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Factors Affecting The Implementation Of Environmental Management Accounting In Manufacturing Enterprises: Evidence From Vietnam

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Abstract

Environmental accounting in Vietnam is a new field, which plays an important role in corporate governance as well as direct and indirect interests outside the enterprise in making economic decisions.This article focuses on the factors affecting the implementation of environmental accounting in manufacturing enterprises, from the perspective of stakeholders.The results of the analysis of 185 survey samples from managers, chief accountants, accountants in 102 manufacturing enterprises in Vietnam, by quantitative research and regression analysis show that 5 key factors have a significant influence on the implementation of environmental accounting in manufacturing enterprises are arranged in descending order, as follows: Pressure from stakeholders; Business sector; Qualification of accounting staff; Managers' perception of environmental accounting; and Enterprise size. At the same time, the study also examined the differences in the perception of surveyed subjects about the level of influence of factors on the implementation of environmental accounting in enterprises. The findings from the empirical research are the basis for the author to make recommendations and suggestions to stakeholders to increase the implementation of environmental accounting in manufacturing enterprises in Vietnam in the coming time.

Keywords: Manufacturing enterprises, environmental accounting, environmental management accounting.

1. Introduction

Vietnam's extensive and effective process of international economic integration over the years has brought many great achievements for the country in general as well as for business in particular. Vietnamese enterprises have more opportunities to enter the global market and integrate more deeply into the world financial market to access foreign capital flows (Nguyen & Tran, 2019). However, developed countries in the world have been investing heavily in green growth strategies. They are particularly interested in combating and eliminating the market access of imported products that do not comply with the manufacturing process and do not meet environmental protection requirements. In that context, Vietnamese enterprises wishing to develop steadily and vigorously need to take care of and be responsible for the environment and society in addition to making profits (Nguyen & Tran, 2019).

Enterprises, if priority is given to setting high economic development goals, must use many natural resources, the possibility of pollution from industrial wastes is very large, directly affecting sustainable development. As a result, the attention and oversight of stakeholders such as governments, environmental regulators, media and communities for the environmental protection of businesses will be increasing. Since then, there is an urgent need for enterprises to have accounting methods that allow enterprises to identify environmental costs, identify incomes and provide the most reasonable ways to

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measure indicators and support for environmental results reports. Therefore, environmental accounting is an effective tool to help managers grasp information about the environment to serve internal management decisions. At the same time, environmental accounting has a significant influence on the decisions of users of accounting information outside the enterprise, such as customers, investors, authorities, local people... In addition, environmental accounting overcomes the disadvantages of traditional accounting by adding environmental physical information to the monetary aspect of traditional accounting, in accordance with social requirements, supporting the improvement of corporate responsibility and generating more positive feedback for stakeholders. Environmental accounting needs to record, measure and disclose the full environmental impacts of the business (Jones, 2010). The emergence and development of environmental accounting helps to improve the understanding of the environment, environmental costs and environmental impacts (Schaltegger & Burritt, 2017; IFAC, 2005).

In Vietnam, in fact, the current legal documents, regimes and accounting standards have not mentioned the organization of environmental accounting in enterprises. The current accounting regime does not contain specific guidelines for the accounting and recognition of expenses incurred in connection with the environment as well as revenues and income. Moreover, the information in the financial statements still does not show the revenue, environmental costs leading to the assessment of the business efficiency of the enterprise. In addition, the travel expense accounts reflect the general management costs of the enterprise with costs related to the environment, making it difficult for the enterprise to classify the scale and nature of environmental costs in general and each environmental cost in particular. The above shortcomings and limitations have significantly reduced the efficiency of implementing environmental accounting in enterprises. Many questions have been asked to learn, such as: In addition to the factors related to the above legal regulations, are there other factors affecting the implementation of environmental accounting in manufacturing enterprises? If so, what is the factor? And what have businesses and stakeholders done to control them?

Through the literature review, the author found that, although there have been some published works in both the world and Vietnam highlighting the impacts of factors on the implementation of environmental accounting in enterprises, such as: Qian (2007) study conducted in Australia, the results show that, complex tasks, interdisciplinary communication, environmental uncertainty, community expectations and environmental strategy are all significantly related to the level of implementation of environmental accounting for waste management in the locality. Jalaludin et al., (2011) showed that the normative pressure on training and accounting body members is the most influential factor in the implementation of environmental accounting of 74 manufacturing enterprises in Malaysia. In contrast, Jamil et al., (2015) showed that the coercive pressure has a significant influence on the implementation of environmental accounting in 32 small and medium enterprises in Malaysia. A fairly complete study of the application of uncertainty theory, Christ & Burritt (2013) found that environmental strategy, industry and enterprise size have an important relationship to current and future environmental accounting in Australia. Using interview and survey methods, Setthasakko (2015) discovered two main factors affecting the implementation of environmental accounting in pulp and paper manufacturing enterprises in Thailand, namely: the perception of senior managers and knowledge sharing in enterprises. Meanwhile, through the analysis of descriptive statistics and testing of One sample t-Test in SPSS, Hoang Thi Bich Ngoc (2017) identified factors affecting environmental accounting in oil and gas processing enterprises of Vietnam National Oil and Gas Corporation, specifically: stakeholder pressure, administrator awareness and cost-benefit considerations all have a favorable influence, but the level of

accounting staff has an opposite influence. In addition, Nguyen Thi Nga (2017) pointed out the factors affecting environmental management accounting in steel manufacturing enterprises in Vietnam: managers' perception of environmental cost management accounting, coercive pressure, internal communication and the role of the management accounting department.

Although, the issue of environmental accounting in enterprises is receiving more and more research attention from academics and practical activities, but there are few empirical studies on factors affecting the implementation of environmental accounting in manufacturing enterprises in Vietnam, where corporate governance rules are limited, the implementation of environmental accounting is still voluntary demand for most enterprises. On the other hand, the publications on the implementation of environmental accounting are mainly carried out in countries with relatively developed economies, the results and recommendations proposed for the specific business environment related to the nature, objectives and conditions of environmental accounting may not be suitable for other environments (Haniffa & Hudaib, 2007) due to differences in economic and social conditions and the development of accounting profession.

Therefore, the main purpose of this article is to identify the factors and quantify the level of influence of each factor on the implementation of environmental accounting in manufacturing enterprises in Vietnam, from the perspective of managers, chief accountants and accountants. At the same time, the study also examined the differences in the perception of the surveyed subjects on the implementation of environmental accounting in manufacturing enterprises. The research results are the basis for the author to propose some effective directions and solutions to motivate manufacturing enterprises to perform environmental accounting in the coming years.

2. Theoretical background and literature review

2.1. Theoretical basis

2.1.1. Environmental accounting

So far, there are quite a few different concepts of environmental accounting. This difference comes from the different objectives, directions of research and approaches of organizations and researchers, specifically as follows:

According to USEPA (1995), environmental accounting is one of the strategies to assess the environmental dimension in sustainable development. These strategies vary in their levels, comparability between energy, water, materials and polluting flows.

According to Gauthier et al., (1997), environmental accounting in enterprises is a part of accounting related to environmental issues and cannot be separated from financial accounting and management accounting; it is an information system that allows collecting, analyzing data, checking, evaluating performance, making decisions and assigning responsibility to managers for environmental costs and risks.

According to Schaltegger & Burritt (2017), environmental accounting is a branch of accounting that involves activities, methods and systems; recording, analyzing and reporting on the financial and ecological impacts of an economic entity.

According to Deegan & Deegan (2003), environmental accounting is a broad term, providing information related to environmental activities to stakeholders both inside and outside the enterprise. Environmental accounting can be applied at the enterprise, national or territorial level.

According to JMOE (2005), environmental accounting aims to achieve sustainable development, maintain good relationships with communities and pursue effective environmental protection activities. Environmental accounting methods allow an enterprise to identify environmental costs, determine the benefits derived from

environmental protection, provide the best means of measurement in monetary or in-kind and method of disclosing information. Therefore, environmental accounting can be used as an environmental information system to support both internal and external functions of the enterprise. Environmental accounting includes data related to environmental protection costs, environmental protection benefits, economic benefits associated with environmental protection activities, etc.

According to IFAC (2005), environmental accounting is a broad term used in a number of different accounting contexts: financial reporting and accounting; management accounting; full cost accounting; resource accounting, national reporting and accounting and sustainable accounting. At the organizational level, environmental accounting is divided into management accounting (assessment of pollution control equipment and revenues from recycled materials; annual savings from new energy saving equipment) and financial accounting (assessment and reporting of liabilities related to the environment).

Although there are still some differences in the view of environmental accounting among organizations and individuals, through the above concepts, environmental accounting is a part of the accounting system, using the new theoretical framework and accounting methods to record, measure and publish environmental financial information and environmental non-financial information to support decision-making of stakeholders inside and outside the enterprise. Environmental accounting is a means of measuring the interactions between the environment and the business activities of enterprises, emphasizing the link between environmental efficiency and economic efficiency towards sustainable development goals.

2.1.2. Implementation of environmental accounting

The contents of environmental accounting in enterprises can be approached from the following angles: access to the work cycle; access to the subjects of environmental accounting; access to the types of information of environmental accounting.

The author approaches the content of environmental accounting according to the work cycle, and includes the following contents: organizing information collection, information processing, information analysis and providing environmental information (Nguyen Thi Hang Nga, 2019). Thus, the implementation of environmental accounting is understood as environmental accounting used by accountants to provide monetary and material information for the decision-making process, evaluate the environmental performance compared to the set objectives, help managers take responsibility and be responsible for their management activities in improving environmental responsibility.

2.2. Factors affecting the implementation of environmental accounting

Domestic and foreign researches have confirmed the direct or indirect influence of factors such as enterprise size; pressure from stakeholders; business sector; managers' perception of environmental accounting; and qualifications of accounting staff to perform environmental accounting, as follows:

2.2.1. Size of enterprise

The size of the enterprise is in fact the breadth of the organization (Khandwalla, 1972). According to Luther & Longden (2001), the size of enterprises is shown by the annual revenue scale. Meanwhile, Libby & Waterhouse (1996) argue that the size of the enterprise is based on the number of employees, or the size of the enterprise is understood, including: total revenue, total assets, total labor and total profit (Zimnicki, 2017). Thus, enterprise size can be measured by headcount, turnover, budget size, size of investment capital and other factors (Mintzberg, 1979). Many studies around the world have demonstrated

that enterprise size is a significant influencing factor for environmental reporting (Roberts, 1992; Deegan & Gordon, 1996) and environmental accounting (Mokhtar et al., 2016; Ofoegbu et al., 2016, Christ & Burritt, 2013). Meanwhile, the research results of Ferreira et al., (2010) show that the implementation of environmental accounting is not dominated by organizational scale. However, the majority of studies show that large-scale enterprises are often under public pressure and have more political oversight. Therefore, large-scale enterprises need to implement environmental accounting to create a good social image, meeting the pressure of communities, investors and governments. Moreover, large-scale enterprises have higher resources and can apply more sophisticated management accounting techniques than small-scale enterprises (Chenhall, 2003). Therefore, the author assumes that:

H1: The size of the enterprise has a favorable influence on the implementation of environmental accounting in manufacturing enterprises.

2.2.2. Pressure from stakeholders

The pressure of stakeholders mentioned in the studies of Kisher (2013), Jamil et al., (2015) when studying the impact of pressures from the community, from the press media or from government agencies on environmental protection standards will create pressure for enterprises to perform environmental accounting. Environmental reporting is increasing both in quantity and quality because environmental accounting is increasingly spreading by imitating the behavior of one business to another to achieve the enormous benefits of sustainable development. Using institutional theory, Zeng et al., (2012) showed that industries with many enterprises involved in environmental information disclosure activities will be able to disclose environmental information more. Research by Wilmshurst & Frost (2000) has shown that the right of shareholders to information is the most significant factor influencing the decision to disclose environmental information. Especially with a growing sense of green consumption, customers can put pressure on businesses to implement environmental responsibility, better manage the environment through environmental accounting. Based on the above analysis, the author considers that:

H2: Pressure from stakeholders has a favorable influence on the implementation of environmental accounting in manufacturing enterprises.

2.2.3. Business areas

Research by Ferreira et al., (2010), Mokhtar et al., (2016) indicate that companies with sensitive business sectors such as the chemical, mining and metallurgical industries are more likely to apply environmental accounting than all other companies considered in the study. Manufacturing companies with environmentally sensitive business areas are in high demand in the implementation of environmental accounting because they often incur unanticipated risks, impact on the environment, causing enterprises to face many compensation incurred, increasing costs, affecting the interests of enterprises. Consensus with the above view, the same conclusions have also been confirmed in the studies of Deegan & Gordon (1996), Pahuja (2009), Christ & Burritt (2013). According to Deegan & Gordon (2001), the implementation and publication of environmental information appear more in environmentally sensitive industries, such as uranium mining, chemicals, coal ... to legalize activities with the interest of environmental groups. Christ & Burritt (2013) have demonstrated that the industry has a positive relationship to the implementation of environmental accounting. With the above analysis, the business sector of the enterprise influences the implementation of environmental accounting in manufacturing enterprises. Therefore, the third hypothesis is established, as follows:

H3: The business sector of the enterprise has a favorable influence on the

implementation of environmental accounting in manufacturing enterprises.

2.2.4. Qualifications of accounting staff

The qualifications of accountants are reflected in the qualifications, knowledge and skills they acquire through education and training. The function of environmental accounting is to provide financial and non-financial environmental information to stakeholders. To perform that function, accounting staff must have knowledge and skills related to recording, measuring, presenting and disclosing environmental information. Accountants must measure and allocate environmental costs precisely to overcome the drawbacks of traditional accounting, but this is not an easy task. Setthasakko (2010) has shown that lack of environmental knowledge and skills can limit the integration of environmental issues into accounting systems practices in enterprises in Thailand. Kisher (2013) argues that, the accountant is the person who directly performs this job so their awareness and knowledge are important to help environmental accounting be done in the business. Based on the above analysis, the author considers that:

H4: The qualification of accounting staff has a favorable influence on the implementation of environmental accounting in manufacturing enterprises.

2.2.5. Managers' perception of environmental accounting

According to Chang & Deegan's study (2010), the perception of business managers will directly affect the implementation of environmental accounting, the study shows that managers and operators have knowledge of environmental accounting, appreciate the usefulness of implementing environmental accounting, accept the costs incurred related to the implementation of environmental accounting will influence the decision to implement environmental accounting in manufacturing enterprises. In addition, Kokubu & Nashioka (2005), Lee et al., (2006) demonstrated the perceptions of senior managers as an important factor in environmental accounting practices in Japan and Korea. Awareness of managers will influence the selection of environmental policies and strategies in business activities. When administrators are well aware of the benefits of environmental accounting, they will implement a proactive environmental strategy to provide more environmental information, minimize operating costs, and minimize waste costs (Setthasakko, 2010; Jamil et al., 2015). From the above analysis, the author assumes that:

H5: Managers' perception of environmental accounting has a favorable influence on the implementation of environmental accounting in manufacturing enterprises

3. Research Method

3.1. Research models and hypotheses

From the theoretical basis and research overview, the author proposes the research model as follows:

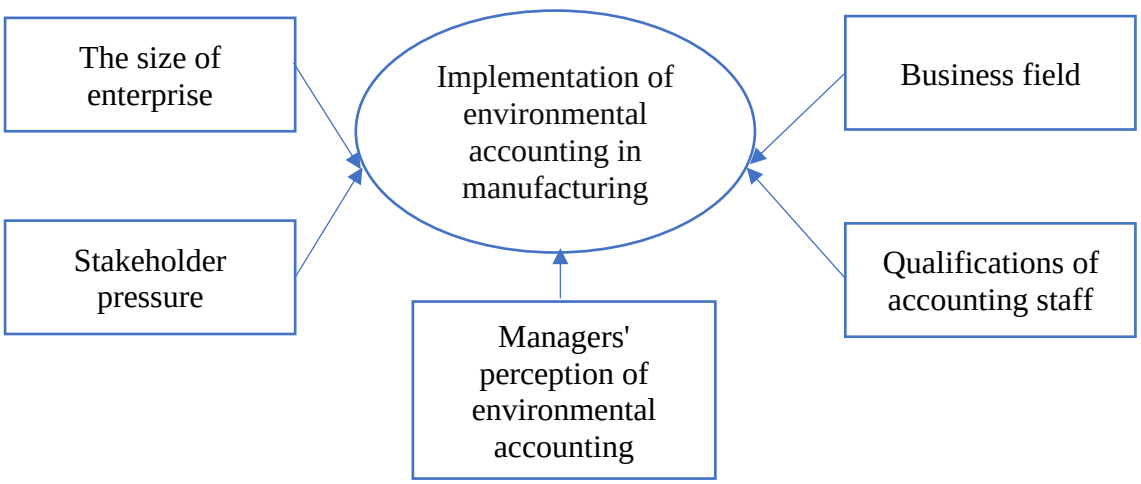

Figure 1: Models of factors affecting the organization of environmental accounting in enterprises

(Source: Author's suggestions)

With multiple regression model as follows:

KTMT = β0 + β1*QM + β2*AL + β3*LVKD + β4* TĐKT + β5*NTQL + ε

In which:

β1, β2… is the regression coefficient, β0 is the blocking coefficient, ε is the residual

Dependent variable

KTMT: Implementation of environmental accounting in manufacturing enterprises

Independent variables, including:

QM: The size of enterprise

AL: Pressure from stakeholders

LVKD: Business areas

TĐKT: Qualification of accounting staff

NTQL: Managers' perception of environmental accounting

3.2. Data collection and processing

To accomplish the research objective, the author used a deductive approach, i.e. based on the theory of previous studies and qualitative research results through expert interviews to propose models. With this study, the author performs with experts from the Board of Directors, chief accountant with long experience in enterprises in many fields of production, such as chemicals, textiles, mining, construction materials... and experts are lecturers of universities with knowledge of accounting and auditing, have in-depth studies on environmental accounting. Using qualitative research methods through interviews with experts, the author develops the selection of factors affecting the implementation of environmental accounting in manufacturing enterprises to include in the research model.

Next, the author conducts an in-depth survey through a questionnaire with 23 observation variables to collect the opinions of managers, chief accountants, accountants on the influence of factors on the implementation of environmental accounting in manufacturing enterprises. The Department of Research selects the survey subjects as managers, chief accountants and accountants because they are knowledgeable about corporate accounting, the impact of environmental accounting on enterprises, directly involved in the process of implementing environmental accounting in enterprises, capable of proposing policies and solutions to organize the implementation of environmental accounting, so there will be objective, comprehensive and accurate assessments of the research problem.

Through the review of previous studies, to evaluate the implementation of environmental accounting in manufacturing enterprises (dependent variables), the author uses the Likert scale of 5 levels of agreement, from: (1) Strongly disagree to (5) Strongly agree. Evaluating independent variable factors, the author uses the Likert scale with 5 levels of influence, from: (1). Very low to (5). Very high. The number of scales measuring variables inherited from the predecessor studies, as follows: independent variables Enterprise size, there are 4 observations, from QM1-QM4, including: average capital source; number of departments, branches; revenue; number of employees (Christ & Burritt, 2013; Mokhtar et al., 2016). Independent variables Pressure from stakeholders, with 5 observations, from AL1-AL5, including: pressure from state management agencies; pressure from customers and communities; pressure from banks and credit financial institutions; pressure from shareholders; and pressure from the media (Kisher, 2013; Jamil et al., 2015; Wilmshurst & Frost, 2000). Independent variables The

business sector, with 3 observations, from LVKD1-LVKD3, includes: environmentally sensitive production sector; sensitive production sector incurs many environmental protection costs; sensitive production sector incurs unexpected risks, impact on the environment (Ferreira et al., 2010; Mokhtar et al., 2016). Independent variables Qualifications of accounting staff, there are 4 observations, from TĐKT1-TĐKT4, including: intermediate, college level; bachelor or higher level; with local professional accounting certificate; with international professional accounting certificate (Setthasakko, 2010; Kisher, 2013). Independent variable Manager's perception of environmental accounting, there are 4 observations, from NTQL1-NTQL4, including: understanding of environmental accounting; appreciating the usefulness of environmental accounting; accepting costs of implementing environmental accounting; there is a need to use environmental accounting information (Chang & Deegan, 2010). Dependent variable Implementing environmental accounting in manufacturing enterprises, there are 3 observations, from the ECE 1 - ECE 3, including: organizing the collection of environmental accounting information; having information processing and analysis system of environmental accounting information; providing environmental accounting information (Nguyen Thi Hang Nga, 2019).

In addition, to ensure the study sample size, based on the minimum sample size requirements for EFA analysis and regression, in Bollen's view (1989), the sample size is calculated according to the formula n = 5*i (i is the number of variables observed in the model), corresponding to this study, the minimum sample size required is 5*23 = 115.

The author uses a convenient sampling method and 185 valid vouchers obtained out of 362 votes sent through sending and receiving questionnaires via Google forms and email to managers, chief accountants, accountants in 108 enterprises in Vietnam. The implementation period is from February 2022 to June 2022. Based on the collected data, the author uses quantitative techniques such as testing the reliability of the scale, exploratory factor analysis... with the use of SPSS software.22 to summarize and present the basic results of the study.

4. Results and discussion

Of 185 valid responses, 26 were from leather manufacturing enterprises, accounting for 14.05%; 28 responses were from garment manufacturing enterprises, accounting for 15.14%; 18 responses were from chemical manufacturing enterprises, accounting for 9.73%; 19 responses were from construction materials enterprises, accounting for 10.27%; 17 responses were from mineral mining enterprises, accounting for 9.19%; 20 responses were from woodworking and furniture enterprises, accounting for 10.81%; 24 responses were from food manufacturing enterprises, accounting for 12.97%; the remaining 33 responses were from manufacturing enterprises in other sectors, accounting for 17.79%.

Regarding the level of education: 154 respondents with university or higher education, accounting for 83.24%; 31 respondents with college or intermediate education, accounting for 16.76%.

Regarding the work unit: 62 replies were received from managers (members of the board of directors, chief accountant), accounting for 33.51%; 123 replies were received from accounting staff, accounting for 66.49%.

Regarding the size of enterprises: 48 replies came from large-scale manufacturing enterprises, accounting for 25.94%; 45 replies came from medium-sized enterprises, accounting for 24.33%; 92 replies came from small-scale manufacturing enterprises, accounting for 49.73%.

The sample surveyed belongs to many different subjects in terms of education level, job position, size of enterprises and especially the production and business sectors with many impacts on the environment. Thus, it is possible to ensure that the answers are reliable and of quality.

Statistical results describing the scale show that most of the observed variables have an average value around the expected average value (3.0) and there is no significant difference between the observed variables in the same group. This shows that the surveyed subjects have similar opinions and all agree with the scale of variables.

4.1. Results of testing the quality of the scale

The test results of Cronbach's Alpha for the first time for the scales of environmental accounting in manufacturing enterprises (6 scales with 23 observation variables) are shown in Table 1.

Table 1 Results of testing the reliability of the scale of the factors in the model

No.	Factor	Cronbach's Alpha
1	The size of enterprise	0.863
2	Stakeholder pressure	0.718
3	Business field	0.762
4	Qualifications of accounting staff	0.753
5	Managers' perception of environmental accounting	0.817
6	Implementation of environmental accounting in manufacturing enterprises	0.741

(Source: Processing Results on SPSS 22)

Thus, the model retains 6 factors to ensure good quality, with 23 characteristic variables (Cronbach's Alpha coefficient) of the whole greater than 0.6; The coefficient of correlation of variables - the sum of the observed variables is greater than 0.3.

Explore factor analysis EFA

The EFA exploratory factor analysis was performed separately for 02 groups of independent variables and dependent variables by the full-angle rotation method (Varimax). The results obtained after the first rotation are as follows:

Table 2. KMO and Bartlett test results table for independent variable

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.783	
Bartlett's Test of Sphericity	Approx. Chi-Square	1932.189
	df	258
	Sig.	0.000

(Source: Processing Results on SPSS 22)

EFA analysis results for the independent variable:

Looking at the results of EFA analysis for independent variables, it can be seen that the results were divided into 5 groups. The criteria are evaluated as follows:

- KMO = 0.783 so the EFA analysis is consistent with the study data.

Sig. (Bartlett's Test) = 0.000 < 0.05 shows that the observed variables in the whole are correlated with each other and the data used in the EFA analysis are appropriate.

- There are 5 factors quoted at Eigenvalues = 1.221 > 1 representing the variation explained by each factor.

- Total variance explained by factor analysis is 73.458% > 50% meet the requirements. This means that these 5 factors explain 73.458% of the data change.

The post-rotation factor matrix table will be reviewed to see what these 5 factor groups include, and whether the order of the observed variables is disturbed compared to the scale constructed at the beginning. The analysis results show that the observed variables have been assembled into 05 groups of variables with the order of the observed variables kept the same compared to the original independent variables.

Table 3: Rotation matrix of factors Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
QM1	.840				
QM3	.835				
QM4	.819				
QM2	.786				
AL1		.867			
AL4		.842			
AL3		.819			
AL2		.796			
AL5		.735			
LVKD1			.824		
LVKD2			.798		
LVKD3			.786		
TĐKT2				.823	
TĐKT3				.781	
TĐKT1				.704	
TĐKT4				.686	
NTQL1					.825
NTQL2					.812
NTQL3					.788
NTQL4					.763

(Source: Processing Results on SPSS 22)

EFA analysis results for dependent variables:

The indicators show the following coefficients:

- KMO coefficient = 0.688 satisfies the condition of 0.5 < KMO < 1, so the analysis of discovery factors is suitable for actual data.

- Sig. = 0.000 satisfies Sig condition. ≤ 0.05 so this test is statistically significant and the variables observed are correlated with each other in the overall analysis, demonstrating that the data used in the analysis are appropriate.

- The analysis of the total variance extracted for the dependent variable shows that the

percentage of variance of the whole percentage of variance = 60.812% > 50%, the value of Eigenvalue = 1.898 > 1, so the model qualifies for exploratory factor analysis and the load factor of the observation variable is greater than 0.5 so the observation variable has practical significance. So the dependent variable is kept between the original independent variable and the observed variable.

4.3. Results of regression analysis

Pearson Correlation Analysis

Correlation analysis was performed prior to regression analysis to check the correlation between the independent variable and the dependent variable, when independent variables not correlated with the dependent variable would be excluded from the model (if Sig. > 0.05).

Table 4: Pearson correlation analysis results

Correlations							
		QM	AL	LVKD	TĐKT	NTQL	KTMT
QM	Pearson Correlation	1					
	Sig. (2-tailed)						
	N	185					
AL	Pearson Correlation	0.253**	1				
	Sig. (2-tailed)	0.005					
	N	185	185				
LVKD	Pearson Correlation	0.548**	0.377**	1			
	Sig. (2-tailed)	0.000	0.000				
	N	185	185	185			
TĐKT	Pearson Correlation	0.375**	0.490**	0.385**	1		
	Sig. (2-tailed)	0.000	0.000	0.000			
	N	185	185	185	185		
NTQL	Pearson Correlation	-0.182*	0.078	-0.073	0.173	1	
	N	185	185	185	185	185	
KTMT	Pearson Correlation	0.331**	0.532**	0.440**	0.605**	0.175	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.039	
	N	185	185	185	185	185	185

**. Correlation is significant at the 0,01 level (2-tailed)

*. Correlation is significant at the 0,05 level (2-tailed)

(Source: Results of data analysis on SPSS 22)

The results of Pearson correlation analysis show that there is a close correlation between the dependent variable and the independent variable in the model. The independent variables in the matrix have average correlation coefficients and have values Sig. < 0.05, this suggests that independent variables are more likely to be able to account for each other, potentially occurring polylinearities. This will be tested more accurately with Durbin - Watson and VIF coefficients.

Regression analysis

Based on the results of EFA analysis, we have an unchanged multiple regression model, the independent and dependent variables remain the same as at the beginning. The following tables show the regression results, in particular:

Table 5: Model summary table[b]

Model	R	R Square	Adjusted R Square	Durbin-Watson
1	.785[a]	.682	.648	1.889

a. Predictors: (Constant), QM, AL, LVKD, TĐKT, NTQL.

b. Dependent Variable: KTMT

(Source: Processing Results on SPSS 22)

Table 6: Model ANOVA[a] analysis table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	80.375	5	16.075	62.694	.000[b]
	Residual	46.905	177	.265		
	Total	127.280	182			

a. Dependent Variable: KTMT

b. Predictors: (Constant), QM, AL, LVKD, TĐKT, NTQL.

(Source: Processing Results on SPSS 22)

Table 7: Linear regression results

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	Constant	.132	.249		.527	.601		
	QM	.171	.046	**.206**	3.830	.000	.742	1.352
	AL	.362	.045	**.408**	8.116	.000	.843	1.188
	LVKD	.235	.048	**.274**	5.013	.000	.718	1.396
	TĐKT	.209	.049	**.229**	4.300	.000	.754	1.328
	NTQL	.118	.043	**.220**	1.394	.005	.948	1.157

a. Dependent Variable: KTMT

(Source: Processing Results on SPSS 22)

Test the relevance of the model

Multicollinearity test: The error magnification factor (VIF) of all independent variables is less than 10, so the multicollinearity in the model is assessed as not serious.

The Durbin - Watson coefficient used to test the correlation of the residuals shows that the model does not violate when using multiple regression, since the Durbin - Watson value obtained is 1,889 (range 1 to 3). In other words, the model has no correlation of the residuals.

The assessment of model suitability is based on the Analysis of Variance (ANOVA) table. ANOVA test results with a significance

level of Sig. = 0.000 shows that the multiple linear regression model has been constructed in accordance with the data set and used, or in other words that this model is significant to derive broadly for the whole.

Evaluate the level of interpretation by the independent variables in the model

The coefficient of R^2 correction = 0.648 > 0.5 means that the independent variable explains 64.8% of the change of the dependent variable "KTMT", also 35.2% is due to random error or other factors outside the model.

The independent variables QM, AL, LVKD, TDKT, NTQL all had statistically significant impacts (due to Sig.< 0.05) to the "Implementation of environmental accounting in manufacturing enterprises".

The independent variables QM, AL, LVKD, TDKT, NTQL all have a coefficient β>0 proving to have a favorable influence on the dependent variable "Implementing environmental accounting in manufacturing enterprises". Therefore, accepting the initial hypothesis (H1, H2, H3, H4 and H5), are independent variables that are linearly related to the dependent variable and perfectly fit the model. From there, we have the regression equation with normalized beta coefficient as follows:

KTMT = 0.206*QM + 0.408*AL + 0.274*LVKD + 0.229*TDKT + 0.220*NTQL

From the results of testing the research model, there are 5 factors that have a favorable influence on the implementation of environmental accounting in manufacturing enterprises in Vietnam. This result is also similar to the results verified by the predecessor studies, namely: for the Corporate Size factor (Christ & Burritt, 2013; Mokhtar et al., 2016); for the Stakeholder Pressure factor (Kisher, 2013; Jamil et al., 2015; Wilmshurst & Frost, 2000); for the Business Area factor (Ferreira et al., 2010; Mokhtar et al., 2016); for the Accounting Staff Qualification factor (Setthasakko, 2010; Kisher, 2013); for the Manager's Perception factor on Environmental Accounting factor (Chang & Deegan, 2010).

In addition, to answer the question whether or not there is a difference in the perception of the surveyed people about the factors affecting the implementation of environmental accounting in production enterprises. The author uses Levene test technique and ANOVA test to find the difference, the results are shown in Table 8 below:

Table 8: Results of testing the differences in environmental accounting performance in enterprises manufacturing work positions

Working position	**N**	**Average**	**Standard deviation**
CFO and Corporate Director	22	3.5713	0.72268
Chief accountant of manufacturing enterprises	40	3.4982	0.80171
Accountants of manufacturing enterprises	123	3.5567	0.91487
Total	185	3.5420	0.81308
Levene's accreditation	**df1**	**df2**	**Sig.**
0.536	3	185	0.502
ANOVA accreditation	**Sum of Squares**	**F**	**Sig.**
Between Groups	1.024	0.533	0.534
Within Groups	149.235		
Total	150.259		

(Source: Results of data analysis on SPSS 22)

The results of Table 8 show that, in the Levene test for the Sig value. = 0.502 is greater than 0.05 so the variance between work positions is no difference, qualified for ANOVA analysis. Next, test ANOVA for Sig.= 0.534 is greater than 0.05. With a significance level of 5%, it can be concluded that there is no statistical difference in the assessment of factors affecting the implementation of environmental accounting in manufacturing enterprises according to work positions. Specifically, based on the average column of Table 8, we can see that people in different positions have the same assessment of the implementation of environmental accounting in manufacturing enterprises.

5. Conclusion and Recommendation

The analysis of 185 survey samples from managers, chief accountants, accountants in 108 manufacturing enterprises in Vietnam. The regression results show that the factors have a positive influence on "Implementing environmental accounting in production enterprises" in descending order, as follows: Pressure from stakeholders; Business sector; Qualification of accounting staff; Managers' perception of environmental accounting; and Enterprise size.

The findings from the experimental study are the basis for the author to make a number of recommendations, specifically as follows:

For the factor of pressure from stakeholders, the results of the study show that the production enterprises are under formal or informal pressure of stakeholders such as the government, banks and financial credit institutions, environmental organizations, from shareholders and the community, which will have a positive impact on promoting and encouraging the production enterprises to perform environmental accounting. Therefore, the study proposes that the government should synchronously issue guidance documents and implement environmental law. In order to create a legal basis in international cooperation as well as ensure consistency with accounting standards and accounting regimes, the government should clearly stipulate the implementation of environmental accounting in the Accounting Law or Government Decree. In addition, the government should have preferential policies on taxes, fees and charges to encourage enterprises to conduct environmental accounting. In addition, the Ministry of Finance should soon revise and promulgate accounting standards related to the environment based on international accounting standards. At the same time, it issued a circular guiding the implementation of environmental accounting, which clearly regulates the recording, processing and disclosure of environmental information. In addition, banks and credit financial institutions should attach importance to and integrate environmental protection issues while approving loans from enterprises, environmental organizations should open training courses for manufacturing enterprises on environmental protection issues, the relationship between environmental accounting and sustainable development.

For the factor of Enterprise size and Business sector, the results of the study indicate that companies with environmentally sensitive business sector are more likely to implement environmental accounting, because manufacturing enterprises with environmentally sensitive production sector often incur unexpected risks, impact on the environment (causing environmental pollution), causing enterprises to face many compensation incurred, increasing costs, affecting the interests of enterprises. At the same time, the study also shows the influence of scale on the implementation of environmental accounting, specifically, the larger the revenue of the enterprise will increase the feasibility of implementing environmental accounting. Therefore, in order to promote the implementation of environmental accounting in manufacturing enterprises in the coming time, there should be guidelines on environmental accounting for large-scale manufacturing enterprises and environmentally sensitive business sectors to voluntarily implement environmental accounting and in the long term,

environmental accounting will be mandatory for large-scale manufacturing enterprises and environmentally sensitive business sectors. Production enterprises should be tested for environmental accounting before mass application to the whole enterprise in the country.

For the factor of accounting staff qualifications, this study shows that accounting staff qualifications have a positive influence on the implementation of environmental accounting. This means that the more knowledgeable and skilled in environmental accounting, the more enterprises perform environmental accounting. Currently, Vietnam does not have any training programs on environmental accounting or in other words, the training of environmental accountants in our country is limited. Therefore, professional associations (VAA, VACPA...) coordinate with foreign professional organizations to organize seminars, symposia, training programs to support the theoretical framework, professional expertise, experience in environmental accounting practice for enterprises, help accountants change their minds, establish mechanisms to learn about environmental accounting. However, in order for environmental accounting to develop in the future, accountants need to be professionalized, fully capable, professional ethics on the environment and sustainable development. Environmental accounting should be included in the curricula for accounting - auditing majors at economic schools for undergraduate and master's degrees in order to build high quality human resources to meet the needs of society for sustainable development, closer access to international practices.

For the factor Awareness of managers about environmental accounting, the awareness of senior managers is the factor affecting the implementation of environmental accounting in production enterprises. This implies that, the higher the managers' perception of environmental accounting, the greater the likelihood that enterprises perform environmental accounting. When senior managers clearly recognize the benefits of implementing environmental accounting, they are motivated to voluntarily implement environmental accounting. Therefore, managers at manufacturing enterprises need to change their viewpoints from focusing mainly on economic interests to ensuring economic interests and environmental interests, not paying too much attention to short-term costs but paying more attention to long-term interests, setting common objectives and policies on the environment, changing their viewpoints on environmental protection activities, implementing proactive environmental strategies rather than complying with environmental regulations, integrating economic, social and environmental aspects in production and business activities to promote the implementation of environmental accounting. Since environmental accounting is quite new in Vietnam, state agencies also need to have propaganda and training activities for corporate administrators to better understand the nature, benefits and role of environmental accounting in the sustainable development of society in general and enterprises in particular.

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