JOURNAL OF CULTURAL ANALYSIS AND SOCIAL CHANGE

Journal of Cultural Analysis and Social Change,
2025, 10(2), 3020-3034
ISSN: 2589-1316

The Impact of Environmental Management Accounting on Environmental Performance and Financial Performance: Evidence from Saudi Arabia

Manal Mohammed Hamoudah[1*]

[1]*Associate Professor of accounting, King Abdulaziz university Jeddah, SAUDI ARABIA, https://orcid.org/0000-0002-0583-195X*

*__Corresponding Author:__ mhamoudah@kau.edu.sa

Citation: Hamoudah, M. M. (2025). The Impact of Environmental Management Accounting on Environmental Performance and Financial Performance: Evidence from Saudi Arabia, *Journal of Cultural Analysis and Social Change*, 10(2), 3020-3034. https://doi.org/10. 10.64753/jcasc.v10i2.2045

Published: November 18, 2025

ABSTRACT

Environmental Management Accounting (EMA) is an essential instrument that incorporates both environmental and financial data to improve the sustainability performance. The conventional accounting does not consider the environmental cost and thus there is a need to know how EMA can bring about the ecological and economic results. This paper analyses how the implementation of EMA affects the environmental performance (EP) and financial performance (FP) in Saudi Arabia and investigate the mediating effect of the environmental performance (EP) between the two. Partial Least Squares Structural Equation Modelling (PLS-SEM) was employed to analyse a quantitative method to analyse survey data of 298 industrial firms. The findings reveal that EMA has a significant positive impact on EP and FP, and the positive impact on environmental outcomes (0.958, $p < 0.001$) and positive impact on financial outcomes (0.479, $p < 0.001$) are strong and moderate respectively. Another mediating variable in the EMA-FP relationship is EP indicating a positive relationship between better environmental efficiency and better financial outcomes. The research finds that EMA is a tactical tool of ensuring sustainability and competitiveness. It supports the topicality of environmental responsibility in the financial decision-making process and stimulates policymakers to enhance the use of EMA by providing training and favourable regulations in accordance with the Saudi Vision 2030.

Keywords: Environmental Management Accounting, Environmental Performance, Financial Performance, Green Accounting, Sustainable Development

INTRODUCTION

Sustainability is one of the most burning issues of global economies, corporations, and policymakers in the twenty-first century (Pomfret, R. 2019). The growing destructive nature of natural resources, the growing pollution, and the growing rate of climate change have sensitized people to the necessity of environmentally friendly business practices. Governments, investors and the general population are increasingly pressurizing organizations to reduce their ecological footprints and conduct their operations in a manner that promotes sustainable development (Zhang, S., & Chen, K. 2023). Nevertheless, the conventional accounting and management systems that are mostly aimed at capturing financial transactions are poor in tracking and controlling environmental impacts. These systems do not consider the cost of the environment, including waste disposal, pollution control, and resource depletion and result in decisions that maximize short-term profits at the cost of long-term survival. To deal with such shortcomings, the Environmental Management Accounting (EMA) concept has become eminent as a new concept that involves the incorporation of environmental and financial data to enhance decision making, control, and performance measurement (Antonini, C., & Gomez-Conde, J. 2024).

Environmental Management accounting can be defined as the recognition, gathering, examination and utilization of physical and financial data to assist the internal management decision making process about the environmental performance and expenditure (Rasit, Z. A., et al, 2020). It is contrasted with traditional accounting in that it clearly correlates the environmental effects like material and energy use, waste, and emissions with economic performance (Rasit, Z. A., et al, 2020). EMA is divided into two primary dimensions such as Physical Environmental Management Accounting (PEMA) and Monetary Environmental Management Accounting (MEMA). PEMA is concerned with the physical movement of materials, water, and energy in an organization to find the inefficiencies and environmental effects (Marrone, M., et al, 2020). MEMA on the other hand entails the quantification and allocation of environmental costs to a particular process or product. These two dimensions together enable the organizations to evaluate the environmental and financial impact of their operations so that the managers can find out the possibilities of cost savings, pollution prevention, and resource efficiency (Guo, Z., et al, 2025). EMA is a strategic management tool that is gaining popularity globally as a tool that integrates the responsibility of the environment with the corporate profitability. It assists firms in internalizing both costs and benefits of the environment and sustainability is no longer viewed as a compliance requirement, but as a competitive advantage (Agwu, E. 2021). By adopting EMA, the firms can track their environmental performance in a systematic manner, meet the environmental regulation requirements, and detect the areas where waste reduction, cleaner production and optimization of the resources would improve overall efficiency (Mungai, E. M., et al, 2020). This two-fold emphasis on environmental and financial performance turns EMA into a key tool in the attainment of a sustainable business performance. Indicatively, Christ and Burritt (2013) and Burritt and Schaltegger (2014) have reported that companies that applied EMA reported reduced costs of operation, improved records of compliance, and increased stakeholder confidence. Through incorporation of environmental information in management systems, organizations would be able to make both economically sound and environmentally responsible decisions (Martínez-Falcó, J., et al , 2025).

Environmental Performance (EP) is a term that is used to describe the actual results of the environmental management activities of a company. It includes such indicators as waste reduction, emission control, energy efficiency, and environmental standards. Bettering the environmental performance does not only reduce the damage that the environment is subjected to but also leads to long-term organizational resilience (Madon, I., Drev, D., & Likar, J. 2019). EMA is very vital in this process as they offer data driven information on the consumption of environmental resources and the mitigation of the effects of the environment. EMA allows firms to evaluate, track and enhance their environmental footprint using tools like environmental cost tracking, life-cycle analysis and the eco-efficiency assessment (Morales-Medina, G., & Berbesí, E, 2025). Empirical studies have demonstrated that EMA organizations have better environmental performance because they have better management of resource flow and waste management systems (Qian et al., 2018). Such enhancements help in clean production processes, environmental regulations and corporate reputation. Financial Performance (FP) on the contrary is the capacity of an organization to meet its economic objectives, profitability, cost efficiency, and returns on investments. The association between EMA and financial performance is a concept that has received a lot of debate in the literature of sustainability. EMA may result in financial benefits in several ways including cost savings, reduction of risks, and innovation. As an example, environmental inefficiency can be identified and minimized to decrease the costs of energy and materials, whereas environmental harm can be avoided to decrease the potential liability and fines. Besides, companies, which incorporate EMA in their activities, are likely to have a better reputation among investors because environmental reporting transparency is an indicator of successful risk management and sustainability (Kochkodan, V. B., & Petryna, M. Y. 2024). It is validated in several studies (Bennett and James, 2018; Jalaludin et al., 2011) that the adoption of EMA results in better profitability and competitiveness as sustainability and strategic financial objectives are aligned. Therefore, EMA is a connection between environmental responsibility and profitability (Kochkodan, V. B., & Petryna, M. Y. 2024).

The connection between EMA and environmental performance and the financial performance is supported by several theoretical views. Resource-Based View (RBV) argues that EMA is an effective organizational resource that has the potential to give companies long-term competitive advantage (Abid, N., et al., 2023). It increases the operational efficiency and innovation through the creation of high-quality information regarding the environmental and economic processes that can be hard to imitate by the competitors. According to the Institutional Theory, organizations are driven to use EMA because of the external pressures, which are created by regulatory agencies, investors, and international markets, to make organizations environmentally responsible (Feng, C., et al., 2025). The Stakeholder Theory highlights that implementing EMA addresses the information requirements of the various stakeholders that require accountability and transparency of environmental and financial reporting. In the meantime, the Legitimacy Theory can be applied to explain that organizations should adopt EMA and report on environmental performance to preserve social legitimacy and trust of people (Ogunode, O. A. 2022). Collectively, these theories present a formidable conceptual basis of comprehending the reasons and mechanisms of EMA adoption by organizations and its influence on environmental as well as

financial performance (Liu, D., Zhang, Y., et al., 2022). The implementation of EMA is especially relevant to the situation in Saudi Arabia, which has traditionally been dependent on oil revenues as the main pillar of its economy. In the introduction of Vision 2030, the Kingdom has embarked on a radical process of diversification of the economic base and environmental sustainability (Sharawi, H. 2024). Vision 2030 focuses on the need to have sustainable development, effective use of resources and proper environmental management. In this agenda, Saudi Arabia has already introduced various programs such as Saudi Green Initiative and the Middle East Green Initiative which focus on minimizing the emission of carbon, maximizing the capacity of renewable energy, and improving the waste management systems. These are all efforts by the government to ensure that economic development is in line with environmental conservation (Ahmad, A. H. 2025). In this context, EMA can be considered a critical management instrument that could help Saudi organizations to meet these national sustainability objectives by incorporating environmental and financial responsibility in their decision-making practices.

Although there is a momentum of EMA globally, little has been done on its application and the effects it has in Saudi Arabia. Most of the current research done on EMA has been in developed economies like Australia, Japan and the countries of the European Union where the environmental regulations and sustainability practices are highly established (Ekonomou, G., & Menegaki, A. N. 2023). Nevertheless, emerging economies tend to have their own problems including poor awareness of the environment, poor enforcement of laws, and shortage of resources. In Saudi Arabia, as in most organizations, the current accounting systems are traditional and do not sufficiently reflect the costs or benefits of the environment. As a result, there is a shortage of empirical data to prove that the adoption of EMA can affect both environmental and financial performance of Saudi companies. This gap needs to be addressed because it will give worthy information on the role of EMA towards sustainable industrial development in the Kingdom. The study will focus on the influence of Environmental Management Accounting on environmental performance and financial performance of organizations in Saudi Arabia (Hassanin, M. E., & Hamada, M. A. 2022). It aims to find out whether EMA practice implementation contributes to some quantifiable changes in environmental performance, i.e. less emission, efficient energy consumption and waste minimization and financial performance indicators, e.g. profitability, cost reduction, and return on assets (Zheng, Y. 2020). The paper will also seek to determine the degree to which contextual variables, such as regulatory pressure, organizational culture and management commitment, affect the relationship between EMA and performance results. The study aims at contributing to a more thorough comprehension of the role of EMA as a sustainability and competitiveness driving factor in the emerging economies by empirically testing these relationships (Soni, T. K. 2023).

This research is important in that it contributes to academic and practical fields. Theoretically, it adds to the body of literature on environmental accounting because it gives empirical evidence of a developing economy that is undertaking structural transformation (Zhang, X., Hou, Y., & Geng, K. 2024). It also incorporates both the environmental and financial aspects in one analysis framework and provides an insight into the twofold effects of EMA on corporate sustainability. In practice, the results will inform policymakers, corporate executives, and environmental regulators in Saudi Arabia in the development of measures that will facilitate the implementation of EMA in industries (Kong, Y., Javed, F., et al., 2022). The findings of the research could also help the organizations to create internal systems that combine environmental cost accounting with strategic financial planning resulting in effectiveness of resources, compliance, and profitability. Finally, Environmental Management Accounting is a strategic instrument towards attaining the two objectives of environmental sustainability and financial success (Afandi, M. 2021). EMA helps firms to convert environmental challenges into a chance to innovate, be efficient, and gain a competitive edge by helping them integrate environmental and financial data. The issues of the EMA effect on the environmental and financial performance are of paramount importance in the context of Saudi Arabia, where the government is focusing on the diversification of the economy in terms of its sustainability (Tan, K., Siddik, A. B., et al., 2022). This study will thus offer meaningful empirical data to substantiate the claim on how EMA can help Saudi organizations to gain sustainable growth as well as meet their environmental obligations. At the end, it will be part of the global discourse of how environmental accounting can be used as a foundation of sustainable development and corporate accountability in the contemporary business environment.

LITERATURE REVIEW

Environmental Management Accounting

Environmental Management Accounting (EMA) has become an essential management practice that combines both environmental and financial data to promote sustainability performance and the efficiency of an organization. In contrast to the conventional accounting, which is more concerned with the financial results

(Prasetya, S. G., & Safitri, J. 2023). EMA includes not only physical data like material, energy, and waste flows, but also monetary data regarding the environmental costs, savings, and revenues. Its first aim is to help the management to recognize and reduce the environmental costs, to enhance resource efficiency and to be sustainable in the long term (He, Z. 2020). EMA allows companies to internalize their environmental effects that previously existed as externalities hence making the environmental performance a quantifiable factor in business performance, it constitutes a critical interface between environmental Management and economic Performance in that it assists companies to align operational choices with sustainable development objectives. EMA has its theoretical underpinning on various management and accounting school of thought. Its adoption can be explained by the institutional theory, which implies that it is a reaction to regulatory demands, social expectations, and industry norms. The stakeholder theory explains the importance of EMA in organizations to meet the increasing transparency and accountability expectations of investors, regulators and society (Thanh Thuy Ngoc, T. 2025). According to the contingency theory, the design and application of EMA is based on the firm-specific factors which include size, industry type and environmental exposure. In the meantime, the resource-based view (RBV) considers EMA as a strategic ability which can create competitive advantage through innovation, cost and environmental efficiency. Combined, these theoretical insights demonstrate how EMA can be used as a compliance instrument, as well as a strategic instrument of sustainable value creation (Zaman, M., et al., 2025).

In practice, EMA uses numerous tools and techniques of analysis in decision making. Material Flow Cost Accounting (MFCA) is a method that monitors the movement of material and energy through the production lines to establish inefficiencies and unseen environmental costs. Life-Cycle Costing (LCC) evaluates the overall cost of a product at the lifespan of the product including external costs on the environment to promote more sustainable design and production decisions (Dekamin, M., et al., 2025). EABC further enhances traditional cost allocation in that the costs related to the environment are allocated directly to the identified activities, which offer better visibility of costs. Also, the indicators of environmental performance and eco-efficiency measures are applied to measure the changes in environmental performance as compared to financial performance (Safitri, N., et al., 2024). All these tools combine environmental data into economic intelligence that can enable managers to make informed decisions that can enhance environmental and financial performance. Although its role is increasingly becoming important, EMA implementation has several challenges in industries and regions. Limited awareness in management, lack of skilled professionals, lack of a data integration system, and lack of regulatory incentives are some of the common barriers. Environmental and accounting departments in most organizations are independent, which leads to lack of synergy of information, and lack of opportunities to create synergy (Wei, X., & Yang, J. 2024). Effective implementation of EMA thus demands solid top management guidance, interdepartmental coordination and staff training. The recent progress in digital technologies including the Internet of Things (IoT), cloud-based systems, and data analytics have also led to the emergence of Digital EMA that enables tracking of the environmental and financial data in real-time. Digital EMA improves the precision, timeliness, and strategic importance of sustainability reporting, which allows organizations to be more aligned in environmental performance to economic decision-making (Adams, D., & Krulicky, T 2021).

Within the Saudi Arabian context, EMA has become increasingly relevant as the country works on its agendas of the Vision 2030 to diversify the economy and become more environmentally responsible. Oil, petrochemicals, construction, and manufacturing are among the industrial sectors which are increasingly pressurized to lower environmental effects and engage in sustainable practices (Alsughayer, S. 2025). EMA offers a systematic method to quantify, control and report on environmental costs to facilitate the implementation of such initiatives as the Saudi Green Initiative (SGI) and national ESG reporting schemes. It helps companies to establish inefficiencies, to use resources optimally, and to follow the environmental regulations that have been issued by different agencies like the Saudi National Center of Environmental Compliance (NCEC). Connecting environmental accounting to financial results, EMA enhances the performance of the company and its reputation. Finally, the incorporation of EMA in the sustainability plan of Saudi Arabia has a transformational strength in the process of aligning the performance of a corporation with national and global sustainability goals so that economic growth is realized through environmental conservation (Qasim, A., Pandi, O. D., & Saleem, F. 2025).

Environmental Performance

Environmental Performance is a multidimensional concept, which indicates how an organization operates, its products and services in a way that they have minimum negative effects on the environment and maximize ecological efficiency and sustainability. It is a crucial part of contemporary corporate governance as it is the way the environmental responsibility relates to operational and strategic decision-making (Lee, P. 2022). Environmental performance is centered on quantifiable results like emission, waste, water use and energy use reduction, recycling, resource efficiency and biodiversity conservation. In contrast to conventional environmental

compliance strategies, which only fulfill the environmental regulations, environmental performance is a concept that focuses on active management and constant improvement, to the extent that it motivates organizations to exceed the regulations and consider sustainable innovations that generate a long-term value. Theoretically, environmental performance is based on several frameworks that underline how and why organizations pursue sustainability objectives (Suhail, M., & Charumathi, B. 2024). The stakeholder theory is based on the premise that a company should attend to environmental issues to ensure its legitimacy and fulfill the demands of the stakeholders in the form of regulators, investors, customers, and communities.

The institutional theory emphasizes that the regulatory pressures, the social norms, and the industry standards influence environmental performance and impact organizational behaviour towards sustainability. Resource-based view (RBV), however, understands outstanding environmental performance as a source of competitive advantage- where capabilities like eco-innovation, effective use of resources as well as management of environmental risks are part of better market positioning and profitability (Gelmez, E., Özceylan, E., & Mrugalska, B. 2024). On the same note, the legitimacy theory can be used to explain why firms are seeking to be environmentally responsible to win the approval of society and retain the social license to operate. All these theoretical approaches emphasize the importance of the fact that environmental performance is not just an ethical or regulatory issue, but rather a strategic and economic necessity. In real sense, the environmental performance is measured using qualitative and quantitative measures that reflect the impact of the organization on the environment. The quantitative measures usually incorporate key performance indicators (KPIs) like the greenhouse gas (GHG) emissions, energy intensity, water usage, waste production and the level of pollution (Čengić-Džomba, S. 2025). The qualitative aspects can include the implementation of environmental management systems (EMS), staff education, and the promotion of sustainability values in corporate culture. Life-cycle Assessment (LCA), Environmental Impact Assessment (EIA), and Eco-efficiency Analysis are some of the tools that are popularly used to determine the environmental performance of the various stages of operations. Consistency and comparability of performance reporting is also enhanced through the adoption of internationally accepted standards like ISO 14001 and Global Reporting Initiative (GRI) standards (Matuszak, Ł., Różańska, E., et al., 2025). These frameworks make firms to set quantifiable goals, track the progress, and report the performance results to the stakeholders openly.

To enhance the environmental performance, it is essential that the environmental consideration is incorporated in every business activity, such as procurement and production, logistics and marketing. Some of the strategies involve the implementation of cleaner production technologies, the use of renewable energy sources, material and energy efficiency and waste minimization programs. In addition, digital technologies, including artificial intelligence (AI), big data analytics, and the Internet of Things (IoT), are also more actively used to improve the accuracy of environmental monitoring and reporting (Wardono, G., Fathoni, F., & Afrigus, W. 2023).

The environmental performance in the framework of Saudi Arabia has emerged as a more significant domain of attention due to the national transformation program of Vision 2030 which focuses on sustainability, renewable energy, and environmental protection. The key projects of the Kingdom, including the Saudi Green Initiative (SGI) and the Middle East Green Initiative (MGI), are supposed to cut down carbon emissions, boost green cover, and enhance the sustainable management of resources (Ghanem, A. M., & Alamri, Y. A. 2023). Businesses that are involved in energy-consuming industries are advised to implement environmental performance models to reduce pollution and enhance eco-efficiency. The introduction of the new environmental regulations and the creation of the Saudi National Center of Environmental Compliance (NCEC) have also compelled organizations to systematic environmental performance monitoring. Furthermore, the inclusion of the environmental performance indicators in the ESG reporting of Saudi Capital Market Authority (CMA) and the Tadawul (Saudi Exchange) indicates the national determination on corporate transparency and sustainability (Van Hoang, T. H., et al., 2021). By so doing, Saudi Arabia is also establishing itself as a regional leader in sustainable development where enhancement of environmental performance is not just a contributor to environmental preservation but also economic diversification and competitiveness on the global platform.

Financial Performance

Financial Performance is a basic measure of the economic performance of an organization in terms of its economic health, efficiency and sustainability. It is a ratio, which determines the efficiency of a company in using its assets to earn revenue, contain expenses, and provide value to shareholders and other involved parties (Čaušević, F. 2019). Conventionally, financial performance has been measured in terms of accounting-based measures like profitability ratios (e.g., return on assets, return on equity, net profit margin), liquidity ratios, and solvency measures. In the last few decades, however, the concept has developed beyond short-term financial measures to include other wider aspects of sustainable financial performance, which connects profitability to social and environmental responsibility (Sumarlin, M. J. R. A., & Tanjung, M. H. 2025). In this new perception,

financial performance is not just an indicator of what has been done in the past, but a dynamic indicator of how an organization can attain a stable and sustainable growth in a more competitive and environmental conscious market. Under the theoretical approach, financial performance has been studied using various perspectives that are used to explain its determinants and strategic importance. Agency theory assumes that the financial performance is a product of the compatibility or incompatibility of the interests of the management and the shareholders, which relies on accountability, performance measurement, and incentive systems. Resource-Based View (RBV) implies that high financial performance is a result of unique resources and capabilities of the firm that has technological innovation, managerial expertise and environmental efficiency that are valuable, rare, and hard to copy. The stakeholder theory builds on this by proposing that the shareholders are not the only stakeholders who affect financial performance and that the firm should also consider its ties with other stakeholders, such as customers, employees, regulators, and communities (Adhi, A. S., & Azizah, L. O. F. 2024). Also, the legitimacy theory correlates financial performance with reputation and social acceptance of an organization, which means that ethical and socially responsible performance leads to financial stability in the long run, through the increase of trust and the loyalty of stakeholders. All these theoretical approaches demonstrate that financial performance is a complex construct, which is defined by both internal managerial effectiveness and external socio environmental (Wei, J. 2018).

Financial performance is normally measured in a combination of both accounting-based and market-based measures in a practical sense. Accounting based indicators can be used as measures of profitability, Return on Investment (ROI), Return on Assets (ROA), and Earnings per Share (EPS) whereas market-based indicators, like the Tobin Q and stock price performance, are used as indicators of how investors perceive future earning potential of the firm (Alswalmeh, A. A. A., et al., 2021). In more recent times, financial performance has been supplemented with non-financial indicators that are associated with sustainability, innovation, and the environmental performance. This is a holistic approach that acknowledges that organizations that are effective in the management of environmental costs, efficient in resource utilization, and have a good relationship with stakeholders have higher chances of getting high financial results in the long run. Additionally, digital accounting technologies, data analytics, and Environmental Management Accounting (EMA) systems have also allowed companies to have a better understanding of the cost structures, risk factors, and the financial effect on sustainability (Rana, T., Rahman, M. J., & Öhman, P. 2025).

Financial performance, in the context of Saudi Arabia, has gained a center of attention in the larger context of Vision 2030 that is expected to expand the economy, boost the private sector, and increase global competitiveness. The Saudi organizations are advised to embrace new financial management approaches that combine the principles of sustainability and governance. The banking industry, investment banks and institutions are also contributing significantly in the development of green financing, ethical investment and ESG disclosure (Basali, M. 2025). To encourage financial transparency and responsible investment practices, the Saudi Capital Market Authority (CMA) and Tadawul (Saudi Exchange) have started ESG reporting guidelines. Besides, the Saudi National Transformation Program (NTP) promotes corporate programs to enhance financial efficiency, lower operational costs, and create sustainable development. Within this changing environment, financial performance is no longer considered in the light of profitability alone but as a balance between the economic generation of value, environmental accountability, and social influence (Shalhoob, H. 2025). The ability of Saudi companies to integrate financial management with sustainability concepts is also likely to draw foreign investments, improve competitiveness, and support the long-term goal of the Kingdom to build a diversified and robust economy.

Foundation Theories

Explanation of the way and reason Environmental Management Accounting (EMA) determines environmental and financial performance. Its main theoretical foundation is the Resource-Based View (RBV), which asserts that the sustainable competitive advantage of firms is attained by building on valuable, rare, inimitable, and non-substitutable internal capabilities (Zvarimwa, C., & Zimuto, J. 2022). In this context, EMA is considered as a strategic organizational potential that improves decision-making since it offers precise and combined environmental and financial data. By using EMA well, companies can determine concealed costs of the environment, increase resource efficiency, minimize waste, and accommodate innovation eventually producing superior environmental and financial results. The useful correlations in this paper between EMA and environmental performance and financial performance confirm the claim of RBV that long-term performance is based on internal resources and competencies. To complement this, the Stakeholder Theory states that organisations use EMA practices to respond to the demands and pressure of different stakeholders such as investors, regulators, customers, and the community in general (Wobo, H. O., & Odoemelam, N. 2024). By creating clear environmental and financial information, EMA assists companies in proving responsibility, meeting their sustainability goals and ambitions as well as enhancing trust in their stakeholders. The ability to

meet these environmental expectations does not only increase the social legitimacy of a firm but also adds to the financial performance of the firms in terms of reputation, customer loyalty, and access to environmentally sensitive markets. In this way, the Stakeholder Theory emphasizes the extrinsic relational aspect of EMA, which connects environmental responsibility with economic benefits (Qomariah, N., & Satoto, E. B. 2021).

METHODOLOGY

Sampling and Data Collection

The sampling model was carefully designed in such a manner that coverage of divergent industrial sectors and professional positions relevant to Environmental Management Accounting (EMA), Financial Performance (FP), and Environmental Performance (EP) was achieved. The target group was managers, accountants, and auditors who work in organizations where sustainability practices, reporting on the environment, and accountability in financial matters are the inseparable parts of the decision-making process. These groups were chosen as they had direct experience with the financial and environmental reporting systems making them the right informants to be used in the research. Stratified sampling methodology was used to ensure that adequate representation of the various sectors such as capital goods, basic material, energy and food production which have been recognized to have a significant impact on the environment and financial implications were captured. In each of the strata, the participants were selected based on their level of involvement and occupational position on strategic or operational sustainability operations. This methodological choice reduced the possible bias and allowed comparative analysis between industries in which environmental issues were heterogeneous.

The pretest method entailed the use of 450 questionnaires which were distributed electronically as well as in hard copy to the potential respondents who were identified through professional associations, corporate directories, and sustainability networks. They received 343 questionnaires, which included a response rate of 76.22. After eliminating the incomplete/inconsistent responses, 298 valid questionnaires were left to be analysed. This sample size is considered sufficient when structural equation modelling is used, and it is in agreement with the recommendations of Hair et al. (2019). Demographic structure of the sample indicated the diversity in terms of educational level, job titles, professional qualifications, and experience years, thus making certain that the data was represented by a wide range of experience and viewpoints. As a result, the intensive sampling procedure provided better external validity of the results and an honest groundwork to test the proposed theoretical associations between EMA, EP, and FP.

Measurements

The current study utilized measurement tools that were based on existing environmental accounting and sustainability literature to ensure reliability and validity of constructs of interest. Environmental Management Accounting (EMA) was conceptualized through an eight-item scale that included cost allocation, cost monitoring, eco-efficiency monitoring, resource utilisation and sustainability reporting dimensions. Financial Performance (FP) was measured using eight indicators that reflect profitability, return on assets, sales growth, cost control, and operational efficiency hence short-term performance as well as long-term financial stability. Environmental Performance (EP) was measured using eight questions that covered the sections of pollution decrement, waste disposal, energy efficiency, resource conservation, adherence to regulations, and the utilization of green technologies. Collectively, these indicators allow a holistic assessment of the way companies balance environmental activities and monetary results.

Statistical Analyses Techniques

The current study used the Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine the relationships between Environmental Management Accounting (EMA), Environmental Performance (EP), and Financial Performance (FP). PLS-SEM was chosen due to its ability to support the complex structural model, as well as handle data with referrals not following normally. Reliability of the measurement model was assessed using Cronbach alpha and Composite Reliability (CR) as well as Average Varied Extracted (AVE) was used to evaluate convergent validity. The determination of discriminant validity was made through Fornell-Larcker criterion together with Heterotrait-Monomethod (HTMT) ratios. The structural model was tested with 5,000 subsamples of bootstrapping which produced solid estimates of path significance. The overall model fit was also assessed using the R^2, F^2 and Q^2 statistics, hence confirming the reliability and predictive validity of the findings.

RESULTS

Demographic Summary

The demographic profile of the respondents provided in Table 1 demonstrates that most of the respondents had a bachelor's degree (60.1%), and most of them worked in the field of cost (37.7%) or financial accounting (25.9%). Most of them were also SOSCPA certified (79.7%). In terms of professional experience, a highly experienced respondent group (more than half 52.2) had five to ten years of experience in the field. The participants were evenly geographically distributed throughout the country with the Western (32.9%) and Northern (29.4%) the most represented. Regarding sector, the largest proportions of the sample were in capital goods (29.7) and basic materials (27.8) industries. Regarding the level of knowledge, most respondents reported having an intermediate level of familiarity (30-60) with the components of EMA, environmental strategy and sustainable corporate performance. Lastly, 80.7 per cent were listed companies, implying that the sample is highly reflective of entities that are more highly required to comply and report.

Table 1. Sample Characteristics

Attribute	Category	Frequency	Percentage
Qualification	Bachelor's Degree	190	63.8%
	Higher Diploma	78	26.2%
	Diploma	25	8.4%
	Master's Degree	5	1.7%
Total		**298**	**100.0%**
Job Title	Cost Accountant	105	35.2%
	Financial Accountant	76	25.5%
	Internal Auditor	40	13.4%
	Management Accountant	36	12.1%
	Storekeeper	1	0.3%
Total		**298**	**100.0%**
Professional Certificates	Saudi Fellowship of Certified Public Accountants (SOCPA)	233	78.2%
	Certified Management Accountant (CMA)	37	12.4%
	American Board of Certified Public Accountants (CPA)	26	8.7%
	General Auditor Certificate	1	0.3%
	None	1	0.3%
Total		**298**	**100.0%**
Years of Experience	5 to <10 years	159	53.4%
	From 10 to <15 years	69	23.2%
	Less than 5 years	57	19.1%
	15 years and older	13	4.4%
Total		**298**	**100.0%**
Location	Western	107	35.9%
	Northern	89	29.9%
	Southern	50	16.8%
	Eastern	37	12.4%
	Middle	15	5.0%
Total		**298**	**100.0%**
Sector	Capital Goods	90	30.2%
	Basic Materials	78	26.2%
	Long-term Commodities	43	14.4%
	Energy	42	14.1%
	Food Production	14	4.7%
	Pharmaceutical	6	2.0%
Total		**298**	**100.0%**
Knowledge of EMA	more than 30% and less than 60%	197	66.1%
	more than 60%	66	22.1%
	less than 30%	35	11.7%
Total		**298**	**100.0%**

Knowledge of Environmental Strategy	more than 30% and less than 60%	159	53.4%
	more than 60%	69	23.2%
	less than 30%	70	23.5%
Total		**298**	**100.0%**
Knowledge of Sustainable Corporate Performance	more than 30% and less than 60%	160	53.7%
	more than 60%	70	23.5%
	less than 30%	68	22.8%
Total		**298**	**100.0%**
Listed Status	Yes	241	80.9%
	No	57	19.1%
Total		**298**	**100.0%**

Source(s): Author's own work

Assessment of Measurement Model

Table 2 assesses the Environmental Management Accounting (EMA) and Financial Performance (FP) and Environmental Performance (EP) measurement model in the context of Partial Least Squares Structural Equation Modelling (PLS-SEM). Every construct is operationalized by an eight-item scale, and the results of the empirical research support strong psychometric properties. The indicator loadings are greater than the standard 0.70 value, ranging between 0.807 and 0.853 and thus indicate a good relationship between the indicators and the constructs (e.g., EMA1 to EMA8 (environmental costs), FP1 to FP8 (profitability), EP1 to EP8 (pollution prevention). The values of Cronbach alpha (EMA=0.938, FP=0.933, EP=0.935) and Composite Reliability indices (EMA=0.949, FP=0.945, EP=0.946) are above the 0.70 standard, which shows high internal consistency. The estimates of the AVE (EMA= 0.699, FP= 0.682, EP= 0.686) exceed 0.50 that validates the convergent validity. The values of Variance Inflation Factor (VIF) are within the range of 2.000 to 2.964 and are less than 5.0, which has eliminated the possibility of multicollinearity. Taken altogether, Table 2 substantiates the use of a reliable and robust model of measurement, which leads to the support of further analyses of discriminant validity and structural model.

Table 2. Model Assessment

Variable	**Items**	**Loadings**	**Cronbach's alpha**	**Composite Reliability (CR)**	**Average variance extracted (AVE)**	**VIF**
Environmental Management Accounting	EMA1	0.849	0.938	0.949	0.699	2.221
	EMA2	0.845				2.027
	EMA3	0.840				2.000
	EMA4	0.825				2.773
	EMA5	0.833				2.941
	EMA6	0.825				2.829
	EMA7	0.820				2.693
	EMA8	0.849				2.049
Financial Performance	FP1	0.830	0.933	0.945	0.682	2.829
	FP2	0.836				2.792
	FP3	0.808				2.505
	FP4	0.837				2.726
	FP5	0.814				2.390
	FP6	0.825				2.724
	FP7	0.822				2.583
	FP8	0.853				2.964
Environmental performance	EP1	0.845	0.935	0.946	0.686	2.021
	EP2	0.85				2.955
	EP3	0.807				2.488
	EP4	0.816				2.501
	EP5	0.818				2.685
	EP6	0.822				2.469
	EP7	0.825				2.707
	EP8	0.821				2.481

Source(s): Author's own work

Table 3 and Table 4 determine the discriminant validity of the measurement model based on the Partial Least Squares Structural Equation Modelling (PLS-SEM). The constructs used in these tables are empirically different, which is important in terms of model validity. Table 3 shows the Fornell-Larcker criterion where the square root of the Average Variance Extracted (AVE) of every construct is compared with its correlation with the other constructs. EMA, EP, and FP have square root values of 0.959, 0.960 and 0.826 respectively, which are larger than the inter-construct correlations (e.g., EMA-EP: 0.958, EMA-FP: 0.836, EP-FP: 0.828). This confirms a discriminant validity in that each construct has more variance with its indicators than with the other constructs, which fulfills the Fornell-Larcker threshold (Fornell and Larcker, 1981). Table 4 presents the ratio matrix of Heterotrait-Monotrait (HTMT), which is a more delicate measure of the discriminant validity. The values of the HTMT are 0.923 (EMA-EP), 0.924 (EMA-FP) and 0.927 (EP-FP), which fall below the conservative cutoff of 0.85, but near the relaxed cutoff of 0.90 (Henseler et al., 2015). This evidence shows that the constructs are different, yet the scores are close to 0.90, indicating some conceptual overlap, especially between EMA and EP, which is probably caused by their environmental concerns. Overall, Table 3 and Table 4 both indicate discriminant validity, with Table 3 meeting the Fornell Larcker criterion and Table 4 indicating that the HTMT ratios are within reasonable limits, although the high correlations point to the necessity of interpreting both EMA and EP with caution. Combined with the high reliability and convergent validity of Table 2, these findings provide a strong measurement model to be used in structural analysis.

Table 3. Discriminant validity - Fornell Larcker Criterion

Constructs	**EMA**	**EP**	**FP**
EMA	0.959		
EP	0.958	0.960	
FP	0.836	0.828	0.826

Source(s): Author's own work

Table 4. Discriminant validity - Heterotrait Monotrait Ratio (HTMT) Matrix

	EMA	**EP**
EMA		
EP	0.923	
FP	0.924	0.927

Source(s): Author's own work

Hypothesis Testing

According to Figure 2 and Table 5, Environmental Management Accounting (EMA), Environmental Performance (EP), and Finance Performance (FP) have strong relationships through the PLS-SEM. Figure 2 indicates that EMA has a significant impact on EP (path = 0.686), FP (= 0.479), and EMA to FP (= 0.699), with the high indicator loadings (e.g., 0.849 in EMA1, 0.850 in EP2) and the R 2 values (EP: 0.917, FP: 0.940) indicating that it has a strong explanatory ability. As table 5 confirms: H1 (EMA → EP: 0.958, T=124.835, p=0.000) indicates that EMA produces a significant positive effect on EP; H2 (EMA → FP: 0.479, T=5.460, p=0.000) and H3 (EP → FP: 0.500, T=5.699, p=0.000) indicate that EMA has a significant positive effect on F The differences in path coefficients (e.g. 0.686 vs. 0.958) might indicate scaling however all the hypotheses are upheld ($p<0.001$), EMA improves EP and FP, with EP mediate the relationship.

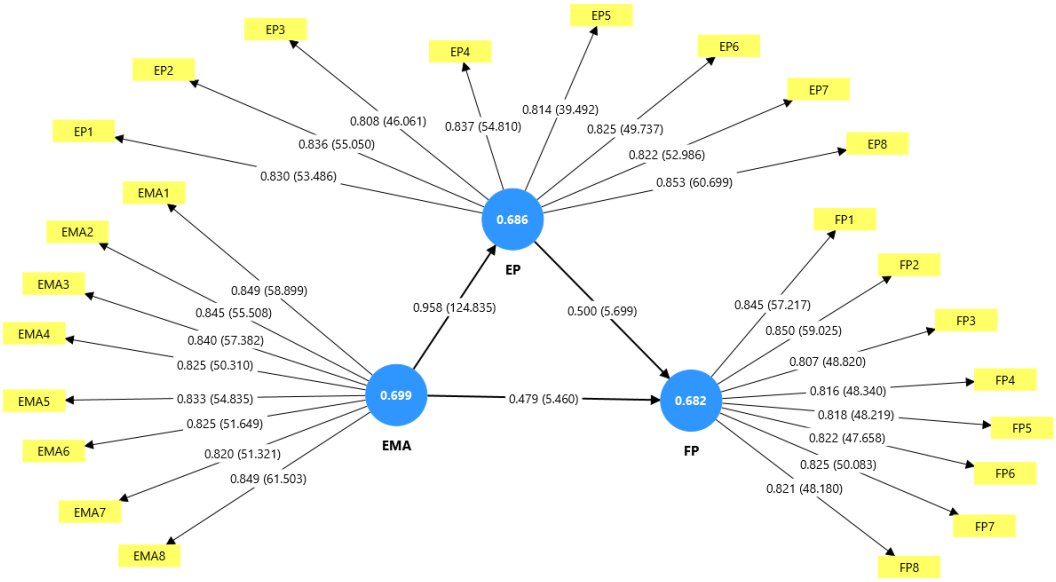

Figure 2. SEM model.
Source(s): Author's own work

Table 5. The Outcome of Hypothesis Testing

Hypotheses	Path	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Results
H1	EMA -> EP	0.958	0.958	0.008	124.835	0.000	Supported
H2	EMA -> FP	0.479	0.471	0.088	5.460	0.000	Supported
H3	EP -> FP	0.500	0.509	0.088	5.699	0.000	Supported
H4	EMA -> EP -> FP	0.479	0.487	0.086	5.560	0.000	Supported

Source(s): Author's own work

Table 6 presents the values of R 2: EP equals 0.917 (adjusted 0.917) and FP equals 0.940 (adjusted 0.939), which explains the high percentage of variance in EP and FP, respectively, which is high predictive power. Table 7 shows f 2 -values: EMA has a large effect on EP (11.089) and a small one on FP (0.315), whereas EP has a small effect on FP (0.343): this is because according to Cohen (1988) thresholds (0.02 small, 0.15 medium, 0.35 large), the effect of EMA on EP is dominant with moderate effects on FP.

Table 6. R^2 values

Endogenous constructs	R-square (R2)	Adjusted R^2
EP	0.917	0.917
FP	0.940	0.939

Source(s): Author's own work

Table 7. F^2 Values

	EP	FP
EMA	11.089	0.315
EP		0.343

Source(s): Author's own work

DISCUSSION

The results of the paper give good empirical evidence of the theory that the Environmental Management Accounting (EMA) greatly improves the environmental performance (EP) and financial performance (FP) in Saudi organizations. The PLS-SEM analysis showed that EMA and EP had a strong and positive correlation (= 0.958, p = 0.001), which supports the idea that the introduction of EMA practices can help a firm become more environmentally efficient. Such an outcome is consistent with the findings of earlier research by Qian et al. (2018) and Lee (2021), who noted that the use of EMA helps to identify environmental inefficiencies, waste, and

resource optimization. Practically, EMA systems integration helps organizations to obtain accurate data on energy, material, and waste flows, thus, resulting in improved decision-making and performance monitoring. It was also shown that there exists a significant and positive correlation between EMA and FP (= 0.479, $p < 0.001$), which suggests that EMA practices not only contribute to the improvement of ecological performance of firms but also to the improvement of financial performance. The result supports the work of Bennett and James (2018) and Jalaludin et al. (2011) that found that EMA helps to reduce costs, enhance profitability, and competitive advantage by means of enhanced environmental cost control. Employing EMA enables companies to determine the concealed environmental spending, reduce resource wastage and maximized production efficiency that eventually led to financial benefits. Moreover, the positive correlation between EP and FP (= 0.500, $p < 0.001$) indicates that the positive changes in the environment made with the help of EMA result in the best financial performance which proves the hypothesis that EP is a mediating variable between EMA and FP.

The fact that the values of R 2 of EP (0.917) and FP (0.940) are high indicates that the proposed model is highly explanatory. These findings emphasize the key position of EMA as a strategic management tool that is a combination of environmental and financial goals. According to the theoretical perspective, the results can be aligned with the Resource-Based View (RBV) that assumes that EMA is an important organizational asset that helps to create a long-lasting competitive advantage. The capacity of EMA to produce precise, trustworthy, and punctual environmental data helps companies to develop unique competencies in environmentally efficient and innovation related to sustainability. On the same note, the results are in line with Stakeholder and Legitimacy Theories, which state that organizations are becoming more driven to implement EMA in order to address the needs of the stakeholders and offer legitimacy to society by being environmentally responsible and transparent. In addition, the results of the empirical research confirm that the Institutional Theory can be applied to explain the adoption of EMA in the Saudi setting. With the increasing regulatory pressures, investor expectations, and national sustainability initiatives under the vision 2030, firms are forced to be integrated in terms of environmental management and accounting systems. The mentioned mediating role of EP also confirms the fact that environmental performance is an important pathway in which EMA affects financial performance. It means that the positive impacts of accounting reforms on financial performance cannot be considered the straightforward effect of the reforms on their own, but as the outcome of the environmentally friendly operations supported by EMA systems.

The high impact size (f 2 = 11.089) of EMA on EP as opposed to moderate effect on FP (f 2 = 0.315) highlights that the most immediate effect of EMA implementation is environmental and not financial. Nevertheless, the indirect economic gains attributed to the increased resource efficiency, compliance with the regulations, and corporate image are significant. All the above findings confirm the fact that EMA is a sustainability-profitability bridge as an environmental innovation mechanism and a financial performance enhancer. Lastly, the results provide new empirical data based on a developing economy setting especially Saudi Arabia where EMA has not been institutionalized yet. The explanatory and predictive power of the model is high, which proves that with the help of effective environmental policies and the commitment of the management team, EMA can be a source of considerable environmental and financial benefits that will be consistent with the national objectives of sustainable industrial development.

CONCLUSION

This research was aimed at investigating the effects of Environmental Management Accounting on environmental performance and financial performance of Saudi organizations. The findings present strong arguments to support the fact that EMA implementation leads to better environmental and financial performance, which proves its two-fold purpose as an environmental management and strategic financial instrument. The statistically significant and positive relationships between EMA, EP and FP indicate that incorporating environmental and economic information in managerial decision-making results in cleaner production, cost effectiveness and competitiveness. Hypothetically, the research supports the applicability of the Resource-Based View, Stakeholder Theory and Institutional Theory in the context of the manner in which EMA acts as an internal resource and as an external reaction to environmental and social stressors. In practice, the results highlight the need to incorporate EMA into the operations system of organizations in order to monitor, quantify and control environmental costs in an effective way. This type of integration does not only help in regulatory compliance but also helps to unlock latent cost-saving opportunities that help to achieve long-term profitability. The environmental performance mediating effect implies that the realization of improved financial performance is achieved when the environmental initiatives are successfully managed and quantified using EMA. This affirms the fact that sustainable financial development relies on good environmental practices, which is in line with the international trends that focus on the need to be environmentally responsible and report on corporate sustainability.

These findings have useful implications to policymakers. In Saudi Arabia, regulatory bodies ought to keep promoting the uptake of EMA by providing training, policy related incentives, and sustainability reporting models. The promotion of EMA practices within organizations will support the objectives of the Vision 2030 sustainable diversification of the economy, minimized environmental degradation, and increased transparency in corporations. Environmental Management Accounting is a radical model of attaining environmental sustainability and financial sustainability at the same time. The empirical evidence presented in the study proves that the adoption of EMA in Saudi Arabia does not only boost the environmental stewardship but also increases financial competitiveness. With the industries still shifting to sustainable models, EMA will be one of the pillars that will be used to spearhead the operational efficiency, corporate responsibility, and sustainable growth that would see economic growth and development go hand in hand with environmental responsibility.

REFERENCES

Abid, N., Dowling, M., Ceci, F., & Aftab, J. (2023). Does resource bricolage foster SMEs' competitive advantage and financial performance? A resource ‐ based perspective. Business Strategy and the Environment, 32(8), 5833-5853.

Adams, D., & Krulicky, T. (2021). Artificial Intelligence-driven Big Data Analytics, Real-Time Sensor Networks, and Product Decision-Making Information Systems in Sustainable Manufacturing Internet of Things. Economics, Management & Financial Markets, 16(3).

Adhi, A. S., & Azizah, L. O. F. (2024). Integrated reporting adoption factors that impact financial statement accountability and firm performance: Natural RBV theory development study in Indonesia. Procedure ISETH (International Summit on Science, Technology, and Humanity), 551-563.

Afandi, M. (2021). KINERJA GURU SEKOLAH DASAR DITINJAU DARI MOTIVASI BERPRESTASI (Doctoral dissertation, UNIVERSITAS NEGERI JAKARTA).

Agwu, E. (2021). Corporate Social Responsibility as an Organizational Tool for Competitive Advantage. International Journal of Strategic Decision Sciences (IJSDS), 12(2), 37-51.

Ahmad, A. H. (2025). Green Financing for Sustainable Development in Saudi Arabia. Journal of Environmental Management and Tourism (JEMT), 16(2 (78)), 95-105.

Alsughayer, S. (2025). Assessing the Integration and Impact of Artificial Intelligence on Accounting Practices in Saudi Arabia. WSEAS Transactions on Business and Economics, 22, 1721-1740.

Alswalmeh, A. A. A., Dali, N. R. S. B. M., & Alta'ani, A. Z. (2021). The effects of accounting and market indicators towards stock return of Amman Stock Exchange index constituents. In E-Prosiding Seminar Antarabangsa Islam dan Sains (pp. 680-698).

Antonini, C., & Gomez-Conde, J. (2024). Environmental management control systems and environmental innovation: Unintended consequences of the EU non-financial reporting directive. Management Accounting Research, 65, 100903.

Basali, M. (2025). Impact of Financial Performance and Corporate Governance on ESG Disclosure: Evidence from Saudi Arabia. Sustainability, 17(18), 8473.

Čaušević, F. (2019). Economic Growth, Financial (In) efficiency, and Sustainability. In Global Financial Centers, Economic Power, and (In) Efficiency (pp. 73-105). Cham: Springer International Publishing.

Čengić-Džomba, S. (2025). Greenhouse Gas Emissions from Agriculture with a Focus on Animal-Based Food Production Systems. Climate Change and Air Pollution.

Dekamin, M., Nabavi-Pelesaraei, A., & Rezaei, H. (2025). Economic and environmental dynamics of tea production through material flow cost accounting (MFCA). Cleaner Engineering and Technology, 26, 100971.

Ekonomou, G., & Menegaki, A. N. (2023). China in the renewable energy era: What has been done and what remains to be done. Energies, 16(18), 6696.

Feng, C., Cheng, X., Luo, J., Zheng, H., & Wang, M. (2025). Can corporate site visits by institutional investors improve the quality of corporate environmental information disclosure? Evidence from China. International Review of Financial Analysis, 102, 104138.

Gelmez, E., Özceylan, E., & Mrugalska, B. (2024). The impact of green supply chain management on green innovation, environmental performance, and competitive advantage. Sustainability, 16(22), 9757.

Ghanem, A. M., & Alamri, Y. A. (2023). The impact of the green Middle East initiative on sustainable development in the Kingdom of Saudi Arabia. Journal of the Saudi Society of Agricultural Sciences, 22(1), 35-46.

Guo, Z., Xu, X., Gao, J., Jin, C., & Li, H. (2025). An innovative governance model for water pollution control considering water credit mechanism from the perspective of coordinating interests. Environment, Development and Sustainability, 1-32.

Hassanin, M. E., & Hamada, M. A. (2022). A Big Data strategy to reinforce self-sustainability for pharmaceutical companies in the digital transformation era: A case study of Egyptian pharmaceutical companies. African Journal of Science, Technology, Innovation and Development, 14(7), 1870-1882.

He, Z. (2020). Sustainable development of livestock and poultry scale‐breeding based on integration control of resource losses and external environmental costs. Environmental Progress & Sustainable Energy, 39(6), e13528.

Kochkodan, V. B., & Petryna, M. Y. (2024). ENTERPRISE RISKS MANAGEMENT IN MODERN CONDITIONS. The actual problems of regional economy development, 1(20), 230-238.

Kong, Y., Javed, F., Sultan, J., Hanif, M. S., & Khan, N. (2022). EMA implementation and corporate environmental firm performance: a comparison of institutional pressures and environmental uncertainty. Sustainability, 14(9), 5662.

Lee, P. (2022). Ranking decision making for eco-efficiency using operational, energy, and environmental efficiency. Sustainability, 14(6), 3489.

Liu, D., Zhang, Y., Hafeez, M., & Ullah, S. (2022). Financial inclusion and its influence on economic-environmental performance: demand and supply perspectives. Environmental Science and Pollution Research, 29(38), 58212-58221.

Madon, I., Drev, D., & Likar, J. (2019). Long-term risk assessments comparing environmental performance of different types of sanitary landfills. Waste Management, 96, 96-107.

Marrone, M., Linnenluecke, M. K., Richardson, G., & Smith, T. (2020). Trends in environmental accounting research within and outside of the accounting discipline. Accounting, Auditing & Accountability Journal, 33(8), 2167-2193.

Martínez-Falcó, J., Sánchez-García, E., & Marco-Lajara, B. (2025). From Digital Roots to Green Fruits: How Knowledge Sharing and Leadership Awareness Drive Innovation in Spanish Wineries. In Research and Development Practices in Innovation (pp. 103-126). IGI Global Scientific Publishing.

Matuszak, Ł., Różańska, E., & Szczepankiewicz, E. I. (2025). Assessment of the Compliance of Environmental Disclosures by Energy Companies Using GRI Standards with European Sustainability Reporting Standards: A Case Study. Sustainability, 17(8), 3380.

Morales-Medina, G., & Berbesí, E. (2025). Analysis of the environmental impact of fuel hydrotreating through life cycle assessment and process data. Energy Conversion and Management, 345, 120333.

Mungai, E. M., Ndiritu, S. W., & Rajwani, T. (2020). Do voluntary environmental management systems improve environmental performance? Evidence from waste management by Kenyan firms. Journal of Cleaner Production, 265, 121636.

Ogunode, O. A. (2022). Legitimacy theory and environmental accounting reporting and practice: A review. South Asian Journal of Social Studies and Economics, 13(1), 17-28.

Pomfret, R. (2019). The Central Asian economies in the twenty-first century: Paving a new silk road.

Prasetya, S. G., & Safitri, J. (2023). The effect of environmental management accounting (EMA) on financial performance and working capital management (WCM) as mediating variables. Jurnal Manajemen (Edisi Elektronik), 14(1), 14-29.

Qasim, A., Pandi, O. D., & Saleem, F. (2025). Linking Green Human Resources Management Practices and Pro-Environmental Performance: The Role of Green Creativity and Transformational Leadership of Private Companies in Saudi Arabia. Science of Law, 2025(2), 240-251.

Qomariah, N., & Satoto, E. B. (2021). Improving financial performance and profits of pharmaceutical companies during a pandemic: Study on environmental performance, intellectual capital and social responsibility. Calitatea, 22(184), 154-165.

Rana, T., Rahman, M. J., & Öhman, P. (2025). Carbon Accounting for Sustainability and Environmental Management. In Carbon Accounting for Sustainability and Environmental Management (pp. 3-21). Routledge.

Rasit, Z. A., Hamidon, N. F., Tarmuji, I., Hamid, N. A., & Rashid, N. (2020). Environmental management accounting implementation and environmental performance through enhanced internal process innovation. Jour of Adv Research in Dynamical & Control Systems, 12(1).

Safitri, N., Hadiwibowo, I., & Azis, M. T. (2024). Evaluating Financial Performance Based On Environmental Performance, Environmental Costs, and Environmental Disclosure. MAKSIMUM: Media Akuntansi Universitas Muhammadiyah Semarang, 14(2), 242-256.

Shalhoob, H. (2025). Impact of Environmental, Social and Governance Practices Disclosure in Promoting Sustainability and Financial Performance: Evidence from Saudi Stock Exchange-Listed Companies. Social and Governance Practices Disclosure in Promoting Sustainability and Financial Performance: Evidence from Saudi Stock Exchange-Listed Companies.

Sharawi, H. (2024). Circular Economy Analysis as a Tool to Enhance Sustainability of Supply Chains in Kingdom Saudi Arabia and a Means to Achieve Saudi Vision 2030. Available at SSRN 5092544.

Soni, T. K. (2023). Demystifying the relationship between ESG and SDG performance: Study of emerging economies. Investment Management & Financial Innovations, 20(3), 1.

Suhail, M., & Charumathi, B. (2024). Environmental Sustainability Disclosure vs. Environmental Sustainability Efficiency. In DIVERSITY, EQUITY AND INCLUSION (pp. 489-506). Routledge.

Sumarlin, M. J. R. A., & Tanjung, M. H. (2025). Financial Ratios and Corporate Performance: The Interaction of Liquidity, Solvency, and Profitability in Indonesian Mining Companies. Journal Research of Social Science, Economics & Management, 5(2).

Tan, K., Siddik, A. B., Sobhani, F. A., Hamayun, M., & Masukujjaman, M. (2022). Do environmental strategy and awareness improve firms' environmental and financial performance? The role of competitive advantage. Sustainability, 14(17), 10600.

Thanh Thuy Ngoc, T. (2025). Unlocking environmental management accounting and environmental performance: a mediated moderation model through green technology innovation and environmental strategy. Meditari Accountancy Research, 33(2), 733-758.

Van Hoang, T. H., Przychodzen, W., Przychodzen, J., & Segbotangni, E. A. (2021). Environmental transparency and performance: does corporate governance matter?. Environmental and Sustainability Indicators, 10, 100123.

Wardono, G., Fathoni, F., & Afrigus, W. (2023). ENVIRONMENTAL ACCOUNTING: ENERGY EFFICIENCY, RENEWABLE ENERGY, AND CIRCULAR ECONOMY. International Journal of Contemporary Accounting, 5(1), 41-60.

Wei, J. (2018). Go Green with Socially Responsible Investing? Socially Responsible Investing Performance During the Financial Crisis. Socially Responsible Investing Performance During the Financial Crisis (April 30, 2018).

Wei, X., & Yang, J. (2024, December). Whether the Disclosure of ESG Information can Enhance Corporate Environmental Performance. In 5th International Conference on Economic Management and Big Data Application (ICEMBDA 2024) (pp. 334-344). Atlantis Press.

Wobo, H. O., & Odoemelam, N. (2024). Environmental Accounting Costs and Financial Performance of Oil and Gas Companies in Nigeria: Interplay of Resource-Based-View, Stakeholder and Legitimacy Theories. Journal of Management, 12(4), 45-59.

Zaman, M., Vo-Thanh, T., Hasan, R., Shams, S. R., & Vukovic, D. B. (2025). How can hotels create sustainable competitive advantages? A resource-based view. Journal of Strategic Marketing, 33(6), 707-722.

Zhang, S., & Chen, K. (2023). Green finance and ecological footprints: Natural resources perspective of China's growing economy. Resources Policy, 85, 103898.

Zhang, X., Hou, Y., & Geng, K. (2024). Environmental regulation, green technology innovation, and industrial green transformation: Empirical evidence from a developing economy. Sustainability, 16(16), 6833.

Zheng, Y. (2020). Reducing Blindness in Energy Conservation and Emission Reduction: Some Reflections on the Indicators of Energy Consumption Intensity1. In Environmental Economics Research and China's Green Development Strategy (pp. 35-55).

Zvarimwa, C., & Zimuto, J. (2022). Valuable, rare, inimitable, non-substitutable and exploitable (VRINE) resources on competitive advantage. International Journal of Business & Management Sciences, 8(1), 9-22.

