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Transforming Financial Services in Sub Saharan Africa: The Interplay of Fintech, Insurtech and Financial Inclusion

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Abstract: This paper examines the evolution of Financial Technology (FinTech) and Insurance Technology (InsurTech) within the financial services industry and their role in promoting financial inclusion in Sub-Saharan Africa (SSA).The study focuses on a balanced panel of 22 SSA countries observed over a ten-year period from 2011 to 2021.Financial inclusion is analysed through indicators related to banking efficiency, resource allocation, labour investment, training efficiency, and green credit development. To address potential endogeneity issues inherent in panel data analysis, the Generalized Method of Moments (GMM) estimation technique is employed. The empirical findings reveal that the adoption of FinTech significantly enhances labour investment efficiency within banks across SSA. Results further indicate improved resource allocation and greater training efficiency, suggesting that digital financial innovations support more productive banking operations. The study also finds evidence that FinTech contributes positively to the expansion of green credit, supporting environmentally sustainable financing in the region. In contrast, the rapid growth of digital technologies combined with low levels of digital literacy, particularly among rural populations, limits the effectiveness of InsurTech in reducing insurance service costs. These challenges hinder the full potential of InsurTech to improve insurance accessibility and affordability in SSA. The study concludes that greater investment in financial education and workforce training programs related to InsurTech is essential to ensure smoother adoption, improved insurance penetration, and sustainable financial inclusion across Sub-Saharan Africa.

Keywords: FinTech, Banking sector, Digital money, Financial inclusion, InsurTech

Introduction

The structure of the financial services industry has been reshaped during the financial crisis in 2008 and post pandemic of covid-19 in 2020. It has revolutionized their business models shifting from traditional to Modern business model technologies. We have analysed the new innovative model such as FinTech, InsurTech and Financial Inclusion to have a better insight of this study.

FinTech covers digital solutions such as mobile banking, online payments, peer to peer financing, roboadvisory services, Blockchain transactions and Artificial Intelligence powered consumer interfaces. FinTech enhances efficiency, accessibility and ease in the financial services. Many researchers such as Zuojing et. (2024), Li et al. (2019), Mirza et al. (2023) and Cheng et al. (2024) have supported the idea that FinTech promotes potential benefit to the banking sector in the sense that it ensures long term growth in the development of the banks. However, there are some researches such as Aduba Jr, Asgari and Izawa (2023), Ferilli et al.(2024) have revealed that FinTech is considered as a disruptor to the financial sector. Given the fact that new technologies poses risk in terms of cyberattacks, system failures and data breaches within the industry.

InsurTech are driving innovation in the insurance sector such as implementing new technologies like big data, Blockchain, Internet of Things (IOT), Chatbots, Telematics and Artificial Intelligence that help in improving insurance product design, pricing, marketing and claims processes. InsurTech also improves data-driven client solutions, improves underwriting and risk management and reinvent existing business models as revealed by XU and Zweifel, (2020), Gupta et al. (2022) and Patel et al. (2022).

However, InsurTech is considered as a phenomenon as revealed by Ma and Ren (2023), Leong and Chen (2020), Thakor (2020), Lanfranchi and Grassi (2022), Dorfleitner, Lars et al. (2021) and Mullins et al. (2021). This is because, AI fraud detection system may be biased, resulting into false allegation of fraud. Moreover, a poor knowledge of the market as well as the high level of competition in the insurance sector would be a threat to existing companies, thus leading to digital disruption.

Financial inclusion is a crucial step towards sustainable development and economic progress and as such it helps in reducing poverty and promoting inclusive development. Financial Inclusion is growing at a reasonable rate given the widespread usage of mobile phones, digital technologies and artificial intelligence as supported by Osabutey and Jackson (2024), Salampasis and Mention (2018) and Bill and Melinda Gates Foundation (2019).

However, some researchers such as Dissaux (2023), Pang et al. (2022) and Ghosh (2021) still believe that innovation lead to financial exclusion instead of financial inclusion given the fact that new enterprises failed to flourish because of the restricted access to external finance, making such restrictions difficult to apply and therefore contributing to financial exclusion.

Literature Review

Impact of Fintech on Financial Inclusion in SSA

Digitalization and FinTech development in Africa have aimed to increase financial inclusion and alleviate poverty (Ellis L.C. Osabutey and Terence Jackson (2024)). Furthermore, Financial Inclusion is increasing at a respectable rate because of the widespread use of mobile phones, digital tools and Artificial Intelligence as supported by Salampasis and Mention (2018) and Bill & Melinda Gates Foundation (2019). The digital financial inclusion also ensures affordable and sustainable financial services for clients (Gomber et al., 2017).

Financial inclusion is vital for managing global crises like Covid-19 and climate shocks and as a result of which new advancement of technologies have been introduced to improve the environmental sustainability including reduced air pollution as supported by Murshed et al. (2023). Given the potential advantages to socioeconomic and environmental development, financial inclusion may play an important role in accomplishing the United Nations' Sustainable Development Goals (2024). According to Dissaux (2023) and Pang et al. (2022), Governments, firms and international organization prioritized innovation to support both new start up and established enterprises. However, new companies struggled to develop given the limited access to external funding, making such regulations challenging to implement and thus leading to financial exclusion.

Buckley et al. (2020) has investigated that the national regulatory framework face many issues due to FinTech innovation. The cross-border nature of FinTech services can complicate the regulatory efforts and increase a country's risk of compliance and enforcement issues. Thus, the inequal adoption of FinTech among the economies may lead to increased economic inequities.

Impact of Insurtech on Financial Inclusion in SSA

InsurTech that combines mobile internet, cloud computing and big data with traditional financial services has created new prospects for innovation in insurance firms in terms of high efficiency, omnidirectionality, stronger consumer reach and geographical penetration (Liu et al., 2023). For instance, artificial Intelligence may eliminate human errors in insurance underwriting and claims by utilizing machine learning capabilities. It can also automatically detect risks and increase company efficiency.

The higher the rates of digital technology adoption has led to a substantial shifts in the insurance business in terms of development of new and affordable insurance products as supported by Ostonokulov Azamat (2023). InsurTech therefore helps firms to achieve technology upgrades by widening financing channels, speeding funding availability, addressing financing challenges and providing effective financial assistance. It can enhance

organisations'risk tolerance, promote investment in high risk, high return initiatives, and increase investment efficiency.

Liu et al. (2023) has however revealed that the InsurTech development is still at the early stage which makes insurance firms' technology and the business model of the InsurTech start up complex around the world. Furthermore, there is a limited access to public data which lead to a shortage of data resources. Wu and Shao (2023) has investigated that there is huge gap in the digital literacy between urban and rural areas, with many rural citizens lacking the necessary skills to utilize InsurTech. Some group of people are still not aware on the InsurTech applications and thus it slow down the growth of the economy. Moreover, online buyers reported the obstacles encountered with the new technologies in place in terms of encountering with slow internet speed (Bhattarai, 2022).

Methodology

The evolution of FinTech and Insurtech on Financial Inclusion has been scrutinized, and the data has been collected from World Development Indicators database and Datastream. The models have been constructed in this functional form which is as follows:

$$\boldsymbol{Ln\ FINFORit = \alpha i + \beta 1\ Ln\ CPSit + \beta 2 Ln\ ATMSit + \beta 3 Ln\ CBBit + \beta 4 Ln\ LFit + \beta 5\ Ln\ EDUit + \varepsilon it}$$

Where,

FINFOR: FinTech Formation (years, t)
CPS: Credit to the Private Sector (% GDP)
ATMS: Automatic Teller Machines (per 100,000 adults)
CBB: Commercial Bank Branches (per 100,000 adults)
LF: Labour Force with advanced education (% of total working age population with advanced education)
EDU: Education Attainment, at least completed primary, population 25+ years, total (%) cumulative
ϵ: Error term

$$\boldsymbol{LNFPit = \beta 0 + \beta 1\ LNInsurtechit + \beta 2 LNLA\ Ratioit + \beta 3\ LNTAit + \beta 4\ LNIHIit + \beta 5\ LNDOIit + \beta 6\ LNROIit + \beta 7\ LNGDPit + \beta 8\ LNURit + \beta 9\ LNCPSit + \beta 10 LNLFit + \beta 11\ LNEDUit + \varepsilon it}$$

Where,

FP: Firm Performance
InsurTech: Degree of development of current InsurTech
LA Ratio: Liability Asset Ratio
TA: Total Asset
IHI: Insurance Herfendal Index
DOI: Density of Insurance
ROI: Return on Investment
GDP per Capita: Gross Domestic Product per Capita
UR: Urbanisation Rate
CPS: Credit to the Private Sector (% GDP)
LF: Labour Force with advanced education (% of total working age population with advanced education)
EDU: Education Attainment at least completed primary, population +25 years, total (%) cumulative
Ɛ: Error Term

The two model equations were constructed in this study whereby 22 Sub Saharan Africa have been taken into consideration including Angola, Botswana, Burkina Faso, Burundi, Cameroon, Congo (Dem. Rep.), Ethiopia, Ghana, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Nigeria, Rwanda, Seychelles, South Africa, Tanzania, Zambia and Zimbabwe and such data were collected for a period of 10 years from 2011 to 2021. The GMM Technique has been employed in this research paper in order to resolve potential endogeneity.

Results and Analysis

Results from Generalised Method of Moments Estimation (Banking)

The dynamic model equation is now as follows:

$$\mathbf{LNFINFOR_{it} = \beta_0 + \beta_1 LNFINFOR_{it-1} + \beta_2 LNCA_{it} + \beta_3 LNAQ_{it} + \beta_4 LNME_{it} + \beta_5 LNEPS_{it} + \beta_6 LNLR_{it} + \varepsilon_{it}}$$

Table 1. GMM results for banking

	GMM first step		GMM Second Step	
Variables	Coefficient	Sig.	Coefficient	Sig.
β_0	6.470		7.079	0.000***
β_1	0.165	0.224	0.207	0.211
β_2	-1.063	0.000***	-0.706	0.011***
β_3	0.950	0.000***	0.964	0.000***
β_4	0.041	0.000***	0.109	0.033**
β_5	-0.133	0.000***	-0.175	0.019**
β_6	-0.059	0.000***	-0.092	0.000***
	Number of instruments=10		Number of instruments=10	
	Number of groups=22		Number of groups=22	
	AR(1) (P-value)= 0.317		AR(1) (P-value)= 0.100	
	AR(2) (P-value)= 0.807		AR(2) (P-value)= 0.834	
	Sargan test (P-value) = 0.820		Sargan test (P-value) = 0.820	

*** 1% level of significance ** 5% level of significance *10% level of significance

Source: Author computation

Results from Generalised Method of Moments Estimation (Digital Money)

The dynamic model equation is now as follows:

$$\mathbf{LNFINFOR_{it} = \beta_0 + \beta_1 LNFINFOR_{it-1} + \beta_2 LNBM_{it} + \beta_3 LNCPS_{it} + \beta_4 LNATMS_{it} + \beta_5 LNCBB_{it} + \beta_6 LNFBS_{it} + \beta_7 LNMCS_{it} + \varepsilon_{it}}$$

Table 2. GMM results for digital money

	GMM first step		GMM Second Step	
Variables	Coefficient	Sig.	Coefficient	Sig.
β_0	5.813	0.000***	6.197	0.000**
β_1	0.159	0.228	0.122	0.250
$\beta_{2\ BM}$	0.094	0.389	0.139	0.245
$\beta_{3\ CPS}$	-0.008	0.089*	-0.008	0.027**
β_4 ATMS	-0.009	0.002***	-0.011	0.000***
$\beta_{5\ CBB}$	0.050	0.255	0.028	0.022**
β_{6FBS}	0.026	0.036**	0.026	0.085*
$B_{7\ MCS}$	0.060	0.000***	0.048	0.002***
	Number of instruments=11		Number of instruments=11	
	Number of groups=22		Number of groups=22	
	AR(1) (P-value)= 0.307		AR(1) (P-value)= 0.351	
	AR(2) (P-value)= 0.862		AR(2) (P-value)= 0.851	
	Sargan test (P-value) = 0.812		Sargan test (P-value) = 0.812	

*** 1% level of significance ** 5% level of significance *10% level of significance

Source: Author computation

Results from Generalised Method of Moments Estimation (Financial Inclusion)

The dynamic model equation is now as follows:

$$\mathbf{LNFINFOR_{it} = \beta_0 + \beta_1 FINFOR_{it-1} + \beta_2 LCPS_{it} + \beta_3 LNATMS_{it} + \beta_4 LNCBB_{it} + \beta_5 LF_{it} + \beta_6 LNEDU_{it} + \varepsilon_{it}}$$

Table 3. GMM results for financial inclusion

	GMM first step		GMM Second Step	
Variables	Coefficient	Sig.	Coefficient	Sig.
β_0	1.441	0.295	1.247	0.537
β_1	0.465	0.200	0.428	0.210
β_2	-0.005	0.984	-0.023	0.901
β_3	-0.503	0.000***	-0.588	0.000***
β_4	0.611	0.000***	0.724	0.000***
β_5	0.600	0.018**	0.647	0.053**
β_6	0.121	0.078*	0.075	0.023**
	Number of instruments=10		Number of instruments=11	
	Number of groups=22		Number of groups=22	
	AR(1) (P-value)= 0.360		AR(1) (P-value)= 0.380	
	AR(2) (P-value)= 0.630		AR(2) (P-value)= 0.854	
	Sargan test (P-value) = 0.806		Sargan test (P-value) = 0.806	

*** 1% level of significance ** 5% level of significance *10% level of significance

Source: Author computation

After conducting preliminary test, GMM was carried out in this research paper. The GMM results for Financial Inclusion focusing on FinTech has revealed that FinTech credit has disrupted the traditional financial intermediation institutions, including regulatory frameworks, procedures, services with the introduction of innovative business models and advanced technologies which explain the negative relationship between FinTech formation and credit to the private sector as depicted in the third row of the table which is at 0.901. These results are in line with Vives (2019b), Tarullo (2019) and Demertzis et al., (2018). It could be perhaps that FinTech credit has led to instability, regulatory arbitrage and has introduce to new risks which is in conformity with Forbes (2021), Braggion et al.(2021), Buch (2020), FSB (2020a, 2020b).

Moreover, the negative outcomes explain that Banks are deploying ATMs to transfer cash registers and other customer service out of their locations. It seems that banks prioritize servicing Point of Sale (POS) terminals above of ATMs and as such both technologies contribute to increasing non cash transactions in the country. These findings are align with Anna Kredina (2021), Alt et al. (2019), Kumar and O'Brien (2019), Zavolokina eta al. (2016).

Nevertheless, the positive statistics have revealed that there is usage of digital innovation such as Blockchain, neural networks, big data analytics that have revolutionized the global financial environment in terms of improvement of green credit in banks, reducing administrative costs and credit risk of the commercial banks, better managing and allocating resources in an efficient manner which is in conformity with Zhao et al. (2022), Guo and Zhang, 2023, Mirza et al. (2023) and Eisenbach et al. (2022).

The development of FinTech has indeed improve the labour investment efficiency by eliminating information asymmetry and addressing agency concerns. Moreover, with the introduction of digital technologies such as artificial intelligence and industrial automation has helped in task automation, lowering labour needs but instead requiring highly qualified workers. These results are in line with, Acemoglu et al. (2022), Acemoglu & Restrepo, (2018), Balsmeier and Woerter (2019).

FinTech start up is also empowering youth with sound financial education at an early stage through online videos which therefore have help them to cope with new financial technologies in the workplace which will eventually help them to attain higher profits and attract new investors. Moreover, financial education programs that have been put in place has led to an expansion in FinTech businesses in terms of promoting innovation and market development which is align with the findings of Alsuwaidi and Mertzanis (2024).

Results from Generalised Method of Moments Estimation

The dynamic model equation is now as follows:

$$\mathbf{LNFP_{it} = \beta_0 + \beta_1 LNFP_{it-1} + \beta_2 LNINSURETECH_{it} + \beta_3 LNLARATIO_{it} + \beta_4 LNTA_{it} + \beta_5 LNIHI_{it} + \beta_6 LNDOI_{it} + \beta_7 LNROI_{it} + \beta_8 LNGDP_{it} + \beta_8 LNUR_{it} + \beta_9 LNCPS_{it} + \beta_{10} LNLF_{it} + \beta_{11} LNEDU_{it} \varepsilon_{it}}$$

Table 4. GMM results for InsurTech

	GMM first step		GMM second step	
Variables	Coefficient	Sig.	Coefficient	Sig.
β_0	11.30	0.032**	5.982	0.000***
LNFP	0.111	0.901	0.506	0.144
LNINSURTECH	0.115	0.008***	0.129	0.012***
LNLARATIO	-0.002	0.097*	-0.564	0.010***
LNTA	0.030	0.002***	0.050	0.034**
LNIHI	9.663	0.038**	5.820	0.052**
LNDOI	0.075	0.009**	1.090	0.02**
LNROI	0.012	0.058*	0.016	0.056*
LNGDP	0.001	0.009***	0.008	0.029**
LNUR	0.396	0.133	0.403	0.071*
LNCPS	0.103	0.056*	0.182	0.022**
LNLF	-0.655	0.084*	-0.761	0.092*
LNEDU	-0.577	0.028**	-0.890	0.074*
	AR(1) (P-value)= 0.470		AR(1) (P-value)=0.414	
	AR(2) (P-value)= 0.979		AR(2) (P-value)=0.701	
	Sargan test (P-value)= 0.923		Sargan test (P-value)=0.823	
*** 1% level of significance	** 5% level of significance		*10% level of significance	

Source: Author computation

The GMM results for Financial Inclusion focusing on InsurTech has revealed that the development of InsurTech has improve the efficiency and productivity of the firm as well as reduce the operation cost as reflected by the positive statistics. It also seems that InsurTech supports sustainability by providing insurance solutions in terms of addressing the environmental and social difficulties which is line with the study conducted by Simona Cosma and Giuseppe Rimo (2024).

However, it seems that the financial health of the firm is not stable and this could be due to that the insurers could be exposed to interest rate risks and managing those asset liability risks could be difficult for them. This result is in conformity with the research conducted by Thakor (2020) and Lanfranchi and Grassi (2022). Furthermore, the negative result could be also explained by the fact that the firm is encountering a declining revenues as well as it holds a poor shareholder's equity which indicates that the firm is at risk of bankruptcy.

On the contrary, a positive significant relationship has been established between Firm Performance and Total Asset. This could be perhaps through the collection of insurance premium whereby the company provide more fund to carry out investment and thus boost up their market share. The positive outcomes could also be explained by the fact that insurers have entered in the usage-based insurance program at an early stage that has promote a higher return on assets and money in the upcoming years which is line with the study conducted by Che et al. (2021).

The firm is quite competitive in the sense that there is innovation in the new products including on demand insurance, a good marketing on the product, brand strategy, services are being made through campaign and social media to attract more clients and investors which is in line with the results obtained by Netscribes (2023), Caroline Shalabi (2024).

Moreover, it seems that internet of things- based solutions and social networks have transformed data collecting and processing, allowing for more accurate premium set up and risk reduction (Rumson and Hallett, (2019). As a result of which, these developments in the insurance market will eventually boost up the economic growth of the country in the long run which is in accordance with the result of Pradhan et al. (2015), Liyan Han et al. (2010), Kok et al. (2010).

It has become important for InsurTech companies to stay competitive and measure the return of investment on the modern and innovative technologies implemented to enable the company to make informed decision and ensure their investment yield positive returns. The results indicates that the investment made in these technologies are profitable and provide a strong return of investment which is in accordance with Christophe Bourguignat (2023). In addition, the digital technology has promote more inclusivity in insurance by increasing the availability of microinsurance products via mobile platforms which give rise to insurance penetrations and thus boost up the economic growth of the country as supported by Biener et al. (2018).

The cluster of cities has brought about development in the urban economies in the sense that it has create more access points to services, infrastructure and economic opportunity for millions of people in Africa. It seems that with the internet of things in terms of services and network have improved the quality of life of the people living in the city as supported by United Nations (2020).

The higher allocation of credit to private sector indicates that there has been an increase in the return of the insurer's account which makes it more competitive liability pricing and gains a higher return of equity which is in line with the study carried out by Fuad Faridi, John Spivey, Ju-Hon Kwek and Henri Torbey and Luca Bionducci (2024). Through Machine learning and Artificial Intelligence, it has indeed improve the way of doing business in terms of improving underwriting decision, standardizing and streamlining credit procedures as well as enable private credit investors to make loan decision rapidly.

It seems that globalizing labour market have a negative effect on the working conditions of lower skilled labours given that they lack the knowledge on new technologies and find it difficult to adapt to the new technical aspect at the workplace that has contributed to a poor performance which is line with the research conducted by Zaakhir Asmal et al. (2023).

In the light of the above, it seems that there is a lack of relevant education and training in the workforce that have further worsen the performance of the firms, creating gaps in insurance related skills and information technology skills gaps as well as increasing the level of risk and crimes in the nation. This research is in line with the study conducted by Zaakhir Asmal et al. (2023).

Discussion

Financial Inclusion Framework with Technology

A Financial Inclusion framework with Technology have been constructed as part of the novelty of this study that integrates both Fintech and Insurtech critical success factors and determine how the implementation of technology has helped in aiding Financial Inclusion in SSA. Five main significant factors were taken into consideration from both model constructed. The critical success factors for Fintech to Financial Inclusion are as follows:

Broad Money

Mobile banking acts as a driving force behind greater financial inclusion, ensuring that people or companies have access to financial services and products (Ren et al., 2023; Muchandigona & Kalema, 2023; Sahay et al., 2023). Through the technological development in terms of digital wallets, mobile money and online banking have actually opened the door for creative financial solutions, breaking down traditional barriers to access and filling gaps in the financial services industry.

Commercial Bank Branches

Many banks are now facilitating clients with a range of services such as opening an account, transferring funds, paying bills and even applying for loans without the need for human intervention. In other words, banks creates access points to clients through self-service kiosks or digital station at their branches which is line with Campanella et al. (2017) and Starnes et al. (2017), Du et al. (2021), Luo et al. (2021), Li et al. (2019), Kumar, N. and Mishra, S., (2022), World Finance (2023), MANTL (2023), Mirza et al. (2023) and Cheng et al. (2024), PYMNTS (2024), University of Phoenix, (2024). Thus, technology enhances the effectiveness and accessibility of financial services and as a result of which it can be said that we are in the right track of attaining the Sustainable Development Goals 2030.

Mobile Cellular Subscriptions

One of the most well-known tool that can be used to promote financial inclusion is through the mobile money services that rely heavily on mobile phones. Through the usage of mobile technology, it has enabled financial institutions to collect alternative data in terms of transaction history and cell phones usage patterns to determine

the creditworthiness of the people and eventually enabling people to have access to credit especially those who do not have traditional credit history. These findings demonstrates that there is growing usage of mobile phones and mobile internet access in the country which are align with Suri and Jack (2016), GSMA Intelligence (2017), Fanta and Makine (2021), Demirgüç-Kunt et al. (2021), Zeya (2022), OECD (2022), Hordofa (2023), GSMA (2023), Mothobi et al. (2024).

Labour Force with Advanced Education

In the world of technology, employees have the opportunity to learn new skills that improve their employability through online training and education platforms and therefore they become more knowledgeable on the different upgraded technologies in place such as mobile banking, digital wallet, e-payment systems and blockchain technologies which in turn raises their earnings and allows them to engage more in the financial system. These results are in line with by Acemoglu & Restrepo, (2018) Balsmeier and Woerter (2019), Balsmeier and Woerter (2019), Balasubramanian (2020), Acemoglu et al. (2022), Dehejia and Gupta (2022), Delechat (2023), Ren (2023), Elouardighi (2023), Ajide (2023) and James et al. (2024), Song (2024).

Education Attainment at Least Completed Primary, Population + 25 Years, Total (%) Cumulative

One of the main approach to reduce financial exclusion and increase financial inclusion in the financial services industry is through education. Therefore education plays a major role in assisting people to have access and to make use of the financial products appropriately. The results demonstrates that there is a high level of financial inclusion associated with the high level of education in the country. It seems that People have improved their financial literacy on financial technologies and are now able to use digital financial goods and services effectively. Likewise, it has helped people to make an informed financial decision regarding savings, investments, and credit. The outcomes are in line with the findings of Dasgupta (2023), Kpodonu and Opoku (2023), Kumar et al. (2023), Wu and Luo (2023), Saharan et al. (2024) and Alsuwaidi and Mertzanis (2024), Luo. (2024), Carè (2024), Menberu (2024).

The Critical Success Factors for Insurtech to Financial Inclusion are as Follows:

GDP per Capita

The booming GDP makes it possible to further integrate digital payments, e-commerce and other tech driven services into the ecosystems. Moreover, government are now able to revise their policies and strategies in an attempt to encourage financial inclusion through technology for the betterment of the economy in the long run and these are digital literacy initiatives, mobile devices subsidies, and public-private partnerships for fintech development. these findings are in accordance with Pradhan et al. (2015), Demirgüç-Kunt et al. (2017), Lee et al. (2018), Biener et al. (2018), Biswas (2021), Daud (2023), Jerome Haegeli (2024), ACI Worldwide (2024), World Economic Forum (2024), International Monetary Fund (2024), Lee (2024), Devet al. (2024).

Domestic Credit to the Private Sector

The credit to private sector has actually enhanced the financial inclusion for individuals, microenterprises and small firms by facilitating access to resources required for the economic activity. Moreover, the marginalized communities such as women, people living in rural areas and unorganized labours may now receive private sector loans due to the technological advancements that increases credit services', affordability, efficiency and accessibility. These outcomes are in line with the study conducted by Okparaka Vincent (2016), Carnegie Endowment for International Peace (2023), Fuad Faridi, John Spivey, Ju-Hon Kwek and Henri Torbey and Luca Bionducci (2024), International Monetary Fund (2024), Atlantic Council (2024), Graduate Institute Geneva (2024), FinRegLab (2024), World Bank (2024), Frontiers in Big Data (2024), Lee (2024), Bester and Rosman (2024).

Labour Force with Advanced Education (% of Total Working Age Population with Advanced Education)

A shrinkage in the workforce has been found due to unemployment, the aging population, skill mismatches, disengaged youth or even gender gaps. Therefore, we can deduce that there are still some cluster of people who are still not full-fledged on the innovative technologies introduced especially in the insurance industry. It seems that proper awareness and coaching on insurtech have not been made that has led to downturn in the labour market. These findings are in conformity with the study conducted by World Bank Group (2018), Lin Lin and Christopher Chen (2019), Moodley (2019), Sahay et al. (2020), Molloy & Ronnie, (2021), Breza (2021), International Monetary Fund (2022), Zaakhir Asmal et al. (2023), Banik (2023), Gallagher Re (2024), Li and Su (2024).

Education Attainment at Least Completed Primary, Population + 25 Years, Total (%) Cumulative

One of the major obstacles to Financial Inclusion is Low Educational Attainment such as Low Literacy rate or insufficient access to quality Education which has an impact on people's financial literacy and capacity to use both traditional and digital financial services. This could be due to financing priorities, lack of access and inclusion, gender imbalances, physical impediments, inadequate teacher training, language or literacy barriers and curriculum constraints. Therefore, Education plays a crucial role at both individuals and government level as it helps to increase knowledge of insurance and financial goods, promotes prudent financial practices, provide individuals with the self-assurance to manage their money. As a result of which, by enhancing the level of financial literacy, it will further promote financial inclusion in the country. These findings are align with Sarma, and Pais, (2011), Maharjan et al. (2022), Kazemikhasragh and Buoni Pineda, (2022), Shanbhag (2022), Yang (2023), Zaakhir Asmal et al. Rooney (2023), Wu and Shao (2023), OECD (2024).

Return on Investment

The insurtech companies have made good investments which has eventually generated more profits in terms of growth in revenue as well as there is an effective management of available resources. A high return of investment shows that reaching low income groups with digital financial services is actually feasible. Thus, it encourages businesses to expand their operations which contributes to financial inclusion in the country. These outcomes are in conformity with the study conducted by Khetan (2020), Bourguignat (2023), Ma and Ren (2023), University of Phoenix (2024), Zhang et al. (2024), Chen et al. (2024), Li et al. (2024), McKinsey & Company (2024) and Deloitte Insights (2024).

Conclusion and Recommendations

The aim of the study was to analyse the impact of fintech and Insurtech onto Financial Inclusion in SSA. As such, we sought to identify the opportunities and challenges encountered. Results have revealed that FinTech formation are negatively correlated with the Capital Adequacy, Earning Per Share and Liquidity ratio, Credit to Private Sector and Automated Teller Machines. However, a positive link has been established between FinTech Formation and Asset Quality, Management Efficiency, Broad Money, Commercial Bank Branches, Fixed Broadband Subscriptions, Mobile Cellular Subscriptions, Labour Force with advanced education and Education attainment of atleast completed primary population. In addition, a positive relationship has been established between the firm performance and the explanatory variable namely degree of development of current InsurTech, Total Asset, Insurance Herfendal Index, Density of Insurance, Rate of Investment, Gross Domestic Product per Capita, Urbanization Rate and Credit to Private Sector. On the contrary, a negative connection has been found between firm performance and the other control variables such as Liabilities Asset ratio, Labour Force with advanced education and Education attainment of atleast completed primary population.

Sub Saharan African Countries was chosen in this study given that there are very few evidence was conducted by previous researchers. A model has been proposed which can be used as a framework for aiding Financial Inclusion in SSA through the innovation technologies. This research has contributed to the body of knowledge in Fintech and InsurTech.

Scientific Ethics Declaration

* The authors declare that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the authors.

Conflict of Interest

* The authors declare that they have no conflicts of interest

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