

Does Environmental Cost Disclosure Improve Environmental Performance And Rationalize Decision-Making?

Dr. Ahmad Jaber¹ & Dr. Ahmad Zerkot²

¹⁻² Faculty of Business Administration and Economics, Lebanese University, Lebanon

Abstract

A few decades ago, a very small number of people were aware of or cared about economics beyond their businesses and costs. Industrial enterprises were not clean nor did they think green or even about the impact of their businesses on the environment. The current research studies the impact of environmental cost disclosure on improving environmental performance and rationalizing decision-making. The researchers hypothesize that there is an impact for measurement and environmental cost disclosure on improving the environmental performance of industrial enterprises. Also, the researchers hypothesize that there are some hindrances that limit the application of measurement and disclosure of environmental costs in financial statements of industrial enterprises in Lebanon. The researchers constructed a five-point Likert style questionnaire and distributed it among a group of Lebanese Association of Certified Public Accountants (LACPAs) which consisted of 300 individuals. The researchers used multivariate data analysis to test the hypotheses. The research rendered some important results mainly that environmental cost accounting helps in making decisions which can reduce environmental costs and expenses. The study also revealed that environmental accounting helps in achieving competitiveness for all the enterprise's products through promoting products with better environmental specifications. Finally, professional organizations and international scientific accounting associations give a lot of significance to issues related to the environment, but there is no independent international standard that clearly identifies environmental disclosure.

Keywords: industrial enterprises, environmental cost disclosure, decision-making, environmental accounting, environmental performance

Date of Submission: 26-11-2023

Date of Acceptance: 06-12-2023

I. Introduction

Environmental contamination is an issue which has met an increasing interest since the nineties of the previous century, especially in the course of the industrial development the contemporary world is witnessing. Although contamination has existed for a long time, there is something new which started to emerge with the Industrial Revolution. Industrial companies began disposing of their harmful materials into the environment – by releasing harmful gases into the atmosphere, dumping wastes into rivers, seas and oceans or by burying them – which has negative impact on the environment.

As a result of continuous emergence of environmental problems related to various industrial activities, and since environment and development are associated with mutual dependence and harmony, it is difficult to continue developing on the basis of the deteriorating environmental resources (Zhang, *et al.*, 2022). In addition, the environment cannot be protected if development overlooked costs of environmental harm. Since it is essential for different enterprises to be aware of and recognize their responsibilities towards their environment, it is pivotal to take some issues into consideration, among which is the role of the accounting profession in resolving environmental problems (IISD, 2007). This can be achieved through environmental (green) accounting which is today at a vital level after the World Bank called for the importance of integrating environmental accounting in the national income which measures the economic activity of the society as a whole, considering that there should be some expenditure to stop or at least reduce wastes resulting from industrial activities (World Bank, 1991). This can protect the environment from such industries and improve both the producers' and consumers' level of environmental awareness through putting forth a scientific framework for the concepts of environment, environmental contamination, and the nature of environmental costs.

Some various studies about this topic were previously conducted, one of which is a study by Christophe and Bebbington (1992). It discussed the concept and importance of environmental accounting in relation to the French experience in this regard. This study showed that environmental accounting is a system that produces information about an enterprise's environmental performance. Such information is used in decision-making. The study concluded that some French enterprises prepare environmental lists that provide

information about the quantity of pollutants produced and financial information about costs of investing in technology to fight or decrease contamination, which was in accordance to demands by the ministry of environment to limit contamination and disclose the enterprises' activities in this regard.

Additionally, Kaplin & Ramanna (2021) showed that defending against environmental contamination results in environmental commitments and costs relative to accounting problems. This study concluded that there is certain difficulty in guiding enterprises that cause or contribute to contamination to abide by environmental legislations and standards. Ifada & Jaffar (2023) aimed at recognizing the problem of frail interest in environmental performance on industrial enterprises. The study concluded that the system of valuating environmental performance applied in industrial enterprises is not concurrent with present environmental changes, and that these enterprises do not have standards to limit contamination and preserve the environment.

Furthermore, another study by Rini & Adhariani (2021) found that financial performance has a positive relation with environmental costs. This shows if the assets of a business are used in an effective manner to share in activities with environmental trend or not. The study also noted a negative relation between environmental disclosure and financial performance in addition to a positive relation between environmental disclosure and environmental cost. The study suggests broader understanding of how performance impacts environmental costs and disclosure. In a study that Lu & Taylor (2018) conducted, they specifically found that environmental disclosure, financial performance, and environmental performance are business concepts that have relations and help the business gain competitive approach for success.

In addition, a study by Iatridis (2013) depicted a positive relation between environmental performance and environmental disclosure since when a business has high capital spending and high profitability, these are reflected in the businesses' environmental performance. Furthermore, in their study, Al-Tuwaijriet *et al.*, (2004) have also depicted a positive relation between environmental performance and environmental disclosure. Formerly, cost accounting in many industrial companies was restricted to costs of production but leaving out environmental costs, which led to underlying profits, and consequently, to deceptive financial statements (Mahdavi *et al.*, 2015). Also, environmental accounting focuses on events, perceptions and systems that have environmental effects. As a result, environmental reports are central in the decision-making process (Al-Nimer, 2015). This means that financial accounting is related to environmental matters, so environmental performance needs to be disclosed.

There are very few studies that tackled the subject-matter of the current study; thus, its importance lies in filling the gap in the literature related to the topic. The current study which examines the impact of environmental cost disclosure on decision making is the first to be done in Lebanon on the topic as far as the researchers can tell.

II. Conceptual Framework of the Research

Environmental accounting is that section of accounting which takes interest in activities, methods and rules which have direct or indirect impact on the environment and shaping the results in the form of reports delivered to decision makers and external parties who benefit from these results (Stasiskiene, 2019). In the course of the past two decades, there has been an increasing interest on all levels in maintaining the environment with the increasing demand on economic and financial statements related to the environment and natural resources, which environmental accounting has played a major role in providing these statements. In 1941, the American Institute of Certified Public Accountants has defined environmental accounting as the process of identifying and measuring environmental costs and merging them into financial statements for better decision making. It is also defined as generating, analyzing and using financial information to corporate, environmental and economic performance to achieve a sustainable environmental-friendly business (Bennett and James 1998). Green accounting is an extended system of the traditional accounting system which is based on analyzing results and causes of the cost to determine the impact of environmental costs which the industrial enterprise caused (Peter and Roger, 2002). The United States Environmental Protection Agency (1995) made a three-fold definition of environmental accounting.

- a. Environmental accounting from the economic view: measurement and analysis of production factors entries take place during this phase
- b. Environmental accounting as an extension of financial accounting: in this phase, financial statements are prepared according to accounting principles where these statements include data and information about impacts on the environment in order to help beneficiaries from those statements such as investors and shareholders.
- c. Environmental accounting from the managerial view: in this phase, information related to environmental activities are identified and analyzed to help the management take better decisions such as pricing products, etc.

Based on the above, environmental accounting identifies and measures costs of environmental activities and utilities and uses this information in making decisions which help decrease negative impacts of activities and regulations.

Importance of Environmental Accounting

Environmental accounting has special importance in helping economic entities in the following (Portella & Borba, 2019; Basuki & Irwanda, 2018; Saremi & Moeinnehad, 2014):

- Helping managers make decisions which can reduce environmental costs and expenses.
- Expanding the valuation process and analyzing investment to include potential environmental harm.
- Reaching a better understanding of environmental costs, performing operations and products, and pricing them more accurately.

Neglecting measurement of environmental costs resulting from contamination can mislead many indicators of performance measures and expand the results.

Importance of Environmental Costs

The subject “Environmental Cost Accounting” began in 1992 in the United States of America as a response for outer parties’ worry, who believed that preventing contamination was not of importance to environmental management from the industrial side. Thus, enterprises were encouraged to adopt, completely comprehend and integrate Environmental Cost Accounting in the process of decision-making. They were also encouraged to increase interest in those costs in order to give the enterprises chances to sufficiently decrease environmental cost or eliminate it, reinforce enterprises’ competitive position and improve environmental performance. It is self-evident that cost accounting does not reflect environmental impact of an enterprise’s work since the enterprise does not disclose this information despite its importance and the importance of disclosing it in financial statements. One study, which was adopted by the Environmental Protection Agency (EPA) in USA, 1995, points some main reasons for interest in environmental costs:

- 1- A lot of costs can be decreased or avoided entirely since these costs do not add value to products since they can be operating or investment costs.
- 2- These costs can be included in indirect costs and not totally ignored.
- 3- Reconsidering current operational systems and understanding environmental costs help the enterprise to supply more accurate information about pricing the products and designing product with specifications that achieve more profitability.
- 4- Achieving competitiveness for the enterprise’s products through promoting other products with better environmental specifications.
- 5- Understanding environmental costs help support environmental management system, which a lot of the enterprises seek to develop as a means of acquiring the ISO 14001, which was developed by the International Organization for Standardization and corresponds to the environment.

Importance of Environmental Disclosure

The importance of environmental disclosure is revealed in achieving several goals (Dhaif Allah *et al.*, 2021, Kalash, 2020, and Portella & Borba, 2019). One of which is developing disclosure and final report by expanding disclosed information in form and content to include an enterprise’s economic and environmental performance. Another goal is to answer to the increasing needs of users of financial statements and financial reports about information related to an enterprise’s environmental commitments due to the variety of those users and the different types of information they need. A third goal of environmental disclosure is that it helps guide economic decisions for users of financial statements as related to the extent of the enterprise’s commitment to its responsibilities toward preserving the environment. Furthermore, environmental disclosure of the economic impact on contamination proficiently helps analyze and predict the efficiency of the state’s natural resources in the light of the environmental changes, which leads the society to increase trust in enterprises which abide by their environmental commitments and to encourage them to develop their activities.

Requirements of Environmental Disclosure

According to Hassan & Ibrahim (2012), the requirements of environmental disclosure are included in the main constituents necessary for its success in addition to financial and quantitative information needed to apply it and reap its expected benefits. These requirements include disclosure of environmental and economic performance in addition to restriction of costs relative to environmental activities and differentiation between environmental commitments and operating costs. There are some general and specific requirements for environmental cost disclosure.

General requirements

These are the foundations on which success of this operation in achieving the expected goals is based. They include (IFRS, 2021):

1. Founding governmental organizations which monitor and control enterprises' commitment to the laws and regulations of protecting the environment and incurring financial and non-financial penalties on enterprises which do not abide by the laws.
2. The presence of scientific, practical standards to value the costs and benefits of environmental activities relying on statistical and quantitative methods and computers, which support trust in these standards, provided that a team of internal accountants, financial analysts, representatives of specialized, scientific organizations should conduct the valuation in order to achieve objectivity.
3. The presence of a highly professional organization which puts forth acceptable, professional standards related to environmental disclosure and controls implementation of those standards.
4. Disclosing the accounting policies which the enterprise abides by in tackling the costs and benefits of its environmental activities.
5. Enhancing an auditor's role and responsibility to include environmental activities and reports to achieve accuracy and objectivity in environmental disclosure.

Specific Requirements

These requirements include financial statements relative to environmental costs and benefits (Basuki & Irwanda, 2018 & PwC, 2021):

- Costs of purchasing assets of highly advanced technology to stop or eradicate causes of contamination.
- Costs of recycling harmful wastes of industrial operations.
- Costs of storing harmful wastes.
- Costs of disposal of wastes in sound scientific methods.
- Present and projected costs resulting from the enterprise's violating the rules and regulations of protecting the environment.
- Financial grants from international organizations who promote environmental protection.
- Increase in revenues resulting from reduction of production costs due to support, financial grants, and increase in sales.
- Tax advantages that enterprises get as a result of tax reduction or exemption on assets related to environmental activities.
- Quantitative statements relative to policies which enterprises apply to meet their responsibilities toward contamination
- Technical policies adopted by the enterprise to reduce present and future contamination to internationally authorized standards, such as recycling wastes in a way to benefit from it in producing by products.
- Technical policies that an enterprise can adopt regarding use of alternative resources that reduce or limit causes of polluting.

Difficulties Facing Disclosure of Environmental performance

As preparing financial statements releases the management from responsibility toward shareholders, so is preparing environmental reports considered a release of the management's responsibility toward the community. However, in light of present accounting systems, environmental reports face some obstacles which include the following (Micco *et al.*, 2020):

- Difference in content: There is no specific pattern for environmental reports. Some of them are in the form of a group of separate reports about the environmental performance, while others were integrated in the financial performance.
- Difference in domain: This means difference in the type of information that environmental reports cover. Some of them only cover the costs that the enterprises implement to limit contamination, while others include enterprises' environmental commitments and their impact on the assets. Some other reports included disclosure of environmental policies.
- Difference in reporting periods: Environmental disclosure ranges between quarterly periods and three-year periods, as some enterprises do.
- Difference in quantity of information: Major enterprises with high financial power make higher disclosure than enterprises with less financial power.

Impact of Environmental Disclosure on the Quality of Financial Statements

As a result of the enterprises development of work environment, in addition to complexity of financial investments and the inclination of many countries toward developing and enriching information in financial

statements to achieve transparency and apply requirements of enterprise governance, it has become pivotal to develop the contents of financial statements to include unconventional information which achieves transparency on one hand and supports trust in users of those reports on the other hand. Previous developments have led to an increasing need for disclosure of information which aids decision-makers in future prediction of enterprise performance in the light of dangers around the enterprises' work environment.

With the appearance of the enterprise's responsibility toward the environment and the community commitments, the goal of financial reports now covers various individual needs, some of which follow:

- The group of investors in an enterprise ownership including present and potential shareholders.
- The group of lenders including present and potential shareholders, in addition to debtors who finance the enterprise in the form of short-term loans.
- The group of analysts and advisors including financial analysts, journalists, economists, brokers and others who provide advisory services.
- The group of enterprise relations including clients, suppliers and others who are interested in integration and control of the enterprise.
- The management of the enterprise whose center of interest in the information included in the financial statements arises from its will to be released from its responsibilities in confronting the owners.
- The group of employees and work unions, whereas the importance of the information for them arises from their urge to know what happens in an enterprise, its financial status, and other information to assess the need to continue their relation with the enterprise.
- The government (related organizations such as taxation department, related ministries, departments which control commercial and industrial activities).

From the above, it is evident that financial statements are not a goal, but they aim at supplying information which is useful in decision-making whether the information is financial or other. Consequently, it was necessary to demand new standards of measurement and disclosure and increasing the amount of disclosed information to meet the new information requirements. This would lead to enhancing and developing disclosure of information included in financial statements, which would result in increasing the quality of financial reports and the possibility of relying on them in decision-making.

Role of Professional Accounting Organizations in Issuing Environmental Standards

A number of professional organizations have conducted a lot of researches and publications to support and apply environmental accounting (Dinh *et al.*, 2022; Tran *et al.*, 2021; Le *et al.*, 2019; Alewine, 2010). Some American accounting standards related to environmental performance of companies were issued, but they weren't tackled directly in the form of an independent environment-related standard. The Financial Accounting Standards Board (FASB) didn't deal with measurement and disclosure of environmental articles independently; rather, the FASB pointed them out in the course of accounting and disclosure of contingency articles under Standard No.5 to point out that loss of contingency is likely to occur.

Despite that, it may be difficult to determine the extent of abidance by them reasonably. The FASB has issued numerous interpretations to clarify Standard number 5, some of which include No. 14 relative to Accounting for Contingency and No. 39 relative to Settling an Amount correlated with specific contracts. A number of teams for contingencies derived from the FASB, and they presented numerous interpretations. Among those were 8-90 (relative to capitalizing costs of environmental contamination) and 5-93 (relative to accounting procedures for environmental elements).

In addition, there were several others which dealt with this issue including statement No.96-1 by the American Institute of Certified Public Accountants (AICPA) related to disclosure of significant risks and specific uncertainties and bulletin No. 92 by the Securities and Exchange Commission (SEC) related to environmental liability disclosures (ELD).

III. Research Questions and Hypotheses

Environmental accounting is considered a novelty in this domain. This innovation was the result of the increase in size and decisions of enterprises which are largely influential in domains such as finance, economy, society, and environment which lead to more interest given by academic, professional and accounting organizations. Since the intellectual accounting framework lacks the ability to supply specific solutions to many problems facing the accountant – such as measurement, disclosure of environmental costs and other related problems – it was essential for researchers to find helpful information in this regard. Thus, the main problem this research lies in the following main question:

What is the importance of measurement and disclosure of environmental costs in financial statements in improving environmental performance and rationalizing decision-making?

From the above question, the following sub questions arise:

1. Are LACPAs aware of the importance of applying accounting measurement and disclosure of environmental costs in financial statements of industrial enterprises in Lebanon to improve environmental performance?
2. Are there any drawbacks that limit application of measurement and disclosure of environmental costs in financial statements of industrial enterprises in Lebanon?
3. Do measurement and disclosure of environmental costs contribute to improving decision-making in industrial enterprises in Lebanon?

Based on the research questions and the previous literature, the researchers hypothesize the following:

Measurement and disclosure of environmental costs in financial statements is highly important in improving environmental performance and rationalizing decision-making.

From the above main hypothesis, the following sub-hypotheses arise:

1. LACPAs are aware of the importance of applying accounting measurement and disclosure of environmental costs in financial statements of industrial enterprises in Lebanon to improve environmental performance.
2. There are many drawbacks that limit application of measurement and disclosure of environmental costs in financial statements of industrial enterprises in Lebanon.
3. Measurement and disclosure of environmental costs contribute to improving decision-making in industrial enterprises in Lebanon.

Research Importance

The importance of this research lies in that there is an urgent need for such researches that positively tackle measurement and disclosure of environmental costs as related to improving environmental performance since enterprises fall under additional great financial burden to protect the environment in order to polish the image of the enterprise in society. It is also important for users of financial information to assess the extent of accord between the enterprise and the surrounding community which is basically that the enterprise is part of the community and should preserve and maintain it.

IV. Research Procedures and Methodology

The researchers adopted the descriptive analytical method in tackling this research in order to deeply comprehend and depict constituent factors of the research. The researchers also clarified methods used in measurement and disclosure of environmental costs in financial statements and identified their impacts on valuation and improvement of environmental performance to reach conclusions that help answer the research problem including the sub-questions to get full familiarity of the topic under study.

Population and Sample Selection

The population of this study consists of all Lebanese Certified Public Accountants (LCPAs) in Lebanon. The researchers chose a random sample of 315 LCPAs and distributed the questionnaire among them, 300 of which responded and all were valid for testing and analysis. The demographic data of the sample is shown in Table 1:

Table (1): Distribution of respondents according to their personal data

Variable	Frequency	Percentage
Education		
Bachelor	168	56.0%
Master	98	32.7%
PhD	34	11.3%
Major		
Accounting	142	47.3%
Banking and Finance	93	31.0%
Economics	37	12.3%
Business administration	28	9.3%
Years of experience		
0 – 5 years	72	24.0%
5 – 10 years	64	21.3%
10 – 15 years	84	28.0%
15 years and above	80	26.7%
Total	300	100.0%

It is quite clear from Table (1) that 56% of the participants have Bachelor’s degrees. In addition,32.7% have Masters’ and 11.3% have PhDs, most of whom (78.3%) have majored in Accounting and Banking which are appropriate majors to comprehend items in the questionnaire and give qualified and consistent responses for the subject-matter of the current study. It is also evident that 76% of the sample has more than 5 years of experience in the profession, which gives the responses more reliability.

Based on the previous studies and the researchers’ personal experience, the researchers constructed a five-point Likert Style questionnaire with 36 items categorized into five domains. The scale ranges as in Table 2:

Table (2): Correct Tool of the Study

Scale	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Score	5	4	3	2	1

Table No. (3) provides the scale categories and the scope of each:

Table (3): Five-point Likert scale

	Approval Level				
	Very low	Low	Moderate	High	Very high
Mean	< 1.8	1.8 - 2.59	2.6 - 3.39	3.4 - 4.19	> 4.2
Relative Weight	< 36%	36% - 51.9%	52% - 67.9%	68% - 83.9%	> 84

The following table show Cronbach's Alpha and Guttman Split-Half Coefficient:

Table (4): Reliability of the questionnaire using Cronbach's Alpha

Domain	Cronbach's Alpha	
	Number of Items	Cronbach's Alpha
First Domain	15	0.843
Second Domain	9	0.826
Third Domain	3	0.915
Overall	27	0.940

It is evident from table 4 that Cronbach’s Alpha for the items of the questionnaire as a whole is **0.940**which means that there is reliability in all items of the questionnaire.

V. Testing the Hypotheses

The first sub-hypothesis

H₁:LACPAs are aware of the importance of applying accounting measurement and disclosure of environmental costs in financial statements to improve environmental performance.

Table (5): Testing the first sub-hypothesis

	Item	Mean	S. D	T	P	Relative weight	Level of agreement	Rank
1	Measurement and disclosure of environmental costs in industrial organizations lead to improving environmental performance in industrial organizations.	3.81	1.16	13.95	0.000	76.2%	High	11
2	Measurement and disclosure of environmental costs in industrial organizations leads to meeting the customer needs with eco-friendly products in convenient environmental quality.	3.94	0.97	19.25	0.000	78.8%	High	9
3	Measurement and disclosure of environmental costs in industrial organizations contributes in maximizing the organization’s profitability on the long run.	4.02	1.01	20.25	0.000	80.4%	High	5
4	Measurement and disclosure of environmental costs in industrial organizations leads to quality products, which leads to improve the product’s competitiveness.	3.97	0.94	20.46	0.000	79.4%	High	6
5	Measurement and disclosure of environmental costs in industrial organizations leads to an improvement in environmental performance	3.95	0.97	19.44	0.000	79%	High	8

	through increasing the rate of returns on environmental investments.							
6	Measurement and disclosure of environmental costs in industrial organizations leads to an improvement in environmental performance through decisions to determine the technology used in production and the nature of production processes that reduces the size and level of environmental damage.	4.08	0.99	21.53	0.000	81.6%	High	4
7	Measurement and disclosure of environmental costs in industrial organizations leads to improve the environmental performance of the organization through the organization's allocative efficiency of its environmental assets.	3.97	0.94	20.46	0.000	79.4%	High	6
8	Measurement and disclosure of environmental costs in industrial organizations leads to an increase in the organization's current environmental commitments.	4.08	0.99	21.61	0.000	81.6%	High	4
9	Measurement and disclosure of environmental costs in industrial organizations contributes in increasing the organization's economic performance.	4.09	1.07	20.17	0.000	81.8%	High	3
10	Measurement and disclosure of environmental costs in industrial organizations contributes in decreasing marketing and production costs on the long run.	3.39	0.83	5.642	0.000	79.1%	High	7
11	Measurement and disclosure of environmental costs in industrial organizations leads to the availability of many sources of funding for the organization.	4.31	0.88	29.64	0.000	86.2%	Very high	1
12	Measurement and disclosure of environmental costs in industrial organizations leads to an improvement of the organization's reputation.	4.17	0.93	25.05	0.000	83.4%	High	2
13	Measurement and disclosure of environmental costs in industrial organizations helps the organization to get governmental support.	3.86	1.14	15.00	0.000	77.2%	High	10
14	Measurement and disclosure of environmental costs in industrial organizations helps in maximizing the organization's ability to market its products.	3.77	1.08	14.06	0.000	75.4%	High	13
15	Measurement and disclosure of environmental costs in industrial organizations leads to increasing the prices of the organization's shares in the stock market.	3.79	1.13	13.94	0.000	75.8%	High	12
	Overall	4.05	1.09	19.09	0.000	81%	High	

Significant at (P) < 0.05

The mean of the responses to all items in the first domain is **4.05** and the relative weight is **81%**. Also, the value of the 'T' test is **19.09**, which is greater than the value of tabulated 'T' at the significance 0.05. This means that there is an increase of statistical significance to the neutral level in the average responses of the members of the sample; thus, the first sub-hypothesis which states "**LACPAs are aware of the importance of applying accounting measurement and disclosure of environmental costs in financial statements to improve environmental performance**" is accepted.

The second sub-hypothesis

H₂: There are many drawbacks that limit application of measurement and disclosure of environmental costs in financial statements of industrial enterprises.

Table (6): Testing the second sub-hypothesis

	Item	Mean	S. D	T	P	Relative weight	Level of agreement	Rank
1	Measurement and disclosure of environmental costs in industrial organizations is difficult in the light of the absence of specific standards.	3.82	1.15	14.12	0.000	76.4%	High	3
2	Measurement and disclosure of environmental costs in industrial organizations requires comparing returns to expenditure.	3.72	1.17	12.30	0.000	74.4%	High	8

3	Measurement and disclosure of environmental costs is considered an announcement to governmental and non-governmental parties about the environmental damage caused by industrial organizations.	3.76	1.20	12.61	0.000	75.2%	High	7
4	Measurement and disclosure of environmental costs leads to increasing costs of industrial organizations in acquiring additional financial investments to protect the environment.	3.78	1.25	12.31	0.000	75.6%	High	6
5	The accounting system applied in Lebanon is not appropriate for the measurement and disclosure of environmental costs.	3.83	1.15	14.34	0.000	76.6%	High	2
6	Applying environmental cost systems in industrial organizations requires a high cost in order to train executives, workers and interactions with other parties.	3.88	1.13	15.48	0.000	77.6%	High	1
7	Those responsible for cost systems in industrial organizations know that recording environmental costs leads to increasing cost of a produced unit.	3.79	1.20	13.12	0.000	75.8%	High	5
8	The current cost system applied in industrial organizations in Lebanon does not solve all issues which face measurement and disclosure of environmental costs.	3.51	1.28	4.75	0.000	70.14%	High	9
9	The current cost system applied in industrial organizations in Lebanon does not meet the full needs for measurement of environmental costs of the produced unit.	3.79	0.41	23.31	0.000	75.83%	High	4
	Overall	3.80	0.62	25.77	0.000	76.0%	High	

Significant at (P) < 0.05

In general, the mean of the responses to all items of the second domain of the questionnaire relative to the study is **3.80** and the relative weight is **76.0%**. Also, the value of the calculated 'T' test is **25.77**, which is greater than the value of tabulated 'T' at the significance 0.05. This means that there is an increase of statistical significance to the neutral level in the average responses of the sample; thus, the second sub-hypothesis of the study which states "**There are many drawbacks that limit application of measurement and disclosure of environmental costs in financial statements of industrial enterprises**" is accepted.

The third sub-hypothesis

H₃: Measurement and disclosure of environmental costs contribute to improving decision-making.

Table (7): Testing the fourth sub-hypothesis

	Item	Mean	S. D	T	P	Relative weight	Level of agreement	Rank
1	Measurement and disclosure of environmental costs in industrial organizations leads to evaluating and improving environmental performance in industrial organizations through decisions taken.	3.66	1.01	6.81	0.000	71.53%	High	2
2	Measurement and disclosure of environmental costs in industrial organizations leads to making decisions that improve and rationalizes decision-making as a complement to the environmental management system.	3.83	1.15	4.91	0.000	69.44%	High	3
3	Measurement and disclosure of environmental costs in industrial organizations leads to improving environmental performance by making new and more rationalized decisions than current ones.	3.73	1.00	7.93	0.000	73.19%	High	1
	Overall	3.65	0.96	10.40	0.000	76.67%	High	

Significant at (P) < 0.05

The mean of the responses to all items of the fourth domain is **3.65** and the relative weight is **76.67%**. In addition, the value of the calculated 'T' is **10.40**, which is greater than the value of tabulated 'T' at the significance 0.05. This means there is an increase of statistical significance to the neutral level in the average responses of the sample; thus, the fourth sub-hypothesis of the study which states "**Measurement and**

disclosure of environmental costs contribute to improving decision-making in industrial enterprises” is accepted.

VI. Conclusions and Recommendations

Based on the above, the study reached a number of conclusions based on which the researchers put forth some recommendations.

Conclusions

1. Environmental cost accounting helps in making decisions which can reduce environmental costs and expenses, which agrees with Basuki & Irwanda (2018).
2. Environmental disclosure helps guide economic decisions for users of financial statements as related to the extent of the enterprise's commitment to its responsibilities toward preserving the environment. This agrees with Saremi & Moeinnehzad (2014).
3. There are many drawbacks that limit application of measurement and disclosure of environmental costs in financial statements of industrial enterprises. There is no independent international standard that clearly identifies environmental disclosure, which agrees with Dinh *et al.* (2022).
4. Applying environmental cost systems in industrial organizations in Lebanon requires a high cost in order to train executives, workers and interactions with other parties, which agrees with PwC (2021). Also, the current cost system applied in industrial organizations in Lebanon does not meet the full needs for measurement of environmental costs of the produced unit.

Recommendations

Based on the above results, the researchers recommend that:

1. Measurement and disclosure of environmental costs in industrial organizations leads to essential effects in methods of preparing accounts; thus, organizations should adopt it.
2. Measurement and disclosure of environmental costs in industrial organizations requires developing the accounting system in Lebanon to include environmental damage. There is no doubt that setting an independent international standard that clearly identifies environmental disclosure is central.
3. Enterprises should disclose the accounting policies they abide by in tackling the costs and benefits of their environmental activities, since it can promote the enterprise and encourage other enterprises to follow.

References

- [1]. Alewine, H.C. (2010), A Model For Conducting Experimental Environmental Accounting Research. *Sustainability Accounting, Management And Policy Journal*, Vol. 1 No. 2, Pp. 256-291. <https://doi.org/10.1108/20408021011089275>
- [2]. Al-Nimer, M. (2015). Perceptions Of Environmental Accounting In The Jordanian Pharmaceutical Industries - Applications And Disclosure. *International Journal Of Business And Management*, Vol. 10, No. 2, Pp: 73-80. <https://doi.org/10.5539/ijbm.v10n2p73>
- [3]. Al-Tuwaijri, S.A., Christensen, T.E., & Hughes I.K. (2004). The Relations Among Environmental Disclosure, Environmental Performance, And Economic Performance: A Simultaneous Equations Approach. *Accounting, Organizations And Society*, Vol. 29, No. 5-6, Pp: 447-471. [https://doi.org/10.1016/S0361-3682\(03\)00032-1](https://doi.org/10.1016/S0361-3682(03)00032-1)
- [4]. Basuki, B. & Irwanda, R.D., (2018). Environmental Cost Analysis And Reporting To Measure Environmental Performance In Realizing Eco-Efficiency At PT Industri Kereta Api (Persero). *Asian Journal Of Accounting Research*, Vol. 3, Iss. 2, Pp: 169-180. <https://doi.org/10.1108/AJAR-06-2018-0013>
- [5]. Carnevale C, Ferrari F, Guariso G, Maffei S, Turrini E, Volta M. Assessing The Economic And Environmental Sustainability Of A Regional Air Quality Plan. *Sustainability*. 2018; 10(10):3568. <https://doi.org/10.3390/Su10103568>
- [6]. Christophe, B. & Bebbington, J. (1992). The French Bilan Social – A Pragmatic Model For The Development Of Accounting For The Environment. *The British Accounting Review*, Vol. 24, No. 3, Pp: 281-290. <https://www.sciencedirect.com/science/article/abs/pii/S0890838905800277>
- [7]. De Micco, P., Rinaldi, L. Vitale, G., Cupertino, S. Maraghini, M.P. (2020). The Challenges Of Sustainability Reporting And Their Management: The Case Of Estra. *Meditari Accountancy Research*, Vol. 29., Iss. 3. Retrieved From The Official Emerald Website: <https://www.emerald.com/insight/content/doi/10.1108/MEDAR-09-2019-0555/full/html>
- [8]. Dhaif Allah, A., Bourekkadi, S., Babounia, A. & Elhakimi, S. (2021). Extent Of Measurement And Disclosure Of Environmental Information In Financial Reports Under (IFRS & IAS) For Yemeni. *E3S Web Of Conferences* 319, 01079. <https://doi.org/10.1051/E3sconf/202131901079>
- [9]. Dinh, K.X., Nguyen, T.D., & Nguyen, T.H. (2022). Factors Affecting The Application Of Environmental Accounting In Manufacturing Enterprises In Vietnam. *Journal Of Accounting, Finance And Auditing Studies*, Vol. 8, No. 3, Pp: 115-140. <https://doi.org/10.32602/Jafas.2022.020>
- [10]. Hassan, A. & Ibrahim, E. (2012). Corporate Environmental Information Disclosure: Factors Influencing Companies' Success In Attaining Environmental Awards. *Corporate Social Responsibility And Environmental Management*, Wiley Online Library, Vol. 19, Iss. 1, Pp: 32-46. <https://doi.org/10.1002/Csr.278>
- [11]. Iatridis, G. E. (2013). Environmental Disclosure Quality: Evidence On Environmental Performance, Corporate Governance And Value Relevance. *Emerging Markets Review*, Vol. 14, Pp: 55-75. <https://doi.org/10.1016/J.Ememar.2012.11.003>
- [12]. Ifada, L.M. & Jaffar R. (2023). Does Environmental Cost Expenditure Matter? Evidence From Selected Countries In The Asia-Pacific Region. *Sustainability*, Vol. 15, No. 5, Article Number: 4322. <https://doi.org/10.3390/Su15054322>
- [13]. IFRS, (2021). General Requirements For Disclosure Of Sustainability-Related Financial Information Prototype. Retrieved From: <https://www.ifrs.org/content/dam/ifrs/groups/trwg/trwg-general-requirements-prototype.pdf>

- [14]. International Institute For Sustainable Development (IISD, 2007). Corporate Social Responsibility: An Implementation Guide For Business. Available At: https://www.iisd.org/system/files/file=publications/csr_guide.pdf
- [15]. Kalash, I. (2020). Environmental Disclosure: Determinants And Effects On Financial Performance? An Empirical Evidence From Turkey. *Sosyoekonomi*, Vol. 28, Pp: 95-115. <https://doi.org/10.17233/Sosyoekonomi.2020.04.05>
- [16]. Kaplan, R. & Ramanna, K. (2021). Accounting For Climate Change. *Harvard Business Review*. Retrieved From: <https://hbr.org/2021/11/accounting-for-climate-change>
- [17]. Le, T.T.; Nguyen, T.M.A.; Phan, T.T.H. (2019). Environmental Management Accounting And Performance Efficiency In The Vietnamese Construction Material Industry—A Managerial Implication For Sustainable Development. *Sustainability*, Vol. 11, Iss. 19, Article: 5152, Pp: 1-32. <https://doi.org/10.3390/Su11195152>
- [18]. Lu, L.W., & Taylor, M.E. (2018). A Study Of The Relationships Among Environmental Performance, Environmental Disclosure, And Financial Performance. *Asian Review Of Accounting*, Vol. 26, No. 1, Pp: 107-130. <http://dx.doi.org/10.1108/ARA-01-2016-0010>
- [19]. Mahdavi, H., Daryaei, A., Ali Khani, R., & Maran Jouri, M. (2015). The Relation Of Firm Size, Industry Type And Profitability To Social And Environmental Information Disclosure. *Quarterly Journal Of Empirical Accounting Research*, Vol. 4, No. 15, Pp: 87-103. <http://dx.doi.org/10.22051/JERA.2015.1994>
- [20]. Moeinnejhad, B. & Saremi, H. (2014). Role Of Environmental Accounting In Enterprises. *Ecology Environment And Conservation*, Vol 20, No. 3, Pp:1257-1268. <https://doi.org/10.3390/Su14116526>
- [21]. Potella, A.R., & Borba, J.A. (2019). Environmental Disclosure In Corporate Websites: A Study In Brazil And USA. *RAUSP Management Journal*. Vol. 55, No. 3, Pp: 309-324. <https://doi.org/10.1108/RAUSP-07-2018-0053>
- [22]. PwC, (2021). Financial Statement Presentation And Disclosure Requirements. Retrieved From: https://viewpoint.pwc.com/dt/us/en/pwc/accounting_guides/financial_statement/_financial_statement__18_US/Chapter_1_General_presentation_and_disclosure_requirements/11_financial_presentat_US.html#pwc-topic.dita_1946185101185664
- [23]. Qiu, J., & Chen, W. (2022). The Analysis Of Environmental Cost Control Of Manufacturing Enterprises Using Deep Learning Optimization Algorithm And Internet Of Things. *Computational Intelligence And Neuroscience*, Vol. 2022, Pp: 1-11. <https://doi.org/10.1155/2022/1721157>
- [24]. Rini, R.K. & Adhariani, D. (2021). Does Financial Performance Drive Environmental Disclosure And Environmental Cost? Evidence From Indonesia. *Jurnal Ilmiah Akuntansi Dan Bisnis*, Vol. 16, No. 2, Pp: 317-331. <http://dx.doi.org/10.24843/JIAB.2021.V16.I02.P09>
- [25]. Stasiskiene, Z. (2019). Environmental Accounting: Concept, Methodology, And Application. In: Leal Filho, W., Azul, A., Brandli, L., Ozuyar, P., Wall, T. (Eds) *Responsible Consumption And Production. Encyclopedia Of The UN Sustainable Development Goals*. Springer, Cham. https://doi.org/10.1007/978-3-319-71062-4_27-1
- [26]. Tran, N. H., Nguyen, T. T. H., & Nguyen, T. P. (2021). Factors Affecting An Application Of Environmental Management Accounting: A Case Study Of The Automobile Industry In Vietnam. *Journal Of Asian Finance, Economics, And Business*, Vol. 8, No. 7, Pp: 509–516. <https://doi.org/10.13106/Jafeb.2021.vol8.no7.0509>
- [27]. United States Environmental Protection Agency (1995). An Introduction To Environmental Accounting As A Business Management Tool: Key Concepts And Terms. Available Online At: <https://www.epa.gov/sites/default/files/2014-01/documents/busmgt.pdf>
- [28]. World Bank, 1991. *Integrated And Environmental Accounting: A Case Study For Mexico*. <https://documents1.worldbank.org/curated/en/649951493256192334/Pdf/Multi-Page.Pdf>
- [29]. Zhang, L., Xu, M., Chen, H., Li, Y., Chen, S. (2022). Globalization, Green Economy And Environmental Challenges: State Of The Art Review For Practical Implications. *Frontiers In Environmental Science*, Vol. 10, Pp: 1-9. <https://doi.org/10.3389/Fenvs.2022.870271>