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Digital Financial Innovation as a Catalyst for Economic Development: Evidence from NCR Region of India

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Abstract

This study examines the impact of digital financial innovation on economic development, focusing on the National Capital Region (NCR) of India. Digital financial innovation was conceptualized through four dimensions—perceived ease of use, trust, attitude, and perceived cost—while economic development was assessed using two indicators: standard of living and overall economic progress. Primary data were collected through a structured questionnaire and analyzed using structural equation modeling (AMOS). The results reveal that perceived ease of use, trust, and positive attitudes significantly enhance the adoption of digital financial services, thereby contributing to improved standards of living and economic growth in the region. Conversely, high perceived costs were found to hinder the adoption of such innovations. The findings highlight that digital financial innovation can serve as a vital driver of regional economic development if cost-related barriers are minimized and user trust is strengthened. The study's limitations include its geographical focus on the NCR, which may restrict the generalizability of results to other regions, and its reliance on self-reported data, which could be subject to response bias. These insights offer valuable implications for policymakers, financial institutions, and technology providers aiming to foster inclusive economic growth through digital finance.

Key Words : Financial Innovation, Geographical Focus

Introduction

Developing nations, particularly those in Africa, require a sophisticated and sound banking system (Nguena, 2019). The scope and inclusiveness features of the economic system are the main issues with the area's economic growth, which greatly explains Why does the production side of the economy offer only minimal support (Nguena and Tsafack-Nanfosso, 2014; Meisel and Mvogo, 2007; Ndebbio, 2004). A financial system is any set of institutional structures that govern the production of financing and the lending of funds by organisations, people, and other entities and banking mediation facilitates, the flow of funds by making them accessible to deficient entities (Faura, 2013). A well-developed economic system may reduce economic disparity and manage unexpected events, based on how well some of its features—like uncertainity diversification—are implemented reducing information disparities and budgetary restrictions (Bernanke et al., 1999). Although, The relationship between an established economic sector and its degree of technological advancement is unclear.

The major force driving contemporary innovations in finance is the advancement of technology (Achieng et al., 2015). Fin-tech has transformed the banking sector during the last 20 years as ICT networks have made it possible to access a variety of digital financial services, including automation Blockchain innovation, e- banking, digital payment and ATMs (Lashitew et al., 2019; Batiz-Lazo, 2018). Since the 2008, there have been significant efforts to acknowledge the role in banking innovations (Khraisha & Arthur,2018). The main reason of the 2008 economic downturn, according to researchers, was the excessive use and misuse of banking advancements, especially their negative aspects (Henderson & Pearson, 2011). Nevertheless, research has also demonstrated the extensive economic advantages of financial developments that combine technological advances and financial advances

(Finnerty, 2001; Błach, 2011).While technological advancements like digital banking have improved the integration of transaction networks worldwide, they have also changed the kinds of banking services available in the banking sector in Africa (Jonathan and Camilo, 2008). The banking sector has been altered by online services, an invention in finance that has mostly made banking service supply methods and processes simpler. There are differing opinions in theoretical and experimental research regarding the connection between online banking services as a by product of innovative finance and the advancement of finance.

Additionally, the spread of electronic systems linked to e-banking services has both immediate and unforeseen consequences. Because of favourable effects of networks, electronic banking services can boost the financial sector's growth and effectiveness (Hall and Kahn, 2003). The advantages from e- finance include more financial accessibility and expansion, improved banking regulation, increased economic development and stability, and improved banking and overall administration efficiency (Manyika et al., 2016). Additionally, using digital banking can increase financial accessibility (Batiz-Lazo, 2018), Investments are distributed effectively, and surpluses are mobilised.

The impact of new technical advancements on the banking sector is explained by online financial services. The technology being discussed includes a wide range of innovative goods, apps, procedures, and business strategies that are adequate to change the conventional approach taken by financial institutions in order to increase revenues (Miller, 1986; Alvarez and Francesco, 2009). While the incentive for investing in fresh innovations is not entirely unfamiliar, the pace of advancement in the world of finance has accelerated significantly in the past few years, and the impact of this is now observed globally. E-banking , online payments, mobile payment, and mobile money wallets are a few examples of this invention. The banking sector's operations have evolved since the development of electronic devices. This transformation has strengthened individuals lending, investing, saving, and paying practices, which has boosted utility and lowered capital expenses without increasing overall risk proportionately to enhance availability and accessibility of capital, among other things (Mminele, 2008; Miller, 1986).

Literature Review:

An increasing amount of scientific and conceptual investigation has indicated that financial accessibility has a positive influence on the development of the economy. Based on theory, Schumpeter (1911) claims that financing promotes research and development and boosts economic development. This suggests a connection between financing and economic development. Using various databases for economies, several studies have empirically investigated the connection between financial accessibility and economic development. Research has demonstrated that financial accessibility is necessary for both economic development and the eradication of poverty (Boukhatem 2016; Kim 2016; Mohan 2006; Swamy 2012). Further investigation indicates that it has been determined that exists a two-way causal connection between financial accessibility and economic development, with rising financial accessibility improving the effectiveness of monetary regulation (Mbutor & Uba, 2013).

Sr. No.	Author's Name and Year of Publication	Area of Study	Research Objectives	Variables	Research Methodology	Findings
1.	Ahmad et al., 2020	Sub-Saharan Africa	To find out the contribution of mobile money in financial	Per capita growth rates, HDI, Population density, Fixed	Taxonomic, descriptive, and analytical	The study puts up challenges such as the acceptance of

			inclusion and development.	line subscribers, Mobile Phone subscribers per 100 inhabitants	methods	electronic money, e-money, and financial accessibility, the replacement of traditional finance with electronic money, and guidelines on companies offering electronic money facilities.
2.	Chatterjee, 2020	41 countries	To evaluate the effect of FI & ICT on economic development	Outstanding deposits, accounts, ATMs, Branches, Domestic credit, Mobile phone penetration, Fixed telephone, Internet usage, ICT import, GDP per capita, Gross Domestic Product(per capita) growth, Inflation, Industry, Services, Education	GMM	The author investigated that there is a significant relationship between FI and ICT as well and FI positively affects economic development also.
3.	Chinoda & Mashamba, 2021	23 African countries	To investigate the relationship between FI, DFI, and economic development.	Fintech-Use of mobile phones to pay bills, Income Inequalities- Gini-Coefficient, Eco. Dev.-Gross Domestic Product(per capita), Trade openness, Fin. Dev. Index-net interest margin, indirect cost/ assets, broad money/ Gross	ARDL	The study investigated that the influence of Financial Inclusion and DFI was favorable and significant on the economic development of Africa with a decrease in income inequality.

				Domestic Product, bank assets/ bank and Gross Domestic Product, credit(domestic)/ private sector (% of GDP) and quick liabilities/Gross Domestic Product, FI-O/S loans to GDP, Bank accounts per 1000 adults, Commercial bank branches and Automated Teller Machines (per 100,000 adults)		
4.	Ahmad et al., 2021	China	To find out the effect of human resources and DFI on economic growth.	Commercial bank branches per 100,000 adult population, The no. of ATMs in 1000 km, the measure of credit and deposits (% of GDP), GDP per capita, Government expenditure on science and technology, Consumer price index, Trade percentage of GDP, and Population growth rate	Panel-corrected standard errors, Fixed-effect robust, and Driscoll and Kraay regression.	This study investigated that human capital and digital financial inclusion had a crucial effect on China's regional economic development.
5.	Shen et al., 2021	China	To find out the relation between the DFI and economic growth.	Availability, Usage, Affordability, Financial Literacy and Ability, Human Development Index	Spatial Spillover Effect Analysis	The author investigated that there is a favorable association between Digital Financial Inclusion and economic development.

6.	Khera et al., 2021	52 countries	To find out the influence of Digital Financial Inclusion on economic development.	No. of ATMs and branches per 1 lac adults, Mobile subscriptions per 100 people, No. Of registered mobile money agents per 1 lac adults, % of adults who have bank accounts, debit cards, credit cards, or mobile money accounts, use digital payment services.	OLS regression	The author examined that DFI was positively associated with economic development.
7.	Ekong & Ekong (2022)	Nigeria	To investigate the influence of online banking services development on DFI.	ATM's, Web-payment, Mob-payment, Income, Education	Regression analysis	The research investigated the favorable impact of online banking services on the financial inclusiveness of Nigeria.
8.	Kanga et al., 2022	137 Countries	To examine how technological innovation in finance was being adopted and how that affected financial accessibility and quality of life.	Mobile subscriber per 100 people, No. of ATMs per 1 lac people, Private sector credit to GDP, Pension fund assets to GDP, Mutual fund assets to GDP, Insurance premiums to GDP, Financial institutions efficiency, Log of per capita income, HCI, Schooling, capital, Population Growth, Trade, Government Spending, Urbanisation, Absence of corruption,	3-SLS	The author evaluated that there was a long-term effect of technological innovations in finance and financial accessibility on per capita GDP.

				Composite and Political stability, FDI inflow in ICT		
9.	Manasseh et al., 2023	Eastern and Southern Africa	To find out the impact of Digital Financial Inclusion on financial growth.	ATM, Mobile Payment, Point Of Sales, Mobile Banking, Internet Banking, Rule of Law, Regulatory Quality and Government Effectiveness, Ratio of credit(private sector) to GDP	ARDL	The author found in his study that the Rule of law, regulatory quality, and government effectiveness have a significant impact on financial development and DFI positively affects economic development.
10.	Asgari & Izawa, 2023	80 countries	To evaluate the effect of financial technology on financial development	Broad money, Private credit, and bank deposits, Financial Performance, and Financial Inclusion	Correlation Analysis	The study evaluates that financial technology not only influences the financial development of developed countries but also impacts the growth of the countries that are under development.

Research Objective:

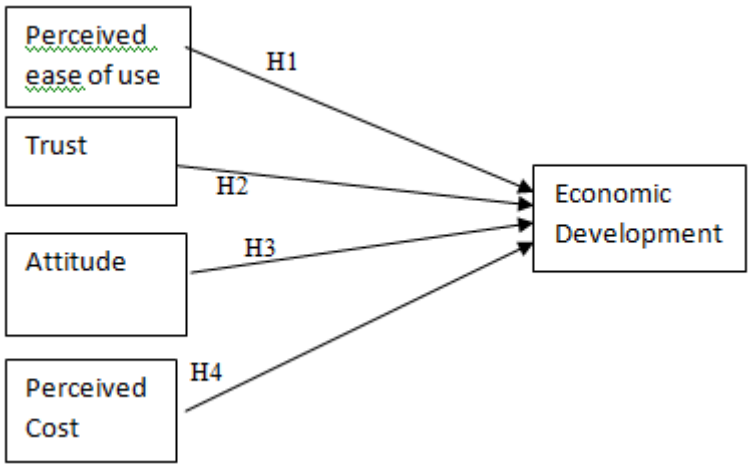
- To assess the impact of digital financial innovation on economic development of India.

Research Methodology:

The data was collected of 490 respondants from NCR region in India. For research analysis primary data was collected. Data was collected through the responses given by respondants in the questionnaire. Questionnaire was prepared on the basis of literature review. For measurement of digital fiancial innovation four sub components such as perceived ease of use, trust, attitude and perceived cost were used. And for the measurement of economic development standard of living and economic development sub components were used. In this study imapct of digital fianncial innovation on economic development was assessed. For this analysis digital financial innovation with its four sub components was used as independent variables and economic development was used as dependent variables. For answer of the questions five-point likert scale from strongly disagree to strongly agree was used. For testing the validity and reliability of questionnaire and for final analysis of the colleced data CFA-SEM technique in Amos-23 was used.

Conceptual Framework:

Figure 1: Conceptual Framework



Source: Created by author

Conceptual Foundation:

H1: There is significant relationship between perceived ease of use and economic development

Perceived Ease of Use is a construct from the Technology Acceptance Model (TAM), originally proposed by Davis (1986). It refers to the degree to which a person believes that using a particular system or technology will be free of effort. In the context of digital financial innovation, PEOU reflects how easily individuals, businesses, or institutions can adopt and operate new financial technologies such as mobile banking apps, digital payment platforms, blockchain solutions, or AI-driven lending systems. The author assumes that there is significant relationship between perceived ease of use and economic development.

H2: There is significant relationship between trust and economic development

Trust in DFI refers to the confidence users have that digital financial systems—such as mobile banking apps, online payment platforms, peer-to-peer lending, or blockchain-based solutions—are secure, reliable, and will act in their best interest. It covers both technology trust (belief that the system functions correctly without errors or data loss) and institutional trust (belief that service providers are honest, competent, and protect user data). The author assumes that there is significant relationship between trust and economic development.

H3: There is significant relationship between attitude and economic development

Attitude, in the context of DFI, refers to an individual's overall positive or negative evaluation of using digital financial tools such as mobile banking, online payments, peer-to-peer lending, or blockchain-based solutions. It represents a user's predisposition to accept, use, and recommend these innovations based on their personal experiences, perceived benefits, and beliefs about their usefulness and convenience. The author assumes that there is significant relationship between attitude and economic development.

H4: There is significant relationship between perceived cost and economic development

Perceived cost refers to an individual's or organization's evaluation of the expenses—both monetary and non-monetary—associated with adopting and using digital financial innovations such as mobile banking apps, digital wallets, peer-to-peer lending platforms, or blockchain-based payment systems. It includes not just direct fees (transaction charges, subscription costs) but also indirect costs (internet data usage, device purchase, learning time, potential risks). The

author assumes that there is significant relationship between perceived cost and economic development.

Results of data analysis: CFA in Amos-23 was used for checking the validity and reliability of dependant and independent variables. Digital financial innovation with its sub-components such as perceived ease of use, trust, attitude and perceived cost was taken as independent variable. And economic development was taken as dependant variable. The collected data was normal distributed so the maximum likelyhood was selected for the analysis. The following diagram and table shows the results of CFA:-

Figure 2: showing the CFA results

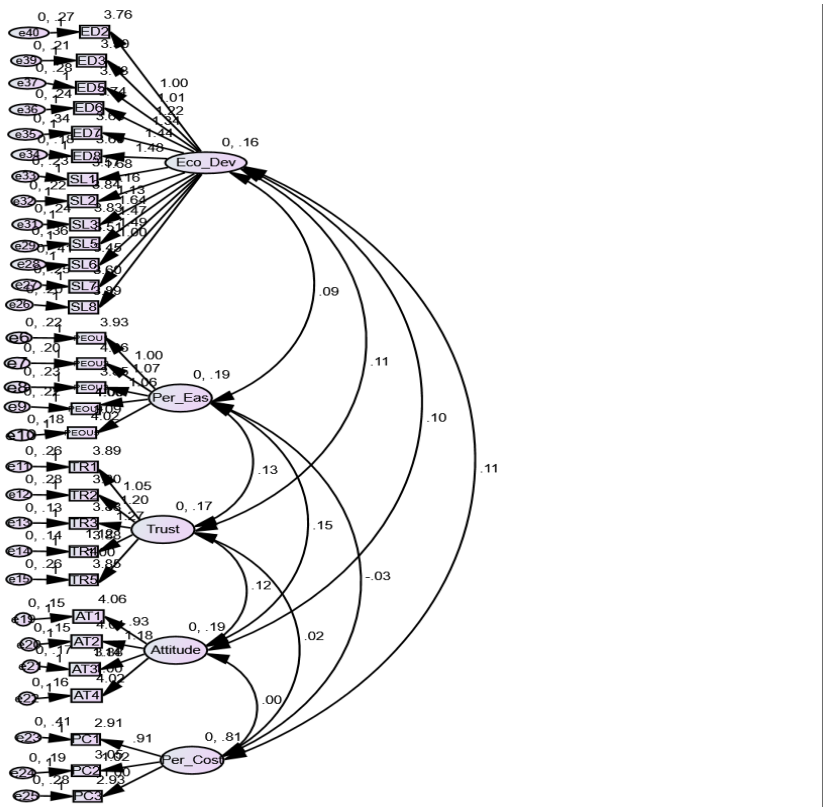


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Table 1: showing the results of model fitness

Fit measures	Standard fit	Model fit	Result
χ^2/DF	$0 \leq \chi^2$/DF≤2-5	3.742	Good Fit
CFI	0.95≤CFI≤1	0.871	Acceptable
IFI/Delta2	0.95≤IFI≤1	0.872	Acceptable
NFI/Delta1	0.95≤NFI≤1	0.833	Acceptable
TLI/RHO2	0.95≤TLI≤1	0.849	Acceptable
RFI/RHO1	0.95≤RFI≤1	0.805	Acceptable
PNFI	0.00≤PNFI≤0.9	0.711	Perfect Fit
RMESA	0.00≤RMESA≤0.05	0.075	Perfect Fit

Source: Author's calculations

Table 1 shows that the results indicate that the model demonstrates an overall acceptable level of fit. The χ^2/DF ratio (3.742) falls well within the generally accepted upper limit of 5, indicating reasonable model adequacy. The RMSEA value of 0.075 also suggests a reasonable fit to the data, as it is below the 0.08 threshold often used in applied research. The PNFI score of 0.711 reflects a satisfactory level of model parsimony.

However, several incremental fit indices (CFI, IFI, NFI, TLI, and RFI) fall below the commonly recommended 0.90 cut-off, with the CFI and IFI values being marginally acceptable while NFI, TLI, and RFI indicate weaker comparative fit. While these results do not meet the highest standard of model fit (≥ 0.95), they are still considered acceptable in some empirical contexts, particularly for complex models or when sample size constraints and measurement limitations exist.

Reliability and validity results of CFA model:

Table 2: showing reliability and validity results

Measures	Perceived ease of use	Trust	Atitude	Perceived cost	Economic development	**Standard fit for Covergent/ Discriminate validity**	**Result**
CR	0.833	0.839	0.842	0.890	0.929	CR>0.7	Valid
AVE	0.500	0.513	0.572	0.731	0.504	AVE>0.5, CR>AVE	Valid
MSV	0.599	0.494	0.599	0.095	0.476	AVE>MSV	Valid

Source: Author's calculation

The measurement model was evaluated for reliability and validity using Composite Reliability (CR), Average Variance Extracted (AVE), and Maximum Shared Variance (MSV). Table 2 shows that all constructs demonstrated strong internal consistency, with CR values ranging from 0.833 to 0.929, exceeding the recommended threshold of 0.70 (Hair et al., 2019). Convergent validity was confirmed as AVE values for all constructs fell between 0.500 and 0.731, meeting the minimum requirement of 0.50 (Fornell & Larcker, 1981). Discriminant validity, assessed through the Fornell–Larcker criterion, indicated that Trust, Perceived Cost, and Economic Development satisfied the condition of AVE being greater than MSV, while Perceived Ease of Use and Attitude did not, as their MSV values (0.599) exceeded their respective AVE values. These results suggest that although the constructs are reliable and display adequate convergent validity, some overlap exists between Perceived Ease of Use and Attitude with other constructs,indicating partial establishment of discriminant validity.

Figure 3: Path Diagram showing impact of, percieved ease of use, trust, percieved cost, and attitude on economic development

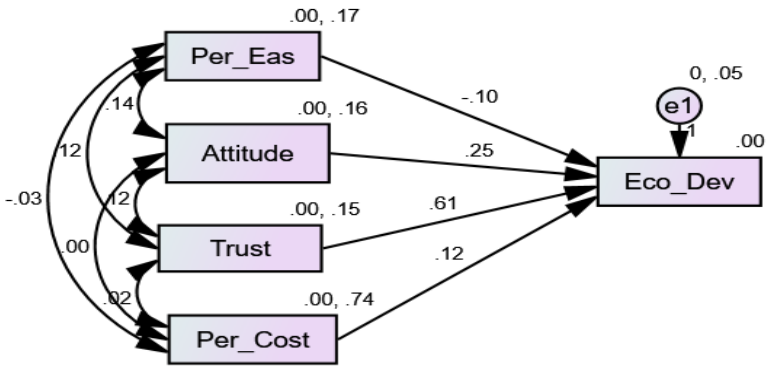

Table 3: shows the results of path diagram

Dimensions	Regression weights	Standardized regression weights	P	R square
Per_Ease →Eco_Dev	-.097	-0.103	0.076	0.655(p < 0.000)
Trust→Eco_Dev	0.248	0.262	0.000	
Attitude→ Eco_Dev	0.610	0.611	0.000	
Per_Cost→ Eco_Dev	0.123	0.275		

Table 3 shows the structural model results from AMOS indicate that attitude exerts the strongest positive and significant influence on economic development, with a standardized coefficient of 0.611 ($p < 0.001$), followed by trust, which also shows a significant positive effect ($\beta = 0.262$, $p < 0.001$). Perceived cost demonstrates a moderate positive impact ($\beta = 0.275$), which appears to be significant, whereas perceived ease of use has a small negative and statistically insignificant relationship with economic development ($\beta = -0.103$, $p = 0.076$). The coefficient of determination (R^2) reveals that these four predictors collectively explain 65.5% of the variance in economic development, suggesting that the model has strong explanatory power. Overall, the findings highlight that attitudinal factors and trust are critical determinants of economic development in this context, while ease of use plays a negligible role.

Conclusion:

The structural equation modeling results clearly indicate that, within the construct of digital financial innovation, trust holds the most substantial influence on economic development. With a strong and highly significant path coefficient ($\beta = 0.611$, $p < 0.001$), trust serves as the cornerstone of adoption and effective utilization of digital financial tools. This suggests that citizens and businesses are more likely to leverage digital finance when they perceive the systems as secure, transparent, and reliable, thereby fostering both standard of living improvements and broader economic progress.

Attitude emerges as the second most impactful determinant ($\beta = 0.262$, $p < 0.001$), indicating that a positive disposition toward digital financial services—rooted in perceived benefits, relevance, and long-term value—plays a critical role in influencing economic outcomes. This finding aligns

with behavioral finance theories, which emphasize that psychological acceptance and willingness to adopt innovations are prerequisites for their successful diffusion.

Interestingly, *perceived cost* ($\beta = 0.275$, $p < 0.001$) also contributes significantly, suggesting that individuals and businesses may associate certain costs as investments in accessing better financial services, especially when those services lead to measurable economic and quality-of-life benefits. However, costs that are perceived as excessive or unfair could act as barriers, indicating the need for balanced pricing strategies in digital finance.

On the other hand, perceived ease of use ($\beta = -0.103$, $p = 0.076$) shows a small negative and statistically insignificant relationship with economic development. This implies that ease of use, while often important in technology adoption, is not a decisive factor in driving economic development in this context. It may be that once a baseline level of usability is achieved, other factors such as trust and perceived value take precedence in influencing outcomes.

The model's explanatory power is robust, with 65.5% of the variance in economic development explained by the four innovation components. Significant correlations among these predictors—especially between attitude and trust ($r = 0.755$) and between perceived ease of use and attitude ($r = 0.858$)—highlight the interconnected nature of user perceptions. This interrelationship underscores the importance of integrated strategies that simultaneously enhance trust, build positive attitudes, and manage perceptions of cost.

Overall, the results provide strong evidence that digital financial innovation has the potential to substantially elevate both the standard of living and broader economic performance, but its success depends heavily on strengthening trust, fostering favorable user attitudes, and ensuring cost-effectiveness. These insights offer practical implications for policymakers, financial institutions, and technology developers, who should prioritize building secure and transparent systems, conducting public awareness campaigns, and offering affordable access to ensure that digital finance serves as a catalyst for sustainable economic development.

Limitations of the study:

While the study provides valuable insights, several limitations should be acknowledged. First, the research is geographically limited to the NCR region of India, which may not fully represent the diverse economic, cultural, and technological contexts across other parts of the country. As such, the results should be interpreted with caution when generalizing to rural or less technologically advanced regions. Second, the study relies on self-reported data, which may be subject to response bias, social desirability bias, or recall inaccuracies. Third, the cross-sectional design captures relationships at a single point in time, preventing the establishment of causal links between digital financial innovation components and economic development. Fourth, the study focuses on a specific set of constructs—perceived ease of use, trust, attitude, and perceived cost—as dimensions of digital financial innovation, while other potentially relevant factors such as regulatory frameworks, digital literacy, and infrastructure quality were not included. Finally, the measurement of economic development through standard of living and related indicators, while useful, may not capture the full complexity of economic growth dynamics. Addressing these limitations in future research could enhance the robustness and applicability of the findings.

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26

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