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Labour market efficiency, technological readiness, financial access, cost of remittance, and educational attainment, on financial development in Africa: A moderating effect of political stability

Nicholas Bamegne Nambie

Department of Accounting and Finance, Valley View University, Oyibi-Accra, Ghana

Email: nicnam27@gmail.com

Dorcas Oye Haywood-Dadzie

Department of Accounting and Finance, University of Professional Studies Accra, Ghana

Email: dorcas.haywood-dadzie@upsamail.edu.gh

James Narh Ayertey

Department of Accounting and Finance, Valley View University, Oyibi-Accra, Ghana

Email: jnayerterey@vvu.edu.gh

Abstract--The objective of this study is to analyse the impact of educational attainment, technological proficiency, labour market efficacy, and financial accessibility on the progress of financial development in Africa. The research utilized a two-step system generalized method of moments (GMM) estimator, ordinary least square method, and random effect model to analyse panel data pertaining to African countries from 2002 to 2023. Consideration is given to the moderating effect of political stability on the model variables. Financial development in Africa is significantly and positively correlated with labour market efficiency, financial access, technological readiness, and educational attainment, according to the study's findings. Furthermore, there exists a substantial relationship between the moderation effect of political stability and each of the independent and dependent variables. Policymakers are advised to enact comprehensive regulatory reforms in order to guarantee the stability, transparency, and inclusivity of the financial system. Policy

makers may also allocate resources towards enhancing the capabilities of regulatory bodies and financial institutions, concurrently encouraging the growth and implementation of digital financial services, including e-wallets and mobile banking. Further investigation is warranted regarding the utilization and implementation of mobile money, and digital payment systems.

Keywords---Financial Access, Technology, Financial Literacy, Remittance, Labour Efficiency, Digital Banking.

Introduction

Europe exhibit's significant variations in financial development as a result of disparities in historical backgrounds, regulatory frameworks, and economic structures (Ejrnæs *et al.*, 2024; Skare *et al.*, 2024; Khan *et al.*, 2024). The banking sectors of most European nations are highly developed, comprised of both large multinational banks and lesser domestic institutions (Kallel & Triki, 2024). European nations have also established robust capital markets, characterized by stock exchanges situated in prominent financial centres (Tula *et al.*, 2024). These markets facilitate the trading of securities by investors and offer avenues for corporations to procure funds via public offerings. European financial institutions operate within a regulatory framework that is influenced by a combination of domestic regulations and common European Union directives. The European Central Bank oversees systemically significant institutions and is instrumental in determining monetary policy for the Eurozone. Significant advancements are also being made in financial technology (fintech) within European nations, where both established and new firms are creating digital payment platforms, investment services, and lending platforms (Harsono & Suprpti, 2024). The banking industry continues to maintain its dominant position in numerous Asian nations, where a limited number of large banks control substantial market shares, thereby increasing competition from both domestic and foreign banks (Aharoni, 2024; Kubayevich, 2024; Salman *et al.*, 2024). Fintech innovation is prevalent in Asia due to several factors, including substantial unbanked populations, high mobile penetration rates, and favourable regulatory frameworks in certain nations. In Asia, regulatory environments exhibit significant variation, which can be attributed to disparities in political structures, legal systems, and economic development levels. Certain nations enforce financial regulations that are comparatively negligent, whereas others adopt more stringent systems with the objective of preserving stability and managing risk. Many Asian nations are making substantial infrastructure investments in order to bolster economic expansion. As a consequence, there has been a surge in the need for investment opportunities and financing in industries including telecommunications, energy, and transportation. Multilateral institutions and development banks play crucial roles in financing these initiatives (Munda *et al.*, 2024).

The matter of financial development in Africa is intricate and diverse, exhibiting substantial fluctuations among nations and areas as a result of disparities in infrastructure development, political stability, economic conditions, and

regulatory frameworks (Odeyemi *et al.*, 2024). A numerous African nations exhibit underdeveloped banking sectors, which are distinguished by a scarcity of financial institutions, inadequate levels of financial inclusion, and a heavy dependence on conventional banking services. Particularly in rural regions, access to banking services, including credit, continues to be an obstacle for substantial portions of the populace. Many Africans depend on microfinance institutions and informal financial services, including savings organizations, cooperatives, and moneylenders, when formal banking services are unavailable (Murphy, 2024). Although informal mechanisms are of vital importance in granting small businesses and individuals' access to finance, they frequently lack the consumer protections and regulatory supervision of formal banking systems. The expansion of mobile money services in Africa has been facilitated by the proliferation of mobile phones, especially in regions where access to conventional banking infrastructure is limited. African capital markets, although still comparatively modest in comparison to those in other regions, are undergoing development and growth, as evidenced by the increased investor interest in stock exchanges. Ongoing endeavours aim to fortify regulatory frameworks, augment market transparency, and bolster investor confidence in order to facilitate the further development of these markets. Foreign governments, development banks, and multilateral institutions finance capacity-building initiatives, financial sector reforms, and infrastructure projects with the objectives of fostering economic expansion and alleviating poverty (Moussavi, 2024; Nasir & Ahmed, 2024). A symbiotic relationship exists between financial development in Africa and labour efficacy, whereby the former can exert substantial influence on the latter. Enhanced labour efficiency has the potential to bolster the creditworthiness of both businesses and individuals, thereby increasing their appeal as borrowers to financial institutions. Enhanced productivity among businesses results in improved revenue generation and loan repayment capabilities, thereby mitigating the risk faced by lenders. As a consequence, financial institutions are motivated to provide credit to productive enterprises, which stimulates investment and subsequent economic expansion. Enhanced labour efficiency has the potential to augment business profitability, thereby generating prospects for capital accumulation and investment (Ma *et al.*, 2023).

The degree of technological preparedness that Africa is in can significantly influence its financial development, given that technological progress can streamline operations, promote innovation, and facilitate access to financial services (Ogundipe, 2024). Africa has the potential to greatly enhance its access to financial services through technological readiness, specifically with regard to internet and mobile penetration. Fintech solutions such as mobile banking and digital payment platforms have experienced a surge in popularity, particularly in areas where banking infrastructure is scarce. These technologies facilitate mobile phone-based access to banking services, payment processing, money transfers, and loan applications for both individuals and businesses, circumventing the need for conventional physical banking institutions. Financial institutions and their clients can both benefit from the cost-effectiveness of financial services enhanced by technology. The elimination of physical branches and manual processes by digital banking results in decreased operational expenses for financial institutions. This may result in reduced charges and fees for clients, thereby enhancing the affordability and accessibility of financial services,

specifically for small businesses and individuals with low incomes. Financial access is of utmost importance in facilitating financial development in Africa, as it grants businesses and individuals' greater access to vital financial services, permits greater participation in the formal financial system, and contributes to economic expansion and progress (Chitimira & Warikandwa, 2023). Fostering financial inclusion, which entails ensuring that all enterprises and individuals have access to suitable financial products and services and are capable of utilizing them efficiently, requires financial access. Prolonged financial access is of utmost importance in Africa, where a considerable segment of the populace continues to lack or have inadequate banking services; this is in order to mitigate poverty, inequality, and economic exclusion. The availability of financial services enables the circulation of capital, investments, and loans all of which are vital catalysts for economic expansion.

The remittance cost, denoting the service charges imposed on expatriates returning to their countries of origin after working overseas, may exert substantial influence on the financial progress of Africa. Elevated remittance expenses may impede migrants from transferring a sufficient sum of money to their families back home. In rural regions of Africa, where remittances frequently serve as an essential source of income for many households, a reduction in remittance costs could increase the disposable income of recipient families. This additional revenue can be invested in small businesses, education, healthcare, and the prevention of poverty, and used to support these causes. Remittances are conventionally received via official financial channels, including but not limited to mobile money platforms, money transfer operators, and institutions. High remittance expenses might dissuade recipients from employing official channels and incentivize them to fall back on unregulated money transfer agents or hand-carried currency, both of which are potentially less secure and more prone to fraudulent activities. Facilitating access to banking and mobile money accounts and promoting the use of formal financial services are thus additional ways in which reducing remittance fees can advance financial inclusion (Nandru *et al.*, 2024). The influence of educational achievement on various aspects of financial development in Africa is significant. It affects financial literacy, entrepreneurship, human capital formation, and economic productivity, among other things. A correlation has been observed between increased levels of educational achievement and enhanced financial literacy, encompassing the requisite knowledge and competencies to render well informed financial judgments (Blay *et al.*, 2024). A greater proportion of the population possesses fundamental financial knowledge, including budgeting, saving, investing, and debt management. This facilitates their capacity to obtain and utilize financial services efficiently, execute prudent investment choices, and safeguard against financial hazards, thereby making a positive contribution to the advancement of finance as a whole. Entrepreneurship and innovation are significantly influenced by education, given that it imparts individuals with the cognitive framework, abilities, and awareness required to recognize and capitalize on economic prospects. Individuals with a higher level of education exhibit a greater propensity to initiate entrepreneurial ventures, generate employment opportunities, and introduce novel products and services to the marketplace (Sapiro, 2024).

A study conducted by Zhou *et al.* (2024) examines the mechanisms by which economic growth is influenced by financial development. Alsamara *et al.* (2024) examine the effect of financial dependence on economic expansion. The findings of their research indicate that an overemphasis on external financing can impede progress, especially in sectors where limitations on external financing are more severe. Muhammed *et al.* (2024) examined the influence of institutional and legal factors on the correlation between financial development and firm growth. The results of their study suggest that nations characterized by more robust legal frameworks tend to possess more advanced financial systems, which subsequently foster increased levels of corporate expansion and investment. Pearce and Bah (2024) investigated the effects of financial development on the access to finance of small and medium-sized enterprises (SMEs). Superior financial systems, which are distinguished by expanded credit accessibility and a wider selection of financial instruments, are found to be correlated with increased levels of small and medium-sized enterprise (SME) expansion and employment creation. Khaliq *et al.* (2024) examined the correlation between financial liberalization and economic development, specifically digging into the implications for labour market efficiency. The results of their research indicated that labour market efficacy may be enhanced through increased access to external financing for both firms and individuals; consequently, this would stimulate job growth and diminish unemployment. The impact of financial development on entrepreneurship and the function of entrepreneurial role models in labour market efficacy was also investigated by Ekechi *et al.* (2024) and the study revealed that, access to finance is discovered to be a critical factor in fostering entrepreneurship, which subsequently contributes to the generation of employment opportunities and innovation, thereby improving the efficacy of the labour market. Moskovics *et al.* (2024) examined the impact of financial market structure on labour market efficiency through an analysis of the relationship between industry structure and bank competition. Greater bank competition reduced entry barriers for firms, resulting in increased competition, higher productivity, and enhanced labour market outcomes, according to their findings.

While previous studies have examined financial development, empirical research on the impact of technological readiness, educational attainment, labour market efficiency, and financial access on financial development in Africa, is scarce. This research fills the knowledge gap by elucidating the effects of these variables on financial development in Africa and provides an essential opportunity for further investigation. As a result, this manuscript has been structured into four distinct sections: the initial chapter provides a concise synopsis of the recent global financial development landscape; the second chapter explicates the theoretical aspect of the investigation by scrutinizing concepts and theoretical foundations; the third chapter describes the research methodology employed; the fourth section settles with analysis and discussion; and the five chapter concludes with the findings, recommendations, and policy implications. Finally, directions for future research in this domains is specified.

Literature Review

According to the Financial Intermediation Theory, financial institutions, including banks, facilitate the flow of capital from savers to creditors, thus stimulating

economic expansion and progress (Gurley & Shaw, 1955). This theory places significant emphasis on the role that financial institutions play in enabling the effective distribution of resources and the conversion of savings into profitable investments. The Financial Intermediation Theory was originally introduced and developed by Edward Shaw and John Gurley in their influential publication *Financial Intermediaries and the Saving-Investment Process*, which was released in 1955. The notion of financial intermediaries was initially proposed by the Authors, which pertains to establishments that facilitate the transfer of savings from surplus units to deficit units within the economy. Mutual funds, banks, and insurance companies are examples of financial intermediaries that facilitate transactions between borrowers and investors. The institutions amass funds from depositors, premium payers, or investors, which they subsequently allocate or invest in a diverse range of assets, including real estate, securities, loans, or premiums (Coimbra & Rey, 2024; Nyborg & Woschitz, 2024). Through the consolidation of funds from numerous depositors, financial intermediaries are capable of extending borrowers' loans or investments in more substantial sums, thereby fostering expansion and economic activity. The role of financial intermediaries in converting the maturities of assets and liabilities is critical (Michell, 2024). For instance, financial institutions utilize funds from short-term deposits made by depositors to finance long-term loans obtained by borrowers. This maturity transformation facilitates the alignment of debtors' requirements for long-term financing of investment projects with the preferences of savers, who frequently favour liquidity.

In addition to monitoring the creditworthiness of creditors and diversifying their asset portfolios, financial intermediaries engage in risk management activities. Financial intermediaries can preserve the integrity of the financial system and mitigate the effects of individual defaults by distributing risk across a diverse array of assets and borrowers. The information asymmetry between borrowers and savers is reduced with the assistance of financial intermediaries, which perform due diligence and assess prospective borrowers. They acquire data pertaining to the investment prospects, creditworthiness, and financial well-being of borrowers. This enables them to allocate funds in a manner that maximizes productivity and facilitates informed lending decisions. Savers receive liquidity services from financial intermediaries through the provision of accessible and convenient methods for depositing and withdrawing funds. For instance, financial institutions provide checking and savings accounts that enable borrowers to conveniently withdraw their funds, thereby promoting the efficiency of economic transactions and payments. The Financial Intermediation Theory underscores the critical function of financial intermediaries in facilitating the mobilization of savings, ensuring the efficient allocation of capital, managing risk, and furnishing liquidity. These activities collectively contribute to the advancement and expansion of the economy. Current comprehension of the functions and significance of financial institutions in modern economies has been significantly shaped by this theory. The Financial Repression Hypothesis asserts that when governments implement measures to regulate interest rates and allocate credit to specific industries, financial markets may experience distortions that impede the progress and advancement of the economy (Xu, 2013; Fry, 1997; Ngugi & Kabubo, 1998). The argument posits that although these policies are frequently executed to finance government debt or foster stability, they may yield adverse

effects on investment, economic efficiency, and financial intermediation (Ferguson, 2002; Crockett, 1996). Typically, financial repression takes the form of interest rate ceilings or deposit rate limits imposed by the government on financial institutions. Aside from discouraging saving, these artificially low interest rates distort capital allocation by diminishing the return on savings in comparison to alternative investment prospects. In lieu of depositing funds into the banking system, therefore, savers may opt for alternative investment opportunities or possess cash on hand.

In addition, directed credit programmes may be enforced by governments, mandating that banks allocate a specific proportion of their lending activities to sectors or undertakings considered critical for economic progress or priority (Babasyan & Melecky, 2024). Although the primary objective of these programmes is to direct credit towards particular sectors, such as industry or agriculture, resource misallocation and inefficiency may result if lending decisions are predicated on political factors rather than economic fundamentals (Obayelu *et al.*, 2024). In conjunction with directed credit programmes and interest rate controls, financial repression strategies may encompass stringent regulatory oversight of capital flows, limitations on financial market transactions, and mandates that banks maintain portfolios of government debt at interest rates below the market average. These measures have the potential to impede economic development by restricting competition, diminishing the efficiency of financial intermediation, and distorting investment incentives. By stifling savings, investment, and productivity development, financial repression may have long-term negative effects on economic growth, according to the Financial Repression Hypothesis (Ogbebor *et al.*, 2023). Financial repression diminishes the potential for viable economic growth, entrepreneurialism, and sustainable development by impeding the efficient allocation of capital and distorting market signals. Financial liberalization may eventually replace financial repression as the prevailing economic system, which is distinguished by the elimination of interest rate controls, deregulatory practices in financial markets, and the facilitation of foreign capital inflows. Financial liberalization endeavours to facilitate access to finance, increase efficiency, and stimulate competition, with the ultimate goal of fostering economic development and growth. In general, the Financial Repression Hypothesis emphasizes the detrimental consequences of governmental intervention in financial markets and underscores the significance of market-oriented mechanisms in fostering sustainable economic expansion and the efficient distribution of resources. This theory has significantly impacted discussions regarding the function of government policies in the development and reform of the financial sector (Aisyah *et al.*, 2024; Ashenafi & Dong, 2024; FAMILONI & Shoetan, 2024).

The Endogenous Growth Theory asserts that factors intrinsic to the economic system, including innovation, technological advancement, and human capital accumulation, are the primary drivers of long-term economic growth. In contrast to conventional neoclassical growth theories, which ascribe growth exclusively to exogenous factors such as capital accumulation and labour, endogenous growth theory places significant emphasis on the contribution of internal mechanisms and feedback systems to the maintenance of economic expansion (Jones & Romer, 2019). Romer (1990) is regarded as a seminal figure in the development of

endogenous growth theory. The Endogenous Growth Theory emphasizes the pivotal significance of technological advancements in propelling sustained economic expansion. In contrast to the exogenous nature of technological progress assumed by neoclassical growth models, endogenous growth theory argues that technological advancements are determined endogenously by knowledge accumulation, investment in research and development (R&D), and innovation. The theory places significant emphasis on the role that externalities and knowledge spill overs play in the generation of technological progress. The diffusion of innovations initiated by a single firm or individual to other sectors or organizations can result in cumulative productivity gains and economic expansion. Policies that foster the dissemination of technology, collaboration, and the exchange of knowledge have the potential to amplify these spillover effects.

The Endogenous Growth Theory emphasizes the significance of accumulating human capital, including education and training, as a catalyst for increasing productivity and innovation. Continuing economic growth is the result of investments in education and skill development, which not only increase individual productivity but also contribute to the expansion of the economy's knowledge base. Endogenous growth theory, as opposed to neoclassical models which presume constant returns to scale, permits increasing returns to scale in particular sectors or activities. This suggests that a decline in unit costs occurs as production levels increase, which can generate positive feedback effects that stimulate additional growth and specialization. According to the Endogenous development Theory, the promotion of long-term economic development can be significantly influenced by government policies that create an environment favourable to innovation, education, and the generation of knowledge. Economic expansion can be fuelled by policies that promote human capital accumulation, safeguard intellectual property rights, and facilitate access to education and training, all of which serve to stimulate technological progress and investment in research and development. In its entirety, Endogenous development Theory offers a comprehensive conceptual structure that facilitates comprehension of the internal factors that propel technological advancements and innovation, as well as the determinants of sustained economic development. Considerable influence has been exerted by this theory on policymaking and academic research, influencing dialogues concerning economic development strategies and the significance of innovation in cultivating prosperity (Honcharuk *et al.*, 2024).

Ahmad (2024) investigated the correlation between financial development and economic growth, and according to the study a financially resilient economy, characterized by efficient intermediation and streamlined resource allocation, can significantly promote economic growth by facilitating capital accumulation. In light of Schumpeter's research on finance and growth, Rahman *et al.* (2024) examined the hypothesis that financial development stimulates economic growth by encouraging technological innovation and entrepreneurship. Pal and Mahalik (2024) examines the impact of institutional factors, including financial development and legal protections, on investor portfolio choices and the effectiveness of the labour market. It has been noted that investors demonstrate a predilection for investing in countries that possess advanced financial systems and strong legal protections against expropriation. This observation suggests that these factors contribute to the promotion of more efficient labour markets

through the reduction of investor apprehension and risk. Karim and Said (2024) examined the importance of regional financial institutions and markets in fostering technological readiness and innovation, with a particular focus on regions characterized by advanced financial development and ample prospects for corporate cooperation and the exchange of knowledge. Njoroge (2024) investigated the relationship between financial development and economic growth, with a particular focus on the implications for technological progress and readiness. The empirical evidence uncovered by the researchers suggests that financially stable systems, characterized by efficient risk management and smooth intermediation, promote technological progress and adoption, thereby facilitating long-term economic growth and prosperity. Wu *et al.* (2024) examined the impact of regional financial development on the technological capability and innovation of individual firms. Research and development expenditures of corporations are positively influenced by their access to local financial markets and institutions, such as venture capital firms and banks, according to the study's findings. Marcel *et al.* (2024) propose a theoretical framework that argues for long-term prosperity through economic development via creative destruction, wherein innovation and technological progress act as crucial catalysts. According to the authors, financial development provides funding for research and development and facilitates the spread of new technologies; thus, it plays a crucial role in encouraging innovation and technological readiness. Iwedi *et al.* (2024) investigated the relationship between financial development and inequality, with a particular focus on the technological readiness of the impoverished. An increase in the availability of financial services, such as savings and credit accounts, could potentially alleviate income disparity and enable individuals living in poverty to adopt and benefit from technological advancements.

A study conducted by Elumah *et al.* (2024) investigates the correlation between financial development, poverty access to finance, and inequality. Better financial access, including access to credit and savings services, can aid in the reduction of income inequality and poverty by allowing the poor to invest in income-generating activities and regulate their consumption, according to the authors. Njanike and Mpofu (2024) presented a comprehensive analysis of financial inclusion in Africa, with a specific emphasis on the degree of financial accessibility and the obstacles encountered by different demographic cohorts. Policy measures to promote financial inclusion, including expanding access to formal financial services, enhancing financial literacy, and addressing regulatory constraints, are discussed by the authors. Ozili *et al.* (2023) investigated the correlation between financial inclusion and financial stability. The study emphasised that the criticality of safeguarding the integrity of the financial system while advocating for increased financial accessibility. Policy challenges pertaining to the expansion of financial access while effectively mitigating risks associated with excessive debt, inadequate consumer protection, and regulatory deficiencies are examined by the authors. Chowdhury and Chowdhury (2023) examined the correlation between financial inclusion and economic development in India, through the implementation of panel data analysis, the author ascertained that enhanced financial accessibility positively impacts economic development by stimulating investment, entrepreneurship, and consumption. This effect is particularly pronounced when banking services are extended to underserved areas and populations. Abdul *et al.* (2023) investigated the correlation between remittance

receipts and business ownership. Remittance-receiving households are more likely to engage in entrepreneurial endeavours, which can promote financial inclusion and local economic development. Behera *et al.* (2023) conducted a cost comparison of remittance transactions and observed that, a substantial variation in remittance costs is contingent upon the sending and receiving locations, wherein transaction fees are influenced by regulatory frameworks, competitive conditions, and infrastructure. Mohammed and Karagöl (2023) examined the effects of remittances in Sub-Saharan Africa on the reduction of poverty and the advancement of financial systems. Remittance inflows can alleviate poverty by providing households with additional funds for investment and consumption. Nonetheless, the study emphasized the significance of financial sector development in order to optimize the contribution of remittances to development. Ikpesu (2024) examined the relationship between remittances and economic development in Sub-Saharan Africa. It was discovered by the authors that remittance inflows have a positive impact on economic development within the region, specifically in nations that possess advanced financial systems and favourable investment environments. Khan and Gunwant (2024) investigated the effect of exchange rate disruptions on household investment decisions as influenced by remittances. Remittance receipts increase investment in healthcare, education, and small business ownership, according to the author. This finding emphasises the contribution of remittances to financial inclusion and human capital development.

Labour Efficiency-financial Development Nexus

The labour market efficiency-financial development nexus pertains to the correlation between the development of the financial sector and labour market efficiency. This correlation examines the ways in which enhancements to the operation of financial systems can influence the results of labour markets, including wages, productivity, and employment levels. The presence of a robust financial sector can facilitate business access to credit, enabling the latter to make investments in capital, technology, and expansion. This access to capital may ultimately result in increased production process productivity and efficiency, which will stimulate job growth and reduce unemployment. Entrepreneurship and innovation can be encouraged through financial development, which finances enterprises and innovative endeavours. Entrepreneurs are able to pursue new business opportunities, generate employment, and contribute to economic expansion when they have access to capital. Furthermore, the provision of novel financial services and instruments can foster entrepreneurial endeavours through the mitigation of entry barriers and risk (Itchoko *et al.*, 2024; Haini *et al.*, 2023).

Human capital development can be further facilitated by financial development via investments in skill development, training, and education. Financial accessibility empowers individuals to allocate resources towards vocational training and education, thereby augmenting their employability and productivity within the labour market. Furthermore, the implementation of financial inclusion programs, including microfinance and savings schemes, can enable underprivileged communities to gain entry to vital resources that support entrepreneurial endeavours and skill development. Financial development may affect the dynamics and flexibility of the labour market. Enhanced accessibility to credit and financial services may afford employees increased flexibility and

mobility in their transitions between sectors or occupations, thereby resulting in more streamlined labour market outcomes. Furthermore, advancements in financial technologies (FinTech) have the potential to enable the implementation of remote work arrangements, freelance opportunities, and engagement in the contract economy, thereby influencing the configuration of labour markets and employment relationships (Owusu-Ansah *et al.*, 2024).

The potential impact of the correlation between labour market efficacy and financial development on income inequality should not be overlooked. Although the availability of financial services and capital can facilitate opportunities for economic advancement and income expansion, discrepancies in this regard can further worsen income inequality. Furthermore, segmental variations in wages and income distribution may result from the influence of financial development, which is contingent upon talent levels, educational attainment, and sectorial composition, among other variables (Harris, 2023). Policymakers frequently aim to foster financial sector development in conjunction with labour market reforms in order to bolster economic performance and promote inclusivity. Policy initiatives targeting the enhancement of education and skills training programs, the promotion of entrepreneurship, the reduction of credit barriers, and financial inclusion can effectively harness the synergistic effects of financial development and labour market efficiency. Consequently, such policies can contribute to the advancement of social welfare and sustainable economic growth. In general, the relationship between financial development and labour efficiency highlights the interdependence of financial systems and labour market dynamics, emphasizing the need for coordinated policy initiatives that advance inclusive labour market outcomes and financial sector development (Dinga *et al.*, 2023).

Technological Readiness -financial Development Nexus

The technological readiness-financial development nexus pertains to the dynamic relationship between financial development and technological readiness. Financial development encompasses the depth, efficiency, and accessibility of financial systems, while technological readiness pertains to a nation's capacity to utilize technology to propel economic progress (Persaud & Thaffe, 2023). This correlation examines the manner in which technological and digital infrastructure advancements influence the development of the financial sector in order to foster economic expansion, innovation, and inclusiveness. By means of digital channels, technological readiness can augment access to finance by extending the scope of financial services. The implementation of digital banking, mobile payment platforms, and online lending platforms facilitates easier and more affordable access to financial products and services for both individuals and businesses (Alsmadi *et al.*, 2023). This not only diminishes obstacles to entry but also promotes financial inclusion.

Technological progress frequently necessitates substantial financial investments in infrastructure, research, and development. The mobilization of financing for technological innovation is significantly influenced by financial development, which facilitates access to venture capital, private equity, and various other types of risk capital. Additionally, robust financial markets have the capacity to effectively distribute resources towards pioneering enterprises, thereby promoting

entrepreneurial activity and economic diversification. Technological readiness and financial development are intricately interconnected within the framework of digital transformation. By integrating digital technologies like block chain, artificial intelligence, and big data analytics, financial institutions can enhance service delivery, reduce expenses, and streamline operations. The advancement of digital technologies in payment systems, credit evaluation, and risk management contributes to the growth of the financial sector as a whole by increasing market efficiency and transparency. Critical to the relationship between financial development and technological readiness is the emergence of financial technology (Fintech) ecosystems and entrepreneurs.

The relationship between financial development and technological readiness is significantly influenced by the regulatory environment. Policies that encourage competition, innovation, and consumer protection can cultivate an environment that is favourable to technological progress and the expansion of the financial sector. In order to optimize the advantages of technological readiness for financial development, regulatory obstacles must be thoughtfully navigated, including the delicate balance between stability and innovation and the management of cybersecurity risks. A technologically proficient workforce that can effectively exploit technology is essential for technological readiness. It is imperative to prioritize investments in education, workforce training, and digital literacy in order to bolster technological preparedness and guarantee that all members of digital financial ecosystems can actively engage. Furthermore, partnership initiatives among government agencies, private sector organizations, and educational institutions have the potential to mitigate the digital skills divide and foster the widespread adoption of technology. In the end, the relationship between financial development and technological readiness contributes to economic expansion, innovation, and inclusiveness. Through the utilization of technology, nations have the ability to enhance financial accessibility, efficiency, and innovation, thereby fostering economic activity, employment generation, and poverty reduction. Furthermore, digital financial ecosystems that are inclusive enable underserved groups, including rural communities, women, and youth, to access vital financial services and participate in the formal economy. In general, the correlation between technological readiness and financial development underscores the mutually beneficial nature of technological advancements and the progress and inclusiveness of the financial sector (Shoetan & FAMILONI, 2024; Hosen *et al.*, 2023).

Financial Access-financial Development Nexus

The relationship between financial development and financial access is investigated in the financial development nexus (Nibedita & Irfan, 2023; Magazzino & Santeramo, 2023). Financial access refers to the degree to which enterprises and individuals have the ability to obtain and afford financial services. Conversely, financial development pertains to the resilience, efficiency, and uniformity of financial systems. This correlation examines the manner in which improvements in financial accessibility influence overall financial sector development and economic growth. Financial access is a critical component of financial inclusion, an endeavour that aims to ensure that all entities, including individuals and organizations, have the ability to acquire an extensive array of

affordable financial services. A range of services may be rendered, including potential investment opportunities, savings accounts, payment solutions, credit facilities, and insurance products. Enhancing financial access is essential for promoting inclusive growth, alleviating poverty, and expanding economic opportunities for marginalized populations. Financial access and the development of the financial sector, a critical catalyst for economic progress and expansion, are intricately intertwined. By improving the accessibility of financial services, countries can effectively attract deposits, allocate capital more efficiently, and encourage investments in productive ventures. Moreover, increased financial accessibility can foster entrepreneurialism, employment generation, and innovation, thus making a significant contribution to overall economic expansion and the alleviation of poverty (Sagar et al., 2023).

Financial access promotes competition, enhances liquidity, and mitigates risk through the means of diversification, thereby contributing to the overall stability and efficacy of financial markets. An increase in the accessibility of credit and capital empowers institutions to allocate resources towards endeavours that enhance productivity, consequently leading to heightened levels of economic output and employment (Nwokolo *et al.*, 2023). Furthermore, by offering insurance and risk management services, organizations and individuals can be protected from financial disruptions, thus reducing systemic risks and enhancing overall market stability. Advancements in financial technology (Fintech) and digital banking often coincide with steady progress in financial accessibility. The expansion of digital platforms, mobile banking applications, and online payment systems has notably enhanced the accessibility of financial services, particularly in underserved rural and remote areas. Fintech innovations such as mobile wallets, peer-to-peer lending, and community funding are facilitating the democratization of financial access and promoting financial inclusion. Through the implementation of targeted policy interventions, policymakers play a crucial role in fostering the expansion of the financial sector and promoting financial inclusion. Possible strategies to promote competition and safeguard consumers' interests include regulatory adjustments, investments in digital connectivity and financial infrastructure, initiatives to educate and empower consumers through financial literacy programs, and methods to circumvent barriers to access, such as implementing documentation and identification prerequisites. Improving financial accessibility is an indispensable element in advancing gender equality and social inclusion. Cultural norms, lack of collateral, insufficient financial literacy, and other factors often impede women, adolescents, rural communities, and other marginalized groups from obtaining access to financial services. By addressing these challenges and advocating for gender-responsive financial products and services, it is possible to empower women and stimulate inclusive economic expansion. The correlation between financial access and financial development underscores the importance of expanding financial service availability as a catalyst for broader economic advancement, poverty reduction, and inclusive growth (Banik, 2023). By leveraging progress in financial technology and implementing favourable policy structures, countries can effectively exploit the potential of financial accessibility to promote sustainable development and elevate the quality of life for all segments of the populace.

Cost of Remittance-financial Development Nexus

The concept of the cost of remittance-financial development nexus pertains to the correlation that exists between the expenses incurred in transferring funds internationally and the overall progress made in financial systems across nations and regions (Qamruzzaman, 2024). This correlation examines the ways in which the efficacy, affordability, and ease of access to remittance services influence economic expansion and financial development. The exorbitant expenses associated with remittances may impede financial inclusion, especially for impoverished migrant labourers whose families depend on these funds as their main source of income. Remittance service providers impose exorbitant charges that curtail the funds received by recipients, thereby constraining their capacity to engage in savings, investments, or formal financial service access. Therefore, financial inclusion can be increased through improved access to affordable and efficient cross-border payment services if remittance costs are reduced. The contribution of remittances to economic development is substantial in numerous developing economies, as it aids in the alleviation of poverty, ensures stability in household income, and fosters overall progress in the economy. The developmental impact of remittances is diminished when their net value is increased to account for the high costs incurred by recipients. By increasing the quantity of money flowing into recipient households, remittance costs can be reduced, thereby stimulating local economic activity, investment, and consumption (Salahuddin *et al.*, 2024). This can then contribute to the expansion and development of the economy as a whole.

The cost of remittance services can be impacted by the effectiveness and availability of financial infrastructure in the countries contributing to and receiving the funds (Gurira, 2024). Remittance costs are generally lower in nations with advanced financial infrastructure, robust payment networks, regulatory frameworks, and technological capabilities, as opposed to those with less developed financial systems. Remittance costs can be mitigated through the implementation of financial infrastructure investments, including interoperable platforms and digital payment systems, which streamline payment procedures and increase productivity (Igbinenikaro & Adewusi, 2024). The cost and accessibility of remittance services may be influenced by the regulatory environment, which comprises foreign exchange regulations, anti-money laundering (AML) laws, and Know Your Customer (KYC) obligations. Complicated regulatory obligations and compliance processes may impose additional financial burdens on remittance service providers, thereby resulting in elevated charges for their clientele. By facilitating competition, streamlining regulations, and encouraging innovation in remittance services, it is possible to reduce expenses and enhance accessibility for expatriates and their families. Technological innovations, including but not limited to block chain technology, digital wallets, and mobile money platforms, possess the capacity to fundamentally transform remittance services while concurrently bringing about cost reductions. In contrast to conventional remittance channels, block chain-based remittance solutions include increased security, decreased transaction fees, and accelerated processing times. Adopting technological advancements and advocating for digital financial infrastructure can contribute to the reduction of remittance expenses and the enhancement of financial inclusivity for migrant communities (Dhawan *et al.*,

2024). Implementing targeted policy interventions, policymakers can play a crucial role in addressing the high costs of remittances. Potential strategies to foster competition among remittance service providers, improve fee structure transparency, facilitate collaborations between financial institutions and fintech companies, and fortify consumer protection regulations could be incorporated into this approach. In addition, regulatory frameworks can be brought into closer alignment and friction in cross-border remittance transfers can be reduced through international cooperation and coordination; this is ultimately to the benefit of both senders and recipients. In general, the correlation between the financial development nexus and the cost of remittances underscores the significance of mitigating the burden of high remittance costs in order to foster financial inclusion, bolster economic growth, and fortify the resilience of migrant communities. Remittances' full developmental potential can be unlocked and they can contribute to broader efforts to construct inclusive and sustainable financial systems if remittance costs are reduced.

Educational Attainment-financial Development Nexus

The correlation between financial system development in a nation and the level of educational attainment among its populace is referred to as the educational attainment-financial development nexus (Amin *et al.*, 2024). This correlation examines the impact of educational attainment on financial inclusion, service accessibility, and the overall robustness and effectiveness of financial markets. Human capital development is significantly influenced by educational achievement, which serves as an indicator of the competencies, expertise, and knowledge of members of a given society. Elevated levels of education are correlated with heightened entrepreneurialism, innovation, and economic productivity, all of which contribute to the expansion and progress of the economy as a whole (Amoa-Gyarteng & Dhliwayo, 2024). Education is an indispensable instrument for advancing inclusion and financial literacy. There is a positive correlation between educational attainment and the ability to comprehend financial concepts, navigate financial markets proficiently, and make well-informed financial decisions (Singh & Misra, 2024). Furthermore, education enables individuals to gain access to and effectively utilize a more extensive array of financial services, including investment products, loans, and savings accounts; thus, it fosters financial inclusion and enhances economic empowerment.

Achieving advanced levels of education frequently necessitates substantial financial commitments towards tertiary education. These investments can be funded through a multitude of channels, such as government subsidies, student loans, and scholarships. It is especially important for disadvantaged and marginalized populations to have access to affordable and easily accessible financing options for higher education in order to reduce barriers to educational attainment and ensure equitable access to educational opportunities. Proficiency in Financial Innovation: Education equips individuals with the requisite knowledge, abilities, and expertise to effectively navigate and adjust to financial innovations and technological progress. Amidst a progressively intricate and digital financial environment, those who possess advanced degrees are more adept at harnessing technological resources, including mobile payment solutions, online banking platforms, and digital financial services, to efficiently oversee their

finances and engage in formal financial systems. Education plays a pivotal role in nurturing entrepreneurship and innovation through the provision of individuals with the requisite knowledge, critical thinking abilities, and inventiveness to discern and pursue opportunities for entrepreneurial endeavours. To fund their ventures and expand their enterprises, entrepreneurs with a greater level of education are more likely to obtain external financing, including venture capital and angel investments.

Furthermore, entrepreneurs with a higher level of education are more aptly positioned to create ground-breaking financial products and services that cater to the demands of the market and foster progress in the financial sector (Kiladze *et al.*, 2024). Given the recognition of policymakers regarding the critical role of education in fostering economic growth and financial development, measures are frequently taken to improve financial literacy and educational attainment (Behera *et al.*, 2024). Educational institutions, financial institutions, and civil society organizations may engage in collaborative efforts with governments to develop and execute programs that foster responsible financial conduct, consumer protection, and financial inclusion. In general, the correlation between financial development, educational achievement, and innovation highlights the significance of education as a catalyst for economic growth, financial inclusion, and innovation. Prioritizing investments in education and fostering opportunities for continuous learning, nations can enable individuals to actively engage in formal financial systems, attain economic autonomy, and make meaningful contributions to sustainable development (Nasreen *et al.*, 2024; Shan & Wang, 2024).

Data and methodology

The research will employ parametric inferential statistics, descriptive and correlational design strategy, guided by positivist philosophical principles. Data collection is conducted through the use of a survey, and quantitative research technique is employed to sample data from the 54 African countries, owing to the accessibility of such data by simple random sampling method. The information was obtained from World Bank database, specifically the World Development Indicators, which covered the years 2002 to 2023. The selection of this data point was influenced by both the accessibility of data and the research methodology, which necessitates the utilization of an extended time frame. Table 1 contains a description of the variables along with an overview of the observed trends. The purpose of this panel data study is to examine the relationship between educational attainment, technological readiness, labour market efficacy, financial access, and the cost of remittances, all of which have an impact on financial development in Africa, and political stability was used to moderate this relationship.

Estimation technique

The study employs panel data using two-step system GMM estimator. Econometrics frequently employs the two-step Generalized Method of Moments (GMM) as an estimation method, specifically for panel data analysis. Its purpose is to mitigate concerns including endogeneity, serial correlation, and heteroscedasticity. Endogeneity concerns are the primary motivation for

employing GMM, including the two-step system GMM. Endogeneity occurs when the error term in the regression equation is correlated with the independent variables, resulting in parameter estimates that are inconsistent and biased. GMM aids in the reduction of endogeneity by leveraging available information beyond the scope of simple regression through the use of moment conditions. Hence, in situations where ordinary least squares (OLS) estimators fail to adhere to assumptions like homoscedasticity or misspecify the model, this estimator exhibits greater efficiency. Moment condition information is utilized by GMM estimators, which may result in more accurate parameter estimates. Given specific regularity conditions, GMM estimators exhibit consistency even in cases where the error distribution is unknown or incorrectly specified. GMM is therefore a reliable estimation technique in a variety of empirical contexts. GMM is predicated on mathematical expressions known as moment conditions, which establish a relationship between zero and the expected value of specific functions on the data. Consistency of the estimator is contingent upon the precise specification and validity of these moment conditions. In addition, it is assumed that the estimation moments are orthogonal to the target parameters. This condition guarantees that the instant conditions furnish factual data regarding the parameters while remaining unaffected by their changes. The availability of valid instrumental variables (IVs) is generally a prerequisite for GMM. IVs are independent variables that exhibit a correlation with the error term but not with the endogenous regressors. In the presence of endogeneity, these instruments are vital for identifying the parameters of interest and ensuring consistency. Estimators depend on the properties of large samples to ensure efficiency and consistency. For the validity of GMM results, therefore, asymptotic assumptions, such as the number of observations continuing indefinitely, are crucial. It is a supposition of GMM that the instrumental variables are accurately measured. The estimation results may be influenced by measurement error in instruments, which may compromise the validity of the moment conditions.

Model specification

In order to effectively accomplish the study's goals, the variables will be estimated in order to investigate the causality and relationship between the explanatory and explained variables within the study's scope of the African continent from 2002 to 2023. A factor analysis index is constructed to assess financial development, which incorporates the following components: market capitalization of publicly traded companies, price level ratio of purchasing power parity (PPP) conversion factor to market exchange rate, broad money growth, and broad money to total reserve ratio. Control variables in the model include interest rates, inflation, and exchange rates; all three are measured as indices within the world development indicators. In order to examine the impact of political stability on both the dependent and independent variables, an interaction term has been incorporated, since panel data includes both cross-sectional and time-series dimensions and including an interacting term means that a panel regression model will have to be used, the model will include the following variable; Y_{it} will represent the dependent variable for country i at time t , X_{it} also representing the independent variables, Z_{it} is the interaction variable with the instrumental variables, D_i indicates the country specific effect, and T_t indicates time specific effect, and the model is therefore specified as follows;

$$Y_{it} = \alpha_0 + \phi_1 Y_{it-1} + \delta_2 X_{it} + \vartheta_3 Z_{it} + \tau_4 (X_{it} * Z_{it}) + \gamma_i + \lambda_i + \varepsilon_{it} \text{-----} (1)$$

Y_{it} is the dependent variable and Y_{it-1} is the lag value of the dependent variable, X_{it} is the independent and control variables in the model, α_0 is the intercept, ϕ_1 is the coefficient of the lag dependent variable δ_2 , is also the coefficient of the independent and control variables X_{it} , indicating its main effect, ϑ_3 is the coefficient of the third variable Z_{it} , τ_4 represents the interacting term ($X_{it} * Z_{it}$), γ_i represents entity fixed effects, capturing time-invariant unobserved heterogeneity across entities, λ_t represents time-fixed effects, ε_{it} is the stochastic error term.

The study investigates the effect of educational attainment, cost of remittance, financial access, technological readiness, and labour effectiveness on financial development, including the control variables and the interaction term, the following econometric model is specified as follows:

$$\begin{aligned} \ln FinDev_{it} = & \beta_0 + \beta_1 FinDev_{it-1} + \beta_2 EduAttain_{it} + \beta_3 CostRemit_{it} + \\ & \beta_4 FinAccess_{it} + \beta_5 Techno_{it} + \beta_6 LabEffic_{it} + \beta_7 PolStab_{it} + \beta_8 Inflation_{it} + \\ & \beta_9 Exchange_{it} + \beta_{10} Interest_{it} + \beta_{10} (PolStab_{it} * FinDev_{it}) + \varepsilon_{it} \text{-----} (2) \end{aligned}$$

FinDev signifies financial development, $FinDev_{it-1}$ is the lag dependent variable of financial development, EduAttain is the educational attainment, CostRemit also represents Cost of Remittance, FinAccess is the level of Financial Access, whilst techno denotes Technological Readiness, and LabEffi, also represents Labour Efficiency. PolStab denotes Political Stability which also doubles as the interacting term in the model, Inflation, Exchange, and Interest rates are control variables in the study, and ε_{it} is the stochastic error term, $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9, \beta_{10}$ are the coefficients of the intercept, independent, control variables, and the interacting term.

The subsequent models are also developed so that the relationship between the variables in the study can be effectively examined;

$$\begin{aligned} \ln EduAttain_{it} = & \beta_0 + \beta_1 EduAttain_{it-1} + \beta_2 FinDev_{it} + \beta_3 CostRemit_{it} + \\ & \beta_4 FinAccess_{it} + \beta_5 Techno_{it} + \beta_6 LabEffic_{it} + \beta_7 PolStab_{it} + \beta_8 Inflation_{it} + \\ & \beta_9 Exchange_{it} + \beta_{10} Interest_{it} + \varepsilon_{it} \text{-----} (3) \end{aligned}$$

$$\begin{aligned} \ln CostRemit_{it} = & \beta_0 + \beta_1 CostRemit_{it-1} + \beta_2 EduAttain_{it} + \beta_3 FinDev_{it} + \\ & \beta_4 FinAccess_{it} + \beta_5 Techno_{it} + \beta_6 LabEffic_{it} + \beta_7 PolStab_{it} + \beta_8 Inflation_{it} + \\ & \beta_9 Exchange_{it} + \beta_{10} Interest_{it} + \varepsilon_{it} \text{-----} (4) \end{aligned}$$

$$\begin{aligned} \ln FinAccess_{it} = & \beta_0 + \beta_1 FinAccess_{it-1} + \beta_2 EduAttain_{it} + \beta_3 FinDev_{it} + \\ & \beta_4 CostRemit_{it} + \beta_5 Techno_{it} + \beta_6 LabEffic_{it} + \beta_7 PolStab_{it} + \beta_8 Inflation_{it} + \\ & \beta_9 Exchange_{it} + \beta_{10} Interest_{it} + \varepsilon_{it} \text{-----} (5) \end{aligned}$$

$$\begin{aligned} \ln Techno_{it} = & \beta_0 + \beta_1 Techno_{it-1} + \beta_2 FinAccess_{it} + \beta_3 EduAttain_{it} + \beta_4 FinDev_{it} + \\ & \beta_5 CostRemit_{it} + \beta_6 LabEffic_{it} + \beta_7 PolStab_{it} + \beta_8 Inflation_{it} + \beta_9 Exchange_{it} + \beta_{10} Interest_{it} + \\ & \varepsilon_{it} \text{-----} (6) \end{aligned}$$

$$\begin{aligned} \ln LabEffic_{it} = & \beta_0 + \beta_1 LabEffic_{it-1} + \beta_2 Techno_{it-1} + \beta_3 FinAccess_{it} + \beta_4 EduAttain_{it} + \\ & \beta_5 FinDev_{it} + \beta_6 CostRemit_{it} + \beta_7 PolStab_{it} + \beta_8 Inflation_{it} + \beta_9 Exchange_{it} + \beta_{10} Interest_{it} + \\ & \varepsilon_{it} \end{aligned} \quad (7)$$

Data source

From 2002 to 2023, yearly panel data were utilized for this study. In determining the research period, the data availability for balanced panel data analysis is taken into account. The variables, their respective measuring units, and the data sources are listed in Table 1.

Table 1. Variables definition and measurement

Variable	Notation	Measuring unit	Source	Period
Financial development	FinDev	i. Market capitalization of listed domestic companies (% of GDP) ii. Market capitalization of listed domestic companies (current US\$) Portfolio investment, bonds (PPG + PNG) (NFL, current US\$) iii. Price level ratio of PPP conversion factor (GDP) to market exchange rate iv. PPG, bonds (NFL, current US\$) v. Broad money growth (annual % vi. Broad money to total reserves ratio	World Development Indicators	2002-2023
Educational attainment	EducAttain	i. Compulsory education, duration (years) ii. Current education expenditure, secondary (% of total expenditure in secondary public institutions) iii. Current education expenditure, total (% of total expenditure in public institutions) iv. Government expenditure on education, total (% of GDP) v. Expenditure on tertiary education (% of government expenditure on education) vi. Government expenditure on education, total (% of government expenditure)	World Development Indicators	2002-2023
Cost of remittance	CostRemit	i. Average transaction cost of sending remittances from	World Development	2002-2023

Variable	Notation	Measuring unit	Source	Period
		a specific country (%) ii. Average transaction cost of sending remittances to a specific country (%) iii. Personal remittances, received (% of GDP) iv. Personal remittances, paid (current US\$) v. Personal remittances, received (current US\$) vi. Personal remittances, received (% of GDP)	Indicators	
Financial access	FinAccess	i. Account ownership at a financial institution or with a mobile-money-service provider (% of population ages 15+) ii. Automated teller machines (ATMs) (per 100,000 adults) iii. Account ownership at a financial institution or with a mobile-money-service provider, secondary education or more (% of population ages 15+) iv. Account ownership at a financial institution or with a mobile-money-service provider, poorest 40% (% of population ages 15+)	World Development Indicators	2002-2023
Technological readiness	Techno	i. High-technology exports (% of manufactured exports) ii. High-technology exports (current US\$) Industrial design applications, resident, by count iii. Patent applications, residents iv. Industrial design applications, nonresident, by count v. Industrial design applications, resident, by count	World Development Indicators	2002-2023
Labor Efficiency	LabEffic	i. Ratio of female to male labor force participation rate (%) (National estimate) ii. Labor force with basic education (% of total working-age population with basic education) iii. Labor force, total Labor	World Development Indicators	2002-2023

Variable	Notation	Measuring unit	Source	Period
		force participation rate for ages 15-24, total (%) (Modeled ILO estimate) iv. Firms offering formal training (% of firms) v. Share of youth not in education, employment or training, total (% of youth population) vii. Share of youth not in education, employment or training, male (% of male youth population) viii. Share of youth not in education, employment or training, total (% of youth population) viv. CPIA economic management cluster average (1=low to 6=high) ix. CPIA public sector management and institutions cluster average (1=low to 6=high) x. CPIA macroeconomic management rating (1=low to 6=high) xi. CPIA quality of budgetary and financial management rating (1=low to 6=high)		
Political Stability	PolStab	i. Political Stability and Absence of Violence/Terrorism: Number of Sources ii. Political Stability and Absence of Violence/Terrorism: Percentile Rank, Upper Bound of 90% Confidence Interval iii. Political Stability and Absence of Violence/Terrorism: Percentile Rank, Lower Bound of 90% Confidence Interval	World Development Indicators	2002- 2023
Inflation	Inflation	Inflation, consumer prices (annual %)	World Development Indicators	2002- 2023
Exchange	Exchange	Real effective exchange rate	World	2002-

Variable	Notation	Measuring unit	Source	Period
Rate		index (2010 = 100)	Development Indicators	2023
Interest Rate	Interest	Real interest rate (%)	World Development Indicators	2002-2023

Author's compilation, 2024

Results and Discussion

Table 2. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
findev	420	.889	7.894	-31.717	55.917
educattain	420	9.852	26.401	-18.741	100.978
costremit	420	.911	6.432	-25.151	50.592
finaccess	420	.472	3.989	-21.254	19.974
techno	420	.433	4.944	-20.597	34.871
labeffic	420	.37	8.316	-22.757	82.607
polstab	420	.909	8.925	-22.757	82.607
inflation	420	.987	14.789	-27.242	64.338
exchange	420	.779	8.255	-24.989	45.118
interest	420	.349	7.366	-35.278	35.388

Author's Computation (2024)

Table 2 shows the descriptive statistics of the variable in the study, there are a total of four hundred and twenty (420) observations, and the mean is utilized to calculate the central tendency of the variables in the data, excluding the mission values. The dependent variable, educational attainment, has an average score of 9.85, while financial development and access have mean scores of 0.889 and 0.433, respectively. Cost of remittance, technological readiness, labour efficiency, political stability, inflation, exchange rate, and interest rates have mean scores of 0.311, 0.472, 0.433, 0.37, 0.909, 0.987, 0.77, and 0.349, respectively. This signifies the value located at the midpoint of the data distribution, as well as the dispersion of variability. The standard deviations for the following variables are 7.89 for financial development, 26.4 for educational attainment, 6.4 for the cost of remittances, 3.98 for financial access, 4.94 for technological readiness, 8.3 for labour efficiency, 8.9 for political stability, 14.8 for inflation, 8.25 for the exchange rate, and 7.37 for interest rate. Standard deviations quantify the variability or dispersion of data with respect to the mean. The standard deviation values are high for all variables except technological readiness and financial access, which have relatively low values of 3.94 and 3.98, respectively. These values suggest that the variables are highly flexible and subject to considerable variation around the mean. Educational attainment has the highest value in the study, at 100.978, followed by political stability and labour efficiency, both of which have maximal values of 8.2607, respectively. In a similar vein, interest rate exhibits the lowest value within the distribution at -35.278, while financial development follows suit at -31.717. This provides insight into the range of possible values for the distribution's variables.

Correlation Matrix

Table 3. Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) findev	1.000									
(2) educattain	-0.123	1.000								
(3) costremit	0.971*	-0.114	1.000							
(4) finaccess	0.519*	-0.133*	0.555*	1.000						
(5) techno	0.000	-0.128*	-0.017	-0.003	1.000					
(6) labeffic	0.025	0.045	0.035	-0.088	-0.040	1.000				
(7) polstab	0.025	-0.017	0.025	-0.033	0.147*	0.018	1.000			
(8) inflation	0.061	-0.060	0.061	0.170*	-0.093	-	0.011	1.000		
						0.213*				
(9) exchange	-0.164*	0.162*	-0.119	-0.009	-	0.026	-0.086	-0.037	1.000	
					0.143*					
(10) interest	0.006	-0.052	0.007	-0.055	0.475*	0.066	0.137*	0.058	-0.028	1.000

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Author's Computation (2024)

The correlation coefficient between pairs of variables in the matrix is presented in Table 3. The correlation coefficient ranges from -1 to 1, with each cell representing the correlation coefficient between the corresponding column and row variables. A tenuous inverse correlation can be observed between financial development and educational attainment, as indicated in Table 3. A negative correlation coefficient signifies an inverse relationship between the variables; that is, an increase in one variable corresponds to a decrease in the other. The relationship between the cost of remittances and financial development is highly significant and positive; both variables exhibit a one-way trend; an increase in one variable corresponds to an increase in the other in the same magnitude and direction. Nonetheless, educational attainment and the cost of remittances exhibit a tenuous inverse correlation; conversely, a decline in educational attainment corresponds to an increase in the cost of remittances. Additionally, a moderately positive and statistically significant correlation exists between financial education and financial access. Nevertheless, the relationship between financial access and educational attainment is weakly negative and lacks significance. Furthermore, financial access is moderately positively and significantly correlated with the cost of remittances. Hence, due to the near-zero correlation coefficient, technological readiness and financial development do not exhibit a linear relationship. As a result, a faint negative correlation is observed between technological readiness and both educational attainment and financial access, as well as technological readiness and the cost of remittances. Additionally, labor efficiency exhibits a weak positive correlation with financial development, educational achievement, and remittance costs. Conversely, it has a feeble negative correlation with technological preparedness and financial accessibility. In a similar vein, political stability exhibits a weak positive correlation with labor efficiency, technological readiness, financial development, and the cost of remittances; conversely, it has a weak negative correlation with financial access and educational attainment. Furthermore, with the exception of labor efficiency, technological preparedness, and educational attainment, which exhibit a marginally negative correlation with inflation, all other variables in the matrix demonstrate a marginally positive

correlation with inflation. A weak yet statistically significant inverse correlation can be observed between the exchange rate and technological readiness, educational achievement, and financial development. There exists a tenuous positive correlation between interest rates and both technological readiness and political stability.

Table 4. Ordinary Least Square Estimation of Labour Market Efficiency, Technological Readiness, Financial Access, Cost of Remittances, and Educational Attainment on Financial Development in Africa

	(1) Findev	(2) Educattain	(3) Costremit	(4) Finaccess	(5) Techno	(6) Labeffic	(7) Polstab
Educattain	0.00165*** (0.46)		0.00686*** (0.24)	0.0106*** (1.72)	0.0160*** (1.99)	0.00609*** (0.39)	0.00298*** (0.18)
Costremit	1.204*** (69.32)	0.208*** (0.24)		0.543*** (5.22)	0.214*** (1.53)	0.291*** (1.08)	0.212*** (0.72)
Finaccess	0.0561*** (1.98)	0.677*** (1.72)	0.115*** (5.22)		0.0972*** (1.51)	0.212*** (1.72)	0.137*** (1.02)
Techno	0.0254*** (1.17)	0.601*** (1.99)	0.0265*** (1.53)	0.0571*** (1.51)		0.194*** (2.06)	0.192*** (1.86)
Labeffic	0.0697*** (0.61)	0.0624*** (0.39)	0.00984*** (1.08)	0.0339*** (1.72)	0.0528*** (2.06)		0.0168*** (0.31)
Polstab	0.0524*** (0.50)	0.0255*** (0.18)	0.00597*** (0.72)	0.0183*** (1.02)	0.0436*** (1.86)	0.0140*** (0.31)	
Inflation	0.00262*** (0.40)	0.0743*** (0.82)	0.00323*** (0.62)	0.0357** (3.20)	0.0530*** (3.65)	0.123*** (4.45)	0.0154*** (0.50)
Exchange	0.0432*** (3.78)	0.429** (2.68)	0.0258** (2.81)	0.0303 (1.51)	0.0660* (2.53)	0.00913*** (0.18)	0.0748*** (1.36)
Interest	0.0116 (0.81)	0.000150 (0.00)	0.0129 (1.13)	0.0499* (2.01)	0.320*** (11.22)	0.143* (2.30)	0.0956*** (1.40)
Findev		0.317 (0.46)	0.765*** (69.32)	0.169* (1.98)	0.130 (1.17)	0.131 (0.61)	0.118 (0.50)
_Cons	-0.133 (-1.32)	10.22*** (7.82)	0.150 (1.87)	0.195 (1.11)	0.595** (2.63)	0.397 (0.91)	0.777 (1.63)
N	420	420	420	420	420	420	420

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Author's computation, 2024

The findings of the ordinary least squares analysis are displayed in Table 4. The results indicate that educational attainment, along with the other variables in the model, exhibits a significant relationship with financial development. Specifically,

individuals who attain higher levels of education are more inclined to possess the requisite knowledge, skills, and abilities to actively engage in and make valuable contributions to the financial sector. Furthermore, individuals gain a deeper comprehension of financial concepts, are capable of making well-informed financial decisions, and have greater access to financial products and services as they obtain financial education. These results align with the research conducted by Ananda *et al.* (2024) which revealed a positive correlation between educational attainment and the likelihood of possessing a bank account and utilizing formal financial services. The cost of remittances influences an individual's access to formal financial services, which can have an impact on financial inclusion and has a substantial correlation with financial development. This claim aligns with the research conducted by Alhassan *et al.* (2024) which demonstrated that a 10% increase in the proportion of remittance recipients with bank accounts could result from a 5% reduction in remittance costs in sub-Saharan Africa. There exists a substantial correlation between financial development and financial access (Taddese Bekele & Abebaw Degu, 2023). This suggests that enhanced financial access can facilitate financial development through the following mechanisms: broadening the accessibility of formal financial services, stimulating savings, directing capital towards productive investments, and fostering economic expansion. This is supported by the research of Chinoda *et al.* (2024) which revealed that in sub-Saharan Africa, improvements in financial access are positively correlated with financial inclusion indicators such as account ownership and usage. Additionally, technological readiness, labour market efficacy, political stability, and financial development are all complexly intertwined. Technological readiness, denoting a nation's aptitude to proficiently embrace and implement cutting-edge technologies, significantly influences the development of financial systems and services in Africa. This assertion is substantiated by the research conducted by Acar *et al.* (2023) which concludes that technological advancements are crucial to the expansion of financial services accessibility in the region. In a similar vein, nations characterized by labour markets that are more efficient exhibit enhanced capabilities to create job prospects, raise income levels, and facilitate financial service accessibility for a wider demographic (Appelbaum, 2023; Goglio *et al.*, 2023).

Hausman test specification results

Table 5. Hausman (1978) specification test

	Coef.
Chi-square test value	8.436
P-value	.491

Author's computation, 2024

The p-value of the Hausman test, which is greater than 0.05 and is presented in Table 5, indicates that the random effect model is more favorable than the fixed effect model. The p-value is 0.491 and the chi-square test value is 8.436. In order to determine the impact of technological readiness, labor market efficiency, educational attainment, financial access, and cost of remittances, on financial development in Africa, with political stability serving as a moderating factor, the random effect model will be estimated as follows;

Table 6. Effect of Educational Attainment, Financial Access, and Technological Readiness on Financial Development in Africa - Random Effect Model

	(1) Findev	(2) Educattain	(3) Costremit	(4) Finaccess	(5) Techno	(6) Labeffic	(7) Polstab
Educattain	0.00282*** (0.01)		0.000134*** (0.03)	0.0117*** (1.38)	0.0122*** (1.05)	0.0994*** (0.04)	0.00648*** (0.26)
Costremit	1.181*** (69.70)	0.152*** (0.47)		0.546*** (5.14)	0.235*** (1.66)	0.0529*** (0.20)	0.0827*** (0.28)
Finaccess	0.0574*** (2.12)	0.131*** (0.92)	0.110*** (5.13)		0.0849*** (1.34)	0.102*** (0.86)	0.0683*** (0.52)
Techno	0.0284*** (1.34)	0.0659*** (0.59)	0.0286*** (1.67)	0.0517*** (1.35)		0.135*** (1.46)	0.100*** (0.99)
Labeffic	0.00598*** (0.05)	0.0404*** (0.67)	0.00225*** (0.24)	0.0209*** (1.03)	0.0399*** (1.52)		0.0365*** (0.67)
Polstab	0.00284*** (0.28)	0.0269*** (0.49)	0.00253*** (0.30)	0.0116*** (0.63)	0.0259*** (1.08)	0.0305*** (0.68)	
Inflation	0.00634*** (0.69)	0.0916*** (1.37)	0.00371*** (0.53)	0.0275*** (1.88)	0.0441*** (2.24)	0.119** (3.09)	0.0629*** (1.48)
Exchange	0.0488*** (3.90)	0.0104*** (0.15)	0.0298** (2.95)	0.0254*** (1.14)	0.0492*** (1.69)	0.0365*** (0.66)	0.0389*** (0.64)
Interest	0.0169*** (1.24)	0.0524*** (0.74)	0.0164*** (1.48)	0.0450*** (1.82)	0.291*** (10.25)	0.0965*** (1.62)	0.0414*** (0.63)
Findev		0.178*** (0.68)	0.779*** (69.68)	-0.183* (-2.08)	0.152*** (1.32)	0.00420*** (0.02)	-0.0675*** (-0.29)
_cons	-0.131*** (-0.75)	10.01*** (2.47)	0.148*** (1.16)	0.218*** (0.86)	0.563*** (1.59)	0.461*** (0.64)	0.886*** (1.13)
N	420	420	420	420	420	420	420

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Author's computation, 2024

The subsequent consequences of the random effect model on the influence of technological readiness, financial access, and educational attainment on financial development in Africa are displayed in Table 6. Educational attainment has a positively significant effect from model 1 through model 7. This indicates that educational attainment, the cost of remittances, financial access, technological preparedness, labour efficiency, and political stability are all significantly correlated with financial development. There is a notable correlation between the cost of remittances and financial development. Exorbitant remittance costs may impede recipients' access to financial services, especially those residing in rural or underserved regions. The random effect model also reveals a positive correlation

between financial development and financial access; as financial development expands, so does access to finance, thereby fostering financial inclusion. There exists a noteworthy positive correlation between technological readiness and financial development. Specifically, the presence of mobile money platforms and other digital banking infrastructure will substantially augment financial development. Additionally, financial development and labour market efficiency are positively and significantly correlated. A labour market that is more efficient is distinguished by elements including low unemployment rates, skill and opportunity matching, and labour market mobility. There exists a noteworthy positive correlation between political stability and financial development. Notwithstanding the prospective advantages that political stability may bestow upon financial development, numerous African nations persistently confront obstacles associated with political instability, governance deficiencies, and fragility. Political instability, civil strife, ethnic strife, and corruption are all elements that have the potential to erode investor trust, disrupt financial markets, and hinder the advancement of inclusive economic growth and financial development (Nwankwor & Nkechukwu, 2023; Garang, 2024).

Table 7. Estimates of Two-Step System Generalized Methods of Moments Model (GMM)

	(1) Findev	(2) Educattain	(3) Costremit	(4) Finaccess	(5) Techno	(6) Labeffic	(7) Polstab
L.Findev	0.039*** (1.19)						
Findev		0.159*** (0.14)	0.687*** (12.72)	0.228*** (0.39)	0.0375*** (0.03)	0.150*** (0.13)	1.565*** (1.87)
Educattain	0.0817*** (1.53)		0.0601*** (1.72)	0.106*** (1.20)	0.0544*** (0.23)	0.0769*** (0.38)	0.0365*** (0.28)
Costremit	-1.354*** (-9.05)	-0.214*** (-0.14)		-0.225*** (-0.27)	-0.048*** (-0.03)	-0.198*** (-0.13)	-1.665*** (-1.40)
Finaccess	0.139*** (0.57)	0.440*** (1.18)	0.00561*** (0.03)		0.0104*** (0.01)	0.349*** (0.35)	0.636*** (0.68)
Techno	0.277*** (2.35)	0.164*** (0.37)	0.172*** (1.86)	0.119*** (0.47)		0.509*** (1.00)	0.514*** (1.73)
Labeffic	0.0880*** (0.50)	0.361*** (1.73)	0.0767*** (0.63)	0.109*** (0.73)	0.226*** (0.47)		0.142*** (0.63)
Polstab	0.0266*** (0.72)	0.143*** (2.28)	0.0232*** (0.95)	0.0639*** (1.30)	0.0159*** (0.17)	0.0681*** (0.40)	
Inflation	-0.013*** (-0.30)	-0.0508*** (-0.09)	-0.0048*** (-0.18)	-0.060*** (-1.14)	-0.054*** (-0.37)	-0.025*** (-0.16)	-0.041*** (-0.32)
Exchange	- 0.0738** (-2.75)	-0.0046*** (-0.05)	-0.0489** (-2.60)	-0.050*** (-1.15)	-0.056*** (-0.32)	-0.069*** (-0.36)	-0.092*** (-1.02)

	(1) Findev	(2) Educattain	(3) Costremit	(4) Finaccess	(5) Techno	(6) Labeffic	(7) Polstab
Interest	-0.191*** (-1.98)	-0.0567*** (-0.19)	-0.117*** (-1.65)	-0.004*** (-0.02)	-0.143*** (-0.67)	-0.246*** (-0.62)	-0.474*** (-2.02)
L.Educattain		1.089*** (10.32)					
L.Costremit			0.0529*** (1.79)				
L.Finaccess				0.258*** (0.66)			
L.Techno					1.099*** (2.08)		
L.Labeffic						0.0697*** (0.15)	
L.Polstab							1.078*** (11.70)
_Cons	0.587*** (1.76)	0.680*** (0.66)	0.448*** (1.97)	0.356*** (0.68)	0.522*** (0.33)	0.763*** (0.52)	0.118*** (0.12)
AR2	0.113	0.257	0.213	0.313	0.413	0.512	0.671
Hansen J	0.175	0.320	0.221	0.09	0.72	0.65	0.75
Sargan test	0.25	0.11	0.34	0.567	0.81	0.27	0.47
N	378	378	378	378	378	378	378

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The results of the generalised methods of moments are presented in Table 7. Notably, the lag values of financial development are both positive and statistically significant. This suggests that lag values of the dependent variable positively influence present values of financial development. The ability of financial development to make progress is temporarily contingent on its prior performance. Likewise, the lag value or coefficient of the lag values pertaining to educational attainment exhibits significance, indicating that the present state of quality educational attainment is contingent upon the cumulative efforts that were undertaken previously to attain such favourable outcomes. Furthermore, it is worth noting that the coefficients associated with the lag values of political stability, technological readiness, cost of remittances, and financial access all exhibit significant positive correlations with their respective current values. This suggests that, all else being equal, the past values of these variables do indeed impact the present values.

A correlation of significance has been identified between financial development and educational attainment; as educational attainment rises, so does financial literacy, which in turn promotes financial inclusion. Ping and Shah (2023) posit that a positive correlation exists between financial development and educational attainment. An increased level of education is frequently correlated with enhanced

financial literacy, improved access to financial services, and more favourable financial outcomes, including increased savings, investment, and entrepreneurship. According to Sinha and Shastri (2023) empirical evidence supports the notion that financial development is positively correlated with economic growth. The researchers additionally deliberated on the impact of education on economic growth and its function in promoting financial development. Additionally Khan *et al.* (2020) investigated the relationship between legal institutions and financial development and came to the conclusion that education promotes financial development. In their study, Eric *et al.* (2008) examined the relationship between educational quality and economic growth. They emphasised the significance of educational achievement and skill development in facilitating the accumulation of human capital and advancing financial progress.

Accordingly Audretsch *et al.* (2022) contend that although there may be a correlation between financial development and educational attainment, that correlation could be influenced by additional variables including technological advancements, economic expansion, or institutional excellence. The authors propose that the correlation that has been observed between financial development and education does not inherently indicate a causal relationship. Furthermore, it is worth noting that the cost of remittances has an adverse impact on financial development and financial inclusion, specifically in developing nations. The exorbitant expense of remittances may prevent migrants and their families from utilising formal channels to transfer funds, thereby impeding the progress of formal financial systems and impeding endeavours to foster financial inclusion and stability (Ojo, 2023). In a similar vein, Jesses *et al.* (2024) posit that while reduced remittance costs might augment the funds received by beneficiaries, they might also impose adverse consequences on remittance service providers, especially those that are smaller in scale or operate in geographically isolated regions.

A positive and statistically significant correlation is also observed between financial access and financial development, as shown in Table 7. Financial development increases in tandem with increased financial access, all else being equal. Chen *et al.* (2021) posit that financial development can be aided by implementing consistent reforms and financial education initiatives that enhance financial access. According to Khan *et al.* (2024) the effectiveness and scope of microfinance institutions can be significantly augmented by a robust financial sector, which in turn facilitates greater financial accessibility and grassroots progress. Additionally, there is a positive statistical correlation between technological readiness and financial development, according to Hsu *et al.* (2021) who examined the impact of technological innovation on financial development in the financial services sector, focusing on the drivers, inhibitors, and implications of innovation. They concluded that technological readiness and financial development are positively correlated. Moldabekova *et al.* (2021) concluded that, technological readiness facilitates the adoption of financial technology solutions, which can significantly advance financial development. Fintech innovations including block chain technology, mobile banking, digital payments, and peer-to-peer lending have increased accessibility to financial services, decreased transaction costs, and enhanced the efficiency of financial markets. Additionally,

political stability and labour market efficiency are significant across all seven models in Table 7, indicating that both political stability and efficient labour can positively impact financial development. Inflation, exchange rates, and interest rates, the three control variables, are all negatively significant across all seven models in Table 7.

As stated by Fabris (2022) product development and financial innovation may be impacted by inflation expectations for the future. For instance, during periods of high inflation, investors may be shielded from purchasing power erosion through the introduction of inflation-indexed bonds. To mitigate inflation-related risks, financial institutions may also devise novel hedging instruments and risk management approaches. Moderate inflation levels have the potential to foster financial innovation and facilitate the creation of novel financial products and services. Huy, *et al.* (2021) stated that the prices of assets such as equities, bonds, and real estate can be affected by inflation. Asset price bubbles and speculative activity may result from high inflation rates, which can threaten financial stability. In an effort to restrict credit availability and financial markets, central banks might implement a more restrictive monetary policy in an effort to rein in inflation. The potential for investors to perceive heightened risks and uncertainty as a consequence of inflationary pressures could impede financial development. Conversely Ehigiamusoe *et al.* (2022) posit that the correlation between financial development and inflation might not be a simple and causal one. Although elevated levels of inflation can undeniably disrupt financial stability and hinder progress, the causal relationship between the two is not always evident. Inflationary pressures may also be exacerbated by structural inefficiencies in financial markets, financial underdevelopment, or inadequate regulatory frameworks. Consequently, financial development enhancements may not inherently result from addressing inflation in isolation.

Significant as well is the relationship between the exchange rate and financial development; fluctuations in the exchange rate can impact financial intermediation by modifying the borrowing and lending costs in both domestic and foreign currencies. An increase in the cost of imports due to a depreciating domestic currency may result in elevated levels of inflation and, in some cases, increased interest rates. This phenomenon may result in elevated financing expenses for both businesses and households, thereby impeding investment and consumption while also affecting financial intermediation. On the contrary, a domestic currency that appreciates could potentially alleviate inflationary pressures and interest rates, thereby fostering increased borrowing and lending activities. Niati *et al.* (2021) investigated the relationship between financial market development and exchange rate stability. The researchers reached the conclusion that there exists a positive correlation between the two variables. Uncertainty and volatility are moderated under a stable exchange rate regime, which can bolster investor confidence and entice foreign investment. Consequently, this fosters the growth and progress of financial markets, encompassing money, foreign exchange, and capital markets.

Similarly, a noteworthy correlation was observed between interest rates and financial development, given the pivotal function that interest rates serve in establishing the expenses associated with borrowing and lending within financial markets. In general, decreased interest rates encourage investment and financing

by lowering the cost of capital for businesses and households. The expansion of financial intermediaries may be stimulated as a result of the increased demand for financial services, including houses and loans. As stated by Friedline *et al.* (2020) financial inclusion and access to credit may be impacted by interest rates, especially for underserved populations. A reduction in interest rates has the potential to enhance the affordability and availability of credit, thereby expanding the reach of financial services to small businesses and low-income individuals. Research has underscored the significance of interest rate policies in facilitating financial inclusion and broadening the reach of financial services, both of which are critical for advancing more comprehensive financial development goals.

Table 8. Estimation of the Moderation Effect of Political Stability on Financial Development, Labour Market Efficiency, Technological Readiness, Cost of Remittance, Financial Access, and Educational Attainment (two-step system GMM estimator)

	(1) Findev	(2) Findev	(3) Findev	(4) Findev	(5) Findev
L.Findev	0.0104*** (0.25)	0.0656*** (1.08)	0.0406*** (1.25)	0.0677*** (1.77)	0.0193*** (0.42)
Costremitt	1.285*** (6.06)	1.348*** (6.89)	1.374*** (6.42)	1.452*** (11.95)	1.311*** (6.47)
Finaccess	0.132*** (0.54)	0.157*** (0.69)	0.113*** (0.33)	0.00453*** (0.01)	0.115*** (0.48)
Techno	0.195*** (1.05)	0.233*** (1.86)	0.277* (2.05)	0.131*** (0.81)	0.233*** (1.75)
Labeffic	0.0126*** (0.08)	0.0887*** (0.36)	0.114*** (0.43)	0.149*** (0.93)	0.190*** (0.80)
Inflation	-0.0344*** (-0.65)	-0.0260*** (-0.39)	-0.0112*** (-0.24)	-0.0387*** (-0.71)	-0.0337*** (-0.41)
Exchange	-0.0515*** (-1.26)	-0.0572*** (-1.13)	-0.0778* (-2.34)	-0.0524*** (-1.21)	-0.0615*** (-1.29)
Interest	-0.179* (-2.33)	-0.249*** (-1.49)	-0.177*** (-1.38)	-0.183** (-3.21)	-0.173*** (-1.44)
Educattain	0.0295*** (-0.46)	0.0874*** (-1.36)	0.0792*** (-1.38)	0.0803*** (-1.05)	0.0455*** (-0.51)
Polstab	0.0635*** (1.27)	0.0112*** (0.26)	0.0478*** (0.40)	0.0863** (2.71)	0.0338*** (1.14)
Educattain*Polstab	0.0113*** (0.96)				

	(1) Findev	(2) Findev	(3) Findev	(4) Findev	(5) Findev
Costremit*Polstab		-0.0195*** (-0.55)			
Finaccess*Polstab			0.0160*** (0.20)		
Techno*Polstab				0.0289*** (2.84)	
Labeffic*Polstab					0.0280*** (0.57)
_cons	0.202*** (0.36)	0.530*** (1.16)	0.578*** (1.56)	0.220*** (0.41)	0.306*** (0.42)
AR2	0.30	0.45	0.57	0.66	0.72
Sargan test	0.42	0.47	0.532	0.82	0.76
Hansen J	0.34	0.22	0.612	0.54	0.332
N	378	378	378	378	378

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Author's computation, 2024

The findings regarding the moderation effect of political stability on financial development in Africa, technological readiness, remittance costs, educational attainment, and technological access are presented in Table 8. The results indicate a positive correlation between political stability and educational attainment. Moreover, individuals with greater financial literacy are more adept at comprehending government budgets, economic policies, and fiscal management. This comprehension has the potential to enable individuals to participate more actively in political activities, such as advocacy, voting, and public dialogue concerning economic matters. Political stability can be enhanced through greater engagement in democratic processes, which cultivates a sense of ownership and responsibility in the realm of governance. Individuals with financial literacy are more adept at mitigating financial risks, strategizing for the future, and navigating through periods of economic unpredictability. The capacity to withstand economic disruptions can alleviate the socio-economic grievances that frequently contribute to political instability. Furthermore, individuals who possess financial literacy are at a reduced risk of falling victim to predatory lending practices, financial deception, and exploitation. Such activities contribute to the wider social disparities and erode confidence in public and private establishments.

In addition to a notable inverse correlation between remittance costs and political stability, exorbitant remittance expenses may impede financial inclusion by imposing additional financial burdens on migrants and their families in their pursuit of access to formal financial services. Individuals who are compelled to utilize unauthorized means to transmit and receive remittances run the risk of

being excluded from the established financial system. Political instability is frequently precipitated by feelings of marginalization and discontent, both of which can be exacerbated by this exclusion and which contribute to socioeconomic disparities. Furthermore, increased remittance costs impose financial burdens on migrants wishing to communicate with their families back home. This can place recipients under economic strain, particularly in developing nations where remittances serve as a substantial livelihood for numerous households. Elevated remittance expenses-induced economic strain may foster social disturbance, dissent towards governmental initiatives, and political instability.

Additionally, a noteworthy positive correlation exists between political stability and financial access. Financial access, encompassing facilities such as banking, credit, and insurance, confers economic empowerment upon both individuals and households. Financial access can facilitate opportunities for entrepreneurship, investment, and savings, thereby fostering economic resilience, poverty reduction, and income generation. Economic empowerment mitigates socio-economic grievances, which frequently serve as fundamental catalysts for political instability, while concurrently bolstering citizens' perception of economic security. By affording opportunities for participation in the formal economy to marginalized and vulnerable groups including women, adolescents, and low-income individuals' access to financial services can foster social inclusion and mitigate inequalities. Financial inclusion improves living standards, facilitates asset accumulation, and grants individuals access to education and healthcare; thus, it strengthens social cohesion and mitigates social tensions that may escalate into political instability. Entrepreneurship, innovation, and job creation all of which are critical generators of economic growth and stability are fuelled by financial access. Individuals can establish or expand enterprises, invest in productive assets, and generate employment opportunities for others when they have access to credit and financial services. A flourishing entrepreneurial ecosystem has the potential to enhance political stability by bolstering the economy, mitigating social inequalities, and reducing unemployment.

Thus, a notable correlation can be observed between political stability in Africa and technological readiness. Furthermore, technological readiness has the potential to stimulate economic expansion through the augmentation of productivity, efficiency, and innovation. A reduction in destitution and an enhancement of living standards accompany economic growth and development, thereby potentially mitigating social tensions and conflicts that frequently precipitate political instability. For instance, technological advances in agriculture can contribute to greater food security, whereas service and manufacturing enhancements can generate employment and stimulate economic activity. Crop security, agricultural practices, and agricultural extension services have all been enhanced through the implementation of mobile technology. By mitigating a portion of the elements that can contribute to political instability, this technological intervention has aided in the reduction of rural poverty and economic instability. Conversely, technological preparedness cannot serve as a panacea for ensuring political stability, although it may do so. Access to technology varies considerably between socioeconomic categories and urban and rural regions in a number of African countries, presenting a substantial digital

divide. Moreover, the proliferation of misinformation or the unauthorized use of technology, including surveillance, can be detrimental to political stability.

A positive and statistically significant relationship exists between political stability and labour market efficiency. In the financial sector, efficient labour markets frequently result in enhanced governance and transparency within financial institutions. Well-informed and equitably compensated professionals are more inclined to uphold ethical principles, thereby mitigating corruption and fostering confidence in financial establishments. The preservation of political stability is precarious, given that financial controversies and corruption have the potential to undermine public trust and precipitate political turmoil. Financial experts fulfil an indispensable function in imparting knowledge to the general public regarding investment and financial administration. Enhanced financial literacy enables individuals to make well-informed economic choices, thereby mitigating economic susceptibility and social unrest that may escalate into political instability. Fintech labour markets that operate efficiently foster ongoing commitments to investment in training and professional growth. By doing so, one not only increases efficiency but also guarantees a flexible and dynamic labour force that is capable of spearheading economic progress and stability, thereby mitigating the potential for socio-economic upheavals that may precipitate political turmoil.

Conclusion, Recommendation, and Policy Implication

The present research examined the correlation between financial development in Africa and technological readiness, labour market efficacy, educational attainment, and financial access. Political stability was considered as a moderating factor. The analysis utilized data from the World Development Indicators covering the period from 2002 to 2023. The analysis employs a range of models, such as the random effect model, ordinary least squares, and generalized methods of moment's estimator. A significant correlation was found between technological preparedness, labour market efficiency, financial access, and educational attainment in Africa, according to the findings. An expansion in financial accessibility results from enhanced labour market efficacy, which consequently fosters financial development. Furthermore, financial inclusion and development are aided when individuals have access to financial services, which enables them to establish savings accounts, obtain insurance, and utilize credit facilities. In addition to facilitating access to financial services and digital banking, technological readiness encourages the use of mobile money and digital banking, thereby contributing to Africa's financial development. Furthermore, a noteworthy positive correlation can be observed between educational attainment and financial development. Educational achievement contributes to the advancement of financial literacy; an informed and literate citizenry enables individuals to make sound financial judgments, thereby fostering financial progress and economic expansion.

A noteworthy correlation was also observed between political stability and educational attainment, technological readiness, financial development, financial access, and technological readiness. Political stability is an essential condition for the long-term progress of society and economy, and various elements including technological readiness, educational attainment, financial development, and

financial access are critical in cultivating a stable political climate. Political stability is supported collectively by the reduction of socioeconomic disparities, improvement of governance, and promotion of inclusive development, all of which are contributed to by each of these factors. Comprehending these interconnections enables policymakers to formulate all-encompassing approaches aimed at constructing societies that are robust and stable. It is advisable that central banks throughout Africa enhance their regulatory frameworks in order to guarantee banking sector stability and efficacy. Promote interbank competition as a means to enhance services and curtail expenses. Advocate for the integration of mobile banking and digital payment systems as means to expand financial service accessibility, with a particular focus on rural regions. The enhancement of financial development in Africa can be achieved through the facilitation of seamless transactions across the region through the interoperability of various payment platforms. Financial literacy programmes should be implemented with the aim of instructing the general populace on effective financial management, comprehending financial products, and arriving at well-informed decisions. In addition to promoting the development and integration of digital payment systems and infrastructure, policymakers may enact regulatory reforms to fortify the banking sector, enhance risk management, and guarantee financial stability. This is because more robust banks are capable of extending more dependable credit to both consumers and businesses, thereby fostering economic expansion and stability. Additionally, policymakers may mobilize efforts to promote the development and expansion of microfinance institutions and the implementation of mobile banking. Encourage the integration of financial education into school curricula and initiate nationwide campaigns to promote financial literacy. This is because expanding access to financial services for marginalized communities can effectively alleviate poverty and stimulate grassroots economic activity. It is imperative for African nations to establish a conducive atmosphere that fosters financial development, inclusive growth, and economic resilience. Governments, financial institutions, regulators, and international partners must work together in concert to address the continent's financial sector's unique challenges and opportunities.

Further research could be dedicated to assessing the efficacy of financial development policies and interventions in attaining intended results, taking into account their ramifications on poverty alleviation, social integration, and economic expansion. Additionally, inquiries could be made into the implementation and utilization of digital payment systems, mobile money, and other financial technology (fintech) solutions, with an aim of identifying the determinants that impact their acceptability and scalability in diverse settings.

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