Factors Influencing the Implementation of Environmental Cost Management Accounting in Manufacturing Enterprises in Hai Duong Province

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Abstract:

The study aims to identify the factors influencing the application of environmental cost management accounting in manufacturing enterprises in Hai Duong province. Two hundred ninety-five survey samples were collected from managers and accountants using a descriptive statistical method, including reliability testing, exploratory factor analysis, correlation, and linear regression with SPSS 26 software. The results indicate that the six influencing factors, in descending order, are: manager awareness, coercive pressure, benefit-cost relationship, normative pressure, accountant qualifications, and mimetic pressure. These research findings provide a crucial basis for suggesting management implications to promote and encourage manufacturing enterprises to adopt environmental cost management accounting.

Keywords: Environmental cost management accounting, Hai Duong province, manufacturing enterprises.

1. Introduction

In addition to the economic growth rate, the rapid processes of industrialization and urbanization have resulted in challenges and concerns regarding sustainability, including issues related to wastewater, emissions, solid waste, and industrial chemicals discharged by businesses. These factors significantly impact the natural environment, deplete resources, and contribute to climate change, adversely affecting human health, quality of life, animals, land, and ecosystems. The challenge lies in balancing economic growth with social advancement while safeguarding the natural environment. In this context, environmental cost management accounting emerged as a solution to assist businesses in meeting their environmental responsibilities throughout their production and operations. This approach is part of overall cost management accounting within enterprises. It aims to implement environmental cost considerations, providing essential information for managers to develop plans that enhance economic efficiency while effectively improving environmental conditions, all directed towards sustainable development. According to Nguyen (2016), adopting environmental cost management accounting enables enterprises to realize several benefits, including increased

income from savings on water, energy, and raw materials, reduced waste, and lower waste treatment costs.

However, implementing environmental cost management accounting in enterprises, particularly manufacturing, still faces limitations and challenges. Because Vietnam has not established an environmental accounting framework for enterprises, it becomes very difficult to separate, accurately track, and detail the costs associated with the environment during the production process. The current accounting system does not fulfill the requirements for accounting and recording all types of costs. Many environmental-related costs are categorized under general management cost accounts, making it challenging for managers to identify the scale and nature of each environmental expense, with their complex accounting and significant role in the country's industrialization and modernization. In Hai Duong province, with their complex accounting systems, there are nearly 20.000 enterprises, including many large manufacturing firms in sectors such as food, pharmaceuticals, household appliances, wood products, chemicals, materials, and plastics, which have substantially impacted the quality of the ecological environment. Given this situation, it is imperative to study and identify the factors that affect the implementation of environmental cost management accounting in manufacturing enterprises in Hai Duong province to enhance production quality and environmental efficiency.

2. Literature review and research model

2.1. Environmental cost management accounting

No unified concept of environmental cost management accounting is widely accepted across all countries or studies. However, according to Birkin (1996), environmental cost management accounting is an advancement of management accounting in enterprises, focused on processing and providing information regarding environmental costs to facilitate decision-making within organizations (Do et al, 2024). Bartolomeo et al. (2000) argue that environmental cost management accounting involves recording, analyzing, and applying financial and non-financial information to integrate enterprises' economic and environmental policies, to promote sustainable business development. The United Nations Sustainable Development Organization (2001) describes environmental cost management accounting as identifying, collecting, and analyzing environmental information using monetary and physical measures for decision-making. Here, physical (non-monetary) information refers to data about the use, flow, and disposal of energy, water, and raw materials (including waste). In contrast, monetary information pertains to costs, benefits, and savings related to environmental concerns. The International Federation of Accountants (IFAC, 2005) defines environmental cost management accounting as the management of economic and environmental performance by developing and implementing appropriate accounting systems and practices that may include reporting and auditing.

In this study, environmental cost management accounting is understood as the implementation of a cycle that includes collecting, processing, and analyzing cost information

related to the environment during the enterprise's business operations, then gathering and preparing necessary reports on those types of costs as a basis for managers to build effective business goals and plans towards sustainable development.

2.2. Theoretical framework

Many theories have been proposed to explain the development and application of environmental cost management accounting, with the most popular being legitimacy theory, stakeholder theory, and institutional theory.

Legal theory posits that an organization's activities should align with its operating environment's values and social norms. It suggests a relationship between business and society. Fernando and Lawrence (2014) emphasized that business is not an isolated entity; it exists in connection with society. Organizations failing to adhere to social values or norms may encounter challenges in earning community support necessary for continued operations. Legitimacy pressures enterprises to engage in environmental management and modify accounting systems to align with community standards and values. Additionally, Chang (2007) notes that providing information about enterprises is crucial, as it impacts their survival. Enterprises that implement business strategies to achieve their objectives also work to maintain legitimacy. Failure to meet societal expectations can lead to the revocation of licenses, significantly jeopardizing long-term enterprise viability (Deegan, 2002).

According to Clarkson (1995), stakeholder theory posits that when enterprises are accountable to their stakeholders, it leads to sustainable benefits for the business. This theory is discussed from two perspectives: normative (ethical) and management (Deegan, 2002). The management aspect focuses on fulfilling stakeholders' desires, while the ethical aspect emphasizes balancing the interests of all participants (Fernando & Lawrence, 2014). According to this theory, stakeholders share the same rights and duties; however, the theory also highlights the complexities that stakeholders introduce, including accounting accountability (Laan, 2009) and environmental management practices (Lai & Fryxell, 2004). It also explains the motivations for organizations to select and voluntarily adopt environmental management accounting in order to meet informational needs. There is a growing awareness of environmental issues among government agencies, credit institutions, investors, consumers, and the broader community.

Institutional theory refers to changes in organizational behavior, such as models, strategies, processes, methods, and techniques, resulting from stakeholder pressure, along with how organizations operate to survive and develop legitimately. According to Scott (1995), institutional theory incorporates the impact of cognition in explaining individual behavior, suggesting that individuals must comply with institutions to avoid differing from others. In this institutional context, the growing emphasis on environmental awareness has influenced the adoption of environmental cost management accounting, compelling organizations to consciously align with societal expectations (Chang, 2007). Research by Qian and Burritt (2009), Jalaludin et al. (2011), and Jamil et al. (2015) has explored the link between the

implementation of environmental cost management accounting within institutional theory and three institutional pillars: government coercive pressure, normative pressure, and mimetic pressure.

Recently, several related domestic studies have been conducted. For instance, Mai (2020) identified factors affecting the application of environmental management accounting in manufacturing enterprises in Da Nang City, which include owner awareness, cost-benefit efficiency, regulations on the implementation of environmental management accounting, enterprise size, and environmental strategy.

Grounded in legal theory and stakeholder theory, Do (2020) assessed the factors influencing the application of environmental cost management accounting in tea production enterprises in Thai Nguyen province. The findings revealed that government coercive pressure, community pressure, stakeholder pressure, and manager perception all impact the application of environmental cost management accounting.

The study of Pham et al. (2022) utilizing data from 68 manufacturing enterprises in Vietnam revealed four main factors that significantly influence the application of environmental cost management accounting in these enterprises: perception of usefulness, perception of difficulties, normative pressure, and coercive pressure.

Doan et al. (2023) shows that the size of the enterprise, the ecological sensitivity of the manufacturing industry, coercive pressure, the strictness of the legal system, managers' awareness, the quality of accounting staff, corporate culture's clarity, and the challenges of applying green accounting are factors that impact the adoption of environmental cost management accounting in manufacturing enterprises of Vietnam.

Lately, Hoang and Nguyen (2024) discuss the factors affecting the application of environmental accounting in manufacturing enterprises in Hung Yen province, including: business production activities, financial resources, awareness of business entities, pressure from stakeholders, and business size.

2.3. Research hypothesis and model

Based on theoretical foundations, the author identified factors affecting the application of environmental cost management accounting in manufacturing enterprises in Hai Duong province. These factors include coercive pressure, normative pressure, mimetic pressure, manager awareness, benefit-cost relationship, and accountant qualifications, supported by six hypotheses as follows:

Coercive pressure refers to the influence of policies aimed at sustainable development, where the government intervenes and regulates business activities through the operating policies of each country (Mia, 2005). This pressure manifests through laws and regulations that enterprises must strictly adhere to to ensure legality. Compliance with environmental

regulations to minimize costs presents coercive pressure that motivates manufacturing enterprises to adopt environmental management accounting (Chang, 2007; Jalaludin et al., 2011). Furthermore, as Alkisher (2013) and Jamil et al. (2015) noted, it also originates from the community, the media, or individuals regarding environmental protection standards. Based on the preceding argument, the research hypothesis is proposed as follows:

H1: Coercive pressure positively impacts the implementation of environmental cost management accounting in manufacturing enterprises.

Normative pressure refers to enterprises' obligation to comply with regulations concerning public relations, rules, and ethics (DiMaggio & Powell, 1983). Promoting professional education and ethical standards at training institutions will create the conditions necessary for implementing environmental management accounting (Qian & Burritt, 2007). When enterprises prioritize training, education, and updating relevant knowledge and skills, it facilitates more accurate accounting practices, ensuring adherence to standards and professional requirements. Based on this argument, the research hypothesis is proposed as follows:

H2: Normative pressure positively impacts the implementation of environmental cost management accounting in manufacturing enterprises.

Mimetic pressure refers to the influence that compels organizations to emulate units recognized as successful in society or to adopt industry standards (DiMaggio & Powell, 1983). The approach to recording environmental costs and managing the associated issues faced by large manufacturing companies globally serves as a valuable lesson in environmental cost management accounting. According to Nguyen (2020), enterprises can model the actions, methods, and processes employed by multinational corporations, large firms within the same industry, and competitors to ensure their environmental strategies align with social standards and values. Building on this argument, the research hypothesis is proposed as follows:

H3: Mimetic pressure positively impacts the implementation of environmental cost management accounting in manufacturing enterprises.

Manager awareness refers to a business leader's perspective on environmental changes that impact accounting and business operations. According to Chang and Deegan (2010), owners' awareness directly influences the implementation of environmental accounting. When managers recognize the role and benefits of environmental cost management accounting, along with the enterprise's environmental responsibilities, they will require the information offered by environmental cost management accounting, value its benefits, promote its implementation, and accept the associated costs. Based on this argument, the research hypothesis is proposed as follows:

H4: Manager awareness positively impacts the implementation of environmental cost management accounting in manufacturing enterprises.

The benefit-cost relationship compares the benefits the enterprise receives to the costs incurred in its application. While environmental cost management accounting has the potential to enhance both financial and environmental performance, it often receives less emphasis when organizations face financial pressures. According to Jamil et al. (2014), limited funding poses a significant barrier to the development of environmental cost management accounting in small and medium-sized manufacturing enterprises. Based on this argument, the research hypothesis is proposed as follows:

H5: The benefit-cost relationship positively impacts the implementation of environmental cost management accounting in manufacturing enterprises.

Accountant qualifications refer to the professional capacity and ability to process and provide information on revenue and environmental costs to managers, demonstrated through the knowledge and experience of accountants in their tasks (Chang, 2007). Essentially, the sequence of collecting, processing, and providing information is similar to traditional management accounting; however, the processing techniques and practical tools differ due to the nature of environmental costs within enterprises. The complex knowledge and technical requirements of environmental cost management accounting tools directly impact accountants during the implementation process. Based on this reasoning, the research hypothesis is proposed as follows:

H6: Accountant qualifications positively impact the implementation of environmental cost management accounting in manufacturing enterprises.

Drawing from the above hypotheses, the author present the following research model:

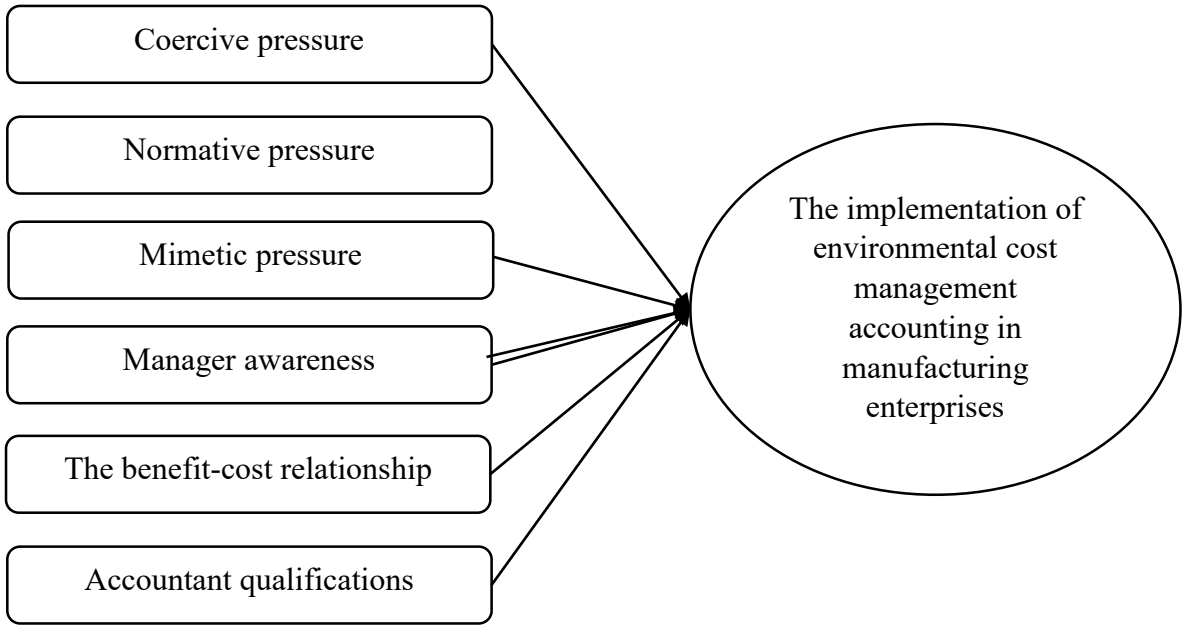

Figure 1: Research model

Source: Proposed by the author

The research model is expressed by the following equation:

$$\mathbf{IECMA = \beta_0 + \beta_1 * CP + \beta_2 * NP + \beta_3 * MP + \beta_4 * MA + \beta_5 * BC + \beta_6 * AQ + \varepsilon}$$

In which:

IECMA (dependent variable): The implementation of environmental cost management accounting in manufacturing.

Independent variables include (X_i): Coercive pressure (CP), Normative pressure (NP), Mimetic pressure (MP), Manager awareness (MA); The benefit-Cost relationship (BC); Accountant qualifications (AQ).

β_k: Regression coefficient (k = 0. 1, 2,..., 6).
ε: error.

3. Research methods

The preliminary scale was developed based on legal theory, stakeholder theory, and institutional theory, combined with studies by Jalaludin et al. (2011), Do (2020), Mai (2020), Pham et al. (2022), and Doan et al. (2023). There were 28 observed variables corresponding to six independent factors and one dependent factor. Before the preliminary scale was included in the official survey, the authors held group discussions with eight administrators and accountants from various manufacturing sectors in Hai Duong province, along with consultations with 3 experts in finance and accounting to review the relationships of the factors and adjust the observed variables to better fit the actual situation. The results indicate that participants agreed with the factors and observed variables in the proposed research model. However, the observed variables need to be revised in some wording to prevent duplication and clearly convey the content of the questions.

The study utilized a 5-level Likert scale, ranging from level 1 (strongly disagree) to level 5 (strongly agree). According to the sample size calculation formula by Hair et al. (2010) for analyzing exploratory factor analysis (EFA), the minimum ratio is 5:1, with the optimal ratio being 10:1. Therefore, based on the best ratio, the number of survey forms needed is 28*10 = 280. Additionally, to prevent the number of invalid survey forms from negatively affecting the analysis capability, the authors increased the actual number of surveys issued by more than 10%, resulting in 310 survey forms. A convenience non-probability survey method was employed, combining direct survey distribution with the distribution of emails to managers, chief accountants, and accounting staff at enterprises in the manufacturing sector of Hai Duong province. From July 2024 to October 2024, 295 valid survey forms were obtained. The collected data were cleaned and analyzed using SPSS 26 software to test the hypothesis at a 5 percent significance level.

4. Research results

A total of 295 survey questionnaires were collected, and the statistical results of the sample frequency reveal the following: In terms of gender, women comprise 57.52% and men make up 42.48%. Regarding job positions, accountants represent 41.23%, chief accountants account for 38.24%, and directors constitute the remaining 20.53%. In terms of educational attainment, college and intermediate levels account for 35.67%, while university-educated individuals represent 59.12%, and those with postgraduate degrees make up 5.21%. Concerning investment capital, among the total survey sample, 75.86% are businesses with entirely domestic investment, whereas 24.14% are businesses with foreign investment. Regarding work experience, the majority of respondents have between 5 to 10 years of experience, accounting for 65.03%, while those with over 10 years account for 21.35%, and the remaining 13.62% have less than 5 years of work experience. Therefore, the survey forms are suitable for use in the subsequent analysis.

Table 1. Reliability test and EFA results of independent factors

Sign	**Items**	**Corrected Item- Total Correlation**	**Cronbach's Alpha if Item Deleted**	**Factor loadings**
Coercive pressure		Cronbach's Alpha = 0.835		
CP3	Enterprises must comply with the regulations on chemical usage levels issued by the state	0.572	0.817	0.828
CP1	The state tightens management of environmental licenses	0.564	0.805	0.811
CP2	Enterprises must comply with environmental reporting regulations issued by the state	0.558	0.792	0.805
CP5	Businesses must comply with penalty policies for environmental violations	0.541	0.788	0.796
CP6	Businesses must comply with environmental standards in production	0.535	0.769	0.770
CP4	The community is always concerned about how businesses handle environmental issues	0.526	0.751	0.763
CP7	Media and press are interested in how businesses handle environmental issues	0.503	0.742	0.752
Normative pressure		Cronbach's Alpha = 0.787		

Sign	Items	Corrected Item- Total Correlation	Cronbach's Alpha if Item Deleted	Factor loadings
NP1	Businesses are influenced by accounting organizations, associations, and the environment.	0.468	0.775	0.781
NP2	Businesses affected by environmental activities	0.451	0.764	0.766
NP3	Businesses under pressure to train employees on environmental issues	0.439	0.758	0.757
Mimetic pressure		Cronbach's Alpha = 0.803		
MP2	Environmental management activities of enterprises are influenced by competitors	0.487	0.792	0.801
MP1	Environmental management activities of enterprises are influenced by enterprises in the same field	0.460	0.784	0.797
MP3	Environmental management activities of enterprises are influenced by managers in the industry	0.445	0.765	0.785
Manager awareness		Cronbach's Alpha = 0.849		
MA2	Enterprises are responsible for disclosing information on environmental activities	0.563	0.835	0.826
MA3	Applying environmental cost management accounting helps businesses calculate product costs more accurately	0.551	0.827	0.815
MA4	Applying environmental management accounting helps enhance the brand value of the enterprise and increase competitive advantage	0.548	0.814	0.808
MA1	recording environmental costs helps businesses build credibility with society and investors	0.520	0.800	0.790
The benefit-cost relationship		Cronbach's Alpha = 0.837		
BC1	Recording environmental costs helps businesses manage resources well, reduce waste and increase profits from savings	0.522	0.824	0.816

Sign	Items	Corrected Item- Total Correlation	Cronbach's Alpha if Item Deleted	Factor loadings
BC2	Recording environmental costs helps businesses have a basis to build effective strategies and solve environmental problems well	0.510	0.819	0.791
BC4	Recording environmental costs brings long-term benefits to enterprises	0.504	0.805	0.785
BC3	Recording environmental costs helps businesses manage environmental issues well and avoid being fined by regulatory agencies	0.484	0.793	0.776
Accountant qualifications		Cronbach's Alpha = 0.796		
AQ2	Accountants can identify, classify and record environmental costs in the enterprise	0.475	0.785	0.773
AQ4	Accountants can measure environmental costs for cost-bearing entities	0.460	0.762	0.759
AQ1	Accountants can analyze environmental cost information to calculate economic efficiency	0.452	0.750	0.746
AQ3	Accountants can prepare environmental cost management reports upon request	0.438	0.743	0.721
KMO = 0.829				
Bartlett's test	Approx. Chi-square value	11052.845		
	df	307		
	Sig.	0.000		
Eigenvalues		1.265		
Total variance extracted %		81.527		

Source: Data analysis results from SPSS26

The results of the reliability test indicate that the Cronbach's Alpha for factors is greater than 0.7, and the corrected item- total correlation coefficient for observed variables of factors exceeds 0.3. Additionally, the Cronbach's Alpha if Item Deleted is lower than the overall Cronbach's Alpha, suggesting that each observed variable contributes positively to the scale's reliability, and no variable needs removal. This satisfies the criteria for inclusion in the exploratory factor analysis (Hair et al., 2010).

The results of the exploratory factor analysis (EFA) of independent factors revealed that the KMO was 0.829, meeting the criteria (greater than 0.5 and less than 1). The Chi-square statistic for the Bartlett Test reached a value of 11052.845, with a significance level of 0.000 (less than 0.05). At an Eigenvalue of 1.265 (greater than 1), the factor analysis extracted 6 factors, accounting for a total extracted variance of 81.527% (greater than 50%), indicating that 6 factors explained 81.527% of the variation in the data. Additionally, the factor loadings of the observed variables were above 0.5, confirming that the data used in the exploratory factor analysis fully complied with the requirements (Hair et al., 2010).

Table 2. Reliability test and EFA results of dependent factor

Sign	**Items**	**Corrected Item- Total Correlation**	**Cronbach's Alpha if Item Deleted**	**Factor loadings**
The implementation of environmental cost management accounting in manufacturing enterprises		Cronbach's Alpha = 0.820		
IECMA1	Enterprises collect and record information on environmental cost management accounting	0.541	0.813	0.799
IECMA2	Enterprises have information processing and analysis systems to serve environmental cost management accounting work	0.539	0.806	0.782
IECMA3	Businesses prepare reports and provide accurate information about the environment.	0.526	0.795	0.778
KMO = 0.806				
Bartlett's test	Approx. Chi-square value			248.963
	df			3
	Sig.			0.000
Eigenvalues				1.078
Total variance extracted %				79.584

Source: Data analysis results from SPSS26

The results of the dependent factor indicate that Cronbach's Alpha exceeds 0.7, the corrected item- total correlation is greater than 0.3, and the Cronbach's Alpha if Item Deleted is lower than the overall Cronbach's Alpha, indicating that the scale is reliable. Exploratory factor analysis reveals that both the factor loading and KMO meet the required thresholds (greater than 0.5 and less than 1). The Chi-square statistic for the Bartlett Test reaches 248.963, with a significance value of 0.000 (less than 0.05) at an Eigenvalue of 1.078 (greater than 1), showing that only one factor is extracted, with the total extracted variance reaching 79.584%

(greater than 50%). Therefore, the data collected for the scale satisfies the necessary criteria (Hair et al., 2010).

Table 3. Pearson correlation analysis results

	IECMA	CP	NP	MP	MA	BC	AQ
IECMA	1	0.654**	0.721**	0.608**	0.765**	0.640**	0.718**
CP	0.654**	1	0.220**	0.415*	0.306**	0.359**	0.278**
NP	0.721**	0.220**	1	0.364**	0.401**	0.358*	0.269**
MP	0.608**	0.415*	0.364**	1	0.276**	0.510*	0.437**
MA	0.765**	0.306**	0.401**	0.276**	1	0.213**	0.304**
BC	0.640**	0.359**	0.358*	0.510*	0.213**	1	0.293*
AQ	0.718**	0.278**	0.269**	0.437**	0.304**	0.293*	1
***. Correlation is significant at the 0.01 level* **. Correlation is significant at 0.05 level*							

Source: Data analysis results from SPSS26

The results of the correlation analysis indicate a strong connection between the independent and dependent factors, with Sig. values under 0.05. Among these, the QT factor exhibits the strongest correlation, with a coefficient of r = 0.765, while the MP factor shows the weakest correlation, with a coefficient of r = 0.608. Furthermore, there is no indication of multicollinearity among the independent factors, satisfying the conditions for inclusion in the regression analysis.

Multiple linear regression analysis was conducted using the Enter method to assess the impact of independent factors on the implementation of environmental cost management accounting in manufacturing enterprises.

Table 4. Model summary

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**Value Durbin-Watson**
1	0.796	0.781	0.775	0.323	1.815

Source: Data analysis results from SPSS26

The model has an R value of 0.796 and an R Square of 0.781, indicating that the model's suitability is 78.1%. The adjusted R^2 value suggests that the model's suitability with the population is 0.775, six independent factors in the model explain 77,5% of the variation in the dependent factor. In contrast, the remaining 22.5% is attributed to factors outside the model and random errors. The Durbin-Watson value of 1.815 satisfies the condition of being in the region that accepts the hypothesis that the residuals do not exhibit first-order serial correlation.

Table 5. ANOVA

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	49.578	6	5.684	117.358	0.000
	Residual	11.457	288	0.014		
	Total	61.035	294			

Source: Data analysis results from SPSS26

The ANOVA analysis results indicate that the significance value of the F test is 0.000, which is less than 0.05. Therefore, the regression model is appropriate for the overall.

Table 6. Multiple regression analysis result

Model		Unstandardized Coefficients		Standardized Coefficient	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	*Constant*	0.351	0.016		2.256	0.000		
	CP	0.304	0.022	0.319	1.978	0.001	0.305	1.691
	NP	0.250	0.018	0.268	2.062	0.000	0.562	1.745
	MP	0.189	0.020	0.213	2.425	0.002	0.419	1.872
	MA	0.325	0.017	0.348	2.197	0.000	0.354	1.734
	BC	0.271	0.013	0.295	2.306	0.001	0.410	1.618
	AQ	0.213	0.010	0.242	2.175	0.000	0.537	1.801

Source: Data analysis results from SPSS26

The results of testing the research hypotheses indicate that factors have a significance level less than 0.05. The variance inflation factors (VIF) of the independent variables presented in the table are below 2, indicating no multicollinearity among the independent variables. Additionally, the scatterplot reveals that the residuals do not exhibit any specific pattern with respect to the predicted values; the data points are primarily distributed around the zero-intercept line and tend to form a straight line, thus confirming that the hypothesis of a linear relationship is not violated. The histogram demonstrates that the residuals are normally distributed with a very small mean (Mean = 4.69E-15) and a standard deviation of 0.993. The PP-plot shows that the actual observation points are closely aligned with the diagonal of the expected values, indicating that the residual data follows a normal distribution. Consequently, the hypothesis that the error of the regression model is constant is appropriate, and the multivariate regression model fully meets the specified conditions.

Thus, the six independent factors equally influence the dependent factor in decreasing order: manager awareness, coercive pressure, the benefit-cost relationship, normative pressure,

accoutant qualifications, and mimetic pressure. As a result, the regression equation based on the standardized beta coefficient is as follows:

IECMA = 0.348*MA + 0.319*CP + 0.295*BC + 0.268*NP + 0.242*AQ + 0.213*MP + ε

The results align with the findings of Jalaludin et al. (2011), Do (2020), Mai (2020), Pham et al. (2022), and Doan et al. (2023). However, this research exhibits differences regarding the level of impact and the order of influence among six independent factors due to variations in circumstances and research subjects. A limitation of the study is the use of a simple regression model and a small sample size, as well as a convenient survey method primarily focused on manufacturing enterprises in Hai Duong province, which has hindered its overall generalizability.

5. Implications

Firstly, with regard to business managers' recognition of the necessity for innovation, it is essential to enhance understanding by emphasizing environmental cost information throughout business operations. This approach will facilitate the creation of business plans and strategies that integrate environmental protection into sustainable development. It is imperative to accurately reflect environmental costs in accounting; hence, consideration should be given to providing training for employees or allowing their participation in specialized courses focused on environmental cost management. Such initiatives will enable employees to learn how to collect, utilize, and accurately record environmental costs in financial statements and reports. Furthermore, establishing a unified and comprehensive set of internal accounts is advantageous for specifically reflecting various types of costs. This methodology will equip administrators with a holistic overview and enable them to develop targeted solutions to address environmental issues that arise from production activities.

Secondly, with respect to the coercive pressure placed on enterprises to rigorously comply with environmental regulations and laws in their production and business practices, it is imperative to systematically update and comprehend evolving information and policies in order to mitigate violations that may result in fines and financial detriment for companies. Competent authorities are required to conduct research and develop comprehensive theoretical frameworks for environmental accounting, establish accounting standards and protocols, enhance obligatory environmental accounting systems, and delineate environmental parameters and costs pertinent to each sector and field of production. This initiative will lay the groundwork for effective environmental and management accounting within enterprises, thereby assisting them in fulfilling their assigned responsibilities while ensuring adherence to established standards.

Thirdly, with respect to the benefit-cost relationship, it is imperative for enterprises to acknowledge the long-term benefits associated with the documentation of environmental costs within the context of sustainable development trends. A heightened awareness of environmental concerns can enhance a business's reputation among investors and subsequently

bolster its competitiveness in the marketplace. Furthermore, regulatory authorities must implement measures to promote and incentivize consumer preference for products manufactured by environmentally responsible firms. Additionally, financial institutions should establish supportive policies aimed at facilitating capital access for these enterprises, including the reduction of interest rates and the introduction of preferential loan packages.

Fourthly, with respect to normative pressure, it is imperative for businesses to actively engage in networking, participate in professional associations, and organize discussion forums pertaining to the accounting profession in general and environmental accounting specifically. This will facilitate favorable conditions for accounting personnel to acquire and update their knowledge, thereby enabling the precise reflection of environmental costs.

Fifth, concerning the accountant qualifications for the effective implementation of environmental cost management accounting, enterprises should encourage employees to engage in both short-term and long-term specialized training programs or accounting seminars to enhance their expertise and professional competencies. Furthermore, relevant authorities ought to prioritize the training and enhancement of accountants' professional qualifications in relation to environmental accounting topics. This ensures their accurate comprehension of the profession and enables them to advise business administrators on matters of environmental cost management accounting, thus mitigating the risk of intentional errors and preventing liability for recording essential environmental costs.

Sixth, concerning mimetic pressure, it is imperative for businesses to proactively acquire knowledge and comprehend the implementation of environmental cost management accounting practices utilized by organizations that have successfully adopted these measures, both nationally and internationally. It will enable them to extract relevant lessons and glean suitable integration experiences into their operations. Furthermore, competent authorities should facilitate the establishment of conditions conducive to the organization of exchanges and workshops aimed at promoting the exchange of expertise and experiences between domestic and international businesses, as well as experts in the field of environmental cost accounting.

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