International Journal of Studies in Business Management, Economics and Strategies
Volume 4, Issue 7, July - 2025
ISSN (E): 2949-883X
Scholarsdigest.org

THE ROLE OF GREEN ACCOUNTING IN ACHIEVING SUSTAINABLE DEVELOPMENT AND REDUCING THE ENVIRONMENTAL IMPACT OF ORGANIZATIONS

Halah Nomas Othman
Maysan University-College of Administration and Economics – Department of Accounting
Halah.nomas@uomisan.edu.iq

Abstract
Recent studies on environmental management and green supply chain management have discovered environmental motivations as one of the most important organizational performance drivers. They can be a combination of organizational incentives, stakeholder pressures, and ethical reasons. The aim of this study is to analyze environmental orientation and its influence upon financial performance with particular attention to green supplier management and relational capital influence.
Statistical sampling comprised 392 managers and experts who were from publicly owned businesses, and random sampling helped to select them. In relation to purpose, this research lies within applied research, while with regards to data collection, this is descriptive-survey research with structural equation modeling to analyze data
Results of hypothesis tests were that environmental orientation positively influences financial performance. Additionally, environmental orientation positively influences green supplier management. The research also discovered that green supplier management significantly positively influences financial performance. Finally, this moderating effect of relational capital on environmental sustainability orientation and financial performance relationship is valid. I.e., voluntary disclosures by companies with respect to social responsibility are compatible and complementary to mandatory disclosures such as financial performance.

Keywords: Green supplier management, relational capital, financial performance, environmental sustainability orientation.

Introduction

Concurrent with economic development, stress to natural systems and Earth's resources intensifies. The lamentable reality is that as long as economic growth continues to accelerate, its environmental foundation upon which it depends does not (Heydarpour & Qarni, 2015). In order to provide an adequate foundation to reporting a collective impact that results from both lean and green management paradigms of production, a set of plausible conditions has been discovered. Some conditions include supportive culture, high initial costs, all-employee

engagement (through training programs and involvement), leadership commitment, and proper organizational structure.

A review of the literature indicates that only a limited number of previous studies have empirically examined these factors in relation to lean, green, and sustainable production management performance (Assembly, 2015; Danso et al., 2020), or have evaluated them conceptually (Desai, 2018; Fiaschi et al., 2019). Therefore, there is a general consensus and pressure among these authors that such factors should be incorporated as part of the analysis in future research to better understand the relationships involved in integrating lean and green production management and how "lean and green production management" impacts corporate sustainability performance across three dimensions: (1) social, (2) environmental, and (3) economic or financial (Desai, 2018).

Literature review shows that combining lean and green production management performance impact is generally positive, but different studies referred to commercial and negative results. More important than making conclusive remarks on combining lean and green production management performance impact upon organizational production systems' sustainability performance is explaining areas of gaps and additional studies, as follows.

As noted earlier, only a handful of studies have attempted to investigate the relationship between the integration of lean and green production management and sustainability performance across all three dimensions: (1) economic or financial, (2) social responsibility, and (3) environmental. For instance, Patz (2017), based on a conceptual model, examined the link between lean, green, agile, and resilient production management paradigms and various supply chain performance dimensions, claiming that there is a synergistic effect for the integration of these paradigms in certain dimensions, but this synergy cannot be assumed for all dimensions.

Similarly, Lee (2012) evaluated the impact of combining lean and green production management systems on sustainability performance. Based on data from one of their studies, authors assumed that organizational performance can be improved by lean, agile, resilient, and green supply chains along operational, environmental, and economic dimensions. Nonetheless, one of their studies further revealed that at the firms under examination, equal emphasis wasn't provided simultaneously to all four supply chain characteristics, while most emphasis has been placed on agility and least emphasis has been made regarding greenness.

Likewise, a study by Hunt (2021) studied lean, resilient, and green management practices and performance associations. The writers presented that such supply chain characteristics can significantly impact costs of operations, business waste, environmental costs, and customer satisfaction.

Faxon (2011) also emphasized, based on their research, that lean production management signifies efficiency and effectiveness, whereas green production or supply management embodies efficiency, effectiveness, and ethics. Consequently, separating the concepts of lean and green management may lead to challenges and potentially negatively impact the dimensions of sustainability performance.

Thus, the results from these studies regarding the distinct consequences of each model are mixed and sometimes contradictory because these studies often incorporate several other characteristics such as agile or resilient production management alongside lean and green

approaches. Only a few studies have examined sustainability performance specifically from the perspectives of supply chain and operations management.

Hence, future research domains proposed by Hang et al. (2018) should be pursued to extend the findings on the integration of lean and green production management beyond waste minimization and environmental impact, addressing social and economic aspects that have not yet been thoroughly explored.

According to Erdiaw-Kwasie et al. (2017), prior studies have primarily utilized a limited number of indicators to measure the impact of integrating lean and green production management on the environment. These indicators typically include pollutant emissions, proper environmental management such as wastewater and solid waste handling, consumption of hazardous, harmful, or toxic materials, frequency of environmental incidents, and the green image of organizations. As Ciampi et al. (2021) emphasized based on their findings, most studies have focused on various types of "waste" because both lean and green management paradigms aim to eliminate non-value-adding activities. However, there are other useful methods for assessing environmental performance that have received little attention. Potential measures could include environmentally friendly product design and packaging, inventory levels, land use, biodegradability, greenhouse gas emissions related to transportation, water management, and chemical wastewater treatment (Amankwah-Amoah et al., 2019; Fernández-Cuesta et al., 2019).

Although recent years have seen efforts to develop standardized or global measurement scales for identifying environmental impact, future research could provide empirical evidence on the effect of integrating lean and green production management on companies' environmental performance. Literature reviews show that economic measurement indicators commonly relate to production costs and time.

Some studies measure operational performance instead of economic performance, using metrics such as quality, speed, flexibility, reliability, inventory, market position, international sales, and customer satisfaction. Future research could differentiate between operational and financial performance, separately assessing the impact of integrating lean and green production management on daily operations and economic outcomes. In this regard, Hategan et al. (2018) highlighted the importance of identifying suitable economic performance measurement indicators to advance emerging concepts and theories in this field.

The literature also indicates a gap in studies examining the combined effect of lean and green management paradigms on social factors (Pislaru et al., 2019; Lewandowski, 2017). Empirical evidence suggests that both paradigms focus on employee training and participation to reduce waste, improve production processes, and eliminate defects and accidents during production. Some empirical studies have indicated that the integration of these paradigms can create more efficient employees and improve operational efficiency (Plaza-Úbeda et al., 2010). However, it has been observed that organizations often do not fully utilize these opportunities. The paradigms can work synergistically to achieve combined social benefits. For example, lean management training provides information on reducing lean waste, decreasing input consumption, and increasing equipment efficiency and lifespan. However, such training does not necessarily encourage employees to think responsibly about green waste management through recycling and resource consumption.

The overall social efficiency improvement derived from the integration of lean and green management can be realized when employees understand how to achieve combined value from these two approaches. In line with this, Roxas et al. (2017) noted that innovative and advanced production processes, through lean management paradigms, can reduce environmental pollution. Reductions in workplace environmental pollution and noise pollution, in turn, enhance working conditions and community quality of life. Shuchenko et al. (2020) and Wills et al. (2021) reported, based on their analyses, improvements in poor health and safety levels and the elimination of some redundant personnel as additional factors experienced under both lean and green waste management paradigms.

However, literature reviews indicate that no empirical studies have tested the impact of integrating lean and green management on other social factors such as community benefits or customer welfare.

Based on the above, future research could address the fundamental question: What is the impact of environmental orientation on financial performance, considering green supplier management and relational capital? This article proceeds by first outlining the theoretical foundations and literature review, followed by hypothesis development, research methodology, descriptive statistics of variables, hypothesis testing, and finally, discussion, conclusions, and recommendations.

2. Literature review

2.1 Theoretical and hypothesis development

2.1.1 The Impact of Environmental Sustainability Orientation on Financial Performance

Environmental sustainability orientation is a crucial aspect of environmental attitudes (Yu & Huo, 2019), reflecting the extent to which a company engages in overcoming environmental degradation. Correspondingly, findings from Yu and Huo (2019) indicate that environmental sustainability orientation refers to a company's responsibility towards the environment, its awareness of the environmental impact it has, and the necessity to minimize this impact. Environmental sustainability orientation also encompasses various actions undertaken by companies to reduce the harmful environmental effects of their daily operations.

The second key concept to define in explaining the relationship between environmental sustainability orientation and financial performance is the company’s financial performance. Financial performance is a broad concept with various interpretations but generally refers to a company’s capacity for growth and profitability, including profit growth and return on sales.

A review of the literature reveals that no study has directly examined the effect of environmental sustainability orientation on financial performance. Existing research primarily reports findings related to the relationships between market orientation, quality orientation, strategic orientation, and financial performance. These studies generally assume that a company’s market orientation, strategic orientation, and quality orientation are associated with higher profitability.

Specifically, it is assumed that as demand for environmentally friendly products increases, companies pay greater attention to environmental protection across all operational areas. In

organizations where a collective culture of environmental sustainability orientation has developed, environmental protection is embedded in everyday activities, and every employee takes environmental responsibility seriously. This collective responsibility regarding environmental sustainability orientation fosters a fully participatory environment for environmental protection, which, in turn, promotes environmentally friendly behaviors. Such protective behaviors contribute to the formation of a green corporate image, increased sales, and market share, ultimately leading to greater profitability (Yu & Huo, 2019).

Therefore, based on the theoretical foundations, relevant empirical evidence, and logical inference in this domain, the first hypothesis of the study is formulated as follows:

Hypothesis 1: Environmental orientation has a positive effect on financial performance.

2.1.2. The Mediating Role of Green Supplier Management

Based on the integration of environmental thinking with supply chain management and organizational practices, "Green Supply Chain Management" (GSCM) can be described as a set of coordinated efforts by companies to reduce the negative environmental impacts of their operations throughout the entire product lifecycle, including product design, raw material procurement and sourcing, production, delivery of the final product, and end-of-life product management (European Union, 2015).

Green supply chain management can be evaluated across three dimensions: supplier management, internal management, and customer management. In this context, green supplier management represents upstream green management, since the focal company must collaborate with upstream suppliers—such as raw material providers, component suppliers, and financiers—to reduce the environmental impacts of its operations. These practices are similar to previous concepts including environmental collaborations with suppliers, green purchasing, sustainable sourcing management, inter-organizational environmental practices, and green supply chain integration (Foxon, 2011).

Impact of Environmental Sustainability Orientation on Green Supplier Management: As a form of social responsibility, environmental sustainability orientation reflects a company's commitment to environmental protection. More specifically, environmental sustainability orientation indicates the extent to which companies respect and care for the environment and proactively respond to environmental requirements set by external stakeholders. This orientation encourages companies to undertake environmental protection strategies and activities to improve their performance.

Moreover, based on Institutional Theory, companies must respond to constraints imposed by various institutions, which can enhance their stability, legitimacy, and likelihood of survival. Within the framework of the Resource-Based View (RBV), these institutions are considered important stakeholders that impose formal (e.g., laws and regulations) and informal (e.g., norms and standards) rules on how companies should address environmental issues. Institutional pressure is thus a critical antecedent of strategic environmental resources.

Many studies confirm that occupational orientation influences strategic positioning and, consequently, organizational behavior. According to RBV, valuable, rare, and inimitable resources can help companies achieve sustainable competitive advantages. Additionally, resource organization assists companies in fully utilizing critical resources and successfully

building core competencies. Therefore, a focal company can enhance the implementation of green supply chain management by leveraging related resources.

Empirically, managerial attitudes toward the natural environment, environmental sustainability orientation, environmental innovation, and environmentally aligned strategic orientation can all improve green supplier management.

Hence, based on the theoretical foundations, related empirical evidence, and logical inference presented above, the second research hypothesis is formulated as follows:

Hypothesis 2: Environmental orientation positively affects green supplier management.

2.1.3 Impact of Green Supplier Management on Financial Performance

According to the Resource-Based View (RBV) and organizational capability theory, green supplier management represents a unique dynamic external capability of the organization that can help companies achieve and sustain competitive advantages. Based on Stakeholder Theory, green supplier management can also be seen as a form of socially responsible behavior that generates significant financial benefits while maximizing the overall interests of stakeholders. It demonstrates a company's commitment to environmental responsibility and can be an effective tool for pollution control and prevention, ultimately leading to improved financial performance.

Numerous empirical studies have found positive relationships between environmentally compatible procurement, green supplier spaces, green supplier collaboration, environmentally oriented supply chain management practices, green purchasing, and financial performance (Hategan et al., 2018).

Procurement is the first stage in the value chain. Integrating environmental objectives into procurement activities and implementing green procurement strategies is crucial for the success of environmental strategies. Collaborating with suppliers on environmental protection helps companies and their suppliers jointly address environmental management goals and solve ecological problems, thereby enhancing the company's credibility, reputation, market position, and benefits.

For example, providing supplier design specifications enables suppliers to understand and procure materials or components that meet environmental standards and regulatory requirements. Environmental audits push suppliers toward waste reduction, cost minimization, and curbing opportunistic behaviors (Lee, 2012). Practically, implementing ISO 14001 environmental management systems helps suppliers reduce pollutant emissions and resource consumption while supplying high-quality materials and parts at lower costs.

From a resource control perspective, these green inputs are considered a vital foundation for greening supply chains and can enhance the company's green image and brand equity (Patz, 2017). With increasing public environmental awareness, green supply chains have become a significant competitive advantage for companies in international markets. Multinational corporations globally are increasingly supporting collaborations with suppliers on environmental protection.

Therefore, based on the theoretical foundations, empirical evidence, and logical reasoning presented above, the third research hypothesis is formulated as follows:

Hypothesis 3: Green supplier management has a positive impact on financial performance.

2.2. The Moderating Role of Relational Capital

Internal Relational capital, being one of the relational forms of social capital, is defined as trust, commitments, respect, and friendship built between actors involved in the supply and production of goods and services as a result of interaction between them (Rexas et al., 2017). Relational capital can be categorized into internal and external relational capital for a focal firm within a supply chain, where external relational capital is based on relationships with upstream suppliers and downstream customers. In this study, the focus is on relational capital with the focal firm's suppliers, i.e., supplier relational capital.

According to the resource-based view (RBV), a firm's resources can be leveraged to achieve extraordinary profits and consequently create sustainable competitive advantages. This relational perspective posits that heterogeneous ties across firm boundaries, as well as formal and informal rules and behavioral norms between firms, serve as sources of relational benefits and competitive advantages. Relational capital can reduce opportunistic behaviors, increase mutual trust, lower transaction costs, and ultimately enhance relationship performance.

Additionally, relational capital as created by social capital theory encompasses organizational behaviors that compel supply chain management to forge social relationships founded upon trust, mutual respect, and friendship with supply chain partners via long-lasting communications and interactions. Social capital has the ability to hasten supply chain collaboration along resource exchange dimensions, dimensions of information sharing, dimensions of asset integration, as well as dimensions of prospective gains.

Incorporating green supply chain management will automatically have firms developing cooperative relationships with supply chain partners to improve environmental performances. Information exchange, risk management, and environmental collaboration are prominent characteristics of green supply chains. Therefore, firms need to build social networks with supply chain partners with trust and long-lasting relationships to reduce information asymmetry and promote mutual cooperation for green management..

Proximity and communication with suppliers allow procurement teams to understand and enact environmental criteria to supply environmentally responsible materials, products, or components to companies. The companies are then capable of auditing suppliers' environmentally compliant practices efficiently at regular intervals and venture into achieving environmental targets. In this context, environmental orientation is a critical resource for supplier collaboration and green management. However, the effective utilization of this resource largely depends on the quality of the firm's external relationships with its suppliers. If a firm maintains strong supplier relationships, its partners are more likely to comprehend the firm's environmental orientations, making green supplier management more effective.

Nonetheless, in practice, firms with environmental sustainability orientations often impose green purchasing requirements even on unknown suppliers, resulting in limited actual implementation of green supplier management. Empirical research has increasingly emphasized the moderating role of relational capital, providing evidence that relational

capital influences the relationship between specific relationship investments and relational learning in international partnerships, the quality of supply chain relationships and firm performance, buyer-supplier relationships and suppliers' willingness to invest in technology, relationship structures and relational performance, and supplier development and relational benefits (Shouchenko et al., 2020).

Hypothesis 4:

Relational capital positively moderates the relationship between environmental orientation and financial performance.

3.Research Methodology and Data sample

The overall methodology of this study is twofold. On the one hand, it is theoretical in nature due to its aim to examine the impact of environmental sustainability orientation on financial performance, considering the mediating role of green supplier management and the moderating effect of relational capital. On the other hand, it is applied in purpose, as it seeks to contribute to the enhancement of environmental sustainability within companies and thereby improve organizational performance. The study employs a survey-based approach, relying on expert judgment through questionnaires. Consequently, the research design is mixed-method—both qualitative and quantitative—as it integrates judgmental survey techniques with quantitative tools such as confirmatory factor analysis (CFA) and structural equation modeling (SEM) to examine the relationships among variables. The statistical population of the study comprises experts, including managers and relevant professionals from publicly listed companies. After excluding incomplete or unusable questionnaires, a total of 392 valid responses were included in the final analysis. As the primary data collection tool was a structured questionnaire, both the validity and reliability of the instrument were confirmed. Content validity was verified through expert evaluations by the supervising professor and other academic and industry specialists. Furthermore, construct validity was confirmed through confirmatory factor analysis. After performing diagnostic tests (including tests for data normality, homogeneity of variances, CFA, and model fit evaluation), the structural equation model was applied to assess the interrelationships among the research variables. The overall framework for defining, measuring, and modeling the connections between variables was developed accordingly. Initially, the conceptual model of the study was visualized based on prior research, followed by the definition and operationalization of the variables. This framework is illustrated in Figure 1.

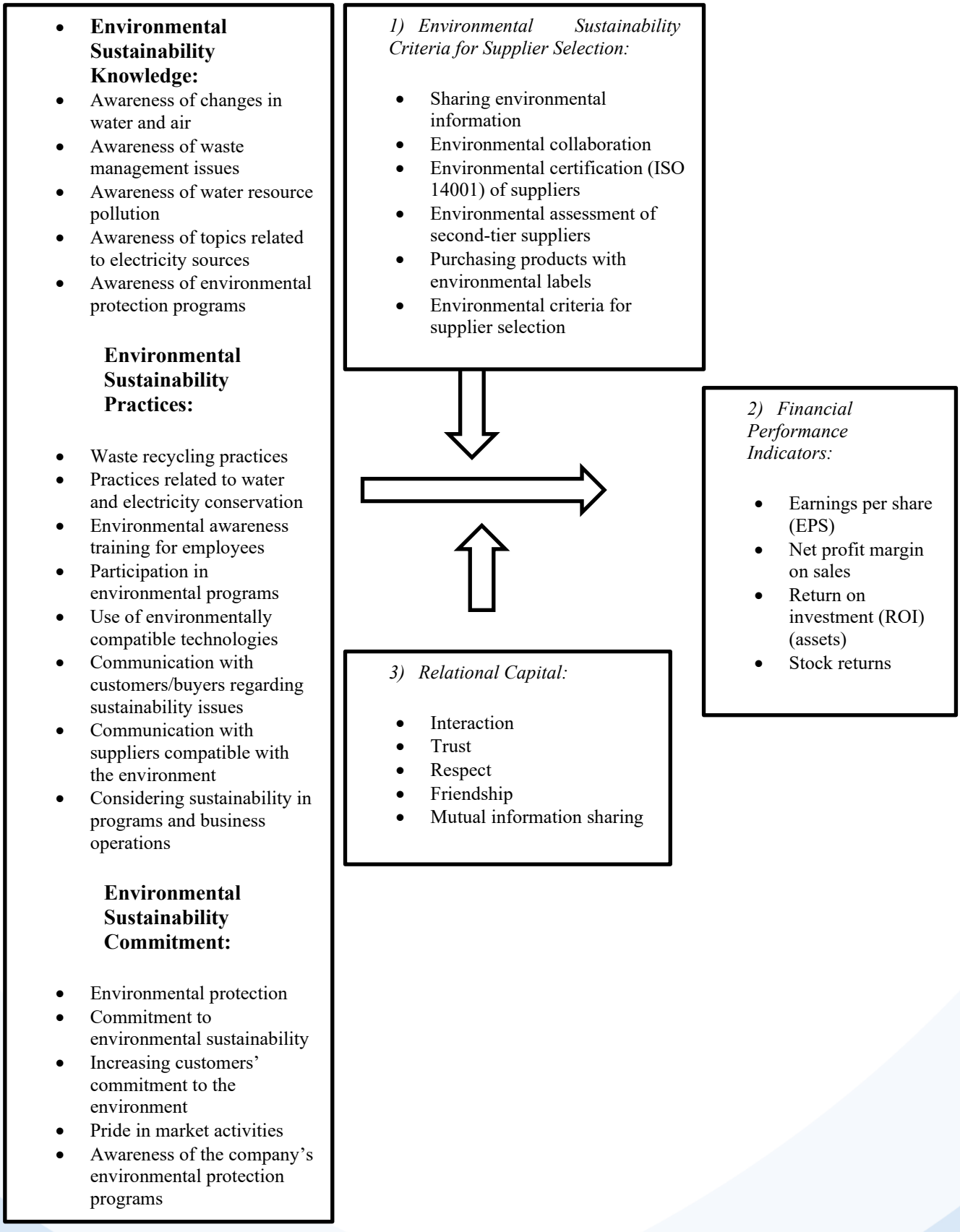

Figure 1 Research model

3.1 Research instrument

Environmental Sustainability Orientation

This variable is measured based on the extended model by Reksas et al. (2017). It is defined through three dimensions: knowledge of environmental sustainability, environmental sustainability practices, and commitment to environmental sustainability. The company's knowledge of environmental sustainability is assessed using five indicators; sustainability practices are measured through eight indicators; and commitment to environmental sustainability is evaluated by four indicators. Similar to the stakeholder integration variable, all indicators are measured on a quantitative scale ranging from 1 to 7.

Knowledge of Environmental Sustainability:

- The company is aware of climate change.
- The company has information on urban waste management issues.
- The company is knowledgeable about drinking water resources.
- The company has awareness of electricity-related topics.
- The company is informed about environmental protection programs.

Environmental Sustainability Practices:

- The company engages in waste recycling practices.
- The company implements water and electricity conservation measures.
- The company provides environmental awareness training to employees.
- Employees and managers participate in environmental programs.
- The company employs technologies that minimize environmental damage.
- The company communicates with customers and buyers about sustainability issues.
- The company works with environmentally friendly suppliers.
- Sustainability is an integral and inseparable part of the company's programs and business operations.

Commitment to Environmental Sustainability:

- Environmental protection is part of the company's business.
- Commitment to environmental sustainability benefits the company's business.
- The company's commitment to the environment enables it to attract more customers.
- The company takes pride in its market presence.
- The company is aware of environmental protection programs.

Financial Performance

- Based on the financial literature, the measurement of the company's financial performance is adopted from studies such as Pislaru et al. (2019), using the following indicators: (1) Earnings Per Share (EPS), (2) Net Profit Margin, (3) Return on Investment (Assets), and (4) Stock Return. These indicators are assessed via a survey method, based on respondents' perceptions in comparison to competitor companies, measured on a Likert-type scale from 1 to 7 to capture different levels of expectation.

Relational Capital

- According to Fiaschi et al. (2017), relational capital is evaluated based on the quality of the relationship between the focal company and its main supplier, measured through five indicators: interaction, trust, respect, friendship, and mutual information sharing. Similar to the previous variables, each of these dimensions is measured on a quantitative scale ranging from 1 to 7.

Green Supply Management

- Green supply management is adapted from Danso et al. (2020) and is based on seven indicators: environmental information sharing, environmental collaboration, environmental auditing, ISO 14001 certification of suppliers, environmental evaluation of secondary suppliers, purchasing products with environmental labels, and the existence of environmental criteria for supplier selection. Like the other variables, each dimension is measured on a quantitative scale from 1 to 7.

4.1 Demographic analysis of the sample

Due to the use of a survey-based research design involving managers and experts from publicly traded companies, the time frame for the study was limited to the three-month period of summer 2025. The responses to the research questions were collected using response options relevant to this period. The gender distribution analysis of respondents showed that the majority of participants were male (295 individuals, accounting for 75.26% of the total), while only 97 participants, equivalent to 24.74%, were female.

Regarding marital status, the results indicated that most respondents were married (315 individuals, representing 80.36% of the total), whereas 77 participants, or 19.64%, were single. The largest age group among participants was 30 to 36 years old, constituting approximately 44.2% of the sample. This was followed by the 37 to 44 age group, which accounted for the second highest frequency with 168 individuals (42.8%). Participants aged 45 and above numbered 29, making up 7.5% of the total. The smallest group consisted of respondents under 30 years old, with 21 individuals (5.5%).

Regarding educational background, the majority of respondents held a bachelor's degree (185 individuals, representing 47.3%). Among them, 157 participants (40.1%) possessed a master's degree. Additionally, 39 respondents (9.9%) held a diploma or below diploma education level. Finally, 1 participant (0.6%) had education higher than a master's degree.

4.2 Measurement model

Given the use of structural equation modeling based on multiple linear regression and the analysis of cross-sectional data to examine the impact of environmental sustainability orientation on financial performance—considering the effects of green supplier management and relational capital as proposed in the conceptual model—diagnostic tests were conducted to validate the application of this method. These tests include: (1) testing for normality of data distribution, (2) reliability testing of the questionnaire, (3) confirmatory factor analysis, (4) convergent validity, and (5) model goodness-of-fit index (GOF).

a) Test of Normality of Data Distribution

In this study, the Kolmogorov-Smirnov test was employed to assess the normality of the data distribution, with the null hypothesis stating that the data are not normally distributed at a significance level of 5%. The results are summarized in Table 1.

Table 1: Results of the Kolmogorov-Smirnov Test

Row	Variable	Symbol	Z Statistic	Significance Level	Test Result
1	Environmental Sustainability Orientation	ESO	1.538	0.017	Reject null hypothesis
2	Green Supplier Management	SGM	1.663	0.009	Reject null hypothesis
3	Interaction of Relational Capital and Environmental Sustainability Orientation	RC*ESO	1.983	0.001	Reject null hypothesis
4	Financial Performance	CEP	1.829	0.006	Reject null hypothesis

Given that the significance levels calculated for each of the variables—environmental sustainability orientation, green supplier management, the interaction between relational capital and environmental sustainability orientation, and financial performance—are all below the 5% threshold, the null hypothesis is rejected. Therefore, at a 95% confidence level, the normality of the variable distributions cannot be rejected.

b) Questionnaire Reliability

In this study, following behavioral finance survey-based research, Cronbach's alpha method was used in SPSS software to estimate the reliability of the questionnaire. The results are presented in Table 2. Since all alpha coefficients exceed the acceptable threshold of 0.7, the questionnaire is considered to have adequate reliability:

Table 2 – Cronbach's Alpha Coefficients for Research Variables to Assess Reliability

Row	Variable	Symbol	Alpha Coefficient	Judgment
1	Environmental Sustainability Orientation	ESO	0.837	Reliability Accepted
2	Green Supplier Management	SGM	0.750	Reliability Accepted
3	Interaction of Relational Capital and Environmental Sustainability Orientation	RC*ESO	0.854	Reliability Accepted
4	Financial Performance	CEP	0.785	Reliability Accepted

c) First-Order Confirmatory Factor Analysis

The factor loadings indicate that the maximum coverage for each of the variables—environmental sustainability orientation, green supplier management, the interaction

between relational capital and environmental sustainability orientation, and financial performance—has occurred within the intended constructs. The selected sub-constructs, compared to other sub-constructs, are also presented in Table 3. Given that the Student's t-values exceed 1.96, the significance of the component effects is accepted.

Table 3 – Estimated Model Fit Indices

Question	Variable	Factor Loading	Factor Weight	t-Statistic	Result
1	Environmental Sustainability	0.70	0.14	6.25	Accepted
2	Environmental Sustainability	0.80	0.13	3.29	Accepted
3	Environmental Sustainability	0.80	0.26	2.43	Accepted
4	Environmental Sustainability	0.75	0.20	4.00	Accepted
5	Environmental Sustainability	0.78	0.22	4.50	Accepted
6	Relational Capital	0.60	0.28	5.23	Accepted
7	Relational Capital	0.60	0.33	2.48	Accepted
8	Relational Capital	0.80	0.45	8.62	Accepted
9	Relational Capital	0.70	0.14	2.77	Accepted
10	Relational Capital	0.60	0.28	4.68	Accepted
11	Green Supplier Management	0.80	0.45	8.62	Accepted
12	Green Supplier Management	0.70	0.14	2.77	Accepted
13	Green Supplier Management	0.80	0.28	4.55	Accepted
14	Green Supplier Management	0.80	0.31	9.58	Accepted
15	Green Supplier Management	0.70	0.29	6.38	Accepted
16	Green Supplier Management	0.60	0.22	2.55	Accepted
17	Green Supplier Management	0.80	0.34	3.36	Accepted
18	Green Supplier Management	0.80	0.29	3.28	Accepted
19	Environmental Sustainability	0.70	0.14	6.25	Accepted
20	Financial Performance	0.60	0.25	4.65	Accepted
21	Financial Performance	0.70	0.33	3.28	Accepted
22	Financial Performance	0.60	0.28	4.68	Accepted
23	Financial Performance	0.60	0.28	5.23	Accepted
24	Financial Performance	0.70	0.31	4.62	Accepted
25	Financial Performance	0.80	0.45	8.62	Accepted
26	Financial Performance	0.70	0.14	2.77	Accepted
27	Financial Performance	0.60	0.28	4.68	Accepted
28	Financial Performance	0.80	0.11	2.66	Accepted
29	Green Supplier Management	0.80	0.28	4.55	Accepted
30	Green Supplier Management	0.80	0.31	9.58	Accepted
31	Green Supplier Management	0.70	0.29	6.38	Accepted
32	Green Supplier Management	0.60	0.22	2.55	Accepted
33	Green Supplier Management	0.80	0.34	3.36	Accepted
34	Green Supplier Management	0.80	0.29	3.28	Accepted

d) Convergent Validity

Convergent validity is based on the Average Variance Extracted (AVE) criterion, which represents the average amount of variance shared between a construct and its indicators, effectively indicating the correlation of a construct with its corresponding indicators. The higher the correlation, the better the model fit. Fornell and Larcker (1981) suggested a threshold of 0.50 for AVE, while other researchers consider 0.40 as the critical cut-off value. The results of the convergent validity assessment are summarized in Table 4. Given that all obtained values exceed 0.40, the latent variables in the research model demonstrate convergent validity, and the hypothesis of multicollinearity is therefore rejected.

Factor	Average Variance Extracted (AVE)	Judgment
Environmental Sustainability Orientation	0.43	Confirmed
Green Supplier Management	0.39	Confirmed
Interaction of Relational Capital and Environmental Sustainability Orientation	0.43	Confirmed
Financial Performance	0.46	Confirmed

e) Goodness-of-Fit (GOF) Index

The GOF index reflects the overall fit between the structural model and the measurement model, allowing assessment of the model's adequacy after evaluating both measurement and structural components. The calculated GOF value for this research model is 0.43, indicating that the tested model exhibits an acceptable fit within the sample under study.

4.3 Structural model

Structural model

In this study, based on the works of Danso et al. (2020), Ardayaw-Kwasi et al. (2017), Pislaru et al. (2019), and finally Yu and Hieu (2019), the relationships among financial performance as the dependent variable, environmental sustainability orientation as the independent variable, green supplier management as the mediating variable, and relational capital as the moderating variable were examined.

To assess the relationships between these variables, path analysis using structural equation modeling (SEM) was employed. Accordingly, the structural equation model was estimated in both significance and standardized dimensions. Figure 2 illustrates the path coefficients among the variables along with their Student's t-statistics or significance levels for the relationships. Additionally, Table 5 presents the path coefficients, significance levels, determination coefficients for the paths proposed in the conceptual model, and the confirmation or rejection of each hypothesis based on the SEM output.

Figure 2 Confirmatory factor analysis

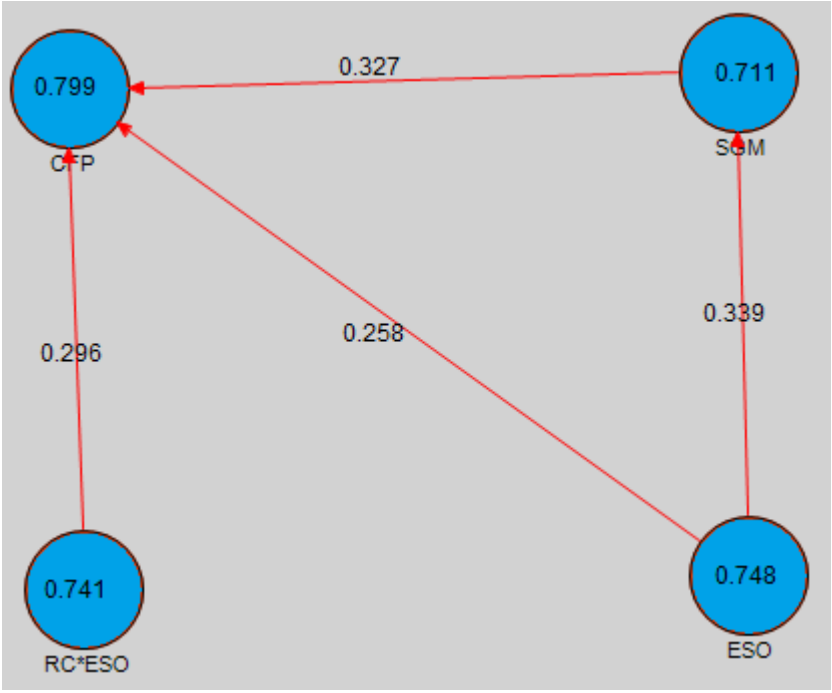

Figure 3 Structural equation modelin

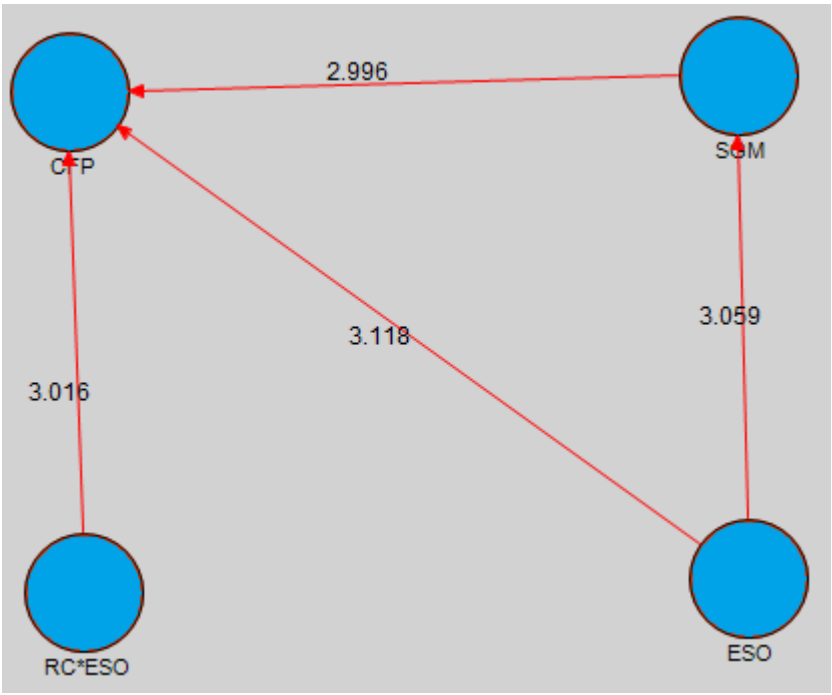

Table 5: Structural model – direct effect

No.	Path	t-Statistic	Path Coefficient	R^2	Result
1	Environmental Sustainability Orientation → Financial Performance	3.118	0.258	0.569	Supported
2	Environmental Sustainability Orientation → Green Supplier Management	3.059	0.339	0.408	Supported
3	Green Supplier Management → Financial Performance	2.996	0.327	0.446	Supported
4	Interaction of Relational Capital and Environmental Sustainability Orientation → Financial Performance	3.016	0.586	0.296	Supported

Based on the path analysis conducted using the structural equation modeling framework, the study results revealed positive direct relationships between variables. The path coefficient from environmental sustainability orientation to financial performance was 0.258, indicating that environmental sustainability orientation positively affects financial performance. The Student's t-statistic approached zero, and at the 95% confidence level, the positive effect of environmental sustainability orientation on financial performance cannot be rejected. Additionally, the model explained approximately 56.9% of the variance in financial performance attributed to the environmental sustainability orientation of the company.

The path coefficient from environmental sustainability orientation to green supplier management was 0.339 and positive, indicating that environmental sustainability orientation has a positive effect on green supplier management. The Student's t-statistic again approached zero, and at the 95% confidence level, the positive impact of environmental sustainability orientation on green supplier management cannot be rejected. The model accounted for 40.8% of the variance in green supplier management explained by environmental sustainability orientation.

Furthermore, the path coefficient from green supplier management to financial performance was 0.327 and positive, implying that green supplier management leads to an improvement in the company's financial performance. The Student's t-statistic was approximately zero, and at the 95% confidence level, the positive effect of green supplier management on financial performance cannot be rejected. This path explained 44.6% of the variance in financial performance attributable to green supplier management.

Finally, the interaction effect of relational capital and environmental sustainability orientation on financial performance had a positive path coefficient of 0.296. This indicates that the interaction between relational capital and environmental sustainability orientation positively influences financial performance. The Student's t-statistic approached zero, and at the 95% confidence level, the positive moderating effect of relational capital on the relationship between environmental sustainability orientation and financial performance cannot be rejected. Moreover, the model explained 56.9% of the variance in financial

performance, considering the moderating effect of relational capital on environmental sustainability orientation.

Mediation Effect

In the present study, the Sobel test method was employed to analyze the mediating variable. This method uses the following formula (Equation 1) for mediation analysis:

$$z\text{-value} = \frac{a \times b}{\sqrt{(b^2 \times s_a^2) + (a^2 \times s_b^2) + (s_a^2 \times s_b^2)}}$$

where:

- aaa is the path coefficient between the independent variable and the mediating variable,
- bbb is the path coefficient between the mediating variable and the dependent variable,
- sas_asa is the standard error of the path between the independent variable and the mediating variable,
- sbs_bsb is the standard error of the path between the mediating variable and the dependent variable.

If the computed zzz-value is greater than 1.96, this indicates that the indirect path a×ba \times ba×b is significant at the 95% confidence level, confirming the mediating role. Therefore, environmental sustainability orientation influences financial performance through the mediating role of green supplier management, and the mediation effect of green supplier management is supported.

Furthermore, to assess the extent of mediation, the Variance Accounted For (VAF) was evaluated. The calculations revealed a VAF value of 0.26 for the research model. Since this value lies between 0.2 and 0.8, it can be concluded that partial mediation occurs.

Based on the synthesis of the relationships among environmental sustainability orientation, green supplier management, and financial performance—supported by diagnostic tests, advanced structural equation modeling estimates, path analysis, regression estimates, and Student's t-tests—all research hypotheses were confirmed.

5. Discussion and Conclusion

5.1 Discussion

Recently, research related to environmental management and green supply management has considered environmental motivations as an effective organizational driver influencing performance. Such motivations may reflect a combination of organizational incentives, stakeholder motivations, and ethical motivations. However, most studies have focused solely on managerial motivations that manifest in the company's performance, and the integration of stakeholders, performance, and financial structure with an emphasis on environmental sustainability and green supply management has not been addressed.

Research on managerial controls has begun to analyze the potential role of environmental performance measurement and control systems in strengthening companies' environmental motivations. The outcome of environmental motivations in management has been better

company performance in terms of better allocation of organizational resources and restructuring in line with the company's value-based goals. For example, it has been stated that environmental performance measurement and environmental control systems manifest in dimensions such as identifying key behaviors and opportunities, facilitating environmental decision-making and coordination, enhancing the interaction between individual interests and organizational goals, and facilitating training in this area (Fiaschi et al., 2017).

A review of the research literature shows a lack of studies on potential issues related to environmental sustainability orientation, and the present study is conducted to help fill this research gap. In this study, developing countries such as Iraq are examined by designing and testing the proposed model, as an emerging capital market facing many governance challenges; therefore, in such conditions, stakeholder participation may help provide the necessary structural support to reduce weak organizational structures and consequently improve the financial performance of firms.

To date, the main financial focus of research in environmental issues has been on the relationship between financial performance and environmental performance, but the effect of environmental strategy on the capital structure of firms has not been addressed. The present study addresses this gap in the literature by investigating the impact of company efficiency in greenhouse gas emissions on the financial structure of companies using the financial debt measure.

"Environmental Sustainability Orientation" is an important aspect of environmental attitudes, indicating the extent of a company's involvement in overcoming environmental degradation. Accordingly, findings from Danso et al. (2020) indicate that environmental sustainability orientation refers to the company's responsibility toward the environment, the importance of recognizing the company's impact on the environment, and the need to minimize this impact. Environmental sustainability orientation also includes various actions a company takes to reduce the harmful environmental effects of its daily activities.

The second term that should be defined to explain the relationship between environmental sustainability orientation and financial performance is the "financial performance" of the company. Financial performance has diverse and broad interpretations and mainly refers to the company's capacity for development and profitability, including profit growth and sales return (Fiaschi et al., 2017). The literature review shows that no study has directly examined the effect of environmental sustainability orientation on financial performance. According to the literature, existing studies have mainly reported findings related to the relationships between market orientation, quality orientation, strategic orientation, and financial performance. These studies have assumed that market orientation (Fackson, 2011), strategic orientation (Hang et al., 2018), and quality orientation (Lee, 2012) are associated with higher profitability.

In this research, based on the studies of Danso et al. (2020), Ardiaw-Kwasi et al. (2017), Pislaru et al. (2019), and finally Yu and Hew (2019), the relationship between financial performance as the dependent variable, environmental sustainability orientation as the independent variable, green supply management as the mediating variable, and relational capital as the moderating variable has been studied. The research method, in terms of objective, is theoretical-applied, relying on a survey research design and descriptive-

inductive inference. Due to the nature of the data and analysis method, it is of mixed type (quantitative-judgmental). Standard questionnaires were used to measure variables, and field research was conducted using simple random sampling. From a random selection of 440 financial managers, accountants, and auditors of listed companies, 392 questionnaires were distributed, and ultimately 392 responses were used in data analysis.

After diagnostic tests including assessment of normality, reliability tests, first-order confirmatory factor analysis, and model validation, structural equation modeling, path analysis, and regression were used to interpret the relationships between variables. Finally, the coefficient of determination was used to validate the estimated relationships, and the Student's t-test was used to assess the significance levels of these relationships.

The results showed that environmental sustainability orientation positively affects financial performance. Environmental sustainability orientation is an appropriate tool for long-term profitability and improvement of financial performance in the long run. Therefore, it is recommended that developing countries such as Iraq consider suitable infrastructure for establishing and implementing sustainable environmental systems for manufacturing companies. This approach leads to resource savings and increased protection of natural and biological resources. Additionally, relational capital as a moderating variable positively affects the relationship between environmental sustainability orientation and financial performance of the company.

Considering the reciprocal relationships between environmental sustainability orientation and financial performance in various aspects, especially green supply management and attention to its affairs, managers are therefore recommended to pay more attention to environmental sustainability performance in the company to improve financial performance indicators such as profitability. Investors and creditors are also advised to adjust their decisions regarding companies based on environmental sustainability indicators.

To promote environmental sustainability orientation and performance, it is suggested that appropriate legal requirements and regulations for information disclosure in financial statements and board reports be determined by the Iraq Stock Exchange Organization in cooperation with active social institutions. Given the lack of a standard indicator for environmental sustainability orientation disclosure in the financial statements of listed companies on the Iraq Stock Exchange, which can be considered one of the reasons for weak environmental sustainability performance, it is therefore recommended that a standard for the presentation and content of environmental sustainability performance reports be established by the Iraq Stock Exchange Organization

References

1. Amankwah-Amoah, J., Danso, A., & Adomako, S. (2019). Entrepreneurial orientation, environmental sustainability and new venture performance: Does stakeholder integration matter? Business Strategy and the Environment, 28(1), 79–87.
2. Assembly, G. (2015). Resolution adopted by the General Assembly on 19 September 2016 (A/RES/71/1, The New York Declaration). 3 October 2016.

3. Ciampi, F., Demi, S., Magrini, A., Marzi, G., & Papa, A. (2021). Exploring the impact of big data analytics capabilities on business model innovation: The mediating role of entrepreneurial orientation. Journal of Business Research, 123, 1–13.
4. Danso, A., Adomako, S., Lartey, T., Amankwah-Amoah, J., & Owusu-Yirenkyi, D. (2020). Stakeholder integration, environmental sustainability orientation and financial performance. Journal of Business Research.
5. Desai, V. M. (2018). Collaborative stakeholder engagement: An integration between theories of organizational legitimacy and learning. Academy of Management Journal, 61(1), 220–244.
6. Erdiaw-Kwasie, M. O., Alam, K., & Kabir, E. (2017). Modelling corporate stakeholder orientation: Does the relationship between stakeholder background characteristics and corporate social performance matter? Business Strategy and the Environment, 26(4), 465–479.
7. European Commission. (2015). EU ETS Handbook. European Union. https://ec.europa.eu/clima/sites/clima/files/docs/ets_handbook_en.pdf
8. Fernández-Cuesta, C., Castro, P., Tascón, M. T., & Castaño, F. J. (2019). The effect of environmental performance on financial debt: European evidence. Journal of Cleaner Production, 207, 379–390.
9. Fiaschi, D., Giuliani, E., & Nieri, F. (2017). Overcoming the liability of origin by doing no-harm: Emerging country firms' social irresponsibility as they go global. Journal of World Business, 52(4), 546–563.
10. Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error. Algebra and Statistics.
11. Foxon, T. J. (2011). A coevolutionary framework for analysing a transition to a sustainable low carbon economy. Ecological Economics, 70(12), 2258–2267.
12. Hang, M., Geyer-Klingeberg, J., Rathgeber, A., & Stöckl, S. (2018). Economic development matters: A meta-regression analysis on the relation between environmental management and financial performance. Journal of Industrial Ecology, 22(4), 720–744.
13. Hategan, C. D., Sirghi, N., Curea-Pitorac, R. I., & Hategan, V. P. (2018). Doing well or doing dood: The relationship between corporate social responsibility and profit in Romanian companies. Sustainability, 10(4), 1041.
14. Hunt, R. A. (2021). Entrepreneurial orientation and the fate of corporate acquisitions. Journal of Business Research, 122, 241–255.
15. Lee, S. Y. (2012). Corporate carbon strategies in responding to climate change. Business Strategy and the Environment, 21(1), 33–48.
16. Lewandowski, S. (2017). Corporate carbon and financial performance: The role of emission reductions. Business Strategy and the Environment, 26(8), 1196–1211.
17. Pislaru, M., Herghiligiu, I. V., & Robu, I. B. (2019). Corporate sustainable performance assessment based on fuzzy logic. Journal of Cleaner Production, 223, 998–1013.
18. Plaza-Úbeda, J. A., de Burgos-Jiménez, J., & Carmona-Moreno, E. (2010). Measuring stakeholder integration: Knowledge, interaction and adaptational behavior dimensions. Journal of Business Ethics, 93(3), 419–442.

19. Putz, R. (2017). Exploring U-shaped relationships between corporate environmental management performance and corporate financial performance (A&C).
20. Roxas, B., Ashill, N., & Chadee, D. (2017). Effects of entrepreneurial and environmental sustainability orientations on firm performance: A study of small businesses in the Philippines. Journal of Small Business Management, 55(sup1), 163–178.
21. Shevchenko, A., Pan, X., & Calic, G. (2020). Exploring the effect of environmental orientation on financial decisions of businesses at the bottom of the pyramid: Evidence from the microlending context. Business Strategy and the Environment, 29(5), 1876–1886.
22. Wales, W. J., Kraus, S., Filser, M., Stöckmann, C., & Covin, J. G. (2021). The status quo of research on entrepreneurial orientation: Conversational landmarks and theoretical scaffolding. Journal of Business Research, 128, 564–577.
23. Yadarpour, F., & Gharani, M. (2015). The impact of environmental accounting on financial and operational indicators of manufacturing companies. Financial Accounting and Auditing Research, 7(26), 39–50.
24. Yu, Y., & Huo, B. (2019). The impact of environmental orientation on supplier green management and financial performance: The moderating role of relational capital. Journal of Cleaner Production, 211, 628–639.