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Article

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Optimizing performance through sustainability: the mediating influence of firm liquidity on ESG efficacy in African enterprises

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ABSTRACT

This study employs a linear regression model to investigate the relationship between ESG performance, liquidity, and firm performance of African-listed firms covering a period from 2013 to 2022. The results indicate that liquidity is a significant mediating factor influencing the association between ESG performance on firm performance. Furthermore, the outcome suggests that augmenting the ESG performance of listed companies enhances firm performance. Robustness tests also corroborate the postulation that firms with higher liquidity improve ESG performance and enhance overall firm performance. This study offers important insights to corporate governors, listed firms, and investors.

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1. Introduction

The recent past has witnessed equanimity between the environment and human sustainability, and organizations are no exception. This tectonic shift from revenue-orientation philosophy to ‘mutual sustainability’ has been an outcome of the realization that nothing can exist in vacuum. This intertwining between firms, finance society, and the environment has led to the need to standardize measures for environment sustainability, social consciousness, and firm performance. Furthermore, there has been a surge in stakeholder interests (Kramer & Pfizer, 2022) as well as academics (Al Amosh et al., 2023; Gao et al., 2022; Gavin et al., 2022; Gupta et al., 2022; Kroft & Bams, 2022; Pulino et al., 2022; Zhou et al., 2022); wherein parallel spheres of investigation and inference are being brought to limelight. These conclusions have been an outcome of discussion in scholarly forums, wherein ESG and its relationship with firm sustainability have been at the core (Ahmad et al., 2021; Aragón-Correa et al., 2016; Bansal & Song, 2017; Christophe & Lee, 2021; Jeong & Harrison, 2017; Jones et al., 2018). Though this primal association has been iteratively investigated, what remains enisle is the integrating association of firm liquidity with the antecedence of ESG disclosures and the outcome of firm performance. Firm liquidity has been studied at length with CSR initiatives (Uyar et al., 2023), and so have been with firm performance (Kassamany et al., 2023); but there are negligible studies that articulate the variable with ESG or firm performance. Practitioners may go to the extent of perceiving CSR as a proxy for ESG; though theoretically, they principally differ. Thus, articulating firm liquidity with ESG and firm performance is a unique triangulation that has to be empirically substantiated. The influence of ESG on firm performance can be deviated with the liquidity behaviour of firms, hence liquidity plays a pivotal role in the success of firm performance. Liquidity plays a crucial role in determining the success of ESG initiatives and, ultimately, firm

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performance. Firms with high liquidity are better positioned to invest in ESG activities, manage risks, and take advantage of growth opportunities. This, in turn, can lead to improved firm performance, especially in the long run. Conversely, firms with liquidity constraints may struggle to invest in ESG, potentially limiting their performance and growth potential. Therefore, when evaluating the influence of ESG on firm performance, it is essential to consider the liquidity behavior of firms, as it can significantly impact their ability to implement and sustain ESG initiatives effectively.

ESG has recently become mainstream. Thus, the united efforts of scholarly and practitioner communities have paved the way for the swift evolution of this sphere. Africa presents significant opportunities for private investors. The region boasts a youthful and expanding population alongside plentiful natural resources. Urban centres are experiencing substantial development, with many nations implementing extensive industrialization and digitalization strategies. The primary drivers behind Foreign Direct Investment (FDI) inflows into Africa in recent years seem to be the availability of natural resources in host countries, coupled with the size of the domestic market playing a secondary role. The potential of FDI to contribute to economic advancement and global integration of African nations is widely acknowledged. However, barring a few (Chetty et al., 2015; Demetriades & Auret, 2014; Garcia et al., 2017; Okolie & Igaga, 2021), there have been fewer consolidated efforts towards empirical investigations on the African continent, which could be attributed to the less evolved financial systems, sparse fortune 500 firms in the geography, asynchronous terminology, absence of longer time horizons, or reasons that need contemplation and cognizance. ESG and firm performance are positively related across various countries (Atan et al., 2018; Busch & Friede, 2018; del Mar Miras-Rodríguez et al., 2015; Gallardo-Vázquez et al., 2019; Han et al., 2016; Khoury et al., 2021; Pulino et al., 2022). Primarily considering the increasing trend of foreign direct investment (FDI) in the African continent and the ESG enforcement by the United Nations, there is always a question of whether ESG performance is relevant for investors. Second, does ESG performance affect a firm's performance? Can ESG performance influence factors for variations? However, limited research has been conducted on the correlations between ESG performance, liquidity, and financial performance. Our study aims to fill this gap with a three-pronged approach: 1) We triangulate the relationship between the ESG performance, firm liquidity, and financial performance of listed companies using a linear regression model with a sample of 1109 firm-year observations (for a total of 165 selected firms), to signify the role that non-tangible resources assert for tangible financial returns. Moreover, it has to be noted that firm liquidity is a novel node that has been rarely studied in theoretical circles and hence signifies importance for this discipline. 2) Second, we bring to literature the mediating association of financial liquidity of a firm to accentuate (or deflate) this primal association. This investigation is seminal, to introduce an intermediary construct that has been rarely done in the past for listed African corporates; wherein we have constructed a linear regression, alongside the mediating effect models. 3) Finally, the manuscript brings to focal this association under the robustness test by considering a wider range of variables, representing firm performance. This three-level analysis ascertaining the direct, mediation and moderated-mediation effect offers some of the robust results that make the research substantial to advance theory in this discipline.

With the swiftly maneuvering business landscape and the growing acknowledgement of ESG, it is significant to study this association owing to its relevance and integration with global and regional integration, and with economic and human progression. With rising acknowledgement of stakeholder and sustainability aspects of business, an investigation of this nature is integral to reveal how inefficient ESG investments that arise from agency and stakeholder issues can inhibit firm performance. Studies of this nature are pivotal to surface a panorama of factors that moderate the adoption of ESG in emerging economies and to identify a host of reasons that implicate the long-term and short-term existence of these organizations, and their sustainability. Moreover, there has been a string of such investigations in peculiar zones like the Nordic region (Saha & Khan, 2024), India (Bodhanwala & Bodhanwala, 2023; Maji & Lohia, 2023), China (Lin et al., 2024), United States (Atayah et al., 2024) and in seven emerging economies (Al-Hiyari et al., 2023); which hints on the need for concentration studies differentiated by time, geography and theoretical foundations. In particular, it is significant to study Africa, owing to its rising journey in the industrial and financial landscape. With not many recent studies on Africa (Okolie & Igaga, 2021), an investigation of this nature maps the vivid contours of this emerging economy and the constituents that shape the understanding of ESG and its financial implications in such economic zones. A study of this nature has the potential to advance theory and also magnify specifics of such economies that can influence the

primal association between ESG and firm performance. Simply, this study aspires to acknowledge and bridge the paucity of literature on ESG and firm performance, enroute to financial liquidity with statistical evidence; especially in zones that are emerging as economies. Thus, this study aims to diligently probe into the interplay that ESG offers to firm performance; and the distinct regional, business landscape that Africa characterizes; and thus, contribute to the advancement of theory, in the sphere of sustainability and accountability. The findings of this study demonstrate that enhancing the ESG performance of listed firms is beneficial for improving firm performance. Furthermore, liquidity plays a significant role as a mediating factor in the impact of ESG performance on firm performance. Robustness tests confirm that if firm performance measured as ROA is replaced by ROE, Tobin's Q or NPM, liquidity plays a significant role as a mediating factor in the impact of ESG performance on firm performance. This study provides several important insights to policymakers, regulators and enterprises. The subsequent sections of this manuscript are structured as follows. The second segment comprises a review of existing literature and research propositions, merging domestic and international literature on ESG performance and liquidity, ESG performance and firm performance, as well as liquidity and firm performance, culminating in the development of research propositions. The third division delineates the methodology, covering data overview, variable choice, and the construction of econometric models. The fourth part demonstrates an examination of the findings. Lastly, the fifth section wraps up the document and offers insights.

2. Literature review and hypotheses development

Scholarly works have consistently investigated ESG and its influence on firm performance (Busch & Schnippering, 2022; Gallardo-Vázquez et al., 2019; Hang et al., 2019; Margolis et al., 2009; Orlitzky et al., 2003; Vishwanathan et al., 2020; Q. Wang et al., 2016); which indicates the significance of this investigation in theory and practice. Furthermore, the whole nature of the study is a complex intertwining of objectivity, finances, and subjectivity, with ethics, culture, and human consciousness moderating the interplay of variables. Therefore, it is important to concentrate on the objective variables while controlling for their subjective aspect, which can be achieved by discussing each of these variables distinctly. Further, it has been noticed that the conclusions of these studies have been conflicting and contrary in vivid settings and scenarios (Ahmed et al., 1998; Guluma, 2021; Gupta et al., 2022; Puni & Anlesinya, 2020); which creates a need for amalgamated and distinct studies. Thus, we discuss the variables as environmental, social, and governance mechanisms, and then discuss them together to hypothesize a research construct. Thus, this study proposes to unearth these hidden intrigues while comprehensively investigating the African continent. Thus, from a broad perspective on the association between ethical conduct and financial performance, there is a need for a bifurcated discussion of studies slotted distinctly for the environment, society, and governance.

For the sake of the current investigation, we draw cues from the Instrumental stakeholder theory (IST), Integrative Social Contracts Theory (ISCT) and Stakeholder Theory, owing to their relevance to the research questions. IST states that the ethical conduct of organizations emerges with high levels of firm trust and cooperation from the stakeholders (Jones, 1995; Jones et al., 2018). Stakeholders hold such firms in high esteem and hence proliferate and encourage the existence of such firms. However, with very little empirical studies around IST and the vivid neglect that is offered through contravening studies, there is a dire need to investigate the relevance of such crucibles. On the other extreme, there is a dearth of studies in which the incremental benefits of IST-based stakeholder relationships have to be fostered. Analogous to the IST, the Integrative Social Contracts theory specifies conditions that socially responsible firms need to foster to materialize intangible aspects, to tangible financial outcomes. Though it is still novel to apply ISCT to business, it is to be understood that differences in communication contexts, moral reasoning and institutional structures influence the intangible contracts that society administers with the firms, which lead to their financial engagement (with firms). ISCT underscores the moral force that an informed consumer and society shall propel on a firm to conduct ethically. Finally, the integration of IST and ISCT in relation to Stakeholder Theory accentuates the notion that capitalism operates in connection with the whole ecosystem, wherein it fosters interconnected relationships amongst the suppliers, employees, investors, communities and consumers at large. So cumulatively, it could be argued that for a firm to operate, it needs to integrate the unseen social contracts that it fosters with its stakeholders and shareholders, which largely should reflect in the way it operates and transpires it to the communities.

2.1. ESG and firm performance

2.1.1. Environmental disclosures on firm performance

There is substantial heterogeneity in environmental disclosures, the extent to which they are influenced by global factors and institutional practices (Al Amosh et al., 2023; Han et al., 2016; Marquis & Toffel, 2011). Although vivid studies have hinted at the positive effect of environmentally conscious companies on firm performance (Ahmed et al., 1998; Jones et al., 2018); this could be an outcome of the initial generation of environmental strategy, which eroded over time. Further, there is substantial support for the varying and decreasing effect of corporate environmental performance on corporate financial performance (Hang et al., 2019; Huang, 2021); which is yet another aspect that says initially they have a positive association, though erodes temporally; this demands studies dedicated to examining the indicative timeline, cultural dimensions (del Mar Miras-Rodríguez et al., 2015) and size of the organization (Gallardo-Vázquez et al., 2019). With the increased criticality of understanding environmental disclosures for firm performance, it becomes critical for timely and consistent investigations to decide on this critical association. Thus, owing to the major string of research that supports the positive association between ESG disclosures and firm performance, we hypothesize the subsequent statement.

2.1.2. Social consciousness disclosure on firm performance

One of the consistent proxy that have been used for ESG is the Corporate social responsibility (CSR) (Becchetti et al., 2023); which though not distinctive, has more to do with societal consciousness. The term is widely used as a technical terminology, synonymous to ESG (Busch & Friede, 2018; Busch & Schnippering, 2022; Chetty et al., 2015; Christophe & Lee, 2021; del Mar Miras-Rodríguez et al., 2015; Demetriades & Auret, 2014; Gallardo-Vázquez et al., 2019; Han et al., 2016; Mahmood et al., 2021; Rost & Ehrmann, 2017; Tang et al., 2011; Vishwanathan et al., 2020; Q. Wang et al., 2016); though this practice has been questioned in a Korean study (Han et al., 2016). This erosion of responsibility (governance) and sustainability thought schools has led to confused constructs, besides shrinking the area of research (Bansal & Song, 2017); which could have been open to distinctive investigation. Drawing from Instrumental stakeholder theory (IST), although CSR is considered to enhance firm trust (Jones et al., 2018), enhance stakeholder reciprocation (D. T. Nguyen et al., 2022), strengthen innovation, and mitigate risk, they are cumulatively evident in defining only 20% of their association with corporate financial performance (Vishwanathan et al., 2020), which offers sufficient prompts to diversify studies conceptually and geographically. In another study atypical to Africa, this association between the focal variables was either negated (Chetty et al., 2015) or inconsistent (Okolie & Igaga, 2021), which requires further examination. Distinct from the environmental aspect is the societal contribution made by organizations that mark financial returns for organizations. While the literature projects a strong tentative association between corporate societal and financial outcomes (Flammer, 2015; Margolis et al., 2009; Rost & Ehrmann, 2017); the magnitude of their influence is questionable. Studies in distinct cultural hemispheres have also negated this relationship (Atan et al., 2018; Han et al., 2016; Shaikh, 2022); hinting at the mitigating effect of national and organizational culture and time (Chetty et al., 2015), to influence this association.

2.1.3. Governance mechanism and firm performance

Governance mechanisms have been critical to firm performance and largely include variables such as board composition (size, integration of independent and executive directors, board committees), CEO leadership, frequency of board meetings, shareholder concentration, independence of the board of directors, transparency, disclosures, and others. Therefore, consistent studies have hinted at the positive association between governance and firm performance (Ahmed et al., 1998; Iqbal et al., 2022) which could be an obvious outcome of strategic efficiency and stakeholder consciousness exhibited in the governing council. Therefore, there is a need for categorical and consistent investigations in this regard. Studies have shown the positive influence of board independence, disclosure, transparency (Erena et al., 2022), and owner representation (Guluma, 2021). However, a recent study from Ghana hints at the need for a diverse composition of directors (independent and executive), larger board size, frequency of meetings, and shareholder concentration. Although the presence of committees on the board has a negative

impact, CEO duality has no impact (Puni & Anlesinya, 2020). These findings are in contrast to all earlier investigations, suggesting the individuality of the African continent in general, and Ghana in particular. Therefore, consistent studies in distinct territorial and cultural zones are required. Furthermore, there have been fewer studies investigating governance mechanisms with organizational outcomes, and those that exist are geographically and temporally diverse, without much consistency in their findings, thus hinting at the need for categorical studies in different cultures.

2.1.4. ESG on firm performance

The literature has been consistent with the preferential relationship between ESG disclosures and firm performance (Chen & Xie, 2022; Busch & Friede, 2018; Busch & Schnippering, 2022; Isachenkova, 2012; Pulino et al., 2022; Vishwanathan et al., 2020), even contextual to the pandemic (Gao et al., 2022); however, this has not always been so. Some studies have vividly suggested that while ESG positively influences financial performance, the governance mechanism modulates the ROA of an organization (Al Amosh et al., 2023). Yet another investigation evinces that statistically, although the association between ESG and firm performance is positively significant, economically, it is meek (Huang, 2021). ESG, which is an integration of environmental consciousness, social integration, and governance parameters, represents the non-financial performance of the organization, which on a shorter-run are intangible, but are consistently evinced to lead to financial return on a longer run (Hang et al., 2019) (Qureshi et al., 2021) which raises a concern when defining timelines in matricular terms (Christophe & Lee, 2021).

The integration of ESG with firm performance has been markedly influenced by reporting systems (Albitar et al., 2020; Pulino et al., 2022; Waddock, 2008); and raised concerns because of the very nature of third-party evaluation, which could be questioned on the grounds of perceived greenwashing (Barrymore, 2021) and other disclosure parameters (Aragón-Correa et al., 2016; Garcia et al., 2017). Some unique investigations attempted to integrate the mediating role of female leadership, wherein women in the upper echelons of the organization were found to influence the impact of ESG on firm performance (Gupta et al., 2022; Jeong & Harrison, 2017), integrated HRM practices in this association (Gupta et al., 2022), firm size (Chen et al., 2021), operational capacity (Zhou et al., 2022) and others. These unique elements provide clues on the myriad dimensions of the focal variables and their significance to investigation across its depth and diversity. While there have been iterative studies that hint at the time constraint of financial performance, solutions have been rendered on the same, with the inclusion of internal stakeholders as phenomenal to achieve the prior (Busch & Schnippering, 2022; Khoury et al., 2021).

Based on the above literature this study proposes the below hypothesis.

H1: Firm ESG disclosure (ESG) has a significant and positive impact on firm performance.

2.2. ESG and firm liquidity

In previous research, most scholarly works have concentrated on a single facet of ESG performance. However, investigations into the interrelationship between these three dimensions as a comprehensive representation of ESG performance and its impact on firm liquidity are limited. Consequently, pertinent studies have predominantly focused on these three dimensions.

2.2.1. Environmental disclosures on firm liquidity

Drawing from the Integrative Social Contracts Theory (ISCT) and stakeholder theory, it is intuitive to understand that requisite environmental disclosures that form a part of macro-social contracts invite stakeholder conviction in the organization (Blanco, 2022; Pan, 2020; Uyar et al., 2023). It has also been empirically observed that green innovation has a robust influence on firm-specific and macroeconomic variables (Farooq et al., 2024). This recent work magnifies the influence of green innovation, not only on sustainable practices, but also on enhancing financial efficiency and reducing the necessity of cash holdings (Farooq et al., 2024); This has been partially contradicted in an empirical investigation of the food and beverage industry (Michalski, 2016); which could be attributed to the nature of the industry, shelf-life operations, and the very requisite of being environmentally conscious for a food operation.

These macrosocial contracts further as larger cash flows and liquidity, which has been underscored in BRIC (Alexander et al., 2024; Farooq et al., 2024), OECD (AlHares et al., 2023), developing nations (Blanco, 2022); and various operational sectors (La Rocca et al., 2023; Michalski, 2016; Sharma et al., 2023; Wu et al., 2015). Studies have reported contradictions, wherein adhering to environmental sustainability procedures has reduced the value of cash (La Rocca et al., 2023); However, the majority of empirical investigations underscore the significance of environmentally conscious disclosures to enhance firm liquidity.

2.2.2. Social consciousness disclosure on firm liquidity

Studies indicate that a higher rate of social insurance premiums leads to less firm liquidity through increased cash holdings (AlHares et al., 2023; Catherine et al., 2020; Deng et al., 2022; Sharma et al., 2023; Sinha & Vodwal, 2023). This is indicative of the negative association between ESG disclosures and cash holdings, which is further encouraged to improve firm performance and positive value of liquidity. This association is affirmed in Asia (Deng et al., 2022), Africa (Pace et al., 2022) and developed countries (AlHares et al., 2023); which makes it generalizable to a global context. There have been instances that counter this principle, wherein it has been witnessed that in financial organizations with a social mission, the cash-holding behavior is counter-cyclical (Faridi et al., 2022; Niu et al., 2022; Romero Martínez et al., 2021; Tchakoute Tchuigoua et al., 2022). While this principle generalizes across sectors; it is vital to have performed during and after the pandemic (Agurto et al., 2023; Kaneda et al., 2021; Vinod, 2022) and during crisis (Sinha & Vodwal, 2023); which goes on to substantiate the generalizability of the principle. However, caution must be taken to optimize cash levels based on the merits and trade-offs of holding cash (Alnori, 2020), and judicious use of capital structure (Chaklader & Padmapriya, 2021; Franco & Mahadevan, 2021). Empirical investigations have also been indicative of the crowdfunding cash wakf model to enable developmental projects as an alternative to maintain cash liquidity (Al-Daihani et al., 2023), although these could be exceptions for organizations engaged in human upliftment, start-ups (Grajzl et al., 2023) and households (Dillon et al., 2021). Empirical evidence hints at the need for optimum and diversified use of liquid cash for a firm's needs depending on the nature of operations (Agurto et al., 2023; Gelo, 2022), appetite for risk (Chang et al., 2021; Qadan & Jacob, 2022), and close monitoring and management of its capabilities to generate revenue, while paying off its debts in a timely (Agurto et al., 2023; Chih & Hsiao, 2023). One of the explicitly suggested, efficient alternatives is the principle of tawarruq, wherein firms can raise liquidity through loan financing by buying installments in a local commodity owned by the bank (Barre, 2022). Thus, we posit that societal consciousness affects a firm's liquidity.

2.2.3. Governance mechanism and firm liquidity

A comprehensive investigation of a sample of 11,926 firms indicates that domestic and cross-border acquisitions due to adherence to corporate governance and scrutiny mechanisms are the strongest influencers of cash holdings (Chatterjee et al., 2021; Macoris et al., 2023). This conjecture was negated in a recent study in Japan, wherein a cross-national study indicated a negative correlation between stringent governance mechanisms and cash holdings (P. Nguyen & Rahman, 2020); which includes readable disclosures (Hasan & Habib, 2020). Yet another study hints at the significance of private equity in addition to corporate governance in determining firm liquidity (Sharma et al., 2023); besides the significance of higher stock equity (Spiropoulos & Zhao, 2023). It should be noted here that organizations with strong customer concentration exhibit tax evasion behavior (J. Wang & Mao, 2021), disciplinary trading (Liu et al., 2023); short-horizon institutional investors are yet another challenge that affects the cash holdings of an agency (Döring et al., 2021; Tran, 2020). Thus, it could be noted that improvement in corporate governance quality can have a lasting effect on the firm's liquidity and strength of the organization (Couzoff et al., 2022); as confirmed in samples from various countries (Akhtar, 2022; Barraza et al., 2022). Technologies and systems such as EDGAR (Lai et al., 2024). Thus, we posit that corporate governance, and its disclosures significantly affect a firm's liquidity.

2.2.4. ESG on firm liquidity

The above discussion subtly hints at the significance of society, governance, and the environment on the firm's liquidity. However, counterintuitively, when it was studied in some developed economies of the world,

it was found that cumulatively, ESG disclosures have a significant negative association with cash holdings (AlHares et al., 2023; Pan, 2020). It has been noted that holding cash and liquid assets during the pandemic helped firms cushion COVID externalities (Cardillo et al., 2022); which is yet another instance underscoring the negative association between ESG disclosures and firm liquidity. This counterintuitive association could be an outcome of the mitigating action of stock liquidity and trading (Liu et al., 2023), CSR initiatives (Chan et al., 2017; Uyar et al., 2023), which act as connectors between the focal variables. So from the above discussion, it could be posited that ESG disclosures have a significant influence on the firm's liquidity.

Based on the aforementioned logical deduction and the first hypothesis, the subsequent hypothesis is posited.

H2: Firm ESG disclosure (ESG) has a significant impact on firm liquidity.

2.3. Firm liquidity and firm performance

Studies on firms' profitability have indicated a strong negative association between liquidity and profitability, underscoring that inefficient use of liquid assets can lead to diminishing profitability (Alarussi & Gao, 2023). It is to be noted that a contextual study, indicated that firm's profitability, tangibility, size and liquidity are major determinants of the capital structure; thus, again affirming the significance of liquidity as a mitigating agency to firm performance (Hussein & Bakry, 2022); Investigations have been unanimous to imply the significance of liquidity to firm performance (Elkabbani et al., 2020), and affirmed in samples from MENA region (Al-Ahdal et al., 2022), India (Farhan et al., 2023), Malaysia (Saif-Alyousfi et al., 2020), Ethiopia (Takele Bayiley & Bulti, 2022), Ghana (Kotey et al., 2020; Kusi et al., 2019) and sub-Saharan Africa (Tehulu, 2023). It is also noted that during M&As, liquidity and market value are significant influencers of decision-making (Abdelmoneim & Abdelrahman Fekry, 2021);, thus hinting at the importance of firm liquidity as a proxy for the financial health of an organization. Banks were found to be relatively resilient with higher liquidity (Adem, 2023); Thus, suggesting that liquidity acts as a mediator in the relationship between ESG and firm performance. This leads to the following hypothesis:

H3: Firm liquidity has a mediating impact on the relationship between Firm ESG disclosure (ESG) and firm performance.

Previous scholarly investigations have made considerable progress in various domains and have yielded numerous valuable results, laying a crucial groundwork for the current research project. Nevertheless, the existing body of literature is not without its limitations. Primarily, most studies tend to focus on specific aspects of ESG performance rather than adopting a holistic approach. Furthermore, while a plethora of research has delved into the relationship between ESG performance, liquidity, and firm performance, the impact of ESG performance on firm performance, along with the potential mediating role of liquidity in this context, has been largely overlooked. Therefore, this study aims to explore these issues from diverse perspectives, including a theoretical analysis, investigating how the ESG performance of publicly listed companies influences firm liquidity and, in turn, how firm liquidity impacts performance. Through the utilization of an empirical analysis employing a mediating effect model, this study seeks to examine the influence of ESG performance on firm performance. The ultimate goal is to develop an ESG performance management approach centered on liquidity, drawing insights from both theoretical and empirical analyses, and to offer practical recommendations for governmental bodies, businesses, and investors.

3. Research design & data analysis

To conduct a comprehensive examination of the performance of environmental, social, and governance factors (ESG), as well as the interrelationships between firm performance and liquidity, we opted to utilize pertinent data from publicly traded companies. By carefully selecting appropriate indicators and employing an empirical model, we aimed to determine whether a correlation exists among these three variables. Additionally, we intend to ascertain whether liquidity's influence on firm performance acts as an intermediary in the context of ESG performance.

3.1. Data sources and sample selection

This study employed a sample consisting of secondary financial data, extracted from the Refinitiv Eikon database, specifically targeting the entire African continent. The sample comprises listed firms from all industrial sectors, covering the period from 2013 to 2022. Moreover, the firm-year data for the chosen publicly traded companies were consolidated, with any gaps or inadequacies in financial data for the specified variables being overlooked. The resulting dataset, which encompassed 1109 firm-year observations for the 165 selected firms, was considered for our study. Outliers were retained without elimination and offered a treatment to Firm ESG performance (ESG) and Inflation rate (IF) by subjecting them to winsorization at 1% (p. 1 99) level STATA software package was used to process the data.

3.2. Variable design

3.2.1. Explained variable: firm performance (return on assets (ROA))

A firm's performance is measured by Return on Assets (ROA) (Dsouza et al.,2022;Habibniya et al., 2022; Dsouza et al.,2022;Demiraj et al.,2022; Dsouza et al.,2023; Dsouza et al.,2024) which denotes the proportion of net income to the entirety of assets and serves as a metric to assess the efficiency with which a corporation employs its assets to generate income. This ratio serves as an indicator of the capacity to acquire net income from all assets, currently present within the enterprise. The greater the net income, the higher the return on assets.

3.2.2. Explanatory variable: ESG performance

ESG performance is measured using the ESG combined score (Demiraj et al.,2024; Demiraj et al.,2023), which is derived from the assessments provided by the respective firms. The ESG combined score, serving as a comprehensive evaluation of a firm, considers the reported data concerning the environmental, social, and corporate governance aspects (ESG score), while also considering any associated ESG controversies.

3.2.3. Mediating variable

3.2.3.1. Liquidity (current ratio). The liquidity in a firm is determined by the current ratio (CR) (Dsouza et al.,2023), which signifies the ratio of current assets to current liabilities. This ratio is an indicator of the adequacy of current assets to meet current obligations. The current ratio provides insights into a firm's financial liquidity position. Ideally, a current ratio of 2:1 is considered optimal; however, any ratio below 1:1 raises concerns regarding a firm's financial well-being.

3.2.3.2. Liquidity (cash ratio). The liquidity in a firm is also expressed by the cash ratio (C), which signifies the ratio of cash to total assets. This ratio is an indicator to measure the proportion of a firm's assets that are made up of cash and cash equivalents.

3.2.4. Control variables

Drawing upon prior literature, the selection of control variables in our study consisted of firm size (Size) (Dsouza et al.,2024) and financial leverage (Lev) (Dsouza et al.,2023). In previous research focusing on the internal attributes of firms, the significance of firm size as a pivotal control variable cannot be overstated. This is attributed to the amplification of the scale effect with the expansion of firm size, leading to a heightened responsiveness towards enhancing financial performance and liquidity through mechanisms like corporate governance. Consequently, companies of varying sizes may exhibit distinct inclinations towards managing ESG performance and financial outcomes. Hence, considering company size as a control variable is imperative. Financial leverage, synonymous with financing leverage, denotes the extent to which a firm utilizes debt instruments for financing. By utilizing leverage as a metric for financial leverage, calculated through the ratio of total debt to total assets, firms employing different levels of financial leverage may adopt unique business strategies and risk preferences, thereby potentially influencing their

approach to ESG performance management. Market-to-book ratio (MB) indicates the ratio of market capitalization to total book value. It compares the firm's book value to its market value. A higher ratio can indicate, whether the market value per share is overpriced, or overvalued. Asset turnover (AT) pertains to the ratio of net sales or total revenue to total assets. This variable signifies the proportion of revenue generated through the effective utilization of the firm's total assets. This indicates the efficiency of firms and their ability to appropriately capitalize on resources to generate revenue. A higher ratio indicates optimal asset utilization for revenue generation. Assets growth (AG) refers to the change in a firm's total assets from the previous period. It is quantified by measuring annual changes in total assets. A positive AG signifies the prosperity of the firm and indicates investments in new business ventures or an expansion in business size. The inclusion of a dummy value allows the measurement of UN – SDG applications and loss-making firms. The application of the UN-SDG influences the assertive enforcement of ESG practices, while the identification of loss-making firms reveals the nature of firms experiencing losses and their impact on the model. The GDP indicates the GDP per capita rate, and the Inflation rate (IF) indicates the Inflation, consumer prices (annual %).

The selection and definition of variables are presented in Table 1.

3.3. Model building

To examine the hypotheses, this study initially formulated models that depict the correlation between ESG performance and both liquidity and firm performance. Following the methodology outlined by Baron and Kenny (1986) for examining mediating effects in a three-step process, the variable representing liquidity is incorporated into the subsequent model. The resulting changes in the regression results are then analyzed once more to provide further evidence supporting the presence of a mediating effect.

3.3.1. ESG performance, liquidity, and firm performance

First, a model of the impact of ESG performance on firm performance is constructed.

$$\begin{aligned} ROA_{it+1} = & \alpha_{10} + \alpha_{11}ESG_{it} + \alpha_{12}Size_{it} + \alpha_{13}MB_{it} + \alpha_{14}Lev_{it} + \alpha_{15}AT_{it} + \alpha_{16}AG_{it} + \alpha_{17}SDG_{it} + \alpha_{18}Loss_{it} \\ & + \alpha_{19}GDP_{it} + \alpha_{110}IF_{it} + Fixedeffects + \varepsilon_{1it} \end{aligned} \quad (1)$$

The return on assets (ROA) of firm *i* in year *t*+1 is denoted as ROA_{it+1} value. The constant term α_{10} and the residual term ε_{1it} are also included in the model. Additionally, the influence coefficient of ESG performance on firm performance is represented by α_{11} , whereas α_{12} – α_{110} represent the influence coefficients of each control variable on firm performance. The fixed effects are represented by year and industry. Hypothesis H1 occurs when α_{11} is significantly positive. In other words, when ESG performance improves, it has a positive impact on enhancing firm performance.

Second, the model of the impact of ESG performance on liquidity is constructed:

Table 1. Selection and definition of variables.

Variable types	Variable name	Measurement
Explained variable	Return on Assets (ROA)	Net income / Total assets
Explanatory variables	Firm ESG performance (ESG)	ESG combined score
Intervening variable	Cash Ratio (C)	Cash / Total assets
	Current Ratio (CR)	Current Assets / Current Liabilities
Control variables	Firm size (Size)	Natural logarithm of total assets
	Market to book ratio (MB)	Market capitalization/ Total book value
	Financial leverage (Lev)	Total debt / Total assets
	Asset turnover (AT)	Net sales as a percentage of Total assets
	Assets growth (AG)	Annual change in total assets
	UN – SDG (SDG)	Application of UN – SDG, since year 2016 is measured as 1 and before as 0.
	Loss making firms (Loss)	Firm years with income less than zero are measured a 1 and the others as 0.
	GDP	GDP per capita
	Inflation rate (IF)	Inflation, consumer prices (annual %)

$$CR_{it} = \alpha_{20} + \alpha_{21}ESG_{it} + \alpha_{22}Size_{it} + \alpha_{23}MB_{it} + \alpha_{24}Lev_{it} + \alpha_{25}AT_{it} + \alpha_{26}AG_{it} + \alpha_{27}SDG_{it} + \alpha_{28}Loss_{it} + \alpha_{29}GDP_{it} + \alpha_{210}IF_{it} + Fixedeffects + \varepsilon_{2it} \quad (2)$$

$$C_{it} = \alpha_{2a0} + \alpha_{2a1}ESG_{it} + \alpha_{2a2}Size_{it} + \alpha_{2a3}MB_{it} + \alpha_{2a4}Lev_{it} + \alpha_{2a5}AT_{it} + \alpha_{2a6}AG_{it} + \alpha_{2a7}SDG_{it} + \alpha_{2a8}Loss_{it} + \alpha_{2a9}GDP_{it} + \alpha_{2a10}IF_{it} + Fixedeffects + \varepsilon_{2a_{it}} \quad (2A)$$

The current ratio and cash ratio, denoted as CR_{it} and C_{it} , serves as a measure of the liquidity of firm i in year t . α_{20} and α_{2a0} denotes a constant term, while ε_{2it} and $\varepsilon_{2a_{it}}$ represents a residual term. α_{21} and α_{2a1} signify the influence coefficient of ESG performance on liquidity and α_{22} – α_{210} , α_{2a2} – α_{2a10} represent the influence coefficients of each control variable on liquidity. The fixed effects are represented by year and industry. If α_{21} and α_{2a1} are significantly negative, hypothesis H2 is confirmed, indicating that ESG performance has a substantial impact on liquidity.

Finally, a test model of the mediating effect of liquidity is constructed:

$$ROA_{it+1} = \alpha_{30} + \alpha_{31}ESG_{it} + \alpha_{32}CR_{it} + \alpha_{33}Size_{it} + \alpha_{34}MB_{it} + \alpha_{35}Lev_{it} + \alpha_{36}AT_{it} + \alpha_{37}AG_{it} + \alpha_{38}SDG_{it} + \alpha_{39}Loss_{it} + \alpha_{310}GDP_{it} + \alpha_{311}IF_{it} + Fixedeffects + \varepsilon_{3it} \quad (3)$$

$$ROA_{it+1} = \alpha_{3a0} + \alpha_{3a1}ESG_{it} + \alpha_{3a2}C_{it} + \alpha_{3a3}Size_{it} + \alpha_{3a4}MB_{it} + \alpha_{3a5}Lev_{it} + \alpha_{3a6}AT_{it} + \alpha_{3a7}AG_{it} + \alpha_{3a8}SDG_{it} + \alpha_{3a9}Loss_{it} + \alpha_{3a10}GDP_{it} + \alpha_{3a11}IF_{it} + Fixedeffects + \varepsilon_{3a_{it}} \quad (3A)$$

where ROA_{it+1} represents the return on assets value of firm i in year $t+1$, CR_{it} corresponds to the current ratio and C_{it} corresponds to the cash ratio of the company i in year t , α_{30} and α_{3a0} denotes a constant term, ε_{3it} and $\varepsilon_{3a_{it}}$ signifies a residual term, and α_{33} – α_{311} and α_{3a3} – α_{3a11} symbolizes the influence coefficient of control variables (Size, MB, Lev, AT, AG, SDG, Loss, GDP, IF). The fixed effects are represented by year and industry. Models (3) and (3A) encompass ESG performance, liquidity, and firm performance within the same research framework. This research investigates the mediating role of liquidity in the relationship between ESG performance and firm performance, in addition to Models (1) and (2), (2A). The model illustrates that if ESG performance has a notable effect on firm performance and if ESG performance impacts firm performance by affecting liquidity, then liquidity functions as a mediating factor. If the model verifies this result, it indicates that liquidity has a substantial mediating effect. Drawing upon the testing methods and procedures outlined in Baron and Kenny (1986) regarding the mediating effect model, the testing steps for the mediating effect of liquidity in this study are as follows:

Firstly, Model (1) is utilized to perform a regression analysis on the relationship between ESG performance and firm performance, aiming to assess the significance of the regression coefficient α_{11} . Should the coefficient prove to be statistically significant, the subsequent step will be taken; otherwise, the testing process will be concluded. Subsequently, Models (2) and (2A) are employed to conduct a regression analysis on ESG performance and liquidity. If the regression coefficients α_{21} and α_{2a1} is deemed significant, it indicates an impact of ESG performance on liquidity; if not, the testing process is stopped. Finally, Model (3) and (3A) incorporate the liquidity variable into Model (1). In this new model, if the coefficient of ESG performance remains significant, alongside a significant and reduced coefficient α_{32} and α_{3a2} for the liquidity variable compared to α_{11} , it implies a partial mediation effect. Conversely, if the coefficient α_{32} and α_{3a2} for the liquidity variable is significant while the coefficient α_{31} and α_{3a1} for ESG performance becomes insignificant, then a complete mediating effect is observed. This leads to the testing of H3, which proposes that liquidity serves as one of the pathways through which ESG performance influences firm performance.

4. Empirical analysis

The descriptive statistics are presented in Table 2. As can be observed from Table 2, the standard deviation is moderate for all variables, except ESG. This suggests that the sample data are relatively close to

their mean values. However, in the case of ESG performance, the standard deviation was slightly higher than those of the other variables. This can be attributed to the fact that the sample comprises more companies with ESG values that deviate from the mean value. The mean value of Return on Assets (ROA) is positive, indicating performance above the breakeven point. The mean value of the Current Ratio (CR) is 2.13, which indicates that the sample has achieved an ideal CR ratio and that of the Cash Ratio (C) is 0.105. This finding suggests that most firms in the sample have a favorable liquidity position.

In the event of a significant occurrence of robust multicollinearity among the exogenous variables within the model, there will be a notable influence on the dependability of the findings derived from the mediation effect model.

The evaluation of multicollinearity can be conducted using statistical methods such as the Pearson correlation test and the variance inflation coefficient (VIF) test. In this investigation, both of these assessments were utilized to assess all factors in the theoretical framework. The results of these tests are presented in Table 3. Examination of Table 3 reveals that the maximum absolute value of the Pearson correlation coefficient between variables is 0.627 and the VIF value is below 2.

It is a commonly acknowledged fact in statistical analysis that the presence of severe multicollinearity is often associated with situations where the Pearson correlation coefficient among independent variables surpasses the threshold of 0.8 or when the Variance Inflation Factor (VIF) value goes beyond 2. Consequently, it can be concluded that there is no significant issue of multicollinearity among the variables in the model developed in this study, and hence, the regression analysis of the model can proceed in the subsequent step.

Table 4 shows the estimated outcomes of the OLS regression. As observed from the regression outcomes presented in Table 4, there is a significant relationship between the ESG performance of the company and firm performance (ROA), thus confirming the theoretical hypothesis H1. Moreover, a significant relationship can be identified between ESG performance and liquidity (CR, C), thereby confirming the theoretical hypothesis H2. When both ESG performance and liquidity (CR, C) are introduced into the same model (Model 3, 3A), the regression coefficients for ESG performance and liquidity are found to be statistically significant. This finding implies that the influence of a company's enhancement of ESG performance on firm performance is partially attributed to liquidity. The regression outcomes validate the theoretical hypothesis that liquidity is a crucial channel through which a company's ESG performance affects its performance.

4.1. Robustness test

Therefore, to verify the robustness of the previous conclusion, we replaced ROA, which measures the firm's financial performance, with Return on Equity (ROE) in Table 5, Tobin's Q in Table 6 and Net Profit Margin (NPM) in Table 7. ROE is measured with net income divided by total equity; Tobin's Q is measured with market value of common shares outstanding plus the market value of preferred shares outstanding plus the book value of debt divided by the book value of assets and NPM is measured by dividing the net income by total revenue. The data was sourced from Refinitiv Eikon database and regression analysis was conducted on Models 1, 2, 2A, 3, and 3A. As it can be seen in Tables 5 and 6 the partial mediation

Table 2. Descriptive statistics.

Variable	Observations	Mean	Std. Dev	Min	Max
ROA	1,109	0.0541148	0.10207	−0.7142537	0.5633646
ESG	1,109	44.60006	18.1485	6.081807	83.04455
C	1,109	0.1054174	0.11588	0	0.9603015
CR	1,109	2.13171	8.16508	0.025974	159.3139
Size	1,109	21.08975	1.39944	16.39495	29.3012
MB	1,109	2.331486	3.07307	−22.53514	33.64524
Lev	1,109	0.2478936	0.17816	0	1.023733
AT	1,109	0.9199611	0.75254	−0.6404117	4.842109
AG	1,109	0.0872891	1.73042	−0.9968536	55.95061
SDG	1,109	0.7403066	0.43866	0	1
Loss	1,109	0.1587015	0.36556	0	1
GDP	1,109	1.433475	2.95228	−14.54654	8.880585
IF	1,109	5.479843	2.53492	0.7059687	18.84719

Table 3. Correlation matrix and VIF coefficients.

Variables	ROA	ESG	C	CR	Size	MB	Lev	AT	AG	SDG	Loss	GDP	IF	VIF
ROA	1													
ESG	0.125***	1												1.2
C	0.113***	0.033	1											1.04
CR	0.088***	-0.120***	0.021	1										1.06
Size	0.04	0.209***	0.023	-0.011	1									1.2
MB	0.333***	0.098***	0.096***	-0.042	-0.135***	1								1.19
Lev	-0.303***	-0.011	0.081***	-0.128***	0.139***	-0.057*	1							1.19
AT	0.153***	0.171***	0.045	-0.076**	-0.185***	0.297***	-0.297***	1						1.29
AG	0.051*	-0.032	0.024	0.007	0.197***	-0.011	-0.022	-0.013	1					1.11
SDG	-0.076**	0.080***	0.021	-0.061**	-0.034	-0.054*	0.079***	-0.065***	0.025	1				1.04
Loss	-0.627***	-0.034	-0.061**	0.001	-0.024	-0.210***	0.155***	-0.101***	-0.046	0.049*	1			1.12
GDP	0.215***	-0.172***	0.026	0.04	-0.033	0.090***	-0.096***	-0.028	-0.092***	-0.094***	-0.199***	1		1.22
IF	0.111***	-0.178***	0.097***	-0.070**	0.087***	-0.074**	-0.029	-0.022	0.181***	-0.028	-0.096***	0.297***	1	1.22

***p < 0.01, **p < 0.05, *p < 0.1.

Table 4. Regression results of ESG performance, liquidity, and the firm performance for firms(ROA).

Variables	Model 1 ROAt + 1	Model 2 CR	Model 3 ROAt + 1	Model 2A C	Model 3A ROAt + 1
ESG	0.000386** (0.00)	−0.0613*** (0.02)	0.000327* (0.00)	0.000420** (0.00)	0.000351* (0.00)
CR	−	−	−0.000831** (0.00)	−	−
C	−	−	−	−	0.0944*** (0.03)
Size	0.00603** (0.00)	−0.187 (0.21)	0.00579** (0.00)	0.00635** (0.00)	0.00517* (0.00)
MB	0.0114*** (0.00)	−0.0643 (0.09)	0.0114*** (0.00)	0.00495*** (0.00)	0.0108*** (0.00)
Lev	−0.138*** (0.02)	−4.380*** (1.58)	−0.142*** (0.02)	0.0252 (0.02)	−0.142*** (0.02)
AT	0.00567 (0.01)	−1.120** (0.49)	0.00458 (0.01)	0.00114 (0.01)	0.00545 (0.01)
AG	−0.00199 (0.00)	0.222 (0.14)	−0.00178 (0.00)	−0.00107 (0.00)	−0.00183 (0.00)
SDG	0.0247* (0.01)	−0.0754 (1.05)	0.0221 (0.01)	0.00325 (0.01)	0.0222* (0.01)
Loss	−0.0679*** (0.01)	−0.682 (0.69)	−0.0686*** (0.01)	−0.0386*** (0.01)	−0.0650*** (0.01)
GDP	−0.00215 (0.00)	0.375** (0.17)	−0.00174 (0.00)	0.00291 (0.00)	−0.0022 (0.00)
IF	0.00461*** (0.00)	−0.529*** (0.13)	0.00411*** (0.00)	0.00669*** (0.00)	0.00394** (0.00)
Constant	−0.0712 (0.06)	11.81** (4.67)	−0.059 (0.06)	−0.181*** (0.06)	−0.0488 (0.06)
Observations	943	1109	943	1109	943
R-squared	0.347	0.175	0.351	0.343	0.354
Durbin-Watson stat	1.411	1.020	1.408	0.645	1.404
Breusch-Godfrey LM test (Prob > chi2)	0.000	0.000	0.000	0.000	0.000
Breusch-Pagan-Godfrey (Prob > chi2)	0.000	0.000	0.000	0.000	0.000

Standard errors in parentheses.

***p < 0.01, **p < 0.05, *p < 0.1.

effect still exists. The company's enhancement of ESG performance on firm performance is partially attributed to liquidity. However, in Table 7, Model 3 reveals to have a complete mediation effect of liquidity, whereas Model 3A results with partial mediation.

5. Conclusion and managerial contribution

This study analyzes the relationship between the ESG performance, liquidity, and firm performance of African firms from 2013 to 2022 using a linear regression (OLS) model. This study selects data from listed companies to conduct empirical research using a mediation effect model. These findings demonstrate that enhancing the ESG performance of listed firms is beneficial for improving firm performance. Furthermore, liquidity plays a significant role as a mediating factor in the impact of ESG performance on firm performance. Robustness tests confirm that if firm performance measured as ROA is replaced by ROE, Tobin's Q or NPM, liquidity plays a significant role as a mediating factor in the impact of ESG performance on firm performance.

This study provides several important insights. First, policymakers and regulators should prioritize ESG performance ratings and promote active management of ESG. Second, enterprises can benefit from ESG performance management in their operations and maintenance of firm performance. Hence, organizations must address previous misunderstandings and actively uphold and enhance their ESG performance. In addition, concerning investors, institutional investors, particularly asset management institutions, should persist in investigating the practicality of investment approaches centered on ESG performance. They ought to reinforce the exploration, evaluation, and implementation of ESG investment on the purchasing side, and create relevant products grounded on the notion of ESG investment on the sales side. Personal investors have the opportunity to integrate the ESG data and evaluations made public by African corporations into their investment tactics. By utilizing the capacities and benefits of ESG

Table 5. Regression results of ESG performance, liquidity, and the firm performance (ROE).

	Model 1	Model 2	Model 3	Model 2A	Model 3A
Variables	ROEt + 1	CR	ROEt + 1	C	ROEt + 1
ESG	0.00227** (0.00)	-0.0613*** (0.02)	0.00221** (0.00)	0.000420** (0.00)	0.00223** (0.00)
CR	-	-	-0.000786 (0.00)	-	-
C	-	-	-	-	0.113 (0.15)
Size	0.0235* (0.01)	-0.187 (0.21)	0.0233* (0.01)	0.00635** (0.00)	0.0225* (0.01)
MB	0.0277*** (0.01)	-0.0643 (0.09)	0.0277*** (0.01)	0.00495*** (0.00)	0.0270*** (0.01)
Lev	-0.145 (0.10)	-4.380*** (1.58)	-0.149 (0.10)	0.0252 (0.02)	-0.149 (0.10)
AT	-0.0192 (0.03)	-1.120** (0.49)	-0.0202 (0.03)	0.00114 (0.01)	-0.0194 (0.03)
AG	-0.00779 (0.01)	0.222 (0.14)	-0.00759 (0.01)	-0.00107 (0.00)	-0.0076 (0.01)
SDG	-0.00545 (0.07)	-0.0754 (1.05)	-0.00793 (0.07)	0.00325 (0.01)	-0.00841 (0.07)
Loss	-0.246*** (0.04)	-0.682 (0.69)	-0.247*** (0.04)	-0.0386*** (0.01)	-0.243*** (0.04)
GDP	0.0108 (0.01)	0.375** (0.17)	0.0112 (0.01)	0.00291 (0.00)	0.0108 (0.01)
IF	0.0145* (0.01)	-0.529*** (0.13)	0.0140* (0.01)	0.00669*** (0.00)	0.0137* (0.01)
Constant	-0.496* (0.30)	11.81** (4.67)	-0.485 (0.30)	-0.181*** (0.06)	-0.47 (0.30)
Observations	943	1109	943	1109	943
R-squared	0.166	0.175	0.166	0.343	0.166
Durbin-Watson stat	1.090	1.020	1.089	0.645	1.088
Breusch-Godfrey LM test (Prob > chi2)	0.000	0.000	0.000	0.000	0.000
Breusch-Pagan-Godfrey (Prob > chi2)	0.000	0.000	0.000	0.000	0.000

Standard errors in parentheses.

***p < 0.01, **p < 0.05, *p < 0.1.

Table 6. Regression results of ESG performance, liquidity, and the firm performance (Tobin's Q).

	Model 1	Model 2	Model 3	Model 2A	Model 3A
Variables	Tobinqt + 1	CR	Tobinqt + 1	C	Tobinqt + 1
ESG	0.00390*** (0.00)	-0.0613*** (0.02)	0.00383*** (0.00)	0.000420** (0.00)	0.00359** (0.00)
CR	-	-	-0.000975 (0.00)	-	-
C	-	-	-	-	0.854*** (0.23)
Size	-0.0411** (0.02)	-0.187 (0.21)	-0.0413** (0.02)	0.00635** (0.00)	-0.0488** (0.02)
MB	0.221*** (0.01)	-0.0643 (0.09)	0.221*** (0.01)	0.00495*** (0.00)	0.216*** (0.01)
Lev	-0.685*** (0.15)	-4.380*** (1.58)	-0.690*** (0.15)	0.0252 (0.02)	-0.715*** (0.15)
AT	-0.0366 (0.05)	-1.120** (0.49)	-0.0378 (0.05)	0.00114 (0.01)	-0.0385 (0.05)
AG	0.00584 (0.01)	0.222 (0.14)	0.00609 (0.01)	-0.00107 (0.00)	0.00728 (0.01)
SDG	-0.378*** (0.10)	-0.0754 (1.05)	-0.381*** (0.10)	0.00325 (0.01)	-0.400*** (0.10)
Loss	-0.0691 (0.06)	-0.682 (0.69)	-0.0699 (0.06)	-0.0386*** (0.01)	-0.0425 (0.06)
GDP	0.0274* (0.02)	0.375** (0.17)	0.0279* (0.02)	0.00291 (0.00)	0.0269 (0.02)
IF	-0.00424 (0.01)	-0.529*** (0.13)	-0.00484 (0.01)	0.00669*** (0.00)	-0.0104 (0.01)
Constant	2.005*** (0.45)	11.81** (4.67)	2.019*** (0.45)	-0.181*** (0.06)	2.207*** (0.45)
Observations	943	1109	943	1109	943
R-squared	0.577	0.175	0.577	0.343	0.584
Durbin-Watson stat	0.684	1.020	0.684	0.645	0.682
Breusch-Godfrey LM test (Prob > chi2)	0.000	0.000	0.000	0.000	0.000
Breusch-Pagan-Godfrey (Prob > chi2)	0.000	0.000	0.000	0.000	0.000

Standard errors in parentheses.

***p < 0.01, **p < 0.05, *p < 0.1.

Table 7. Regression results of ESG performance, liquidity, and the firm performance (NPM).

	Model 1	Model 2	Model 3	Model 2A	Model 3A
Variables	NPM t + 1	CR	NPM t + 1	C	NPM t + 1
ESG	−0.00254* (0.00)	−0.0613*** (0.02)	−0.00209 (0.00)	0.000420** (0.00)	−0.00245* (0.00)
CR	−	−	0.00644*** (0.00)	−	−
C	−	−	−	−	−0.257 (0.20)
Size	0.0127 (0.02)	−0.187 (0.21)	0.0145 (0.02)	0.00635** (0.00)	0.015 (0.02)
MB	0.0178** (0.01)	−0.0643 (0.09)	0.0184** (0.01)	0.00495*** (0.00)	0.0196** (0.01)
Lev	−0.420*** (0.13)	−4.380*** (1.58)	−0.388*** (0.13)	0.0252 (0.02)	−0.411*** (0.13)
AT	−0.0675* (0.04)	−1.120** (0.49)	−0.059 (0.04)	0.00114 (0.01)	−0.0669 (0.04)
AG	−0.00371 (0.01)	0.222 (0.14)	−0.00539 (0.01)	−0.00107 (0.00)	−0.00415 (0.01)
SDG	0.0783 (0.09)	−0.0754 (1.05)	0.0987 (0.09)	0.00325 (0.01)	0.0851 (0.09)
Loss	−0.0406 (0.06)	−0.682 (0.69)	−0.0348 (0.06)	−0.0386*** (0.01)	−0.0486 (0.06)
GDP	−0.0175 (0.01)	0.375** (0.17)	−0.0207 (0.01)	0.00291 (0.00)	−0.0173 (0.01)
IF	0.00174 (0.01)	−0.529*** (0.13)	0.00566 (0.01)	0.00669*** (0.00)	0.00358 (0.01)
Constant	0.135 (0.40)	11.81** (4.67)	0.0403 (0.40)	−0.181*** (0.06)	0.0738 (0.40)
Observations	943	1109	943	1109	943
R-squared	0.108	0.175	0.115	0.343	0.109
Durbin-Watson stat	1.834	1.020	1.850	0.645	1.837
Breusch-Godfrey LM test (Prob > chi2)	0.246	0.000	0.355	0.000	0.277
Breusch-Pagan-Godfrey (Prob > chi2)	0.000	0.000	0.000	0.000	0.000

Standard errors in parentheses.

***p < 0.01, **p < 0.05, *p < 0.1.

evaluations, they can choose superior companies and strengthen their capacity to manage risks and attain consistent returns. This study provides a strong argument for the development of ESG frameworks and regulations tailored to African markets. Governments and regulatory bodies should create incentives for companies to improve their ESG performance, such as tax benefits, subsidies, or favorable financing conditions for firms with strong ESG ratings. This can foster a business environment that prioritizes sustainability and long-term growth. African firms can greatly benefit from prioritizing ESG performance, not only in terms of improving financial outcomes but also in enhancing their market position, attracting investments, and managing long-term risks. The study serves as a guide for companies, policymakers, and investors to work together in building a sustainable and resilient corporate environment in Africa. Lastly, as the study is limited to African enterprises, the results may vary when applied to other parts of the world, even separate industrial results would vary, based on the nature of the industry and funding options.

Author contributions

Conceptualization, Dr. Suzan Dsouza & Dr. Mujtaba Momin; Data curation, Dr. Suzan Dsouza; Formal analysis, Dr. Mujtaba Momin and Dr. Houshang Habibniya; Methodology, Dr. Suzan Dsouza & Dr. Naliniprava Tripathy; Software, Dr. Suzan Dsouza; Supervision, Dr. Naliniprava Tripathy; Validation, Dr. Suzan Dsouza; Roles/Writing - original draft, Dr. Suzan Dsouza, Dr. Mujtaba Momin, Dr. Naliniprava Tripathy, & Dr. Houshang Habibniya. Writing - review & editing: Dr. Naliniprava Tripathy, Dr. Houshang Habibniya, Dr. Suzan Dsouza, and Dr. Mujtaba Momin.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Data availability statement

The data supporting the findings of this study are available from the corresponding author, Dr. Suzan Dsouza, upon reasonable request.

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