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# Examining the Moderating Effect of Organizational Leadership between Management Accounting on Environmental Performance

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**ABSTRACT**

This study explores the impact of management accounting (MA) on environmental performance, considering the moderating effect of organizational culture. The research focused on 33 industrial companies in Jordan, as listed on the Securities Depository Center's website. A structured questionnaire was developed and distributed to key personnel within each company, including the general manager, financial manager, head of the accounting department, and several accountants. A total of 298 questionnaires were distributed, with five allocated to each company. Of the responses received, 255 questionnaires were deemed valid for statistical analysis after excluding five due to duplicate responses. The study adopted a descriptive correlational methodology aimed at examining and interpreting the nature and strength of relationships among the variables. The results revealed statistically significant effects of MA on environmental performance, of MA on organizational culture, and of organizational leadership on environmental performance. Based on these findings, the researchers recommend enhancing employee engagement in formulating environmental policies and implementing incentive programs to improve environmental outcomes.

**Keywords:** Management Accounting, Environmental Performance, Organizational Leadership.

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## 1. Introduction

In the face of increasing environmental problems afflicting organizations today, the development of traditional accounting tools to integrate environmental considerations has become indispensable. Management Accounting (MA) constitutes a fundamental pillar in modern organizational strategies, contributing to achieving harmony between enhancing long-term economic efficiency and reducing negative environmental footprint. By monitoring hidden costs associated with excessive resource consumption or harmful emissions, this tool enables organizations to make informed decisions that enhance operational efficiency and reduce waste, positively impacting both financial viability and environmental sustainability simultaneously (Schaltegger et al., 2016).

Through management accounting, organizations can achieve a balance between profitability and environmental sustainability, as it helps them make strategic decisions that contribute to waste reduction, decreased resource consumption, and the development of environmentally friendly technologies. Furthermore, reliance on this accounting enhances organizational transparency and reflects its commitment to environmental responsibility, which boosts its image among investors and customers who value environmental sustainability (Burritt & Schaltegger, 2010).

Environmental performance has become a core focus for evaluating the environmental impact of activities. Environmental performance involves measuring the efficiency of human activities' impact on the environment, with the aim of taking corrective actions that enhance environmental sustainability and achieve a balance between economic growth requirements and ensuring the preservation of environmental balance (Dangelico & Pujari, 2018). Organizational leadership is considered a fundamental element within an organization, where managers are entrusted with tasks such as developing it and guiding its activities. It is known that beliefs and values define the approach through which employees think, act, and feel, and influence how they deal with challenges and situations within the organization (Robbins & Coulter, 2018).

Management accounting is considered an essential means to improve environmental performance within organizations and institutions, as it contributes to guiding the decision-making process in line with environmental objectives. Management accounting enhances the ability to measure and identify environmental costs, enabling institutions to manage their resources efficiently and reduce waste, thereby improving their environmental performance. The effectiveness of applying management accounting depends significantly on the prevailing organizational leadership within the institution; the presence of an organizational leadership that supports environmental values and sustainability increases the efficiency of environmental accounting and strengthens commitment to sustainable practices. Therefore, the positive mutual impact between management accounting and environmental performance is stronger when supported by an organizational leadership that values the environment and encourages environmental innovation (Schaltegger & Burritt, 2017). Based on the foregoing, this study aims to investigate the importance of the impact of using management accounting on environmental performance, considering the moderating role of organizational culture.

## 2. Study Problem and Questions

The study focuses on analyzing the nature of the interaction between management accounting applications and the level of environmental performance of institutions, while exploring the moderating role of organizational leadership in enhancing or hindering this interaction. In light of escalating global environmental challenges and tightening regulations on sustainability, institutions face difficulty in reconciling the pursuit of profitability with the reduction of their environmental footprint. Here, management accounting emerges as a mechanism to measure costs associated with environmental activities (such as resource consumption or pollution), enabling institutions to make proactive decisions that reduce waste and improve environmental efficiency without neglecting economic viability.

However, the effectiveness of this mechanism does not depend solely on the accuracy of accounting tools but also on the nature of the organizational leadership within the institution. According to recent studies, organizations with an organizational environment that supports environmental values (such as social responsibility and transparency) succeed in utilizing environmental accounting to achieve tangible results, such as reducing emissions or improving waste management (Schaltegger & Burritt, 2017). In this context, research by Epstein & Buhovac (2023) confirms that an organizational leadership that prioritizes sustainability facilitates the adoption of advanced environmental accounting practices and enhances employee interaction with green initiatives, which positively reflects on overall environmental performance.

In light of the above, the study seeks to answer the following questions:

1. Is there a statistically significant effect between management accounting and the environmental performance of Jordanian industrial companies?
2. Is there a statistically significant effect of organizational leadership on the environmental performance of Jordanian industrial companies?
3. Is there a moderating effect of organizational leadership on the relationship between management accounting and environmental performance in industrial companies in Jordan?

## 3. Objectives of the Study

The study seeks to achieve the following objectives:

1. Identify the impact of management accounting and environmental knowledge management practices on environmental performance.
2. Identify the impact of using management accounting on the environmental performance of institutions.
3. Identify the impact of effective environmental knowledge management practices that can contribute to improving environmental performance.
4. Identify the impact of organizational leadership on the effect of management accounting and environmental knowledge management on environmental performance.

## 4. Literature Review

Recent studies have shown increasing interest in analyzing the interaction between management accounting systems, environmental performance, and organizational culture, as these axes are fundamental to understanding the mechanisms for achieving sustainability in industrial and service sectors. In this context, a study by (Mutawali, 2022) provided an in-depth analysis of the impact of applying environmental accounting practices on enhancing operational efficiency and reducing negative environmental impacts. The study adopted a field methodology that included a diverse sample of companies, using advanced statistical tools to measure the relationship between adopting green accounting systems and sustainability levels. The results revealed a positive correlation between the use of environmental accounting tools and improved environmental performance, as this contributed to reducing energy consumption rates and operational waste, which reflected on cost reduction and increased long-term competitiveness. The study also highlighted the necessity of generalizing the application of these systems to companies that have not yet adopted them, especially small and medium-sized enterprises, with a focus on raising awareness of the importance of environmental accounting as a strategic tool for achieving a balance between profitability and the preservation of natural resources.

The study by Bresciani et al. (2023) aimed to explore the impact of Management Accounting (MA) and Environmental Knowledge Management (KM) practices on environmental performance, examining the moderating role of Top Management Support (TMS) and the enhancing effect of Green Work Climate Perception (GWCP) on the relationship between TMS and environmental performance. Data were collected via 329 questionnaires using partial structural equation modeling and multiple regression analysis. The results showed that EMA, KM, and TMS are positively associated with environmental performance, with GWCP enhancing the relationship between TMS and environmental performance. The study recommends increasing focus on management support and green work climate to improve environmental performance.

From another perspective, the study by Selim et al. (2021) aimed to explore the impact of applying management accounting on environmental performance and the competitiveness of petroleum sector companies. The study adopted a field approach that involved collecting data through questionnaires and personal interviews with company managers and environmental officials. The results showed that environmental accounting plays a prominent role in improving companies' environmental performance by reducing waste and decreasing energy consumption, which contributes to reducing environmental costs. The study also confirmed that the application of these systems contributes to enhancing competitiveness by improving companies' reputation and increasing their ability to adapt to environmental legislation. Based on these results, the study recommended the necessity of expanding the scope of environmental accounting application in petroleum sector companies to support environmental sustainability and achieve a sustainable competitive advantage.

Similarly, the study by Mubarak et al.(2017) aimed to assess the impact of developing management accounting on sustainable development requirements in the petroleum sector in Kuwait. The study sought to clarify the extent to which management accounting contributes to achieving sustainable development, with data collected through questionnaires distributed to employees in the Kuwaiti petroleum sector. The results showed a positive relationship between the development of management accounting and the achievement of sustainable development, confirming the importance of this accounting in supporting the sector's long-term environmental goals. The study recommended the necessity of organizing local and international conferences to enhance awareness of the importance of management accounting and highlight its dimensions and role in sustainable development, in addition to encouraging institutions to adopt these practices to achieve sustainable environmental benefits.

Likewise, the study by Hadid & Al-Sayed (2021) aimed to understand the role of management accountants' networks, accounting information systems, and organizational leadership in supporting strategic management accounting practices. The study was conducted on 149 industrial business units in the UK using partial structural equation modeling. The results found that accountants' networks and information systems effectively support SMA. The study recommends encouraging information integration between accountants and information systems to enhance strategic practices.

The study by Pratiwi et al. (2020) aimed to analyze the role of environmental accounting practices in enhancing companies' ability to achieve sustainability goals through improved environmental and financial performance. The study confirmed that management accounting significantly contributes to improving resource efficiency and reducing environmental costs, which enhances companies' sustainable performance in the long term. The study population included companies from multiple sectors adopting environmental accounting practices, including companies of different sizes that apply environmental sustainability strategies. Data were collected through questionnaires directed to environmental accounting officials and top management members, and analytical methods such as regression analysis were used to study the relationship between management accounting and corporate sustainability. The results confirmed the necessity of integrating environmental accounting into corporate strategies to ensure the achievement of sustainable environmental and financial sustainability.

Saeidi et al. (2018) discussed the relationship between environmental innovation and companies' financial performance, focusing on the role of management accounting as a moderating factor that enhances this impact. The study clarified that environmental innovation, through the development of environmentally friendly products and processes, contributes to improving companies' financial performance by enhancing operational efficiency and reducing environmental costs. It also indicated that management accounting provides effective tools for systematically evaluating and monitoring environmental costs. The study included companies from industrial and service sectors facing environmental challenges, such as manufacturing and energy, and relied on a sample of large and medium-sized companies. Data were collected through questionnaires and secondary data, and analytical methods, such as regression analysis and the study of moderating effects, were used to understand the relationship between variables. The results confirmed the importance of integrating management accounting practices within companies' strategies to improve their financial performance and enhance their competitiveness.

Researchers Solovida & Latan (2017) discussed the relationship between corporate environmental strategy and its environmental performance level, focusing on the mediating role of management accounting. The study addressed how companies integrate effective environmental strategies into their operational and administrative processes and the impact of this on improving their environmental performance. The results indicated that management accounting plays a pivotal role as a mediator contributing to transforming environmental strategies into tangible results by providing accurate information that supports environmental decision-making and performance evaluation. The study also highlighted the importance of adopting environmental accounting tools, such as measuring environmental costs and preparing comprehensive environmental reports, to achieve a sustainable balance between companies' economic and environmental objectives. Overall, the study presented an integrated model linking environmental strategy, management accounting, and environmental performance with the aim of supporting sustainable development.

### 4.1. Environmental Performance Concept

Environmental performance is considered a vital pillar within the framework of corporate social responsibility, adopting a strategic approach based on innovation and efficiency to achieve operational excellence, with the aim of mitigating the negative impact of products on the environment throughout all stages of their life cycle. The application of management

systems and total quality management contributes to enhancing sustainable control over operational practices, which helps reduce harmful emissions and effectively manage waste, reflecting positively on environmental protection and ensuring stakeholder interests, in addition to building trust with external partners such as investors and local communities.

Environmental performance according to (Ghiu & Hsieh, 2016) is also defined as the organization's ability to reduce the use of toxic materials and decrease pollutants resulting from its activities, whether gaseous (like air emissions), solid (like manufacturing waste), or liquid (like water waste), which contributes to achieving a balance between economic objectives and environmental commitments. Environmental performance activities are divided into preventive environmental activities, monitoring and evaluation environmental activities, and treatment environmental activities according to their objectives.

1. **Preventive environmental activities:** These are activities aimed at limiting the causes of negative environmental impacts, such as designing production processes to reduce waste and harmful emissions and installing modern machinery.
2. **Environmental monitoring and evaluation activities:** This section aims to monitor potential sources of environmental harm and cooperate with relevant government agencies concerned with environmental protection.
3. **Environmental restoration activities:** Activities aimed at repairing damages, for example, by treating waste safely or recycling it appropriately (Lundgren & Zhou, 2017).

**4.2. Importance of Environmental Performance** Effective environmental practices are considered one of the strategic pillars that determine the success of companies and institutions, as they are closely linked to achieving a balance between economic objectives and social and environmental commitments. By adopting environmental sustainability strategies, companies that implement systematic environmental policies contribute to protecting natural resources and limiting the negative environmental footprint of their activities, such as water depletion or air pollution. The benefit of these practices is not limited to the present; they also contribute to ensuring the continuity of natural resources and preventing their depletion for future generations, which enhances the concept of "sustainable development" as a bridge between the present and the future (Jalil et al., 2016).

**4.3. Relationship of Environmental Performance to the Value of Industrial Companies** The costs that companies incur during their activities affect their financial performance, as they seek to achieve good financial performance by achieving efficiency at the lowest possible cost. Therefore, the costs of improving environmental performance, like other costs, affect the company's financial performance (Basile, 2024). Academic evidence indicates that good environmental performance enhances company value in multiple ways. For example, a study by Konadu (2018) showed that institutions adopting effective management practices experience improved financial performance and market reputation. The study confirmed that environmental improvements lead to increased investor and customer satisfaction, which positively impacts market value.

**4.4. Concept of Organizational leadership** Organizational leadership is the valuable and intellectual framework that shapes the organization's identity, through a pattern of collective ideals, beliefs, and behaviors that define the nature of individuals' interactions within it with each other and with external parties. This leadership fundamentally influences the shaping of the work environment, as a strong and clear leadership contributes to creating a positive climate that stimulates innovation, enhances teamwork, and supports the effective exchange of ideas. In organizations with a well-established organizational culture, these shared values transform into a driver for embracing change and building bridges of trust with customers and partners, which translates into integrated institutional performance (Paais & Pattiruhu, 2020).

**4.5. Factors Affecting Organizational leadership** It consists of values, beliefs, and customs that influence how individuals interact within the organization and with external parties. Organizational cultures differ from one institution to another based on several factors such as leadership, organizational structure, adopted strategies, and the personal values of employees, in addition to the economic and social environment. Understanding these factors helps in improving organizational performance and achieving desired goals by fostering a strong and robust organizational culture.

By analyzing the most prominent previous literature, it becomes clear that the vast majority of studies confirmed a positive relationship between the application of management accounting practices and an increased level of environmental performance of institutions, in addition to the role of organizational leadership in enhancing the interaction between these axes. Research found that adopting accounting systems that consider environmental aspects contributes to improving

operational efficiency, reducing carbon footprint, and rationalizing resource use, which reflects on enhancing organizations' competitive advantage. In the same context, the results of these studies showed that an organizational leadership supporting sustainability is considered a pivotal factor in the successful application of environmental policies, as it contributes to creating a work environment that stimulates innovation and supports employee commitment to green goals. Based on this, these results highlight the importance of studying these variables in the Jordanian industrial sector, which faces increasing environmental and economic challenges, making it an ideal environment for measuring the impact of adopting environmental accounting practices on achieving a balance between profitability and environmental responsibility.

## 5. Study Hypotheses

In light of the foregoing, the following study hypotheses were formulated:

- **H01:** There is no statistically significant effect between management accounting and environmental performance in Jordanian industrial public shareholding companies.
- **H02:** There is no statistically significant effect of organizational leadership on the environmental performance of Jordanian industrial companies.
- **H03:** There is no moderating effect of organizational leadership on the relationship between management accounting and environmental performance in industrial companies in Jordan.

## 6. Study Methodology

To achieve the objectives of this study, which seeks to reveal the impact of using management accounting on environmental performance with the moderating role of organizational culture, the study adopted a descriptive correlational approach that focuses on describing and interpreting the nature of the relationship between variables and how they influence each other. Data were collected using a "questionnaire" as the main tool, where the researcher developed its items to suit the study's objectives, based on previous studies that dealt with relevant variables. The following table shows the sections of the tool, the number of its items, and the references used in its development.

To measure participants' attitudes towards the study items and variables, a five-point Likert scale was used, with responses coded as follows: (5) Strongly Agree, (4) Agree, (3) Moderately Agree, (2) Disagree, (1) Strongly Disagree. To analyze the data and describe the mean values, the researchers relied on the range equation to calculate the class length according to the following formula: Range = (Highest value in the scale - Lowest value in the scale) / Number of corrected levels. Thus, the range value = (5-1)/3 = 1.33, and the mean values can be classified as follows:

1. Low level: The mean value is equal to or less than (2.33).
2. Medium level: The mean values range between (greater than 2.33 - less than or equal to 3.67).
3. High level: The mean values exceed (3.67).

### 6.1. Study Population and Sample

The study population consists of industrial companies in Jordan, totaling (33) companies (according to the website of the Securities Depository Center). The researchers developed and designed the study tool using Google Forms and distributed it electronically, with six questionnaires per company and a total of (298) questionnaires. questionnaires were retrieved, all of which were valid for statistical analysis except for (5) questionnaires that included duplicate responses. Thus, the number of questionnaires valid for statistical analysis was (255) questionnaires. The sampling unit consisted of employees in industrial companies in Jordan under the following job titles: General Manager, Financial Manager, Head of Accounting Department, and Accountant. The following table illustrates the distribution of study sample individuals according to their personal and job data.

**Table 1.** Distribution of study sample individuals according to their personal and job data

| Variable | Category | Count | Percentage (%) |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Educational Qualification | Diploma | 11 | 4.5 |
| | Bachelor's | 193 | 78.1 |
| | Master's | 37 | 15 |
| | Doctorate | 14 | 2.4 |
| Specialization | Accounting | 126 | 51 |
| | Accounting and Business Law | 61 | 24.7 |
| | Accounting Information Systems | 46 | 18.6 |
| | Other | 22 | 5.7 |
| Years of Experience | Less than 5 years | 57 | 23.1 |
| | From 5 years to less than 10 years | 78 | 31.6 |
| | From 10 years to less than 15 years | 100 | 37.2 |
| | More than 15 years | 20 | 8.1 |
| Job Title | General Manager | 21 | 8.5 |
| | Financial Manager | 36 | 14.6 |
| | Head of Accounting Department | 52 | 17.8 |
| | Accountant | 146 | 59.1 |
| Environmental Courses | Management Accounting Course | 15 | 6.1 |
| | General Management Course | 27 | 7.7 |
| | Sustainability and Management Course | 39 | 15.8 |
| | Other | 174 | 70.4 |

The results in Table (1) show the following: Data indicates that the majority of the study sample individuals hold a Bachelor's degree with a large percentage of (78.1%), reflecting that the largest category of participants are primarily university graduates. While the category of Master's degree holders came in second with a percentage of (15%), indicating the presence of a smaller segment with an advanced educational level. As for Doctorate holders, they had the lowest participation rate at (2.4%), which reflects the scarcity of this category in the sample, and this may be due to the nature of the institutions or sectors from which the data was collected, which are perhaps more practical than academic.

Data indicates that the majority of the study sample individuals were from accounting specialization with 51%, which is logical given the study's topic related to management accounting, reflecting significant representation of key specialists. This was followed by the Accounting and Business Law category with 24.7%, indicating increasing interest in the overlap between accounting and legal aspects in business. While the percentage of other specializations was the least represented at 5.7%, reflecting the study's focus on specific specializations.

Regarding years of experience, the data showed that the most represented category is employees with 10 years to less than 15 years of experience, at 37.2%, indicating that the sample focuses on a category with sufficient professional experience to understand and apply environmental accounting practices. This was followed by the category of 5 to less than 10 years with 31.6%, indicating good representation of employees with medium experience. While the least represented category was 15 years or more, at 8.1%, which may reflect the limited number of employees with long experience in the study field.

As for job title, the largest percentage was for accountants at 59.1%, which aligns with the study's focus on the daily operations of environmental accounting. They were followed by heads of accounting departments at 17.8%, a category responsible for supervising and implementing accounting policies. General managers had the lowest percentage at 8.5%, indicating their strategic role compared to field accountants.

Regarding the environmental courses variable: The highest percentage of the study sample received other unmentioned courses, with a frequency of (174) and a percentage of (70.4%). This was followed by those who obtained the "Sustainability and Management" course, with a frequency of (39) and a percentage of (15.8%). The number of those who obtained the " Management Accounting" course was the lowest, with a frequency of (15) and a percentage of (6.1%).

**6.2. Validity and Reliability of the Study Tool** After developing and formulating the study tool in its preliminary form, its validity and reliability must be tested, as follows:

**6.3. First: Validity of the Study Tool** The researchers tested the validity of the study tool in its preliminary form, which consisted of 28 items, by distributing it to a number of faculty members at Al al-Bayt University and other Jordanian universities, to provide their observations and modifications regarding the linguistic and scientific soundness of the questionnaire items and to ensure that they express the variable to which they belong and achieve its objective. The reviewers' modifications included rephrasing some items and deleting others. The researcher made the necessary adjustments based on the reviewers' suggestions and subsequently verified its reliability.

**6.4. Second: Reliability of the Study Tool** The questionnaire was distributed to a pilot sample outside the actual sample and from the study population, consisting of (30) employees, to test the reliability of the tool, by extracting the internal consistency coefficient Cronbach's Alpha. The value is statistically acceptable if the coefficient value is greater than (0.70) (Bonett & Wright, 2015). Table (2) presents the values of Cronbach's Alpha coefficients for the study variables and the total score.

**Table 2.** Reliability of the Study Tool

| Variable | Number of Items | Cronbach's Alpha Coefficient |
|---|---|---|
| Independent Variable: Management Accounting | 11 | 0.735 |
| Dependent Variable: Environmental Performance | 10 | 0.821 |
| Moderating Variable: Organizational Culture | 7 | 0.798 |
| Total Score | 28 | 0.907 |

**6.5. Statistical Analysis and Study Results First Hypothesis:** "There is no statistically significant effect at the level of ($\alpha \leq 0.05$) for management accounting on environmental performance in Jordanian industrial public shareholding companies."

**Table 3.** Means and Standard Deviations for the Independent Variable " Management Accounting" Items (n=255)

| Item No. | Item | Mean | Standard Deviation | Rank | Level |
|---|---|---|---|---|---|
| 1 | Losses such as water, energy, and fuel are estimated. | 3.68 | 1.04 | 4 | High |
| 2 | Energy consumption is measured. | 3.86 | 1.06 | 1 | High |
| 3 | The cost of water used is estimated. | 3.71 | 1.04 | 3 | High |
| 4 | Recyclable materials and products, and waste such as crop residues, fertilizers, and remaining pesticides, are identified. | 3.67 | 0.89 | 5 | High |

| | | | | | |
|---|---|---|---|---|---|
| 5 | The quantity of water consumption is measured. | 3.84 | 0.93 | 2 | High |
| 6 | The cost of water recycling is measured. | 3.6 | 0.98 | 6 | Medium |
| 7 | The quality of water used in the environment is evaluated. | 3.54 | 0.63 | 8 | Medium |
| 8 | The quantity of reusable water is identified. | 3.59 | 0.81 | 7 | Medium |
| 9 | The use and reuse of packaging materials and boxes are recognized. | 3.51 | 0.84 | 9 | Medium |
| 10 | The cost of air, water, and soil pollution factors is determined. | 3.41 | 0.83 | 11 | Medium |
| 11 | Emissions such as water, energy, and fuel are estimated. | 3.48 | 0.72 | 10 | Medium |
| | Management Accounting | 3.63 | 0.29 | --- | Medium |

The results in Table (3) revealed that the level of management accounting practice in Jordanian industrial companies was medium, with a mean of (3.63) and a standard deviation of (0.29). This reflects these companies' interest in environmental issues and their awareness of the impact of these issues on their performance. The means for the items of this variable ranged between (3.41) and (3.86). The item "Energy consumption is measured" ranked first with a mean of (3.86) and a high level. The item "The quantity of water consumption is measured" came in second place with a mean of (3.84) and a high level. The item "The cost of water used is estimated" ranked third with a mean of (3.71) and a high level. While the item "The cost of air, water, and soil pollution factors is determined" came in last place with a mean of (3.41) and a medium level.

To uncover whether there is a statistically significant effect at a significance level of ($\alpha \leq 0.05$) for management accounting on environmental performance in Jordanian industrial public shareholding companies, simple regression analysis was performed. The following table presents the results of the analysis, which will clarify the extent of the impact and the strength of the relationship between management accounting and environmental performance.

**Table 4.** Summary of the First Main Hypothesis Model

| Correlation Coefficient R | $R^2$ Coefficient of Determination | Adjusted $R^2$ Coefficient of Determination | Standard Error |
|---|---|---|---|
| 0.708 | 0.502 | 0.5 | 0.32349 |

It is clear from the results in the previous table that the correlation coefficient value (0.708) indicates a strong positive relationship between the independent variable " Management Accounting" and the dependent variable "Environmental Performance". Furthermore, the $R^2$ coefficient of determination reached (0.502), which indicates that 50.2% of the change in environmental performance can be explained by the change in the independent variable Management Accounting, while 49.8% of the change is due to other factors not included in the study. These results reflect the significant importance of management accounting in improving the environmental performance of industrial companies and indicate the necessity of enhancing the adoption of these practices to achieve more sustainable environmental results.

**Table 5.** ANOVA Test Results for the First Main Hypothesis

| Model | Sum of Squares | Degrees of Freedom | Mean Square | F-value | Sig. |
|---|---|---|---|---|---|
| Regression | 25.827 | 1 | 25.827 | 246.811 | 0 |
| Residual | 25.638 | 245 | 0.105 | | |
| Total | 51.465 | 246 | | | |

It is clear from the results in Table (5) that there is a statistically significant effect at the level of ($\alpha \leq 0.05$) for management accounting on environmental performance in industrial companies in Jordan. This conclusion was based on the F-value of (246.811), which is statistically significant at a level less than 0.05, confirming that the relationship between management accounting and environmental performance is not random, but has a clear and significant impact. This result reinforces the importance of integrating management accounting practices into corporate strategies to improve their environmental performance and achieve environmental sustainability.

**Table 6.** Coefficient Values for the First Main Hypothesis

| Model | Unstandardized Coefficients (B) | Standardized Coefficients (Beta) | t-value | Sig. |
|---|---|---|---|---|
| Constant | 0.744 | 0.276 | | 2.695 |
| Management Accounting | 1.165 | 0.074 | 0.708 | 15.71 |
| Dependent Variable: Environmental Performance | | | | |

It is clear from the previous table that there is a statistically significant effect at the level of ($\alpha \leq 0.05$) for management accounting on environmental performance in Jordanian industrial public shareholding companies, based on the t-value of (15.710), which is statistically significant at a level less than (0.05). The table also shows that the impact coefficient (B) was (1.165), indicating that a one-unit change in management accounting leads to an increase in environmental performance by (1.165). Based on this, the null hypothesis is rejected, and the alternative hypothesis is accepted, which states: "There is a statistically significant effect at the level of ($\alpha \leq 0.05$) for management accounting on environmental performance in Jordanian industrial public shareholding companies".

The study concluded that management accounting has a statistically significant positive effect on environmental performance in these companies. This effect is attributed to management accounting's contribution to measuring the environmental impacts of the company's systems and operations, such as water and energy consumption, which helps identify weaknesses and work on improving them. Environmental accounting also helps identify strategic opportunities related to innovation and environmental sustainability. Additionally, regularly tracking and managing environmental data allows companies to improve their environmental performance and adhere to international standards and environmental regulations. Environmental accounting also contributes to enhancing transparency, which boosts public trust and helps improve the company's environmental and social image. These results are consistent with the study by (Bresciani et al., 2023), which demonstrated a positive relationship between management accounting and environmental performance.

**6.6. Second Hypothesis:** "There is no statistically significant effect at the level of ($\alpha \leq 0.05$) for organizational leadership on environmental performance in industrial companies in Jordan."

To identify the level of environmental performance in industrial companies in Jordan, the researchers extracted the means and standard deviations for the items of this variable. Table (7) presents these values.

**Table 7.** Means and Standard Deviations for the Dependent Variable "Environmental Performance" Items (n=255)

| No. | Statement | Mean | Std. Dev. | Rank | Level |
|---|---|---|---|---|---|
| 1 | Environmental performance includes comparing the factory's performance to similar plants | 3.45 | 0.89 | 10 | Moderate |
| 2 | The type and extent of environmental deviation are accurately identified | 3.57 | 0.85 | 8 | Moderate |
| 3 | Environmental cost deviations are identified using appropriate financial ratios | 3.5 | 0.87 | 9 | Moderate |

| | | | | | |
|---|---|---|---|---|---|
| 4 | Focus is placed on improving environmental performance while reducing environmental costs | 3.66 | 0.88 | 4 | Moderate |
| 5 | The factory is supported in establishing an environmental management system | 3.63 | 0.79 | 5 | Moderate |
| 6 | The company strives to achieve its environmental goals | 3.67 | 0.97 | 3 | Moderate |
| 7 | The company complies with environmental measurement and disclosure regulations | 3.7 | 0.95 | 2 | Moderate |
| 8 | Efforts are made to enhance employees' understanding of environmental regulations | 3.61 | 0.86 | 6 | Moderate |
| 9 | Internal regulations require employees to adhere to environmental performance standards | 3.6 | 1 | 7 | Moderate |
| 10 | The company evaluates environmental performance using dedicated control mechanisms | 3.73 | 0.87 | 1 | High |
| | TOTAL | 3.60 | 0.45 | -- | Moderate |

The results in Table (7) showed that the level of environmental performance in Jordanian industrial public shareholding companies was medium, with a mean of (3.58) and a standard deviation of (0.46). This indicates the need to improve and enhance environmental performance in these companies. The means for the items of this variable ranged between (3.41) and (3.68). The item "The company evaluates environmental performance using control mechanisms prepared for this purpose" ranked first with a mean of (3.68) and a high level. It was followed by the item "The company adheres to legislation regarding environmental measurement and disclosure requirements" with a mean of (3.66) and a medium level. While the item "The company seeks to achieve its environmental goals" came in third place with a mean of (3.64) and a medium level. The item "Environmental performance includes a comparison process between the factory's environmental performance and that of similar factories" came in last place with a mean of (3.41) and a medium level.

To determine whether there is a statistically significant effect at the level of ($\alpha \leq 0.05$) for organizational leadership on environmental performance in industrial companies in Jordan, simple regression analysis was performed. The following tables present the results of this analysis.

**Table 8.** Summary of the Second Main Hypothesis Model

| Correlation Coefficient R | $R^2$ Coefficient of Determination | Adjusted $R^2$ Coefficient of Determination | Standard Error |
|---|---|---|---|
| 0.768 | 0.59 | 0.588 | 0.29361 |

It is clear from the previous table that the correlation coefficient value was (0.768), indicating a strong positive relationship between the moderating variable "Organizational Culture" and the dependent variable "Environmental Performance". Furthermore, the $R^2$ coefficient of determination reached (0.590), meaning that (59%) of the change in environmental performance is due to the effect of the change in organizational culture. This result indicates that strengthening organizational leadership in companies may lead to significant improvements in environmental performance.

**Table 9.** ANOVA Test Results for the Second Main Hypothesis

| Model | Sum of Squares | Degrees of Freedom | Mean Square | F-value | Sig. |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Regression | 30.344 | 1 | 30.344 | 352.003 | 0 |
| Residual | 21.12 | 245 | 0.086 | | |
| Total | 51.465 | 246 | | | |

It is clear from Table (9) that there is a statistically significant effect at the level of ($\alpha \leq 0.05$) for organizational leadership on environmental performance in Jordanian industrial public shareholding companies, based on the F-value of (352.003), which is statistically significant at a level less than (0.05). This result indicates that organizational leadership has a significant and positive impact on environmental performance, which reinforces the importance of strengthening organizational values and practices in improving companies' environmental performance.

**Table 10.** Coefficient Values for the Second Main Hypothesis

| **Model** | **Unstandardized Coefficients (B)** | **Standardized Coefficients (Beta)** | **t-value** | **Sig.** |
|---|---|---|---|---|
| Constant | 1.054 | 0.136 | | 7.752 |
| Organizational Culture | 0.737 | 0.039 | 0.768 | 18.762 |
| Dependent Variable: Environmental Performance | | | | |

It is clear from the previous table that there is a statistically significant effect at the level of ($\alpha \leq 0.05$) for organizational leadership on environmental performance in Jordanian industrial public shareholding companies, as the t-value was (18.762), which is statistically significant at a level less than (0.05). Furthermore, the impact coefficient (B) was (0.737), meaning that a one-unit change in organizational leadership leads to an increase in environmental performance by (0.737). Based on this, the null hypothesis is rejected, and the alternative hypothesis is accepted, which states: "There is a statistically significant effect at the level of ($\alpha \leq 0.05$) for organizational leadership on environmental performance in industrial companies in Jordan".

The results indicated that an organizational leadership concerned with environmental issues and sustainability contributes to enhancing employee commitment to environmental practices and making decisions and strategies that support environmental protection and reduce negative impacts. Furthermore, an organizational leadership that encourages innovation in the environmental field contributes to developing new and innovative solutions and enhances awareness of environmental issues. Additionally, adopting an organizational leadership concerned with environmental issues contributes to strengthening companies' commitment to environmental standards and legislation, which reduces environmental and legal risks.

**6.8. Third Hypothesis:** "There is no statistically significant moderating effect at the level of ($\alpha \leq 0.05$) for organizational leadership on the relationship between management accounting and environmental performance in industrial companies in Jordan."

**Table 11.** Means and Standard Deviations for the Moderating Variable "Organizational Culture" Items (n=255)

| **No.** | **Statement** | **Mean** | **Std. Dev.** | **Rank** | **Level** |
|---|---|---|---|---|---|
| 1 | Management invests in developing employee capabilities for maximum productivity | 3.40 | 0.87 | 5 | Moderate |
| 2 | Management seeks to build collaborative relationships to complete tasks | 3.65 | 1.05 | 1 | Moderate |
| 3 | Management values employee participation in decision-making | 3.55 | 0.9 | 3 | Moderate |

| | | | | | |
|---|---|---|---|---|---|
| 4 | Employees are empowered through involvement in decision-making | 3.58 | 0.89 | 2 | Moderate |
| 5 | Organizational norms encourage creativity at work | 3.35 | 0.85 | 6 | Moderate |
| 6 | Senior management meets employee expectations regarding rewards and incentives | 3.25 | 1.05 | 7 | Moderate |
| 7 | Management aligns employee values with those of the organization | 3.48 | 0.92 | 4 | Moderate |
| | TOTAL | 3.46 | 0.47 | -- | Moderate |

The results in Table (11) showed that the level of organizational leadership in industrial companies in Jordan was medium, with a mean of (3.43) and a standard deviation of (0.48). This indicates the need to develop and enhance organizational leadership in these companies. The means for the items of this variable ranged between (3.21) and (3.60). The item "Management seeks to form positive work relationships based on cooperation to accomplish tasks" ranked first with a mean of (3.60) and a medium level. It was followed by the item "Management empowers employees by involving them in the decision-making process" with a mean of (3.54) and a medium level. While the item "Management seeks to promote the importance of participation in decision-making" came in third place with a mean of (3.53) and a medium level. The item "Top management meets employees' expectations regarding incentives and rewards" came in last place with a mean of (3.21) and a medium level.

To determine whether there is a statistically significant moderating effect at the level of ($\alpha \leq 0.05$) for organizational leadership on the relationship between management accounting and environmental performance in industrial companies in Jordan, multiple regression analysis was performed. The following table presents the results of this analysis.

**Table 12.** Summary of the Third Main Hypothesis Model

| Correlation Coefficient R | $R^2$ Coefficient of Determination | Adjusted $R^2$ Coefficient of Determination | Standard Error |
|---|---|---|---|
| 0.801 | 0.642 | 0.639 | 0.27467 |

It is clear from the previous table that the correlation coefficient value was (0.801), indicating a moderating effect of organizational leadership on the relationship between management accounting and environmental performance in industrial companies in Jordan. Furthermore, the $R^2$ coefficient of determination reached (0.642), meaning that (64.2%) of the change in environmental performance can be explained by the change in the independent variable " Management Accounting" and the moderating variable "Organizational Culture" together. Referring to Table (12), which shows the $R^2$ coefficient of determination between the independent variable (Management Accounting) and the dependent variable (Environmental Performance), we find that the $R^2$ coefficient was (0.502). This indicates that organizational leadership moderated the relationship between the two variables, as the $R^2$ coefficient value increased from (0.502) to (0.642), demonstrating a strong positive effect of organizational leadership in enhancing the relationship between management accounting and environmental performance.

**Table 13.** ANOVA Test Results for the Third Main Hypothesis

| Model | Sum of Squares | Degrees of Freedom | Mean Square | F-value | Sig. |
|---|---|---|---|---|---|
| Regression | 33.056 | 2 | 16.528 | 219.076 | 0 |
| Residual | 18.409 | 244 | 0.075 | | |
| Total | 51.465 | 246 | | | |

It is clear from Table (13) that there is a statistically significant moderating effect at the level of ($\alpha \leq 0.05$) for organizational leadership on the relationship between management accounting and environmental performance in industrial companies in Jordan, based on the F-value of (219.076), which is statistically significant at a level less than (0.05). This result confirms that organizational leadership plays an important role in enhancing the relationship between management accounting and environmental performance in these companies.

**Table 14.** Coefficient Values for the Third Main Hypothesis

| Model | Unstandardized Coefficients (B) | Standardized Coefficients (Beta) | t-value | Sig. |
|---|---|---|---|---|
| Constant | 0.176 | 0.241 | | 0.731 |
| Management Accounting | 0.538 | 0.09 | 0.327 | 5.995 |
| Organizational Culture | 0.513 | 0.052 | 0.534 | 9.789 |
| Dependent Variable: Environmental Performance | | | | |

It is clear from the previous table that there is a statistically significant moderating effect at the level of ($\alpha \leq 0.05$) for organizational leadership on the relationship between management accounting and environmental performance in industrial companies in Jordan, based on the t-values of (5.995, 9.789) respectively, which are statistically significant at a level less than (0.05). Based on this, the null hypothesis is rejected, and the alternative hypothesis is accepted, which states: "There is a statistically significant moderating effect at the level of ($\alpha \leq 0.05$) for organizational leadership on the relationship between management accounting and environmental performance in industrial companies in Jordan".

The results showed that organizational leadership plays a pivotal role as a moderating factor in enhancing the relationship between management accounting and environmental performance. This may be attributed to the fact that an organizational leadership focusing on environmental issues supports innovation and continuous improvement, which enhances the application of management accounting practices. This leadership encourages employees and management to comply with environmental legislation, monitor energy and water consumption, and strive to reduce emissions and environmental pollution, leading to improved corporate environmental performance. Furthermore, an organizational leadership that encourages accountability and transparency contributes to enhancing the effectiveness of management accounting through environmental performance disclosure and related reporting. This contributes to building trust among stakeholders and improving the company's reputation in society.

## 7. Conclusions and Recommendations

The study results revealed that the level of management accounting application in Jordanian industrial companies was medium, with a mean of (3.63). This result can be attributed to the companies' commitment to environmental legislation and regulations, and their awareness of the importance of environmental accounting in achieving sustainability. It may also be due to companies' recognition of the economic returns resulting from adopting these practices, such as cost reduction and efficiency enhancement, in addition to their pursuit of a competitive advantage through their commitment to environmental sustainability and responsibility. This result differs from Al-Hussein's (2014) study, which showed that establishments in Iraq do not apply the principles of management accounting.

The results also showed that the level of environmental performance in Jordanian industrial companies was medium, with a mean of (3.58). This may be attributed to economic pressures that limit companies' ability to invest in improving their environmental performance, especially in light of competition and the pursuit of maximizing profits. Additionally, companies may face difficulties in bearing the costs of improving environmental performance and providing incentives to employees to encourage them to adopt environmentally friendly practices. Environmental legislation may also be insufficient or not implemented in a way that encourages companies to enhance their environmental commitment.

The results also indicated that the level of organizational leadership in Jordanian industrial companies was medium, with a mean of (3.43). This may be a result of the difficulties companies face in changing the prevailing organizational culture, as this change requires continuous and intensive efforts. Furthermore, some companies may lack effective programs to foster an organizational leadership that supports environmental development, in addition to the impact of social and cultural challenges that may hinder the building of a strong and sustainable organizational culture.

### 7.1. Study Importance

The research importance of studying the interaction between management accounting, environmental performance, and organizational leadership lies in filling knowledge gaps regarding how the organizational environment influences the application of environmental accounting practices and its contribution to enhancing the efficiency of institutions' environmental performance. Analyzing this relationship enriches the theoretical aspect by developing analytical models and frameworks that help academics and professionals identify organizational factors that promote or hinder the success of environmental accounting systems, and also provides new insights into the role of institutional leadership in supporting the transition towards environmental sustainability.

On the practical level, the study enables administrative leaders to adopt effective strategies to improve environmental performance through the utilization of management accounting tools. For example, these tools allow for measuring costs associated with environmental impacts (such as energy consumption or pollution), which contributes to guiding decisions towards waste reduction and adopting environmentally friendly practices. Additionally, a supportive organizational leadership for sustainability enhances employee engagement in achieving environmental objectives, which improves the institution's competitive reputation and strengthens the trust of regulatory bodies and environmentally concerned investors.

### 7.2. Importance and Benefits of Environmental Accounting

A report issued by the Chinese Financial Accounting and Corporate Governance Authority indicated the mandatory application of environmental accounting standards to all companies listed on the Chinese stock exchange. These standards aim for three main objectives:

1. Raising the accuracy level of environmental data provided to investors and stakeholders.
2. Improving management mechanisms within companies.
3. Supporting sustainable development paths at the national level.

For example, these standards enable companies to systematically document their environmental impacts (such as resource consumption or emissions), which enhances transparency and contributes to making more sustainable investment decisions. They also provide a practical framework for monitoring environmental performance and reducing costs associated with environmental violations. On the other hand, the standards encourage the adoption of environmentally friendly technologies, such as renewable energy projects or recycling, which accelerates the transition towards a green economy (Epstein & Buhovac, 2014).

### 7.3. Importance of Management Accounting

1. **Enhancing resource efficiency:** Helps increase resource efficiency by monitoring and evaluating the environmental impacts of various activities. This leads to reduced waste and improved operational performance (Burritt & Schaltegger, 2023).
2. **Reducing environmental costs:** By identifying and evaluating environmental costs related to production processes, companies can make decisions that reduce costs, such as minimizing waste and improving energy efficiency (Schaltegger et al., 2022).
3. **Compliance with environmental regulations:** management accounting supports companies in complying with environmental regulations and laws by providing accurate and comprehensive information on environmental performance, which helps avoid fines and penalties (Epstein & Buhovac, 2023).
4. **Enhancing corporate public reputation:** Boosts the reputation of companies as environmentally responsible organizations, attracting customers and investors interested in sustainability (Elkington, 2022).

5. **Supporting strategic decision-making:** Helps in making strategic decisions that support sustainable development, such as investing in environmentally friendly technologies or improving production processes (Hart & Milstein, 2022).

**7.4. Recommendations** Based on the findings of the researchers, the study provides the following recommendations:

1. Develop an advanced management accounting system for the purpose of collecting accurate data on resource consumption, pollutant emissions, and waste production.
2. Provide necessary training programs and workshops to raise employee awareness of management accounting practices and improve environmental performance.
3. Utilize green technology and environmental innovations, such as using renewable energy sources and supporting research and development to find innovative and new solutions for dealing with various environmental challenges.
4. Enhance effective employee participation with the aim of developing environmental performance policies and initiatives, and provide incentives and rewards to employees to achieve this.

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## Biographies