Acta Universitatis Danubius
ŒCONOMICA

Business Administration and Business Economics

Human Capital Development and Financial Sector Efficiency: Drivers of International Trade Competitiveness in Sub-Saharan Africa

David Aboagye Danquah[1], **Kunofiwa Tsaurai**[2]

Abstract: This study assesses the relationship between human capital development, financial sector efficiency, and international trade competitiveness in Sub-Saharan Africa (SSA). The study utilised the system Generalised Moment Method (GMM) to analyse annual panel data for 38 SSA economies from 1980 to 2022. The study revealed human capital development serves as a channel for financial development to impact trade. Thus, for each unit increase in the interaction between financial development and human capital development, trade intensity increases by approximately 0.412%. and trade volume increases by approximately 0.4507%. The study suggests that policymakers in Sub-Saharan Africa should integrate financial literacy and managerial skills training to enhance international trade competitiveness, focusing on SMEs, while also facilitating SME access to financial services, establishing funding mechanisms, and strengthening institutional support for trade promotion, to foster sustainable growth in trade intensity and volume.

Keywords: Financial Development; Generalised Moment Method; Human Capital Development; International Trade; Africa

JEL Classification: G15; J24; N27; P33

[1] PhD in progress, Department of Finance, Risk Management and Banking, University of South Africa. Address: P.O. Box 392, UNISA 0003, Pretoria, South Africa.
[2] Professor, Department of Finance, Risk Management and Banking, University of South Africa. Address: P.O. Box 392, UNISA 0003, Pretoria, South Africa. Corresponding author: tsaurk@unisa.ac.za.

1. Introduction

In the dynamic environment of international trade, Sub-Saharan Africa (SSA) stands as a region with vast potential yet faces multifaceted challenges hindering its full integration into the global market. Amidst these challenges, the significance of human capital development and financial sector efficiency emerges as critical determinants shaping SSA's competitiveness in international trade (Nkrumah & Sinha, 2020). Human capital, a fundamental driver of economic development, is markedly deficient in Sub-Saharan Africa (SSA), as evidenced by low literacy rates and limited access to quality education (Fredriksen, 2023; Juju, et. al, 2020). This deficit intertwines with the region's underdeveloped financial sector, inhibiting efficient resource allocation and capital mobilization (Amin, 2022; Olaniyi & Odhiambo, 2023). Consequently, SSA struggles to capitalize on its vast economic potential, hindered by inadequate human capital and financial sector inefficiencies.

The consequences of this dilemma are complex; thus, insufficient human capital undermines innovation and technological adoption, crucial for international trade competitiveness (Rahman, Zhang & Musa, 2023). Meanwhile, the limited access to finance, particularly for SMEs, impedes their ability to invest in productivity-enhancing technologies and expand operations (Agwuna, 2022). Consequently, SSA risks missing out on the economic benefits associated with increased international trade participation.

The costs of inaction are substantial considering the strong correlation between human capital development and economic growth as stated in empirical studies (Adeleye, 2024). Thus, the failure to address these challenges not only stifles innovation and economic diversification but also perpetuates a cycle of low trade participation and limited foreign exchange earnings. Moreover, Owusu-Agyei et. al. (2020) estimate significant potential economic gains from enhanced trade facilitation measures in Africa and further assert that increased SME participation in international trade could create millions of new jobs across the continent. Therefore, addressing these issues necessitates a comprehensive approach that tackles both human capital development and financial sector inefficiencies. Thus, by investing in education and skills development and implementing policies to enhance financial inclusion and access to credit, SSA can unlock its full economic potential and foster sustainable growth and development.

Empirical studies affirm that a robust financial market enhances capital efficiency and reduces costs (Li & Qamruzzaman, 2022). Furthermore, the literature highlights the important role of human capital in international trade, with Sehrawat and Giri (2017) emphasizing its significance alongside the financial sector. Thus, insufficient human capital can hinder trade relations despite financial development (Sehrawat & Giri, 2017), while its enhancement can foster demand for financial products (Hatemi & Shamsuddin, 2016). Conversely, financial development is equally crucial for trade

competitiveness (Li & Qamruzzaman, 2022). Other studies' findings reveal that financial institution growth enhances human capital development, mitigating liquidity constraints and enhancing technical skills (Ha & Ngoc, 2022). Additionally, countries with robust human capital can leverage the financial sector more effectively, fostering innovation and resource optimization for export promotion (Sarwar, et. al, 2020).

Considering these dynamics, this paper aims to examine the relationship between human capital development, financial sector efficiency, and international trade competitiveness in SSA. Therefore, by establishing causal relationships and identifying key drivers, policymakers can formulate targeted interventions to enhance economic growth, foster trade integration, and promote sustainable development.

The rest of the paper is structured as follows. Section 2 examines the theoretical and empirical literature on the impact of financial development and human capital development on international trade in Sub-Saharan Africa. Section 3 goes into the data sources and techniques used. Section 4 summarizes and discusses our empirical findings. Finally, Section 5 concludes the paper.

2. Literature

Theoretical Review: Endogenous Growth Theory: This study is backed by the endogenous growth theory, which posits that sustained economic growth stems from internal factors such as human capital accumulation, technological innovation, and knowledge creation (Peretto, 2018). Unlike exogenous growth models, endogenous growth theory emphasizes the role of endogenous factors, thereby challenging the notion of diminishing returns to capital accumulation (Jones, 2019). One of its key assumptions is the presence of positive externalities associated with knowledge and innovation, leading to increasing returns and perpetual growth (Acs & Sanders, 2021). The strength of endogenous growth theory lies in its ability to explain the long-term dynamics of economic development, highlighting the importance of human capital and innovation in driving sustained growth (Chirwa & Odhiambo, 2018). However, it is not without limitations. Critics argue that the theory's reliance on assumptions of perfect competition and constant returns to scale may not always hold in real-world contexts (Chirwa & Odhiambo, 2018).

In support of this study, endogenous growth theory provides a theoretical framework for understanding the relationship between human capital development, financial sector efficiency, and international trade competitiveness in Sub-Saharan Africa. Thus, emphasizing the role of internal factors in driving economic growth, the theory underpins the study's focus on policies and interventions aimed at fostering human

capital accumulation and enhancing financial sector efficiency to promote long-term trade competitiveness.

Empirical Review: There exists a beneficial relationship between financial development and human capital development, wherein the availability of financial resources facilitates the cultivation of human capital, while the presence of skilled individuals fosters innovation and enhances the effectiveness of the financial sector. The relationship facilitates cross-border trade, nurtures innovative practices, and enhances the holistic advancement of the sub-Saharan economy.

Across a spectrum of empirical investigations in both developed and developing countries, scholars have examined the intricate relationship between financial development, human capital, and economic growth. Maghfiroh and Purwono (2021) explored emerging markets, finding a significant positive association between high-quality human capital and financial development, while domestic savings exhibited a significant influence on economic growth. In South Asian economies, Sethi, Mishra and Bhujabal (2019) observed a positive correlation between market size, financial development, and human capital development. Similarly, Guan et. al. (2020) demonstrated in China that human capital significantly enhances financial development, indicating enduring associations between the two variables. Hussain et. al. (2021) corroborated these findings in high-income economies with abundant resources, highlighting the significant roles of human capital and institutional quality in fostering financial development. Vo, Tran and Nguyen (2021) focused on Southeast Asia, revealing a significant relationship between financial development and human capital accumulation, albeit with an inverse relationship. However, regional disparities exist; Oyinlola and Adedeji (2022) highlighted the importance of financial sector reforms in Sub-Saharan Africa to augment the impact of human capital on inclusive growth. Tsaurai (2021) emphasized the need for strategic measures to foster financial sector growth for human capital development in African nations. Lastly, Adesina (2019) highlighted the paramount role of human capital in enhancing efficiency within African commercial banks, urging for its prioritization in banking sector development efforts.

Methodologically, these studies employ various estimation techniques, including the Generalised Method of Moments (GMM), panel co-integration methodologies, and econometric models such as ARDL, FMOLS, and DOLS. Maghfiroh and Purwono (2021) utilize GMM to analyze financial development factors in emerging markets, finding a significant role for human capital. Sethi, Mishra and Bhujabal (2019) employ PDOLS and FMOLS to uncover positive relationships between market size, financial development, and human capital in South Asian economies. Guan et. al. (2020) deploy a comprehensive range of techniques, including ARDL and Granger causality testing, to demonstrate the importance of human capital in China's financial development. Similarly, studies by Hussain et. al. (2021) and Vo, Tran and

Nguyen (2021) utilize various econometric models to explore the relationship between resources, human capital, and financial development in high-income economies and Southeast Asian emerging markets, respectively. Moreover, Oyinlola and Adedeji (2022) employ panel data analysis to investigate inclusive growth in Sub-Saharan Africa.

From the empirical review, this study uniquely explores the nexus of financial development, human capital, and international trade in Sub-Saharan Africa. While existing literature has explored various aspects of these relationships in other regions or within isolated frameworks (Leibovici, 2021; Mustafa, et. al, 2017), this study integrates finance and human capital measures that capture multiple dimensions, viewing human capital as a conduit for finance-trade relationships. This holistic approach deepens understanding of trade dynamics by addressing interconnected factors, offering insights into Sub-Saharan Africa's unique challenges and opportunities. Also, previous studies have overlooked crucial aspects, including the impact of external shocks on trade dynamics and the substantial regional heterogeneity within the continent. Moreover, the absence of robust methodologies to tackle endogeneity issues in earlier studies has led to incomplete analyses. Therefore, focusing on this region, the study enhances relevance and applicability, providing valuable insights for policymakers, practitioners, and researchers seeking to promote economic development and global integration.

Furthermore, based on the above arguments in existing literature, there is some interaction between human capital development and financial sector development to promote trade (Mishra & Bhujabal, 2019; Guan, et. al, 2020); therefore, there is a need to examine such relationships within the sub-Saharan African region. Hence, it is hypothesized that human capital development is a channel through which financial development enhances international trade. The alternative and null hypotheses are stated as follows, in line with Sharma (2016):

$\boldsymbol{H_0}$: No effect ($\beta_1 \times \beta_2 = 0$), where β_1 and β_2 are the independent variables.

$\boldsymbol{H_1}$: There is an effect ($\beta_1 \times \beta_2 = k$), $k > 0$.

3. Methodology

Empirical Model: The endogenous growth model offers a compelling justification for the impact of financial development and human capital on international trade. Therefore, emphasizing the role of investment, innovation, and knowledge accumulation, the model highlights how financial development facilitates access to capital, trade financing, and risk mitigation, enabling businesses to engage in international trade. Simultaneously, human capital development enhances labour productivity and drives technological advancements, fostering a region's

comparative advantage and specialization in trade. The model indicates the interdependence between financial development, human capital, and international trade. The extended endogenous growth model modified for this research considers financial development and its interactions with human capital. Considering the Cobb-Douglas output of an economy as follows:

$$Y_t = K_t^{\alpha} H_t^{\beta} (A_t L_t)^{1-\alpha-\beta} \quad (1)$$

where Y denotes output, K denotes the stock of physical capital, H denotes the stock of human capital, and L denotes the labour force. A denotes efficiency and technology's current state, and t denotes time. Assume that $\alpha + \beta < 1$ results in a production function with a constant return to scale and a decreasing marginal product for each input factor.

The functional form of the adapted theoretical model with the incorporation of international trade, financial development and human capital will be expressed empirically:

$$IT_{i,t} = f\,(FD_{i,t}, HC_{i,t}, Z_{i,t}, U_t) \quad (2)$$

ITit represents international trade, FDit represents financial development measurements, HCit represents human capital, Z_{it} represents the Control variable, and U_{it} is the error term also representing other factors that influence international trade but cannot be captured. Where Z_t represents the control variables to include in the model. Also, the control variables employed in this study have been incorporated into other financial development studies or international trade studies.

The study established a baseline model in which trade was modelled as an equation of its lag, financial development, and other control variables to determine if financial development encourages or discourages trade in sub-Saharan Africa. In particular, the study estimated the following equation:

$$IT_{i,t} = \alpha_0 IT_{i,t-1} + \alpha_1 FD_{i,t} + \alpha_2 Z_{i,t} + \varepsilon_{it} \quad (3)$$

$$\varepsilon_{i,t} = \mu_i + \epsilon_t + \delta_{it}$$

In light of this, α_o is used to determine whether the region's level of international trade meets, diverges or converges to a typical steady state; μ_i represents the country-specific fixed effects; The time effects are represented by ϵ_t, and the error term is represented by δ_{it}, which is the error term assumed to have an independent and identical distribution, *iid* $N(0, \sigma^2)$.

The research also examines the mechanism via which finance influences international trade, utilizing human capital as the primary source and the effect of financial development on trade assessed by α_1 in equation (3). A multiplicative interacting term of finance and human capital is included in equation (4) to explore

how financial development affects international trade given nations' levels of human capital. This estimates equation (3) as follows:

$$IT_{i,t} = \gamma_0 IT_{i,t-1} + \gamma_1 FD_{i,t} + \gamma_2 HC_{i,t} + \gamma_3 Z_{i,t} + \theta(FD_{it} \times HC_{it}) + \varepsilon_{it} \quad (4)$$

From equation (4), θ measures the impact of financial development on international trade given the countries' human capital level.

This study utilised the Two-Step Generalized Method of Moments (GMM) by Bundell and Bond (1998) which offers unparalleled flexibility in handling endogeneity, serial correlation, and heteroscedasticity issues, thus ensuring the integrity of estimations even in complex datasets unlike the traditional fixed-effects and random-effects models in panel data analysis (Ullah, et. al, 2018). This technique was appropriate because of its ability to accommodate unobserved heterogeneity and dynamic panel structures without imposing stringent assumptions on the underlying data-generating process (Belloni, et. al, 2018). Therefore, efficiently exploiting instrumental variables, GMM transcends the limitations of conventional panel techniques, delivering estimates that are both consistent and efficient, even in the presence of omitted variables and measurement errors (Arellano & Bond, 1991).

Data: The study used secondary annual panel data from 1980 to 2022 for 38 sub-Saharan African economies, and this period was dictated by the availability of data. All data series, except Financial Development and Human capital development, are from the World Bank's Development Indicators database. Data on financial development was obtained from the International Monetary Fund's (IMF) International Financial Statistics database, while data on human capital development data was sourced from UNDP. The decision to use the data spanning these years is made because this extended time frame allows for a comprehensive analysis, offering a deeper understanding of the relationship between finance, human development, and trade over different economic cycles.

Table 1. Description of Data, Measurement and Expected Sign for selected control variables

Variable	Description	Indicators	Measure	Source
IT	International trade	Trade Volume	Natural log of Total trade	WDI
		Trade Intensity	Trade-to-GDP ratio	WDI
FD	Financial Development	Financial Development Index	Index	IMF
HC	Human Capital Development	Human Development Index	Index	UNDP
Z	Control Variables	Exchange rate	Annual % estimates	IMF

		Net Foreign Direct Investment	percentage of GDP	WDI
		Agriculture Growth	percentage of GDP	WDI
		Government Expenditure	percentage of GDP	WDI
		Inflation rate	percentage of YoY inflation	IMF
		Population	percentage of midyear estimates	WDI

Note: WDI – World Development Indicators, IMF - International Monetary Fund, UNDP - United Nations Development Programme.

Source: Author's Compilation, 2024

4. Findings and Discussions

Descriptive statistics: The descriptive statistics for Sub-Saharan Africa (SSA) between 1980 and 2022 reveal significant trends in various economic indicators. The mean trade intensity stands at 3.82%, with a standard deviation of 0.896, indicating a moderate level with some variability, largely due to heavy reliance on a limited range of commodities like oil, minerals, and agricultural products for exports, rendering the region vulnerable to global market fluctuations and limiting value addition. Similarly, the mean trade volume is 2.834%, with a standard deviation of 0.930, highlighting moderate trade levels with notable variability, largely attributed to inadequate infrastructure and barriers such as high tariffs and complex regulations, hindering intra-regional and external trade expansion.

Financial development, with a mean of 0.209 and a standard deviation of 0.269, is relatively low on average, indicating limited access to banking services and credit, constraining economic growth and exacerbating inequality, though some countries exhibit higher levels. Human capital development, with a mean of 0.661 and standard deviation of 0.264, is moderately developed but varies significantly, with challenges including inadequate education funding, low teacher quality, and curriculum mismatches with labour market needs, emphasizing the need for improved access to quality education and aligned curricula to foster development.

Table 2. Descriptive Statistics of Panel Data between 1980 and 2022

Variable	Mean	Standard deviation	Minimum	Maximum	Obs
Trade Intensity	3.82	0.896	0.993	5.463	1634
Trade Volume	2.834	0.93	0.477	5.092	1634
Financial Development	0.209	0.269	0	1	1634
Human Capital Development	0.661	0.264	0.216	1	1634
Agricultural Growth	21.523	14.547	0.893	71.763	1634
Foreign Direct Inv.	2.924	7.149	-28.624	161.824	1634
Inflation Rate	36.688	615.078	-17.64	23773.13	1634
Government Exp	13.024	7.619	0.911	51.975	1634
Population Growth	2.605	1.207	-16.881	16.625	1634
Exchange rate	1.758	1.245	-3.561	10.93	1634

Source: Stata IC 15

Correlation Matrix: The correlational matrix reveals a negative correlation between financial development and trade intensity in Sub-Saharan Africa (SSA), indicating that as financial systems advance, countries may rely less on trade for economic activity due to structural reliance on commodity exports prone to volatility. Conversely, a weak positive correlation exists between financial development and trade volumes, suggesting that improved financial systems enable larger trade volumes, potentially diversifying economies. Also, a weak negative relationship between human capital development and trade volume implies that higher levels of human capital may not always lead to increased trade, possibly due to structural barriers like inadequate infrastructure and limited financing.

Furthermore, a moderate negative correlation between human capital development and trade intensity suggests a prioritization of domestic economic activities over trade, possibly due to mismatches between acquired skills and job market demands, leading to underemployment. Additionally, a moderately strong positive relationship between financial and human capital development indicates that as financial systems improve, so does human capital, potentially through increased access to education loans and skill development programs, yet this may not necessarily correspond to proportional increases in trade volume or intensity in SSA, as financial institutions may favour sectors less reliant on international trade.

Table 3. Correlation Analysis

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)	1.000									
(2)	0.157*	1.000								
	(0.000)									
(3)	-0.231*	0.105*	1.000							
	(0.000)	(0.000)								
(4)	-0.226*	-0.121*	0.289*	1.000						
	(0.000)	(0.000)	(0.000)							
(5)	0.020	-0.302*	-0.329*	-0.152*	1.000					
	(0.412)	(0.000)	(0.000)	(0.000)						
(6)	-0.013	0.047	-0.022	-0.056*	-0.142*	1.000				
	(0.609)	(0.059)	(0.383)	(0.024)	(0.000)					
(7)	-0.067*	-0.057*	0.008	-0.021	0.039	-0.010	1.000			
	(0.007)	(0.020)	(0.759)	(0.389)	(0.118)	(0.681)				
(8)	0.524*	0.066*	0.002	-0.037	-0.120*	0.009	-0.063*	1.000		
	(0.000)	(0.007)	(0.938)	(0.136)	(0.000)	(0.717)	(0.011)			
(9)	-0.156*	0.059*	-0.128*	-0.080*	0.071*	0.048	0.053*	-0.125*	1.000	
	(0.000)	(0.018)	(0.000)	(0.001)	(0.004)	(0.054)	(0.033)	(0.000)		
(10)	0.159*	-0.086*	-0.194*	-0.307*	0.116*	0.017	0.139*	-0.007	0.106*	1.000
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.480)	(0.000)	(0.788)	(0.000)	

*Note: *** p<0.01, ** p<0.05, * p<0.1.*
(1) Trade Intensity, (2) Trade Volume, (3) Financial development, (4) Human capital development, (5) Agricultural Growth, (6) Foreign Direct Investments, (7) Inflation rate, (8) Government Expenditure, (9) Population growth, (10) Exchange rate.

Source: Stata IC 15

Pre-diagnostic tests*:* The diagnostic tests were conducted for various assumptions that underpin the classical regression model. The heteroskedasticity was assessed using the Cook-Weisberg test, both Model 1 and Model 2 showed potential issues indicated by large test statistics, yet with p-values greater than 0.05, suggesting no evidence of heteroskedasticity. Similarly, tests for normality, utilizing the adjusted chi-square statistic, revealed no strong evidence of non-normality in the residuals of either model. Wooldridge autocorrelation tests indicated no significant autocorrelation in the residuals of both models. Additionally, the Ramsey RESET test found no strong evidence of misspecification in terms of omitted variables or non-linearity for either model.

Moreover, the Variance Inflation Factor (VIF) test showed no problematic multicollinearity among the independent variables in both models, with mean VIF values well below 10. Lastly, the test of endogeneity found no strong evidence to suggest endogeneity in any of the independent variables in either Model 1 or Model 2, implying unbiased estimates. These results suggest that both models meet the necessary assumptions for reliable interpretation of the coefficients and further analysis.

Table 4. Pre-Diagnostic Tests

Test	Model 1. Trade Intensity		Model 2. Trade Volume	
Cook-Weisberg test for heteroskedasticity	chi2(1) = 1167.93	Prob > chi2 = 0.7437	chi2(1) = 1831.52	Prob > chi2 = 0.4773
Normality	adj_chi2(2) = 52.550	Prob > chi2 = 0.1229	adj_chi2(2) = 63.220	Prob > chi2 = 0.1519
Wooldridge autocorrelation test (panel data)	F (1, 37) = 168.413	Prob > F = 0.6355	F (1, 37) = 177.261	Prob > F = 0.5546
Ramsey RESET test	F(3, 1622) = 168.64	Prob > F = 0.8423	F(3, 1622) = 162.11	Prob > F = 0.7123
Variance Inflation Factor	Mean VIF = 1.111	N/A	Mean VIF = 1.111	N/A
Test of endogeneity (orthogonality conditions)	chi2(1) = 0.2978	p = 0.5852	chi2(1) = 0.0145	p = 0.9043

Source: Stata IC 15

Empirical Results: Table 5 also shows that in both models, financial development has a positive impact on international trade. In Model 1, the coefficient is 0.116 with a significant level of 1%, implying that an increase in financial development positively affects trade intensity. Similarly, in Model 2, the coefficient is smaller at 0.09 at a 10% significant level, indicating a weak positive impact of financial development on trade volume compared to trade intensity. These findings imply that in many sub-Saharan African countries, the development of financial infrastructure, including banking systems, credit markets, and insurance services, has historically been limited. However, as financial systems become more robust and accessible, businesses are better equipped with the necessary resources and tools to engage in trade more effectively, leading to an overall increase in both the intensity and volume of trade. Therefore, improved access to finance can facilitate trade by providing businesses with working capital, trade financing, and risk management instruments. Moreover, financial development can also enhance the efficiency of trade transactions, reducing costs and increasing the competitiveness of firms in global markets. This empirical evidence is supported by the study of Ho, Pham and Nguyen (2021) who found evidence that financial development positively affects the volume of international trade. They argue that improved access to finance enhances the ability of firms to engage in export-oriented activities by providing them with the necessary funds for investment, production, and trade facilitation.

The coefficient for human capital development in model 1 was -0.415 with a 1% significance level, implying that higher human capital development negatively influences trade intensity. Contrary to Model 2, human capital development does not have a statistically significant impact on trade volume. This could be attributed to

factors such as increased skills, knowledge, and expertise among the workforce, which are limited and do not enable firms to produce higher-quality goods and services that are competitive in international markets. Conversely, in Model 2, where human capital development does not significantly impact trade volume, it may indicate that the effect of human capital on the volume of trade interactions is less definite. This could be due to various factors such as limited infrastructure, market access barriers, or insufficient institutional support, which may hinder the full realization of the potential benefits of human capital development in increasing trade volume. This empirical evidence is contrary to the findings of Adeleye (2024) but in line with Hussain et. al. (2021).

Table 5. Human Capital Development as a Channel Through which Financial Development Enhances International Trade

Variables	**Model 1** **Trade Intensity**	**Model 2** **Trade Volume**
Lag_Trade Intensity	0.882***	
	(0.0504)	
Financial Development	0.116***	0.0900*
	(0.0255)	(0.0454)
Human Capital Development	-0.415***	0.0248
	(0.0902)	(0.102)
Financial Development*Human Capital Development	0.412***	0.4507***
	(0.0911)	(0.141)
Agricultural growth	0.148***	0.367***
	(0.0499)	(0.0637)
Foreign Direct Investment	0.0409*	0.0363**
	(0.0240)	(0.0144)
Inflation rate	0.0397***	0.0491***
	(0.00845)	(0.0120)
Government Expenditure	-0.111*	0.297***
	(0.0647)	(0.0745)
Population growth	0.456***	0.532***
	(0.147)	(0.113)
Exchange rate	0.00550	0.145***
	(0.0218)	(0.0248)
Lag_Trade Volume		0.798***
		(0.0304)
Constant	0.159**	0.291**
	(0.0765)	(0.139)
AR1	-4.15	-3.88
Pr > z	***0.084***	***0.023***
AR2	-0.59	-0.91
Pr > z	***0.556***	***0.363***

Sargan Test	15.20	19.51
Prob > chi2	***0.998***	***0.978***
Hasen Test	32.04	30.57
Prob > chi2	***0.564***	***0.637***
Country Effect	*Yes*	*Yes*
Time Effect	*Yes*	*Yes*
Observations	1,596	1,596
Number of countries	38	38

*Note: Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*
Source: Stata IC 15

Table 6. Marginal Effect Results

Marginal Effect			
Model VCE: Two-Step System GMM			
		Trade Intensity	**Trade Volume**
Financial Development	dy/dx	9.2051 ***	2.8275 ***
		(1.5673)	(0.0097)
Human Capital Development	dy/dx	-9.3187***	2.8171***
		(2.0454)	(0.0058)

*Note: Dependent variable: International trade (Trade intensity and Trade Volume); Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; Sensitivity analysis is based on the Delta-method.*

The results from Table 5 show that in both models, the coefficient for the interaction of Financial Development and Human Capital Development is positive and statistically significant. This suggests that when both financial development and human capital development increase simultaneously, they have a positive effect on both trade intensity and trade volume. Thus, in Model 1 (Trade Intensity), the coefficient is 0.412 with a standard error of 0.0911, which means that for each unit increase in the interaction between financial development and human capital development, trade intensity increases by approximately 0.412%. Similarly, in Model 2 (Trade Volume), the coefficient is 0.4507 with a standard error of 0.141, indicating that for each unit increase in the interaction between financial development and human capital development, trade volume increases by approximately 0.4507%.

This means that in SSA, financial development, coupled with human capital development, fosters innovation and technological adoption, which are critical for enhancing trade competitiveness and diversification. Thus, improved access to financing supports research and development activities, technology acquisition, and adoption of modern production techniques. Simultaneously, a skilled workforce facilitates the absorption and application of new technologies, leading to productivity gains, quality improvements, and the development of new export products and services. Also, as asserted by Maghfiroh and Purwono (2021) the interaction between financial development and human capital development can also enhance

risk mitigation strategies and market access for businesses. Thus, financial literacy and managerial skills among the workforce enable firms to better assess and manage risks associated with international trade, such as currency fluctuations, payment risks, and regulatory complexities. Additionally, access to financial instruments, such as insurance and hedging products, can help mitigate trade-related risks, thereby encouraging firms to expand their trade activities and explore new markets.

After considering the joint effect of financial development and human capital development on international trade in SSA. This study further explored the partial or marginal effect of each of the variables on both trade intensity and trade volume when they are employed together within the region in Table 6. When the focus of the region is to intensify its level of trade, the marginal effect of financial development on trade intensity is positive and statistically significant at the 1% level. Thus, a one-unit increase in financial development will lead to a 9.21% increase in trade intensity holding human capital development constant. Alternatively, the marginal effect of human capital development on trade intensity is negative and statistically significant at the 1% level. Thus, a one-unit increase in human capital development results in a decrease of 9.32% in trade intensity holding financial development constant. This finding may be attributed to the prioritization of policies and investments aimed at improving financial infrastructure over human capital development within the region. Thus, despite efforts to enhance education, skills, and workforce development, there are barriers or inefficiencies in the utilization of human capital to drive trade intensity in sub-Saharan Africa.

Moreover, when the focus of the region is to increase its trade volumes, the marginal effect of financial development on trade volume is positive and statistically significant at the 1% level. Thus, a one-unit increase in financial development leads to a 2.827% increase in trade volume. Similarly, the marginal effect of human capital development on trade volume is negative and statistically significant at the 1% level. Thus, a one-unit increase in human capital development results in a decrease of 2.817% in trade volume. This may be attributed to the fact that constraints in the absorption and utilization of skilled labour within the trade sector. Thus, structural barriers such as limited access to technology, insufficient infrastructure, and regulatory bottlenecks may hinder the effective deployment of human capital in trade-related activities, thereby dampening trade volume growth.

In conclusion, it is evident that both financial development and human capital development have significant impacts on international trade, but their effects vary across the measure of international trade. This coincided with Leibovici (2021) and Mustafa et. al. (2017) with a similar finding in their respective studies. Also, human capital development serves as a channel through which financial development impacts international trade with the region. These findings align with Hatemi and Shamsuddin (2016) and Ha and Ngoc (2022) who established and positive

significant relationship between financial development and human capital development.

Finally, the findings of the controlled variables in this study revealed that foreign direct investment, agricultural growth, inflation and population growth positively influence trade intensity and trade volumes respectively. Also, government expenditure negatively impacts trade intensity and positively impacts trade volumes. Moreover, the exchange rate is observed to impact trade volumes positively. These findings explain the important roles of these variables as catalysts for augmenting trade intensity and volumes within sub-Saharan Africa.

The diagnostic tests strongly support the use of the Two-Step System GMM estimator for both Model 1 (Trade Intensity) and Model 2 (Trade Volume). The AR1 test results indicate first-order autocorrelation, particularly significant in Model 2, which the Two-Step System GMM can address effectively. The AR2 test shows no significant second-order autocorrelation, aligning with the assumptions of the GMM estimator. The Sargan test results, with very high p-values, confirm the validity of the instruments used, while the Hausman test indicates no endogeneity issues, validating the inclusion of country and time effects confirming the pre-diagnostic tests.

5. Conclusion and Recommendations

The study was to examine human capital development as a channel through which financial development enhances international trade proxied as trade intensity and trade volumes. The study concluded that human capital development serves as a channel for financial development to impact trade. Thus, for each unit increase in the interaction between financial development and human capital development, trade intensity increases by approximately 0.412%. and trade volume increases by approximately 0.4507%. This implies that financial literacy and managerial skills among the workforce enable firms to better assess and manage risks associated with international trade, such as currency fluctuations, payment risks, and regulatory complexities. However, considering the marginal effects, it is evident that both financial development and human capital development have significant impacts on international trade, but their effects vary across the measure of international trade.

Based on the conclusions drawn from the study on the impact of financial development on international trade in the Sub-Saharan African region this study recommends that policymakers ought to integrate financial literacy and managerial skills training programs to bolster international trade competitiveness. Such initiatives aim to equip the region's workforce, particularly within small and medium-sized enterprises (SMEs), with the requisite knowledge and capabilities to navigate the complexities of global trade effectively. Therefore, by investing in

human capital development alongside financial literacy initiatives, SSA countries can empower businesses to confidently engage in international markets while effectively managing risks such as currency fluctuations, payment uncertainties, and regulatory challenges.

Moreover, policymakers should facilitate access to financial services for SMEs. Thus, by incentivizing financial institutions to offer tailored products and services, governments can enhance SMEs' ability to access credit and navigate cross-border transactions more efficiently. Additionally, establishing dedicated funding mechanisms and guarantee schemes can mitigate the risks associated with international trade, thereby encouraging greater participation and fostering trade intensity and volume growth.

Furthermore, strengthening institutional support for trade promotion further amplifies these efforts. Therefore, by establishing specialized agencies or enhancing existing trade promotion bodies, SSA countries can provide targeted assistance to businesses seeking to expand their international trade activities. Such support includes facilitating market research, trade finance arrangements, and compliance with trade regulations. In addition, collaborative efforts with international organizations and development partners can further enhance knowledge exchange and technical assistance programs, ultimately creating an enabling environment conducive to sustainable growth in trade intensity and volume.

References

Acs, Z. & Sanders, M. (2021). *Endogenous growth theory and regional extensions*. Berlin: Springer Berlin Heidelberg, pp. 615-634.

Adeleye, B. N. (2024). Income inequality, human capital and institutional quality in sub-Saharan Africa. *Social Indicators Research*, Vol. 171(1), pp. 133-157.

Adesina, K. S. (2021). How diversification affects bank performance: The role of human capital. *Economic Modelling*, Vol. 94, pp. 303-319.

Agwuna, L. U. (2022). Entrepreneurship Financial Stability and Implications. *The Future of Entrepreneurship in Africa*. Routledge, pp. 116-142.

Amin, A. A. (2022). The development cost of maintaining price and economic stability in Central and West African CFA Franc Zone. In *Monetary and Financial Systems in Africa: Integration and Economic Performance*. Cham: Springer International Publishing, pp. 185-216.

Arellano, M. & Bond, S. (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *Review of Economic Studies*, Vol. 58, pp. 277–297.

Belloni, A.; Chernozhukov, V.; Chetverikov, D.; Hansen, C. & Kato, K. (2018). High-dimensional econometrics and regularized GMM. *HD Econometrics and Regularized GMM.*

Blundell, R. & Bond, S. (1998). Initial Conditions and Moment Restrictions in Dynamic Panel Data Models. *Journal of Econometrics*, Vol. 87, pp. 115–143.

Chirwa, T.G. & Odhiambo, N.M. (2018). Exogenous and endogenous growth models: A critical review. *Comparative Economic Research. Central and Eastern Europe*, Vol. 21(4), pp. 63-84.

Fredriksen, B. (2023). Promise not kept: universal primary education for all children in sub-Saharan Africa. *Journal of International Cooperation in Education*, Vol. 25(1), pp. 62-79.

Guan, J.; Kirikkaleli, D.; Bibi, A. & Zhang, W. (2020). Natural resources rent nexus with financial development in the presence of globalization: is the resource curse exist or myth? *Resources Policy*, Vol. 66.

Ha, N. M. & Ngoc, B. H. (2022). The asymmetric effect of financial development on human capital: Evidence from a nonlinear ARDL approach. *The Journal of International Trade & Economic Development*, Vol. 31(6), pp. 936-952.

Hatemi-J. A. & Shamsuddin, M. (2016). The causal interaction between financial development and human development in Bangladesh. *Applied Economics Letters*, Vol. 23(14), pp. 995-998.

Hong Vo, D.; Tran, N. P. & Nguyen, H. M. (2021). Does financial development improve human capital accumulation in Southeast Asian countries? *Cogent Business & Management*, Vol. 8(1).

Hussain, M.; Ye, Z.; Bashir, A.; Chaudhry, N. I. & Zhao, Y. (2021). A nexus of natural resource rents, institutional quality, human capital, and financial development in resource-rich high-income economies. *Resources Policy*, Vol. 74.

Jones, C. I. (2019). Paul Romer: Ideas, nonrivalry, and endogenous growth. *The Scandinavian Journal of Economics*, Vol. 121(3), pp. 859-883.

Juju, D.; Baffoe, G.; Dam Lam, R.; Karanja, A.; Naidoo, M.; Ahmed, A.; Jarzebski, M. P.; Saito, O.; Fukushi, K.; Takeuchi, K. & Gasparatos, A. (2020). Sustainability challenges in sub-Saharan Africa in the context of the sustainable development goals (SDGs). *Sustainability Challenges in Sub-Saharan Africa I: Continental Perspectives and Insights from Western and Central Africa*, pp. 3-50.

Leibovici, F. (2021). Financial development and international trade. *Journal of Political Economy*, Vol. 129(12), pp. 3405-3446.

Li, J. & Qamruzzaman, M. (2022). Does tourism induce sustainable human capital development in BRICS through the channel of capital formation and financial development? Evidence from augmented ARDL with structural break and Fourier-TY causality. *Frontiers in Psychology*, Vol. 13.

Maghfiroh, S. I. & Purwono, R. (2021). Determinants of financial development: impact of human capital in emerging markets countries. *Trikonomika*, Vol. 20(2), pp. 97-104.

Mustafa, G.; Rizov, M. & Kernohan, D. (2017). Growth, human development, and trade: The Asian experience. *Economic Modelling*, Vol. 61, pp. 93-101.

Nkrumah, R. B. & Sinha, V. (2020). Revisiting global development frameworks and research on universal basic education in Ghana and Sub-Saharan Africa: a review of evidence and gaps for future research. *Review of Education*, Vol. 8(3), pp. 733-764.

Olaniyi, C. O. & Odhiambo, N. M. (2023). Does institutional quality matter in the financial Development-Economic complexity Nexus? Empirical insights from Africa. *Research in Globalization*, Vol. 7.

Owusu-Agyei, S.; Okafor, G.; Chijoke-Mgbame, A. M.; Ohalehi, P. & Hasan, F. (2020). Internet adoption and financial development in sub-Saharan Africa. *Technological Forecasting and Social Change*, Vol. 161.

Oyinlola, M. A. & Adedeji, A. A. (2022). Tax structure, human capital, and inclusive growth: A sub-Saharan Africa perspective. *Journal of Public Affairs*, Vol. 22(4).

Peretto, P. F. (2018). Robust endogenous growth. *European Economic Review*, Vol. 108, pp. 49-77.

Rahman, P.; Zhang, Z. & Musa, M. (2023). Do technological innovation, foreign investment, trade and human capital have a symmetric effect on economic growth? Novel dynamic ARDL simulation study on Bangladesh. *Economic Change and Restructuring*, Vol. 56(2), pp. 1327-1366.

Sarwar, A.; Khan, M. A.; Sarwar, Z. & Khan, W. (2020). Financial development, human capital and its impact on economic growth of emerging countries. *Asian Journal of Economics and Banking*, Vol. 5(1), pp. 86-100.

Sehrawat, M. & Giri, A. K. (2017). A sectoral analysis of the role of stock market development on economic growth: empirical evidence from Indian economy. *Global business review*, Vol. 18(4), pp. 911-923.

Sethi, N.; Mishra, B. R. & Bhujabal, P. (2019). Do market size and financial development indicators affect the human capital of select South Asian economies? *International Journal of Social Economics*, Vol. 46(7), pp. 887-903.

Tsaurai, K. (2021). Economic growth-financial development-poverty nexus in emerging markets. *International Journal of Services, Economics and Management*, Vol. 12(1), pp. 93-108.

Ullah, S.; Akhtar, P. & Zaefarian, G. (2018). Dealing with endogeneity bias: The generalized method of moments (GMM) for panel data. *Industrial Marketing Management*, Vol. 71, pp. 69-78.