DIGITAL FINANCIAL INCLUSION: EXPLORING SOLUTIONS FOR WOMEN INCLUSIVITY

BY

DEEPANWITA DAS
(Admission No. 22MB0021)

Dissertation Submitted to

Prof. Preeti Roy

Indian Institute of Technology

(Indian School of Mines) Dhanbad – 826004 (Jharkhand)

For the award of the degree of

MASTER OF BUSINESS ADMINISTRATION

MAY,2024

INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD

CERTIFICATE FOR THE FINAL VERSION OF DISSERTATION

This is to certify that the dissertation entitled being Submitted to Indian Institute of Technology (Indian School of Mines) Dhanbad by Ms. **DEEPANWITA DAS**, Admission Number **22MB0021** for the award of the degree of **Masters in Business Administration** from IIT(ISM) Dhanbad is the Bonafede work carried out by him in the **Department of Management Studies and Industrial Engineering, IIT(ISM) Dhanbad.** Under my supervisor and guidance. The dissertation has fulfilled all the requirements as per the regulations of this Institute and, in my/our opinion, has reached the standard needed for submission. The results embodied in this dissertation have not been submitted to any other university or institute for the award of any degree or diploma.

Preetiroy

Signature Of Supervisor

Name- Prof. Preeti Roy

Date- 10.05.2024

INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD

DECLARATION BY THE STUDENT

I hereby declare that the work which is being presented in the dissertation entitled "Digital Financial Inclusion: Exploring Solutions for women inclusivity" in partial fulfilment of the requirements for the awards of the **Degree of Master of Business Administration in Business** is an Authentic record of my own work carried out during the period from **June** to **April** Under the supervision of **Prof. Preeti Roy** Department of **Management studies and Industrial Engineering** Indian Institute of Technology (ISM) Dhanbad, Jharkhand, India.

I acknowledge that I have read and **Understood the UGC (Promotion of Academic Integrity and Prevention of plagiarism** in Higher Education Institutions) Regulations, 2018. These regulations were published in the Indian Official Gazette on 31st July,2018. I confirm that this Dissertation has been checked for plagiarism using the online plagiarism checking software provided by the Institute. At the end of the Dissertation, a copy of the summary report demonstrating similarities in content and its potential source (if any) generated online using plagiarism checking software is enclosed. I herewith confirm that the Dissertation has **less than 10% similarity** according to plagiarism checking software's report and meets the MoE/UGC regulations as well as the institutes rule of plagiarism.

I further declare that no portion of the dissertation or its data will be published without the Institute's or Guide's permission. I have not previously applied for any other degree or award using the topics and findings described in my dissertation.

Deepanwita Das

Signature of Student

Name- **Deepanwita Das**

Admission Number- **22MB0021**

Department- **Department of Management Studies and Industrial Engineering**

INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES),

DHANBAD

CERTIFICATE FOR CLASSIFIED DATA

This is to certify that the Dissertation entitled **Digital Financial Inclusion: Exploring Solutions for women inclusivity** being submitted to the Indian Institute of Technology (Indian School of Mines), Dhanbad by **Ms. Deepanwita Das** for award of master's degree in master's in business administration does not contain any classified information. This work is original and yet not been submitted to any institution or university for the reward of any degree.

Preetiroy
10/05/24.
Signature of Supervisor

Deepanwita Das
Signature of Student

INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES) DHANBAD

COPYRIGHT AND CONSENT FORM

(To be submitted at the time of Final Dissertation Submission)

To ensure uniformity of treatment among all contributors, other forms may not be substituted for this form, nor may any wording of the form be changed. This form is intended for original material submitted to the IIT (ISM), Dhanbad and must accompany any such material in order to be published by the IIT (ISM). Please read the form carefully and keep a copy for your files.

TITLE OF DISSERTATION: Digital Financial Inclusion: Exploring Solutions for women inclusivity

AUTHOR'S NAME & ADDRESS: Deepanwita Das, Kolkata, West Bengal

COPYRIGHT TRANSFER

1. The undersigned hereby assigns to Indian Institute of Technology (Indian School of Mines), Dhanbad all rights under copyright that may exist in and to: (a) the above Work, including any revised or expanded derivative works submitted to the IIT (ISM) by the undersigned based on the work; and (b) any associated written or multimedia components or other enhancements accompanying the work.

CONSENT AND RELEASE

2. In the event the undersigned makes a presentation based upon the work at a conference hosted or sponsored in whole or in part by the IIT (ISM) Dhanbad, the undersigned, in consideration for his/her participation in the conference, hereby grants the IIT (ISM) the unlimited, worldwide, irrevocable permission to use, distribute, publish, license, exhibit, record, digitize, broadcast, reproduce and archive; in any format or medium, whether now known or hereafter developed: (a) his/her presentation and comments at the conference; (b) any written materials or multimedia files used in connection with his/her presentation; and (c) any recorded interviews of him/her (collectively, the "Presentation"). The permission granted includes the transcription and reproduction of

the Presentation for inclusion in products sold or distributed by IIT(ISM) Dhanbad and live or recorded broadcast of the Presentation during or after the conference.

3. In connection with the permission granted in Section 2, the undersigned hereby grants IIT (ISM) Dhanbad the unlimited, worldwide, irrevocable right to use his/her name, picture, likeness, voice and biographical information as part of the advertisement, distribution and sale of products incorporating the Work or Presentation, and releases IIT (ISM) Dhanbad from any claim based on right of privacy or publicity.
4. The undersigned hereby warrants that the Work and Presentation (collectively, the "Materials") are original and that he/she is the author of the Materials. To the extent the Materials incorporate text passages, figures, data or other material from the works of others, the undersigned has obtained any necessary permissions. Where necessary, the undersigned has obtained all third party permissions and consents to grant the license above and has provided copies of such permissions and consents to IIT (ISM) Dhanbad.

GENERAL TERMS

* The undersigned represents that he/she has the power and authority to make and execute this assignment.
* The undersigned agrees to indemnify and hold harmless the IIT (ISM) Dhanbad from any damage or expense that may arise in the event of a breach of any of the warranties set forth above.
* In the event the above work is not accepted and published by the IIT (ISM) Dhanbad or is withdrawn by the author(s) before acceptance by the IIT(ISM) Dhanbad, the foregoing copyright transfer shall become null and void and all materials embodying the Work submitted to the IIT(ISM) Dhanbad will be destroyed.
* For jointly authored Works, all joint authors should sign, or one of the authors should sign as authorized agent for the others.

Deepanwita Das

Signature of the Author

INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD

CERTIFICATE REGARDING ENGLISH CHECKING

This is to certify that the Dissertation entitled **Digital Financial Inclusion: Exploring Solutions for women inclusivity** being submitted to the Indian Institute of Technology (Indian School of Mines) by **Mr. Deepanwita Das** admission No. **22MB0021,** for the award **of Master of Business Administration** has been thoroughly checked for English and logical sequencing of topics.
It is hereby certified that the standard of English is good and that grammar any typos are thoroughly checked.

Preetiroy
Signature of Supervisor

Prof. Preeti Roy

Date: 10.05.2024

Deepanwita Das
Signature of Student

Deepanwita Das

Date: 10/05/2024

DECLARATION

I declare that.

(a) the work contained in the thesis is original and has been done by me under the guidance of my supervisors.

(b) the work has not been submitted to any other institute for any degree or diploma.

(c) I have followed the guidelines provided by the Institute in preparing the thesis.

(d) I have conformed to ethical norms and guidelines while writing the thesis.

(e) whenever I have used materials (data, models, figures, and text) from other sources, I have given due credit to them by citing them in the text of the thesis, giving their details in the references, and taking permission from the copyright owners of the sources, if necessary, and.

(f) whenever I have quoted written materials from other sources, I have put them under quotation marks and given due credit to the sources by citing them and providing required details in the references.

Deepanwita Das

Place: Dhanbad
Date: 10 / 05 / 2023
Deepanwita Das

Acknowledgements

During this period of my study, there are many people whose guidance, support and encouragement have made me indebted for my whole life. I take this opportunity to express my sincere thanks and appreciation to all these people.

I would like to express my sincere gratitude to Professor Preeti Roy for her invaluable guidance, support, and encouragement throughout the duration of my thesis. Her expertise, insights, and dedication have been instrumental in shaping this research and guiding me through its various stages.

Deepanwita Das

Table of Contents

Dedication…….……...i-v

Declaration

……...……...vi

Acknowledgements…….……...vii

Table of

Contents……...……...viii

Abstract……..11

Chapter 1:

Introduction…….....12

Chapter 2:

Objectives…….…….13

Chapter 3: Literature Review…… 14-18

Chapter 4: Research Methodology……..19

Chapter 5: Data Analysis…… .25-30

Chapter 6: Conclusion……27-28

6.1:Findings……..

6.2:Framework…….

6.3:Discussion……...

6.4:Recommendation……...

6.5:Limitations……..

6.6:Future Scope……

References……...…29

Abstract

Digital financial inclusion (DFI) has emerged as a transformative tool in providing access to financial services through digital technologies, with the potential to uplift billions worldwide. This study investigates the intricate relationships between financial literacy (FL), digital literacy (DL), digital financial inclusion (DFI), and financial resilience behavior (FRB) among women in Dhanbad, India. Through a combined experimental and survey-based methodology, data was gathered from 52 respondents, focusing on DL, FL, DFI, and FRB dimensions. Factor analysis revealed significant correlations within FL and DL, while partial least squares structural equation modeling (PLS-SEM) indicated that both DL and FL influence DFI, with DL exhibiting a slightly stronger association. Binary logistic regression highlighted the significant association between DL and FRB, while FL showed no significant impact. Recommendations include tailored digital literacy workshops and integrating financial education into existing curricula. Limitations include the small sample size and the need for longitudinal studies. Future research could focus on evaluating interventions and exploring the role of emerging technologies in promoting financial inclusion and empowerment for women.

Chapter1: Introduction

What is Digital Financial Inclusion?
It is the transformative process of providing individuals and communities with access to financial services through digital technologies.
On the surface, Digital Financial Inclusion sounds like a simple concept of but it has the potential to transform the lives of billions of people worldwide and take them closer to a brighter future.
There have been significant advancements in technology and digital infrastructure in this regard but, there persists several challenges and problems in achieving comprehensive financial inclusion through digital means. However, it is through overcoming challenges how societies grow and prosper.
The governments of different countries around the world are resolving to digital technologies for leveraging its potential to provide digital financial services to the most vulnerable groups and achieve the key Sustainable Development Goals (SDGs).
The Indian Government has established 75 Digital Banking Units (DBUs) in 75 districts. The focus of them is to offer financial services like payments, savings, transactions, insurance, affordable credit with low transaction costs and security along with the opening of bank account – all to be addressed with digital solutions and technologies. The DBUs are in self-services mode.
According to Global Findex, the current situation of India with respect to financial inclusion is that 78 of 100 people with more than 15 years of age hold a bank account (no gender gap in the ownership of account). But opening of bank accounts is just the 1st piece of the puzzle. It is usage of those account how we can proceed towards a complete solution for financial inclusion.
There have been three pathbreaking digital solution; Unified Payments Interface (UPI), the Aadhaar-enabled Payment System (AePS) & Payments Bank. There has been a significant increase in ownership of accounts due to the popularity of digital payments but there still a gap that persists between women and men utilizing digital payment.

OBJECTIVES

1. To study the relationship between financial literacy(FL) & digital financial inclusion(DFI).

2. To study the relationship between digital literacy(DL) & digital financial inclusion(DFI)

3.To study the relationship between digital literacy(DL) & financial resilience behavior(FRB)

4.To study the relationship between financial literacy(FL) & financial resilience Behavior(FRB)

5.To investigate whether the digital literacy(DL) & financial literacy(FL) leads to notable digital financial inclusion(DFI)

Chapter 3: Literature Review

Author & Year	Findings	Methodology
Arora, R. U. 2012	In developing Asian countries, strong education systems are often associated with weaker financial development, highlighting a complex relationship,, suggesting that improving education is crucial for enhancing FI	Principal Component Analysis Regression Analysis
Johan Almeenberg , Anna Dreber 2015	Gender differences in FL can explain a significant part of the gender gap in stock market participation of individuals.	Descriptive statistics Probit regression analysis
Dipasha Sharma 2016	FI is very necessary in terms of society's access to forrmal banking services to achieve the overall economic growth of the country.	Vector auto-regression (VAR) models and Granger causality test
Bannierr, C. E., & Neubert, M. 2016	Gender alone doesn't directly impact investment decisions. Men's standard investments are influenced by both actual and perceived FL, while women's decisions are mainly tied to their actual financial knowledge.	Regression analysis

Sharma, D. 2016	Crucial role of financial inclusion, particularly banking penetration and access, in fostering economic growth in India. However, no causality is found between the usage of banking services and economic prospects.	Vector auto-regression
Amoah, A., Korle, K., & Asiama, R. K. 2020	Social, cultural,and psychological factor play an important role in motivating the choice and means of mobile transactions	Stratified random sampling Logit model
Koomson, I., Villaano, R. A., & Hadley, D. 2020	Financial Literacy training program could increse the propensity to save and account ownership incidences especially among women than men.	

N'dri, L. M., & Kakinaka, M. 2020	FI, especially when delivered through mobile money services with interoperability, significantly reduces poverty and improves nonmonetary aspects of well-being like nutrition, healthcare, and education in Burkina Faso.	Propensity Score Matching through Logistic Regression model

Demirr, A., Pesqué-Cela, V., Altunbas, Y., & Muriinde, V.	Financial Technology reduces income inequality by promoting FI, especially in higher-income countries.	Empirical research model Quantitative analysis
Bathuula, S. and Gupta, A	Factors, like age, education, workforce participation, income, and gender, play distinct roles in influencing access and usage of both traditional and digital financial services, emphasizing the need for targeted policies to improve financial inclusion, especially for women and low-income individuals.	Binary Probit Regression Descriptive statistics
Gutiérrez-Rommero, R., & Ahamed, M 2021	Poverty can not be directly eliminated by FI but can be reduced through reducing the negative consequences of inequality on poverty	Poverty decomposition method Descriptive Statistics

Demir, A., Pesqué-Cela, V., Altunbas, Y., & Murinde, V 2022	Finnancial Technology affects directly income inequality and indirectly through FI	Gini coefficient quantile regressions
Kaiser, T., Lussardi, A., Menkhoff, L., & Urban, C. 2022	Financial education interventions have a notably +ve impact on financial knowledge and behaviors, contradicting earlier beliefs.	Meta-analysis model
Hermansson, C., Jonsson, S., & Liu, L. 2022	A combination of FL and learning from media has a significant +ve impact on an individual's participation in the stock market.	Logit regression analysis

Shabir, S. and Ali, J. 2022	The gender gap decreases with increased product sophistication, indicating greater potential for female financial inclusion	Descriptive statistics Chi-square tests Logistic regression
Ali, J., & Ghilldiyal, A. K. 2023	The adoption of digital financial services is significantly associated with various socio-economic factors, like gender, age, education, employment status, income, mobile phone ownership, and regular banking activities.	Chi-square tests Logistic regression
Reynolds, T. W., Bisccaye, P. E., Leigh Anderson, C., O'Brien-Carelli, C., & Keel, J. 2023	Persistent gender disparities in MM awareness and usage across low- and middle-income countries, even when accounting for various influencing factors,may be attributed to unmeasured factors, including cultural norms limiting women's FI.	Multivariate probit models

Chapter 4: RESEARCH METHODOLOGY

Design of Research

The research will proceed with a combined experimental and survey-based methodology, enabling the examination of quantitative data to discern the impact of various factors on Digital Literacy (DL), Financial Literacy (FL), as well as their subsequent influence on Digital Financial Inclusion (DFI) and Financial Resilience Behavior (FRB). This approach will allow for a comprehensive analysis of the interplay between different variables and their effects on individuals' digital and financial competencies, thereby providing valuable insights into strategies for enhancing digital inclusion and financial resilience in the target population.

Data Gathering

Data collection will involve the creation of a survey tailored for individual respondents, specifically targeting local women in Dhanbad. Given the local context, the survey will be administered through interviews to ensure effective data gathering. The questionnaire will be meticulously designed to encompass the four key dimensions: DL, FL, DFI, and FRB.

Each dimension will be comprehensively assessed through three distinct factors. For instance, within the Digital Literacy dimension, factors such as Self-Perception, Understanding of Financial Concepts, and Knowledge of Complex Financial Concepts will be explored. This structured approach will enable a thorough understanding of the respondents' proficiency in digital technologies, financial knowledge, and their ability to navigate complex financial systems. By delving into these specific factors, the survey aims to capture nuanced insights into the digital and financial competencies of the target population, thus facilitating the formulation of tailored interventions to promote digital inclusion and financial resilience among local women in Dhanbad.

Information Analysis

The collected survey data will undergo thorough analysis utilizing three distinct statistical techniques: Factor Analysis, Partial Least Squares Structural Equation Modeling (PLS-SEM), and Binary Logistic Regression Analysis.

Factor Analysis will be employed to explore the correlations among the variables related to Digital Literacy (DL) and Financial Literacy (FL). This method will help uncover underlying patterns and relationships within the data, facilitating a deeper understanding of the factors influencing DL and FL. The analysis will be conducted using statistical software like SPSS, after organizing the data to ensure clarity and distinctiveness of each factor. With a total of nine questions for both DL and FL, Factor Analysis will provide valuable insights into the interconnections between these variables.

Moving on to PLS-SEM, the focus will shift to examining the impact of DL and FL on Digital Financial Inclusion (DFI). Normal scores for DL, FL, and DFI will be calculated using the Min-Max Method to standardize the data. Subsequently, the streamlined data will be subjected to PLS-SEM analysis, which will elucidate the relationships and pathways between DL, FL, and DFI. This approach will offer a comprehensive view of how improvements in DL and FL can contribute to enhancing DFI levels, aiding in the formulation of targeted interventions.

Finally, Binary Logistic Regression Analysis will be employed to investigate the influence of DL and FL on Financial Resilience Behavior (FRB). The variables/questions related to FRB will be scored as either 1 for financially resilient or 0 for financially non-resilient. Additionally, normal scores for DL and FL will be determined using the Min-Max method. By applying Binary Logistic Regression Analysis, the study aims to discern the extent to which DL and FL impact FRB, thereby shedding light on the factors that contribute to financial resilience among the target population.

Overall, this multifaceted analytical approach will provide comprehensive insights into the relationships between DL, FL, DFI, and FRB, enabling informed decision-making and the development of effective strategies to promote digital inclusion and financial resilience among local women in Dhanbad.

CHAPTER 5: DATA ANALYSIS

Factor Analysis: Financial Literacy

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.652
Bartlett's Test of Sphericity	Approx. Chi-Square	184.249
	df	36
	Sig.	<.001

- From the table we can infer that, KMO = 0.652 which suggests that the data are **moderately suitable for the process of factor analysis** suggesting further that we can go ahead with the data.
- The value of Chi-Square being 184.249 suggests that the v**ariables are significantly correlated** indicating that the use of Factor Analysis is justified.
- Sig. <0.001 indicatess that the correlation matrix of Finacial Literacy significantly differs from the identity matrix (no-correlation).

The value of **KMO** ranges from 0 to 1. Higher values suggest that the data are more suitable for factor analysis. However, a value more than 0.5 is normally considered acceptable, but values that are closer to 1 are preferred.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.160	35.108	35.108	3.160	35.108	35.108
2	2.212	24.582	59.690	2.212	24.582	59.690
3	1.110	12.335	72.025	1.110	12.335	72.025
4	.743	8.255	80.280			
5	.612	6.796	87.076			
6	.439	4.876	91.952			
7	.297	3.296	95.248			
8	.288	3.198	98.446			
9	.140	1.554	100.000			

Extraction Method: Principal Component Analysis.

Initial Eigenvalues are the eigenvalues for each component before extraction, indicating the variance accounted for by each component.The "Total" column displays the initial eigenvalues.

The "% of Variance" column tells us about the %ge of total variance explained by each component.

"Cumulative %" column shows the cumulative %age of total variance that is explained up to each component.

Extrraction Sums of Squared Loadings depict the variance retained by each of the component after extraction.

The "Total" column showcases the sums of squared loadings for each component.

The "% of Variance" column indicates the %age of total variiance retained by each component.

The "Cumulative %" column presents the cumulative %age of total variance retained up to each component.

3 Components are extracted through Principal Component Analysis; where they together explain 72.025% of the total variance

Factor Analysis: Financial Literacy

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.219	69.096	69.096	6.219	69.096	69.096
2	.913	10.144	79.240			
3	.656	7.287	86.528			
4	.508	5.649	92.177			
5	.265	2.942	95.118			
6	.240	2.666	97.784			
7	.138	1.537	99.321			
8	.061	.679	100.000			
9	-1.748E-16	-1.942E-15	100.000			

Extraction Method: Principal Component Analysis.

Only **1 Component** is extracted through Principal Component Analysis; where it explains 69.096% of the total variance.

Principal Component Analysis is a statistical method of reduction of dimensions in data analysis for simplification purposes. The idea is to transform the original variables into a set of new variables known as Principal Components which are combinations of the original variables.
The method is used for dimension reduction, data preprocessing, pattern recognition etc.

Partial Least Square-Structural Equation Modelling

This method is used to understand the relationship between DFI and DL & DFI.

PLS-SEM is a statistical technique that is used to analyse complex relationship among variables in a structural model. It estimates the latent variables, which are underlying variables that have an effect on the dependent variables other than the observed variables.

Structural Equation Modeling: SEM is a statistical technique that is used to test and evaluatee causal relationships between different variables. It's based on covariance analysis and can handle both observed and latent variables.

Partial Least Squares (PLS): PLS is a method used to analyze the structural relationships between variables. Unlike other SEM approaches (like covariance-based SEM), which focus on maximizing the explained variance in the observed variables, PLS focuses on maximizing the explained variance in the latent variables.

Regression in PLS-SEM: In PLS-SEM, regression is used to estimate the relationships between latent variables and observed variables, as well as between latent variables themselves. Its goal is to find the most appropriate model by minimizing the differences between the observed data and the model predictions.

With the context of our analysis, the dependent variable is Digital Financial Inclusion and independent variables are DL and FL.
The scores of these variables are normalized through Min-Max method.

Min-Max method

The Min-Max normalization method is a simple technique used to rescale numeric variables to a common scale. This normalization method is commonly employed in data preprocessing to ensure that variables with different scales or units are comparable and do not unduly influence the analysis.
The process involves transforming each value in a variable to a standardized score based on the minimum and maximum values observed in the dataset.

Normal Score= (Value-Minimum Value)/(Maximum Value- Minimum Value)

Proportion of Variance Explained

	Statistics				
Latent Factors	X Variance	Cumulative X Variance	Y Variance	Cumulative Y Variance (R-square)	Adjusted R-square
1	.751	.751	.665	.665	.659
2	.249	1.000	.034	.699	.686

The total number of Latent Factors extracted are 2 where Latent Factor 1 explains 75.1%

of total variance.

Loadings

Variables	Latent Factors 1	2
FinancialLiteracy	.668	-.829
DigitalLiteracy	.756	.560
DigitalFinancialInclusion	1.000	1.000

The Loading table tells us about the impact of the observed variables on the Latent Factors. From the table we can interpret that both FL and DL have positive effect on Latent Factor 1 and with that factor DL has more effect than FL.

Parameters

Independent Variables	Dependent Variables DigitalFinancialInclusion
(Constant)	1.123
FinancialLiteracy	.224
DigitalLiteracy	.578

The Parameters tables gives us the idea about the degree of effect of FL and DL on the DFI.
We can interpret that the value of FL is 0.224 which indicates that the predicted value of DFI increases by 0.244 units with every 1 unit increase in FL and the value of DL is 0.578 which indicates that the predicted value of DFI increases by 0.578 units with every 1 unit increase in FL.

So from PLS-SEM Analysis we can infer that both Digital Literacy(DL) and Financial Literacy(FL) have influence on Digital Financial Inclusion(DFI) with Digital Literacy(DL) having slightly stronger association.

Binary Logistic Regression

Logistic regression, a statistical method, measures the relationship between a categorical dependent variable and one/more independent variables.While it shares similarities with a linear regression model, it is applicable to models that have dichotomous dependent variables

.Binary logistic regression works in the following manner:

Model Specification: Binary logistic regression models the relationship between the log odds of the the dependent variable and the independent variables. The relationship is typically modeled using the function which is logistic function, which transforms the linear combination of the independent variables into probabilities.

Estimation of Parameters is done through logistic regression model are estimated using maximuum likelihood estiimation (MLE). The goal is to find the set of parameter values that maximize the likelihood of observing the data provided in the model.

The coefficients estimated by the logistic regression model represent the log-odds in the dependent variiable associated with a 1-unit channge in the corressponding independent variable, holdinng all other variables constant. These coefficients can be exponentiated to obtain an odds ratio that provides a more interrpretable measure of effect size.

Once the model is successfully fitted, the performance of the model can be evaluated using various metrics such as the Hosmer-Lemeshow goodness-of-fit test, classification accuracy, area under the receiver operating characteristic (ROC) curve, and confusion matrix. These metrics help assess the model's predictive accuracy and its ability to discriminate between the two outcome categories.

We will be finding the final score of the variables/questions for FRB (to be coded as 1; financially resilient and 0; financially non resilient) and also find the normal scores of DL and FL by the help of Min-Max method.

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	42.682[a]	.370	.509

From the model summary we can deduce that that the Nagelkerke R square value is 0.509 which indicates that 50.9% of the variance of the independent variable is explained by the dependent variables. The value should be between 0 to 1 and a higher value vouches for a good model fit.
2 Log Likelihood is a measure of model fit. A lower value indicates a better fit. In this case, the value is 42.68 hence our model is a good fit.
Cox & Snell's pseudo-R squared is an index of model fit ranging from 0 to 1. Higher values indicate better fit. Here, it is 0.370, suggesting that 37% of the variance that is present in the dependent variable is explained by the independent variables in the model.

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Digital Literacy	.846	.296	8.167	1	.004	2.331
	Financial Literacy	.006	.287	.000	1	.982	1.006
	Constant	-4.990	2.157	5.352	1	.021	.007

a. Variable(s) entered on step 1: Digital Literacy, Financial Literacy.

From this table we can understand the Significance of each of the independent variables and their impact on the dependent variable. Here, it shows that the significance value of Digital Literacy is 0.004 which less than 0.05 indicating that DL is significantly associated with the FRB. Whereas, the significant value of Financial Literacy is 0.982 which is more than 0.05 indicating that it is not significantly associated with FRB.

Summary and Conclusion

6.1 Findings:

- Both Digital Literacy(DL) and Financial Literacy(FL) have influence on Digital Financial Inclusion(DFI) with Digital Literacy(DL) having slightly stronger association.

- Digital Literacy(DL) is significantly associated with the Financial Resilience Behavior(frb) where as Financial Literacy is not significantly associated with the Financial Resilience Behavior.

6.2: Framework:

- The framework encompasses four key dimensions: Digital Literacy (DL), Financial Literacy (FL), Digital Financial Inclusion (DFI), and Financial Resilience Behavior (FRB). These dimensions are interconnected, with DL and FL influencing DFI and FRB. DL and FL are measured using a survey-based methodology, while DFI and FRB are assessed through statistical techniques such as Partial Least Squares Structural Equation Modeling (PLS-SEM) and Binary Logistic Regression.

6.3: Discussion:

- The discussion revolves around the findings of the study, highlighting the significance of digital and financial literacy in promoting digital financial inclusion and financial resilience among women in Dhanbad. It explores the implications of these findings for policy, practice, and future research. Additionally, it delves into the challenges and opportunities in advancing financial inclusion and empowerment, emphasizing the need for tailored interventions and partnerships across sectors.

6.4: Recommendations:

- Through the study Digital Literacy was found to be significantly associated with both Financial Resilience Behavior and Digital Financial Inclusion, so it would be beneficial for women to work on improving their digital literacy skills.

- Digital literacy workshops specifically tailored for women-basic computer skills, using and navigating the internet, using mobile apps financial transactions and services, and understanding digital safety, security and privacy measures.

- Offering training sessions on how to use mobile financial applications for various purposes, such as budget tracking, bill payments, and investment management could improve the level of Digital Literacy.

- Partnering with schools and workplaces to integrate digital and financial literacy education into existing curricula or employee training programs could help solve the problem from grassroot level.

6.5: Limitations of the study:

- The data set of the study is from 52 respondents. There is possibility of deducing more detailed insights if the study is conducted for a larger data set.
- Longitudinal studies would provide much stronger evidence of causality.
- While the dimensions (DL, FL, DFI, FRB) are important, there could be other significant factors that may influence financial behaviors, such as socio-cultural factors or access to resources.

6.6: Future Scope

- Evaluating the impact of digital and financial literacy interventions on women's financial resilience and well-being can help assess the effectiveness of different educational programs, training initiatives, and policy interventions.

- Investigating the role of emerging technologies such as artificial intelligence, blockchain, and digital identity solutions in promoting financial inclusion and empowerment for women presents exciting opportunities for future research.

- Research can contribute evidence-based recommendations to policymakers and stakeholders on measures to address gender disparities, promote equal opportunities, and foster an enabling environment for women's economic participation.

References

[1] Ali, J., & Ghildiyal, A. K. (2023). Socio-economic characteristics, mobile phone ownership and banking behaviour of individuals as determinants of digital financial inclusion in India. International Journal of Social Economics. Article in press. https://doi.org/10.1108/IJSE-10-2022-0673

[2] Almenberg, J., & Dreber, A. (2015). Gender, stock market participation and financial literacy. Economics Letters, 137, 140–142. https://doi.org/10.1016/j.econlet.2015.10.009

[3] Amoah, A., Korle, K., & Asiama, R. K. (2020). Mobile money as a financial inclusion instrument: what are the determinants? International Journal of Social Economics, 47(10), 1283–1297. https://doi.org/10.1108/IJSE-05-2020-0271

[4] Arora, R. U. (2012). Financial Inclusion and Human Capital in Developing Asia: The Australian connection. Third World Quarterly, 33(1), 177–197. https://doi.org/10.1080/01436597.2012.627256

[5] Bannier, C. E., & Neubert, M. (2016). Gender differences in financial risk taking: The role of financial literacy and risk tolerance. Economics Letters, 145, 130–135. https://doi.org/10.1016/j.econlet.2016.05.033

[6] Bathula, S. and Gupta, A. (2021), The determinants of financial inclusion and digital financial inclusion in India: a comparative study, The Review of Finance and Banking, 13(2), 109-120, doi: 10.24818/rfb.21.13.02.02.

[7] Demir, A., Pesqué-Cela, V., Altunbas, Y., & Murinde, V. (2022). Fintech, financial inclusion and income inequality: a quantile regression approach. European Journal of Finance, 28(1), 86–107. https://doi.org/10.1080/1351847X.2020.1772335

[8] Gutiérrez-Romero, R., & Ahamed, M. (2021). COVID-19 response needs to broaden financial inclusion to curb the rise in poverty. World Development, 138. https://doi.org/10.1016/j.worlddev.2020.105229

[9] F. Hair Jr, J., Sarstedt, M., Hopkins, L. and G. Kuppelwieser, V. (2014), Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research, European Business Review, 26 (2), 106-121. https://doi.org/10.1108/EBR-10-2013-0128

[10] Hermansson, C., Jonsson, S., & Liu, L. (2022). The medium is the message: Learning channels, financial literacy, and stock market participation. International Review of Financial Analysis, 79(November 2021), 101996. https://doi.org/10.1016/j.irfa.2021.101996

[11] Kaiser, T., Lusardi, A., Menkhoff, L., & Urban, C. (2022). Financial education affects financial knowledge and downstream behaviors. Journal of Financial Economics, 145(2), 255–272. https://doi.org/10.1016/j.jfineco.2021.09.022

[12] Koomson, I., Villano, R. A., & Hadley, D. (2020). Intensifying financial inclusion through the provision of financial literacy training: a gendered perspective. Applied Economics, 52(4), 375–387. https://doi.org/10.1080/00036846.2019.1645943

[13] N'dri, L. M., & Kakinaka, M. (2020). Financial inclusion, mobile money, and individual welfare: The case of Burkina Faso. Telecommunications

Policy, 44(3), 101926. https://doi.org/10.1016/j.telpol.2020.101926
[14] Reynolds, T. W., Biscaye, P. E., Leigh Anderson, C., O'Brien-Carelli, C., & Keel, J. (2023). Exploring the gender gap in mobile money awareness and use: evidence from eight low and middle income countries. Information Technology for Development, 1–28. https://doi.org/10.1080/02681102.2022.2073579
[15] Shabir, S. and Ali, J. (2022), Determinants of financial inclusion across gender in Saudi Arabia: evidence from the World Bank's Global Financial Inclusion survey, International Journal of Social Economics, 49(5), 780-800. https://doi.org/10.1108/IJSE-07-2021-0384
[16] Sharma, D. (2016). Nexus between financial inclusion and economic growth. Journal of Financial Economic Policy, 8(1), 13–36.
[17] Siddiqui, T. A., & Siddiqui, K. I. (2020). FinTech in India: An analysis on impact of telecommunication on financial inclusion. Strategic Change, 29(3), 321–330. https://doi.org/10.1002/jsc.2331
[18] van Rooij, M., Lusardi, A., & Alessie, R. (2011). Financial literacy and stock market participation. Journal of Financial Economics, 101(2), 449–472. https://doi.org/10.1016/j.jfineco.2011.03.006

Digital Financial Inclusion: Exploring Solutions for women inclusivity

ORIGINALITY REPORT

6%	3%	4%	4%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to University of Strathclyde Student Paper	1%
2	dspace.univ-alger3.dz Internet Source	1%
3	Evans Tindana Awuni, Achim Kemmerling. "Taking Gerschenkron to the Field: Attitudes towards Digitalization Hopes and Fears about the Future of Work in Ghana", Telecommunications Policy, 2023 Publication	1%
4	Submitted to Higher Education Commission Pakistan Student Paper	1%
5	dash.harvard.edu Internet Source	1%
6	Submitted to Adtalem Global Education, Inc. Student Paper	1%
7	Buzuneh Marine, Dagne Mengistie. "An Analysis of Various Factors Underlying Covid-	1%

19 Prevention Practice and Strategy in Jigjiga Town, Northeast Ethiopia", Infection and Drug Resistance, 2024
Publication

8	Submitted to University of Leeds Student Paper	1 %
9	dokumen.pub Internet Source	1 %

Exclude quotes	On	Exclude matches	< 1%
Exclude bibliography	On		