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Article

Does green accounting influences ecological sustainability? Evidence from a developing economy

Cogent Business & Management

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Suggested Citation: Wiredu, Ishmael; Agyemang, Andrew Osei; Agbadzidah, Samuel Yayra (2023) : Does green accounting influences ecological sustainability? Evidence from a developing economy, Cogent Business & Management, ISSN 2331-1975, Taylor & Francis, Abingdon, Vol. 10, Iss. 2, pp. 1-25,
<https://doi.org/10.1080/23311975.2023.2240559>

This Version is available at:

<https://hdl.handle.net/10419/294561>

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To cite this article: Ishmael Wiredu, Andrew Osei Agyemang & Samuel Yayra Agbadzidah (2023) Does green accounting influences ecological sustainability? Evidence from a developing economy, Cogent Business & Management, 10:2, 2240559, DOI: [10.1080/23311975.2023.2240559](https://doi.org/10.1080/23311975.2023.2240559)

To link to this article: <https://doi.org/10.1080/23311975.2023.2240559>



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Published online: 01 Aug 2023.



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Received: 09 June 2023
Accepted: 20 July 2023

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ACCOUNTING, CORPORATE GOVERNANCE & BUSINESS ETHICS | RESEARCH ARTICLE

Does green accounting influences ecological sustainability? Evidence from a developing economy

Ishmael Wiredu^{1*}, Andrew Osei Agyemang² and Samuel Yayra Agbadzidah¹

Abstract: This study examined the impact of green accounting on ecological sustainability and employed environmental costs as a mediation between green accounting and sustainability. The study focused on pharmaceutical companies because of the heavy use of natural resources and the subsequent greenhouse gases and wastewater from this sector pose a risk to the ecological system. The data utilized in this research was obtained from 372 respondents from 35 registered members of Pharmaceutical Manufacturers Association of Ghana through online questionnaire. PLS-SEM was used to analyze the data and tested the hypotheses for the study using SMART-PLS 4. The findings revealed that environmental compliance and business efficiency have a major and constructive effect on sustainability, and also discovered that environmental costs mediated the impact of green accounting on sustainability. This study recommends that policymakers and corporations must take a holistic and coordinated approach when considering the effects of their actions on society and the environment.

Subjects: Agriculture & Environmental Sciences; Botany; Conservation - Environment Studies; Ecology - Environment Studies; Environmental Management; Environment & Resources; Environment & Society; Business, Management and Accounting

Keywords: green accounting; sustainability; pharmaceutical firm; PLS-SEM; Ghana

1. Introduction

Companies are the driving force behind the expansion of the economy. As a result, corporations play a significant role in ecological harm. According to (Agyemang et al., 2023), it has led to a greater interest among corporate stakeholders in understanding how business activities affect communities and ecosystems. Stakeholders are demanding that businesses report not just their monetary outcomes, but also the effects they have on society and the environment.

Many environmental problems are the result of industrialization. Major environmental issues have arisen in previous years due to the unchecked influence of manufacturing activities on ecological systems (Bebbington et al., 2017). The world and the economy are being harmed by severe occurrences such as the loss of the ozone layer, excessive harvesting of resources from nature, global warming, atmosphere pollution, and hazardous wastes. Hence, interest in green or environmental accounting. The purpose of environmental accounting for sustainable development

is to quantify and disseminate data about how various business activities affect sustainable development. Sustainable accounting, as a business philosophy, is rapidly gaining traction in this millennium, especially in terms of international adoption (N. P. Giang et al., 2021).

Green accounting for sustainable development is influenced by many external variables such as the enterprise's administrator's level of awareness, institutional and regulatory hurdles, the scale of the enterprise's operations, and other factors may all play a role (Agyemang et al., 2023). Ecological, social, and financial metrics are often considered interdependent, and thus sustainability is often defined as their integration. Businesses must disclose environmental information that tells the whole story of the company, including how value is created, the company's strategy, risks, threats, and opportunities, and how well the business is performing about its strategic goals (Kalbouneh et al., 2023).

Most corporations' actions have noticeable and instant detrimental effects on the broader public, and this has been a cause of contention within communities and these corporations. The tension between locals and manufacturing, oil and mining firms in Africa is rising, including several tales of uprisings by locals opposing businesses resulting in asset devastation, casualties, and even legal disputes (Kurantin, 2011). The long-term survival of humanity depends on humans becoming environmentally conscientious. The past few years have increased public concern over environmental degradation (Dura & Suharsono, 2022). Land and water damage all harm business activities and undermine efforts to optimize profits while reducing environmental damage. However, numerous businesses have fewer concerns about ecological issues due to the good influence that growth in the industry has on workforce incorporation, which in turn can enhance economic efficiency (Abdullah & Amiruddin, 2020).

Earlier studies have revealed that, financial reporting, which is biased, unequal, and one-sided (Agyemang et al., 2021). Hence, it is no longer considered to be the only informational resource for business accountability and performance due to improvements in corporate governance practices. Moreover, it has been stated that the existing methods of financial reporting primarily fail to benefit those with a financial stake in a company, such as shareholders, investors, and other users in the company due to the partial disclosure of non-financial reporting (Zhou et al., 2022).

Research on environmental disclosure procedures in the setting of developing nations is in its early stages. The concept of green accounting is new to most developing sub-Saharan African (SSA) countries including Ghana. Few investigations on environmental accounting and sustainable development have been conducted in developing nations. Previous studies like those of (Beredugo & Mefor, 2012; Kurantin, 2011; Maama & Appiah, 2019; Van Zyl, 2013) and (Omran & Ramdhony, 2015) focused on environmental accounting and environmental and firm performance. The analysis of (Kurantin, 2011) is limited to Ghana's burgeoning oil and gas industry. Green accounting was the focus of (Maama & Appiah, 2019) research in Ghana, particularly mining and other manufacturing enterprises. Additionally (Akumfi, 2022), zeroed focus on stock exchange firms in the Ashanti Region, stressing corporations' role in economic growth and the cost of environmental damage. The author focused on how corporations trading on the Ghana Stock Exchange (GSE) handle optional environmental disclosure. Hence, this research intends at establishing the nexus connecting green accounting and ecological sustainability for a developing SSA like Ghana

The study aims: (1) To investigate the impact of green accounting on green accounting on ecological sustainability. (2) To examine the benefits of green accounting on ecological sustainability. (3) To explore the challenges impeding green accounting implementation.

In order to evaluate the connection between green accounting and sustainability, we used an adaptable theoretical structure incorporating stakeholder and institutional theories. According to the stakeholder theory, it is important to identify and classify stakeholders about their relative importance and bearing on an organization. To effectively apply green accounting practices that

foster ecological sustainability, it is essential to identify those who are interested and have an awareness and understanding of worries and desires. Green accounting and ecological sustainability benefit from stakeholder engagement because it improves value congruence and facilitates the incorporation of multiple viewpoints. By including those vested in the well-being of the environment, we may better pinpoint problems, gain new perspectives, and rally behind green accounting practices that ultimately contribute to ecological sustainability. According to institutional theory, environmental controls, waste disposal, and eco-friendly procedures may all fall under this category of rules. Companies may be compelled to use green accounting processes by the need to track and publish their environmental achievements following regulatory obligations.

Regarding the motivation of the study, the rising ecological worries are the primary impetus for the study. Ecological sustainability is becoming increasingly urgent as environmental consciousness spreads around the globe. It is challenging for emerging economies to balance economic development and environmental protection. Assessing successful techniques for sustainable growth within these countries is aided by this research, which examines the connection between green accounting and ecological sustainability.

In terms of uniqueness, the investigation is distinct from prior studies and incorporate new insight to the previous literature on green accounting for sustainable development in the following ways. First, in contrast to previous research that focused on green accounting and environmental and firm performance, this research emphasized on the effect of green accounting on ecological sustainability which is yet to be studied in Ghana. The study focused on the immediate effect of green accounting on ecological sustainability as opposed to other studies that concentrated on firm and environmental performance. By focusing on green accounting, this study presented how stakeholders' pressure, environmental compliance, management position and business efficiency positively impact ecological sustainability.

Second, this study take into account pharmaceutical firms in Ghana as the population. This is because pharmaceutical sector is notable for its harmful environmental effects as a result of its intricate supply networks, highly energy-intensive production methods, and toxic substance creation. Thus, studying the impact of green accounting in this sector will reveal opportunities for reducing the sector's negative impact on the environment and fostering greener ways of operation. The authors then selected 35 companies registered under the Pharmaceutical Manufacturers Association of Ghana. The study's results will help shape policies and procedures for a greener, more equitable pharmaceutical industry.

Third, a mediating variable was also employed in the study. The breadth of green accounting in this investigation divulge to implementing environment costs. This consists of environmental prevention costs, environmental detection costs and internal and external costs. The relationship between green accounting and sustainable development has been the mainstay of previous research. The results of these investigations were inconclusive, nevertheless, with both positive and negative outcomes reported (N. Giang et al., 2020; Shakkour et al., 2018). The mediating influence of environmental cost on this association is not considered in those investigations, which is a significant shortcoming.

The result of the study found that environmental compliance has a major and beneficial influence on sustainability. In similar vein, business efficiency was discovered to have significant effect on ecological sustainability. Contrary, pressure from stakeholders and management position results reveal insignificant effect on ecological sustainability.

With regards to contribution, first, this study contributes to understanding the possible regulatory consequences of implementing green accounting methods by examining the connection between green accounting and ecological sustainability. The results can help regulators figure out how to include green accounting in macroeconomic strategy and choices for equitable growth.

Second, our study provides actionable advice to firms, authorities, and other stakeholders in emerging markets following the analysis findings. Green accounting concepts, rewards systems, and the alignment of company processes with sustainable development objectives are all included in these suggestions. By following these instructions, stakeholders might be motivated to contribute to environmental longevity and accountable handling of resources.

Third, the study highlights the difficulties encountered by emerging economies in adopting environmentally friendly accounting methods. The authors identified such challenges and offered suggestions on tackling these problems and making the most of current possibilities to promote sustainability. Regulators and other parties might use this work as a road map to develop more efficient solutions.

Fourth, the study presents important empirical information concerning the precise effect of green accounting methods on ecological sustainability by reviewing actual data from emerging economies. By using empirical evidence, we better understand how green accounting practices can reduce negative effects on the environment while also boosting the economy.

The authors divided the study into seven different sections. In the first section, an introduction was given. The second part of the study talked about background by exploiting regulatory, reform and policy issues and developments. The next section is about the theoretical literature review. Next is empirical review and hypotheses from related studies and conceptual framework. Research design for the study is discussed in section five. The sixth section contains empirical results and discussion of result. The final section contains a summary and conclusion.

2. Background

Awareness for preserving the environment and the critical desire to confront the world's ecological issues has gained prominence in the past few decades (Orazalin et al., 2023). Swift industrialization and costly industry activities present special challenges for emerging economies seeking long-term environmentally sustainable development while fostering prosperity. Regulatory measures and changes have evolved in these economies to tackle the ecological implications of business operations and facilitate the incorporation of environmentally friendly concepts to pursue a sustainable future. Sustainability issues are increasingly included in the laws and regulations of countries with emerging economies (Tran et al., 2021). As a result, we now have pollution limits, waste disposal rules, and measures to preserve the environment for future generations. The laws and ordinances guarantee that ecological requirements are met and push firms toward greener techniques like green accounting.

Emerging nations have begun implementing reforms to foster environmentally friendly growth to address their urgent ecological problems. As part of these changes, fiscal regulations, administration of resource methods, and prioritized investments are frequently re-evaluated. In line with the goals of these reform attempts, green accounting has emerged as a means to calculate the environmental costs and benefits of financial operations (Ali et al., 2021). Several emerging markets have made sustainability a priority in their policymaking. To combat environmental deterioration and realize the Sustainable Development Goals (SDGs) set forth by the United Nations, authorities have developed sustainability policies, initiatives, and benchmarks at a national scale (Singh et al., 2021). Green accounting has risen as a viable technique for tracking these outcomes and gauging the environmental viability of business practices. Capitalists, the public, and civic groups are among those pressing for more information to be made public and for responsible parties to be held accountable for their actions concerning the ecosystem. Stakeholders want companies to disclose how their operations affect the planet and work to reduce this effect (Bebbington et al., 2017). Matching the demands of interested parties and improving its ecological goodwill, green accounting allows businesses to measure, schedule, and report their commitment to sustainability.

Several ecological concerns have been lessened because of government regulations in industrialized nations, but accountancy actions are essential to attain environmentally friendly growth. The reality that corporations are most often the primary cause of ecological problems is a major factor in why they bear the responsibility (Shakkour et al., 2018). Additionally, it becomes clear that most of these sectors have the financial means, the industrial know-how, and the societal clout to give final answers; nevertheless, their reaction appears to be quite inert. Since advocates and concerned entities in emerging economies like Ghana have been pushing for additional details on green accounting activities, there has been a noticeable uptick in sustainability reporting initiatives in such countries. Financial financiers and other interested parties seek increased ecological data from companies.

The Government of Ghana recognized the need to do something about the destruction of the environment; thus, in 1994, it created the Environmental Protection Agency (EPA). The agency's mission is to protect, restore, and promote the nation's natural resources and ecosystems to achieve ecologically sustainable growth through socially just and economically equitable means. Its responsibility is to monitor the national environment policy and put it into action. Policymaking, leadership, and tracking of ecological standards are all part of the job. Other responsibilities include conserving natural resources. The conservation and preservation of Ghana's resources of nature and the establishment of operational protocols for completing environmental impact assessments of every development initiative also fall under the purview of the Ministry of Environment, Science and Technology. In 1994, lawmakers enacted EPA Act to give the agency more authority over ecological matters. Governing body is authorized to eliminate, reduce, or regulate the negative environmental impacts of an initiative, to do so under the EPA Act 490. Furthermore, they are accountable for making amends for any harm done by these influences, whether via direct payment or other rehabilitation measures.

3. Theoretical literature review

The purpose of this research is to explore the connection between green accounting and ecological sustainability. Institutional and stakeholder theories have been applied in prior investigations on green accounting. Therefore, both institutional and stakeholder theories will be employed in this investigation.

3.1. Institutional theory

According to (Latifah & Soewarno, 2023), institutional theory has emerged as a major theoretical framework in modern studies of organizations. It encompasses a broad and varied collection of theoretical and empirical research that is unified by a focus on intercultural comprehension and agreement. Policy manuals, industry standards, and innovative organizational designs can all be explained by institutional theory (Peters, 2022).

A corporate consensus on the form of green information to disclose may emerge as a result of institutional pressure to comply with the usual practice of one's peers (Ramdhony et al., 2022). The author continues by saying that accounting is a metaphor for institutionalized activity in businesses. Using institutional theory (Agyekum & Singh, 2018), says that the selection of accounting rules can be understood. To win over the public and establish their credibility, businesses may have to show that they follow the norms and values held in high regard by the general public, and this is where the institutional theory comes in (Maama & Mkhize, 2020).

Consequently (Comyns, 2018), argue that it is important to keep in mind that firms are ultimately seeking an organization's external reporting processes as a means of establishing legitimacy and gaining public backing. According to a study conducted by (Muñoz-Torres et al., 2019), companies value membership in the FTSE4 Good index due to the competitive nature of the membership pool. The authors stated that firms must adequately disclose environmental and social information to be included in the index. According to (Tilt, 2018), local apparel suppliers have been compelled to engage in organizational communication to dispel worries about inhumane

working conditions to appease their multinational customers. To qualify for loans from organizations like the World Bank, some emerging economies, like Ghana, may need to adopt accounting and reporting processes consistent with World Bank standards, as noted by (Caesar et al., 2017) (Peters, 2022). adds that organizations that stray from institutionalized standards may struggle to gain and keep their legitimacy.

Organizations can benefit from applying institutional pressure theory to green accounting and sustainability by gaining a deeper understanding of the external constraints that shape their environmental practices. To further strengthen their legitimacy in the eyes of society, they can utilize green accounting to monitor their progress in minimizing their environmental effect and share that information with stakeholders (Ebrahimi & Koh, 2021). Organizations and associations of professionals frequently develop complementary regulations and norms for sustainable development in the manufacturing industry. These recommendations might encourage or mandate the adoption of green accounting procedures by association members. Companies may be influenced to adopt green accounting due to institutional pressure from industry rules and guidelines.

3.2. Stakeholder theory

According to (A. Osei et al., 2023), stakeholder theory centers on the participation of various interested parties. Individuals, organizations, or groups with a legitimate stake in the organization are considered stakeholders. According to stakeholder theory, various interest parties have varying views regarding how an organization should be managed. Van Zanten & Van Tulder (2018) found few studies that analyzed how different groups of people felt about green and social information being made public in his review of the literature. Therefore, it is crucial to examine how to meet the information needs of different stakeholders, firms need to hear from a wide range of people.

According to (A. A. Osei et al., 2019), there are many different perspectives, including those of investors, buyers, and advocates. Environmental responsibility in organizations has a natural right to the attention of companies' stakeholders. Wang et al. (2018) adds that analyzing corporate green reporting through the lens of firm-level decisions made with stakeholders' needs in mind is a viable approach. Based on to this view, there are no rules about who needs access to information or what kind of information should be shared. Stakeholder theory is widely viewed as susceptible to different interpretations in green accounting. This demand a clear and articulate grasp of how corporation's activities will affect its various stakeholder groups. When stakeholders are not involved, ecological disclosure tends to be minimal (Nzama et al., 2022). It has been shown in the past studies that when a company discloses its finances and other details to its stakeholders, it helps to eliminate disparities in information (Fonseka et al., 2019).

With the help of stakeholder theory, businesses can make decisions that benefit everyone involved, including the planet. When businesses adopt sustainability and green accounting practices, they are better equipped to assess their influence on the environment and create long-term strategies that benefit all of their stakeholders (Hörisch et al., 2020). The company's adoption and use of green accounting are two areas where stakeholders can impact. Regulation, shareholder demands, and civic engagement are all examples of how stakeholders might apply pressure. Companies in the pharmaceutical business can improve their environmental ratings, satisfy stakeholders' desires, and show their dedication to ecological sustainability by adopting green accounting methods.

4. Empirical review and hypothesis development

4.1. Pressure from stakeholders and sustainability

According to (Dura & Suharsono, 2022), stakeholder theory points out that the corporation is responsible for providing relevant environmental data to its constituents. Simply put, a company's success is directly proportional to the quality of its relationships with its shareholders and other stakeholders. Additionally, stakeholders' pressure for more sustainable methods and

practices in the firms where they do operations is a major driver of company responses to ecological challenges (Dura & Suharsono, 2022).

Empirical research like (Dura & Suharsono, 2022; N. Giang et al., 2020) have already examined how much green accounting affects sustainable development. However, research into how stakeholder pressure can affect ecological sustainability is scant, with most investigations being conducted in developed nations. (Khare et al., 2023) discovered that pressure from stakeholders have a substantial impact on implementing green management and sustainability performance. In similar vein (Latifah & Soewarno, 2023), found that normative pressure from interested parties has positive connection with sustainability. According to (Masum et al., 2020), economic expansion is no more the sole motivator for businesses. Aspects of society and the natural world also play crucial roles. Sustainable development can only happen with all relevant parties' active participation and collaboration. While sustainability reporting has grown widespread in certain advanced nations, such as the United States, it is just beginning to gain traction in Africa (Oti & Mbu-Ogar, 2018). According to (N. Giang et al., 2020), there was a direct relationship between green accounting practices and long-term prosperity. In green thinking, eco-friendly manufacturing practices take center stage. Any business that adopts green accounting practices is bound to see positive results. Consistent with the stakeholder theory's claim, stakeholder pressure leads to better ecological sustainability. Hence, the first hypothesis is:

H₁: Pressure from stakeholders is positively associated with sustainability through environmental cost.

4.2. Environmental compliance and sustainability

The theory of institutionalized pressure theory suggests that the need for businesses to abide by ecological laws could lead to a common understanding of how green disclosures should be made. It has been recommended that institutionalized pressure can help firms attract customers and gain their reputations by demonstrating that they adhere to widely accepted principles and standards (Agyekum & Singh, 2018).

Empirically, we are motivated to investigate the impact of environmental compliance on sustainability because there appears to be a need for more empirical studies between this associations. Nguyen (2022) found that compliance as a result of coercive pressure have a positive impact on environmental management implementation in pulp and paper enterprises in Vietnam. Ecological policies and guidelines have been review to end environmental issues in Vietnam. The author found that if firms face much pressure to comply environmental laws, they will consider implementing environmental accounting in the future to enhance sustainability.

(Oti & Mbu-Ogar, 2018) found that economically emerging nations like Ghana and Nigeria have environmental accounting problems. The challenge lies in enforcing and complying with many rules, even though the government has adopted several environmental statutes and formed organizations and regulators. The extent of the effect of these companies' activities has not lessened, and hostility and confrontations with the local communities have risen despite the fact that these corporations profess that they enforce policy and adhere to norms on ecological problems. At the core of sustainable development (Shakkour et al., 2018), investigated the fiscal responsibility of policy decisions for adverse ecological consequences. Sustainable prosperity is measured as a function of preserving ecosystems in green accounting. Improving sustainability requires societal evaluation of these objectives using guidelines, regulations, and benchmarks. Ellison et al. (2011) looked into how much it would cost to implement different approaches that would lessen the impact of global warming through the wise application of natural assets and the maintenance of ecological equilibrium.

Following the previous discussion, environmental compliance will contribute to ecological sustainability, particularly highlighting the significance of environmental regulations for fostering sustainability, mitigating global warming, and keeping track of stakeholders' perspectives. In light of this, the next hypothesis is developed:

H₂: Environmental compliance is connected positively with sustainability through environmental cost.

4.3. Management position and sustainability

According to the institutional theory, management is seen as an essential system that complies with ecological regulations to lessen environmental damage (Gupta & Gupta, 2021). Stakeholder theory, in the same vein, states that interested parties' ecological worries can be addressed by a greater awareness of numerous stakeholder groups that are usually linked with corporate social responsibility. According to stakeholder theory, stakeholders care further regarding management formulating plans to tackle ecological challenges (Nzama et al., 2022).

Only some empirical investigations have examined whether management position affects environmental sustainability. Nguyen (2022) found there is benefit of manager's awareness of implementing environmental management accounting. The author stated that firms applying environmental accounting aids managers to comply prerequisites of community, creating trust in the society and improve image and position. Environmental reporting on significant ecological dangers and corporate responsibility were among the topics examined by (Shakkour et al., 2018). According to their findings, managers desire to initiate swift measures to tackle ecological hazards, the conventional accounting structure's pare attention to financial information fails to capture the ecological impacts caused by company exertion, and an imperative to report sustainability performance to stakeholders. According to (Almaliki, 2020), management uses environmentally friendly accounting to construct an organization-wide reaction to sustainability problems, proving the usefulness of a societal action from a business viewpoint when conducting green accounting research. The results prompt inquiries into the management procedure for assessing green accounting measures, and they suggest that further study is needed to aid internal environmental advocacy proponents in remaining active and avoiding untimely annexation. Maama & Appiah (2019) analyzed the green accounting practices of the top two hundred and two (202) companies traded in Ghana between 2006 and 2015. According to the results of their research, increasing levels of transparency by management were deliberate efforts to win over skeptical public image. More specifically, the authors looked for an array of parameters and the level of disclosures derived through a review of the literature on environmental reporting. Societal limitations, scale, systematic danger, and time frame for management decisions were among the variables considered. The research also shows that ecological reporting has improved in quality and quantity over time.

As a result, we discovered that some businesses have begun implementing measures to improve their environmental management in response to institutionalized pressure and stakeholder theory. The impetus to do so was to cut expenses and protect the environment. Hence, the third hypothesis we are testing is:

H₃: Management position is significantly associated with sustainability through environmental cost.

4.4. Business efficiency and sustainability

Theoretically, institutional pressure theory influence firms to carry out eco-efficiency such as waste management activities to achieve ecological sustainability. D'Adamo et al. (2019) discovered that

institutional pressure induce small and medium-sized enterprise to execute management of to improve economic and ecological sustainability goals. Similarly (Latifah & Soewarno, 2023), found that the effect of waste management on sustainability performance of small and medium-sized enterprises is positive and significant as a result of institutional pressure. According to (Maama & Appiah, 2019) research, companies' annual reports did not provide any noteworthy environmental disclosures regarding energy expenditure, waste management, safety-related measures, or environmental protection. There needs to be more clarity in ecological disclosures made by Ghanaian businesses because there are currently no consolidated efforts to improve Ghana's reporting of environmental and social data, thus green accounting practices (Agyemang et al., 2023). stated standard accounts do not reflect the immediate need to adopt more effective accounting strategies for useful material to manage them. Economic and environmental policies should consider these concerns. Waste is produced at every production stage, from mining to transport to processing to medication, and each of these steps poses risks to human health and the environment. As a result, we hypothesized that:

H₄: Business efficiency is positively associated towards improving sustainability with environmental cost.

4.5. The mediating role of environmental cost on green accounting-sustainability nexus

Green accounting is a method of financial reporting that takes into consideration environmental expenses and decreases in resources on a national scale (Rounaghi, 2019). Green accounting was designed to help businesses pay for and manage the costs and benefits of pursuing green initiatives and more conventional business objectives (Dhar et al., 2022).

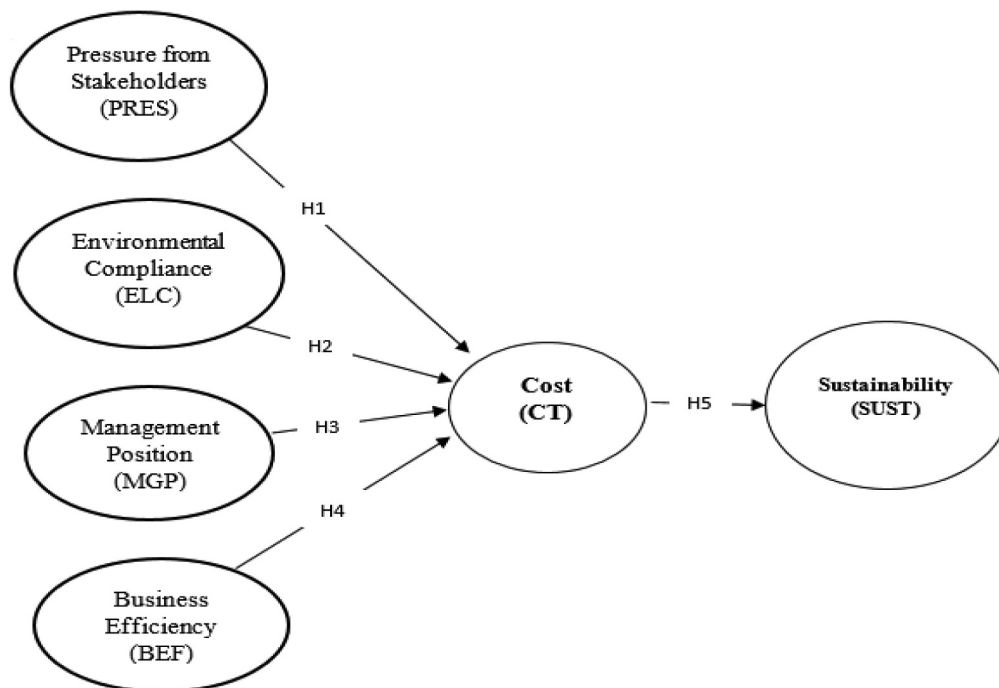
(Almaliki, 2020) analyzed environmental cost and environmental performance by accurately monitoring and applying these factors to both the operations and final goods. In addition to boosting the company's earnings and competitive edge, the research also helps to ensure that product costs are accurately measured and the resulting income remains in line with those costs. For evaluating the unpredictable environment and prospective expenses (Anex & Englehardt, 2001), employed a forecasting Bayes framework proven. Huge, ecologically unforeseen expenditures and costs that are dependent on particular previous occurrences are typically disregarded or represented insufficiently by environmental accounting approaches. Instead of generating variables, the prognostic Bayesian method provided dispersion of the value relevance. Numerous environmental hazards are used to evaluate the models' outputs. Environmental risk management is covered, as is how the model can be used as part of a company's larger risk management strategy (Effiong & Asuquo, 2010). Based on the above discussion, the last hypothesis is:

H₅: Environmental cost significantly associated with sustainability.

Institutional and stakeholder theories are applicable in this study since environmental pollution is multi-stakeholder challenge that calls for collaboration between many parties. Firms are motivated to reduce their environmental impact by responding to demands of stakeholders for environmentally friendly practice. Understanding that firms determined by institutional, social and political contexts, Stakeholder and Institutional theories may offer all-encompassing perspective on disclosing environmental information (Latifah & Soewarno, 2023; Nzama et al., 2022).

A close relationship exists among the hypothesis of green accounting, environmental cost and ecological sustainability, despite discrepancies in the theoretical perspectives used to explain it. The chosen independent variables in this study are seen as valuable from a theoretical standpoint because they cover a variety of theories in a variety of organizational settings, as shown in Figure 1 above.

Figure 1. Conceptual framework.



5. Research design

The study utilized the quantitative research approach to explore the connection between green accounting and ecological sustainability. The research followed positivist paradigm. The authors of the study used primary data extracted from the results of the survey because primary data has not undergone any human intervention, making its validity higher, improved interpretation, attention to relevant research questions, and decency of the data (Nzama et al., 2022). In obtaining data for this study, a survey questionnaire and participant setting were developed to uncover the participants' real perceptions and experiences of green accounting and ecological sustainability. The study's hypotheses informed the design of the questionnaires used to collect data. The questionnaire employed Five-Point Likert Scale starting from "Strongly disagree" to "Strongly Agree". It was carried out to ensure the goal of the study was ultimately met. The variables selected were suitable for data availability for pharmaceutical firms. After the questionnaire was created, an instrument pre-test was conducted before a pilot test. By seeking the opinions of experts on the test items, the questionnaire was pilot-tested ahead of time. They offered helpful criticism, which assisted in enhancing the questionnaire's substance. This procedure was carried out to ensure the legitimacy of the content. A pilot test was carried out after the questionnaire was modified in response to expert feedback.

The authors selected pharmaceutical firms in Ghana as the study's population since pharmaceutical firms contribute to major environmental pollution (Bour et al., 2019). Companies that do pharmaceutical research and development, manufacture, and sell medications for either human or animal consumption make up the pharmaceutical sector. Producers, wholesalers, distributors, retailers, and consumers of drugs make up the bulk of Ghana's pharmaceutical sector. When compared to other West African countries, Ghana has a sizable pharmaceutical business. There are numerous firms producing biopharmaceuticals, drugs, and medicines in Ghana of which 35 registered members of the Pharmaceutical Manufacturers Association of Ghana were selected. The non-systematic technique employed in this study was convenience sampling, therefore the 35 firms were selected.

The selected participants perform duties in the firms. Factory supervisors and accountants, management accountants, account/finance clerks, chief accountant and chief financial officers responded the questionnaire. Google Forms and in-person administrations of questionnaires were both used for administration. The survey could only be completed once by each respondent. Respondents were invited to participate through email address obtained from their company's website. Eleven questionnaires were sent to each of the 35 pharmaceutical businesses. Three hundred and seventy two participants responded to the questionnaires well, three respondents did not answer correctly and ten questionnaires were not answered. We removed the three responses that were not correctly answered. Therefore, the authors analyzed only 372 questionnaires.

Data cleaning was done to prepare the data for the analysis of statistics. To verify our hypotheses, we employed Partial Least Square—Structural Equation Modeling (PLS-SEM) and determine the significance of the predictor variable. PLS-SEM is appropriate for this study because it is adaptable to both measurable (observed) and unmeasurable (latent) factors, whereas, in the past, only measurable variables were used in evaluations. The data was analysed using SMART-PLS. SMART-PLS is a software that can run more responses and uneven data distribution and focuses on variance analysis which is useful in studies. Data were coded and organized into integrated constructs in the Statistical Package for the Social Sciences (SPSS) before being fed into the Smart-PLS tool for analysis. The data were subjected to inferential as well as descriptive analysis.

5.1. Operational definition of study variables

Sustainability serves as the dependent variable in this investigation. Green accounting dimension such as pressure from stakeholders, environmental compliance, management position and business efficiency are the independent latent variables. Environmental cost was used in this investigation as a mediating variable. The study used ordinal scale to measure the indicators which ranges from 1 (strongly disagree) to 5 (strongly agree).

5.1.1. Dependent variable

5.1.1.1. Sustainability. Sustainability refers to an organization's ability to meet present needs without compromising those of future generations (Agyemang et al., 2021). To make sure future generations take care of themselves economically and environmentally, sustainable development must think about how the economy, society, and the environment are all interdependent (Singh et al., 2021). There are challenges for businesses and stakeholders that want to show their dedication to sustainability. An important factor that might impact the behavior of interested parties is sustainable accounting (Kalbouneh et al., 2023).

5.1.2. Independent variables

5.1.2.1. Green accounting dimension. Green accounting is known as costs related to environmental corporate actions identified, measured, assessed, and disclosed (Latifah & Soewarno, 2023). The term green accounting according to (Saputra et al., 2021) is the approach used in measuring and communicating economic units' environmental impacts to the parties involved and society so that environmental performance can be monitored and assessed.

5.1.2.2. Pressure from stakeholders. Stakeholders' pressure encompasses elements like public concern and knowledge of ecological sustainability concerns, requesting the company to provide environmental information and dedication to ecological issues (N. Giang et al., 2020).

5.1.2.3. Environmental compliance. Environmental compliance backs green accounting by preserving the environment and complying environmental regulations and irreversible directives with conservation efforts. It comprehend disclosing wastes and emissions levels to appropriate authorities (Almaliki, 2020).

5.1.2.4. Management position. Management support assessing and implementing ecological activities and cost-efficiency to guarantee the firm's long-term position. It includes reporting

stakeholders such as investors, customers, and the society. Management is accountable not merely for the company’s efficiency but also for any profiteering that may arise from dealing with ecological issues. In addition to fiscal accountability, a for-profit enterprise has to take on ecological duty (Rounaghi, 2019).

5.1.2.5. *Business efficiency.* Business efficiency helps reduce costs and ecological effects through using less materials, water and energy in production process and final products. It involves planning and implementing energy, water and materials efficiency projects (Almaliki, 2020).

5.1.3. *Mediating variable*

5.1.3.1. *Environmental cost.*

As described by (Almaliki, 2020), environmental costs are internal and external costs, representing a part of the components of the firm’s entire cost system that have resulted via its associations with protecting the environment or adverse effects on the environment activities (Table 1, Table 2, Table 3).

6. Empirical results and discussion

Table 4 presents demographic characteristics of respondents from the various companies.

Table 4 shows that most of the respondents are from the account/finance unit (26.08%) with majority work experience being 11 to 19 years (80.12%) and the qualifications of respondents are degree holders (52.42%).

6.1. Measurement model

The first step in a PLS-SEM analysis is to examine the measurement models for assessing the outcomes. In essence, by assessing the measurement model, the researcher can compare the selected theory to the collected data for the investigation. Indicator reliability, internal consistency

Table 1. Population and sample size	
Unit of Respondent	Number in each firm
Factory supervisory	2
Factory accounting	1
Management accounting	2
General manager/Managing director	1
Account/Finance unit	3
Chief accountant	1
Chief finance officer	1
Total questionnaire sent	11 X 35 = 385

Table 2. Sample selection		
Category	Number	Status
Questionnaire answered correctly	372	Accepted
Questionnaire answered incorrectly	3	Removed
Unanswered questionnaire	10	Removed
Total questionnaire sent	385	
Responses accepted for analysis	372	

Table 3. Summary of study variables

Constructs	Number of indicators	Construct types	Measurement
Sustainability	4	Dependent	Likert scale
Pressure from stakeholders	3	Independent	Likert scale
Environmental Compliance	3	Independent	Likert scale
Management position	3	Independent	Likert scale
Business efficiency	3	Independent	Likert scale
Environmental cost	3	Mediating	Likert scale

Table 4. Demographic characteristics of respondents

Demographics	Characteristics	Number	Percentage (%)
Gender	Male	283	76.08
	Female	89	23.92
Age	Below 30 years	12	3.23
	30–39 years	94	25.27
	40–49 years	248	66.67
	50 years and above	18	4.84
Portfolio	Factory supervisory	70	18.82
	Factory accounting	32	8.60
	Management accounting	68	18.28
	General manager/	35	9.41
	Managing director	97	26.08
	Account/Finance unit	35	9.41
	Chief Accountant	35	9.41
	Chief finance officer		
Qualification	HND/Diploma	91	24.46
	Degree	195	52.42
	Masters	83	22.31
	PhD	3	0.81
Working Experience	10 years and below	30	8.06
	11 to 19 years	298	80.12
	20 years and above	32	8.60

Source: Gathered by the authors.

reliability, convergent validity, and discriminant validity were used to evaluate the measurement model in this investigation.

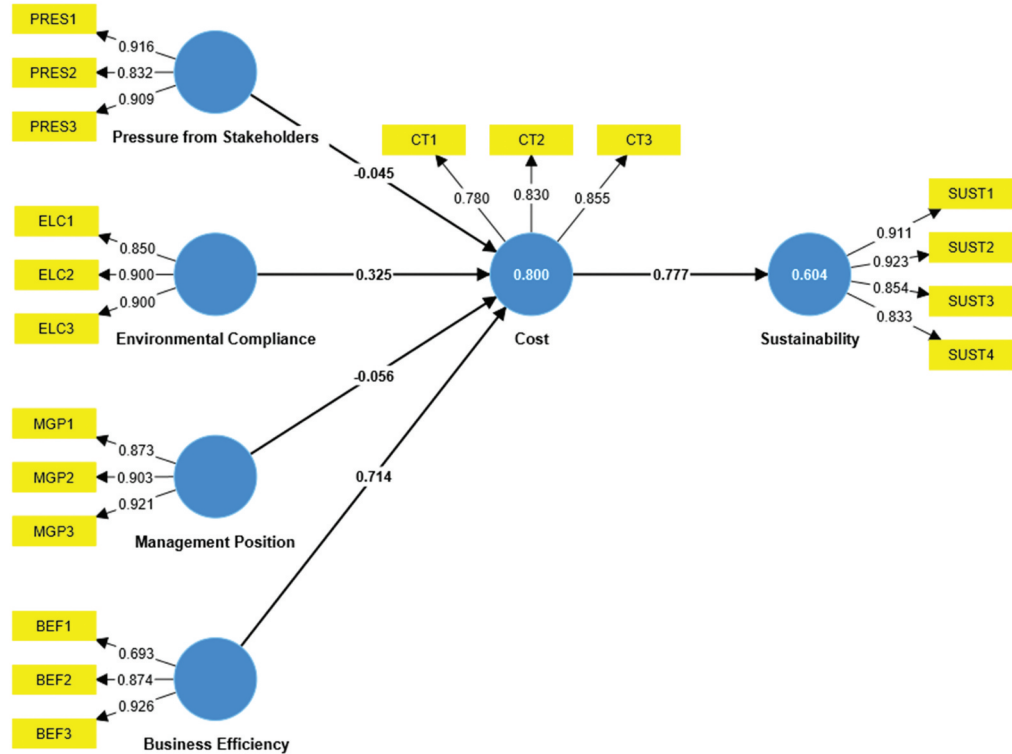
6.1.1. Indicator reliability

The first step in assessing a reflective measurement model is to look at the indicator loadings. Loadings above 0.708 are preferred since they show that construct is sufficiently reliable to account for almost 50% of the variation in the indicator (Hair et al., 2019). In this case, all indicators are strongly weighted on their underlying latent factors. Therefore, none were taken out of the model (Straub et al., 2022). That is to say, all indications were above the needed threshold when the initial study was performed. The model was run using the PLS algorithm, the indicator loadings are displayed in Figure 2.

6.1.2. Internal consistency reliability

Internal consistency reliability assesses how well each individual items evaluate similar concepts. Internal consistency reliability is kind of reliability test used to evaluate validity of similar indicators. It examines the consistency and reliability of each indicator. Cronbach's alpha, Jöreskog's composite reliability, and Rho A were employed to assess the internal consistency reliability of the survey.

Figure 2. Measurement model results (Indicator loadings).



Cronbach's alpha quantifies the degree of group cohesion within a set of elements. It is used as a gauge of how reliable an indicator is. The lack of validity of an indicator cannot be inferred from a "high" alpha value.

Composite reliability is the method of choice when assessing internal consistency (Jöreskog, 1971). In most cases, higher quality results are more valuable. The range of 0.60–0.70 is considered "acceptable in exploratory research," while the range of 0.70–0.90 is considered "satisfactory to good." However, high values (greater than 0.95) are concerning because they suggest that the items are redundant, which in turn lowers construct validity (Diamantopoulos et al., 2012).

Lastly, Rho_A is a more precise option to Cronbach's alpha and the composite reliability, which is typically found to lay between the two. Rho_A is a measure of reliability of the composite scale when all indicators are viewed as a single case. Maintaining a Rho_A around 0.70 is advised.

The results are presented in Table 5.

Table 5 displays that the Cronbach alpha for all latent variables and constructs was more than 0.70. Cronbach alpha values which range from 0.763 to 0.903 signifies that the model is having good internal consistency. Composite reliability, in contrast to Cronbach's alpha, is stronger because the items are weighted according to their separate loadings on the construct indicators. Based on the results, the composite reliability values vary from 0.862 to 0.933, which is good (see Table 5). As can be shown in Table 5, the Rho_A values of all constructs are higher than 0.70. A higher Rho_A means the data is accurate.

The investigation complies with the internal consistency reliability criteria because all Cronbach's alpha, composite reliability and Rho_A scores for each variable were greater than the minimum threshold of 0.70. The, the data is verified and reliable.

Table 5. Internal consistency reliability results

Constructs	Cronbach's alpha	Composite reliability	Composite reliability (Rho_A)
Business Efficiency	.778	.874	.799
Cost	.763	.862	.781
Environmental Compliance	.859	.914	.864
Management Position	.882	.927	.885
Pressure from Stakeholders	.864	.917	.877
Sustainability	.903	.933	.908

Source: PLS-SEM analysis results.

6.1.3. Convergent validity

Convergent validity measures how well a construct accounts for differences in its constituent parts. Concerning convergent validity, it is the rate at which all indicators in the model relate to other items of the same latent variable. Average Variance Extracted (AVE) measures convergent validity. By calculating AVE from each component, outer loadings allow for the evaluation of convergent validity. The results of the convergent validity are presented in Table 6.

Table 6. Convergent validity results

Constructs	Average variance extracted (AVE)
Business Efficiency	0.701
Cost	0.676
Environmental Compliance	0.781
Management Position	0.809
Pressure from Stakeholders	0.787
Sustainability	0.776

Source: PLS-SEM analysis results.

By calculating AVE from each component, outer loadings are applicable for evaluating convergent validity. From Table 4, all latent variables showed high loading which is greater than 0.50. Thus, convergent validity was met because all AVE values in Table 6 were greater than 0.50.

6.1.4. Discriminant validity

If the convergent validity is known, then discriminant validity can be calculated. Discriminant validity requires that each construct represents a phenomenon that is not captured using any other component of the model (Hair et al., 2020). The empirical evidence is compared to the other constructs in the model to determine the level of difference between them. Examining the relationships between different constructs, AVE helps to verify the discriminant validity of the test. Discriminant validity is frequently assessed using the Fornell-Larcker criterion by contrasting the AVE (shared variance within) of the constructs with the squared correlation between them (shared variance between). To assess discriminant validity, the study employed (Fornell & Larcker, 1981) criterion. The results of the Fornell-Larcker criterion are presented in Table 7.

Discriminant validity of the data was achieved by the result of the Fornell-Larcker criteria. Latent variables tend to correspond more closely to their corresponding indicators than to any other latent variables, as shown in Table 6. Figures reflecting this are presented in bold in the Table 7. The highest values across rows and columns are highlighted in bold. Discriminant validity has been established here.

Table 7. Fornell-Larcker criterion result

Constructs	Business Efficiency	Cost	Environmental Compliance	Management Position	Pressure from Stakeholders	Sustainability
Business Efficiency	0.837					
Cost	0.822	0.875				
Environmental Compliance	0.709	0.746	.884			
Management Position	0.685	0.671	.846	.899		
Pressure from Stakeholders	0.694	0.679	.845	.827	.887	
Sustainability	0.756	0.777	.84	.779	.775	0.881

Source: PLS-SEM analysis results.

6.2. Structural model assessment

The structural connection between components is modeled in the inner model. The structural model is utilized to test the direct effect and connection between the dependent and independent variables. The structural evaluation criteria include multicollinearity issue, path coefficient, coefficient of determination (R^2), and standardized root mean squared residual (SRMR).

6.2.1. Evaluating multicollinearity issue of structural model

To ensure that collinearity does not skew the results of the regression, it is important to test for it before the structural relationships can be evaluated. The degree of multicollinearity was evaluated by looking at the Variance Inflation Factor (VIF) values across all of the different measures. Collinearity problems can be avoided with a cut-off of 5 or fewer (Hair et al., 2020). When VIF is greater than 5, there is likely collinearity among the predictor constructs.

According to Table 8, there are no collinearity issues because all VIF values are less than 5. Table 8 presents the findings from the VIF test.

6.2.2. Evaluating path coefficients significance in structural model

The path coefficient between the model's latent variables needs to be evaluated for significance once collinearity has been checked. The path coefficient was used to determine if there is a correlation between the dependent, mediating, and independent variables. It was done through the process of bootstrapping with 5000 samples on Smart-PLS 4 with 0.1 two-tailed. A non-

Table 8. Multicollinearity statistics results (Inner VIF)

Constructs	Business Efficiency	Cost	Environmental Compliance	Management Position	Pressure from Stakeholders	Sustainability
Business Efficiency		2.19				
Cost						1.000
Environmental Compliance		4.841				
Management Position		4.257				
Pressure from Stakeholders		4.277				
Sustainability						

Source: PLS-SEM analysis results.

parametric test with Smart-PLS is required since PLS-SEM cannot prove that the data is evenly distributed (Hair et al., 2019). The bootstrapping method is applied to obtain p-values and t statistics for studying both direct and indirect effects.

PLS-SEM technique's outcome, which provide path coefficient, t statistics, p-values, make it more appropriate for both complicated and straightforward models. The findings are presented in Table 8. When a 95% confidence interval (CI) is taken into account, a critical value of 1.65 is suggested for 10% (two-tailed) significance (Hair et al., 2021).

Direct and indirect effect for hypothesis testing was used to assess the mediating role of cost in the relationship between the independent and dependent variable. This is because specific indirect effect and total effect have the same results from the analysis.

T-statistics (t-value) was used to analyze the direct and indirect effects of the latent variables. Table 9 shows two out of four hypotheses tested have crucial t values of 1.65 or above, indicating that they are supported. Thus, H2 H4 and H5 were significant and H1 and H3 were not significant.

First, the result revealed pressure from stakeholders has an insignificant indirect effect on sustainability through cost (H1: $\beta = -0.036$, $t = 0.938$, $p = 0.349$). With the inclusion of the mediator, the effect of pressure on stakeholders on cost was insignificant ($\beta = -0.046$, $t = 0.937$, $p = 0.348$). The total effect of pressure on sustainability through cost result was the same as the indirect effect which was not significant. This shows no complementary partial or full mediating role of cost in the relationship between pressure from and stakeholders. This means cost does not play a crucial role in green accounting, which in turn promotes sustainability. This result does not support the H₁ hypothesis.

Table 9 reveal that environmental compliance has a significant indirect effect on sustainability through cost (H2: $\beta = 0.247$, $t = 5.179$, $p = 0.000$). The direct effect of environmental compliance on cost was significant ($\beta = 0.319$, $t = 5.224$, $p = 0.000$), with the inclusion of the mediator which is significant and has a direct relationship with sustainability. This indicates that a percentage change in environmental compliance will increase sustainability by 0.247. This means cost plays

Table 9. Direct and indirect relationship for hypothesis testing results

	Relationship	Path coefficient	T values	P values	Inference	95% CI LL	95% CI UL
H1	Pressure from Stakeholders -> Cost	-.046	0.937	.349	Not Significant	-0.140	0.049
	Pressure from Stakeholders -> Cost -> Sustainability	-.036	.938	0.348	Not Significant	-0.109	0.038
H2	Environmental Compliance -> Cost	.319	5.224	.000***	Significant	0.200	0.440
	Environmental Compliance -> Cost -> Sustainability	.247	5.179	0.000***	Significant	0.154	0.340
H3	Management Position -> Cost	-.062	1.062	.288	Not significant	-0.172	0.054
	Management Position -> Cost -> Sustainability	-.048	1.059	0.290	Not Significant	-0.133	0.043
H4	Business Efficiency -> Cost	.724	20.782	.000***	Significant	0.653	0.789
	Business Efficiency -> Cost -> Sustainability	.560	18.887	0.000***	Significant	0.501	0.617
H5	Cost -> Sustainability	.774	40.400	.000***	Significant	0.731	0.807

Significant at 1%***

a role in getting manufacturing licenses for production and pressure to publish environmental information and reports to improve sustainability. Therefore, this result supports the H_2 hypothesis.

Table 9 shows that management position has an insignificant indirect effect on sustainability through cost ($H_3: \beta = -0.048, t = 1.059, p = 0.290$). The direct effect of management position on cost was significant ($\beta = -0.062, t = 1.062, p = 0.288$), which is not significant and has no direct relationship with cost and sustainability. It means no complementary partial or full mediating role of cost in the relationship between Management position and sustainability. This means that management does not work with suppliers to plan products or services at a cost for sustainability. Hence, this result does not support the H_3 hypothesis.

Business efficiency has a significant indirect effect relationship ($H_3: \beta = 0.560, t = 18.887, p = 0.000$) with sustainability through cost. Also, business efficiency has a significant direct relationship with cost ($H_3: \beta = 0.724, t = 20.782, p = 0.000$). This means that there is a causal connection or even a meaningful one between business efficiency, cost, and sustainability. This reports that 1% change in business efficiency will improve sustainability by 0.560. This is a reflection that green accounting helps track water, material, and energy efficiency programs and reduce the cost to promote sustainability. This brings us to the conclusion that the H_4 hypothesis should be accepted.

This result shows cost is significant and has a direct relationship with sustainability. Table 9 reveals that the value of the cost coefficient is 0.774, with a matching t value of 40.400 and a p value of 0.000. This means a 1% percent change in environmental cost will enhance sustainability. This indicates that cost plays a crucial role in green accounting, which in turn promotes sustainability. This result does not support the H_5 hypothesis.

6.2.3. Goodness of fit (GOF)

Goodness of Fit (GOF) shows how well or poorly the model is matched. Additionally, misspecifications in the measurement and structural models can be discovered with the help of the GOF test. The most common measure of GOF is the R square (R^2) and SRMR.

A model's ability to explain data is quantified by its R^2 value, which is equal to the fraction of the total variance that can be attributed to each of the model's internal constructs. The results of the GOF are shown in Table 10.

Table 10. R square results		
Dependent and Mediating Constructs	R-square	R-square adjusted
Cost	0.800	0.797
Sustainability	0.604	0.603

Source: PLS-SEM analysis results.

It can be seen that the model's R^2 is 0.800 from Table 10. This suggests that there are no fluctuations in the endogenous factors that can be attributed to the confluence of the exogenous latent variables. Some fields consider an R^2 value of 0.10 to be appropriate, but this varies widely depending on the application. R^2 increases as the number of predictor components grows.

6.2.4. Standardized root mean squared residual (SRMR)

SRMR is expressed as mean of standardized residuals between the measured and the predicted covariance (Pavlov et al., 2021). SRMR was utilized in the investigation. This is because numerous research has found SRMR to be a reliable method to analyze the goodness of fit in PLS-SEM. The

lower the SRMR, the better the fit of the model. When the SRMR is 0, the fit is ideal. A SRMR of 0.08 or less, however, is considered to be optimal.

Table 11 shows the calculated SRMR value of 0.07 is less than the threshold value of 0.08. It means the model is appropriately fitted and that there are no misspecifications in either the measurements or the structural model.

Table 11. SRMR results		
	Saturated model	Estimated model
SRMR	0.072	0.076

Source: PLS-SEM analysis results.

6.2.5. Evaluating the effect size

To determine whether or not an independent construct significantly influences the dependent construct, researchers use effect sizes. If the f^2 value is below 0.020, the independent construct has a small effect on the dependent construct, and if it is between 0.150 and 0.350, the independent construct has a moderate effect on the dependent construct (Gefen et al., 2011). We utilized Cohen's f square (f^2) to calculate the effect size of each path. Table 11 displays the f^2 values.

Table 12. F square results					
Constructs	Business Benefit	Environmental Compliance	Management Position	Pressure from Stakeholders	Sustainability
Business Benefit					0.167
Environmental Compliance					0.188
Management Position					0.008
Pressure from Stakeholders					0.005
Sustainability					

Given the numbers in Table 12, our possible conclusion is that there is influence of some independent constructs (Business Benefits and Environmental Compliance) on the dependent construct (Sustainability) is minimal. Furthermore, there is no relationship between Management Position and Pressure from Stakeholders and the dependent construct, Sustainability.

6.3. Discussion

Green accounting aims to lessen the financial burden of environmental damage. The use of environmentally friendly raw materials, a system of waste management which is not causing damage to the surrounding environment, strategic position, environmental compliance and the existence of pressure from stakeholders are all activities that reflect green accounting practices to promote sustainability.

Pressure from stakeholders is an essential element of green accounting. Interactions with firms and stakeholders are critical to success and ecological sustainability. According to the stakeholder theory, firm dedication to ecological initiatives or actives improve company's relationship with its stakeholders (Orazalin et al., 2023). Stakeholders' prefer firms with strong ecological performance.

Stakeholders' pressure consists of requests for information about the environment from management and pledges to engage in environmental actions, as well as a heightened public focus on ecological sustainability (N. Giang et al., 2020). If stakeholders pressure firms to disclose environmental information, firms can reduce environmental pollution. In addition, with the reduction harms to the environment, corporations can reduce environmental costs, hence improving sustainability. The hypothesis testing results did not match the theoretical postulation. The analysis results with regards to the hypothesis of pressure from stakeholders being positively associated with sustainability, was not supported. This indicates that many pharmaceutical firms' stakeholders do not pressure them to use the right amount of information to carry out their report preparation. Furthermore, firms think green information (sustainable reporting) are costly than other traditional information in preparing financial statements. However, findings from other studies conducted on green accounting have largely revealed stakeholders' pressure positively influences sustainability (N. Giang et al., 2020). The findings is contrary with those of the studies of (Dura & Suharsono, 2022) who found positive association between stakeholder pressure and sustainable development.

Environmental compliance significantly contributes to sustainability. Environmental compliance helps environmental accounting by keeping the environment safe and following the regulations set forth in environmental policies and legislation (Almaliki, 2020). According to the institutional theory, firms tend to comply environmental laws as a result of institutional pressure to improve their legitimacy (Ramdhony et al., 2022). The institutional theory establishes organizational structure which includes complying environmental policies and standards (Latifah & Soewarno, 2023). The compliance of environmental laws is also determined by stakeholders' pressure as the stakeholder theory proposes which contributes to ecological sustainability (Nguyen, 2022). Green accounting helps safeguard the environment by ensuring that laws and company policies are followed in a way that is effective and affordable. Hence, the study assumed a positive link between environmental compliance and sustainability. The outcome of the analysis reveals hypothesis of environmental compliance being positively connected to sustainability, was significant. According to the outcome, environmental compliance helps cut costs and boost sustainability by providing more thorough and widespread monitoring of these factors. This means the policymakers must ensure necessary environmental indicators are regulated for the products and services of enterprises. The findings of our study corroborate those of (Loen, 2018) and (N. Giang et al., 2020) studies, which found green accounting has a substantial impact on the sustainability perspective as a result of environmental compliance. This can aid in the growth of an organization's comprehensive environmental management system. Thus, green accounting disclosures will boost shareholder value because of a company's commitment to environmental protection, according to the research conducted by (Almaliki, 2020).

Furthermore, management positioning and long-term viability are safeguarded through cost-effectiveness and environmental program protection with the help of accounting (Almaliki, 2020). According institutional theory, management may encounter institutional pressure to implement green accounting to regulators and stakeholders (Nguyen, 2022). Management is seen as an important element that complies with ecological regulations to lessen environmental damage according to the institutional theory. Green accounting helps businesses assess if their current plans are the most advantageous and ecologically responsible options for the future. According to our findings, management position hypothesis was not supported which indicates that management did not commit to improving sustainability. Management efforts in evaluating and implementing cost-effective and sensitive environmental activities to ensure the long-term sustainability of the business are not encouraging. Setting goals to improve sustainability is essential and also management should take it necessary in reporting to its stakeholders. The results is not congruent with (Almaliki, 2020) who found a positive link between strategic position and environmental performance.

Moreover, with the help of green accounting, businesses can lessen their financial burden and their negative effects on the environment by optimizing their use of resources (N. Giang et al., 2020). Business efficiency promotes more efficient use of resources inside an organization, which in turn lowers costs and has a smaller negative impact on the environment. According to the institutional theory, firms efficiently use resources to improve environmental performance as a result of institutional environment (Latifah & Soewarno, 2023). Our outcome supports the business efficiency hypothesis which is positively associated with sustainability. The finding is consistent with (Almaliki, 2020). The study of (Latifah & Soewarno, 2023) states environmental accounting influences sustainability performance through waste management which support our study. Combustion of fossil fuels, disposal of waste, and utilization of raw materials can all be reduced by careful monitoring of important metrics including energy, garbage, resources, and pure water consumption, which in turn improves operational efficiency and saves money (Khoury et al., 2019). Assessing performance and setting goals are essential for businesses to increase output, revenue, and longevity.

Finally, the ecological cost of a product is the sum of all the costs associated with it, including those associated with the production process and any decision-supporting systems and services. The cost-benefit analysis must also be applied to the cost to the environment (Rounaghi, 2019). The cost hypothesis used in the study which shows a connection with sustainability was supported. The study used the cost-and-benefit approach to assess how ecological cost impact sustainability. The correct cost of these items is determined in part by clearly defining and measuring the aspects of cost, which are subsequently included in the activities and ultimately the products themselves. The results of the study agrees with the findings of (Almaliki, 2020). Rationalizing pricing decisions and accurately measuring costs depend on knowing the correct relationship between product revenues and costs (Magablih, 2017). Green accounting is a tool for cutting costs and improving the efficiency of environmental management systems.

7. Summary and conclusion

Stakeholders are placing increasing pressure on businesses to produce products in a sustainable manner that is both cost-effective and competitive. Measuring an enterprise's environmental performance relative to its financial performance is reported to increase corporate value and human satisfaction while reducing environmental impact, hence promoting sustainable growth, making a positive contribution to the quality of life, and utilizing fewer resources. When it comes to safeguarding Ghana's ecosystem, green accounting and reporting can make a huge difference. This is because it compels businesses to provide a benchmark by which their emissions of greenhouse gases, energy consumption, resource consumption, and other important environmental indicators can be compared. Green accounting has attracted attention among researchers, policy-makers and practitioners. Consequently, there is limited research on green accounting and sustainability in pharmaceutical sector. Therefore, our study explored the relationship between green accounting and ecological sustainability in the pharmaceutical industry.

The findings of the study conclude pressure from stakeholders is not positively associated with ecological sustainability. However, environmental compliance was found to significantly impact sustainability. Also, management position was found to have a negative influence on sustainability. Moreover, the results indicate business efficiency has substantial effect ecological sustainability. Lastly, environmental costs positively affects ecological sustainability.

Importantly, we examined the mediating role of environmental costs on green accounting and ecological sustainability nexus. Hence, our study contributes to literature in the following ways.

First, the research explore the green accounting and sustainability and the mediating role of environmental costs on the association between green accounting and sustainability to highlight the shortfall of previous studies which only looked at green accounting, sustainable development and environmental performance. Second, the study adds to previous research on green accounting and

sustainable development in emerging economies with environmental issues and low environmental regulations implementation. Third, the research contributes to prior studies by analyzing data which relates to pharmaceutical industry, one of the major contributors to environmental pollution. Fourth, this study adds to existing literature by depending on institutional and stakeholder pressure theories to examine the connection between green accounting dimensions and sustainability.

7.1. Implications

7.1.1. Practical implications

The research and practical implications of the study's findings and interpretations are summed up here. Implications for theory highlight the study's contributions to the expanding amount of literature on the pervasive use of green accounting by industrial organizations. Under the implications for researchers, the study's contributions to improving the methodology of past studies on environmental accounting are explored. Moreover, manufacturing enterprises can be encouraged and assisted in their transition to green accounting practices employing proper governmental guidelines. Firms can use the study's findings to evaluate how their level of adoption stacks up against that of competing pharmaceutical companies; this information is also applicable to the broader manufacturing sector. Benefits from using green accounting methods are expected to improve if owners and managers apply the paradigm established in this study. Our research may help industrial companies develop formal and comprehensive environmental impact strategies.

7.1.2. Policy implications

The study calls for the establishment of policies, encouraging the adoption of environmentally friendly bookkeeping techniques by industrial firms, and fostering understanding of these concepts which lead to greater sustainability. Environmental impact and sustainability capacity education must be prioritized in public policy and general public interventions. Based on this, policy implications below are suggested:

First, the research shows how vital it is to factor in environmental costs and implications when deciding on financial decisions. To ensure that environmental costs are incorporated into policy assessments, financial management, and investment decisions, policy makers should utilize the results as justification for the incorporation of green accounting standards into national financial reporting schemes.

Second, the results of the study can be utilized to develop and execute regulations and initiatives that encourage eco-friendly behaviors. Regulators should introduce economic tools like environmental taxes, subsidies, market-driven processes to motivate companies and individuals to embrace greener activities and minimize their effects on the environment.

Third, the findings of the study may be used to justify the modification and improvement of ecological legislation and guidelines. The results can be used to push for stricter environmental legislation, with the end goal being industry-wide reductions in emissions, use of materials, and the absence of harmful waste.

7.2. Limitations and future research

The research has some limitations that needs to be addressed by future studies. First, our research is based on pharmaceutical firms who are only members of the Pharmaceutical Manufacturers Association of Ghana. Consequently, the results cannot be generalized to pharmaceutical industry in Ghana and other developing economies. Therefore, further study can shed light on alternative contexts to test and validate the findings. Second, factor analysis was performed to determine the study's components and dimensions to reduce the number of dependent and independent variables including a categorical variable. Therefore, it is suggested that future research into the sustainability of green accounting should incorporate complementary methods like the correspondent analysis. By utilizing both dependent and independent categorical data, conceptual

frameworks can be constructed via correspondence analysis. Third, the study did not include stakeholders' perspectives such as industry representatives and local communities. Future studies can systematically examine wide range of stakeholders to get thorough understanding of the complication of green accounting and ecological sustainability. Lastly, the study used numerous responses from the same companies for the analysis. Future studies can identify the person who can best answer the question to avoid conflicting answers.

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Disclosure statement

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

Citation information

Cite this article as: Does green accounting influences ecological sustainability? Evidence from a developing economy, Ishmael Wiredu, Andrew Osei Agyemang & Samuel Yayra Agbadzidah, *Cogent Business & Management* (2023), 10: 2240559.

References

- Abdullah, M. W., & Amiruddin, H. (2020). Efek green accounting terhadap material flow cost accounting dalam meningkatkan keberlangsungan perusahaan. *EKUITAS (Jurnal Ekonomi Dan Keuangan)*, 4(2), 166–186. <https://doi.org/10.24034/j25485024.y2020.v4.i2.4145>
- Agyekum, A. A., & Singh, R. P. (2018). How Technology is Changing Accounting Processes: Institutional Theory and Legitimacy Theory Perspective. *Journal of Accounting and Finance*, 18(7), 2158–3625. <https://doi.org/10.33423/jaf.v18i7.458>
- Agyemang, A. O., Yusheng, K., Twum, A. K., Ayamba, E. C., Kongkuah, M., & Musah, M. (2021). Trend and relationship between environmental accounting disclosure and environmental performance for mining companies listed in China. *Environment Development and Sustainability*, 23(8), 12192–12216. <https://doi.org/10.1007/s10668-020-01164-4>
- Agyemang, A. O., Yusheng, K., Twum, A. K., Edziah, B. K., & Ayamba, E. C. (2023). Environmental accounting and performance: Empirical evidence from China. *Environment Development and Sustainability*, 1–26. <https://doi.org/10.1007/s10668-022-02853-y>
- Akumfi, C. A. (2022). Green accounting practices lessons from an emerging economy; a case study of listed limited liability companies in ashanti region. *Kwame Nkrumah University of Science and Technology, Kumasi*, 22.
- Ali, E. B., Anufriev, V. P., & Amfo, B. (2021). Green economy implementation in Ghana as a road map for a sustainable development drive: A review. *Scientific African*, 12, e00756. <https://doi.org/10.1016/j.sciaf.2021.e00756>
- Almaliki, N. (2020). Impact of green accounting on improving environmental costs and performance: An analytical study from an academic point of view. *International Journal of Engineering Technology Research & Management*, 4(3), 127–143.
- Anex, R. P., & Englehardt, J. D. (2001). Application of a predictive Bayesian model to environmental accounting. *Journal of Hazardous Materials*, 82(2), 99–112. [https://doi.org/10.1016/S0304-3894\(00\)00348-4](https://doi.org/10.1016/S0304-3894(00)00348-4)
- Bebbington, J., Russell, S., & Thomson, I. (2017). Accounting and sustainable development: Reflections and propositions. *Critical Perspectives on Accounting*, 48, 21–34. <https://doi.org/10.1016/j.cpa.2017.06.002>
- Beredugo, S. B., & Mefor, I. P. (2012). The impact of environmental accounting and reporting on sustainable development in Nigeria. *Research Journal of Finance & Accounting*, 3(7), 55–63.
- Bour, K. B., Asafo, A. J., & Kwarteng, B. O. (2019). Study on the effects of sustainability practices on the growth of manufacturing companies in urban Ghana. *Heliyon*, 5(6), e01903. <https://doi.org/10.1016/j.heliyon.2019.e01903>
- Caesar, A. E., Maayir, G., Osei-Agyemang, A., & Anaba, O. A. (2017). Marketing mix practices in the development of small and medium enterprises in the Bolgatanga Municipality, Ghana. *International Journal of Management Sciences and Business Research*, 6(12), 90–102.
- Comyns, B. (2018). *Climate change reporting and multinational companies: Insights from institutional theory and international business*. Paper presented at the Accounting Forum.
- D'Adamo, I., Ferella, F., Gastaldi, M., Maggiore, F., Rosa, P., & Terzi, S. (2019). Towards sustainable recycling processes: Wasted printed circuit boards as a source of economic opportunities. *Resources, Conservation and Recycling*, 149, 455–467. <https://doi.org/10.1016/j.resconrec.2019.06.012>
- Dhar, B. K., Sarkar, S. M., & Ayittey, F. K. (2022). Impact of social responsibility disclosure between implementation of green accounting and sustainable development: A study on heavily polluting companies in Bangladesh. *Corporate Social Responsibility and Environmental Management*, 29(1), 71–78. <https://doi.org/10.1002/csr.2174>
- Diamantopoulos, A., Sarstedt, M., Fuchs, C., Wilczynski, P., & Kaiser, S. (2012). Guidelines for choosing between multi-item and single-item scales for construct measurement: A predictive validity perspective. *Journal of the Academy of Marketing Science*, 40(3), 434–449. <https://doi.org/10.1007/s11747-011-0300-3>
- Dura, J., & Suharsono, R. (2022). Application green accounting to sustainable development improve financial performance study in green industry. *Jurnal akuntansi*, 26(2), 192–212. <https://doi.org/10.24912/ja.v26i2.893>
- Ebrahimi, S. M., & Koh, L. (2021). Manufacturing sustainability: Institutional theory and life cycle thinking. *Journal of Cleaner Production*, 298, 126787. <https://doi.org/10.1016/j.jclepro.2021.126787>
- Effiong, S. A., & Asuquo, A. (2010). Environmental accounting and environmental cost reporting: Implications and prospects for business survival. *African Journal of Management and Administration*, 3(4), 144–147.

- Ellison, D., Lundblad, M., & Petersson, H. (2011). Carbon accounting and the climate politics of forestry. *Environmental Science & Policy*, 14(8), 1062–1078. <https://doi.org/10.1016/j.envsci.2011.07.001>
- Fonseka, M., Rajapakse, T., & Richardson, G. (2019). The effect of environmental information disclosure and energy product type on the cost of debt: Evidence from energy firms in China. *Pacific-Basin Finance Journal*, 54, 159–182. <https://doi.org/10.1016/j.pacfin.2018.05.001>
- Fornell, C., & Larcker, D. F. (1981). *Structural equation models with unobservable variables and measurement error: Algebra and statistics*. Sage Publications Sage CA.
- Gefen, D., Rigdon, E. E., & Straub, D. (2011). Editor's comments: An update and extension to SEM guidelines for administrative and social science research. *MIS Quarterly*, 35(2), iii–xiv. <https://doi.org/10.2307/23044042>
- Giang, N., Binh, T., Thuy, L., Ha, D., & Loan, C. (2020). Environmental accounting for sustainable development: An empirical study in Vietnam. *Management Science Letters*, 10(7), 1613–1622. <https://doi.org/10.5267/j.msl.2019.12.005>
- Giang, N. P., Hien, T. N. B., Huyen, V. T. T., Ngan, L. T. H., & Ha, D. N. (2021). Perspectives on green accounting and its relationship with sustainable development in the business. *Multicultural Education*, 7(12), 629. <https://doi.org/10.5281/zenodo.5810650>
- Gupta, A. K., & Gupta, N. (2021). Environment practices mediating the environmental compliance and firm performance: An institutional theory perspective from emerging economies. *Global Journal of Flexible Systems Management*, 22(3), 157–178. <https://doi.org/10.1007/s40171-021-00266-w>
- Hair, J. F., Jr., Howard, M. C., & Nitzl, C. (2020). Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *Journal of Business Research*, 109, 101–110. <https://doi.org/10.1016/j.jbusres.2019.11.069>
- Hair, J. F., Jr., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). *A primer on partial least squares structural equation modeling*. Sage publications. <https://doi.org/10.1007/978-3-030-80519-7>
- Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, 31(1), 2–24. <https://doi.org/10.1108/EBR-11-2018-0203>
- Hörisch, J., Schaltegger, S., & Freeman, R. E. (2020). Integrating stakeholder theory and sustainability accounting: A conceptual synthesis. *Journal of Cleaner Production*, 275, 124097. <https://doi.org/10.1016/j.jclepro.2020.124097>
- Jöreskog, K. G. (1971). Simultaneous factor analysis in several populations. *Psychometrika*, 36(4), 409–426. <https://doi.org/10.1007/BF02291366>
- Kalbouneh, A., Aburishah, K., Shaheen, L., & Aldabbas, Q. (2023). The intellectual structure of sustainability accounting in the corporate environment: A literature review. *Cogent Business & Management*, 10(2), 2211370. <https://doi.org/10.1080/23311975.2023.2211370>
- Khare, V. K., Raghuvanshi, S., Verma, P., & Shrivastava, A. (2023). *The importance of green management and its implication in creating sustainability performance on the small-scale industries in India*.
- Khoury, C. K., Amariles, D., Soto, J. S., Diaz, M. V., Sotelo, S., Sosa, C. C. ... Guarino, L. (2019). Comprehensiveness of conservation of useful wild plants: An operational indicator for biodiversity and sustainable development targets. *Ecological Indicators*, 98, 420–429. <https://doi.org/10.1016/j.ecolind.2018.11.016>
- Kurantın, N. Y. (2011). *Integrating environmental accounting into Ghana's emerging oil and gas economy. Proceedings of the Paper presented at the International Conference on Petroleum and Sustainable Development*, Dubai, United Arab Emirates. IPCBEE.
- Latifah, S. W., & Soewarno, N. (2023). The environmental accounting strategy and waste management to achieve MSME's sustainability performance. *Cogent Business & Management*, 10(1), 2176444. <https://doi.org/10.1080/23311975.2023.2176444>
- Loen, M. (2018). Penerapan green accounting dan material flow cost accounting (MFCA) terhadap sustainable development. *Jurnal Akuntansi Dan Bisnis Krisnadwipayana*, 5(1). <https://doi.org/10.35137/jabk.v5i1.182>
- Maama, H., & Appiah, K. O. (2019). Green accounting practices: Lesson from an emerging economy. *Qualitative Research in Financial Markets*, 11(4), 456–478. <https://doi.org/10.1108/QRFM-02-2017-0013>
- Maama, H., & Mkhize, M. (2020). Integration of non-financial information into corporate reporting: A theoretical perspective. *Academy of Accounting & Financial Studies Journal*, 24(2), 1–15.
- Magabli, A. M. (2017). The impact of green accounting for reducing the environmental cost in production companies. *Journal of Modern Accounting and Auditing*, 13(6), 249–265. <https://doi.org/10.17265/1548-6583/2017.06.002>
- Masum, M. H., Hasan, M. T., Miraz, M. H., Tuhin, M., & Chowdhury, Y. (2020). Factors affecting the sustainability reporting: Evidence from Bangladesh. *International Journal of Mechanical and Production Engineering Research and Development (IJMPERD)*, 10(3), 8323–8338. <https://doi.org/10.24247/ijmperdjun2020792>
- Muñoz-Torres, M. J., Fernández-Izquierdo, M. Á., Rivera-Lirio, J. M., & Escrig-Olmedo, E. (2019). Can environmental, social, and governance rating agencies favor business models that promote a more sustainable development? *Corporate Social Responsibility and Environmental Management*, 26(2), 439–452. <https://doi.org/10.1002/csr.1695>
- Nguyen, T. H. (2022). Factors affecting the implementation of environmental management accounting: A case study of pulp and paper manufacturing enterprises in Vietnam. *Cogent Business & Management*, 9(1), 2141089. <https://doi.org/10.1080/23311975.2022.2141089>
- Nzama, S., Olarewaju, O. M., Arise, O. A., & Ganiyu, I. (2022). Environmental Management Accounting (EMA) practices and plastic pollution control in selected food and beverage firms. *Cogent Business & Management*, 9(1), 2085368. <https://doi.org/10.1080/23311975.2022.2085368>
- Omran, M. A., & Ramdhony, D. (2015). Theoretical perspectives on corporate social responsibility disclosure: A critical review. *International Journal of Accounting and Financial Reporting*, 5(2), 38–55. <https://doi.org/10.5296/ijaf.v5i2.8035>
- Orazalin, N. S., Ntim, C. G., & Malagila, J. K. (2023). Board sustainability committees, climate change initiatives, carbon performance, and market value. *British Journal of Management*. <https://doi.org/10.1111/1467-8551.12715>
- Osei, A., Osei Agyemang, A., Amoah, J., & Sulemana, I. (2023). Empirical study on the impact of working capital management on going concern of manufacturing firms in Ghana. *Cogent Business & Management*, 10(2), 2218177. <https://doi.org/10.1080/23311975.2023.2218177>

- Osei, A. A., Yusheng, K., Caesar, E. A., Kissiwaa, A. T., & Shaibu, A. (2019). Impact of board characteristics on corporate social responsibility disclosure in Ghana. *International Journal of Sciences: Basic and Applied Research*, 46(1), 104–116.
- Oti, P. A., & Mbu-Ogar, G. B. M. (2018). Analysis of environmental and social disclosure and financial performance of selected quoted oil and gas companies in Nigeria (2012–2016). *Journal of Accounting and Financial Management ISSN*, 4(2), 3.
- Pavlov, G., Maydeu-Olivares, A., & Shi, D. (2021). Using the standardized root mean squared residual (SRMR) to assess exact fit in structural equation models. *Educational and Psychological Measurement*, 81(1), 110–130. <https://doi.org/10.1177/0013164420926231>
- Peters, B. G. (2022). Institutions, institutional theory and policy design. *Research Handbook of Policy Design*, 55–56. <http://dx.doi.org/10.4337/9781839106606>
- Ramdony, D., Rashid, A., Gow, J., & Soobaroyen, T. (2022). The influence of corporate governance and corporate foundations on corporate social responsibility (CSR) reporting practices. *Journal of African Business*, 23(3), 816–832. <https://doi.org/10.1080/15228916.2021.1952521>
- Rounaghi, M. M. (2019). Economic analysis of using green accounting and environmental accounting to identify environmental costs and sustainability indicators. *International Journal of Ethics and Systems*, 35(4), 504–512. <https://doi.org/10.1108/IJOES-03-2019-0056>
- Saputra, K. A. K., Manurung, D. T. H., Rachmawati, L., Siskawati, E., & Genta, F. K. (2021). Combining the concept of green accounting with the regulation of prohibition of disposable plastic use. *International Journal of Energy Economics & Policy*, 11(4), 84–90. <https://doi.org/10.32479/ijee.10087>
- Shakkour, A., Alaodat, H., Alqisi, E., & Alghazawi, A. (2018). The role of environmental accounting in sustainable development empirical study. *Journal of Applied Finance & Banking*, 8(1), 71–87.
- Singh, A. P., Rahman, Z., & Olan, F. (2021). Integrating corporate sustainability and sustainable development goals: Towards a multi-stakeholder framework. *Cogent Business & Management*, 8(1), 1985686. <https://doi.org/10.1080/23311975.2021.1985686>
- Straub, D., Gefen, D., & Recker, J. (2022). Quantitative research in information systems. *Association for Information Systems (AISWorld) Section on is Research, Methods, and Theories*.
- Tilt, C. A. (2018). Making social and environmental accounting research relevant in developing countries: A matter of context? *Social and Environmental Accountability Journal*, 38(2), 145–150. <https://doi.org/10.1080/0969160X.2018.1489296>
- Tran, M., Beddewela, E., & Ntim, C. G. (2021). Governance and sustainability in Southeast Asia. *Accounting Research Journal*, 34(6), 516–545. <https://doi.org/10.1108/ARJ-05-2019-0095>
- Van Zanten, J. A., & Van Tulder, R. (2018). Multinational enterprises and the Sustainable Development Goals: An institutional approach to corporate engagement. *Journal of International Business Policy*, 1(3–4), 208–233. <https://doi.org/10.1057/s42214-018-0008-x>
- Van Zyl, A. S. (2013). Sustainability and integrated reporting in the South African corporate sector.
- Wang, X., Cao, F., & Ye, K. (2018). Mandatory corporate social responsibility (CSR) reporting and financial reporting quality: Evidence from a quasi-natural experiment. *Journal of Business Ethics*, 152(1), 253–274. <https://doi.org/10.1007/s10551-016-3296-2>
- Zhou, Y., Agyemang, A. O., Adam, I. O., & Twum, A. K. (2022). Assessing the impact of technological innovation on environmental and financial performance of Chinese textile manufacturing companies. *International Journal of Technology, Policy and Management*, 22(4), 369–393. <https://doi.org/10.1504/IJTPM.2022.126152>