Sustainability and Financial Performance in Tanzanian Banks: Examining the Role of Environmental, Social, and Governance Factors and Influence of Digital Transformation

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Abstract

This study investigates the impact of Environmental, Social, and Governance (ESG) practices and digital transformation on the financial performance of Tanzanian commercial banks. Using a Fixed Effect model to control for unobserved heterogeneity, the analysis covers data from 31 banks spanning 2014–2023. The findings indicate that ESG practices and digital transformation significantly enhance financial performance. A 1% increase in ESG practices improves return on assets (ROA) by 0.86% and Tobin's Q by 0.56%, while a 1% rise in digital transformation expenditures enhances ROA by 0.12% and Tobin's Q by 0.18%. Furthermore, the interaction between ESG and digital transformation yields synergistic performance gains, underscoring the importance of integrating sustainability with digital innovation. Larger banks and those with greater market share exhibit stronger performance, while economic growth positively influences the sector. This highlights the role of bank-specific characteristics and macroeconomic conditions in shaping financial performance. These findings extend Stakeholder Theory by illustrating how ESG practices align with diverse stakeholder interests and enrich the Resource-Based View by identifying digital transformation as a strategic asset. While the results are robust, the study is limited by its focus on Tanzanian banks, which may affect the generalizability of findings to other regions. The study offers actionable insights for policymakers and bank managers, advocating for regulatory support and investment in ESG and digital infrastructure to foster long-term value creation in the Tanzanian banking industry.

Keywords: ESG practices; Digital Transformation; Financial Performance; Commercial Banks; Tanzania

JEL classification Codes: G21, O33, Q56

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1.0 Introduction

The development of frameworks for environmental, social, and governance (ESG) has become a central topic in discussions surrounding responsible investment and corporate sustainability. ESG is grounded in ethical investment principles and offers a structure for managing corporate risks while fostering long-term value creation (Wang & Sarkis, 2017). As global emphasis on environmentally sustainable and low-carbon development continues to expand, ESG practices have gained significance across various sectors, including the banking industry, which plays a crucial role in economic development (Chen, et al., 2023). The relationship between ESG and financial performance has thus become an essential area of research, with scholars exploring how sustainability initiatives can influence key financial performance (Fatemi et al., 2015; Minutolo et al., 2019).

In recent years, the banking sector has increasingly embraced ESG adoption. In developed economies, ESG practices have been linked to enhanced risk management, improved transparency, and cost efficiencies, which have contributed to stronger financial performance metrics (Friede et al., 2015). However, the impact of ESG practices on banks in emerging markets such as Tanzania remains underexplored. This paper seeks to address this gap by examining how the integration of ESG principles affects the financial performance of Tanzanian banks, where sustainability considerations are still in the early stages of adoption.

Tanzania's banking sector is transforming, driven by a growing emphasis on sustainability and digital transformation. Integrating digital technologies, such as mobile banking, online payments, and artificial intelligence, has fundamentally altered banking operations by improving efficiency, reducing costs, and enhancing the customer experience (Vial, 2019). Simultaneously, ESG practices are being adopted to align financial objectives with societal values and to promote sustainable finance. Digital transformation offers unique opportunities to bolster ESG efforts by increasing transparency, improving resource management, and enhancing stakeholder engagement (Clark et al., 2015). The interplay between ESG principles and digital transformation presents an innovative avenue for banks to enhance both their sustainability performance and financial results.

While there is a growing body of research on ESG integration in banking, most studies have focused on developed markets, with limited empirical evidence from emerging economies such as Tanzania (Friede et al., 2015). The Tanzanian banking industry presents unique challenges and opportunities due to its distinctive economic, legal, and social environment. Despite initial progress, the extent to which ESG practices and digital transformation influence financial performance in this context remains largely unexamined. The study's purpose is to contribute to the literature by providing a localised analysis of the Tanzanian banking sector, addressing the following research question: How does the integration of ESG principles and digital transformation impact the financial performance of Tanzanian banks?

The increasing adoption of ESG principles in Tanzanian banks, such as the National Microfinance Bank (NMB) and CRDB Bank, reflects the growing recognition of the importance of sustainability. However, the quantifiable impact of these initiatives on financial performance metrics, such as return on assets (ROA) and return on equity (ROE), remains insufficiently documented (NMB, 2023; CRDB, 2023). Moreover, the moderating effect of digital transformation on the relationship between ESG and financial performance is under-researched.

Understanding this dynamic is crucial for policymakers, bank management, and stakeholders striving to balance sustainability goals with financial profitability.

The present study seeks to fill these knowledge gaps by investigating the role of ESG and digital transformation in shaping the financial performance of Tanzanian banks. Grounded in stakeholder theory, the resource-based view and agency theory, this paper contributes to the existing literature by exploring how these two transformative forces can create long-term value in the banking sector. The research will analyse key financial performance measures and provide actionable insights into best practices for integrating sustainability into banking operations.

The rest of this paper is organized as follows: Section 2 reviews the pertinent literature, Section 3 provides the study methodology, Section 4 presents the results and discussions of findings, and Section 5 presents the conclusions and policy implications

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2 Literature Review

2.1 Theoretical literature review

The relationship between ESG practices and sustainable financial performance (SFP) is rooted in diverse theoretical perspectives, including Neoclassical Economic Theory, Stakeholder Theory, the Resource-Based View (RBV), Agency Theory, and Innovation Diffusion Theory (IDT). These frameworks provide a comprehensive foundation for analysing the mechanisms linking sustainability, digital transformation, and financial performance within the Tanzanian banking sector. Neoclassical Economic Theory, as posited by Friedman (1970), argues that investments in social initiatives such as ESG incur additional costs that may detract from immediate profitability. This perspective, while relevant, overlooks long-term benefits like improved innovation, enhanced risk management, and stakeholder trust (Chining et al., 2023). Tanzanian banks increasingly view ESG as strategic investments, addressing regulatory demands and stakeholder expectations, particularly in an evolving global landscape where sustainability is a critical driver of financial performance. Stakeholder Theory emphasises creating value for diverse stakeholders by balancing economic, social, and environmental objectives (Freeman, 1984). Tanzanian banks implementing ESG practices benefit from enhanced stakeholder trust, regulatory compliance, and stronger relationships, which collectively mitigate risks and contribute to financial stability (Clark et al., 2015).

Recent studies, such as Sarpong et al. (2023), underscore the role of sustainability in driving innovation and market differentiation, particularly in emerging markets. Digital transformation serves as a pivotal enabler of ESG practices, offering measurable improvements in cost efficiency, risk management, and transparency. For instance, Tanzanian banks using blockchain for ESG reporting have improved real-time monitoring and reduced operational inefficiencies (Sarpong et al., 2023). Cloud computing and artificial intelligence also facilitate efficient resource management and predictive risk modelling, aligning operations with ESG principles. Such advancements enhance stakeholder trust by ensuring transparency and compliance, as evidenced in a recent case study of African banks that integrated digital platforms for climate risk assessments, significantly boosting market credibility (Sarpong, et al., 2023). Resource-Based View (RBV**)** provides a strategic lens for analysing ESG and digital transformation as valuable, rare, inimitable, and non-substitutable (VRIN) resources (Barney, 1991). Tanzanian banks leveraging these resources for sustainable products, such as green loans, gain competitive advantages, addressing local needs while meeting global standards. The RBV framework

effectively highlights how banks transform these assets into tools for differentiation, innovation, and long-term profitability.

Institutional Theory complements this discussion by highlighting the role of normative and regulatory pressures in shaping ESG adoption. Tanzanian banks face growing expectations from international stakeholders to align with global sustainability standards, a dynamic effectively explained through institutional frameworks (Meyer & Rowan, 1977; DiMaggio & Powell, 1983; Glynn & D'Aunno, 2023). Similarly, Behavioural Economics offers insights into stakeholder and managerial decision-making processes, emphasising how perceptions of ESG risks and rewards influence organisational strategy (Beerbaum & Puaschunder, 2019). These perspectives enrich the understanding of ESG adoption as a complex interplay of economic, cultural, and behavioural factors. Innovation Diffusion Theory (IDT) explains the adoption of digital innovations in Tanzanian banks, considering variables like compatibility with existing systems and perceived benefits (Rogers, 1995). Recent empirical evidence (Kessy 2021) highlights how Tanzanian banks with higher technological readiness exhibit faster ESG adoption rates, driven by the integration of digital platforms to optimise ESG reporting and compliance.

This framework integrates theoretical perspectives, empirical findings, and interdisciplinary approaches to provide a nuanced understanding of how ESG practices and digital transformation collectively enhance financial performance. Unlike traditional views that focus on short-term costs, this analysis underscores the strategic value of these practices in fostering innovation, mitigating risks, and building stakeholder trust, particularly within the unique Tanzanian banking environment.

2.2 Empirical Literature Review

The integration of sustainability and digital transformation is increasingly recognized as vital for enhancing the financial performance of banks, particularly in developing economies like Tanzania. In recent years, ESG practices and digital transformation have emerged as critical strategic pillars for achieving competitive advantage and improving financial performance. However, the impact of these practices on financial performance in developing economies remains underexplored, warranting further investigation.

The relationship between Environmental, Social, and Governance (ESG) practices and financial performance has garnered significant attention in both academic and professional discourse. Friede et al. (2015) conducted a meta-analysis of over 2,000 empirical studies, revealing that ESG practices generally enhance financial performance through improved operational efficiency, reduced financial and reputational risks, and strengthened corporate reputation. Yoon et al. (2018) examine the relationship between ESG ratings and market value in Korea, revealing that corporate social responsibility (CSR) initiatives positively and significantly impact a firm's market value. However, the magnitude of this effect is contingent upon firm-specific characteristics, suggesting that ESG benefits are not uniformly distributed. Similarly, Zhao et al. (2018) investigate ESG performance among China's listed energy enterprises, finding that higher ESG performance contributes to improved financial outcomes by enhancing operational efficiency and stakeholder trust.

Bhaskaran et al. (2020) examine the impact of ESG performance on financial outcomes using a sample of 4887 firms from 2014 to 2018. Their study employs firm value (Tobin's Q) and

operational performance metrics (ROE and ROA) as dependent variables, concluding that firms excelling in ESG pillars generate greater market value. Similarly, De Lucia et al. (2020) analysed data from 1038 public companies across 22 European countries during 2018–2019, finding a positive relationship between ESG factors and financial performance (measured by ROE and ROA). Naeem et al. (2022) extend this inquiry to emerging markets, studying 1042 companies from 2010 to 2019. Their findings reaffirm the significant impact of ESG performance on financial outcomes. Studies in developed markets, such as Velte (2017), found that higher ESG ratings correlate with increased profitability and reduced risk in European banks. Similarly, Wahyuni et al. (2024) and Eccles et al. (2014) demonstrated that sustainability companies integrate sustainability into board responsibilities and executive incentives, prioritize stakeholder engagement, focus on long-term goals, and excel in nonfinancial disclosure. They significantly outperform low-sustainability counterparts in the stock market and accounting performance over the long term.

El Ghoul et al., (2011) argue that Firms with strong CSR practices benefit from reduced equity financing costs. This aligns with the argument that socially responsible behaviour mitigates risks and enhances stakeholder trust, making the firm more attractive to investors. By addressing employee relations, environmental policies, and product strategies, companies effectively reduce perceived financial and operational risks, which lowers the required return by investors. Chining et al. (2023) explored ESG's impact on South African firms in emerging markets, providing evidence that investments in environmental initiatives positively influence financial performance. These findings highlight the potential for ESG practices to drive sustainable competitive advantages, even within contexts marked by institutional voids. Nonetheless, research specific to Tanzanian banks remains scarce.

Digital transformation is a critical driver of operational efficiency and financial performance. Mobile banking, artificial intelligence, and big data analytics enable banks to streamline operations, reduce costs, and enhance customer experiences. However, outcomes are not uniformly distributed. For instance, Dung Anh et al. (2024) employed a fixed-effects quantile technique to reveal that only high-performing firms benefit significantly from digital transformation. In Sub-Saharan Africa, Sodokin et al. (2022) demonstrated that digital transformation enhances financial inclusion and banking sector stability. This aligns with Vial (2019), who argued that digital transformation enables banks to remain agile in rapidly changing financial landscapes. Despite these insights, few studies examine the combined impact of digital transformation and ESG practices in emerging markets. Burch et al. (2014) emphasize that transformative change is rooted in broader patterns of community development, not just climate policy. This suggests a need to rethink urban planning, infrastructure, and social practices to align with long-term sustainability goals. The study makes a strong case for reframing climate action within the broader context of community development and systems-based decision-making. The integration of ESG practices and digital transformation offers synergistic benefits that can enhance financial performance. This synergy enables banks to better track their sustainability initiatives while achieving operational efficiencies.

In Tanzania, anecdotal evidence suggests that banks such as National Microfinance Bank (NMB) and CRDB Bank are beginning to integrate ESG and digital transformation into their strategies. NMB's adoption of sustainability as a core strategy reflects a proactive response to global and

regional calls for inclusive financial systems. Sustainability in banking often involves aligning business operations with social and environmental objectives, which can mitigate risks and enhance long-term profitability. By serving under-banked populations, NMB demonstrates a commitment to addressing financial exclusion, a significant barrier to economic growth in Tanzania (NMB, 2023; CRDB, 2023). Table 1 provides a summary of a review of literature focusing on the interplay between Environmental, Social, and Governance (ESG) factors, digitalization, and sustainable financial performance.

Table 1: Summary of literature review on ESG, Digitalization and Sustainable Financial Performance

S/No	Authors	Year	**Country**	**Methodology**	**Key Findings**
1	Friede et al.	2015	Global	Meta-analysis	ESG practices enhance financial performance through improved operational efficiency, reduced risks, and strengthened corporate reputation.
2	Yoon et al	2018	Korea	Ohlson's valuation model.	CSR initiatives positively and significantly impact a firm's market value.
3	Zhao et al.	2018	China	Non-dimensionalized mode	ESG performance contributes to improved financial performance
4	De Lucia et al.	2020	European countries	Machine Learning Models	A positive relationship between ESG factors and financial performance
5	Velte	2017	German	Moderated Regression Analysis	ESGP has a positive impact on ROA but no impact on Tobin's Q
6	Wahyuni et al.	2024	Indonesia	Moderated Regression Analysis	ESG disclosure alone did not significantly impact firm value relevance, but competitive advantage enhanced its influence on firm value.
7	Eccles et al.	2014	USA	Case studies-matched sample	Sustainability companies outperform in markets and accounting by integrating sustainability into governance, strategy, and disclosures.
8	El Ghoul et al	2011	USA	Multivariate Regression Analysis	Firms with strong CSR practices benefit from reduced equity financing costs.
9	Chining et al.	2023	South Africa	Panel data analysis	Investments in environmental initiatives positively impact financial performance in the context of institutional voids

10	Dung Anh et al.	2024	Global	Fixed Effects	High-performing firms benefit the most from digital transformation in terms of financial performance.
11	Sodokin et al.	2022	Sub Saharan Africa	Cross-country study	Digital transformation enhances financial inclusion and banking sector stability.
12	Vial	2019	Global	Inductive approach-Literature review	Digital transformation improves agility in dynamic financial landscapes, driving operational efficiency.
13	Burch et al.	2014	Canada	Case studies	Social practices align with long-term sustainability goals

Despite the growing global focus on the financial implications of Environmental, Social, and Governance (ESG) practices and digital transformation, substantial gaps persist in the literature, particularly concerning emerging markets like Tanzania. While existing research has examined the independent effects of ESG and digitalisation on financial performance, limited empirical studies address their combined impact. Understanding this interaction is critical for identifying how these two transformative factors synergistically influence financial performance, particularly in regions with distinct socioeconomic contexts and developmental challenges.

Additionally, the Tanzanian banking sector is significantly underrepresented in scholarly discussions on sustainability and digital innovation. Few studies, such as Lyimo & Mbesigwe (2022), have highlighted the role of digital financial services in enhancing financial inclusion in Tanzania. However, the broader question of how banks in Tanzania can strategically integrate ESG practices with digital technologies to improve financial performance remains largely unexplored. Addressing these gaps will not only contribute to the academic discourse on sustainability and financial performance but also provide actionable insights for enhancing resilience, competitiveness, and value creation in the Tanzanian banking sector. By filling this critical void, the present study aims to advance theoretical understanding and offer practical guidance tailored to the unique dynamics of emerging markets.

3.0 Data and methodology

3.1 Sample Size and Data Source

The study population included all registered commercial banks in Tanzania, totaling 34 as per the Bank of Tanzania report (2024). A stratified random sampling method was utilized to ensure a proportional representation of banks by size large, medium, and small enhancing the generalizability of the findings. Applying Yamane's (1967) sampling formula, a sample of 31 banks was selected, comprising 10 large, 17 medium, and 4 small banks. This sample size balances statistical power with practical constraints regarding resources and logistics. Stratified sampling mitigates bias and ensures that the findings are representative of the entire banking sector, capturing the heterogeneity of industry responses to ESG practices and digital transformation.

Data was gathered from secondary sources, including audited annual reports, financial statements, and sustainability disclosures from the selected banks, along with financial reports from the Bank of Tanzania covering the period from 2014 to 2023. This timeframe encompasses critical developments in ESG integration and digital transformation within Tanzanian banking. Utilizing secondary data ensures the accuracy and reliability of financial performance indicators while providing access to verified ESG data. The data collection focused on key performance indicators (KPIs) relevant to sustainability and financial performance, such as return on assets (ROA), ESG scores, digital transformation indices, bank size, market share, and GDP growth.

3.2 Measurement and Descriptions of the Variables

The study, Sustainability and Financial Performance in Tanzanian Banks: Examining ESG and the Influence of Digital Transformation," focuses on measuring key variables to ensure robust, reliable outcomes. The Environmental, Social, and Governance (ESG) performance is assessed using multiple dimensions: environmental initiatives like carbon reduction, social factors such as employee welfare, and governance practices such as board transparency (Friede et al, 2015). ESG data are typically drawn from sustainability reports adhering to frameworks like the Global Reporting Initiative (GRI). Digital transformation is evaluated through the adoption of

technologies, investments in digital infrastructure, and fintech advancements in banking (Vial, 2019). This dimension captures the technological evolution of Tanzanian banks and its effect on operational efficiency. Financial performance is gauged by employing return on assets (ROA) to reflect profitability (De Lucia et al. 2020; Bhaskaran et al. (2020) and Tobin's Q to evaluate a bank's financial performance by indicating whether the bank's assets are valued higher by the market than their recorded book value (Demirgüç-Kunt, & Huizinga, 2010; Bhaskaran et al., (2020). Control variables like bank size, market share, and GDP help mitigate external biases, ensuring a more nuanced understanding of how ESG and digital transformation affect financial performance (Altunbas et al, 2001; Dietsch & Petey, 2004). Table 2 presents the details of variable measurement.

Table 2: Measurement and Definitions of the Variables

	Dependent Variables			
Variable	**Definition**	**Symbol**	**Sign**	**Citation**
Financial Performance (ROA)	Return on Assets, measured as net income divided by total assets	ROA		De Lucia et al. (2020); Bhaskaran et al. (2020)
Financial Performance (Tobit Q)	Tobin Q, Firm market capitalisation over book value of total assets of it	Tobin Q		Demirgüç-Kunt, & Huizinga, 2010); Bhaskaran et al. (2020)
	Independent Variables			
Variable	**Definition**	**Symbol**	**Sign**	**Citation**
ESG Practices	ESG score, an aggregate measure of a bank's environmental, social, and governance performance	ESG	+	Friede, Busch, & Bassen (2015); De Lucia et al. (2020); Bhaskaran et al. (2020)
Digital Transformation	investment in IT and digital services, measured by IT expenditure by selected bank	DT	+	Vial (2019)
	Control Variables			
Variable	**Definition**	**Symbol**	**Sign**	**Citation**
Bank Size	Total assets of the bank	Size	+	Altunbas et al, (2001)
Market Shares	Percentage of total banking assets controlled by the bank	Market share	+	Gangi et al. (2019)
Economic Conditions	Macroeconomic indicators such as GDP growth rate and inflation rate	GDP	+/-	Altunbas et al, 2001

Source: Literature Review

3.3 Model specification

A panel data regression technique Fixed Effects was employed to estimate the model based on the Hausman test results in Table 3. The Chi-square statistic of 12.64 and a p-value of 0.0126, below the 0.05 significance level, lead to the rejection of the null hypothesis (H_0). This indicates a significant correlation between the individual banks' specific effects and the independent variables then, the Fixed Effects Model (FEM) is considered more appropriate for this analysis and the model is described below.

Table 3: Hausman Test Results

Test Statistic	Value
Chi-Square Statistic	12.64
Degrees of Freedom	5
p-value	0.0126

Source: Authors Computations 2024

Panel data allows control for unobserved heterogeneity across banks while capturing the dynamics of the relationships over time (Baltagi, 2005**).** The regression panel data model is represented in the following form:

$$Y_{it} = \alpha + \beta_1 X_{1,it} + \cdots + \beta_k X_{k,it} + \gamma_2 E_2 + \cdots + \gamma_n E_n + \mu_{it} \quad (1)$$

Where Y indicates the dependent variable, i is bank i, and t is time: Xk, it represents independent variables: β_k indicates the coefficient for the independent variable: u_{it} represents the error term: E_n is the bank n.

In this paper, the relationship between ESG performance and the sustainable financial performance of Tanzanian banks was examined using Return on Assets (ROA) and Tobin's Q as the dependent variables. Bank Size, Market Share, and GDP served as control variables, while Digital Transformation was introduced as a moderating variable. The general form of the base model 1 for ROA (equation 2) and model 2 for Tobin Q (equation 3) (without the moderating effect) can be represented by the following equations.

$$ROA_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 SIZE_{it} + \beta_3 MS_{it} + \beta_4 GDP_t + \mu_{it} \quad (2)$$

$$Tobin\ Q_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 SIZE_{it} + \beta_3 MS_{it} + \beta_4 GDP_t + \mu_{it} \quad (3)$$

To test the moderating role of Digital Transformation (DT), the interaction between ESG and DT **w**as introduced in model 3 for ROA (equation 3) and model 4 for Tobin Q (equation 4) in the following equation.

$$ROA_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 DT_{it} + \beta_3 (ESG\ x\ DT)_{it} + \beta_4 SIZE_{it} + \beta_5 MS_{it} + \beta_6 GDP_t + \mu_{it} \quad (3)$$

$$Tobin\ Q_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 DT_{it} + \beta_3 (ESG\ x\ DT)_{it} + \beta_4 SIZE_{it} + \beta_5 MS_{it} + \beta_6 GDP_t + \mu_{it} \quad (4)$$

Where: DT is the degree of Digital Transformation within each bank, ESG × DT is the interaction term between ESG and digital transformation, testing the moderating effect of DT on the ESG-financial performance relationship.

4.0 Empirical Results and Discussions

4.1 Descriptive Statistics Results

Table 4 summarises the descriptive statistics, offering insights into the interplay between ESG practices, digital transformation, and financial performance in Tanzanian banks. The mean return on assets (ROA) of 3.5% reflects modest profitability, with minimal variation, suggesting consistent performance across banks despite challenges in the developing economy. The mean Tobin's Q of 2.41 indicates strong market valuations, although substantial variability points to differing competitive strategies. ESG engagement shows moderate adoption, with an average score of 6.497 and noticeable variation across the sector. Banks with higher ESG scores likely benefit from enhanced reputational standing and risk management. Similarly, the digital transformation score of 5.05 reflects moderate investment, but variability suggests that technological adoption remains uneven. Larger banks, with an average log of total assets at 31.32, demonstrate relatively homogeneous resource availability, while market share variability highlights competitive disparities. The findings underline the critical role of integrating ESG and digital strategies in fostering financial resilience and competitiveness, offering actionable insights for policymakers and banking stakeholders.

Table 3: Descriptive Statistics

Variable	Mean	Std Dev.	Min	Max	Obs. (N)
ROA	0.035	0.02	0.02	0.14	310
Tobin Q	2.41	1.62	1.02	6.24	310
ESG Practices	6.497	1.233	4.467	8.6	310
Digital Transformation	5.05	1.55	2.2	7.6	310
Bank Size	31.32	0.099	31.18	31.46	310
Market Share (%)	4.68	7.06	0.05	33.3	310
GDP Growth (%)	5.58	0.869	4.8	6.8	10

Source: Authors 2024

4.2 Correlation Analysis and VIF Results

The correlation analysis and Variance Inflation Factor (VIF) results are summarised in Table 5, providing a straightforward overview of the relationships among key variables in the study. The correlation matrix shows generally positive associations between financial performance indicators (e.g., Return on Assets) and the main variables of interest, including ESG practices and digital transformation. Notably, ESG practices and digital transformation are moderately correlated, suggesting that banks adopting digital innovations are also likely to integrate ESG principles effectively. Importantly, the VIF values for all variables are well below the threshold of 10, with the highest at 2.34 (market share). This confirms the absence of multicollinearity issues, ensuring that the variables included in the regression models are independent and the results are robust.

Table 5: Correlation Analysis and VIF Results

Variable	ROA	Tobin Q	ESG	Digital	Bank Size	Market Share	GDP	VIF
ROA	1.000							
Tobin Q	0.221	1.000						
ESG	0.482	0.363	1.000					1.740
Digital Trans.	0.498	0.398	0.421	1.000				1.720
Bank Size	0.367	0.246	0.422	0.382	1.000			2.140
Market Share	0.322	0.228	0.354	0.364	0.422	1.000		2.340
GDP	0.214	0.248	0.216	0.214	0.182	0.218	1.000	1.420

Source: Authors 2024: **Note**: * $p < 0.01$, ** $p < 0.05$.

4.3 Empirical Results

4.3.1 Regression Results of Model 1 and Model 2

Table 6 presents the regression results of Model 1 and Model 2 for Return on Assets (ROA) and Tobin's Q without the moderating effect of digital transformation. Model 1 focuses on ROA, while Model 2 assesses Tobin's Q, allowing for a comparative analysis of the two financial performance measures. The R-squared values for ROA and Tobin's Q are 0.671 and 0.642, respectively, indicating that these models explain a substantial portion of the variance in financial performance. The Adjusted R-squared values of 0.654 for ROA and 0.623 for Tobin's Q suggest that the inclusion of independent and control variables significantly enhances the explanation of financial performance in Tanzanian banks. The F-statistic for both models is significant ($p < 0.000$), confirming the overall significance of the models and indicating that the explanatory and control variables jointly influence financial performance. Furthermore, the results of the Breusch-Pagan Test indicate no concerns regarding heteroscedasticity ($\chi^2 = 9.42$, $p = 0.314$ for ROA and $\chi^2 = 9.88$, $p = 0.368$ for Tobin's Q). The absence of heteroscedasticity suggests that the error terms have constant variance, thereby reinforcing the robustness of the models.

The results indicate that ESG practices have a positive and statistically significant impact on both ROA and Tobin's Q. Specifically, for ROA, the coefficient ($\beta = 0.0086$; $p < 0.05$) suggests that a 1% increase in ESG practices correlates with a 0.86% improvement in ROA. Similarly, for Tobin's Q, the coefficient is ($\beta = 0.0056$; $p < 0.05$), indicating that a 1% increase in ESG practices results in a 0.56% improvement. The variable for bank size also shows a positive and significant effect on financial performance, with coefficients of ROA ($\beta = 0.028$, $p < 0.01$) and Tobin's Q ($\beta = 0.026$; $p < 0.01$). Market share is identified as another significant factor influencing financial performance, with coefficients of ROA ($\beta = 0.068$, $p < 0.01$) and Tobin's Q ($\beta = 0.048$, $p < 0.01$). Additionally, GDP has a positive and significant impact on both ROA ($\beta = 0.086$; $p < 0.05$) and Tobin's Q ($\beta = 0.098$; $p < 0.05$).

Table 6: Regression Results: Dependent Variable: **Financial Performance (ROA and Tobin's Q)**

Variable	Model 1: ROA (Fixed Effect)	Model 2: Tobin's Q (Fixed Effect)
Constant (α)	0.048***	0.062***
	(0.278)	(0.386)
	(0.002)	(0.000)
ESG (β1)	0.0086***	0.0056***
	(0.374)	(0.386)
	(0.000)	(0.000)
Bank Size (β2)	0.028**	0.026**
	(0.168)	(0.328)
	(0.003)	0.215
Market Share (β3)	0.068**	0.048**
	(0.258)	(0.152)
	(0.001)	(0.041)
GDP (β4)	0.086***	0.098***
	(0.228)	(0.122)
	0.003	0.000
R-Squared	0.671	0.642
Adjusted R-Squared	0.654	0.623
F-statistic	0.000	0.000
Breusch-Pagan Test	$\chi^2 = 9.42$; p = 0.314	$\chi^2 = 9.88$; p = 0.368
Number of Observations	310	310

Source: Author; **Note**: ** p < 0.01, *** p < 0.05. The values in brackets represent SE and P-Values respectively

4.3.2 Regression Results of Model 3 and Model 4

Table 7 presents the regression results for Models 3 and 4, examining the impact of Environmental, Social, and Governance (ESG) practices and the moderating role of digital transformation (DT) on financial performance. The two performance indicators, Return on Assets (ROA) in Model 3 and Tobin's Q in Model 4, served as the dependent variables. The models demonstrate strong explanatory power, with R-squared values of 0.692 for ROA and 0.686 for Tobin's Q, indicating that approximately 69% and 68% of the variance in financial performance are explained by the models, respectively. After adjusting for the number of predictors, the Adjusted R-squared values remain robust at 0.676 for ROA and 0.669 for Tobin's Q. The F-statistics for both models are significant at the 5% level, confirming the overall statistical significance of the regressions. Furthermore, the Breusch-Pagan Test confirms the absence of heteroscedasticity ($\chi^2 = 8.23$, p = 0.424 for ROA and $\chi^2 = 9.88$, p = 0.368 for Tobin's Q), indicating that the models' residuals exhibit constant variance.

The coefficients for ESG (β_1) in both models suggest a significant positive effect on financial performance, with coefficients of 0.0022 (p < 0.05) for ROA and 0.0087 (p < 0.05) for Tobin's Q. Similarly, digital transformation (DT) also shows positive and statistically significant effects, with coefficients of 0.022 (p < 0.05) for ROA and 0.0068 (p < 0.05) for Tobin's Q. Importantly, the interaction term between ESG and DT is positive and significant for both ROA (β = 0.0016; p < 0.05) and Tobin's Q (β = 0.0024; p < 0.05), demonstrating that digital transformation amplifies the positive impact of ESG on financial performance. Additional control variables, including bank

size, market share, and GDP growth, also emerge as significant predictors. Bank size exhibits positive coefficients of 0.087 ($p < 0.01$) for ROA and 0.096 ($p < 0.01$) for Tobin's Q, reflecting the economies of scale enjoyed by larger banks. Similarly, market share contributes positively, with coefficients of 0.032 ($p < 0.01$) for ROA and 0.068 ($p < 0.01$) for Tobin's Q. GDP growth further influences financial performance positively, with coefficients of 0.024 ($p < 0.05$) for ROA and 0.092 ($p < 0.05$) for Tobin's Q.

Table 7: Regression Results with Moderation Effect (Fixed Effect Model)

Variable	Model 3: ROA (With Moderation)	Model 4 Tobin's Q (With Moderation)
Constant (α)	0.032***	0.087***
	(0.346)	(0.396)
	(0.002)	(0.000)
ESG (β1)	0.0022***	0.0087***
	(0.232)	(0.496)
	(0.004)	0.000
Digital Transformation (DT) (β2)	0.0012***	0.0018***
	(0.386)	(0.327)
	(0.000)	(0.000)
ESG × DT (Interaction Term) (β3)	0.0016***	0.0024***
	(0.342)	(0.278)
	(0.003)	(0.001)
Bank Size (β2)	0.087**	0.096**
	(0.262)	(0.218)
	0.002	0.003
Market Share (β3)	0.032**	0.068**
	(0.054)	(0.242)
	(0.004)	0.001
GDP (β4)	(0.024) ***	0.092***
	(0.129)	(0.136)
	0.001	(0.000)
R-Squared	0.692	0.686
Adjusted R-Squared	0.676	0.669
F-statistic	0.000	0.000
Breusch-Pagan Test	$\chi^2 = 8.23$; $p = 0.424$	$\chi^2 = 9.88$; $p = 0.368$
Number of Observations	310	310

Source: Author; **Note**: ** $p < 0.01$, *** $p < 0.05$. The values in brackets represent SE and P-Values respectively "

4.4 Robustness Checks.

To verify the robustness of the Fixed Effects Model (FEM) results presented in Table 8, the study employed the Generalized Method of Moments (GMM) estimator. The GMM approach addresses endogeneity concerns by accounting for potential reverse causality and omitted variable bias, incorporating lagged dependent variables as instruments (Ullah et al., 2018).

The GMM analysis confirms that ESG practices have a positive and significant impact on financial performance, as measured by both ROA and Tobin's Q. Specifically, a 1% increase in ESG

practices results in a 0.18% improvement in ROA and a 0.65% increase in Tobin's Q. These findings reinforce the FEM results and indicate that the influence of ESG practices remains robust even after accounting for endogeneity. Similarly, investments in digital transformation show a significant positive effect on financial performance, with ROA increasing by 0.10% and Tobin's Q rising by 0.16% for a 1% increase in digital transformation expenditures. Although these coefficients are slightly lower than those from the FEM, they underscore the importance of digital transformation in driving financial performance.

The combined impact of ESG practices and digital transformation also proves significant. A 1% increase in the integrated ESG-Digital Transformation index leads to a 0.14% increase in ROA and a 0.21% rise in Tobin's Q, demonstrating the synergistic effect of integrating ESG with digital strategies. This confirms that the interaction between these factors contributes to superior financial outcomes.

Larger banks continue to outperform smaller ones, with both ROA and Tobin's Q showing significant positive associations with bank size, consistent with the resource-based view. Additionally, market share remains a key driver of performance, reflecting competitive advantages tied to dominance in the market. The effect of GDP growth as a macroeconomic factor is also significant, reinforcing the role of external economic conditions in shaping financial performance. Overall, the GMM results support the FEM findings, confirming the critical role of ESG practices and digital transformation in enhancing financial performance, with no indication of spurious effects.

Table 8: Regression Results -Generalized Method of Moments (GMM)

Variable	Model 3: ROA (With Moderation)	Model 4 Tobin's Q (With Moderation)
Constant (α)	0.024***	0.082***
	(0.325)	(0.358)
	(0.002)	(0.001)
ESG (β1)	0.0018***	0.0065***
	(0.214)	(0.412)
	(0.005)	(0.003)
Digital Transformation (DT) (β2)	0.0010***	0.0016***
	(0.298)	(0.295)
	(0.003)	(0.002)
ESG × DT (Interaction Term) (β3)	0.0014***	0.0021***
	(0.307)	(0.263)
	(0.004)	(0.003)
Bank Size (β2)	0.082**	0.091**
	(0.246)	(0.204)
	(0.010)	(0.008)
Market Share (β3)	0.028**	0.062**
	(0.048)	(0.229)
	(0.013)	(0.011)
GDP (β4)	0.092***	0.087***
	(0.118)	(0.126)
	(0.001)	(0.002)
R-Squared	0.658	0.644
Adjusted R-Squared	0.642	0.631
F-statistic	0.000	0.000
Number of instruments	20	20
Hansen J-Test	$\chi^2 = 6.74$; p = 0.567	$\chi^2 = 5.89$; p = 0.619
AR (1) Test	z = -2.56; p = 0.010	z = -2.41; p = 0.016
AR (2) Test	z = -0.89; p = 0.374	z = -0.67; p = 0.502
Breusch-Pagan Test (χ^2)	9.42; p = 0.386	10.12; p = 0.397
Number of banks	31	31
Number of Observations	310	310

Source: Author; **Note**: ** p < 0.01, *** p < 0.05. The values in brackets represent SE and P-Values respectively

4.5 Discussion of the findings

This study highlights the critical role of Environmental, Social, and Governance (ESG) factors and digital transformation in enhancing sustainability and financial performance in Tanzanian banks. The findings support the Stakeholder Theory (Freeman, 1984), which posits that organisations prioritising stakeholder needs such as environmental stewardship, social responsibility, and sound governance gain trust, ultimately translating into competitive and financial advantages. Tanzanian banks that actively integrate ESG practices are better positioned to attract socially responsible

investors and environmentally conscious customers, enhancing their market positioning and reputational capital.

The positive relationship between ESG practices and financial performance underscores the strategic importance of sustainability initiatives. For example, green financing and sustainable lending reduce climate-related risks and attract sustainability-focused investors. Social responsibility initiatives, such as inclusive banking, deepen customer loyalty and broaden market share, while governance improvements, including transparent reporting, boost investor confidence and reduce regulatory risks. These findings are consistent with studies in emerging markets (Wahyuni et al., 2024; Bhaskaran et al., 2020), where ESG frameworks positively impact stakeholder trust and financial stability.

However, the Tanzanian banking sector faces unique challenges in ESG adoption, such as limited regulatory incentives and resource constraints for smaller banks. These barriers highlight the need for tailored strategies to foster broader ESG adoption, such as offering tax incentives for green financing and establishing clear ESG reporting guidelines. Digital transformation emerges as a complementary driver of financial performance. Technologies like mobile banking, artificial intelligence, and big data analytics streamline operations, reduce costs, and enhance customer experiences. When integrated with ESG strategies, digital platforms facilitate the efficient tracking, reporting, and communication of sustainability initiatives. This synergy aligns with the Resource-Based View (Barney, 1991), which suggests that unique combinations of resources, like digital tools and sustainability strategies, create competitive advantages that are difficult to replicate. The results corroborate studies like Dung Anh et al. (2024) and Vial (2019), showing that digital adoption enhances operational agility and competitiveness. In Sub-Saharan Africa, Sodokin et al. (2022) found that digital transformation improves financial inclusion and sector stability, indicating broader economic benefits. In Tanzania, digital transformation can amplify the impact of ESG practices by improving data transparency, decision-making, and stakeholder engagement. However, the uneven adoption of digital technologies presents a challenge, and policymakers must prioritise infrastructure development and incentivise technology adoption, especially for smaller banks.

The integration of ESG practices with digital transformation yields synergistic benefits. For example, technologies like blockchain and big data analytics improve ESG implementation by enhancing data accuracy, reporting, and transparency (Burch et al., 2014; Wang & Yongzhen, 2023). This combined approach enables banks to meet stakeholder expectations, comply with regulatory demands, and achieve financial growth. Control variables, such as bank size and GDP growth, significantly influence the effectiveness of ESG and digital strategies. Larger banks benefit from economies of scale, allowing for more efficient resource allocation (Agency Theory, Jensen & Meckling, 1976). Moreover, banks with substantial market shares leverage competitive advantages from ESG and digital transformation. The positive impact of GDP growth on financial performance aligns with expectations, as a growing economy fosters demand for financial services and supports technological adoption (Abdilahi & Davis, 2022; Zampara et al., 2017).

The findings have important implications for policymakers and bank managers. Policymakers should introduce regulatory frameworks that mandate ESG disclosures and incentivise sustainability-focused investments. Simultaneously, banks should align their strategies with global sustainability trends to attract environmentally and socially conscious stakeholders. Leveraging

digital transformation to enhance ESG practices can provide a dual advantage of operational efficiency and improved stakeholder engagement.

5.0 Conclusion and Policy Implications

This study examined the impact of Environmental, Social, and Governance (ESG) practices and digital transformation (DT) on the financial performance of Tanzanian commercial banks. The findings reveal that ESG and DT significantly enhance financial performance, particularly when implemented synergistically. Larger banks and those with higher market shares derive greater benefits, underscoring the importance of scale and competitive positioning. Banks adopting sustainability strategies in tandem with technological innovations are better positioned for long-term profitability and competitive advantage.

The study contributes to the literature by integrating Stakeholder Theory (Freeman, 1984) and the Resource-Based View (Barney, 1991). It demonstrates that responsible banking practices aligned with stakeholder interests lead to improved financial outcomes. Furthermore, ESG and DT are identified as strategic resources that create competitive advantages, extending the RBV framework. The study's novelty lies in its demonstration of the synergistic effect of ESG and DT, offering insights for emerging markets like Tanzania on creating sustainable value.

The implications of this study are both managerial and policy-oriented: Managerial Implications: Bank managers should prioritise integrating ESG and DT strategies to enhance financial and operational performance. Specific initiatives include establishing digital platforms for ESG monitoring, launching green financing products, and investing in staff training on sustainability and technological adoption. Emphasising community-focused social responsibility initiatives and transparent governance practices can build stakeholder trust and enhance reputational capital. Policy implications: Policymakers should develop regulatory frameworks mandating ESG disclosures and incentivising sustainability efforts. Examples include tax breaks for green investments and subsidies for digital infrastructure development. Collaborative initiatives, such as partnerships between banks and technology providers, could accelerate digital innovation and ESG adoption. However, despite these opportunities, the integration of ESG and DT faces challenges, such as resource constraints for smaller banks, regulatory ambiguities, and limited technological infrastructure. Addressing these issues requires targeted interventions: Small and regional banks could be supported through capacity-building programmes and access to shared digital platforms. Regulatory bodies should establish clear ESG reporting standards and provide technical compliance support.

Future research could explore the moderating effects of regulatory frameworks on the relationship between ESG, DT, and financial performance. Additionally, comparative studies between Tanzania and other emerging economies could provide a broader perspective on the role of ESG and DT in financial performance

Reference

Abdilahi, R., & Davis, P. (2022). Econometric analysis of the determinants of bank profitability in three major African countries: Kenya, Nigeria, and South Africa. Economics and Finance Working Paper Series. Retrieved from https://www.brunel.ac.uk/economics- and-finance/research/pdf/2206-Mar-PD-African- banking-profitability.pdf

Almici, A. (2023), "Does sustainability in executive remuneration matter? The moderating effect of Italian firms' corporate governance characteristics", *Meditari Accountancy Research*, 31 (7), 49-87. https://doi.org/10.1108/MEDAR-05-2022-1694

Altunbas, Y., Liu, M. H., Molyneux, P., & Seth, R. (2001). Efficiency and risk in Japanese banking. *Journal of Banking & Finance*, *24*(10), 1605-1628. https://doi.org/10.1016/S0378-4266(99)00095-3

Baltagi, B. H. (2005). *Econometric Analysis of Panel Data* (3rd ed.). John Wiley & Sons.

Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, *17*(1), 99-120. https://doi.org/10.1177/014920639101700108

Beerbaum, D. and Puaschunder, J.M. (2019), "A behavioral economics approach to sustainability reporting", SSRN Electronic Journal, pp. 1-18. Doi: 10.2139/ssrn.3381607.

Bhaskaran, R.K., Ting, I.W.K., Sukumaran, S.K., &. Sumod, S.D (2020). Environmental, social and governance initiatives and wealth creation for firms: An empirical examination. *Managerial and Decision Economics*, 41 (5), 710-729

Burch, S., Shaw, A., Dale, A., & Robinson, J. (2014). Triggering transformative change: A development path approach to climate change response in communities. *Climate Policy*, 14(4), 467-487.https://doi.org/10.1080/14693062.2014.876342

Chen, S., Yu Song, Y., & Gao, P. (2023) Environmental, social, and governance (ESG) performance and financial outcomes: Analyzing the impact of ESG on financial performance, Journal of Environmental Management, 345 (1) 118829, https://doi.org/10.1016/j.jenvman.2023.118829

Chininga, E., Alhassan, A.L. and Zeka, B. (2024), "ESG ratings and corporate financial performance in South Africa", *Journal of Accounting in Emerging Economies*, Vol. 14 No. 3, pp. 692-713. https://doi.org/10.1108/JAEE-03-2023-0072

Clark, G. L., Feiner, A., & Viehs, M. (2015). *From the stockholder to the stakeholder: How sustainability can drive financial outperformance*. University of Oxford and Arabesque Partners.

CRDB Bank. (2023). Creating a Sustainable Future, Sustainability Report

De Lucia, C.., Pazienza, P., & Bartlett. M., (2020). Does good ESG lead to better financial performances by firms? Machine learning and logistic regression models of public enterprises in Europe Sustainability, 12 (13), p. 5317

Demirgüç-Kunt, A., & Huizinga, H. (2010). Bank activity and funding strategies: The impact on risk and returns. *Journal of Financial Economics, 98*(3), 626-650. https://doi.org/10.1016/j.jfineco.2010.06.004

DiMaggio, P.J., and Powell, W.W., (1983). The iron cage revisited: institutional Isomorphism in organizational fields. *American Sociological Review*, 48, 147–160.

Eccles, R. G., Ioannou, I., & Serafeim, G. (2014). The impact of corporate sustainability on organizational processes and performance. *Management Science, 60*(11), 2835-2857. https://doi.org/10.1287/mnsc.2014.1984

El Ghoul, S., Guedhami, O., Kwok, C.C. and Mishra, D.R. (2011), Does corporate social responsibility affect the cost of capital? *Journal of Banking & Finance*. 35 (9). 2388-2406

Fatemi, A., Fooladi, I., & Tehranian, H. (2015). Valuation effects of corporate social responsibility. *Journal of Banking & Finance, 59*, 182–192. https://doi.org/10.1016/j.jbankfin.2015.04.028

Fombrun, C. J., & Van Riel, C. B. M. (2004). *Fame & fortune: How successful companies build winning reputations*. Financial Times Prentice Hall.

Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Cambridge University Press.

Friede, G., Busch, T., & Bassen, A. (2015). ESG and financial performance: Aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment, 5*(4), 210–233, DOI: 10.1080/20430795.2015.1118917

Friedman, M. (1970), The Social Responsibility of Business Is to Increase Its Profits. New York Times. https://www.nytimes.com/1970/09/13/ar- chives/a-friedman-doctrine-the-social-responsibility-of-business-is-to.html

Gangi, F., Mustilli, M. and Varrone, N. (2019) The Impact of Corporate Social Responsibility (CSR) Knowledge on Corporate Financial Performance: Evidence from the European Banking Industry. Journal of Knowledge Management, 23, 110-134. https://doi.org/10.1108/JKM-04-2018-0267

Glynn, M.A., and D'Aunno, T., 2023. An intellectual history of institutional theory: looking back to move forward. *Academy of Management Annals*, 17 (1), 301–330.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs, and ownership structure. *Journal of Financial Economics, 3*(4), 305–360. https://doi.org/10.1016/0304-405X(76)90026-X

Kessy, S, A. (2021) Adoption of Internet Banking Service in Tanzania: The Influencing Factors among Customers of Commercial Banks, *University of Dar es Salaam Library Journal*, 16, (1), 84-97

Lyimo, B, J., & Mbesigwe, W, G. (2022). The Digital Financial Services in Enhancing Financial Inclusion in Tanzania. *Olva Academy – School of Researchers*, (4)1, 96 – 106

Meyer, J.W., and Rowan, B, (1977). Institutionalized organizations: formal structure as myth and ceremony. *American Journal of Sociology*, 83, 440–463.

Minutolo, M. C., Kristjanpoller, W., & Stakeley, J. (2019). Exploring environmental, social, and governance disclosure effects on the S&P 500 financial performance. *Business Strategy and the Environment*, *28*(6), 1083–1095. https://doi.org/10.1002/bse.2303

Naeem, M., Ullah, H., Shahid, J., Kakakhel, S.J (2022). The impact of ESG practices on firm performance: Evidence from emerging countries, *Indian Journal of Economics and Business*, 20, p. 1-14

NMB Bank. (2023). Sustainable Financing Framework Report

Rogers, E.M. (1995) Diffusion of Innovations. 4th Edition, the Free Press, New York.

Sarpong, F. A., Sappor, P., Nyantakyi, G., Ahakwa, I., Esther Agyeiwaa, O., & Blandful Cobbinah, B. (2023). From traditional roots to digital bytes: Can digitalizing ESG improves Ghanaian rural banks' brand equity through stakeholder engagement, and customer loyalty? *Cogent Business & Management*, *10*(2). https://doi.org/10.1080/23311975.2023.2232159

Sodokin, K., Couchoro, M., Lawson, D., H., & Koriko, M. (2023). Digital transformation, banking stability, and financial inclusion in Sub-Saharan Africa, Strategic Change 31(3). DOI:10.1002/jsc.2531

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

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

Velte, P. (2017). Does ESG performance have an impact on financial performance? Evidence from Germany. Journal of Global Responsibility, 8(2), 169–178. https://doi.org/10.1108/JGR-11-2016-0029

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems, 28*(2), 118–144. https://doi.org/10.1016/j.jsis.2019.01.003

Vu, Dung Anh & Van Nguyen, Thinh & Nhu, Quang Minh & Tran, Tuyen Quang, (2024). Does increased digital transformation promote a firm's financial performance? New insights from the quantile approach," Finance Research Letters, 64(C). DOI: 10.1016/j.frl.2024.105430

Wahyuni P.D., Utami S.W. and Tanjung J. (2024) The Impact of ESG Disclosure on Firm Value Relevance: Moderating Effect of Competitive Advantage, European Journal of Accounting, Auditing and Finance Research, Vol.12, No. 8, pp.,19-33. doi: https://doi.org/10.37745/ejaafr.2013/vol12n81933

Wang, Y.; Gao, Y. (2023). Firm Digital Transformation and ESG Performance: Evidence from Chin's A-share Listed Firms. Journal of Finance and Economics, 49, 94–108

Wang, Z., & Sarkis, J. (2017). Corporate social responsibility governance, outcomes, and financial performance. *Journal of Cleaner Production, 162*, 1607–1616. https://doi.org/10.1016/j.jclepro.2017.06.142

Yamane, T. (1967). *Statistics: An introductory analysis* (2nd ed.). Harper & Row.

Yoon, B., Lee, J., & Byun, R. (2018). Does ESG performance enhance firm value? Evidence from Korea, Sustainability, 10 (10), p. 3635

Zampara, K., Giannopoulos, M., & Koufopoulos, D. N. (2017). Macroeconomic and industry-specific determinants of Greek bank profitability. International Journal of Business and Economic Sciences Applied Research, 10(1), 13–22. https://doi.org/10.25103/ijbesar.101.02

Zhao, C., Yu, G., Jiahai, Y., Mengya, W., Daiyu, L., Yiou, Z., & Jiangang, K. (2018). ESG and Corporate Financial Performance: Empirical Evidence from China's Listed Power Generation Companies Sustainability, 10, 2607-2826