



## The Impact of Managerial Perception of Environmental Accounting Practices on Sustainable Performance: Evidence from LISCO

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### Abstract

In this study, the relationship between managerial perception of environmental accounting practices and sustainable performance in the Libyan Iron and Steel Company (LISCO) was investigated. The study was designed to examine how managerial perception of environmental accounting practices is associated with environmental, social, and economic performance. A descriptive-analytical approach was adopted, and primary data were gathered using a structured questionnaire distributed to relevant personnel in the selected departments using purposive sampling. A total of 65 questionnaires were distributed, of which 54 valid questionnaires were returned and analyzed using the Statistical Package for the Social Sciences (SPSS). The findings reveal that managerial perception of environmental accounting practices is at a high level and has a statistically significant positive relationship with sustainable performance overall, as well as with each of its three dimensions: environmental, social, and economic performance. The results indicate that managerial perception of environmental accounting practices is significantly associated with sustainability outcomes within the specific context of LISCO. This study provides case-specific empirical evidence from the Libyan industrial context regarding the relationship between managerial perception of environmental accounting practices and sustainable performance.

### Keywords

Environmental accounting practices, Managerial perception, Sustainable performance, LISCO, Libya.



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## تأثير إدراك الإدارة لممارسات المحاسبة البيئية على الأداء المستدام: دراسة ميدانية

### على الشركة الليبية للحديد والصلب (LISCO)

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### الكلمات المفتاحية:

### المستخلص

ممارسات المحاسبة البيئية، إدراك الإدارة، الأداء المستدام، الشركة الليبية للحديد والصلب.

هدفت هذه الدراسة إلى استقصاء العلاقة بين إدراك الإدارة لممارسات المحاسبة البيئية والأداء المستدام في الشركة الليبية للحديد والصلب (LISCO). وقد سعت الدراسة إلى قياس مدى ارتباط إدراك الإدارة لممارسات المحاسبة البيئية بالأداء البيئي والاجتماعي والاقتصادي. واعتمدت الدراسة على المنهج الوصفي التحليلي، حيث تم جمع البيانات الأولية باستخدام استبانة منظمة وُرعت على الأفراد ذوي الصلة في الإدارات المختارة ضمن عينة الدراسة، وذلك باستخدام أسلوب العينة القصدية. بلغ عدد الاستبانات الموزعة (65) استبانة، استرجع منها (54) استبانة صالحة للتحليل، وتم تحليلها باستخدام الحزمة الإحصائية للعلوم الاجتماعية (SPSS). وأظهرت نتائج الدراسة أن مستوى إدراك الإدارة لممارسات المحاسبة البيئية مرتفع، وأن هناك علاقة إيجابية ذات دلالة إحصائية بين إدراك الإدارة لممارسات المحاسبة البيئية والأداء المستدام بشكل عام، وكذلك أبعاده الثلاثة: البيئي والاجتماعي والاقتصادي. كما تشير النتائج إلى وجود ارتباط ذي دلالة إحصائية بين إدراك الإدارة لممارسات المحاسبة البيئية ومخرجات الاستدامة ضمن السياق المحدد للشركة الليبية للحديد والصلب. وتقدم هذه الدراسة دليلاً تجريبياً خاصاً بالسياق الصناعي الليبي حول العلاقة بين إدراك الإدارة لممارسات المحاسبة البيئية والأداء المستدام.

## 1. Introduction

The modern global business world has evolved to look at how well a company manages economic, environmental, and social matters as well as financial matters, rather than solely at how profitable it is. Environmental Accounting (EA) has, in recent times, become more than just a voluntary disclosure exercise but a powerful instrument that aids sustainable decision-making and provides greater transparency to an organization, especially as it becomes more industrialized (Appiah et al., 2023). This has led to a growing emphasis on accounting research to support the United Nations Sustainable Development Goals (SDGs) beyond the traditional goal of maximizing short-term profits to long-term sustainable growth and responsible resource management (Bebbington & Unerman, 2018).

In developing countries like Libya, the transition from the pre-crisis economic situation and the pressure of environmental needs are compounding demands for the industrial sector to be both economically revived and environmentally sustainable. Libyan Iron and Steel Company (LISCO) is one of the biggest industrial complexes in North Africa and belongs to a resource-intensive industry with high energy consumption and high environmental impact. In such a context, the implementation of environmental accounting practices becomes necessary to recognize environmental costs, make the system more efficient, and enable sustainable performance (Phan et al., 2018). But sustainability is not just about the technical application; managerial perception and organizational commitment have a great impact on it (Solovida & Latan, 2017).

According to previous studies, managerial perception is one of the most important factors influencing environmental management accounting practices, especially in the developing countries (Gunaratne & Alahakoon, 2016). Environmental disclosure is also a strategic tool that can be used to retain organizational legitimacy and obtain a social license to operate in industries that are sensitive to the environment (Appiah et al., 2023). In this frame, legitimacy theory can be a helpful tool to analyze and comprehend the reaction of organizations to societal expectations when they make efforts to increase transparency and deal with sustainability-related issues.

Although there is an increasing number of publications dealing with environmental accounting, there is still limited empirical research on the role of environmental accounting in the Libyan industrial context. In particular, the research that has examined the role managerial perception of environmental accounting practices plays in sustainable performance in large industrial organizations is limited. This gap is especially significant when formal environmental accounting systems are not completely in place; managerial perception is a crucial indicator of organizational readiness to implement and use them in the future. In view of this, this study is designed to explore managerial perception of environmental accounting practices and its contribution towards sustainable performance at LISCO.

## 2. Statement of Problem

Environmental accounting has become increasingly important for resource-intensive industries because of their significant environmental, social, and economic impacts. However, evidence from the Libyan context indicates that environmental accounting operates within an evolving institutional and regulatory environment. A recent empirical study at the National Oil Corporation (NOC) of Libya found a high overall level of environmental accounting disclosure, while respondents expressed only a moderate level of agreement regarding the adequacy of Libyan environmental laws and regulations for environmental disclosure (Bakir & Abusatala, 2026). The

same study demonstrated that environmental accounting disclosure significantly influences sustainable development across its environmental, social, and economic dimensions.

These findings provide evidence that environmental accounting is relevant to sustainability outcomes in the Libyan context, but they do not establish how managerial perception of environmental accounting practices is associated with sustainable performance in other resource-intensive Libyan industries. In particular, limited empirical evidence exists regarding this relationship at the Libyan Iron and Steel Company (LISCO). Therefore, the central research problem is not an assumed deficiency in managerial perception or sustainable performance at LISCO, but rather the lack of empirical evidence regarding whether and to what extent managerial perception of environmental accounting practices is associated with sustainable performance and its environmental, social, and economic dimensions at LISCO.

Accordingly, this study addresses the following main research question:

Is there a statistically significant effect of managerial perception of environmental accounting practices on sustainable performance at LISCO?

The following sub-questions guide this study to answer the above question:

- What is the level of managerial perception of environmental accounting practices at LISCO?
- What is the level of sustainable performance at LISCO across its environmental, social, and economic dimensions?
- Is there a statistically significant effect of managerial perception of environmental accounting practices on each dimension of sustainable performance (environmental, social, and economic) at LISCO?

### **3 .Research Objectives**

The main purpose of this research is to examine the effect of managerial perception of environmental accounting practices on sustainable performance at LISCO. For this purpose, the following sub-objectives are set:

- To assess the level of managerial perception of environmental accounting practices at LISCO
- To evaluate the level of sustainable performance at LISCO across its environmental, social, and economic dimensions.
- To examine the statistical effect of managerial perception of environmental accounting practices on each dimension of sustainable performance (environmental, social, and economic) at LISCO.

### **4 .Significance of the Study**

This study has contextual and empirical significance by examining the relationship between managerial perception of environmental accounting practices and sustainable performance within the specific context of LISCO. From a practical perspective, the study provides insights for LISCO management into how managerial perceptions of environmental accounting practices are associated with the environmental, social, and economic dimensions of sustainable performance. These insights may support internal efforts to strengthen environmental accounting practices and sustainability-related decision-making.

From an academic perspective, the study provides case-specific empirical evidence on managerial perception of environmental accounting practices and sustainable performance within a resource-intensive industrial organization in Libya. It may also provide a useful reference for future research examining similar relationships in other Libyan industrial organizations and emerging-economy contexts.

From a policy perspective, the findings may provide context-specific insights relevant to discussions on environmental accounting and sustainability practices in Libya. However, given the study's focus on a single organization and the use of purposive sampling, the findings are not intended to be generalized to all Libyan industrial companies or to the Libyan economy as a whole.

## **5 .Literature Review**

### **5.1 Managerial Perception of Environmental Accounting Practices**

Recent publications have shown that while significant technical attributes of the environmental accounting transition are important, they are also cognitive and perceptual. The relevance of managerial perception in determining the adoption and effectiveness of the implementation of environmental accounting practices has also been emphasized in previous studies, especially in developing and emerging economies. According to Gunarathne and Alahakoon (2016), managerial awareness and managerial strategic orientation are significant factors in implementing environmental management accounting practices. Likewise, Solovida and Latan (2017) showed that managerial perception directly influences environmental performance by its influence on environmental management accounting systems.

Additionally, there is some more recent evidence that suggests that the perception gap is common in organizations in emerging economies, where managers recognize the importance of environmental issues but struggle with the implementation of environmental integration into formal accounting practices (Appiah et al., 2023). This gap highlights the importance of managerial cognition as a determining factor in translating environmental awareness into practice.

### **5.2 The Environmental Accounting System in Heavy Industries**

In high-emission heavy industries, environmental accounting is more and more relevant because there are high resource consumption levels. In the Libyan industrial context, the authors Abulghasem and Al-Zway (2021) state that environmental activities are mostly operated at the operational level but not formally introduced into accounting systems, which implies that there is a gap between the operational level and formal accounting activities. Also, the higher the firms' perceived value of environmental accounting as a strategic tool to improve resource efficiency, the more positive the sustainability results (Amir et al., 2024). The findings support the argument that managerial perception of environmental accounting practices comes before the implementation, and it is an important factor in deciding the level of integration of environmental accounting practices within the organizational system.

### 5.3 Environmental Accounting and Sustainable Performance

In recent years, there has been growing academic interest in the relationship between environmental accounting and sustainable performance. Previous research indicates that sustainability-oriented organizational practices are associated with stronger long-term performance outcomes (Eccles et al., 2014). More specifically, environmental management accounting has been linked to environmental performance, while recent evidence also suggests that its implementation can contribute to environmental, social, and economic sustainability outcomes (Solovida & Latan, 2017; Amir et al., 2024).

In addition, managerial perception and awareness have been identified as important organizational factors associated with the adoption and effectiveness of environmental accounting practices. Managers who recognize the importance and role of environmental accounting are more likely to support its integration into organizational processes (Gunarathne & Alahakoon, 2016; Solovida & Latan, 2017). However, these studies differ in their focus: some examine the adoption or implementation of environmental management accounting, while others focus primarily on environmental performance or broader sustainability outcomes. Limited empirical attention has been given specifically to the relationship between managerial perception of environmental accounting practices and sustainable performance across its environmental, social, and economic dimensions, particularly within the Libyan industrial context.

### 5.4 Comparative Analysis of Previous Studies

| Methodology                                                                             | Main Variables / Focus                                                                      | Context / Sample                                                                                          | Study                                   |
|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-----------------------------------------|
| Qualitative/exploratory analysis based on authors' experience across several industries | Environmental Management Accounting (EMA) practices and their diffusion                     | Sri Lanka; several locally controlled organizations across apparel, hotels, manufacturing and plantations | Gunarathne & Alahakoon (2016)           |
| Survey; Partial Least Squares with bootstrap testing                                    | Environmental strategy, EMA, environmental performance                                      | Indonesia; managers from ISO 14001-certified listed firms                                                 | Solovida & Latan (2017)                 |
| Longitudinal matched-sample archival study                                              | Corporate sustainability, organizational processes, accounting and stock-market performance | 180 matched U.S. companies; high- vs low-sustainability firms                                             | Eccles, Ioannou & Serafeim (2014)       |
| Quantitative survey; PLS-SEM using SmartPLS                                             | EMA implementation, organizational sustainability, stakeholder integration                  | Pakistan; 267 ISO-certified manufacturing organizations                                                   | Amir, Azhar & Krishnen (2024)           |
| Quantitative questionnaire and regression analysis                                      | Environmental accounting disclosure → sustainable development                               | Libya; National Oil Corporation; 67 valid questionnaires                                                  | Bakir & Abusatala (2026) – NOC study    |
| Descriptive-analytical survey                                                           | Environmental control; environmental accounting practices;                                  | Libya; Ahlia Cement Company; 102 valid questionnaires                                                     | Abusatala & Bakir (2026) – Cement study |

|                                                                                                       |                                                                                       |                                                                          |               |
|-------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|---------------|
|                                                                                                       | sustainable development                                                               |                                                                          |               |
| Cross-sectional quantitative survey; descriptive statistics, correlation and simple linear regression | Managerial Perception of Environmental Accounting Practices → Sustainable Performance | LISCO, Libya; 54 valid responses; purposive sample of relevant personnel | Current Study |

The comparative evidence shows that prior studies differ substantially in their focal variables, contexts, and methodologies. Gunarathne and Alahakoon (2016) focused on the adoption and diffusion of environmental management accounting, whereas Solovida and Latan (2017) examined environmental strategy, EMA, and environmental performance. Eccles et al. (2014) investigated broader corporate sustainability and long-term organizational performance, while Amir et al. (2024) examined actual EMA implementation and organizational sustainability across three dimensions. Libyan studies have mainly focused on environmental disclosure, environmental control, and compliance with environmental accounting practices. In contrast, the present study specifically examines managerial perception of environmental accounting practices and its statistical relationship with sustainable performance and its environmental, social, and economic dimensions within LISCO. Thus, the current study differs from prior research in its focal explanatory construct, organizational context, and the multidimensional specification of sustainable performance.

### 5.5 Theoretical Framework: Stakeholder Theory, Legitimacy Theory, and Institutional Theory

**Stakeholder Theory:** According to Stakeholder Theory, organizations are expected to respond to the interests and expectations of multiple stakeholders, including regulatory authorities, employees, local communities, and other relevant parties (Freeman, 1984; Gray et al., 1995; Deegan, 2002). In the context of this study, managerial perception of environmental accounting practices may influence how management recognizes and responds to stakeholders' environmental, social, and economic expectations. When managers perceive environmental accounting practices as important for identifying environmental costs, improving transparency, and supporting decision-making, they may be more likely to incorporate environmental considerations into organizational processes. Accordingly, Stakeholder Theory provides a theoretical basis for expecting a positive statistical relationship between managerial perception of environmental accounting practices and sustainable performance across its environmental, social, and economic dimensions.

**Legitimacy Theory:** Legitimacy Theory suggests that organizations seek to align their activities with societal norms and expectations in order to maintain legitimacy (Suchman, 1995). For a resource-intensive industrial organization such as LISCO, environmental and social responsibilities are particularly relevant to maintaining societal acceptance. Managerial perception of environmental accounting practices may support greater recognition of

environmental impacts, costs, and accountability requirements. From this perspective, stronger managerial perception may be associated with organizational practices that support environmental responsibility, social accountability, and sustainable economic performance. Therefore, Legitimacy Theory helps explain the expected relationship between managerial perception of environmental accounting practices and sustainable performance.

***Institutional Theory:*** Institutional Theory explains how organizational behavior is shaped by regulatory, normative, and cognitive pressures within the institutional environment (DiMaggio & Powell, 1983). In the Libyan context, where environmental accounting practices operate within an evolving institutional and regulatory setting, managerial perception may represent an important internal cognitive factor shaping how organizations interpret and respond to external sustainability pressures. Managers who recognize the importance, role, and contribution of environmental accounting practices may be more responsive to environmental and sustainability requirements. Institutional Theory therefore provides a theoretical explanation for why managerial perception of environmental accounting practices may be statistically associated with sustainable performance at LISCO.

The use of the three theories is justified by their complementary explanatory roles rather than by treating them as separate descriptive perspectives. Stakeholder Theory explains the external expectations placed on LISCO by regulators, employees, local communities, and other stakeholders; Legitimacy Theory explains why responding to environmental and social expectations is relevant to maintaining societal acceptance; and Institutional Theory explains how such external pressures may be interpreted through managerial perceptions within an evolving institutional environment. Together, these theories provide a complementary basis for expecting a statistical relationship between managerial perception of environmental accounting practices and sustainable performance across its environmental, social, and economic dimensions. Accordingly, this integrated theoretical foundation is used to derive the study's main hypothesis and its three sub-hypotheses.

## **6 .Research Gap and Study Contribution**

Previous studies have examined environmental accounting from several perspectives. Some studies have focused on the adoption and implementation of environmental management accounting practices and have identified managerial awareness and strategic orientation as important factors influencing such practices (Gunarathne & Alahakoon, 2016; Solovida & Latan, 2017). Other studies have concentrated on environmental accounting and disclosure and their relationship with sustainability-related outcomes. In the Libyan context, previous empirical research has also examined environmental accounting disclosure and its relationship with sustainable development, providing evidence of the relevance of environmental accounting to environmental, social, and economic sustainability outcomes.

However, these studies have primarily focused on environmental accounting practices, their implementation, or environmental disclosure, rather than directly examining managerial

perception of environmental accounting practices as the focal explanatory variable and its statistical relationship with sustainable performance. In particular, limited empirical evidence exists on whether managerial perception of environmental accounting practices is associated with sustainable performance at LISCO and with each of its environmental, social, and economic dimensions.

Therefore, the present study addresses this gap by empirically examining managerial perception of environmental accounting practices and its relationship with overall sustainable performance and its environmental, social, and economic dimensions within the specific context of LISCO. The study thus provides case-specific empirical evidence from a resource-intensive Libyan industrial organization, without assuming that its findings are generalizable to the wider Libyan industrial sector.

## **7 .Research Hypotheses**

Based on the integrated theoretical framework, Stakeholder Theory suggests that managerial perception of environmental accounting practices is relevant to responding to environmental, social, and economic stakeholder expectations; Legitimacy Theory supports the expectation that such perception is associated with sustainability-related practices that enhance accountability and societal acceptance; and Institutional Theory explains how managerial perception may shape responses to sustainability pressures within an evolving institutional environment. Together with the empirical evidence reviewed above, these complementary theoretical arguments provide the basis for testing the relationship between managerial perception of environmental accounting practices and overall sustainable performance and each of its environmental, social, and economic dimensions at LISCO. Accordingly, the following null hypotheses are formulated.

### **Sub-Hypotheses:**

H<sub>1</sub>: There is no statistically significant effect of managerial perception of environmental accounting practices on the environmental dimension of sustainable performance.

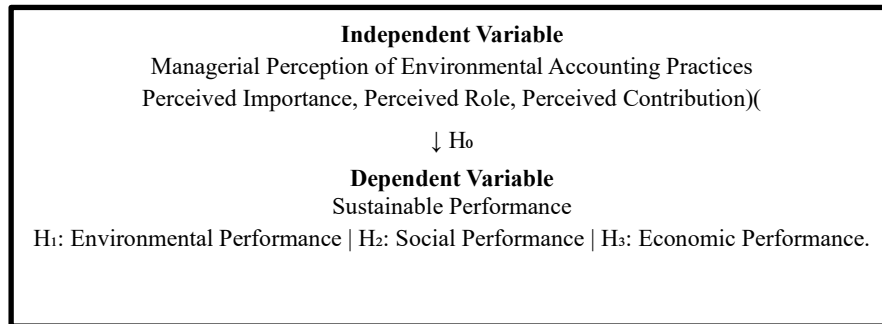
H<sub>2</sub>: There is no statistically significant effect of managerial perception of environmental accounting practices on the social dimension of sustainable performance.

H<sub>3</sub>: There is no statistically significant effect of managerial perception of environmental accounting practices on the economic dimension of sustainable performance.

## **8 .Theoretical Research Model**

Using the theoretical basis and the study hypotheses, the conceptual model is developed to analyze the relationship between managerial perception of environmental accounting practices and sustainable performance at LISCO. Managerial perception of environmental accounting practices is considered the independent variable. Based on the Triple Bottom Line approach, sustainable performance is the dependent variable, which is represented by three dimensions, namely, environmental performance, social performance, and economic performance. The model assumes

a positive association between managerial perception of environmental accounting practices and both overall sustainable performance and its three dimensions.



*Source: Developed by the researcher based on the study hypotheses*

**Figure 1: Conceptual Research Model**

## 9 .Research Methodology

### 9.1 Research Design

In this research, a descriptive-analytical method was used to study the existing level of managerial perception of environmental accounting practices at LISCO and analyze the relationship between managerial perception of environmental accounting practices and sustainable performance with the application of appropriate statistical techniques. A cross-sectional survey design, with data collected at one point in time, is used. The design is suitable for exploratory aims of the study in a context that is not a well-studied one, but it does not allow causal inferences to be drawn; the relationships that are reported are predictive statistical associations.

### 9.2 Population and Sampling.

The target population comprised relevant personnel from five LISCO departments directly involved in financial reporting, environmental impact, and sustainability-related activities: Finance and Accounting, Internal Audit, Environmental Protection, Safety and Occupational Health, and Production Management. To ensure that the respondents had relevant knowledge and experience concerning environmental accounting and sustainability practices, a purposive (non-probability) sampling method was used. This approach was considered appropriate because the study required respondents with direct knowledge of environmental accounting and sustainability-related activities. Their functional involvement in these activities enabled them to provide informed assessments of management's perception of environmental accounting practices at LISCO. A total of 65 questionnaires were purposively distributed to eligible and accessible personnel within the five selected departments. The exact total number and departmental distribution of eligible personnel were not available to the researchers; therefore, participant

selection was based on their direct relevance to the study variables and accessibility within the selected departments. After collecting the data, 54 valid responses were obtained for analysis, yielding a response rate of 83.1%, which exceeds the 70% response-rate benchmark cited by Sekaran and Bougie (2016).

### 9.3 Instrument Design and Validity

A structured questionnaire on a five-point Likert scale with the choices 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree was used to collect primary data. The instrument consisted of 21 items: 15 items measuring managerial perception of environmental accounting practices as the independent variable through three subdimensions: perceived importance, perceived role, and perceived contribution, and six items on sustainable performance in three dimensions (environmental, social, and economic). The managerial perception construct was assessed through respondents' informed evaluations of management's awareness, beliefs, and recognition of environmental accounting practices. To ensure conceptual distinction between the two constructs, the independent-variable items measure managers' perceptions and judgments regarding the importance, role, and expected contribution of environmental accounting practices, whereas the dependent-variable items assess the perceived level of LISCO's sustainable performance across its environmental, social, and economic dimensions. Thus, references to economic, social, or environmental outcomes within the independent variable reflect managers' perceptions of the expected contribution of environmental accounting practices rather than direct measures of sustainable performance. Accordingly, the distinction between the two constructs rests on the referent of measurement: the independent variable assesses managerial judgments about what environmental accounting practices are expected to contribute, whereas the dependent variable assesses the perceived level of sustainable performance demonstrated by LISCO.

Content validity was obtained by literature research and judgment of five experts in the field of accounting and sustainability. The expert panel feedback was considered before data was collected. An exploratory test with eight participants outside the final sample was also carried out to test the clarity and internal consistency of the instrument to ensure that there was no problem with internal consistency before full deployment.

### 9.4 Ethical Considerations

The research in this study was carried out in an ethically accepted manner in relation to research involving human subjects. Before the study, all respondents were informed about the purpose of the study and gave voluntary and informed consent. Throughout the data collection process, anonymity and confidentiality of responses were ensured. The questionnaire instruments did not contain information for identifying the respondents.

## 9.5 Statistical Analysis

The data collected were analyzed with the Statistical Package for the Social Sciences (SPSS). The analytical techniques used were: (a) Cronbach's alpha coefficient was used for reliability; (b) descriptive statistics (mean and standard deviation) were used to summarize the level of managerial perception of environmental accounting practices; (c) one-sample t-test was applied to determine whether the level of managerial perception of environmental accounting practices was significantly different from the neutral scale value of 3; (d) Pearson correlation analysis was applied to examine the bivariate relationship between the main variables; and (e) simple linear regression analysis was used to test the main hypothesis and the three sub-hypotheses. Assumptions of normality of residuals, homoscedasticity, and linearity were checked and found to be met before conducting the regression. The level of significance was  $\alpha = 0.05$ .

## 10. Results and Data Analysis

### 10.1 Response Rate

**Table 1: Distribution and Response Rate of the Study Sample**

| Category                   | Frequency | Percentage |
|----------------------------|-----------|------------|
| Distributed Questionnaires | 65        | 100.0%     |
| Valid Questionnaires       | 54        | 83.1%      |
| Invalid Questionnaires     | 11        | 16.9%      |

*Source: Primary data (2025).*

### 10.2 Reliability Analysis

To assess the internal consistency of the measurement scales, Cronbach's Alpha coefficients were calculated for the main study variables (Cronbach, 1951).

**Table 2: Reliability Analysis of the Study Variables**

| Variable                                                                         | Number of Items | Cronbach's Alpha | Interpretation |
|----------------------------------------------------------------------------------|-----------------|------------------|----------------|
| Managerial Perception of Environmental Accounting Practices (all sub-dimensions) | 15              | 0.88             | Good           |
| Sustainable Performance (all dimensions)                                         | 6               | 0.91             | Excellent      |

*Note: Values above 0.80 reflect high reliability (Hair et al., 2019).*

### 10.3 Descriptive Statistics

This section presents descriptive statistics for the independent variable (managerial perception of environmental accounting practices) and the dependent variable (sustainable performance). The following classification of mean scores was adopted: 1.00–2.49 = Low; 2.50–3.49 = Moderate; 3.50–4.49 = High; 4.50–5.00 = Very High.

**Table 3: Descriptive Statistics – Managerial Perception of Environmental Accounting Practices: Perceived Importance Dimension**

| Item                                                                                                                                                          | Mean        | SD          | Level       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|-------------|
| 1. Top management possesses adequate knowledge of the concept of environmental accounting and its role in measuring and disclosing environmental costs.       | 4.00        | 1.01        | High        |
| 2. Management recognizes that environmental accounting is essential for compliance with local and international laws and regulations.                         | 3.81        | 1.26        | High        |
| 3. Management is aware of the importance of separating environmental costs from general industrial costs in financial reporting.                              | 3.55        | 1.33        | High        |
| 4. Management recognizes that environmental accounting contributes to identifying inefficiencies in the use of natural resources such as energy.              | 3.55        | 1.30        | High        |
| 5. Management believes that environmental accounting provides accurate financial information regarding the environmental impacts of manufacturing operations. | 4.40        | 1.29        | High        |
| <b>Overall – Perceived Importance</b>                                                                                                                         | <b>3.93</b> | <b>0.80</b> | <b>High</b> |

**Table 4: Descriptive Statistics – Managerial Perception of Environmental Accounting Practices: Perceived Role Dimension**

| Item                                                                                                                                                               | Mean        | SD          | Level       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|-------------|
| 1. Management recognizes that costs related to filter maintenance and emission treatment are classified as environmental costs.                                    | 3.80        | 1.17        | High        |
| 2. Management is aware that environmental penalties resulting from pollution negatively affect the company's financial position if not properly accounted for.     | 3.59        | 1.20        | High        |
| 3. Management recognizes that current environmental activities such as water treatment require specialized accounting systems to assess their economic efficiency. | 3.87        | 1.10        | High        |
| 4. Management believes that disclosing environmental performance in annual reports enhances the transparency of financial information for regulatory authorities.  | 4.04        | 1.05        | High        |
| 5. Management is aware that the absence of separate environmental cost items in current accounting records leads to distortions in financial results.              | 3.81        | 1.15        | High        |
| <b>Overall – Perceived Role</b>                                                                                                                                    | <b>3.82</b> | <b>0.78</b> | <b>High</b> |

**Table 5: Descriptive Statistics – Managerial Perception of Environmental Accounting Practices: Perceived Contribution Dimension**

| Item                                                                                                                                                                             | Mean        | SD          | Level       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|-------------|
| 1. Management believes that adopting environmental accounting practices can reduce operational costs in the long term (economic performance).                                    | 3.91        | 1.12        | High        |
| 2. Management believes that environmental accounting practices contribute to improving the company's image within the local community (social performance).                      | 4.00        | 1.05        | High        |
| 3. Management recognizes that providing accurate environmental accounting information supports green investment decisions that enhance organizational sustainability.            | 3.89        | 1.13        | High        |
| 4. Management perceives environmental accounting as a key tool for achieving a balance between production expansion and environmental protection (environmental performance).    | 4.11        | 1.02        | High        |
| 5. Management is aware that implementing environmental accounting practices enhances the company's competitiveness in global markets that impose strict environmental standards. | 3.81        | 1.15        | High        |
| <b>Overall – Perceived Contribution</b>                                                                                                                                          | <b>3.94</b> | <b>0.79</b> | <b>High</b> |

**Table 6: Descriptive Statistics – Sustainable Performance**

| Item                                                                                                      | Mean | SD   | Level         |
|-----------------------------------------------------------------------------------------------------------|------|------|---------------|
| 1. The company is committed to reducing environmental pollution resulting from its operations.            | 4.04 | 1.03 | Environmental |
| 2. The company adopts environmentally responsible practices that minimize negative environmental impacts. | 3.94 | 1.08 | Environmental |
| 3. The company contributes to improving the well-being of the local community.                            | 3.83 | 1.12 | Social        |
| 4. The company is committed to maintaining high standards of employee health and safety.                  | 4.02 | 1.05 | Social        |
| 5. The company efficiently utilizes its resources to improve operational performance.                     | 3.89 | 1.09 | Economic      |
| 6. The company enhances its competitiveness and achieves sustainable financial performance over time.     | 3.96 | 1.07 | Economic      |

The results show that the overall level of managerial perception of environmental accounting practices is high across all three dimensions: perceived importance ( $M = 3.93$ ), perceived role ( $M = 3.82$ ), and perceived contribution ( $M = 3.94$ ). Sustainable performance also achieves an overall high average rating ( $M = 4.08$ ,  $SD = 0.54$ ) for environmental, social, and economic aspects. The standard deviations for all the measures were relatively low, which suggested that responses were consistent and that there was generally agreement on the measures. These results offer initial empirical evidence for the positive association between the study variables as assumed by legitimacy theory.

### 10.4 One-Sample T-Test: Level of Managerial Perception of Environmental Accounting Practices

One-sample t-tests were performed using the test value 3 (neutral midpoint) to determine if there was a difference between the level of managerial perception of environmental accounting practices and the neutral value. The following hypotheses were tested:

T<sub>1</sub> (H<sub>0</sub>): The mean of the perceived importance dimension of environmental accounting practices is not significantly different from the neutral value (3).

T<sub>2</sub> (H<sub>0</sub>): The mean of the perceived role dimension of environmental accounting practices is not significantly different from the neutral value (3).

T<sub>3</sub> (H<sub>0</sub>): The mean of the perceived contribution dimension of environmental accounting practices is not significantly different from the neutral value (3).

**Table 7: One-Sample T-Test Results for the Dimensions of Managerial Perception of Environmental Accounting Practices (Test Value = 3)**

| Dimension              | Mean | SD   | t-value | df | p-value | Decision              |
|------------------------|------|------|---------|----|---------|-----------------------|
| Perceived Importance   | 3.93 | 0.80 | 8.55    | 53 | < 0.001 | Reject T <sub>1</sub> |
| Perceived Role         | 3.82 | 0.78 | 7.73    | 53 | < 0.001 | Reject T <sub>2</sub> |
| Perceived Contribution | 3.94 | 0.79 | 8.75    | 53 | < 0.001 | Reject T <sub>3</sub> |

*Note: df = degrees of freedom. All tests are two-tailed.*

The results indicate that all three dimensions of managerial perception of environmental accounting practices are statistically significantly higher than the neutral value ( $p < 0.001$ ). Accordingly, all three null hypotheses are rejected, confirming that managerial perception of environmental accounting practices is at a statistically significant level above neutral across the dimensions of perceived importance, perceived role, and perceived contribution.

### 10.5 Correlation Analysis

**Table 8: Pearson Correlation Matrix**

| Variable                                                       | 1       | 2       | 3       | 4       | 5     |
|----------------------------------------------------------------|---------|---------|---------|---------|-------|
| 1. Managerial Perception of Environmental Accounting Practices | 1.000   | —       | —       | —       | —     |
| 2. Sustainable Performance (Overall)                           | 0.712** | 1.000   | —       | —       | —     |
| 3. Environmental Performance                                   | 0.681** | 0.874** | 1.000   | —       | —     |
| 4. Social Performance                                          | 0.698** | 0.891** | 0.763** | 1.000   | —     |
| 5. Economic Performance                                        | 0.705** | 0.882** | 0.741** | 0.798** | 1.000 |

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

The findings indicate that there is a strong positive and statistically significant correlation between managerial perception of environmental accounting practices and sustainable performance ( $r = 0.712$ ,  $p < 0.01$ ). Correlations with the individual performance dimensions are also quite high:

environmental ( $r = 0.681$ ), social ( $r = 0.698$ ), and economic ( $r = 0.705$ ). The results of this study support the hypotheses with a high degree of preliminary support.

### 10.6 Hypothesis Testing – Regression Analysis

To test the main hypothesis and each of the three sub-hypotheses, four simple linear regression analyses were performed, using managerial perception of environmental accounting practices as the independent variable and each performance outcome as the dependent variable. Before the analysis, regression assumptions were checked for: residual normality (Shapiro-Wilk  $p > 0.05$ ), homoscedasticity (Breusch-Pagan test  $p > 0.05$ ), and linearity (scatter plots).

**Main Hypothesis ( $H_0$ ):** There is no statistically significant effect of managerial perception of environmental accounting practices on overall sustainable performance.

**Table 9: Regression Results – Main Hypothesis (Dependent Variable: Overall Sustainable Performance)**

|                                                             | $\alpha_0$ (Constant) | B     | $\beta$ (Std.) | SE    | t-value | R <sup>2</sup> | F     | Sig.    |
|-------------------------------------------------------------|-----------------------|-------|----------------|-------|---------|----------------|-------|---------|
| Managerial Perception of Environmental Accounting Practices | 1.321                 | 0.480 | 0.712          | 0.074 | 6.45    | 0.507          | 41.62 | < 0.001 |

*Note: B = unstandardized coefficient;  $\beta$  = standardized coefficient; SE = standard error of B.*

Managerial perception of environmental accounting practices exerts a statistically significant positive effect on overall sustainable performance ( $B = 0.480$ ,  $\beta = 0.712$ ,  $t = 6.45$ ,  $p < 0.001$ ). The model explains 50.7% of the variance in sustainable performance ( $R^2 = 0.507$ ). Accordingly,  $H_0$  is rejected.

**Sub-Hypothesis  $H_{11}$ :** No statistically significant effect of managerial perception of environmental accounting practices on the environmental dimension of sustainable performance.

**Table 10: Regression Results –  $H_{11}$  (Dependent Variable: Environmental Performance)**

|                       | $\alpha_0$ (Constant) | B     | $\beta$ (Std.) | SE    | t-value | R <sup>2</sup> | F     | Sig.    |
|-----------------------|-----------------------|-------|----------------|-------|---------|----------------|-------|---------|
| Managerial Perception | 1.204                 | 0.521 | 0.681          | 0.082 | 6.31    | 0.464          | 39.80 | < 0.001 |

*Note: B = unstandardized coefficient;  $\beta$  = standardized coefficient; SE = standard error of B.*

Managerial perception has a statistically significant positive effect on environmental performance ( $B = 0.521$ ,  $\beta = 0.681$ ,  $t = 6.31$ ,  $p < 0.001$ ,  $R^2 = 0.464$ ). Accordingly,  $H_{11}$  is rejected.

**Sub-Hypothesis  $H_{12}$ :** No statistically significant effect of managerial perception on the social dimension of sustainable performance.

**Table 11: Regression Results – H<sub>2</sub> (Dependent Variable: Social Performance)**

|                                                             | $\alpha_0$ (Constant) | B     | $\beta$ (Std.) | SE    | t-value | R <sup>2</sup> | F     | Sig.    |
|-------------------------------------------------------------|-----------------------|-------|----------------|-------|---------|----------------|-------|---------|
| Managerial Perception of Environmental Accounting Practices | 1.189                 | 0.463 | 0.698          | 0.068 | 6.79    | 0.487          | 46.12 | < 0.001 |

Note: B = unstandardized coefficient;  $\beta$  = standardized coefficient; SE = standard error of B.

Managerial Perception of Environmental Accounting Practices has a statistically significant positive effect on social performance (B = 0.463,  $\beta$  = 0.698, t = 6.79, p < 0.001, R<sup>2</sup> = 0.487). Accordingly, H<sub>2</sub> is rejected.

**Sub-Hypothesis H<sub>3</sub>:** No statistically significant effect of managerial perception of environmental accounting practices on the economic dimension of sustainable performance.

**Table 12: Regression Results – H<sub>3</sub> (Dependent Variable: Economic Performance)**

|                                                             | $\alpha_0$ (Constant) | B     | $\beta$ (Std.) | SE    | t-value | R <sup>2</sup> | F     | Sig.    |
|-------------------------------------------------------------|-----------------------|-------|----------------|-------|---------|----------------|-------|---------|
| Managerial Perception of Environmental Accounting Practices | 1.246                 | 0.457 | 0.705          | 0.065 | 7.02    | 0.497          | 49.29 | < 0.001 |

Note: B = unstandardized coefficient;  $\beta$  = standardized coefficient; SE = standard error of B.

Managerial Perception of Environmental Accounting Practices has a statistically significant positive effect on economic performance (B = 0.457,  $\beta$  = 0.705, t = 7.02, p < 0.001, R<sup>2</sup> = 0.497). Accordingly, H<sub>3</sub> is rejected.

**Table 13: Summary of Hypothesis Testing Results**

| Hypothesis     | Relationship Tested                                                                           | B     | $\beta$ | R <sup>2</sup> | Sig.    | Decision |
|----------------|-----------------------------------------------------------------------------------------------|-------|---------|----------------|---------|----------|
| H <sub>0</sub> | Managerial Perception of Environmental Accounting Practices → Overall Sustainable Performance | 0.480 | 0.712   | 0.507          | < 0.001 | Rejected |
| H <sub>1</sub> | Managerial Perception of Environmental Accounting Practices → Environmental Performance       | 0.521 | 0.681   | 0.464          | < 0.001 | Rejected |
| H <sub>2</sub> | Managerial Perception of Environmental Accounting Practices → Social Performance              | 0.463 | 0.698   | 0.487          | < 0.001 | Rejected |
| H <sub>3</sub> | Managerial Perception of Environmental Accounting                                             | 0.457 | 0.705   | 0.497          | < 0.001 | Rejected |

| Hypothesis | Relationship Tested              | B | $\beta$ | R <sup>2</sup> | Sig. | Decision |
|------------|----------------------------------|---|---------|----------------|------|----------|
|            | Practices → Economic Performance |   |         |                |      |          |

## 11 .Discussion

This study's results indicate that managerial perception of environmental accounting practices has a significant positive relationship with sustainable performance at LISCO across its environmental, social, and economic dimensions. The regression coefficients and explained variance values further suggest that managerial perception of environmental accounting practices is not merely a cognitive consideration but may also be relevant to how environmental accounting information is incorporated into sustainability-related decision-making. Accordingly, the findings support the view that environmental accounting can serve as a management-oriented information tool associated with sustainability outcomes.

The findings are broadly consistent with previous empirical research. Eccles et al. (2014) found that firms with stronger sustainability-oriented policies exhibited distinct organizational processes and better long-term stock market and accounting performance than firms with limited sustainability policies. More specifically to environmental accounting, Solovida and Latan (2017) demonstrate the important role of environmental management accounting in linking environmental strategy with environmental performance. Gunarathne and Alahakoon (2016) further highlight the role of environmental management accounting as an interface between management accounting and environmental management and as an information tool supporting environmental management and decision-making. These studies provide a relevant empirical basis for interpreting the positive relationship identified in the present study, while recognizing that the current study specifically examines managerial perception of environmental accounting practices rather than the actual implementation of environmental management accounting systems.

In the specific context of LISCO, this relationship may be explained by the resource-intensive nature of iron and steel production, where environmental issues are closely connected to resource use, environmental costs, pollution control, and production efficiency. Respondents reporting stronger managerial perception of the importance, role, and contribution of environmental accounting practices may therefore reflect a management environment that is more attentive to incorporating environmental information into sustainability-related considerations. This interpretation is supported by Shaaban and Al-Qusair (2017), who found, specifically in the context of LISCO, evidence of awareness of environmental management accounting and its perceived potential contribution to competitive advantage. Further contextual support is provided by Bakir and Abusatala (2026), who found a positive and statistically significant relationship between environmental accounting disclosure and sustainable development within Libya's National Oil Corporation, with environmental accounting disclosure explaining 50.7% of the variance in sustainable development. Although their study examined environmental accounting disclosure

rather than managerial perception, its findings provide relevant evidence from the Libyan resource-intensive context concerning the relationship between environmental accounting-related practices and environmental, social, and economic sustainability outcomes. These contextual and empirical considerations may help explain the significant association observed between managerial perception of environmental accounting practices and sustainable performance at LISCO.

The findings may also be interpreted in light of the institutional characteristics of the Libyan context. In an environment where formal environmental accounting and sustainability-related practices are still evolving, managerial understanding and attention to environmental information may assume particular relevance in sustainability-related decision-making. In this context, managerial perception may serve as an important internal mechanism through which environmental accounting information is recognized and considered alongside environmental, social, and economic concerns. However, this interpretation should be understood as contextual rather than causal, given the cross-sectional design of the present study.

From a theoretical perspective, the findings are consistent with Legitimacy Theory (Suchman, 1995), which emphasizes the importance of alignment between organizational activities and societal expectations in maintaining legitimacy. In the LISCO context, attention to environmental accounting information may contribute to greater transparency and accountability regarding environmental responsibilities. The findings can also be interpreted through Stakeholder Theory (Freeman, 1984), since greater managerial attention to environmental accounting information may facilitate responsiveness to the expectations of relevant stakeholders, including regulators, employees, local communities, and other interested parties. Institutional Theory (DiMaggio & Powell, 1983) provides an additional perspective by explaining how institutional pressures may shape organizational practices and responses. Taken together, these theoretical perspectives provide complementary explanations for the observed relationship between managerial perception of environmental accounting practices and sustainable performance, without implying causality beyond what can be established by the study design.

Finally, the regression results indicate relatively similar associations across the three dimensions of sustainable performance, with standardized coefficients ranging from  $\beta = 0.681$  to  $\beta = 0.712$ . This suggests that the relationship between managerial perception of environmental accounting practices and sustainable performance is not confined to the environmental dimension but extends to the social and economic dimensions examined in the study. From a theoretical perspective, this pattern is consistent with the holistic logic of the Triple Bottom Line framework (Elkington, 1997), which conceptualizes sustainability through the integration of environmental, social, and economic dimensions. In the context of LISCO, the findings therefore suggest that managerial perception of environmental accounting practices is associated with sustainability outcomes across all three dimensions rather than with environmental performance alone.

## 12 .Conclusion

The study examined the relationship between managerial perception of environmental accounting practices and sustainable performance at LISCO. The findings provide empirical evidence of a positive and statistically significant relationship between managerial perception of environmental accounting practices and sustainable performance across all three dimensions—environmental, social, and economic. The relatively similar regression results across these dimensions further indicate that the observed relationship is not limited to one aspect of sustainable performance. Overall, the findings highlight the relevance of managerial perception of environmental accounting practices to sustainable performance within the specific context of LISCO. Accordingly, these findings should be interpreted as context-specific evidence from LISCO and should not be generalized to other Libyan industrial companies or emerging economies without further empirical investigation.

From a theoretical perspective, the findings are consistent with the theoretical framework adopted in the study. They are compatible with Legitimacy Theory in emphasizing the relevance of environmental considerations to societal expectations, and with Stakeholder Theory in recognizing the importance of environmental information in addressing stakeholder concerns. The findings can also be interpreted through Institutional Theory, which provides a contextual perspective for understanding environmental accounting practices within evolving institutional environments. These theoretical interpretations are intended to explain the observed relationships rather than represent additional relationships tested statistically in the study.

From a practical perspective, given the high level of managerial perception of environmental accounting practices and the significant positive relationship identified with sustainable performance, LISCO should build on this existing awareness by moving toward greater practical integration of environmental accounting practices into its accounting and sustainability-related processes. Particular attention should be given to the systematic measurement, documentation, and use of environmental accounting information in decision-making. This recommendation is consistent with the study findings and does not imply a deficiency in managerial awareness; rather, it emphasizes translating the existing level of perception into more structured practical application.

The findings of this study should be interpreted within its methodological and contextual boundaries. The cross-sectional design provides evidence of statistical relationships between the study variables but does not establish causal relationships. Furthermore, the study was conducted within a single organization using a relatively small purposive, non-probability sample; therefore, the findings are primarily applicable to the specific context of LISCO and should be generalized to other organizations with caution. The reliance on self-reported perceptual data may also introduce potential common method bias, as both the independent and dependent variables were measured using the same questionnaire. In addition, sustainable performance was assessed through perceptual measures rather than objective performance indicators and using a concise six-item scale covering the environmental, social, and economic dimensions. Although the items were

selected based on their relevance to the study context and subjected to expert review, the measure was intended to capture key dimensions of sustainable performance rather than provide an exhaustive assessment of all sustainability indicators.

Future studies are encouraged to include multiple organizations and sectors and adopt longitudinal approaches to examine changes over time. Future research may also consider factors such as organizational culture, regulatory quality, and governance mechanisms to provide a broader understanding of sustainable performance. Comparative studies between developing and developed economies may further clarify the role of institutional and contextual differences.

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