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POLICY IMPERATIVES FOR ENHANCING FINANCIAL INCLUSION IN SUB-SAHARAN AFRICA THROUGH ICT-DRIVEN FINANCIAL TECHNOLOGIES

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Abstract:

Financial inclusion plays a crucial role in fostering inclusive development, particularly in less affluent nations. This research examines the connection between financial ICT-technologies and financial inclusion in Sub-Saharan Africa (SSA) using panel data spanning from 1999 to 2023. Previous research has explored the impact of financial technology on financial inclusion across various countries, employing diverse methodologies. The outcomes of these studies have yielded mixed results, depending on the country and analytical models utilized. To address these inconsistencies, this study aims to determine whether financial technology contributes to the growth of financial inclusion specifically within SSA countries. Empirical research indicates that financial inclusion in Sub-Saharan Africa (SSA) is strongly linked to various financial technologies. This study examines several aspects of ICT-driven financial technologies, including the percentage of individuals using the internet, fixed telephone and mobile cellular subscriptions per 100 people, and fixed broadband subscriptions. The research aims to determine which of these technologies significantly influence financial inclusion in the studied nations. The results reveal that, as anticipated, most financial technology aspects positively impact financial inclusion, though the effects differ across various dimensions. Significant correlations exist between financial inclusion growth and factors such as fixed broadband and telephone subscriptions per 100 people, internet usage percentage, and mobile cellular subscriptions per 100 people. Interestingly, fixed broadband subscriptions appear to hinder financial inclusion growth in SSA countries.

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1.0 INTRODUCTION

Financial inclusion is widely acknowledged as a cornerstone of sustainable development, particularly in the Global South. In Sub-Saharan Africa (SSA), a significant portion of the population remains unbanked or underbanked, hindering economic participation and poverty alleviation. The deployment of financial technologies (FinTech), especially through ICT-driven platforms, has emerged as a transformative mechanism for improving access to financial services. Despite the proliferation of digital technologies, financial exclusion persists due to infrastructural, socioeconomic, and policy limitations.

This paper investigates the potential of ICT-driven FinTech in enhancing financial inclusion within SSA, emphasizing the sustainability dimension—economic empowerment, poverty reduction, and equitable development. The research is grounded in empirical data from 1999 to 2023 and identifies technological interventions and policy actions required to scale inclusive finance[1]. Current debates have centered on financial inclusion, financial technology, and digital finance. These conversations extend beyond their purported importance as drivers of economic development to encompass the evolution of financial services in the post-COVID-19 era. World Bank research indicates that 1.7 billion people globally lack bank accounts[2]. Unbanked adults are currently excluded from financial services due to their limited engagement with formal financial institutions. In essence, being underbanked signifies that a segment of the adult population either does not use any financial services or does not possess a bank account[3].The development of contemporary banking has been supported by two pillars that are based on technology[4]. A third option to online and mobile banking has developed in the form of payment banks, which has helped

[1] Oladotun Larry Anifowose and Bibi Zaheenah Chummun, 'A Panel Data Analysis of Determinants of Financial Inclusion in Sub-Saharan Africa (SSA) Countries from 1999 to 2024' (2025) 18(5) *Journal of Risk and Financial Management* 275.

[2] Demirgüç-Kunt A and others, 'The Global Findex Database 2017: Measuring financial inclusion and opportunities to expand access to and use of financial services' 34 S2

[3] Ediagbonya V and Tioluwani CJTS, 'The role of fintech in driving financial inclusion in developing and emerging markets: issues, challenges and prospects' 2 100

[4] Ma J and others, 'The 2021 battery technology roadmap' 54 Journal of Physics D: Applied Physics 183001

to improve operational effectiveness and save costs connected with delivering services to clients in rural and semi-urban regions[5].
The deployment of Fintech has hastened the current development of financial services. Fintech innovations include the development of online banking services and mobile money. The financial planning process and the economy are influenced by these technologies. To remain innovative and competitive, financial services must embrace fintech. Financial technology can be described as an ecosystem due to its ability to deliver financial services at reduced costs. The five components of the Fintech ecosystem are the government, technology developers, financial clients, Fintech start-ups, and conventional financial institutions like banks. Several financial institutions have partnered with fintech companies to enhance the financial services they now provide. Making financial services more accessible to customers can help to lessen the existing social and economic inequalities. This may be accomplished by using digital finance, which will enhance the economy's stability[6].

Research indicates that digital technology generally enhances financial inclusion; however, further investigation is required, especially in Sub-Saharan African nations. The discussion focuses on how financial technologies influence financial inclusion across Africa. Despite advancements in digital technology, financial inclusion rates remain low, largely due to limited internet access for a significant portion of the population[7]. Additionally, low levels of technical and financial literacy have significantly contributed to financial exclusion on the continent[8]. As a result, exclusion from the formal financial system continues to be a major obstacle to reducing poverty in Africa: This paper is divided into six sections. Following this introduction, Section II provides a conceptual and theoretical clarification of financial inclusion and financial technologies. Section III presents the methodology used in the paper. Section IV presents the results and discussion of the results.

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[5] Asif M and others, 'The impact of fintech and digital financial services on financial inclusion in India' 16 Journal of Risk and Financial Management 122

[6] Telukdarie A and Mungar A, 'The impact of digital financial technology on accelerating financial inclusion in developing economies' 217 Procedia computer science 670

[7] Duvendack M and Mader PJJoES, 'Impact of financial inclusion in low-and middle-income countries: A systematic review of reviews' 34 594

[8] Evans O, 'Connecting the poor: the internet, mobile phones and financial inclusion in Africa' 20 Digital Policy, Regulation

Section V presents the legal recommendations approaches for addressing the challenges and gaps in existing legal and policy frameworks that hinder the integration of sustainability in digital financial inclusion. Section VI concludes the paper with key insights recommendations and summary of the paper.

2.0 LITERATURE REVIEW AND GAPS IN EXISTING LAWS AND POLICIES CONCERNING INTEGRATING SUSTAINABILITY

This segment offers a comprehensive review of financial technology and financial inclusion, encompassing conceptual, theoretical, empirical aspects and gaps in existing laws and policies concerning integrating sustainability.

2.1 Conceptual Clarification: Financial Inclusion and ICT-Driven Fintech in SSA

This section unpacks the key concepts relevant to the discussion: Financial Inclusion: Defined as the access to and use of formal financial services by all segments of society, especially underserved populations. It ensures availability, affordability, and appropriate usage of banking services, including savings, loans, insurance, and digital payments. ICT-Driven Financial Technologies: Refers to digital innovations (e.g., mobile money, internet banking, broadband-based services) that facilitate financial transactions and services. Components include internet access, mobile subscriptions, and fixed broadband networks.

In many developing countries, financial inclusion has become a top priority on their policy agendas. This is demonstrated by a number of G20 statements, the creation of financial inclusion departments within central banks and finance ministries, and the setting of clear financial inclusion goals. However, a crucial aspect of policymaking involves the ability to measure progress towards these objectives. Over the past decade, significant advancements have been made in evaluating financial inclusion globally. This capability for measurement has been vital in tracking advancements resulting from financial innovation and policy interventions.

Different viewpoints define financial inclusion in different ways. In general, it relates to people's capacity to conveniently, dependably, and flexibly access and utilize basic financial services like insurance, loans, and savings. Conventional wisdom emphasizes the availability of a wide range of reasonably priced financial services as a catalyst for economic expansion. On the other hand, financial inclusion may also be understood as fostering fair and equal access to financial services throughout society by guaranteeing that low-income and underprivileged groups have access to banking services at affordable prices. In its broadest definition, financial inclusion seeks to guarantee that everyone has fair access to financial resources, goods, and services[9][10]. The goal of financial inclusion initiatives is to increase access to and promote the usage of suitable financial services. It plays a vital role in economic development and is regarded as a process that ensures all segments of society, including vulnerable groups such as low-income individuals and micro, small, and medium enterprises (MSMEs), have access to suitable financial products and services.

2.2 Theoretical Review

The theories that underpin the relationship between financial technology and financial inclusion are described in this section. Silber's Constraint Theory of Innovation, the Financial Intermediation Theory, and the Innovation Diffusion Theory are among the important theories.

2.2.1 Innovation Diffusion Theory

In his groundbreaking 1937 research paper, Keynes introduced the Financial Intermediation Theory, which explains a system where individuals, organizations, and entities with surplus funds deposit them in financial institutions. These institutions then provide loans to those in need of capital[11]. Essentially, this process enables the transfer of resources from net savers to net spenders. [12]further examined liquidity management, categorizing it into four functions: operational, restricted,

[9] Chummun ZB and Bisschoff C, 'A Comparison of two Models to measure' (2019)

[10] Chummun ZB and Bisschoff CA, 'A Theoretical Model to Measure the Business Success of Micro-insurance (MI) in South Africa' (2014) 5 Journal of Economics 87

[11] Keynes, 'The general theory of employment' 51 The quarterly journal of economics 209

[12] Diamond DW and Dybvig, 'Bank runs, deposit insurance, and liquidity' 91 401

contingent, and strategic. Operational liquidity covers cash required for daily transactions and timely bill payments. Restricted liquidity is designated for specific business activities, while contingent liquidity is set aside to address financial obligations during periods of economic uncertainty. Strategic liquidity, on the other hand, is allocated for future business needs beyond routine operations. Financial institutions play a crucial role in transforming assets into liquid commitments. Since savers are generally risk-averse and face uncertainty regarding inflation and future consumption, financial intermediaries help balance the trade-off between long- term investments, which offer higher returns, and the need for liquidity.

Financial intermediaries are primarily recognized for creating unique financial products [13]. These products are introduced whenever the intermediary identifies an opportunity to sell them at prices that cover all associated opportunity and direct costs. Market imperfections are the reason for the existence and success of financial intermediaries, as they would not exist in ideal markets without transaction or information costs. Many markets exhibit varying levels of information among participants. Moral hazard impedes the sharing of information, which is crucial for investors to fund significant projects.

Financial intermediation refers to the processes and mechanisms financial institutions use to channel funds from savers to borrowers[14][15]. Typically, investors lend money to financial institutions, such as banks, at favorable rates, and these institutions, in turn, provide loans to individuals and businesses. Investors often avoid direct lending because financial intermediaries have sophisticated credit risk monitoring systems. Additionally, these institutions offer secondary financial instruments, enabling clients and investors to purchase primary securities[16]. When

[13] Coimbra N and Rey H, 'Financial cycles with heterogeneous intermediaries' 91 Review of Economic Studies 817

[14] Coimbra N and Rey H, 'Financial cycles with heterogeneous intermediaries' (2024) 91 Review of Economic Studies 817

[15] Chummun ZB and Bisschoff CA, 'A Theoretical Model to Measure the Business Success of Micro-insurance (MI) in South Africa' (2014) 5 Journal of Economics 87

[16] Boulware DR and others, 'Timing of antiretroviral therapy after diagnosis of cryptococcal meningitis' 370 2487

financial intermediary services are available, they are often a more efficient option than direct investment. However, in some cases, investors may find it more cost-effective to purchase primary securities directly rather than acquiring secondary assets through an intermediary, thereby avoiding intermediation fees.

Income inequality and scarcity traps are exacerbated by financial market disruptions and inefficiencies. Asymmetric information and transaction costs are two examples of factors that have a big impact on capital investment and return decisions. The study's foundation is this theory, which looks at financial inclusion from the perspective of financial intermediation. It also examines how financial innovations can be used to expand services to the unbanked population and the level of financial intermediation needed to enhance financial inclusion[17].
An effective financial intermediary efficiently transfers funds from savers to borrowers for productive use at a reasonable cost, contributing to economic growth and development. This implies that FinTech plays a crucial role in disrupting traditional banking by reducing reliance on conventional intermediaries. Transaction costs have historically been a key consideration in evaluating the function of financial intermediaries, including the FinTech services analyzed in this study [18].

One limitation of this intermediation theory is that it overlooks the role of lenders in managing risk within financing relationships. Additionally, it assumes that financial intermediaries have a fixed role in addressing market inefficiencies, lowering transaction costs, and mitigating information asymmetries.

2.2.2 Financial Intermediation Theory

Rogers first proposed this theory in 1969, arguing that organizations should strategically adopt innovations to strengthen their market

[17] Jerinabi U and Santhi P, Creativity, innovation and entrepreneurship, vol 1 (Allied Publishers 2012)
[18] Lynn T and others, Harness the crowd: An exploration of the crowdfunding community on Twitter (2017)

position, enhance competitiveness, and lower costs[19]. The theory suggests that market adoption of innovation depends on its perceived relative advantage, with newer products often being preferred. Additionally, it emphasizes the role of consumer personality in purchasing behavior, as individuals are more likely to switch to products they perceive as offering greater value than existing alternatives.

2.2.3 Silber's Constraint Theory of Innovation

In 1983, William Silber developed and presented this theory. Financial innovations are designed to boost profits by utilizing technology to enhance productivity in areas where a company faces bottlenecks. The theory suggests that the efficiency of an organization's operations limits its ability to maximize profits. Silber noted that certain limitations, such as administrative management problems, hinder profit maximization. Furthermore, government regulations and controls present obstacles for companies trying to increase their profits. As a result, financial institutions seek to reduce or bypass these regulations to optimize their profitability. Although these constraints encourage a firm management approach, they also slow down the pace of financial institutions, leading them to focus on cutting costs.

Research indicates that organizations tend to innovate more actively when facing challenges in achieving high profitability in specific areas. This inclination aligns with Silber's *Constraint Theory of Innovation*, which suggests that investing in technology and innovation enables organizations to counter competitive pressures effectively. Such efforts not only defend market positions but also contribute to improved profitability and long-term sustainability. FinTech innovations, as examples of financial innovation, can be analyzed effectively through the lens of Silber's theory. The framework highlights critical variables and their interplay with financial inclusion. Nevertheless, like other innovation theories, Silber's approach has its limitations. It often fails to account for real-world complexities such as incomplete markets, principal-agent issues, regulatory constraints, market volatility, tax

[19] Rogers EM, Singhal A and Quinlan MM, 'Diffusion of innovations' in an integrated approach to communication theory and research (Routledge 2014)

implications, asymmetric information, and other economic dynamics. As a result, they may offer an idealized perspective that portrays financial innovations as instruments that create flawless financial markets, while minimizing the importance of risk factors in the operations of financial institutions. The theoretical foundations are Financial Intermediation Theory explains the role of institutions in channeling funds from savers to borrowers. Secondly, Innovation Diffusion Theory (Rogers) contextualizes the adoption of digital tools based on perceived benefits. Lastly, Silber's Constraint Theory emphasizes innovation as a response to structural bottlenecks in financial institutions.

2.3 Empirical Reviews Related to Financial Technologies on Financial Inclusion

In order to increase financial inclusion in rural India,[20]looked into the main factors impacting the adoption of disruptive financial technology. In order to help the future use of financial technology in these locations, the study experimentally investigated how technology fosters entrepreneurship in undeveloped areas. The researchers used inferential statistics to test their hypotheses using a quantitative methodology. They evaluated the effect of FinTech on financial inclusion in rural India using structural equation modeling and conducted exploratory factor analysis to pinpoint important components. The findings demonstrated that in rural India, social influence factors positively impacted the intention to employ managerial technology.

[21]examined how FinTech promotes financial inclusion and assessed how it affects Egypt's financial industry. By carefully examining pertinent literature, the study sought to provide a comprehensive grasp of the subject. A survey was used to gather information from respondents in Egypt. The impact of elements like behavioral intention, social influence, service trust, and usability on the adoption of FinTech for advancing financial inclusion was evaluated using statistical techniques such as

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[20] Goswami S, Sharma RB and Chouhan V, 'Impact of financial technology (Fintech) on financial inclusion (FI) in Rural India' 10 Universal Journal of Accounting Finance 483

[21] Abdelfattah RMM, 'The Impact of Fintech on Financial Inclusion in Egypt' (The German University in Cairo 2023)

correlation analysis and multivariate regression. The results demonstrated how important people's intention to use FinTech services and their level of trust in them are to achieving financial inclusion goals. With a focus on Sub-Saharan Africa (SSA),[22]investigated the connection between financial technologies and financial inclusion in emerging nations. The study performed a thorough evaluation of pertinent published materials using an exploratory research approach, using information from reliable sources like the World Bank, the Enhancing Financial Inclusion Surveys, and Global Findex reports. Although efforts to improve financial inclusion in SSA countries have benefited from the adoption of financial technologies, the study found obstacles like inadequate system interoperability, socioculturally shaped gender-related issues, worries about data privacy violations, and FinTech companies' propensity to prioritize urban areas over underserved rural regions, which impedes progress.

The possibility of financial inclusion to improve the lives of low-income people is a topic that is still being extensively studied, as examined by [23]. Many people in developing nations reside in rural locations, which restricts their access to financial services. One promising way to speed up financial inclusion in these emerging nations is through digital financial technologies. Strong evidence from earlier research suggests that the economy could gain from a stronger emphasis on financial inclusion. Artificial intelligence and other digital technologies have a lot of promise as useful instruments for facilitating people in poor nations' access to financial institutions and their offerings[24].

The majority of research indicates that ICT and FinTech are important forces behind financial inclusion, with a few notable exceptions, as [25]. Furthermore, a large body of research indicates a robust relationship

[22] Ogunode OA and Akintoye RI, 'Financial technologies and financial inclusion in emerging economies: perspectives from Nigeria' (2023) 23 Asian Journal of Economics, Business and Accounting 38

[23] Telukdarie A and Mungar A, 'The impact of digital financial technology on accelerating financial inclusion in developing economies' 217 Procedia computer science 670

[24] Chummun BZ and Singh, 'Factors influencing the quality of decision-making using business intelligence in a metal rolling plant in KwaZulu-Natal' 8 108

[25] Tchamyou VS, Erreygers G and Cassimon D, 'Inequality, ICT and financial access in Africa' 139 Technological Forecasting Social Change 169

between financial inclusion and mobile phone penetration, both internationally and domestically[26]. Additionally, mobile money use and financial inclusion for people and enterprises are positively correlated. According to[27], households with mobile money accounts are more likely to have bank accounts, send and receive remittances more frequently, and save more money.

Empirical Evidence: Studies from SSA and beyond reveal that while internet use and mobile technology foster inclusion, infrastructural and policy limitations—like over-reliance on fixed broadband—can impede progress.

2.4 Gaps in Existing Laws and Policies Concerning Integrating Sustainability

Despite policy declarations, several gaps impede sustainable financial inclusion in SSA:

1. Fragmented Regulatory Frameworks: Many SSA countries lack harmonized laws governing FinTech innovations, leading to regulatory uncertainty.
2. Absence of Clear Sustainability Mandates: Existing financial inclusion strategies often ignore or inadequately integrate sustainable development goals (SDGs), particularly those targeting inequality and digital access.
3. Neglect of Rural and Gender Dimensions: Policies often fail to address sociocultural barriers and gender disparities, limiting outreach to rural women and marginalized communities.
4. Overlooked Data Privacy and Consumer Protection: Rapid FinTech adoption has outpaced legal safeguards for data privacy, consumer rights, and cyber-resilience.

Because of the discrepancies in earlier research on the effects of financial technology on financial inclusion in various nations, the study finds a research vacuum. In particular, previous studies have shown different

[26] Ghosh S and Vinod D, 'Furthering the financial inclusion agenda in India: how important is gender?' (2016) Economic and Political Weekly 126

[27] Ouma SA, Odongo TM and Were M, 'Mobile financial services and financial inclusion: Is it a boon for savings mobilization?' 7 Review of development finance 29

findings based on the nations studied and the methodologies employed. This disparity highlights the need for more focused studies on the unique circumstances of Sub-Saharan Africa in order to gain a better understanding of the ways in which various ICT-driven financial technologies impact financial inclusion in the region. Using panel data from 1999 to 2023, the study attempts to resolve this discrepancy by offering empirical proof of the contribution of financial technologies to enhancing financial inclusion in SSA nations.

3.0 METHODOLOGY

The model will be modified to evaluate the effect of financial technology on financial inclusion in Sub-Saharan African nations, drawing from the recent work of [28]which at first only looked at Kenya. This is the model.
$FIIi,\ t = \alpha 0 + \alpha 1(\text{FIBS}i,t) + \alpha 2(\text{FBSP}i,t) + \alpha 3(\text{FTS}i,t) + \alpha 4(\text{IUIP}\ i,t) + \alpha 5(\text{FTSPP}i,t) + \alpha 6(\text{MCS}i,t) + \alpha 7(MCSPPi,t) + \epsilon i,t$
Table 1 present the expected sign of the variables of the above model.

Table 1: Priori Expectation

	A priori expectation			
S/N	**Variable**	**Abbreviation**	**Variable Measurement**	**Expected Sign**
1	Financial Inclusion Index	FII	Annually	**+ / -**
	Financial Technology proxies			
2	Fixed Broadband Subscriptions	FBS	Annually	**+**
3	Fixed Broadband Subscriptions Per 100 People	FBSP	Annually	**+**
4	Fixed Telephone Subscriptions	FTS	Annually	**+**
5	Individuals Using the Internet of Population	IUIP	Annually	**+**

[28] Kamau L and Aduda J, 'The Effect of Financial Technologies on Financial Inclusion in Kenya' (2024) 2 Journal of Economics, Finance and Business Analytics 45

6	Fixed Telephone Subscriptions Per 100 People	FTSP	Annually	+
7	Mobile Cellular Subscriptions	MCS	Annually	+ / -
8	Mobile Cellular Subscriptions Per 100 People	MCSPP	Annually	+ / -
Ln= Natural Logarithm; α_0= Intercept term; α_1= parameter estimates Ɛ = Error term				

Source: Created by Authors (2025)

4.0 RESULT AND DISCUSSION

Table 2: summarizes the descriptive statistics for each of the variables in your dataset, including mean, median, maximum, minimum, and number of observations (645) for each variable.

Table 2: Descriptive Statistics

	FINTECH	FBSP	FBS	FTS	FTSPP	IUIP	MCS	MCSPP
Mean	65.02	614.73	100498.70	271723.80	3.39	1414.89	12715101.00	63.411
Median	34.67	0.13	10000.00	76354.00	1.03	8.43	3665661.00	57.232
Max	506.14	395813.00	18455836.00	4917000.00	36.88	902253.00	204000000.00	185.559
Min	0.00	0.00	0.00	0.00	0.00	0.11	73.60	0.070
Obs	645.00	645.00	645.00	645.00	645.00	645.00	645.00	645.000

Source: Created by Authors (2025)

Table 3 below show the correlation matrix show that FII is moderately positively correlated with FTSPP and MCSPP, suggesting these two variables might be key predictors in influencing FII.FTS and MCS show

weak to moderate correlations with several other variables, but none of them are highly correlated with FII.

Table 3: Correlation Matrix

+	FII	FBSP	FBS	FTS	FTSPP	IUIP	MCS	MCSPP
FII	1							
FBSP	-0.013	1						
FBS	-0.014	0.961	1					
FTS	-0.052	-0.014	0.146	1				
FTSPP	0.565	-0.011	0.016	0.164	1			
IUIP	-0.013	1.000	0.961	-0.014	-0.011	1		
MCS	0.017	-0.020	0.119	0.358	-0.132	-0.020	1	
MCSPP	0.491	-0.019	0.087	0.161	0.375	-0.019	0.270	1

Source: Created by Authors (2025)

The table lists the Kao Residual Cointegration Test and the Augmented Dickey-Fuller (ADF) Test, two crucial tests frequently employed in panel data research. Testing for Kao Residual Cointegration: The p-value of 0.2735 obtained from the test is higher than the standard significance level (e.g., 0.05). Consequently, we are unable to rule out the null hypothesis that there is no cointegration. This implies that the variables do not move in tandem over time and do not show a long-term equilibrium relationship. Regarding RESID(-1) and the Augmented Dickey-Fuller (ADF) Test: The t-statistic is -9.113919, the p-value is 0.0000, and the coefficient is -0.424927. According to these findings, the time series lacks a unit root since the residuals are stationary at the initial difference (D(RESID)). D (RESID (-1)): In addition, to being statistically significant, the coefficient is 0.200472, with a t-statistic of 3.422027 and a p-value of 0.0007. Consequently, the ADF test indicates that the residuals are stationary, whereas the Kao Residual Cointegration Test indicates that there is no cointegration among the variables. This indicates that the residuals are appropriate for additional investigation because they lack a unit root, even though the variables do not share a long-run equilibrium connection. In summary, Kao Co integration Test**:**

The variables do not appear to be co integrated, indicating no long-term relationship among them and ADF Test**:** The residuals are stationary at the first difference, suggesting that there is no unit root, and the model can be considered stable in the short term.

Table 4: Kao Residual Cointegration Test

Kao Residual Cointegration Test				
Series: FII FBSP FBS FTS FTSPP IUIP MCS MCSPP				
Sample: 1999 2023				
Included observations: 1125				
Null Hypothesis: No cointegration				
Trend assumption: No deterministic trend				
User-specified lag length: 1				
Newey-West automatic bandwidth selection and Bartlett kernel				
		t-Statistic	Prob.	
ADF		-0.60219	0.2735	
Residual variance		802.6775		
Augmented Dickey-Fuller Test Equation		680.7116		
Method: Least Squares				
Sample (adjusted): 2002 2022				
Included observations: 522 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.42493	0.046624	-9.11392	0
D(RESID(-1))	0.200472	0.058583	3.422027	0.0007
R-squared	0.135146	Mean dependent var		-1.87263
Adjusted R-squared	0.133483	S.D. dependent var		32.59165
S.E. of regression	30.33856	Akaike info criterion		9.66654
Sum squared resid	478622.8	Schwarz criterion		9.682853
Log likelihood	-2520.97	Hannan-Quinn criter.		9.67293
Durbin-Watson stat	1.630349			

Source: Created by Authors (2025)

The outcomes of a panel data regression with Fixed Effects are shown in the table 5: The FBSP shows a large positive influence on FII and is highly significant ($p<0.05$). This shows that, when all other factors are held constant, FII rises by roughly 7.82 units for every unit increase in FBSP. Additionally, FBS has a negative coefficient and is statistically significant ($p<0.05$). This indicates that, when all other factors are held constant, FII falls by a negligible amount (-0.0000595 units) with every unit rise in FBS. Moreover, FTS does not appear to have a substantial

effect on FII, as it is not statistically significant (p>0.05). Additionally, FTSPP has a positive coefficient and is statistically significant (p<0.05). This indicates that, when all other factors are held constant, FII rises by roughly 5.56 units for every unit increase in FTSPP. Additionally, the following insights are revealed by the panel data regression utilizing Fixed Effects: IUIIP has a positive coefficient and is statistically significant (p<0.05). Keeping all other factors equal, a rise of one unit in IUIIP results in an increase of roughly 0.94 units in FII. MCS does not significantly affect FII in this model, as evidenced by the fact that it is not statistically significant (p>0.05). MCSPP has a beneficial effect and is statistically significant (p<0.05). Keeping all other factors equal, FII rises by about 0.27 units for every unit increase in MCSPP. The statistical performance and model fit: R-squared: 0.84669. This shows a strong overall fit, with the independent variables in the model accounting for about 84.67% of the variation in FII. R-squared adjusted: 0.833793. The model continues to explain about 83.38% of the variation in FII after controlling for the number of predictors, further demonstrating its resilience. At p=0.0000, the F-statistic is 65.61358. The joint significance of each independent variable in the model is tested using the F- statistic. An overall p-value of 0.0000 indicates that the independent variables collectively account for a significant portion of the variation in the dependent variable (FII).

Table 5: Panel Data Regression

Dependent Variable: FII				
Method: Panel Least Squares				
Sample (adjusted): 2000 2022				
Periods included: 23				
Cross-sections included: 44				
Total panel (unbalanced) observations: 645				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
FBS	-5.95E-05	1.32E-05	-4.50711	0.0000
FBSP	7.821543	0.708215	11.04403	0.0000
FTS	-6.94E-06	8.82E-06	-0.78717	0.4315
FTSP	5.663051	1.677838	3.375208	0.0008
IUIP	0.94485	0.181095	5.217431	0.0000
MCS	2.67E-07	1.77E-07	1.509996	0.1316
MCSPP	0.266245	0.080204	3.319614	0.001
C	-6111.57	439.8314	-13.8953	0
	Effects Specification			
Cross-section fixed (dummy variables)				
Root MSE	34.8188	R-squared	0.846697	
Mean dependent var	65.02326	Adjusted R-squared	0.833793	
S.D. dependent var	88.997	S.E. of regression	36.28277	
Akaike info criterion	10.09633	Sum squared resid	781964.9	
Schwarz criterion	10.44971	Log likelihood	-3205.07	
Hannan-Quinn criter.	10.23345	F-statistic	65.61358	
Durbin-Watson stat	0.830828	Prob(F-statistic)	0	

Source: Created by Authors (2025)

Panel data regression with Fixed Effects was used in the analysis. The findings demonstrated that the dependent variable, FII, is significantly impacted by the variables FBSP, FBS, FTSPP, IUIIP, and MCSPP. Nevertheless, it was determined that the variables FTS and MCS were not statistically significant. With an R-squared of 84.67%, the model explains a significant amount of the variance in FII. According to a study on how financial technology affects financial inclusion in SSA nations, FII is greatly influenced by FBSP, FBS, FTSPP, IUIIP, and MCSPP, but not by FTS or MCS. A considerable amount of the variance in FII can be explained by the model (R-squared = 84.67%).

5.0 LEGAL RECOMMENDATIONS APPROACHES FOR ADDRESSING THE CHALLENGES

To ensure inclusive and sustainable FinTech-driven financial inclusion in SSA, the following legal and policy approaches are recommended:

1. Enact Comprehensive Digital Finance Laws: Laws should incorporate principles of access, affordability, digital literacy, and consumer protection tailored to SSA contexts.
2. Mandate Sustainability Integration: Financial inclusion policies should be aligned with SDGs, mandating sustainability audits for digital financial programs.
3. Strengthen Regulatory Coordination: Establish cross-border regulatory frameworks for digital finance harmonization, involving central banks, FinTech innovators, and ICT authorities.
4. Promote Inclusive Access Policies: Enforce legal quotas or subsidies to expand broadband and mobile infrastructure in underserved regions, with a focus on gender inclusivity.
5. Enhance Data Governance: Introduce data privacy regulations specifically for digital financial services, incorporating GDPR-like protections within African Union jurisdictions.
6. Support Legal Capacity Building: Train judges, regulators, and legal practitioners in digital finance law and emerging FinTech regulatory challenges.

This paper has explored the transformative potential of ICT-driven financial technologies in promoting sustainable financial inclusion in Sub-Saharan Africa. The analysis highlights that while mobile and internet technologies contribute positively, legal and infrastructural bottlenecks impede progress. Addressing regulatory gaps and embedding sustainability within policy frameworks is essential. A harmonized, inclusive, and rights-based legal approach will be vital in achieving financial inclusion that is not only wide-reaching but also sustainable and equitable.

6.0 CONCLUSION

The findings demonstrated that while not all financial technology variables have the same degree of influence, the majority of them do have a beneficial impact on financial inclusion. Internet usage as a percentage of the population, mobile cellular subscriptions per 100 people, fixed broadband subscriptions, and fixed telephone subscriptions per 100 people are all strongly correlated with the expansion of financial inclusion. However, in SSA nations, fixed broadband subscriptions appear to be impeding the expansion of financial inclusion. This result is consistent with[29][30][31]. This paper has explored the transformative potential of ICT-driven financial technologies in promoting sustainable financial inclusion in Sub-Saharan Africa. It identified five major policy and regulatory challenges and proposed detailed, impact-specific legal and institutional frameworks to overcome them. The study emphasizes that harmonized legal systems, sustainability-driven policies, inclusive access laws, robust data governance, and institutional capacity building are critical to building an equitable and sustainable digital financial ecosystem in SSA. Future reforms should be guided by these principles to ensure no one is left behind in the digital finance revolution.

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[29] Oke D, Soetan R And Ayedun T, *Financial Inclusion and The Performance Of Micro, Small And Medium Enterprises In Southwest Nigeria* (2023)

[30] Ilori Db And Ilori Ma, 'Supply-Side Factors and Financial Inclusion Of Micro, Small And Medium Enterprises In Southwest, Nigeria' (2025)

[31] Anifowose OL and Chummun BZ, 'A Panel Data Analysis of Determinants of Financial Inclusion in Sub-Saharan Africa (SSA) Countries from 1999 to 2024' (2025) 18 Journal of Risk and Financial Management 275