services, Credit Card, Point of Sale, BHIM UPI do not show significant value with the respect of all levels of women empowerment. One of the reasons is that women are not more familiar about these services and due to limited digital literacy, women are not able to fully utilize these services. The government should create a supportive environment to enhance the impact of these services. Policy measures should facilitate faster procedures through effective support system and seamless interactions across platforms for various stakeholders.

6. Conclusions and research implications

Finally, the impact of digital financial inclusion on women's empowerment was examined in this study. In addition to opening up new economic opportunities and closing the gender gap in account ownership, digital financial inclusion strengthens household resilience to better resist financial shocks. Women should have greater access to digital financial services and education, according to Tripathi and Rajeev (2023). We were able to discover and validate important elements that support women's empowerment through digital financial services by using statistical techniques including confirmatory factor analysis (CFA) and exploratory factor analysis (EFA).

Our EFA identified a number of crucial aspects of digital financial inclusion, including as Social Security and Community Engagement, financial autonomy and convenience, and Family Economic Well-Being, that have a substantial impact on women's empowerment. The validity and reliability of these dimensions were then validated using CFA, which also showed a strong model fit and supported the robustness of our findings.

The analysis has demonstrated that women who have greater access to digital financial inclusion are better equipped to handle both personal and professional finances, becoming more adept at handling money. Their participation in economic activities rises along with their economic independence, which boosts their confidence and gives them a sense of empowerment. The Empirical evidence supports the notion that digital financial services give women the resources they need to become more financially stable and make wise financial decisions. As a result, there is an increase in social interaction and volunteer and community activity participation. Women can also spend more time on other productive tasks thanks to the time-saving advantages of digital financial transactions. The capacity to obtain financial services from home has enhanced family wealth and given women more opportunities in the workforce. In the end,

encouraging digital financial inclusion is critical to furthering women's empowerment and attaining sustainable development.

7. Limitations and Implications of the Study

Despite the fact that this study made great steps to improve its reliability, validity, and comprehensiveness. Certain constraints could not be completely overcome. The purpose of the study was to investigate the features of women's empowerment in connection to digital financial inclusion. The study was therefore unable to consider the viewpoints of different stakeholders, including men, women, and older people. Through its examination of the relationship between digital financial inclusion and women's empowerment, the study fills a research gap by adding to the body of knowledge on the subject. Because of this, the current study approach may be utilized to analyze the degree of digital financial inclusion in various parts of the country where women participate in the labour force at lower rates than males and have lower levels of digital literacy. It will help in formulating the policies and also benefited for industry practices.

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