

UNIVERSITY OF CAPE COAST



ENVIRONMENTAL ACCOUNTING PRACTICES AND PERFORMANCE
OF LISTED SENSITIVE ENVIRONMENTAL FIRMS IN GHANA

AJARA AMALO

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OF LISTED SENSITIVE ENVIRONMENTAL FIRMS IN GHANA

BY

AJARA AMALO

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DECLARATION

Candidate's Declaration

I hereby declare that this dissertation is as a result of my own original research and that no part of this dissertation has been presented for another degree in this university or elsewhere.

Candidate's Signature : Date:

Name: Ajara Amalo

Supervisor's Declaration

We hereby declare that the preparation and presentation of the dissertation was supervised in accordance with the guidelines on supervision of dissertation laid down by the University of Cape Coast

Supervisor's Signature: Date:

Name: Rev. Prof. George Nii Tackie

ABSTRACT

This research elucidates the relationship between environmental accounting practices and the financial outcomes of publicly traded firms with significant environmental impact in Ghana. Environmental accounting practices were evaluated through three distinct thematic lenses: energy management, water stewardship, and effluent and waste management, with Return on Assets serving as the metric for financial performance. The data was sourced from the annual reports and financial statements of ten publicly listed environmentally sensitive firms in Ghana. The analysis employed panel data regression techniques. The findings indicated a lack of statistically significant correlation between the scores of energy management, water management, and effluent and waste management on Return on Assets. Nevertheless, the variable of firm age exhibited a statistically significant positive correlation with Return on Assets. In light of these results, the study advocates for enhanced education of environmentally sensitive firms in Ghana by the Environmental Protection Agency and other regulatory organisations regarding the detrimental impacts of their operations on the environment and strategies to mitigate these issues through transparent reporting to stakeholders. Hence, helping Ghana to achieve the SDG agenda by the UN in 2030. Notwithstanding, firms engaged in environmental accounting practices must be motivated by the government with tax allowance to boost disclosure practices and compel other non-disclosing firms to do the same. Regulatory bodies should be resourced to strengthen the monitoring and enforcement of environmental accounting practices. Evidence of environmental accounting practices in academia is provided from this current study to Africa and the rest of the world.

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DEDICATION

To my husband and children



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CHAPTER ONE

INTRODUCTION

In an age marked by intensifying global ecological issues, the significance of corporate responsibility in alleviating environmental degradation has become increasingly paramount. Environmental accounting has surfaced as a crucial instrument for the transparent documentation and evaluation of organisations' ecological effects, especially for environmentally sensitive enterprises that possess a considerable ecological footprint (Zik-Rullahi & Jide, 2023). This study investigates the environmental accounting methodologies and efficacy of publicly listed environmentally sensitive companies in Ghana, a setting that offers unique perspectives on environmental management within developing nations.

Sensitive environmental firms are characterized by their substantial direct environmental impact across critical sectors such as chemicals, pharmaceuticals, oil and gas, and motor vehicles and parts (Bartrem et al., 2022). These industries are distinguished by their high environmental pollution propensity, consistently generating effluents and emissions that can cause significant environmental degradation (Olorunfemi et al., 2024). The expanding corpus of research highlights how environmental accounting is becoming more widely acknowledged as a vital instrument for comprehending and handling business environmental obligations (Bebbington et al., 2023). This study intends to add to this developing conversation by investigating the particular setting of Ghana, a nation that is rapidly industrialising and dealing with serious environmental issues.

Background to the Study

Around the globe, questions are being asked about the operations of businesses that directly influence the natural world. Their interactions with the environment have prompted monitoring and discussion in many parts of the world (Donthu & Gustafsson, 2020). Ensuring harmonious and sustainable relations between industry and ecosystems is an important issue that affects people and places everywhere. Hence, making life unbearable for living organisms on the planet Earth (Del Signore, 2023). The actions of these corporations can result in various environmental hazards, including dangers to the oceans like whaling and overfishing.

Additionally, the release of toxic waste has the potential to pollute springs. The ongoing extraction and combustion of carbon-intensive resources like coal, oil, and gas have environmental consequences that extend across the entire planet (Du et al., 2024). The resultant emissions from these activities, particularly of the greenhouse gas carbon dioxide, are disrupting Earth's delicate climatic balance on a global scale. If left unaddressed, this disruption of natural climatic systems threatens vast ecosystems, economic livelihoods, and human well-being for present and future generations alike (Thomas, 2024). Transitioning to more sustainable energy sources will be necessary to stabilise oceans, skies, and weather worldwide. Moreover, issues related to nuclear power energy and forest conservation are also part of the damaging consequences caused by these companies, Greenpeace Southeast Asia (Aydin, 2020).

Environmental damage directly claims more lives than HIV/AIDS, tuberculosis, and malaria combined causing over 9 million deaths annually

compared to 3 million from these diseases (Makam & Matsa, 2021). Around 90% of people on the planet reside in regions where air pollution levels are higher than acceptable levels, and 2.2 billion people do not have access to clean drinking water, according to WHO data from 2018. Low-income areas are disproportionately affected by this avoidable public health issue caused by extensive exposure to contaminated air, water, and soil (Njoku & Sampson, 2023). According to Mateen (2022), while global health initiatives have made progress against infectious diseases through vaccination and treatment programs, environmental health hazards remain under-addressed.

Protecting human health requires immediate action to reduce air and water pollution, remediate contaminated land, and transition to sustainable practices that preserve natural resources while supporting human well-being (Mateen, 2022). Major environmental disasters, such as the deadly methyl isocyanate release in Bhopal, India, and the massive oil spill off Alaska's coast from the Exxon Valdez, were impactful incidents that heightened global awareness of environmental issues and risks (Gupta & Varma, 2020). These sobering events served to underscore the vulnerabilities communities and ecosystems face from industrial accidents and failures.

In the aftermath, they drew international attention to priorities like responsible industry standards, preparedness for hazards, remediating harms, supporting affected populations, and preventing future crises through prudent safeguards, oversight, and emergency response systems (McEntire, 2021). Their tragic legacies persist in demonstrating why proactively addressing humanity's relationship with the natural world merits attentive focus and collaborative solutions (Rafea et al., 2022). Countries have enact

laws requiring businesses to follow environmental protection guidelines.

Some examples in legislation are assessments of company impact on the environment from 1999 and the passing of an Environmental Protection Act in 1994 (Morgera, 2020). However, as discussed by (Amoako et al., 2021), enforcement can be inconsistent and companies do not always fully comply. The sources note that while regulations exist on paper, following all standards in practice has remained an ongoing challenge. Businesses still need to keep up their efforts to consistently implement sustainability measures as outlined by these laws because the effectiveness of these interventions in promoting sustainable environmental practices has been called into question, particularly in light of the evidence that Ghana's law enforcement is lacking and regulations are not being followed (Amoako, 2021). As a result, the state of the ecosystem keeps getting worse.

Environmentally conscious businesses' actions have had a significant negative impact on the environment in Ghana. The operations of both registered and unregistered mining companies (galamsey) have resulted in the cyanide contamination of river bodies, such as River Pra, Ankobra, and Birem. According to Ali et al. (2021) and Kyere-Boateng and Marek (2021), Ghana's forest cover has decreased by half since attaining independence. As such, the country's expenditure on addressing environmental degradation, relative to its GDP, has been approximately 9.6%, as reported by the UNDP in 2018 (Amoako, 2021). From these reports, if proper measures are not put in place the country's natural environment would soon be depleted and destroyed by the activities of business and mankind.

Taking into account the aforementioned factors, the United Nations defined Sustainable Development (SD) in the late 1980s as progress that meets present demands without compromising the capacity of future generations to meet their own (Grunkemeyer & Moss, 2020). As interest has grown in monitoring sustainability performance, major global institutions have aimed to establish frameworks to help structure and standardise how progress on these multifaceted goals can be measured, tracked, and communicated (Lashitew, 2021).

Organisations are given tools and transparency regarding the systematic management and reporting of their economic, environmental, social, and governance impacts and dependencies by voluntary systems such as the Global Reporting Initiative, the International Organisation for Standardization guidelines, the Principles for Responsible Investment, the Sustainability Accounting Standards Board protocols, the United Nations Global Compact criteria, and the International Integrated Reporting Council's integrated reporting standards (Hamad et al., 2020). Widespread utilisation of these resources aims to foster smarter decision-making, benchmarking, accountability, and collaboration to advance the move toward development that balances both people and the planet over the long run (Challoumis, 2024).

There are many different approaches companies can take to operate in a socially and environmentally responsible manner. One notable strategy that has gained popularity is called "triple bottom-line reporting". Instead of only looking at financial performance, this method encourages businesses to consider their impact in three key areas - people, planet, and profit. By measuring social outcomes, environmental stewardship, as well as economic results, companies

get a more well-rounded view of their true performance and how it affects stakeholders (El Fallahi et al., 2023). Considering the integrated consequences for communities, the environment, and financial returns can lead to balanced, sustainable decisions that create value for everyone now and into the future (Hariram et al., 2023). The triple bottom line framework provides a holistic lens for companies to evaluate all aspects of what they bring - or take - from the world, as outlined by Elkington in 1999.

The focus on environmental sustainability has prominently emerged in various political, business, and academic forums in recent years. As noted by Marrone et al. (2020), Qian et al. (2021), and Gulluscio et al. (2020), there has been a significant surge in attention towards environmental accounting and accountability in academic literature over the last five decades. The fourth objective investigating the mediating effect of firm age introduces a nuanced dimension to understanding environmental accounting practices. This approach aligns with the research of Khan et al. (2021), referencing Crossley et al. (2021) and Arvidsson and Dumay (2022), who noted the increasing adoption of sustainability reporting practices over the years. These types of reports offer a comprehensive overview of how a company's operations specifically affect the natural world.

They document the environmental aspects that are assessed, along with the procedures utilised to track performance in these areas. By considering firm age, the study acknowledges that organisational maturity and experience may significantly influence how companies approach environmental management and financial performance. By thoroughly reporting out things like resource usage, emissions levels, waste production, pollution reductions and

the systems employed to gauge these metrics, the reports give stakeholders transparency into both what environmental impacts result from the business's activities as well as how diligently they are measuring and aiming to manage their interactions with the environment according to Kedward et al. (2023). This level of visibility into a company's environmental impacts and monitoring processes helps demonstrate its commitment to sustainability (Campos et al., 2020).

They noted that environmental issues have become integral to management decision-making. Additionally, Wiengarten and Durach (2021) emphasised that incorporating sustainability practices into sustainability management is now a crucial aspect in the thinking and actions of researchers and operational managers. The initial documents identified as sustainability reports primarily comprised single-issue reports, predominantly concentrating on environmental performance. These reports have now become environmental accounting reports (Kulevicz et al., 2020). As highlighted by Dwivedi et al. (2022), environmental reports play an important role for both a company's leadership team and its many stakeholders. By documenting things like resource usage, emissions, waste levels, and remediation efforts, management gains valuable insights or decision-making around operations.

Additionally, the reports provide transparency for employees, investors, community members, environmental groups, customers and financial analysts. Making this information available helps everyone understand what environmental impacts result from the business's activities. It also shows stakeholders how seriously the company takes sustainability issues and monitors its performance (Burke, 2022). Overall, the reports serve

as a useful tool for both strategic planning within the organisation and maintaining accountability to people impacted by or involved with the company.

In the current era of globalisation and widespread use of social media platforms, information affecting the environment and communities has become increasingly accessible, regardless of whether organisations choose to report or not (Qalati et al., 2022). Whether companies choose to share information or keep it private, data related to environmental and community impacts has become more available thanks to increased connectivity (Oughton et al., 2021). Greater international cooperation and platforms like social media have made it easier for such details to come to light, even without organisational reporting (Lo et al., 2022). These trends mean sensitive topics are harder to avoid discussing, as different stakeholders can now more readily obtain and spread such details.

As a result, transparency from within companies may help control the message and provide facts in their full context. Using social media platforms, Reilly (2020) argues that firms can post their sustainability information on Facebook, Twitter, Instagram, and YouTube. There has been research into why companies decide to publicly report on their environmental impacts and activities. Ali and Rizwan pointed out in 2013 that firms often feel pressure from norms, regulations, or competitors to disclose this information (Ahmed et al., 2023).

Additionally, Adusei (2022) found that these reports are very helpful for stakeholders like investors, communities and regulators in making decisions. Supporting this viewpoint, Castelo Branco and Castelo Branco (2021) that

issues surrounding environmental protection and preventing pollution have become highly important to the various stakeholders of companies operating in sensitive sectors. As concerns have grown around sustainability, firms in industries that directly impact natural resources face increasing expectations of transparency around their environmental performance, management programs, and metrics over time.

Providing these reports has become a key part of maintaining accountability to those affected by business operations. According to Alshbili and Elamer (2020), strong institutional pressure, particularly from the World Bank, motivates firms' environmental disclosure practices. Therefore, the study adopts legitimacy, stakeholder, and institutional theory to determine the cause of environmental accounting reports and financial performance. Yet, to motivate business professionals to adopt environmentally sustainable practices, Boakye et al. (2020), for example, suggested that demonstrating a positive connection between sustainable policies and financial outcomes would encourage businesses to embrace environmentally sustainable practices.

Despite the trade-off involved—benefiting from reduced pollution and a clean environment on one side, but facing higher costs to comply with stringent environmental practices that may affect competitiveness on the other—establishing this positive association could be a key motivator (Javeed et al., 2022). Furthermore, Vernier et al. (2022) suggested that adopting sustainable environmental practices could stimulate innovation, potentially mitigating the initial investment costs and positively influencing profitability.

Several studies have supported this notion by confirming a significant and positive relationship between financial performance and environmental

practices, while other studies have found the opposite (Acar & Temiz 2020; Wang et al., 2020; Chiu et al., 2020; Osemene et al., 2016; Agyemang et al., 2021; KaoDui et al., 2019). The argument is still going strong. In light of this, the purpose of this research is to determine how Ghanaian publicly traded firms with substantial environmental impacts fare in terms of overall success when it comes to comprehensive environmental accounting and reporting (EAP).

Specifically, it will evaluate different key components of EAP measures to determine if stronger environmental disclosure and management practices are correlated with better financial or operational results for these sensitive industry firms over time. The goal is to provide insights into whether full transparency about resource usage, emissions, waste, and sustainability programs translates to tangible benefits or outcomes for businesses navigating complex regulatory frameworks and stakeholder expectations around their interactions with natural environments.

The research objectives collectively respond to the call by scholars like Bebbington (2021) and Marrone et al. (2020) for more comprehensive research into environmental accounting and accountability. In the context of Ghana's delicate environmental industries, the study seeks to offer empirical insights into the intricate link between financial outcomes and environmental management techniques. By exploring these objectives, the research seeks to contribute to the ongoing academic and practical dialogue about sustainable business practices, offering valuable insights for corporations, policymakers, and stakeholders interested in balancing economic performance with environmental responsibility.

Statement of the Problem

The global sustainability landscape has become increasingly complex, with the United Nations' 2030 Agenda for Sustainable Development setting ambitious targets for member countries to address environmental and social challenges (Vergerio & Knotten, 2024). This context has created a critical need for comprehensive research into environmental accounting practices and their impact on corporate performance, particularly in emerging markets like Ghana. Recent scholarly investigations have highlighted the growing importance of understanding how environmental management strategies intersect with financial outcomes (Aguilera et al., 2021).

Despite the existence of environmental accounting standards and sustainability frameworks, firms in environmentally sensitive sectors in Ghana continue to underperform in aligning environmental responsibility with financial viability (Ahinful, 2018). This disconnect suggests that existing environmental accounting practices are either insufficiently adopted, poorly implemented, or ineffective in driving financial performance (Amoako et al., 2021). This misalignment presents a critical challenge for regulators, investors, and corporate leaders, particularly in a context like Ghana where environmental degradation is high, but sustainability initiatives remain weakly enforced. Again, firms operating in environmentally sensitive sectors in Ghana face a dual challenge of responding to increasing environmental pressures (Ahinful et al., 2022).

Many previous studies have limitations, including combining all environmental disclosure items into a single measurement, relying on outdated research from over a decade ago, and failing to disaggregate environmental

accounting practices into specific thematic areas (Roszkowska-Menkes et al., 2024; Brown, 2024; Udeagha & Ngepah, 2023). By investigating the complex connections between environmental accounting procedures and financial performance through a targeted analysis of listed environmentally sensitive companies in Ghana, the study seeks to close these important gaps (Welbeck et al., 2017). The study specifically aims to look into four main research goals: The study will first ascertain how energy usage management affects the financial results of Ghanaian listed sensitive environmental companies. This goal acknowledges the possible financial ramifications of energy use as well as its crucial role in business sustainability initiatives.

Second, the study will look at how these companies' financial performance is affected by managing their water usage. This is an important topic of research because recent studies have indicated that water saving tactics can significantly affect organisational performance (Prakash et al., 2023). Third, the research will evaluate the effect of effluent and waste management on financial performance. Previous research, such as the work by Makan and Kabra (2021), have found paradoxical conclusions about waste reduction, underscoring the need for a more sophisticated understanding of this environmental accounting dimension.

Fourth, the study will investigate the mediating effect of firm age on performance. This objective acknowledges that organisational characteristics like age may play a significant role in how environmental accounting practices translate into financial outcomes. The motivation for this research stems from several critical observations. Existing literature has predominantly focused on specific industries such as mining, manufacturing, financial institutions, and

telecommunications, leaving significant knowledge gaps (Litvinenko, 2020). Moreover, most studies in Ghana and globally have approached environmental accounting through overly simplified methodological approaches, often combining complex environmental disclosure items into single, undifferentiated measurements (Stasiskiene, 2022).

Recognising the significance of openness in environmental reporting, the Global Reporting Initiative (GRI) has issued guidelines to help businesses with environmental disclosure (Caputo et al., 2021). Research employing these standards is still scarce, though, especially in developing nations like Ghana. By offering a more thorough examination of environmental accounting procedures, this study seeks to overcome this constraint. Empirical evidence suggests that environmental reporting can significantly influence stakeholder perceptions and organisational performance. A study by Aboagye-Otchere et al. (2020) examining environmental information disclosure among Ghanaian companies found that factors such as industry type, company size, and age significantly predict environmental reporting levels.

However, their research was limited to data from 2003 to 2012, underscoring the need for contemporary investigation. Ghana presents a particularly interesting context for this research. Positioned as the 27th most polluted country globally and 7th in Africa, the nation faces significant environmental challenges (Ali et al., 2022). Despite existing environmental protection legislation, enforcement remains inconsistent, and corporate compliance with sustainability measures continues to be problematic (Aureli et al., 2020).

This study aims to offer nuanced insights that can direct corporate strategy, inform policy development, and support more sustainable business practices by breaking down environmental accounting practices into distinct thematic areas and analyzing their unique effects on financial performance. The study is a crucial step in comprehending how economic goals and environmental management techniques can be successfully combined. It offers to provide insightful advice for businesses looking to strike a balance between financial performance and environmental stewardship, thereby promoting more ethical and sustainable business practices in developing nations.

Purpose of the Study

The purpose of the study was to investigate Ghanaian listed sensitive environmental enterprises' performance and environmental accounting methods.

Research Objectives

The specific objectives of the study are to:

1. Determine the effect of energy usage management on the financial performance of listed sensitive environmental firms in Ghana.
2. Determine the effect of water consumption management on the financial performance of listed sensitive environmental firms in Ghana.
3. Determine the effect of effluent and waste management on the financial performance of listed sensitive environmental firms in Ghana.
4. Determine the mediating effect of age on the firm performance of listed sensitive environmental firms in Ghana.

Research Hypothesis

The study tested empirically the following hypotheses:

1. H₁: There is a significant effect of energy management on the financial performance of listed sensitive environmental firms in Ghana.
2. H₁: There is a significant effect of water management on the financial performance of listed sensitive environmental firms in Ghana.
3. H₁: There is a significant effect of effluent and waste management financial performance of listed sensitive environmental firms in Ghana.

Significance of the Study

This study sets out to examine how embracing practices related to environmental accounting may affect the financial outcomes of companies in environmentally important industries that are publicly traded in Ghana. Another goal is to gauge awareness of sustainability issues among listed firms and evaluate how extensively they have adopted the Global Reporting Initiative G4 guidelines within the country. The research also aims to determine which precise facets of an environmental accounting approach significantly impact corporate performance. By shedding light on this relationship with a focus on distinct metrics, the researcher expects the results will add a useful perspective to the still limited body of knowledge exploring the links between sustainable reporting, environmental impact reduction efforts, and financial results.

The hope is that this work provides insights that help such organisations optimize their natural resource management strategies to benefit both ecological well-being and business prosperity over the long run. Transparency on these issues could reveal opportunities to better balance environmental stewardship with economic interests moving forward. Furthermore, it is hoped

that the study will prompt Ghanaian companies, professional bodies, and other organisations to engage in public discussions on environmental sustainability, potentially leading to its widespread adoption as standard practice in Ghana.

Delimitations of the Study

The study specifically focuses on environmental accounting practices (EAP) by environmentally sensitive firms on the Ghana Stock Exchange. Specifically, it examined whether the EAP, about energy usage, water consumption, and effluent and waste management, influences financial performance among the study Ghanaian firms. The study focuses on firms operating in industries known to substantially influence the environment, including mining, manufacturing, construction, and oil and gas. These economically important sectors regularly extract natural resources, produce emissions, generate waste, and utilise vast amounts of water in their regular operations. By investigating companies in fields with considerable environmental footprints, the research aims to provide insight into how sustainable accounting and reporting practices may affect their financial outcomes. Ten-year annual reports, ranging from 2013 to 2022 were employed for the study with G4 guidelines as the environmental disclosure measure.

Limitations of the Study

There are over 50 sensitive environmental companies in Ghana, but the study included only 10 listed sensitive environmental companies, which, as a result, may have affected the strength of the study findings, hence, the sample size was a limiting factor to this current study. Also, measuring key variables and identifying environmental accounting practices may have been difficult, which could potentially affect the accuracy of the results. A notable limitation

was the small amount of previous research specifically examining issues like energy usage, water utilisation, effluent discharge, and waste handling within Ghana's business context.

While studies have explored these environmental concerns in other locations, they have received much less focus when it comes to Ghanaian companies. The lack of local data in these key impact areas constituted a challenge. It highlighted the importance of the current study to help reduce existing knowledge gaps. Going forward, increasing transparency on sustainability initiatives like resource management could facilitate a more in-depth analysis of their relationship to operational performance. Continued research shedding light on industry-specific challenges and opportunities will also be valuable for encouraging further progress

Organisation of the Study

This study is organised into five main parts. After the literature review segment in chapter two, the following sections build upon one another. Chapter three describes the research approach and methods used. Next, chapter four details the findings from analysing the collected data. The project wraps up with a concluding chapter that synthesises the key takeaways, outlines conclusions reached, and provides recommendations informed by the results. By breaking the report into logical phases, it aims to convey the flow and progression of information for readers. The summarised chapter structure signifies how subsequent sections will delve deeper into specific elements of the process before tying together the completed work at the end. This formatting is intended to help orient the audience and signal what types of insights they can expect to gain at each juncture.

CHAPTER TWO

LITERATURE REVIEW

Introduction

The goal of the study is to evaluate environmental accounting practices and performance of listed sensitive environmental firms in Ghana. Information about the literature review, theoretical review, conceptual review, empirical review, and conceptual framework is provided in this part.

Theoretical Review

Defee et al. (2010) assert that for research to be considered good, it must be theoretically grounded. Due to these developments, academics have proposed several theoretical frameworks for understanding social and environmental accounting practices (EAP), including resource-based theory (Barney, 1991), institutional theory (DiMaggio & Powell, 1983), legitimacy theory (Suchman, 1995), stakeholder theory (Freeman, 1984), and how these theories relate to firms' financial performance. These various perspectives aim to provide explanatory lenses for reporting and their potential relationship to organisational success (Welbeck et al., 2017; Amoako, 2021; Zamil & Hassan, 2019). Since there is no universally accepted single theory for determining EAP and financial performance of firms, based on the researcher's influence, the legitimacy, stakeholder, and institutional theories are embraced for this current study.

Legitimacy Theory

The concept of legitimacy theory emerges as a critical framework for understanding corporate environmental accountability in the research. The theory fundamentally explores the relationship between organisational

transparency and meeting societal expectations. In the context of the study on environmental accounting practices (EAP) among sensitive environmental firms in Ghana, legitimacy theory provides a nuanced lens for examining how companies communicate their environmental impacts and responsibilities. The research document aligns with the legitimacy theory's core premise that businesses must maintain a "social license to operate" by demonstrating accountability and transparency (Egoshina, 2024).

This is particularly relevant for environmentally sensitive firms in Ghana, which face significant environmental challenges, including being ranked as the 27th most polluted country globally. By openly communicating about their environmental management strategies, these companies seek to build trust with stakeholders and justify their continued operational presence (Crossley et al., 2021). The study's theoretical framework suggests that larger corporations, especially those in industries with substantial environmental footprints like mining, manufacturing, construction, and oil and gas, face heightened expectations for social responsibility (Adebayo et al., 2024). This aligns perfectly with legitimacy theory's proposition that organisational size correlates with increased pressure to disclose operational details and environmental initiatives.

The research emphasises that environmental reporting is not just a compliance exercise but a strategic approach to maintaining organisational legitimacy. By providing transparent reports on energy usage, water consumption, effluent and waste management, these firms aim to show stakeholders that they understand and are actively managing their environmental impacts. This transparency becomes a mechanism for building

trust and demonstrating ethical commitment to societal and environmental well-being (Gutterman, 2023). Interestingly, the document references previous studies that have used legitimacy theory to explore the connections between environmental accounting practices and financial performance (Akhter et al., 2023).

The theory suggests that negative environmental reputations could lead to consumer protests, media scrutiny, and ultimately poor financial outcomes. Therefore, comprehensive environmental disclosure becomes a proactive strategy for managing organisational reputation and maintaining stakeholder confidence (Cahyono et al., 2024). The study's focus on Ghana provides a unique context for exploring legitimacy theory. Despite existing environmental protection legislation, the country struggles with inconsistent enforcement and corporate compliance. In this environment, voluntary environmental reporting becomes even more critical for firms seeking legitimacy and demonstrating commitment to sustainable practices (Nishitani et al., 2021).

By adopting the Global Reporting Initiative (GRI) guidelines and disaggregating environmental accounting practices into specific thematic areas, the research aims to provide a more nuanced understanding of how companies can effectively communicate their environmental stewardship. This approach reflects legitimacy theory's dynamic nature, acknowledging that societal norms and expectations around environmental responsibility continuously evolve. The research ultimately positions environmental accounting as more than just a reporting mechanism, it becomes a strategic tool for organisations to negotiate their social license, build stakeholder trust, and potentially improve their

financial performance by demonstrating responsible and transparent environmental management.

Stakeholder Theory

Freeman and Phillips (2002) championed the development of stakeholder theory. The stakeholder theory emphasises the growing importance of transparency and accountability to various stakeholders in environmental accounting, which directly aligns with the theoretical perspectives described. The study highlights how companies are increasingly recognising their responsibilities to multiple stakeholders, including investors, communities, environmental groups, customers, and financial analysts. This reflects Freeman's foundational concept that corporations have obligations to diverse groups with varying interests. The research specifically notes that environmental reporting serves as a crucial tool for providing transparency to these stakeholders, enabling them to understand the environmental impacts and sustainability efforts of sensitive environmental firms (Caputo et al., 2021).

The study particularly echoes the ethical branch of stakeholder theory by arguing for comprehensive disclosure of non-financial information. It emphasises that environmental reports provide valuable insights not just for company leadership, but for a wide range of stakeholders. The research acknowledges that in the current era of globalisation and social media, information about environmental and community impacts has become increasingly accessible, creating additional pressure for transparency (Harness et al., 2024). Moreover, the study demonstrates the managerial perspective of stakeholder theory by exploring how companies respond to institutional pressures and stakeholder expectations. It notes that firms often feel compelled

to disclose environmental information due to norms, regulations, and competitive pressures.

The study specifically investigates how environmental accounting practices can influence stakeholder perceptions and organisational performance.

The research's focus on Ghana's context adds nuance to stakeholder theory, showing how these principles play out in an emerging market with significant environmental challenges. The study basically investigates how businesses might reconcile the interests of different stakeholders, striking a balance between economic goals and environmental stewardship, by looking at how environmental accounting methods impact financial performance. It's interesting to note that the study also supports Tackie's (2020) definition of stakeholders, which is people or organisations that have the power to affect or be affected by a company's operations.

This is clear from the discussion of how environmental reporting has emerged as a crucial tool for upholding accountability to stakeholders impacted by corporate operations, including investors, local communities, and regulatory agencies (Tackie, 2020). The research ultimately suggests that effective stakeholder engagement through comprehensive environmental accounting can potentially create value for multiple parties, supporting the theory's core premise of equitable consideration of different stakeholder groups' interests.

Institutional Theory

Institutional theory offers an additional viewpoint that complements both legitimacy theory and stakeholder theory. The discussion of institutional theory in the study aligns closely with the theoretical framework presented in the study, which emphasises the importance of organisational responses to

external pressures and stakeholder expectations (Martens & Bui, 2023). The research highlights how companies in environmentally sensitive industries are increasingly compelled to adopt transparent reporting practices due to various institutional pressures. This mirrors the institutional theory's concept of isomorphism, where organisations adapt their practices to conform to external expectations. Specifically, the text notes that firms face pressures from norms, regulations, and competitors to disclose environmental information, which closely reflects the coercive and mimetic isomorphism described in institutional theory (Villena & Dhanorkar, 2020).

The research acknowledges strong institutional pressures, particularly from global institutions like the World Bank, which motivate firms to develop environmental disclosure practices. This aligns with the institutional theory's understanding of how external bodies can drive organisational change. The Global Reporting Initiative (GRI) guidelines mentioned in the document serve as a prime example of an institutional framework that encourages companies to adopt standardised environmental reporting practices (Negash & Lemma, 2020). Moreover, the study emphasises the increasing accessibility of environmental information through global connectivity and social media platforms. This phenomenon creates additional institutional pressure for companies to be transparent about their environmental impacts.

As the text notes, whether companies choose to share information or not, data related to environmental and community impacts has become more readily available, forcing organisations to be more accountable. The study's exploration of why companies publicly report on their environmental impacts directly relates to institutional theory's core principles. It recognizes that firms are

increasingly motivated by stakeholder expectations, regulatory requirements, and the need to maintain legitimacy within their institutional environment. The research suggests that providing environmental reports has become a key mechanism for maintaining accountability and responding to institutional pressures. The theoretical approach of the study, which adopts legitimacy, stakeholder, and institutional theories, reflects a nuanced understanding of how external forces shape organisational behavior.

By investigating how environmental accounting practices influence financial performance, the research seeks to unpack the complex interactions between institutional pressures and corporate strategy. In essence, the research provides a rich, contextual exploration of institutional theory in practice, particularly within the realm of environmental accounting in Ghana's sensitive environmental sectors. It demonstrates how organisations navigate and respond to the complex institutional landscape, adapting their practices to meet evolving expectations of transparency, sustainability, and environmental responsibility.

Conceptual Review

Environmental Sustainability

The concept of environmental sustainability centers around preserving the well-being of the natural world and its resilience over time in supporting human life. It is intrinsically tied to the health and productivity of ecosystems, as well as the natural environment's ability to withstand stresses and maintain its functionality. At its core, environmental sustainability concerns sustaining the integrity and capacity of the earth's living systems upon which all life ultimately depends (Koul et al., 2022). Environmental sustainability demands the judicious utilisation of natural capital, considering it as a source for

economic inputs and a repository for waste (Bateman & Mace, 2020). This implies a careful balance, ensuring that natural resources are harvested at a rate compatible with regeneration while waste is released no faster than the environment can assimilate (Diesendorf, 2020).

The underlying principle is acknowledging the finite boundaries of Earth systems, within which equilibrium is maintained. However, the unrelenting drive for unchecked growth is putting increasing strain on the Earth's system and testing its limitations, since technological advancement may not be able to support exponential growth. Concerns regarding environmental sustainability are becoming more and more supported by the research. Notably, climate change's threats highlight how urgently environmental sustainability is needed. Due to either human activity or natural variability, climate change entails substantial and protracted changes to the climate system (Acharya, 2021).

Changes include global warming of the oceans and atmosphere, melting ice, increasing sea levels, more acidity of the oceans, and higher concentrations of greenhouse gases (Du et al., 2022). Losses in biodiversity are already a sign of climate change's effects. In particular, Kubelka et al. (2022) discovered that rising temperatures affect species distributions and population levels, change migration patterns, and affect when wildlife and plants reproduce. Although predictions for the future are still dubious, Kapinga et al. (2021) stress how crucial it is for society to adjust to changing environmental conditions in order to maintain sustainability, especially when it comes to managing ecosystems and identifying the biophysical boundaries of economic growth. Therefore, combating climate change is essential to maintaining the robustness of the natural systems that support all life.

Natural extinction rates are currently being surpassed by the rate of biodiversity loss (UNSD, 2018c). The limits of the world's biomes are predicted to vary due to climate change, which will cause species to migrate to higher latitudes and altitudes and cause changes in the worldwide vegetation (Villa et al., 2024). Species' chances of surviving decrease if they are unable to adjust to new geographic distributions. Sea level rise is predicted to cause the loss of 20% or more of coastal wetlands by 2080 (Wang et al., 2018). As previously highlighted, these factors have a significant impact on the stability and resilience of natural systems that support human existence and development, making them extremely consequential components of environmental sustainability. The preservation of robust, healthy ecosystems is seriously threatened by climate change, which destroys biodiversity and natural habitats.

Environmental Accountability

The first voluntary environmental reports appeared in the late 1980s. Businesses that were involved in ecologically sensitive activities, especially major polluters, took the initiative to set up environmental reporting. Non-governmental organisations' investigation and criticism of the power of multinational companies prompted this action, in part (Busch, 2018). Lack of social understanding about the magnitude of a company's environmental impact might result from a lack of environmental accountability. According to Alrazi et al. (2015), there may not be enough social pressure on businesses to adopt practices and policies that support environmental sustainability.

According to Perkiss et al. (2019), financial accounting is the process of documenting business transactions and presenting financial data to interested stakeholders for decision-making purposes. Reporting financial data to

stakeholders has evolved from its conventional function. These days, companies' financial reports show not only their financial performance and position but also the success of non-financial information, such as social and environmental factors, and the activities they carried out during the reporting period (Krivačić & Jankovic, 2017; Perkiss et al., 2019). The disclosure of environmental activities as part of a firm's financial or separate report has now evolved into a term known as environmental accounting.

Environmental accounting involves collecting, analysing, and assessing data about both environmental and financial performance. This information is obtained from different business management systems, environmental management systems, and financial accounting systems within organisations. It entails quantifying the economic impacts and costs associated with an entity's environmental footprint to enable more informed decision-making regarding sustainability. The subsequent step involves implementing corrective management measures to mitigate environmental impacts and costs.

In addition to internal monitoring and assessment, organisations may opt to externally communicate their environmental and financial performance by publishing verified corporate sustainability reports or disclosing relevant information within annual financial reports and statements. Providing externally reported information aligned with recognized standards helps ensure transparency about an entity's environmental impacts and the economic consequences of its sustainability initiatives for stakeholders to adequately evaluate performance.

The field of environmental accounting is growing as organisations aim to better understand and communicate their resource usage and true

environmental costs. It seeks to identify, quantify, and report on a company or national economy's actual and potential environmental impacts (Serafeim & Zochowski, 2023). Environmental accounting involves systematically collecting, recording, and analysing data about environmental costs and related expenses to provide insights for decision-makers (Morrison et al., 2023). By accounting for environmental externalities, it aims to integrate financial and ecological considerations to support more sustainable decision-making over time. As the discipline matures, opportunities continue emerging to refine methodologies and further mainstream environmentally-informed accounting practices.

Essentially, it addresses the financial implications arising from environmental protection, encompassing both environmental expenditures and savings. In Ghana and around the world, several measures have been put in place to encourage firms to disclose their EAP and measures to reduce the effects of these activities on the environment. Given this, the United Nations in 2015 launched an agenda with the theme of the SDGs. The aim is to voluntarily compel member states to practice environmental sustainability to make the world a healthy, habitable place for both living and non-living organisms by 2030. This prompted scholars in academia to find out whether firms in member countries are complying or not. In reviewing and assessing the state of sustainability accounting and reporting practices over the period from 2009 to 2015 among four gold mining companies operating in Ghana, Tackie et al. (2017) found that mining companies are now earnestly addressing environmental accounting and sustainability reporting.

KaoDui et al. (2019) investigated the connection between Ghanaian companies' corporate performance and social and environmental accounting and reporting standards. In line with earlier research by Tackie et al. (2017) that also observed this trend among Ghanaian enterprises, their findings demonstrated that businesses in Ghana have increasingly implemented sustainability accounting and reporting methodologies. Wahyuningrum et al. (2020), however, noted that earlier research had discovered poor levels of environmental disclosure among Indonesia Stock Exchange-listed companies.

Additionally, Dinca et al. (2019) found that Romanian companies disclosed little environmental information when they examined the data from 100 companies listed on the Bucharest Stock Exchange. Acar and Temiz (2020), on the other hand, investigated the connection between voluntary environmental reporting in emerging markets and company environmental performance. According to their findings, businesses that exhibit better environmental performance also have a tendency to voluntarily disclose more environmental issues. In light of the inconsistent findings in the literature above, this study aims to determine whether companies' failure to disclose environmental activities affects their performance.

Environmental Accounting Practices and Firms' Performance

It is strongly believed and arguable in the literature that environmentally sensitive firms are more sensitive to environmental issues than non-sensitive environmental firms. The reason has been that activities by the latter have a direct impact on the environment, hence being more responsible for the environment than the former. This argument has compelled many scholars in the field to research it. Buallay et al. (2020) sought to compare sustainability reporting

practices between the manufacturing and banking sectors. According to their argument, environmental disclosure in the banking industry, which is thought to be less environmentally sensitive, can have a negative effect on a company's financial and market performance, whereas manufacturing firms, which are thought to be environmentally sensitive, typically have a positive impact. The authors sought to investigate the potential effects of environmental sensitivity on the connection between organisational performance and sustainability reporting.

Numerous research have discovered connections between competitiveness, performance, and environmental disclosure. Businesses that exhibit better environmental performance are more likely to voluntarily reveal a greater variety of environmental issues, according to Acar and Temiz (2020). Higher financial success has been linked to this high-quality disclosure of environmental information (Xi et al., 2022). Polycarp (2019) also noted that companies committed to environmental friendliness and willingly disclosing their initiatives experience heightened competitiveness. Implementing environmental accounting practices can positively influence both financial performance and corporate reputation, according to the literature. Overall, voluntary environmental disclosures that demonstrate high environmental standards and commitment appear to correlate with improved organisational outcomes.

The enhanced quality of financial performance and inherent reputation is shaped by the dedication of the company to environmental quality and corporate social responsibility (Najihah et al., 2020). Notwithstanding, the majority of prior research has found an empirically significant positive association between the implementation of environmental accounting practices

(EAP) and various measures of firm performance (Tackie, 2019; Acar & Temiz, 2020; Wang et al., 2020). These results suggest that the financial performance of firms under study increases as environmental accounting disclosure also increases. In sharp contrast, Welbeck et al. (2017) reported finding a negative relationship, conflicting with most other studies.

When assessing the type of environmental information predominantly disclosed by companies in Ghana, Welbeck et al. (2017) also found a negligible association between profitability metrics and levels of environmental disclosure. This adds some nuance to the overall positive relationships reported elsewhere, suggesting the relationship may differ based on regional or industry context factors. Confirming this, Agyemang et al. (2021) contend that as the profitability of mining companies increases, their environmental disclosure reduces. These results suggest that EAP by environmentally sensitive firms does not impact their performance. Tackie (2019) contends that businesses in environmentally sensitive industries should give priority to practices that improve environmental accountability, even if doing so could have a detrimental effect on their financial performance, based on the conflicting results of the body of research already conducted on the subject.

Environmental Accounting Reporting Framework

Globally, several organisations pay attention to sustainability reporting. As a result, a lot of concerns have been raised to develop a generally accepted sustainability reporting (SR) framework that will compel all firms to comply. To gauge and communicate economic, environmental, and social activities, global organisations supporting SR have developed voluntary frameworks. Several prominent sustainability reporting frameworks and

guidelines have emerged over time. The United Nations Principles for Responsible Investment (PRI), the Sustainability Accounting Standards Board (SASB) standards, the United Nations Global Compact, the Global Reporting Initiative (GRI), the Organisation for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises, the International Organisation for Standardization (ISO) standards, and the International Integrated Reporting Council's (IIRC) integrative reporting frameworks are a few of the important ones.

Nonetheless, the GRI guidelines are regarded as the most extensively used framework in the world for evaluating and disclosing sustainability performance. Joseph et al. (2026) argue that, in contrast to other guidelines, "the GRI offers comprehensive instructions on reporting, outlining overarching objectives and specifying reporting content through standard disclosures and sector supplements". Established in 1997, the GRI played a significant role as one of the primary creators of SR. The mission of the GRI is to support organisations by making SR a standard practice through the provision of guidance (Sethi et al., 2017).

In 2006, GRI released the third edition of its guidelines, known as G3. The GRI G3 guidelines were subsequently updated to version G3.1 in 2011. Subsequently, G3.1 was updated to G4 in 2013. The researcher adopted G4 as EDI. The GRI G4 guidelines feature two categories of standard disclosures: general standard disclosures that all organisations report on, as well as specific standard disclosures that vary depending on the organisation's impacts and activities. To meet the objectives of this study, the researcher focused the analysis on the specific standard disclosures within the GRI G4

guidelines. This was done by limiting the scope to indicators categorized by aspects, which are divided into three parts: economic, environmental, and social. Analysis of indicators related to these aspects allowed the researcher to gain insights relevant to the goals of the current study. The researcher considered the environmental category to achieve the research objectives.

Empirical Review

Effect of Energy Usage Management on Financial Performance

Fan et al. (2017) investigated the connection between a sample of Chinese companies' financial performance and energy efficiency using a panel dataset covering the years 2010–2014. The analysis makes use of six financial indicators that show the advantages of various stakeholders. According to the empirical findings, energy efficiency has no discernible association with Tobin's q but is positively correlated with return on equity, return on assets, return on investment, return on invested capital, and return on sales. The study also looked at how energy intensity and business growth interact, and it discovered that firm expansion strengthens the favorable correlation between energy intensity and financial performance. The results encourage businesses to take the initiative in their efforts to reduce emissions and conserve energy.

In Nairobi City County, Kenya, Gatwiri et al. (2024) investigated how smart energy management systems affected the bottom line of budget hotels. The purpose of this study, which used a descriptive research approach, was to assess how SEMS affected the bottom line of budget hotels. Key financial factors, such as profitability and cost control, were assessed using the Balance Scorecard Model, which provides a thorough framework for evaluation. To provide a thorough knowledge of SEMS's effects, data were gathered from 300

visitors and 24 hotel managers using Likert scale questionnaires. Descriptive and inferential statistics were used for analysis.

According to the results, hotels may obtain real-time energy data by implementing SEMS, which greatly increases energy efficiency by cutting down on wasteful energy use and expenses. Regression research also revealed a moderately favorable correlation (0.529) between financial success and SEMS adoption, suggesting that higher SEMS usage leads to better financial results. This implies that SEMS improves overall operational efficiency and profitability in addition to assisting budget hotels in optimizing their energy use. In light of these findings, the study suggests that managers of budget hotels implement SEMS in order to improve financial performance by increasing energy efficiency and lowering energy expenses.

In their study, an analysis of OECD countries with a high environmental performance index, Szymczyk et al. (2021) investigated the relationship between CO₂ emission management and energy consumption, economic growth, and financial development. The study's primary goal was to assess, using the panel data analysis method, the effects of economic growth, energy consumption, energy management, urbanization, trade openness, and financial development on CO₂ emissions in OECD nations with high environmental performance index rankings for the years 1990–2014. The evaluation discovered a positive correlation between CO₂ emissions, urban population, energy consumption, and economic growth.

Furthermore, it was argued that there is a substantial and adverse correlation between financial development and CO₂ emissions. The association between trade openness and CO₂ emissions is negligible, even though they

show a comparable negative correlation. There is a two-way causative relationship between energy use and CO₂ emissions, according to the results of the Dumitrescu-Hurlin panel causality test. Furthermore, correlations were shown where trade openness is caused by CO₂ emissions and the urban population is an explanatory variable of the former relationship.

An evaluation of the relationship between the use of renewable energy and business financial performance was conducted by Shin et al. (2018). They looked at the relationship between the use of RE and the company's financial success over time, based on the natural resource-based approach of the business. The study's findings were further validated by post hoc bootstrapping and sensitivity analyses, which compare the annual ROI, Tobin's Q, and operating margin of large U.S. firms identified as exceptional users of RE in the EPA's Fortune 500 Top Green Power Partners list with their respective industry medians over a 7-year period (2007–2013). As a result, the study's conclusions support the idea that there is a commercial case for using RE in addition to its positive social and environmental effects.

Effect of Water Consumption Management On Financial Performance

Due to a dearth of empirical research on the relationship between corporate water management and financial performance, Weber and Saunders-Hogberg (2020) addressed the knowledge gap regarding the relationship between water management performance and the financial performance of businesses in the food and beverage industry. Secondary corporate social performance data from KLD-MSCI, secondary financial data from Compustat, and primary water management data were analysed using structural equation modeling. The findings indicated that corporate social performance positively

affects water management performance and that water management performance affects the sample firms' financial performance. The study came to the conclusion that improving the financial performance of the food and beverage business can be achieved through an inside-out strategy to corporate social responsibility that addresses tangible issues like water.

Ji et al. (2023) investigated the financial performance and management of water resources in highly water-sensitive enterprises. Using the fuzzy set qualitative comparative analysis method (fsQCA), the study selected 259 A-share listed manufacturing corporates from 2015 to 2021 as research samples in order to investigate the configuration and influencing path of water resource management affecting financial performance. This was done in order to determine the possible relationship and influencing mechanism between water resource management and corporate financial performance, based on configuration thinking. The study then examined it using the assumption that financial success is impacted by the CSR score (but not environmental responsibility).

The findings demonstrated that: (1) terrible company financial performance will arise from both inadequate water management and a low CSR score; nevertheless, the former will have a more severe negative influence on corporate financial performance than the latter. Certain configurations show that businesses' financial performance will suffer significantly if they execute few concrete water-related measures and technical innovation. (2) A high CSR score can produce high financial performance, but good water resource management cannot directly provide it. This suggests that water resource management is a required but not sufficient condition for high corporate financial performance.

Emmanuel et al. (2024) investigated the connection between 14 deposit money banks listed on the Nigerian Exchange Group's financial performance and environmental sustainability. It focuses on how the bank's return on assets (ROA), a proxy for financial success, is affected by environmental disclosure of renewable energy, carbon emissions, waste management, and water consumption—all of which are proxies for environmental sustainability. Panel data and multiple regression analysis are used to analyse the data for this eight-year study, which runs from 2013 to 2021. The information was gathered from the Nigerian Exchange Group's deposit money banks' yearly reports. The study's ex-post facto design makes use of secondary data gathering techniques. The results indicated that financial performance (ROA) and environmental sustainability indices (renewable energy, carbon emissions, waste management, and water usage) have a positive but negligible relationship. According to the study's findings, there is no meaningful connection between financial performance (ROA).

Effect of Effluent and Waste Management on the Financial Performance

Guessier et al. (2015) investigated how Brazilian businesses manage their environmental impact by examining the variables that affect waste, emissions, effluents, and other impacts disclosure. In order to accomplish this, 50 Brazilian corporations' annual and sustainability reports from 2009 to 2011 were examined. First, each company's level of disclosure for waste, emissions, effluents, and other impacts was measured. The model used to estimate the amount of disclosure was built using guidelines from the Global Reporting Initiative and a review of the literature. The characteristics that explain what corporations report were identified after the disclosure level was measured.

These factors are utilised in the literature to measure the effectiveness of economic performance, legitimacy, and environmental reporting. The degree of environmental disclosure from the examined companies' reports was then connected with these decisive elements.

We were able to determine the following through the assessment of the degree of environmental reporting: (i) the most obvious aspects are associated with solid waste and atmospheric emissions; (ii) the reports do not provide information on goals for reducing impacts; (iii) there are no standards for comparison; and (iv) there is a need to increase the amount of quantitative and financial data pertaining to environmental impact. A canonical correlation between the sustainability report and environmental variables (potential pollutants, members of the environmental sustainability index, website information dissemination, and the sustainability report) and between the annual report and auditing was found through the analysis of the determining factors. Although there was a positive link for the economic variable associated with company size, there was no correlation between the performance of environmental disclosure in the sustainability and annual reports and the economic variables.

Using data from Italian waste management organisations, Bartolacci et al. (2018) investigated the connection between sound environmental practices and financial performance. Using separate waste collection rates and collection per capita as proxies for good environmental practices, and return on assets to assess financial performance, an empirical analysis of 45 Italian companies over the four-year period 2012–2015 was conducted in order to achieve the study's goal. According to the data, there is a very high general connection and a slight

positive linear correlation, meaning that even if the proportion may change, if one variable increases, the other one does too. In other words, the research findings appear to rule out the potential that enhanced environmental policies, such as separate garbage collection, could have a negative impact on the financial results of the enterprises under analysis.

Watson et al. (2004) compared two business strategies to investigate how the installation of environmental management systems affected financial performance. According to the study, methods that prioritize waste reduction and process/product redesign in the effort to lessen environmental effect can be adopted in order to achieve better environmental performance. The majority of the data demonstrating EMS's influence on financial performance is anecdotal, and the organisation lacks a framework to measure improvements. Due to a perceived cost disadvantage, this lack of theoretical research has reduced corporate backing and, consequently, the possibility of EMS deployment. In order to ascertain how EMS methods affect financial performance, this study put forth and evaluated a framework for quantifying EMS improvements. The results indicated that a firm's financial performance is not adversely affected by the adoption of an EMS strategy.

Mediation Effect of Age on the Firm Performance

Building on business network research, Chen et al. (2021) sought to investigate the relationship between a firm's dynamic network capability (DNC) and firm performance, bounded by firm age and mediated by the pace of product reconfiguration (also known as new product development [NPD] speed). Additionally, a moderated mediation analysis was performed using survey data from small and medium-sized technology and industrial companies in the

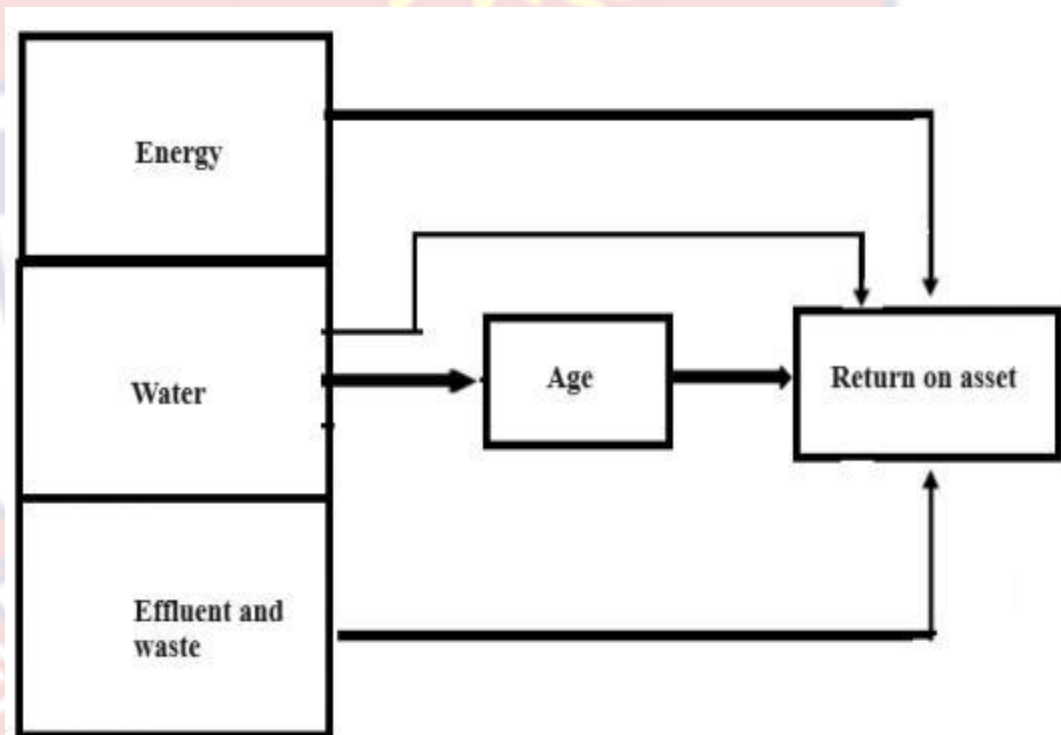
United States. An initial survey and a follow-up survey were employed in the study. The results corroborate the widely held belief that, irrespective of business age, the DNC plays a crucial role in firm performance. The DNC, however, functions differently for younger and older businesses. In other words, accelerating NPD allows the DNC to have an impact on younger firms' performance, whereas alternative resource reconfiguration routes seem to account for a large portion of the impact on older firms' performance.

Asad et al. (2023) investigated the relationship between green entrepreneurial approach and the performance of entrepreneurial businesses, focusing on the mediating function of green innovation and the moderating role of resource acquisition with company age. Simple random sampling was used in the data collection process. Based on the analysis of 384 businesses operating in the Pakistani cities of Karachi and Sialkot, the study discovered intriguing results regarding the mediating role of green innovation and the moderating influence of resource acquisition with firm age on the relationship between green innovation and the performance of entrepreneurial firms. The resource-based perspective and the green utility model benefited greatly from these discoveries.

Conceptual Framework

Conceptual framework is a group of organisations between aspects being studied in the context of the researcher that has been logically developed, described, and explained (Sekaran & Bougie, 2016). In this current study, the variables that were of interest to the researcher were firm performance (FP) measures by return on assets and environmental accounting practices (EAP) measured by the following thematic areas under the environmental category of

GRI specific disclosures: energy, water, effluent, and waste. Financial performance was designated as the dependent variable in this study. Environmental accounting practices were examined as the independent variable. Firm age, measured as the number of years the firm has been in operation, was included as a control variable to account for potential influences on the dependent variable outside of the relationship with the independent variable. The conceptual framework is depicted below

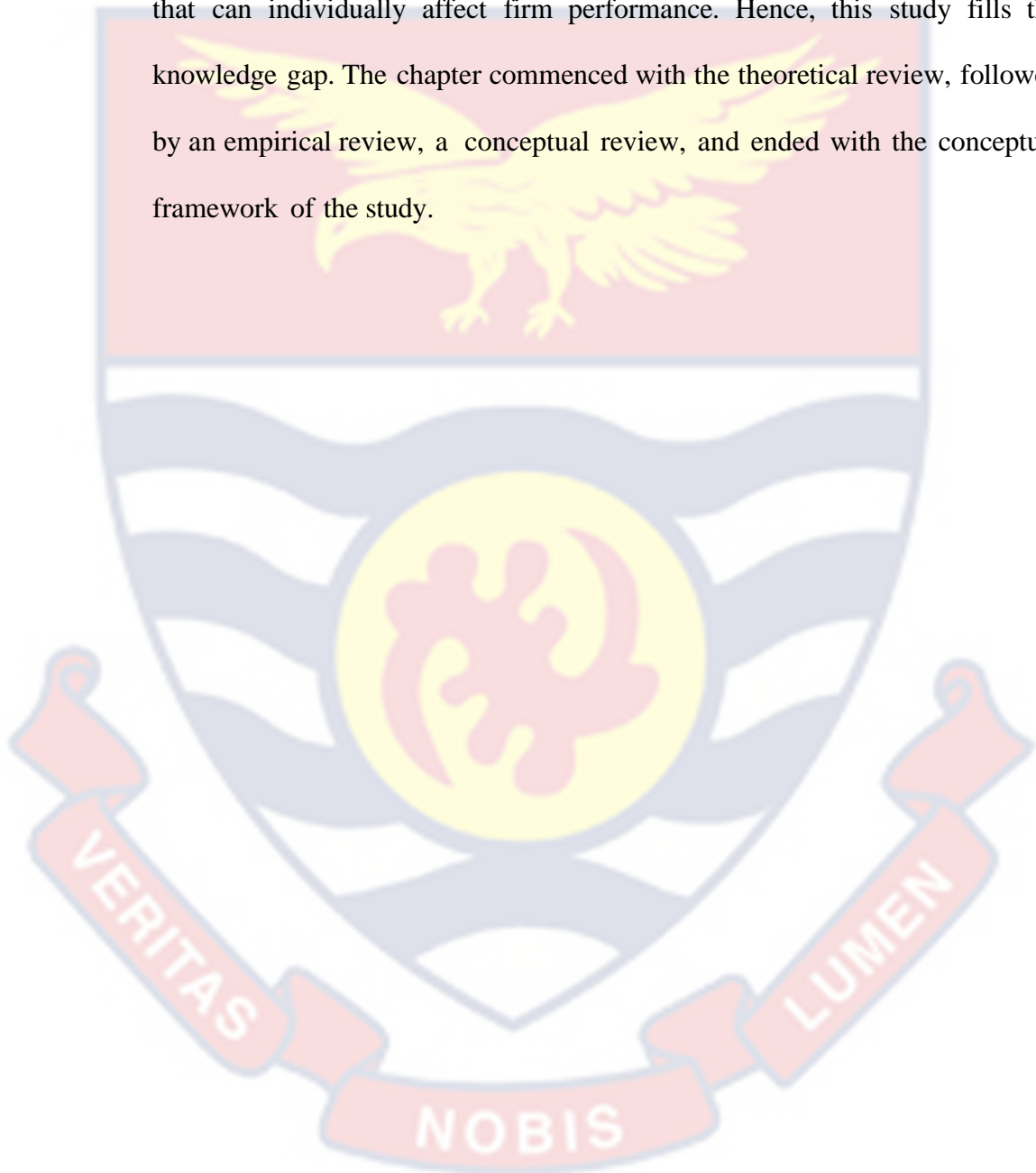


Source: Author's construct (2024)

Figure 1: The Conceptual Framework

Chapter Summary

The focus of the chapter was to interrogate the extant literature with the knowledge of EAP and FP. It was found that separate environmental disclosure areas considered by GRI were not properly considered as variables that can individually affect firm performance. Hence, this study fills the knowledge gap. The chapter commenced with the theoretical review, followed by an empirical review, a conceptual review, and ended with the conceptual framework of the study.



CHAPTER THREE

RESEARCH METHODS

Introduction

The study's methodology is described in this section. Research design, population and sampling methods, data collection tools, data processing and analysis, and ethical considerations are all covered in detail. Specifically, it will examine the research design, population sampled, techniques for collecting data, instruments used to analyse the data, and precautions taken to perform the research is conducted ethically.

Research Design

The research design encompasses the blueprint and process for the research, covering decisions ranging from overarching assumptions to specific methods of collecting and analysing data (Mirgissa, 2024). The research design outlines the structure of one's study, providing a blueprint for collecting, measuring, and analysing data in a research investigation. There are three most commonly used research designs. There are three main types of research designs: exploratory, descriptive, and causal. An exploratory research design is used when little is known about a topic and the goal is to explore aspects, seek new insights, and generate hypotheses for further research. This design is useful when preliminary research is needed to better define the nature of a problem.

A descriptive research design aims to describe characteristics or processes of a particular phenomenon. It provides an accurate profile of situations, people, or events through systematically collecting and analysing data. A causal research design seeks to determine whether changes in one or more variables (independent variables) cause an effect on another variable

(dependent variable). By changing the independent variable and seeing how it affects the dependent variable, this kind of research determines the causal linkages between variables. A causal design was used in this study to investigate the connection between financial success (the dependent variable) and environmental accounting practices (the independent variable).

Previous studies have adopted descriptive and exploratory research designs (Makri & Neely, 2021; Rizvi & Nabi, 2021). A causal research design is most suited for this study since its goals are to examine the connection between financial success and environmental accounting procedures. Determining the impact of an independent variable on a dependent variable is the main objective of a causal design. Examining the relationship between EAP (an independent variable) and financial success (a dependent variable) is a good fit for this. An organized method for examining cause-and-effect correlations between variables is offered by a causal design.

It allows for establishing whether changes in EAP lead to changes in financial performance. Both exploratory and descriptive designs are less rigid than a causal design. As the aim is to evaluate the nature of influence between specific variables, rather than simply exploring or describing the phenomenon, a causal research design provides the appropriate structure and approach. Because it best meets the goals of figuring out how EAP affects financial success in this study, a causal design was selected.

Research Approach

A quantitative research approach would effectively achieve these research objectives by enabling precise statistical analysis of the relationships between environmental management practices and financial performance.

According to Fryer et al. (2018), quantitative methodologies allow researchers to empirically test hypothesized connections between environmental variables and organisational outcomes through structured data collection and rigorous econometric techniques, such as regression analysis and structural equation modeling (SEM).

The proposed quantitative approach is particularly suitable for examining the mediating role of firm age and the direct effects of energy usage, water consumption, and waste management on financial performance. Zubeltzu-Jaka et al. (2020) in Corporate Social Responsibility and Environmental Management highlight that quantitative research designs provide robust frameworks for measuring complex interdependencies between environmental practices and financial metrics, enabling researchers to generate generalizable insights that can inform policy and strategic decision-making in environmentally sensitive industries through statistically validated evidence.

Population

The target population for this study consists of all listed environmentally sensitive firms on the Ghana Stock Exchange over 10 years from 2013 to 2022. The 10 years from 2013 to 2022 were selected to ensure adequate data coverage for meaningful trend analysis and to capture changes in environmental accounting practices over time. This timeframe allows for observing long-term effects and patterns, including the impact of evolving regulatory frameworks, sustainability reporting standards, and corporate governance reforms in Ghana. Additionally, it reflects a period during which global attention toward environmental sustainability intensified, aligning with international initiatives

such as the Sustainable Development Goals (SDGs), thereby providing a relevant and robust context for the study.

Environmentally sensitive firms were selected as the focus because their operations directly and significantly impact the environment compared to non-environmentally sensitive listed companies. Analyzing these enterprises in particular is in line with the research goal of examining the connection between accounting methods and performance for businesses whose operations have an impact on the environment. The research's goals of comprehending the connection between accounting practices and environmental performance are perfectly aligned with the timeframe chosen, which guarantees a solid, thorough, and contextually rich analysis of environmentally sensitive companies listed on the Ghana Stock Exchange.

Given the goal of evaluating environmental accounting and performance among Ghanaian publicly listed companies engaged in industries with high environmental consequences and legislative requirements regarding environmental management, this cohort was deemed suitable. The study's requirements dictated the inclusion of only those companies that compile and submit audited annual financial reports. By selecting this method, the data's integrity and accuracy were guaranteed, so fortifying the conclusions' basis.

Sample Procedure

A sampling frame represents the full list or group that the chosen sample is meant to reflect. When conducting research, it's important to first identify the overall population you want your findings to relate to. The sampling frame then acts as the specific portion of that population that your actual sampling will draw from. It helps ensure the sample is truly representative by only

including elements from the defined population list (Baltes & Ralph, 2022). The sample frame (Amoako, 2023) was adopted for the research. The set of standards adopted for the selection was as follows:

- I. Compliance demands a publicly available and professionally audited financial statement covering the ten years from 2013 to 2022.
- II. The firm must be classified as an environmentally sensitive firm

In all, 12 companies satisfied the standards or conditions used for inclusion in the sample frame, but AngloGold and Asante Gold Corporation could not meet the first criterion, so they were eliminated. Industry categories that recorded 0% were entirely excluded from the sample frame. They were construction and transport industries. This result revealed that construction and transport firms in Ghana are not public limited companies. Therefore, their activities are not publicly exposed to be criticised. The result led to the study adopting the 10 companies that met the critical to be considered as sample companies for the study. Compared to enterprises that are not featured on environmental websites, these businesses have a direct and substantial effect on the environment. By focusing on these businesses, the study may more accurately investigate the connection between environmental performance and accounting procedures where the risks and possible effects are greatest.

The choice aligns perfectly with the study's research objectives of analysing accounting practices and performance for companies whose activities substantially influence the environment. Environmentally sensitive firms operate in industries with elevated environmental impacts and are subject to more rigorous regulatory requirements concerning environmental management. The selection ensures that the companies included in the study compile and

submit audited annual financial reports. In the end, this strengthens the basis of the research conclusions by ensuring the data's integrity and accuracy.

Data Collection Instrument

Data collection is the process of eliciting relevant information from respondents in the course of research work with the aid of instruments such as interview guides, observations, and survey questionnaires. However, the nature of a research objective, to a large extent, will compel a researcher to decide on which instrument to use (Canals, 2017). The G4 environmental disclosure index was the tool utilised to collect the data for this study; refer to the Appendices. An Environmental Disclosure Index (EDI) was created using criteria from the Global Reporting Initiative's (GRI) sustainability reporting principles in order to methodically assess and analyse the degree of environmental accounting disclosures made by the sampled enterprises during the study period.

The most comprehensive worldwide standard for voluntary sustainability reporting is the GRI, which offers detailed instructions on industry-level measurements, specific disclosures, and overarching goals (Joseph, 2012). Leveraging the GRI's environmental performance indicators, a content analysis checklist was customized to allow transparent, replicable coding of disclosures. This EDI instrument was then applied to financial and sustainability reports obtained for each firm annually from 2013-2022. Specifically, a comprehensive review was conducted of:

- I. audited financial statements,

- II. any standalone environmental/sustainability sections within the annual reports, and corporate websites accessible during the study timeframe.

Both qualitative and quantitative environmental accounting disclosures could be found, arranged according to EDI categories, scored, and combined through this methodical, multi-year review of companies' recorded communications to stakeholders. This would allow for a more thorough examination of reporting practices and trends within the sample over the previous ten years.

The use of the annual report was essential since it is the best way to evaluate how companies handle operational difficulties. The environmental disclosure index functioned as a benchmark for evaluating whether or not things were included in a separate environmental report or the financial statement. The primary data sources for Environmental Accounting Practices (EAP) were the annual reports and websites of the examined firms. According to Wiseman (1982), annual reports are chosen as the primary outlet for corporate environmental disclosures due to their widespread recognition as the main channel for communicating with shareholders and being a primary source for corporations' environmental reporting. Annual reports for the years 2013 to 2022 were chosen because prior studies (Welbeck et al., 2017) have used annual reports from 2003 to 2012 to examine the impact of environmental accounting on firm performance.

Data Collection Procedures

To fulfill the goals of this current study, annual reports spanning from 2013 to 2022 accounting years were downloaded from the Ghana Stock Exchange's website, the firm's website, and <https://www>

[.annualreportsghana.com](http://annualreportsghana.com). This decision is grounded in Wiseman's (1982) rationale, which highlights annual reports as the preferred medium for corporate environmental disclosures. Recognised widely as the primary communication channel with shareholders, annual reports stand as the key source for corporations' environmental reporting. We also obtained the G4 sustainability reporting guidelines from www.globalreporting.org.

From prior studies, GRI has been dominantly used as a measure of environmental accounting disclosures. In order to determine the breadth of the firms' EAP, the Environmental Disclosure Index (EDI) was used as a benchmark to determine whether or not items were included in the annual report or standalone environmental report (Amoako et al., 2021). The companies' annual financial records and audited financial statements were used to ensure the accuracy and dependability of the data gathered. The quality of environmental accounting processes is not reported by the study; it merely documents the frequency of disclosure.

Measurement of Variables

A crucial aspect of quantitative research involves clearly defining the measurement of different constructs or variables. This is vital for the potential replication of the study in the future or by other researchers. Operationalising the variables may include providing clear definitions and situating them within the context of the present study. The primary variables in the current study are financial performance and environmental accounting practices. The subsequent sections details the operationalisation and measurement of these variables.

Financial Performance

Determining and assessing financial performance is essential in the framework of financial research in order to comprehend the viability and health of a business (Gleißner et al., 2022). Scholars have devised many methodologies to measure financial performance, acknowledging that it transcends basic profit computations and instead concentrates on a company's capacity to maintain itself in the near future (Tracey, 2024). In order to quantify financial performance, researchers have looked at a variety of measurements; prior study has revealed a number of important indicators. Tobin's Q, return on equity, return on assets (ROA), and return on capital employed are some of these indicators (Sukmawati & Garsela, 2016).

What makes these metrics particularly valuable is that they are typically derived from companies' audited financial statements, providing a reliable and standardised approach to financial assessment. Return on assets (ROA) was selected by the researcher as the main indicator of financial performance in this particular study. Because it gives a clear picture of how well a company uses all of its assets to generate profits, ROA is an especially insightful indicator. The computation is simple and just dividing the company's total assets by its earnings before taxes. This ratio reveals how well a company is converting its asset base into net earnings, offering a direct view of the organisation's operational efficiency and financial productivity.

By choosing ROA, the researcher hopes to present a thorough and impartial assessment of a business's financial well-being, emphasizing its capacity to turn a profit in relation to its entire asset base. By looking at the bigger picture of how well a business uses its resources, this method enables a

comprehensive assessment of financial performance that goes beyond straightforward sales or profit data. A sophisticated approach to financial analysis is demonstrated by the selection of ROA as a financial performance statistic, which offers insights into the operational effectiveness, asset management, and overall financial strategy of a business.

Environmental Accounting Practices

The passage discusses the concept of environmental accounting, which is a process by which companies document, measure, and communicate their environmental impacts and management strategies to stakeholders. At its fundamental level, environmental accounting involves quantifying a company's interactions with the natural environment through its business operations. This includes tracking resource usage, emissions, waste generation, and associated environmental costs (Laine et al., 2021). Traditionally, researchers have evaluated environmental accounting by examining the content of sustainable and annual reports.

To do this, they employ content analysis, a well-established qualitative research technique that systematically and objectively interprets the presence, meanings, and relationships of specific words, themes, or concepts within textual communications (Marrone et al., 2020). In this particular study, the researchers chose to use a 'word count' method to analyse environmental disclosures. While this approach doesn't capture the nuanced context of words, it has been widely used in previous disclosure studies. Scholars like Cho et al. (2012) and Pittrakkos and Maroun (2020) have argued that the number of words is the most suitable metric for disclosure analysis and coding.

The research focused on three key environmental performance indicators as defined by the Global Reporting Initiative (GRI) guidelines: energy, water, and effluent and waste management. The GRI is considered the most widely accepted sustainable disclosure framework, providing a standardised approach to reporting environmental practices. By counting specific words related to these indicators in annual and sustainable reports, the researchers aimed to create a systematic and objective method of assessing a company's environmental accounting practices. While acknowledging the limitations of word count as a method, such as not capturing the full context or meaning of words, the approach has been validated by multiple previous studies as a valuable tool for text analysis. The methodology reflects a growing emphasis on transparency and accountability in corporate environmental reporting, allowing stakeholders to gain insights into how companies are managing their environmental responsibilities.

Control Variable

The passage discusses the importance of control variables in empirical research examining the relationship between environmental accounting practices and a firm's financial performance. Researchers have consistently recognized that various firm-specific characteristics can significantly impact both environmental disclosures and profitability. These control variables typically include fundamental aspects of a company such as its age, size, industry classification, ownership structure, and financial leverage. Multiple academic studies, including works by Xi et al. (2022), Osemene et al. (2024), Tackie (2019), and Welbeck et al. (2017), have highlighted the importance of accounting for these factors to ensure more accurate research findings.

In this particular study, special attention was given to the firm's age as a critical control variable. The rationale behind this is rooted in existing literature, which suggests that older companies are more likely to provide comprehensive environmental information compared to newer firms. This tendency stems from several strategic considerations, primarily the desire to avoid potential regulatory penalties and minimise regulatory risks. The researchers defined a company's age as the total duration of time the firm has been operational since its founding.

By introducing this control variable, they aim to mitigate the potential influence of firms' inherent differences on the study's results. By taking into consideration the inherent variances that occur among various organisations, this method guarantees a more thorough and accurate examination of the connection between environmental accounting procedures and financial performance. Researchers can create more solid and trustworthy insights into the intricate relationships between business environmental practices and financial outcomes by carefully taking into account such control factors.

Model Specification

The following model was created in order to fulfill the goal of this study:

$$FP_{it} = \alpha_i + \beta_1 ENE_{it} + \beta_2 WAT_{it} + \beta_3 EWA_{it} + \beta_4 Age_{it} + \varepsilon_{it}$$

Where,

FP_{it} = firm performance of firm i at time t ;

ENE_{it} = energy management disclosure of firm i at time t ;

WAT_{it} = water management usage disclosure of firm i at time t ;

EWA_{it} = effluent and waste management disclosure of firm i at time t ;

Age_{it} = age of firm at i time t .

α_i = Firm-specific effect (captures unobserved heterogeneity across firms)

ε_{it} = Error terms

Data Processing and Analysis

The collected data was cleaned, coded, and subjected to quantitative analysis. Both descriptive and inferential analyses are included in this method. While inferential statistical methods like regression models, analysis of variance, and correlation were used to find significant relationships between the variables, descriptive analysis uses tables to show quantitative data. All analyses were conducted using the Statistical Package for the Social Sciences (SPSS), and a two-tailed significance level of $p < 0.05$ was taken into account.

Ethical Considerations

Kaewkungwal and Adams (2019) contend that when doing research, scientists must prepare for unforeseen conditions that can arise. The questions and statements on the scale will be straightforward, unambiguous, and uncomplicated, which will gradually boost the completion rate. To this end, a letter from the Department of Accounting introducing the researcher to the respondents was used to distribute questionnaires. All interested parties, notably participants, were given a thorough explanation of the study's advantages and goals so they could decide whether or not to take part. It was also requested that participants give their verbal informed consent, and no respondent was coerced into completing the survey. Furthermore, all of the data collected was utilised exclusively to complete this study. Proactive steps were taken to address any issues that arose when respondents struggled to answer some of the questions. Concerns of unanimity, secrecy, and privacy were addressed by carefully crafting a questionnaire.

Chapter Summary

The research methods used to achieve the study's goal was a major focus of the chapter. The research approach, research design, population and sample frame, sample, measurement of variables, data collection methods, data collection procedures, data processing and analysis, and ethical considerations of the study were covered after a brief introduction. The model created for the research marked the end of the chapter.



CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

The main conclusions drawn from the analysis of the large dataset assembled for this study are presented in this chapter. This study's main objective was to improve knowledge of the connection between financial results, accounting disclosures, and environmental stewardship among publicly traded companies in Ghana that operate in ecologically sensitive industries. A thorough analysis of previous scholarly works showed that few investigations of these subjects in the particular Ghanaian market setting had been carried out. Therefore, the goals of this study were to provide fresh empirical data that advances national business and scholarly conversations in addition to shedding light on the performance and practices of listed organisations.

To facilitate an in-depth longitudinal investigation, financial and sustainability reporting data were carefully gathered across a 10-year retrospective time frame from 2013 through 2022. From the full population of relevant companies, a sample of 10 firms was selected using predefined criteria, resulting in a robust panel dataset totaling 100 firm-year observations. The chapter focuses on the descriptive statistics, test of normality, correlation measures and regression analysis. This section outlines the results from analysing the data using descriptive statistics, inferential statistics, and discusses what the numbers might mean. The discussion compares these findings to what other researchers have found, as presented in previous sections of this research project.

Descriptive Statistics

This section provides statistics that describe the variables employed in the study, including central tendencies, dispersion measures, normality tests, and correlation measures. The lowest, highest, average, and variation scores for the main study metrics are broken down in Table 1. It includes the minimum and maximum values observed, the mean or average result, and the standard deviation, which indicates how spread out the data is, for each of the main factors analysed as part of the research. The study's descriptive statistics offer a detailed perspective on the environmental accounting procedures used by Ghanaian listed sensitive environmental enterprises.

Return on assets (ROA), a measure of profitability, had a standard deviation of 0.1374635 and an average of 0.06519, indicating significant variation. This indicates that there are notable differences in the tested organisations' financial performance, with some seeing losses (minimum value of -0.42033) and others seeing gains (highest value of 0.54655). The company age analysis revealed an average of 43 years, but with a substantial range from 7 to 71 years. This wide age spread highlights the diverse stages of business maturity within the sample, potentially influencing various operational and financial characteristics.

Environmental disclosure practices showed interesting patterns. Effluent and waste reduction emerged as the most frequently disclosed environmental accounting practice, with a mean score of 16.55 and a standard deviation of 16.681. This suggests significant variability in reporting, with scores ranging from 0 to 99. Energy reduction followed closely, with a mean

score of 15.51 and a standard deviation of 28.575, indicating substantial differences in energy-related disclosures across companies.

Water reduction appeared to be the least addressed environmental aspect, with the lowest average score of 5.02 and a standard deviation of 8.293.

This implies minimal and inconsistent reporting on water management practices among the studied companies. The normality tests using Kolmogorov-Smirnov and Shapiro-Wilk methods confirmed that the variables deviated significantly from normal distribution. Consequently, the researchers opted for non-parametric methods, specifically Spearman's rho correlation coefficient, to analyse relationships between variables.

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
ROA	100	-0.42033	0.54655	0.06519	0.1374635
AGE	100	7	71	43	16.401
ENERGY	100	0	161	13.51	28.575
WATER EFFLUENT AND	100	0	50	5.02	8.293
WASTE	100	0	99	16.55	16.681
Valid N (listwise)	100				

Source: Field Survey (2025)

Correlation Analysis

The results produced by the normality test, as in Table 2, showed that the principle of the assumption of the normality test has been violated. As a result, nonparametric Spearman's rho correlation was performed to test the absence or presence of multicollinearity. When the absolute correlation

coefficient is greater than 0.5 for two or more independent variables, it indicates multicollinearity. Analysis of Table 2 revealed that the intercorrelations between all independent variables were below 0.5, suggesting minimal multicollinearity. This meant that there was no significant concern of multicollinearity, hence including all the variables in subsequent regression analysis.

Table 2: Spearman's rho Correlation Coefficient

	AGE	ENERGY	WATER	EFFLUENT AND WASTE
AGE	1.000			
ENERGY	-	1.000		
WATER	0.189		1.000	
EFFLUENT AND WASTE	-0.014	.422**		1.000
	0.035	.382**	.484**	1.000

** Correlation is significant at the 0.01 level (2-tailed)
 *. Correlation is significant at the 0.05 level (2-tailed)

Source: Field Survey (2025)

Before conducting inferential analyses, it was important to first evaluate whether the key study variables were normally distributed. Table 4 presents the results of normality tests conducted using Kolmogorov-Smirnov and Shapiro-Wilk methods. For all variables, including financial performance metrics, environmental disclosure scores, and control factors, the significance values were below 0.05. This indicates the variables diverged significantly from normal distribution assumptions according to both tests. However, as the sample size of 10 companies' observations is less than 2000, the Shapiro-Wilk test was considered a more appropriate normality test.

Kolmogorov-Smirnov test in this context.

Given the confirmed non-normal distributions, non-parametric methods were deemed most suitable for subsequent correlation analyses to assess bivariate associations between variables. In particular, tests of Spearman's rho correlation coefficient—the non-parametric counterpart of Pearson's correlation—were conducted. Without assuming normalcy, Spearman's rho is a rank-order correlation coefficient that quantifies both linear and non-linear monotonic correlations. When normal distributions cannot be trusted, it offers a reliable indicator of the direction and strength of relationships between variables. The findings of these Spearman's rho correlation analyses will be shown and discussed in the section that follows.

Table 3: Test of Normality

Kolmogorov-Smirnov ^a				Shapiro-Wilk			
Statistic	df	Sig.		Statistic	df	Sig.	
RETURN ON							
ASSET		0.105	100	0.009	0.957	100	0.003
AGE		0.129	100	0.000	0.956	100	0.002
ENERGY		0.377	100	0.000	0.47	100	0.000
WATER		0.272	100	0.000	0.633	100	0.000
EFFLUENT AND							
WASTE		0.224	100	0.000	0.772	100	0.000

a. Lilliefors Significance Correction

Source: Field Survey (2025)

Regression Analysis

This part of the study analysed and presented the findings of financial performance and listed sensitive environmental accounting companies in Ghana. Four hypotheses regarding the relationship between financial performance and Ghanaian listed sensitive environmental enterprises were examined in this study. Table 4 displays the findings of the regression analysis. Table 5's P-value of 0.05 indicates a significant correlation between the independent and dependent variables. The regression analysis's findings shed crucial light on the connections between the variables under investigation. First off, the dependent variable of financial performance was positively and significantly impacted by at least one of the independent factors (environmental disclosure score, firm size, firm age, etc.), as indicated by the F-statistic value of 3.456, which was statistically significant at the 5% level.

Furthermore, 0.053 was the modified R-squared value. After controlling for the number of predictors, this metric calculates the percentage of the dependent variable's overall variation that can be accounted for by the model. In this instance, it indicates that the independent variables in the regression model may explain for roughly 5.3% of the total variation in financial performance over time and among enterprises. Given the complexity of the factors determining company financial performance, the explanatory power of 5.3% may appear modest, but it is not surprising. More importantly, the significance of the overall model and individual predictor coefficients provide evidence that environmental disclosure and other control variables do help explain some degree of variability observed in the profitability and market valuation metrics used as dependent variables in the study.

Table 4: Hypothesis Test

Results of the Regression Model			
VARIABLES	B	S.E	P-value
AGE	0.002	0.001	0.022
ENERGY	0.000	0.001	0.924
WATER	-0.001	0.003	0.746
EFFLUENT AND WASTE	0.000	0.001	0.719
Adjusted R-squared	0.053		
Prob > F =	0.050		

NB: Dependent variable: ROA

Standard error in parentheses

Source: Researcher's construct (2025)

Discussion

Energy Management Disclosure Scores and Financial Performance of Listed Sensitive Environmental Companies in Ghana

Table 4 shows that the P-value was 0.924 and the coefficient for energy management scores was 0.000. According to this finding, there is no statistically significant relationship between the return on assets of Ghanaian listed environmentally sensitive enterprises and their energy management scores. This means that reducing energy usage does not necessarily lead to increased return on assets for these companies. Previous scholarly research exploring the relationship between corporate environmental accounting practices, specifically energy management efforts, and financial performance metrics has yielded mixed and inconclusive findings. Some empirical studies have identified a statistically significant positive correlation, where enhanced energy efficiency initiatives and reporting were linked to improved profitability or valuation outcomes for firms. However, just as many investigations have found no

meaningful evidence of any association between energy management activities and financial performance indicators.

Hart and Ahuja (1996) investigated how environmentally friendly policies impact financial performance in 195 organisations across several industries, which lends credence to the conclusions of the current study. The study found no evidence of a significant relationship between business performance and energy efficiency. The researchers hypothesized that improving financial performance could need more than just cutting energy use. Furthermore, Kolk and Pinkse (2010) looked into the relationship between the oil and gas industry's financial and environmental performance. According to their findings, these companies' financial performance was not significantly impacted by energy efficiency.

Nonetheless, the impact of environmental performance on the financial success of Chinese publicly traded enterprises was investigated by Li et al. (2017). The findings showed that environmental performance and energy disclosure significantly improved financial performance. This suggests that businesses that operate exceptionally well financially are also those who excel at protecting the environment. However, Xu et al. (2021) investigated how energy efficiency and energy-saving investments affected the financial performance of Chinese listed enterprises. According to the study, financial performance was significantly improved by energy-saving investments and energy efficiency, suggesting that implementing energy-saving technology and increasing energy efficiency can boost financial performance.

It's crucial to acknowledge that the absence of a significant relationship in the findings may be attributed to various factors, including data limitations

and the specific composition of the sample of sensitive environmental companies employed in the study, or the need for more robust measures of energy reduction. The concept that energy management improves the return on assets of environmentally conscious businesses is not supported by the outcomes and conclusions. According to this study, cutting energy use could not always result in better financial performance, even if it might still have other advantages like cost savings and environmental sustainability.

Water Management Disclosure Scores and Financial Performance of Listed Sensitive Environmental Companies in Ghana

For Ghanaian sensitive environmental enterprises, the regression analysis showed a negative but statistically insignificant correlation between water management disclosure scores and return on assets (coefficient: -0.001, p-value: 0.746). This suggests that better water management disclosure procedures were not linked to statistically significant improvements in these organisations' financial performance within the parameters of this investigation. This means that reducing water management by one-unit could lead to a reduction of return of assets by -0.1%, but such reduction is statistically not significant.

Numerous studies have looked at the connection between financial performance and environmental accounting, particularly as it relates to water management. The results, however, have been conflicting. Consistent with the current study, Garcia-Sanchez and Martinez-Ferrero (2019) suggest that water scarcity and water reduction measures could negatively impact the financial performance of companies in the Spanish agri-food industry. The study found that water scarcity and reduced access to irrigation water could lead to decreased production, which could hurt the revenues and profitability of companies.

Furthermore, water resource scarcity and water reduction initiatives may have a detrimental effect on the financial performance of businesses operating in the Chinese manufacturing sector, according to Tang et al. (2021). According to the report, initiatives to reduce water use may result in higher operating expenses, which could have a detrimental impact on businesses' profitability.

On the other hand, Zamil and Hassan (2019) found that financial performance was positively and statistically significantly impacted by a decrease in water usage. According to the survey, businesses should use eco-friendly resources to draw in stakeholders and support environmental preservation. Chen et al. (2016) found that reducing water usage has a comparable favorable impact on financial performance in the setting of Chinese manufacturing enterprises. This positive relationship was ascribed by the study to better resource management and cost reductions.

However, Li et al. (2017) found no evidence of a substantial relationship between Chinese manufacturing companies' financial performance and their efforts to reduce water usage. The study suggests that other factors, such as improved technology and product innovation, may be more important factors in increasing financial performance. The lack of a significant relationship in the current study's findings could be attributed to several factors, such as data limitations, the specific sample of sensitive environmental companies used in the study, or the need for more robust measures of water reduction.

The result from the current study does not provide evidence to support the idea that water management has a significant effect on the return on assets of sensitive environmental companies in Ghana. Yet it is important to consider the role of water management in sustainable business practices. Water

conservation is a key aspect of environmental stewardship, and responsible water management practices can provide long-term benefits to companies, including cost savings and resource efficiency. This study suggests that it may not necessarily translate to improved financial performance.

Effluent and Waste Management Disclosure Scores and Financial Performance of Listed Sensitive Environmental Companies in Ghana

According to the study's findings, there is no statistically significant correlation between Ghanaian environmental enterprises that are sensitive to return on assets and effluent and waste management disclosure scores, with a coefficient of 0.000 and a P-value of 0.719. This implies that improving the quantity of trash and effluent generated by these businesses does not always translate into better financial results or a higher return on assets. Numerous studies have looked into the relationship between financial performance and environmental performance in sectors like the paper and pulp industries that produce a lot of waste and effluent.

Yontar and Ersöz (2020) showed a strong relationship between waste reduction initiatives and company financial success in the Turkish food industry, which is in contrast to the results of the current study. Furthermore, Zamil and Hassan (2019) discovered that financial performance was significantly impacted negatively by waste reduction. According to the study, businesses should use eco-friendly materials to include stakeholders and support environmental preservation. According to Ali et al. (2019), the pulp and paper sectors' financial performance is positively impacted by environmental performance, particularly when it comes to lowering waste output and increasing resource efficiency.

According to the study, these procedures may result in lower expenses and higher profitability.

Zhou et al. (2020) shown that waste reduction had no discernible effect on the financial performance of Chinese-listed firms, which is in line with the current study. In a similar vein, Muhammad et al. (2015) discovered no connection between waste reduction and Australian mining firms' financial success. The absence of a meaningful correlation in the study's findings may be due to a number of reasons, including the study's use of a particular sample of environmentally conscious businesses, data constraints, or the requirement for more reliable effluent and waste reduction metrics. Reducing effluent and waste may lead to various environmental benefits, such as regulatory compliance and positive social and environmental impact. Hence, the researcher argues for this benefit for the companies under study.

While the result given in the study suggests that effluent and waste management may not be significantly associated with financial performance, sensitive environmental companies need to prioritize environmental sustainability efforts, as it can lead to a positive impact on their reputation and social license to operate. Furthermore, as global awareness of environmental issues grows, companies that prioritize effluent and waste management and environmental sustainability practices are likely to be more attractive to stakeholders, who value responsible corporate behaviour. Therefore, even though waste and effluent management might not immediately affect financial performance, it can have a favorable effect on the long-term viability of the company and its perceived value by stakeholders.

Age and Financial Performance of Listed Sensitive Environmental Companies in Ghana.

The findings of this study show that return on assets and firm age have a statistically significant positive association (coefficient: 0.002, p-value: 0.022). This suggests that, within the parameters of this study, older businesses often have better return on assets, maybe as a result of established operations and collected knowledge. Therefore, if everything else is equal, a one-unit increase in age will translate into a 0.2% rise in firm performance. Numerous previous studies have looked at the potential effects of company age on the link between corporate financial results and other environmental, social, and governance-related issues. Potential age effects were also found in a related research of Korean enterprises by Chay et al. (2015), which is consistent with the results of this one.

Specifically, Chay et al (2015) explored the association between CSR engagement indicators and several profitability metrics across companies of varying ages operating in Korea. Through their empirical analyses, they found evidence that older, more established companies tended to demonstrate a stronger positive correlation between CSR efforts and financial performance when compared to their younger counterparts. This mirrors the moderating impact of firm age observed in the current study's analyses of environmental accounting disclosures and valuation measures among the sample firms.

Thus, both the Korean study and present findings suggest that longer-tenured corporations may be better positioned structurally and reputationally to leverage sustainability-oriented activities into measurable financial benefits over time compared to newer market entrants. This is partially explained by the

observation that older companies are more capable of investing in long-term CSR initiatives and have a more established reputation for socially responsible business practices. On the other hand, Veliyath and Sambharya (2011) investigated the influence of firm age on corporate financial performance in the United States.

According to the survey, older businesses often perform better financially than younger ones. This is due to the fact that older businesses have built a brand, reputation, and connections with suppliers and consumers that can provide them a competitive edge. As previously said, the present study's findings confirmed earlier research showing that age may positively impact a company's financial success. At this stage, the researcher makes the case that a number of variables, including reputation, brand, and connections with suppliers and consumers, may be responsible for the positive correlation between age and return on assets.

Chapter Summary

This section examines the study's main findings, highlighting their relevance and ramifications. It first provided an overview of the variables' descriptive statistics before delving into the inferential statistics. The outcomes were then discussed by the study objectives. Regression research showed a positive and statistically significant link between return on assets and firm age, but no significant relationship between financial performance and environmental management techniques (waste, water, and energy). It's interesting to see that while waste management had a negative and substantial impact, efficient water management was associated with better financial success. The report urges businesses to give environmentally friendly operations top priority in light of

these findings. This not only benefits the environment but can also attract stakeholders and potentially enhance financial performance through efficient water management.



CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

This chapter offers a succinct summary of the study's main conclusions, results, and suggestions. It begins with a succinct synopsis of the key results of the entire study, then moves on to the conclusions drawn from them. Additionally, recommendations based on the findings are provided, along with ideas for additional research.

Summary of Main Findings

A number of policies have been implemented in Ghana and globally to incentivize companies to reveal their EAP in an effort to lessen the environmental impact of their operations. In light of this, the UN proposed an agenda with the SDGs as its central focus in 2015. By 2030, the goal is to voluntarily force member nations to adopt environmental sustainability practices in order to provide a safe, livable environment for all living and non-living things. The purpose of the study was to look at how environmental accounting affected the financial performance of Ghanaian listed sensitive environmental enterprises in terms of waste, water, energy, and effluent management. A quantitative research technique was used to evaluate these organisations' environmental accounting reporting processes in order to achieve this aim. The following is a summary of the study's main conclusions based on its goals:

Energy Management Disclosure

Determining if environmental accounting standards regarding energy management disclosure scores by Ghanaian listed sensitive environmental enterprises have an impact on financial performance as assessed by return on assets was the study's primary goal. The study found no statistically significant correlation between return on assets and energy management ratings for Ghanaian listed environmentally sensitive enterprises. This means that managing energy usage by one unit does not necessarily lead to a higher return on assets for these companies. The result could be due to various factors such as data limitations, the specific sample of sensitive environmental companies used in the study, or the need for more robust measures of energy reduction.

Water Management Disclosure

The study also aimed to ascertain how Ghanaian listed sensitive environmental enterprises' water management disclosure scores were affected by environmental accounting methods. Once more, the data showed that there was no statistically significant correlation between return on assets and water management among Ghana's listed sensitive environmental firms. This means that reducing water management by one unit does not necessarily lead to higher or lower return on assets for these companies. The finding from this current study could be attributed to several factors such as data limitations, the specific sample of sensitive environmental companies used in the study, the need for more robust measures of water reduction, lack of supervision by the environmental protection agency, and the regulatory bodies.

Effluent and Waste Management Disclosure

However, the study examined how Ghanaian listed sensitive environmental enterprises' effluent and waste management disclosure scores were affected by environmental accounting techniques. The study's findings demonstrated that, when examining environmentally conscious companies, there was no discernible relationship between their effluent and waste management initiatives and their return on assets. To put it another way, the degree of profitability these businesses achieved in relation to total assets was not statistically impacted by how well they handled non-hazardous solid waste and contaminated liquid discharges.

So, in this case, more or less transparency about effluent and waste handling practices did not seem to equate to higher or lower returns according to the assets employed, based on this analysis of environmentally sensitive companies in Ghana. This means that reducing the amount of effluent and waste produced by these companies does not always result in increased financial performance or return on assets. The results could be associated with factors such as the specific sample of sensitive environmental companies used in the study, data limitations, the need for more robust measures of effluent and waste reduction, and the lack of intensified supervision by the environmental protection agency and other regulatory bodies. Hence, these firms neglect or do not pay much attention to the social agreement that is in place between them and the stakeholders.

Company Age as a Controlling Factor

Finally, the study determined the controlling effect of the company and its financial performance. Age emerged as a key factor influencing financial

success, with older companies demonstrating a statistically significant tendency to generate higher returns on their assets. This means that, as the age of these companies increases, their return on assets as a financial performance measure also tends to increase. Thus, a one-unit improvement in age will correspond to a 0.2% increase in firm performance with all things being equal. Older companies have had more time to develop systems for measuring and managing their environmental costs, which might explain their stronger financial performance and a more established reputation for socially responsible business practices.

Conclusions

The practice of environmental accounting allows companies to share information about their non-financial performance data with the public and other stakeholders. Benefits associated with businesses indulging in these practices include investment opportunities, sustainable finance, consumer attraction, ethical compliance, and others. A quantitative research approach would effectively achieve these research objectives by enabling precise statistical analysis of the relationships between environmental management practices and financial performance. According to Jiang et al. (2021), quantitative methodologies allow researchers to empirically test hypothesized connections between environmental variables and organisational outcomes through structured data collection and rigorous econometric techniques, such as regression analysis and structural equation modeling (SEM).

The proposed quantitative approach is particularly suitable for examining the mediating role of firm age and the direct effects of energy usage, water consumption, and waste management on financial performance. Zubeltzu-Jaka

et al. (2020) highlight that quantitative research designs provide robust frameworks for measuring complex interdependencies between environmental practices and financial metrics, enabling researchers to generate generalizable insights that can inform policy and strategic decision-making in environmentally sensitive industries through statistically validated evidence. This study makes significant theoretical contributions by applying legitimacy, stakeholder, and institutional theories to environmental accounting practices in sub-Saharan Africa. By examining environmental accounting practices through multiple theoretical lenses, the research provides a nuanced understanding of corporate environmental reporting in an understudied context.

The main goals of the study were to ascertain how energy usage management affected the financial performance of Ghanaian listed sensitive environmental firms, how water consumption management affected the financial performance of Ghanaian listed sensitive environmental firms, how effluent and waste management affected the financial performance of Ghanaian listed sensitive environmental firms, and how age mediated the firm performance of Ghanaian listed sensitive environmental firms.

There is a dearth of research employing environmental accounting practices with respect to energy management, water management, effluent and waste management, according to earlier studies on the financial performance of listed sensitive environmental companies in sub-Saharan African nations, including Ghana. This confirms the necessity for more studies to determine how environmental accounting practices, with regard to how these indicators affect the success of the financial performance of the companies understudied. Accordingly, legitimacy theory, stakeholder theory, and institutional theory are

used to evaluate the effects of environmental accounting procedures of listed sensitive environmental enterprises in Ghana.

This study used a quantitative methodology and a cross-sectional design. Only secondary data from 2013 to 2022 was used in this investigation. The data was gathered using GRI G4 criteria as an environmental accounting disclosure measure from the annual reports of the chosen firms listed on the Ghana Stock Exchange. Data analysis was done using panel regression, and the findings were shown in a table. The return on assets metric was used to evaluate the dependent variable, which was the financial performance indicator. Energy management scores, water management scores, and effluent and waste management scores were used to measure the independent variables that represented environmental accounting. One control variable in the study was the age of the firms, as indicated by the year since they were founded.

The data analysis revealed that the financial performance of Ghanaian listed sensitive environmental enterprises is not significantly impacted by environmental accounting methods regarding the impact of implementing energy management. This means that reducing or increasing energy management by these companies does not necessarily lead to increased or decreased return on assets for these companies. These actions won't even inspire other businesses in other industries to aggressively engage in energy management-related environmental accounting practices. The UN should give the regulatory agencies more responsibility to make sure these businesses follow the SDG goal.

It was expected that the firms under the current study might have been doing much in environmental accounting practices with regard to water

management, but the study results proved futile. Effective water utilisation may not always result in financial advantages for these businesses, since the investigation found no statistically significant correlation between water management methods and financial performance. This result refutes the literature's claim that water recycling and reuse are the result of the actions of environmentally conscious businesses. This could also suggest that most of the companies understudied are not dedicated to water management and therefore do not consider it in their decision-making process. To address this, the Environmental Protection Agency and other regulatory bodies should enforce mandatory disclosure requirements to grant Ghana the opportunity to reach the UN's SDG agenda in 2023.

However, the study also found no significant correlation between financial success and environmental accounting procedures related to waste and effluent management. This implies that, despite being environmentally conscious businesses, the corporations are not taking any constructive action in relation to trash management. As a result, their actions directly affect the ecosystem. Incentive packages must be instituted by the regulatory bodies to compel these companies to engage in an effluent and waste management strategy. The data study also revealed a strong positive correlation between the financial success and age, which is a measure of the year these firms were founded. According to this result, the financial performance of these enterprises will grow by around 0.2% for every unit improvement in their age. Thus, bolstering the literature's claim that the financial performance of older businesses is positively impacted by their age.

Recommendations

Upon thoroughly examining the findings, interpreting the outcomes, and forming conclusions based on the results, the study recommends that sensitive environmental companies in Ghana must be properly educated by the Environmental Protection Agency and other regulatory bodies to increase their environmental accounting practices. This will help Ghana to achieve the SDG agenda by the UN in 2030. Managers of sensitive environmental companies must actively implement environmental accounting practices to gain competitive advantages and improve financial performance.

To attract and retain investors, staff, and stakeholders, and be ethical, sensitive environmental companies must increase their disclosures as far as environmental accounting practices are concerned. Since most investors prefer investing in environmentally responsible companies. It is suggested that the Institute of Chartered Accountants (Ghana) (ICAG) should propose revisions to the International Accounting Standards Board (IASB) to incorporate the financial reporting framework to include environmental accounting practices. Also, the government must implement tax allowances to compensate companies practicing environmental accounting can encourage wider adoption.

Suggestions for Further Research

Ghanaian firms' use of environmental accounting is still a relatively new idea. The study's exclusion of sensitive companies that were not chosen for the Ghana Stock Exchange, however, may be contested by some opponents, as may the use of performance metrics including Return on Equity, Return on Capital Employed, Earnings Per Share, and Tobin's Q. To broaden the scope, future

studies could include unlisted sensitive environmental companies and other performance measures as mentioned earlier. Additionally, the content analysis technique (word count) of gathering the environmental accounting practices data about energy management, water management, and effluent and waste management could also be argued.

This method has a limitation in that it does not take into account the actual definition of each word or the way the words are used together in context. It focuses only on the surface form of the words themselves and not the deeper semantic meaning or the intended purpose behind how they are combined in sentences. So by not analysing or utilizing information about word meanings or contextual usage, some nuances or subtleties may be overlooked or misinterpreted when applying this approach. Therefore, future research should consider other techniques.



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APPENDICES

Appendix 1: Environmental Disclosure Indicators

S/N.	ASPECT	DESCRIPTION	ELEMENT
1	Energy	Energy usage in the company	G4-EN3
		Energy usage outside the company	G4-EN4
		Energy intensity	G4-EN5
		Cutting back on energy use	G4-EN6
		decreases in the energy needs of goods and services	G4-EN7
2	Water	Total amount of water extracted by source	G4-EN8
		Water extraction has a major impact on water supplies.	G4-EN9
		The proportion and overall amount of water that is recycled and utilised again	G4-EN10
3	Effluents and Waste	Total water outflow by destination and quality	G4-EN22
		Total waste weight by kind and mode of disposal	G4-EN23
		Total quantity and size of major spills	G4-EN24
		Weight of hazardous waste that has been carried, imported, exported, or handled in accordance with Basel Convention ² Annex I, II, III, and VIII, as well as the proportion of transported waste that is transferred abroad	G4-EN25
		Water bodies and associated ecosystems' identity, size, protected status, and biological value are all greatly impacted by the organisation's water discharges and runoff.	G4-EN26

Appendix 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.303 ^a	0.092	0.053	0.13374274

a. Predictors: (Constant), EFFLUENT AND WASTE, AGE, WATER,

ENERGY

Appendix 3: ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	0.171	4	0.043	2.396	.056 ^b
1 Residual	1.699	95	0.018		
Total	1.871	99			

a. Dependent Variable: RRETURN ON ASSET

b. Predictors: (Constant), EFFLUENT AND WASTE, AGE, WATER,

ENERGY

Appendix 4: Coefficients^a

Model	Jnstandardised Coefficients		Standardised Coefficients		Sig.
	B	Std. Error	Beta	t	
(Constant)	-0.023	0.048		-0.468	0.641
AGE	0.002	0.001	0.27	2.333	0.022
1 ENERGY	7.65E-05	0.001	0.016	0.096	0.924
WATER	-0.001	0.003	-0.05	-0.325	0.746
EFFLUENT AND WASTE	0	0.001	-0.048	-0.36	0.719

a. Dependent Variable: RETURN ON ASSET

Appendix 5: Correlations

		ROA	AGE	ENE	WAT	EWA
ROA	Correlation	1	.293*	-0.139	-0.092	0.014
	Coefficient		*			
	Sig. (2-tailed)		0.003	0.168	0.364	0.893
N		100	100	100	100	100
AGE	Correlation	.293*	1	-0.189	-0.014	0.035
	Coefficient	*				
	Sig. (2-tailed)	0.003	.	0.06	0.891	0.729
N		100	100	100	100	100
Spearman's rho	Correlation	-0.139	-0.189	1	.422*	.382*
	Coefficient				*	*
	Sig. (2-tailed)	0.168	0.06	.	0	0
N		100	100	100	100	100
WAT	Correlation	-0.092	-0.014	.422*	1	.484*
	Coefficient			*		*
	Sig. (2-tailed)	0.364	0.891	0	.	0
N		100	100	100	100	100
EWA	Correlation	0.014	0.035	.382*	.484*	1
	Coefficient			*	*	
	Sig. (2-tailed)	0.893	0.729	0	0	.
N		100	100	100	100	100

** . Correlation is significant at the 0.01 level (2-tailed).

Appendix 6: List of Companies and their Measurement Variables

COMPANIES	YEAR	FP	CONT. VAR.	ENVIRONMENTAL ACCOUNTING DISCLOSURES		
		ROA	AGE	ENE	WAT	EWA
GOIL	2013	0.08460	53	9	4	7
TOTAL ENERGY		0.13312	62	2	0	10
TULLOW OIL		0.03309	7	56	50	45
ALUWORKS		0.01531	35	6	0	7
BENSO OIL		0.10474	37	0	0	0
COCOA PROCESSING		0.05484	32	1	1	12
FAN MILK		0.27847	53	0	5	19
PRODUCE BUYING		0.12576	32	3	1	10
GGB		0.10458	53	2	16	12
UNILEVER GHANA	0.10358	21	12	6	9	
GOIL	2014	0.08631	54	6	1	9
TOTAL ENERGY		0.12436	63	8	0	10
TULLOW OIL		- 0.17201	8	60	27	55
ALUWORKS		0.01127	36	8	1	7
BENSO OIL		0.20641	38	1	1	16
COCOA PROCESSING		- 0.08435	33	0	1	8
FAN MILK		0.15954	54	0	2	6
PRODUCE BUYING		0.27757	33	8	0	12
GGB		0.01351	54	6	6	11
UNILEVER GHANA	0.01862	22	10	1	1	
GOIL		0.06619	55	8	1	7

TOTAL ENERGY		0.16015	64	9	0	20
TULLOW OIL		-0.09638	9	38	13	35
ALUWORKS		-0.00109	37	8	0	9
BENSO OIL	2015	0.11499	39	2	0	12
COCOA PROCESSING		-0.02874	34	0	1	0
FAN MILK		0.27906	55	0	3	8
PRODUCE BUYING		0.21714	34	8	0	12
GGB		0.00956	55	1	9	13
UNILEVER GHANA		0.16398	23	4	1	2
GOIL		0.09625	56	9	5	7
TOTAL ENERGY		0.13032	65	10	0	19
TULLOW OIL	2016	-0.06987	10	50	26	57
ALUWORKS		-0.01471	38	8	0	6
BENSO OIL		0.15344	40	1	0	9

COCOA PROCESSING		-0.05577	35	0	1	3
FAN MILK		0.33565	56	0	0	10
PRODUCE BUYING		0.22199	35	7	0	11
GGB		0.12438	56	1	5	14
UNILEVER GHANA		0.14228	24	12	2	3
GOIL		0.05006	57	5	5	7
TOTAL ENERGY		0.09063	66	7	2	19
TULLOW OIL		0.00203	11	68	12	57
ALUWORKS		-0.31903	39	2	0	3
BENSO OIL		0.16457	41	1	1	9
COCOA PROCESSING	2017	-0.04133	36	1	3	7
FAN MILK		0.21160	57	3	1	25
PRODUCE BUYING		0.11505	36	7	0	10
GGB		0.07929	57	1	3	99
UNILEVER GHANA		0.14340	25	5	3	4
GOIL		0.14533	58	7	5	9
TOTAL ENERGY		0.10463	67	25	2	35
TULLOW OIL		0.04968	12	81	23	53
ALUWORKS		-0.07202	40	6	0	9
BENSO OIL		0.07742	42	2	0	9
COCOA PROCESSING	2018	0.02777	37	0	0	2
FAN MILK		0.04869	58	1	1	35
PRODUCE BUYING		0.02809	37	1	0	12
GGB		0.09576	58	1	4	13
UNILEVER GHANA		0.34860	26	5	6	10
GOIL		0.08281	59	10	7	6

TOTAL ENERGY	2019	0.13517	68	13	5	29
TULLOW OIL		-0.16706	13	138	36	41
ALUWORKS		-0.04226	41	4	1	9
BENSO OIL		0.13527	43	4	0	9
COCOA PROCESSING		0.00178	38	7	3	4
FAN MILK		0.09725	59	2	6	18
PRODUCE BUYING		0.01565	38	1	0	0
GGB		0.07575	59	3	3	12
UNILEVER GHANA		-0.42033	27	9	0	16
GOIL	2020	0.06437	60	13	6	6
TOTAL ENERGY		0.18808	69	12	6	30
TULLOW OIL		-0.15520	14	121	21	56
ALUWORKS		-0.05582	42	8	1	4
BENSO OIL		0.23927	44	1	0	8
COCOA PROCESSING		-0.05238	39	6	1	3

FAN MILK		0.00063	60	4	11	27
PRODUCE BUYING		0.05491	39	1	0	14
GGB		0.05995	60	0	10	19
UNILEVER GHANA		-0.06568	28	10	6	29
GOIL		0.05381	61	11	9	6
TOTAL ENERGY		0.14221	70	6	9	32
TULLOW OIL		0.09286	15	114	25	57
ALUWORKS		-0.11352	43	1	3	12
BENSO OIL		0.45784	45	1	2	8
COCOA PROCESSING	2021	-0.06136	40	5	1	3
FAN MILK		-0.03509	61	2	1	13
PRODUCE BUYING		0.01380	40	2	0	15
GGB		0.13824	61	1	11	24
UNILEVER GHANA		-0.08520	29	9	1	34
GOIL		0.03929	62	7	1	7
TOTAL ENERGY		0.14516	71	22	10	30
TULLOW OIL		0.14563	16	161	20	49
ALUWORKS		-0.15375	44	0	0	8
BENSO OIL		0.54655	46	1	0	0
COCOA PROCESSING	2022	-0.05116	41	1	1	1
FAN MILK		-0.05161	62	7	3	17
PRODUCE BUYING		0.01459	41	1	0	1
GGB		0.03095	62	21	16	23
UNILEVER GHANA		0.07927	30	8	5	25