

Financial Inclusion and Fintech Ecosystems in the Digital Age: A Systematic Review and Meta-Analysis

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ABSTRACT

The digital age presents a significant opportunity to bridge the financial divide and empower individuals to participate fully in the financial landscape. This study investigates the relationship between Fintech ecosystems and financial inclusion, leveraging a meta-analysis approach to extract the research findings. We move beyond basic correlations by employing weight analysis to identify the most impactful components within the Fintech ecosystem. Our analysis examines the relationship between Fintech ecosystems and four key aspects of financial inclusion: financial behavior/access, mobile banking, credit access, and investment opportunities. We explore how various elements within the Fintech ecosystem, such as digital consumerism, mobile payments, ownership of financial accounts, mobile phone use in financial transactions, FinTech credit offerings, financial capability, and internet use in financial transactions, correlate with these aspects of financial inclusion.

The findings reveal a positive and statistically significant correlation between Fintech ecosystems and financial inclusion. Weight analysis further highlights the critical role of specific factors, including internet use in financial transactions, FinTech-facilitated credit access, mobile phone use in financial activities, and service trust. This research highlights the power of Fintech ecosystems to expand financial inclusion and pave the way for more inclusive fintech ecosystems in the future. By understanding the relationship between specific Fintech components and financial inclusion, policymakers and industry leaders can foster the development of targeted interventions that leverage the strengths of the digital age to bridge the financial divide.

Keywords: Financial inclusion, fintech ecosystems, digitalization.

INTRODUCTION

The digital revolution, characterized by widespread internet access and a surge in mobile technologies (Darwish & Lakhtaria, 2011), has entered a transformative era. This presents a unique and urgent opportunity to address the persistent global challenge of financial exclusion (World Bank, 2021). Financial exclusion is defined as the lack of access to essential financial products and services that meet individuals' needs. It disproportionately impacts low-income populations, women, and those living in geographically remote areas. (Demirguc-Kunt et al., 2017). Despite progress, an estimated 1.4 billion adults worldwide still lack a basic bank account, hindering their ability to save effectively, manage finances, and weather financial shocks (Ansar et al., 2023). Bridging this financial divide is not just crucial but imperative for achieving inclusive and sustainable development.

However, the digital divide itself can exacerbate financial exclusion. Limited internet access and a lack of digital literacy skills can further marginalize those already excluded from traditional financial systems (Li & Usama, 2023). Understanding these populations' specific barriers is crucial for ensuring equitable participation in the digital financial landscape.

1. Financial Behavior and Access

Financial inclusion encompasses several key aspects, including fostering positive financial behavior and access. Traditional financial institutions often rely on credit history and other factors that disadvantage those new to the financial system or with limited formal income sources. Fintech solutions have the ability to transform access to financial services by harnessing alternative data sources and developing cutting-edge credit scoring models. By tapping into non-traditional information, such as social media activity, payment histories, and even utility bills, these solutions can create a more comprehensive picture of an individual's creditworthiness. This innovative approach not only broadens access for those who may be overlooked by traditional banks but also fosters a more inclusive financial landscape for everyone (Gomber et al., 2018). This enables individuals to establish a financial history and access important financial products and services, like savings accounts and microloans, which help them manage their finances more effectively (Hasan et al., 2022).

2. Mobile Banking

Mobile banking has emerged as a game-changer in financial inclusion. By leveraging the ubiquity of mobile phones, fintech companies can bypass the limitations of traditional brick-and-mortar branches and offer financial services to even remote populations (Gomber et al., 2018). Mobile banking solutions provide convenient access to account management, transactions, and financial tools, promoting financial literacy and empowering individuals to manage their finances on the go (Etim, 2014). This not only fosters better financial behavior but also allows individuals to participate more actively in the formal financial system.

3. Credit Access

Access to credit is another critical aspect of financial inclusion. Traditional financial institutions often have stringent lending requirements that can exclude those with limited credit history or lower incomes. Fintech companies, however, can leverage alternative data sources and innovative credit scoring models to expand credit access to underserved populations (Rauniyar et al., 2020). Access to micro-loans and other financial products can empower individuals to invest in small businesses, manage unexpected expenses, and build a path toward financial stability (Demirguc-Kunt et al., 2017).

4. Investment Opportunities

Financial inclusion also involves expanding access to investment opportunities. Traditionally, investment options have been limited to those with significant wealth or financial literacy. Fintech platforms can leverage technology to offer micro-investment options and experiences, making investment opportunities more accessible and engaging for a broader population (Wewege et al., 2020). This can empower individuals to save for the future, build wealth, and participate in the growth of the financial system. However, a deeper understanding of the specific components within these ecosystems that drive financial inclusion is necessary.

By examining the relationship between mobile payments, digital consumerism, internet usage, and financial literacy, this study seeks to illuminate how fintech ecosystems empower individuals and contribute to a more inclusive financial future. We move beyond basic correlations by employing weight analysis to identify the most impactful components within the fintech ecosystem. This research aims to investigate these research questions:

RQ1: How do traditional financial institutions (FIs) interact within fintech ecosystems?

RQ2: How do these interactions, along with other key components of fintech ecosystems, influence financial inclusion?

This research also contributes to the existing body of knowledge in several ways. First, using a robust meta-analysis approach, it comprehensively analyzes the relationship between fintech ecosystems and financial inclusion. Second, it employs weight analysis to identify the most critical components within fintech ecosystems driving financial inclusion. Finally, this research offers valuable insights for policymakers and industry leaders in fostering the development of targeted interventions that leverage the strengths of fintech ecosystems to bridge the financial divide and achieve greater financial inclusion for all.

METHODOLOGY

This research employs a meta-analysis approach to comprehensively synthesize existing research on the intricate relationship between fintech ecosystems and financial inclusion across four key aspects: financial behavior and access, mobile banking, credit access, and investment opportunities. A meta-analysis allows us to systematically evaluate the cumulative evidence from multiple studies, providing a more robust understanding of the phenomenon under investigation (Guzzo et al., 1987). Our methodology encompasses several key steps to ensure a rigorous and comprehensive analysis.

1. Management Review

We initiated the systematic review process with a collaborative planning meeting to ensure a comprehensive and rigorous approach. This meeting involved a professor and two doctoral students. The primary objective of this meeting was to identify key variables for exploration based on existing research.

2. Search Strategy

The review was conducted by following the Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA) checklist (Johnson & Hennessy, 2019). We comprehensively searched relevant studies utilizing academic databases such as Web of Science, Scopus, and Google Scholar. We employed specific keywords and search strings tailored to identify studies that investigate the relationship between fintech ecosystems, financial inclusion, and the four chosen aspects (financial behavior/access, mobile banking, credit access, and investment opportunities). For instance, some of the search strings included:

- **Google Scholar:** ("Fintech ecosystem" OR "financial technology") AND ("financial inclusion") AND ("financial behavior" OR "access to finance") AND ("credit access" OR "investment opportunities")
- **Web of Science:** ("Fintech ecosystem" OR "financial technology") AND ("financial inclusion") AND ("mobile banking") AND ("credit access" OR "investment opportunities")
- **Scopus:** ("Fintech ecosystem" OR "financial technology") AND ("financial inclusion") AND ("investment opportunities")

Our initial search across the abovementioned databases yielded many articles (1196). However, to ensure the focus and quality of our research, we implemented a rigorous selection process based on pre-defined inclusion and exclusion criteria.

3. Inclusion and Exclusion Criteria

To ensure the quality and relevance of the included studies, we established clear inclusion and exclusion criteria (Meline et al., 2006). These criteria were based on factors such as:

- **Study type:** We focused on primary research studies, including peer-reviewed journal articles and conference proceedings.

- **Publication date:** A specific timeframe (2014-2024) was chosen to capture the most recent trends in fintech, as the field is rapidly evolving. This timeframe ensures our analysis reflects the latest advancements influencing the relationship between fintech ecosystems and financial inclusion.
- **Language:** For practical reasons, the search was limited to studies published in English. We did not consider studies published in other languages due to the unavailability of reliable translation resources.
- **Methodology:** We prioritized the studies that employ clear hypotheses and statistical analyses.
- **Focus:** The selected study must explicitly investigate the relationship between fintech ecosystems and at least one of the four key financial inclusion aspects.

Applying inclusion and exclusion criteria removed duplicates (n=281), irrelevant studies (n=413), and screening (n=458), leaving 44 selected articles to be utilized for meta-analysis.

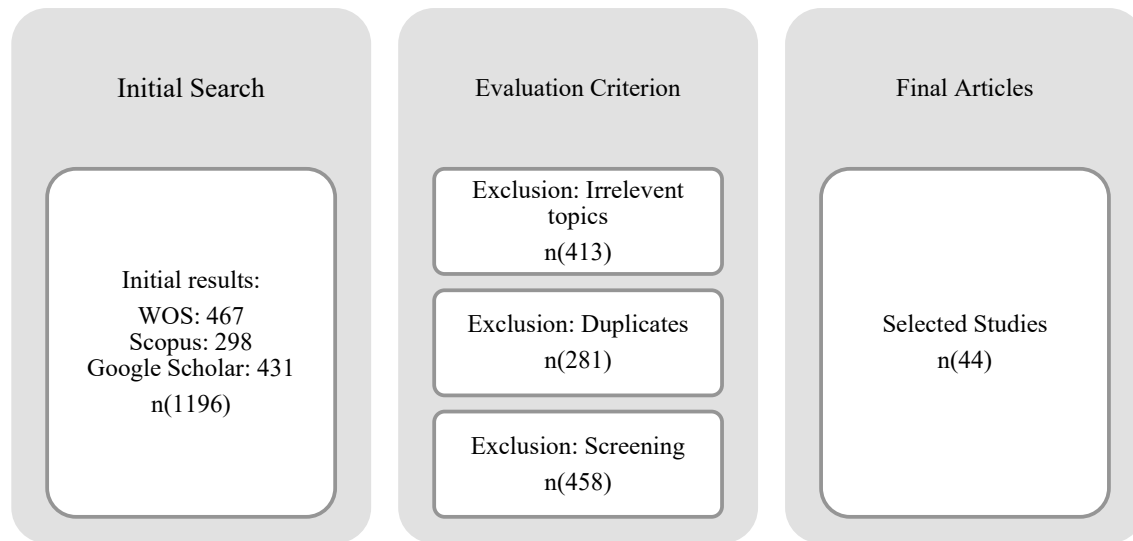


Figure 1: Studies selection chart

4. Quality Assessment

To ensure the reliability of our meta-analysis results, we assessed the quality of each included study using a risk-of-bias approach in Review Manager 5.4.1. This approach categorizes studies as having a 'low risk of bias,' 'unclear risk of bias,' or 'high risk of bias'. The risk of Bias and its summary are detailed in Figure 2.

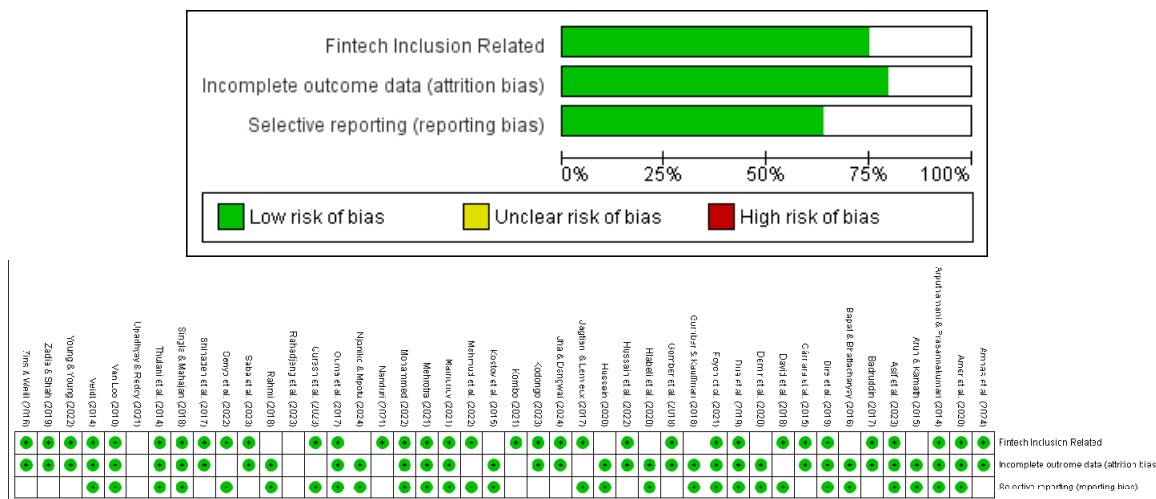


Figure 2: Risk of bias summary

5. Selected Studies

This rigorous screening process resulted in a final selection of 44 studies for inclusion in our meta-analysis. Following this meticulous search and selection process, the final set of relevant studies is presented in Table 1.

Table 1: Selected articles under study

	Study	Year	Authors	Journal
1.	Fintech And Financial Inclusion: Exploring the Mediating Role of Digital Financial Literacy and The Moderating Influence of Perceived Regulatory Support.	2024	Muhammed Basid Amnas, Murugesan Selvam and Satyanarayana Parayitam	Journal of Risk and Financial Management JRFM
2.	Factors Influencing Financial Inclusion for Social Inclusion in Selected African Countries	2024	Kosmas Njanike and Raphael T. Mpofo	Insight on Africa
3.	Fintech services and financial inclusion: A systematic literature review of developing nations	2024	Shweta Jha, Ramesh Chandra Dangwal	Journal of Science and Technology Policy Management (JSTPM)
4.	Does The Fintech Ecosystem Promote Effective Financial Inclusion in Kenya?	2023	Odongo Kodongo	Kenya Bankers Association (KBA)
5.	The Impact of Fintech and Digital Financial Services on Financial Inclusion in India	2023	Mohammad Asif, Mohd Naved Khan, Sadhana Tiwari, Showkat K. Wani and Firoz Alam	Journal of Risk and Financial Management JRFM
6.	An Empirical Investigation of Financial Inclusion in Pakistan	2023	Sabaa, Wajiha Haq, Muhammad Shujah Ur Rehman	International Journal of Social Science Archives (IJSSA)
7.	Analysis Of Financial Technology, Financial Literacy, Financial Attitudes, On Mediated Business Performance Financial Inclusion and Self-Efficiency in Small Medium Industry (Smi) In Malang City, Indonesia	2023	Erna Retno Rahadjeng, Heri Pratikto, Imam Mukhlis, Nurika Restuningdiah	International Journal of Professional Business Review
8.	The Impact of Fintech on Financial Inclusion: Opportunities, Challenges, And Future Perspectives	2023	Muneera Quresh, Muhammad Ismail, Madiha Khan, Mohsin Asad Gill, Rabia Kishwer	PalArch's Journal of Archaeology of Egypt/Egyptology
9.	Adoption Factors of Fintech: Evidence from An Emerging Economy Country-Wide Representative Sample	2022	Khaled Mahmud, Md. Mahbulul Alam Joarder and Kazi Muheymin-Us-Sakib	International Journal of Financial Studies IJFS
10.	Fintech Ecosystem Practices Shaping Financial Inclusion: The Case of Mobile Money in Ghana	2022	P. K. Senyo, Stan Karanasios, Daniel Gozman & Melissa Baba	European Journal of Information Systems EJIS
11.	Technology adoption: impact of FinTech on financial inclusion of low-income households	2022	Darius Young and John Young	International Journal of Electronic Finance (IJEF)
12.	FinTech's Role in Promoting Financial Inclusion in Pakistan	2022	Syed Ali Mohammed	Scientific and Academic Development Institute (SADI)

13.	Financial Literacy and Investment Decisions: Evidence from Pakistan	2022	Anwaar Hussain, Ploypailin Kijkasiwat, Hafiz Khalil Ur Rehman, and Muhammad Zia Ullah	South Asian Journal of Finance
14.	Fintech And the Digital Transformation of Financial Services: Implications for Market Structure and Public Policy	2021	Erik Feyen, Jon Frost, Leonardo Gambacorta, Harish Natarajan and Matthew Saal	The Bank for International Settlements and the World Bank Group
15.	Analysis Of the Microeconomic Factors of The Financial Inclusion of The Population in The Republic Of Congo	2021	Pierre Ghislain Batila Ngouala Kombo	Theoretical Economics Letters
16.	Financial Inclusion Through Fintech: A Case of Lost Focus	2021	Anupam Mehrotra	2019 International conference on automation, computational and technology management (ICACTM)
17.	Digital Finance: Fintech For Financial Inclusion and Sustainability	2021	Dr. Sireesha Nanduri	Turkish Online Journal of Qualitative Inquiry (TOJQI)
18.	Digital financial inclusion - demand-side vs. supply-side approach	2021	Ashutosh Upadhyay and Kalluru Siva Reddy	International Journal of Electronic Finance (IJEf)
19.	The Role of Information Technology in Fintech Innovation: Insights from the European Fintech Ecosystem	2021	Stanislav Mamonov	Hawaii International Conference on System Sciences (HICSS)
20.	Mobile Money and Financial Inclusion for The Unbanked – A Choice Analysis	2020	Batloung Hlabeli, Pitso Tsiobolane, Malcolm Garbutt	International Conference on Information Resources Management (CONF-IRM)
21.	Fintech, Financial Inclusion and Income Inequality: A Quantile Regression Approach	2020	Ayse Demir, Vanesa Pesqué-Cela, Yener Altunbas, Victor Murinde	The European Journal of Finance
22.	The Impact of Financial Technology on Financial Inclusion: The Case of Egypt	2020	Hossam Hussein	IOSR Journal of Economics and Finance
23.	Sustainability, Fintech, and Financial Inclusion	2020	Douglas W. Arner, Ross P. Buckley, Dirk A. Zetzsche and Robin Veidt	European Business Organization Law Review
24.	Fintech Contribution Towards Economic Prosperity in Pakistan	2019	Mujtaba Zadia and Asad Ali Shah	Pakistan Review of Social Sciences (PRSS)
25.	Role Of Fintech in Financial Inclusion and Financial Integration	2019	Puja Dua, Dr. Namita Sahay & Dr. O.S. Deo	Research Review Journals
26.	The Effect of Financial Literacy Towards Financial Inclusion Through Financial Training	2019	Amram Rohi Bire, Heni Matelda Sauw, Maria	International journal of social sciences and humanities

27.	Microfinance: An Approach for Financial Inclusion in India	2018	Anju Singla and Parul Mahajan	International Journal of Social Science and Economic Research (IJSSER)
28.	Empirical Analysis of The Determinants of Financial Inclusion in Nigeria: 1990 - 2016	2018	Okoroafor O. K. David, Adeniji Sesan Oluseyi, Awe Emmanuel	Journal of Finance and Economics
29.	On The Fintech Revolution: Interpreting the Forces of Innovation, Disruption and Transformation in Financial Services	2018	Peter Gomber and Robert J. Kauffman	Journal of Management Information Systems
30.	Making Innovation More Competitive: The Case of Fintech	2018	Rory Van Loo	UCLA Law Review
31.	Fintech For Financial Inclusion	2018	Mustika Rahmi	Conference on Economics, Business, Entrepreneurship, and Finance
32.	Financial inclusion and socioeconomic development: Gaps and solution.	2018	Rastogi, Shailesh, and Ragabiruntha E.	International Journal of Social Economics
33.	Conceptualization Of the Effectiveness of Fintech in Financial Inclusion	2017	Ms. Aisha Badruddin	International Journal of Engineering Technology Science and Research
34.	The Financial Inclusion Development in Palestine	2017	Shihadeh, Fadi, Hannon Azzam and Wang Xiuhua	Business and Economic Research
35.	Mobile Financial Services and Financial Inclusion: Is It a Boon for Savings Mobilization?	2017	Shem Alfred Ouma, Teresa Maureen Odongo, Maureen Were	Review of development finance
36.	Fintech Lending: Financial Inclusion, Risk Pricing, And Alternative Information	2017	Julapa Jagtiani and Catharine Lemieux	Risk Pricing and Alternative Information
37.	The Determinants of Financial Inclusion in Africa	2016	Alexandra Zins and Laurent Weill	Review of development finance
38.	Determinants Of Financial Inclusion of Urban Poor in India: An Empirical Analysis	2016	Dhananjay Bapat Biswa Nath Bhattacharyay	CESifo Working Paper Series
39.	Access To Financial Services: The Case of the 'Mzansi' Account in South Africa	2015	Philip Kostov, Thankom Arun, Samuel Annim	Review of Development Finance
40.	Financial Inclusion: Policies And Practices	2015	Thankom Arun, Rajalaxmi Kamath	IIMB Management Review
41.	Factors That Matter for Financial Inclusion: Evidence from Peru	2015	Cámara, Noelia Tuesta, David	Aestimatio: The IEB International Journal of Finance
42.	Financial Inclusion Through Micro Finance: The Way to Rural Development. A Case Study of	2014	Mrs.J.Arputhamani and Dr.(Mrs.) K. Prasanna kumari	KKIMRC International Journal of Research in Finance and Accounting

	Rajapalayam Block in Virudhunagar District			
43.	The Role of SHGS in Financial Inclusion. A Case Study	2014	Robin Veidt	International Journal of Scientific and Research Publications
44.	Mobile Money as A Strategy for Financial Inclusion in Rural Communities	2014	Mr. Thulani, Prof. Pepukayi Chitakunye, Dr. Bibi Zaheenah Chummun	Mediterranean Journal of Social Sciences

This study collected data for meta-analysis of 44 selected studies from various journals and international conferences. These studies have been included from 2014-2024 to evaluate and analyze the meta-analysis regarding the influences of the fintech ecosystem on financial inclusion. Figure 3 illustrates the distribution of the selected studies across various years of publication. Six studies were published in each of the following years: 2021 and 2018. Five studies were published in the years 2023, 2022, and 2017, and three studies were contributed in the year 2024, while four were published in both 2020 and 2015. Additionally, three studies were published in each of the years 2019 and 2014. Lastly, only two studies were published in 2016.

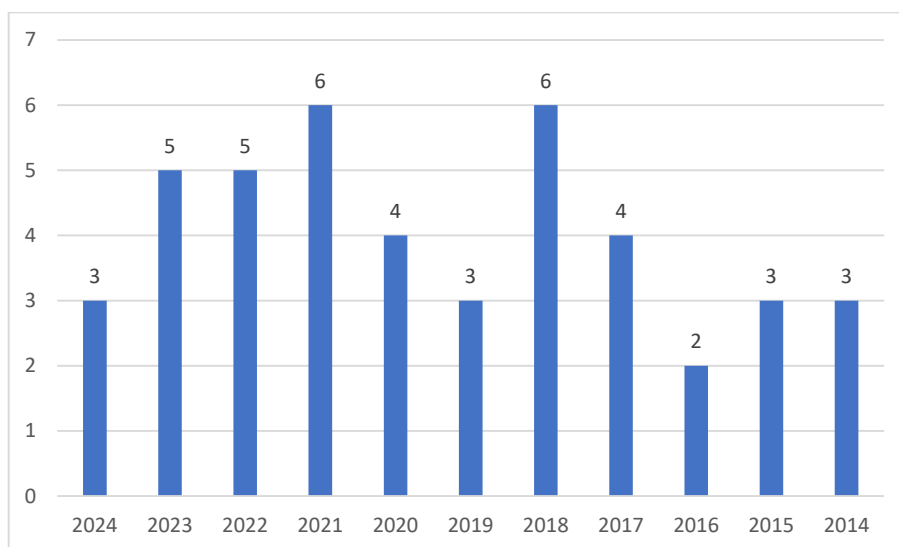


Figure 3: Number of studies per year

6. Data Analysis

We employed meta-analysis techniques to statistically combine the findings from the included studies. Depending on the data availability and heterogeneity of the studies, mixed-effects models were used to account for potential variability between them. Forest plots were generated to visually represent each variable's effect sizes, confidence intervals, and overall effect size.

RESULTS & DISCUSSION

Overall Relationship with Financial Inclusion

The mixed effects model regression analysis revealed a statistically significant positive association (Coef. = 0.10163, p = 0.0435) between fintech ecosystems and the overall financial inclusion score (Table 2). However, it is important to consider that the coefficient value suggests a moderate, not strong, association. This finding reveals a potential positive influence of fintech ecosystems on financial inclusion, but further research is needed to solidify this relationship and explore the underlying mechanisms. Additionally, the high standard error (0.0242813) compared to the coefficient indicates some uncertainty in the estimate of the association.

Table 2: Mixed effects ML regression

Number of observations = 44
 Log-likelihood = -54.514975
 Wald chi² (1) = 3.92
 Prob > chi² = 0.0435

Financial inclusion	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]
Fintech ecosystem	0.10163	.0242813	3.10	0.0435	0.037092 .1732846

_cons	.4862628	.1307953	3.72	0.000	.2299087	.7426169
Random effects Parameters	Estimate	Std. Err.	[95% Confidence Interval]			
Var (Residual)	.6977296	.1487565	.4594205 - 1.059654			

Relationship with Specific Aspects of Financial Inclusion

We conducted separate meta-analyses to explore the relationship between fintech ecosystems and the four aspects of financial inclusion (Table 3). The primary model's goal variables were financial behavior, credit and investment, and mobile banking. The sample's size-corrected correlation (r), the number of times the link was evaluated (R), and the confidence interval (lower and upper limits) for the 95% confidence level are all included. Lastly, about the last criterion, if the interval contains the number zero, then the association is only deemed to be non-statistically significant. If they do not, they are regarded as statistically significant. Furthermore, most associations exhibit a high degree of heterogeneity, above 90%, indicating that genuine heterogeneity across studies, rather than sampling error, is the reason for the variation in effect sizes. As a result, the suitability of the random effect model may be verified. They are regarded as statistically significant otherwise. The results highlight significant positive associations between fintech ecosystems and several sub-dimensions:

- **Financial behavior/access:** Digital consumerism ($r = 0.83$), service trust ($r = 0.50$), social influence ($r = 0.52$), financial education ($r = 0.53$), and internet penetration ($r = 0.54$) emerged as key drivers of financial behavior/access.
- **Mobile banking:** Account ownership ($r = 0.64$), mobile phone use in financial transactions ($r = 0.67$), mobile payments ($r = 0.62$), and digital banking ($r = 0.63$) exhibited strong positive correlations with mobile banking penetration.
- **Credit access:** Fintech credit ($r = 0.68$) displayed the most significant positive association with access to credit, followed by regulatory technology (RegTech) ($r = 0.55$).
- **Investment:** Financial capability ($r = 0.64$) emerged as the most critical factor for investment opportunities within fintech ecosystems.

Table 3: Meta-analysis findings

Dependent Variable	Independent Variable	R	r	CI (95%)		Q-statistics	I ²	Weight
Financial Behavior/Access	Payment solutions	14	0.28	0.12	0.18	542.3	0.86	0.9
	Insurance	6	0.48	0.23	0.48	56.4	0.65	0.76
	Financial attitude	9	0.43	0.09	0.18	423.2	0.96	0.78
	Personal Finance	6	0.52	0.08	0.19	432.3	0.76	0.65
	Number of ATMS	3	0.32	0.11	0.44	543.3	0.54	0.34
	Number of POS	5	0.45	0.14	0.44	653.3	0.57	0.53
	Number of agent banking users	7	0.43	0.13	0.26	543.2	0.22	0.54
	Digital consumerism	6	0.83	0.27	0.29	512.3	0.56	0.56
	Financial literacy	9	0.42	0.01	0.12	732.3	0.67	0.7
	Financial inclusion advocacy	8	0.47	0.1	0.58	234.2	0.98	0.7
	Behavioral intention	11	0.49	0.07	0.38	542.2	0.56	1
	Service trust	13	0.50	0.05	0.39	753.2	0.43	1
	Social influence	15	0.52	0.03	0.41	864.5	0.67	1
	Financial education	6	0.53	0.01	0.42	953.3	88	0.78
Internet penetration	8	0.54	0.32	0.43	1043.4	0.56	0.65	

Mobile Banking	Number of mobile banking users	6	0.56	0.21	0.45	1097.4	0.74	0.34
	Number of Internet banking users	7	0.57	0.56	0.78	1154.3	0.75	0.53
	Mobile money aggregation	9	0.59	0.23	0.56	1165.4	0.46	0.54
	Usability	5	0.60	0.05	0.39	432.2	0.56	0.56
	Mobile payments	8	0.62	0.03	0.41	1163.3	0.97	0.7
	Digital banking	8	0.63	0.01	0.42	1089.3	0.86	0.78
	Ownership of accounts	7	0.64	0.32	0.43	943.3	0.84	0.67
	Mobile users	16	0.53	0.27	0.29	1431.3	0.54	1
	Mobile phones in financial transactions	13	0.67	0.01	0.12	943.2	0.57	1
Investment	Expenditures on Fintech	9	0.43	0.1	0.58	432.3	0.22	0.9
	Utilities and online payment	6	0.34	0.07	0.38	764.1	0.56	0.7
	Financial capability	7	0.64	0.23	0.48	765.4	0.67	0.6
	Regulatory environment	5	0.23	0.09	0.18	543.8	0.67	0.6
	Technology support	6	0.21	0.08	0.19	987.3	88	0.7
	Microfinance	4	0.23	0.01	0.424	766.0	0.56	0.45
	Self-efficacy	3	0.42	0.32	0.438	43.2	0.74	0.31
Credit	Blockchain	5	0.25	0.27	0.29	55.4	0.75	0.56
	Regulatory tech	2	0.55	0.01	0.123	76.3	0.46	0.13
	Fintech credit	13	0.68	0.1	0.58	543.7	0.56	1
	Secured bank credit	8	0.38	0.07	0.38	987.3	0.97	0.78
	Internet use in financial transactions	14	0.40	0.23	0.56	1067.3	0.86	1

Heterogeneity and Publication Bias

The significant Q-statistics and I^2 values for most associations in Table 3 indicate substantial heterogeneity across studies. This suggests that factors beyond sampling error contribute to the variation in effect sizes. Further research is warranted to explore potential moderators that explain this heterogeneity. Formal tests for publication bias were not conducted due to the limited number of studies within some sub-categories (e.g., RegTech). However, future research with larger sample sizes should employ appropriate methods to assess publication bias.

Weight Analysis Results:

Weight analysis assigns a value to each variable based on its frequency as a significant predictor in the studies reviewed. Here, a higher weight indicates a stronger influence on financial inclusion, as shown in Table 3, and several fintech components emerged as the most impactful. These components consistently appeared as significant predictors across the studies, suggesting their critical role in driving financial inclusion. By integrating the meta-analysis with the weight analysis, we comprehensively understand the relationship between fintech ecosystems and financial inclusion. Figure 4 shows the forest plot that examines how various factors influence financial behavior in areas like mobile banking, investment, and credit access. It highlights the importance of financial literacy, trust in services, supportive regulations, and technological infrastructure. Notably, factors like intention to use mobile banking and access to existing services seem more influential for mobile banking adoption. At the same

time, regulations and technology play a bigger role in investment decisions, and traditional and fintech credit options are the primary sources for obtaining credit.

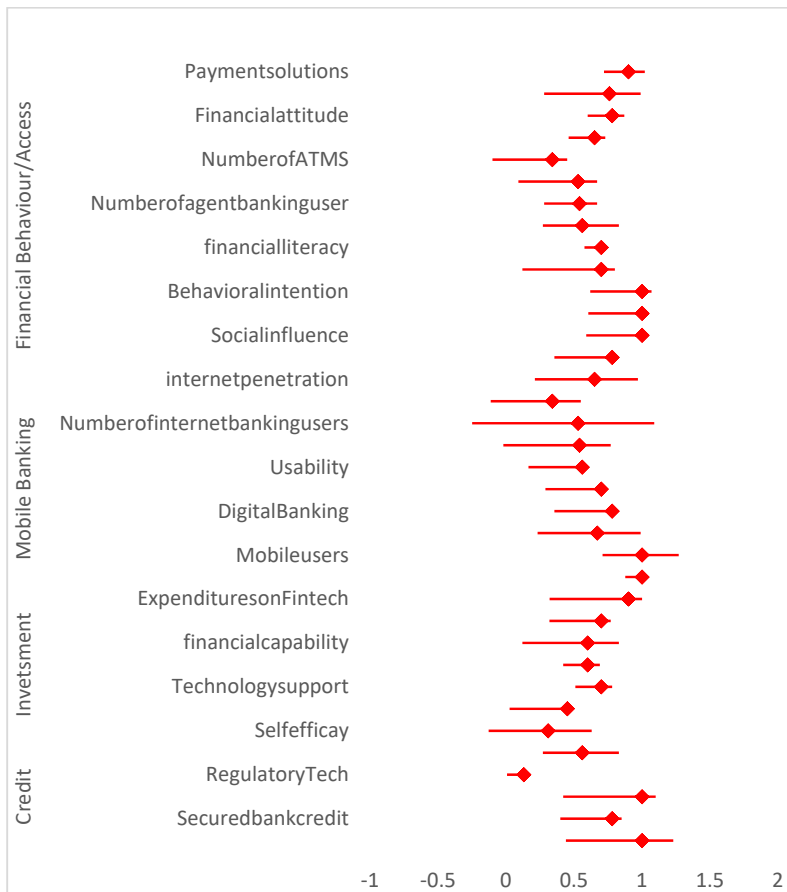


Figure 4: Forest plot

From the analysis, this study found out how traditional financial institutions (FIs) can collaborate with fintech companies to leverage their combined strengths and broaden the reach of financial services. This collaboration can take many forms, such as traditional FIs providing funding to fintech startups or partnering with fintech companies to offer new financial products and services.

Furthermore, these interactions, along with other key components of fintech ecosystems, influence financial inclusion in several ways. For example, fintech companies can develop new financial products and services that are more accessible and affordable for underserved populations. Traditional FIs can also benefit from collaborating with fintech companies to improve their own products and services and reach new customers. Additionally, fintech ecosystems can help to promote financial literacy and education, which is essential for financial inclusion.

CONCLUSION

This study employed a meta-analysis approach to investigate the intricate relationship between fintech ecosystems and financial inclusion across four key aspects: financial behavior and access, mobile banking, credit access, and investment opportunities. Our findings reveal a statistically significant positive association between robust fintech ecosystems and increased financial inclusion. However, the observed effect size is moderate, suggesting further research is needed to understand the underlying mechanisms thoroughly.

This research sheds light on the specific components within fintech ecosystems that contribute most significantly to financial inclusion. Factors like digital consumerism, internet penetration, service trust, and financial education emerge as crucial drivers for financial behavior and access. Mobile banking is supported by mobile phone ownership and use in financial transactions, mobile payments, and digital banking solutions. Fintech credit offerings and regtech are prominent in expanding access within the credit access aspect. Finally, financial capability and expenditures are the most critical factors for investment opportunities within fintech ecosystems, as shown in Figure 5.

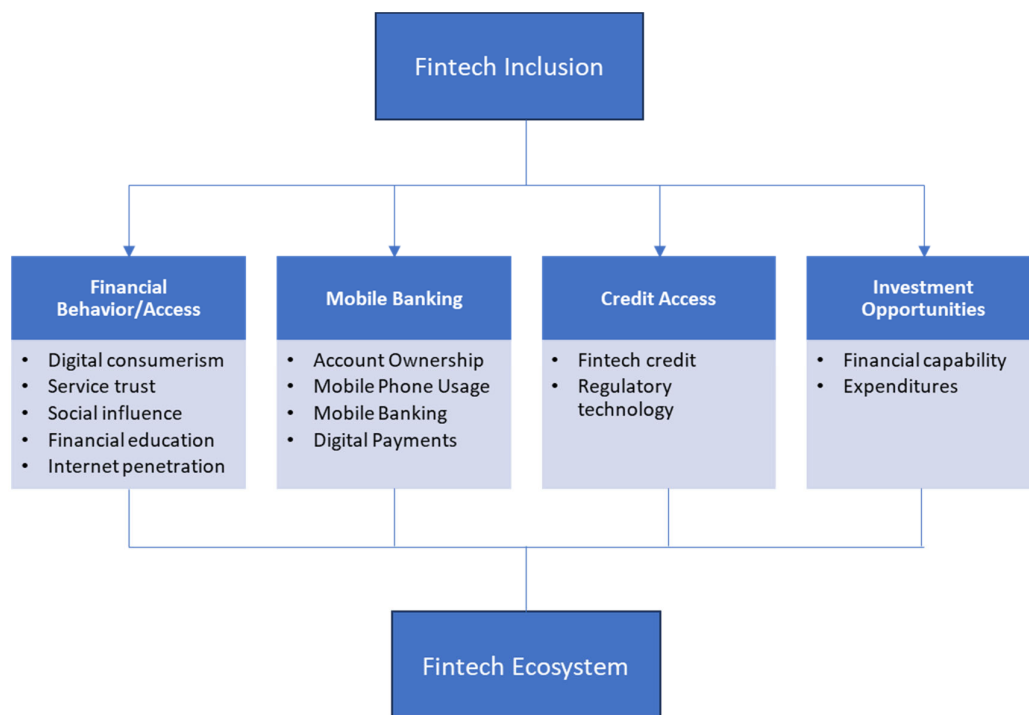


Figure 5: Study model

These findings provide valuable implications for policymakers and industry leaders working to bridge the financial divide. By fostering targeted interventions that leverage these key fintech components, stakeholders can empower individuals and communities to participate more actively in the formal financial system. Future research can delve deeper into understanding the varying impacts of fintech across different demographics and geographic contexts. Additionally, exploring the long-term sustainability of these fintech-driven financial inclusion efforts would be a valuable area of future inquiry.

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