

## TÁC ĐỘNG CỦA CÁC NHÂN TỐ QUẢN TRỊ MÔI TRƯỜNG TỚI HIỆU QUẢ MÔI TRƯỜNG: BẰNG CHỨNG TẠI VIỆT NAM

Trần Thị Thu<sup>1</sup>, Đỗ Thị Hải Yến<sup>2</sup>

### Tóm tắt

*Nghiên cứu này xem xét tác động của chiến lược môi trường, sự bất định của môi trường và nhân tố trung gian là cam kết của nhà quản trị tới hiệu quả môi trường của doanh nghiệp. Kết quả trích xuất từ phần mềm PLS khẳng định có mối quan hệ tích cực giữa các nhân tố quản trị môi trường và hiệu quả môi trường. Bài báo cũng nhấn mạnh tầm quan trọng của cam kết của nhà quản trị trong việc đẩy mạnh thực hiện các hoạt động liên quan tới môi trường, từ đó tác động tích cực tới hiệu quả môi trường trong các doanh nghiệp tại Việt Nam.*

**Từ khoá:** chiến lược môi trường, hiệu quả môi trường, sự bất định của môi trường, cam kết của nhà quản trị.

### THE IMPACT OF ENVIRONMENTAL MANAGEMENT FACTORS ON ENVIRONMENTAL PERFORMANCE: EVIDENCE IN VIETNAM

#### Abstract

*This study examines the combined impact of environmental strategy, perceived environmental uncertainty with the mediating role of top management commitment on corporate environmental performance. The results extracted from the smart PLS software indicate a positive relationship between environmental management factors and environmental performance. The findings also emphasize the role of top management commitment in promoting the implementation of environmental activities, thereby significantly impacting environmental performance in Vietnamese firms.*

**Keywords:** environmental strategy, environmental performance, perceived environmental uncertainty, top management commitment.

*JEL classification:* P28, P48.

#### 1. Introduction

In recent years, corporate social and environmental responsibility has much attention from media, international organizations, and stakeholders. Firms in all sectors are under massive pressure in controlling the impact of their activities on the natural environment (Burnett and Hansen, 2008). Besides, perceived environmental uncertainty is unforeseen situations such as climate change, natural disasters, or market changes as expected by customers, challenges from competitors, ecological changes are having a substantial impact on businesses. These changes incur high environmental costs and affect business growth opportunities (Spencer, Adams, and Yapa, 2013). To solve this problem, firms concentrate on building environmental strategy, planning to respond to environmental uncertainty to ensure sustainable development goals proactively and achieve environmental performance (Wagner and Schaltegger, 2004; Schaltegger and Burritt, 2005; Paulraj and Chen, 2007; Sands, Lee, and Gunarathne, 2015; Lisi, 2015). Environmental performance is an essential indicator of firm performance as addressing environmental issues can help cost reduction, image improvement, increased market share and technological leadership (Porter and Van der Linde, 1995;

Klassen and McLaughlin, 1996; Russo and Fouts, 1997). However, there is currently no clear evidence to confirm that combining the two activities above can reinforce corporate environmental performance. In addition, different economic and cultural contexts among countries also affect this relationship, especially in developing countries which are limited in disclosing environmental information (Clarkson, Li, Richardson, and Vasvari, 2008; He and Loftus, 2014).

Studies related to environmental performance have not been explored in Vietnam. The past researches concentrated mainly on identifying factors affecting the implementation of environmental accounting or environmental management accounting (Oanh, 2016; Ngoc, 2017). To fill the gaps in the Vietnamese market's unclear and verifiable relationship, the research objective focuses on the influence between environmental strategy and perceived environmental uncertainty on the use of top management commitment, which can improve corporate environmental performance. Research results confirm the importance combination of environmental strategy and managers' commitment on environmental performance.

## 2. Literature review and hypotheses development

### 2.1 Perceived environmental uncertainty, top management commitment and environmental performance

Environment uncertainty can be caused by climate change, natural disasters, and markets as expected by customers, competitors, and technology (Latan, Jabbour, Wamba, and Shahbaz, 2018). From the contingency theory point of view, firms exist and are affected by the environment. Therefore, environment uncertainty leads to a lack of information and knowledge in managers' decision-making (Lawrence and Lorsch, 1967; Duncan, 1972). Managers as a business executive need to change their environmental perceptions to carry out their responsibilities, with practical solutions to current and future problems that may arise (Pondeville, Swaen, and De Rongé, 2013). Adams, Larrinaga-González, Pérez, Ruiz, and Fenech (2007), Spencer et al. (2013) and Latan et al. (2018) indicate when managers are aware of the potential benefits that can improve business performance from the enforcement of environmental issues, they could actively develop initiatives to strengthen and apply governance systems to increase information related to the environment. Some other views state that a positive relationship between perceived environmental uncertainty and environmental management accounting (Chang and Deegan, 2010; Latan et al., 2018). Meanwhile, several studies have explored the relationship between perceived environmental uncertainty to environmental strategy and accounting work, which in turn affects environmental performance (Swamidass and Newell, 1987; Lewis and Harvey, 2001). Starting from the theory and previous empirical results, there still exist gaps in the relationship between perceived environmental uncertainty, top management commitment, and the environmental performance. There should be more considerations on these issues. Hence, we proposed research hypotheses:

*H<sub>1a</sub>: Perceived environmental uncertainty has a positive effect on top management commitment*

*H<sub>1b</sub>: Perceived environmental uncertainty has a positive indirect effect on corporate environmental performance through top management commitment*

### 2.2. Environmental strategy, top management commitment, and environmental performance

Contingency theory deals with the role of strategic factors in firms. Strategies may create a dominant, valuable, and attractive position for many different activities (Porter, 1980). According to Bansal and Roth (2000), "environmental strategy can be defined as a set of initiatives that can reduce the impact of operations on the natural environment through products, processes and corporate policies such as reducing energy consumption and waste, using sustainable green resources and environmental management system implementation". Managers' attention to environmental issues triggers the firms' ability to establish a proactive environmental strategy (Hart and Dowell, 2011). Firms with proactive orientation strategies led to improved environmental performance (Rodrigue, Magnan, and Boulianne, 2013) which may appear on environmental performance indicators. Besides, implementing environmental issues are from the regulatory compliance perspective and the achievable environmental performance (Solovida and Latan, 2017). Apart from financial criteria such as revenue and profit, environmental performance is also an important criterion for evaluating operating efficiently to increase business performance (Parker, 2005; Schaltegger and Burritt, 2006; Schaltegger and Lüdeke-Freund, 2013). Therefore, the initiative to change managers' perceptions, views, and actions on environmental issues contributes to their competitive advantage over other firms (Hart and Dowell, 2011). Perego and Hartman (2009) reveal that the support of an environmental strategy affecting environmental performance with a random sample conducted by surveying financial managers in manufacturing firms. Following this, Rodrigue et al. (2013) explain the effect of stakeholders' pressure on environmental strategy and selecting indicators to evaluate environmental performance. Some other studies concentrate on the role of Environmental Management Accounting (EMA) or Environmental Information System (EIS) to act as an intermediary in the relationship between environmental strategy and environmental performance (Burritt, Hahn, & Schaltegger, 2002; Burritt, Schaltegger, Ferreira, Moulang, & Hendro, 2010; Solovida and Latan, 2017; Latan et al., 2018). Another discovery made by Govindarajan (1986), Gupta (1987), Chong and Chong (1997) reveal that a relationship between

environmental strategy, perceived environmental uncertainty, and environmental performance. This study is based on the contingency theory background and gaps from previous studies to explore the relationship between environmental strategy, top management commitment, and Vietnamese firms' environmental performance. The following hypotheses are proposed:

*H<sub>2a</sub>: There is a positive association between environmental strategy and top management commitment*

*H<sub>2b</sub>: Environmental strategy has a positive indirect effect on corporate environmental performance through top management commitment*

### 2.3. Top management commitment and environmental performance

The top managers have an important role in shaping organizations (Tzempelikos, 2015). Top management commitment relates to the environment explored in many previous studies. Spencer et al. (2013) note that top managers' commitment will tend to adopt a system that can provide information related to the environment such as material flow cost accounting. Paul (2004) made a measure of the manager's commitment to the quality or strategic plan of the business, by implying that if the commitment of top management like CFOs, chief accountant focusing on the development of environmental sustainability, considering as an essential goal of firms, it will ensure high value and reliability in implementation. Adams et al. (2007) argue that top management commitment to environmental issues is a decisive factor in environmental improvement. Spencer et al. (2013) found a

positive relationship between top management commitment directly or indirectly through the environmental information system's effectiveness on environmental performance. It is explained that if managers recognize a commitment to environmental sustainability could create competitive advantages such as cost reduction, image improvement, technology leadership and increased market share (Porter and Van der Linde, 1995; Shrivastava, 1995; Klassen and McLaughlin, 1996; Russo and Fouts, 1997), they will take the initiative. Lisi (2015) also indicates a positive relationship between management's commitment that directly affects environmental performance and indirectly through measuring systems that increase environmental performance. Similar findings by Latan et al. (2018) shows that management's commitment can directly affect environmental performance indirectly through the use of EMA. Wee and Quazi (2005) state that top management commitment to the environment is an important factor in strengthening environmental governance performance and applying EMA work to benefit businesses (Chang and Deegan, 2010). Dixon-Fowler, Ellstrand, and Johnson (2017) found a committed environmental presence in enterprises that reflects top management concerns to improve environmental performance. From the above experimental evidence, this research proposes the following hypothesis:

*H<sub>3</sub>: The commitment of top management has a positive effect on corporate environmental performance.*

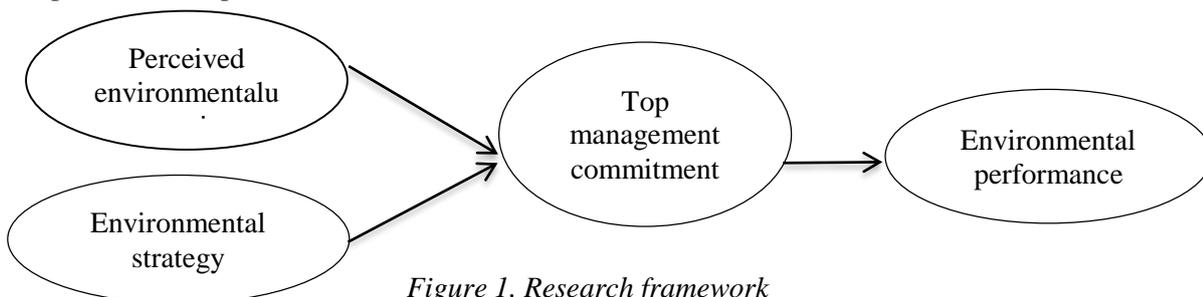


Figure 1. Research framework

### 3. Research method

An online survey is created and sent directly to participants. Respondents who answer questionnaires from management level upwards such as directors, chief accountants in firms' operating in the Vietnamese market. The duration of time given from January to March 2020 with the scope of the survey focusing on businesses operating in the field that greatly affect the environment in big cities like

Ha Noi, Ho Chi Minh, and Da Nang in Vietnam. The survey results collected 150 questionnaires. However, 43 out of 150 questionnaires were not fulfilled completed, so the final valid questionnaires were 107. Respondents worked in many different industries such as Construction (38.3%), Oil (13%), Textile (15.7%), etc. To exclude the possibility that different industries affected the differences in interview results, this research analyzed the T-test

with  $p < 0.05$  but there was no impact from industries to environmental performance.

The measurement scale is inherited from previous studies. The scale of environmental strategy includes four questions based on Walls, Phan, and Berrone (2008) focusing on KPIs, capital sources, ISO standards, and commitment to developing strategies related to the environment. Perceived environmental uncertainty is measured by seven questions from Pondeville et al. (2013). The questions emphasize on the changing in environmental law, tax policy and the market faced by businesses. Next, top management commitment variables use nine questions from Spencer et al. (2013). Respondents mainly expressed commitment to environmental

issues in the corporate governance process. To measure environmental performance variables, this research uses seven questions from Latan's research (2018). Respondents will be asked about the financial and non - financial benefits, its competitive advantages as well as its impacts on society and the environment. However, some questions were rejected due to the loading factor lower than 0.6. Others questions with coefficients higher than 0.6 are still accepted because they ensure reliable values rho\_A better than 0.70 and extraction variance (AVE) exceed 0.50 (Latan and Ghazali, 2015; Hair, Sarstedt, Ringle, & Gudergan, 2017; Latan, Noonan & Matthews, 2017). The last scales for this study include the following questions:

**Table 1:** Construct indicators and measurement model

Indicators/Items	Code	FL	AVE	rho_A
Perceived environmental uncertainty (PEU)			0.541	0.730
National/International environmental laws	PEU1	0.832		
Environmental tax policies	PEU2	0.700		
Environmental regulations affecting the sector	PEU3	0.759		
Availability of substitute environmental products	PEU6	0.635		
Environmental strategy (ES)			0.694	0.600
Performance indicators (KPIs), identified four main categories of air, waste, water, and energy.				
0: none				
1: one indicator	ES1	0.885		
2: 2 indicators				
3: 3 indicators				
4: 4 indicators				
Long-term commitment to the environment				
0: none				
1: statement made	ES4	0.778		
2: vision is 5 years or longer				
Top Management's Commitment (TMC)			0.686	0.936
My own work has made a contribution to the environmental performance	TMC1	0.867		
Accurate environmental cost information	TMC2	0.776		
Continues to put an emphasis on environmental performance	TMC3	0.904		
Improve firm's environmental management system	TMC4	0.895		
Continue to treat environmental performance	TMC5	0.770		
Environmental performance is one of the most important targets to achieve	TMC7	0.882		
Providing accurate information on firm's environmental performance	TMC8	0.680		
Environmental performance (EP)			0.629	0.901
Improved reputation	EP2	0.794		
Increased competitive advantage	EP3	0.781		
Complying with environmental regulations	EP4	0.636		
Limiting environmental impact beyond	EP5	0.837		
Preventing and mitigating environmental crises	EP6	0.862		
Generating societal benefits	EP7	0.828		

Note: <sup>a</sup> FL is factor loadings

PLS-SEM is mainly used in many studies to develop theories in exploratory research. So, this study applied Structural Equation Modeling (SEM) through smart PLS software for analyzing. PLS (consistent partial least squares) is a new

algorithm of PLS-SEM was used to test hypotheses because it helps to solve complex relationships, increase the accuracy of the results, is applicable for small sample sizes while increasing efficiency when achieving large

sample sizes (Latan and Ghozali, 2015; Latan et al., 2017), and providing covariance results similar to SEM.

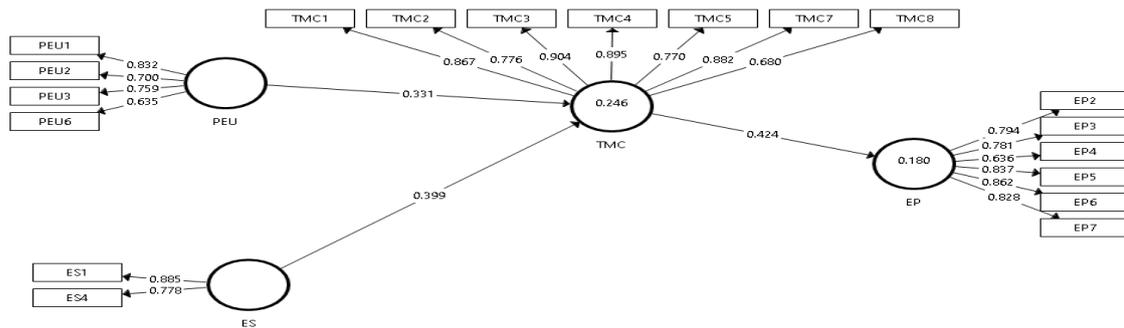
**4. Empirical results**

The study performed two steps to test the proposed research model, including the measurement model and structural model. In analyzing the measurement model, reliability and value criteria (convergent and discriminant values) need to be ensured before evaluating the structural model that is a step to confirm whether the research hypothesis is achieved or not. Table 4.1 determines the values to be achieved in the

measurement model. It can be seen that Cronbach's Alpha coefficient and composite reliability are higher than 0.7, average Variance Extracted of the variables in the model greater than 0.5 (Hair, Sarstedt, Hopkins & Kuppelwieser, 2014). However, Cronbach's Alpha coefficient of ES is lower than 0.7 is still guaranteed because of the reliable rho\_A and the extracted variance (AVE) is better than 0.5 (Hair et al., 2017; Latan and Ghozali, 2015; Latan et al., 2017). Thus, the reliability and convergence value of the model is achieved.

**Table 2: Construct Reliability and Validity**

	<b>Cronbach's Alpha</b>	<b>rho_A</b>	<b>Composite Reliability</b>	<b>Average Variance Extracted (AVE)</b>
EP	0.883	0.901	0.910	0.629
ES	0.567	0.600	0.819	0.694
PEU	0.719	0.730	0.823	0.541
TMC	0.922	0.936	0.938	0.686



**Figure 2: Evaluation of the structural measurement model**

Table 2 shows the differential value of the model evaluated according to the Fornell-Larcker standard. Specifically, it is necessary to compare the square root of the variance of AVE extract with the correlation coefficient of two latent variables. A factor AVE's square root value must be greater than the maximum correlation coefficient of that factor and other factors. AVE's square root (on the main diagonal) is greater

than the correlation coefficient between pairs of variables (values below the main diagonal of the table) of the model proving that the variables reached discriminant validity. Simultaneously, the value of HTMT (Heterotrait-Monotrait Ratio) above the main diagonal is lower than 0.85 shows that the distinguishing value of the model is guaranteed.

**Table 3: Correlations and discriminant validity results**

	<b>EP</b>	<b>ES</b>	<b>PEU</b>	<b>TMC</b>
EP	0.793	0.367	0.221	0.440
ES	0.225	0.833	0.214	0.503
PEU	0.101	0.084	0.735	0.343
MC	0.424	0.371	0.297	0.828

The measurement model results are confirmed, the next step is to evaluate the structure model. Table 3 and Table 4 clarify the indicators achieved by the model to ensure statistical value. Table 4.3 reports the recommended VIF (Variance inflation factor) values is lower than 3 ensures that

multicollinearity does not occur when testing hypothesis (Hair et al., 2017; Latan and Ghozali, 2015). We base on the coefficient of R-square (R<sup>2</sup> or adjusted R<sup>2</sup>), effect size (f<sup>2</sup>) and predictive relevance (Q<sup>2</sup>) to evaluate the model. The f<sup>2</sup> value shows the exogenous variable's degree of influence on the endogenous variable is small or

large. The findings point out that  $f^2$  is in average level. Next, the value of  $Q^2$  is higher than 0 for endogenous latent variables (EP and TMC) shows the appropriate model showing the forecast's

accuracy. Finally, the adjusted  $R^2$  values fluctuate in the range (0.1), showing that the structural model has good quality.

**Table 4: Structural model results**

	Adjusted $R^2$	$f^2$	$Q^2$	VIF
EP	0.166	-	0.077	-
ES	-	0.210	-	1.007
PEU	-	0.144	-	1.007
TMC	0.222	0.219	0.150	1.000

The coefficient ( $\beta$ ) for relationship PEU -> TMC in Table 4.4 is 0.331 with a p-value 5%, and PEU indirectly through TMC positively affects EP ( $\beta = 0.140$ ) with a significance level of 10%. It can be seen that value of the coefficient ( $\beta$ ) to the relationship ES -> TMC is  $\beta = 0.399$  with a

statistical significance 1% and ES -> TMC -> EP is  $\beta = 0.169$  with a p-value 5%. Furthermore, the commitment of top management to positively affect environmental performance is guaranteed with  $\beta = 0.424$  (statistical significance level 1%). Thus, the research hypotheses are accepted.

**Table 5: Relationships between variables**

Hypotheses	$\beta$	Standard Deviation (STDEV)	p-Value	Conclusion
PEU -> TMC	0.331	0.163	0.043**	H <sub>1a</sub> supported
PEU -> TMC -> EP	0.140	0.082	0.087*	H <sub>1b</sub> supported
ES -> TMC	0.399	0.101	0.000***	H <sub>2a</sub> supported
ES -> TMC -> EP	0.169	0.080	0.036**	H <sub>2b</sub> supported
TMC -> EP	0.424	0.145	0.004***	H <sub>3</sub> supported

Note: \*\*\*, \*\*, \* statistically significant at 1%, 5% and 10%, respectively.

In robustness analysis to evaluate the construction hypothesis, we run an additional analysis to confirm research model's the value and strength. Extraneous variables such as firm size (measured by two categories, i.e., big firms and small-medium firms), industry type (measured by a dummy variable of 1 for firms that are more sensitive to the environment such as construction, oil, textile and 0 otherwise) is modeled using the PLS-MGA (Partial Least Squares- multi-group analysis) tool. PLS-MGA findings assert that no difference in considering the effect of size as well as sectors on the research results ( $p > 0.05$ ).

## 5. Discussions

Hypothesis H<sub>1a</sub> and H<sub>1b</sub> confirm that perceived environment uncertainty affects environmental performance through top management commitment. These results are consistent with the contingency theory due to the theoretical point of view that enterprises exist and develop are affected not only internal environment but also external environment. Changing in the external environment is arduous for controlling and predicting, so managers should actively change perceptions and actions to deal with such changes, contributing to the limitation mitigating damages as well as generating benefits from activities related to the environment.

Hypotheses H<sub>2a</sub> and H<sub>2b</sub> explore that environmental strategy can indirectly affect top management commitment to environmental performance. These results support the proposition of contingency theory and empirical research. This finding confirms that a business with environmental strategy will strongly influence the administrator's attitude and behavior, thereby creating environmental performance in the present and the future. Some studies by Henri and Journeault (2010), Journeault (2016), Lisi (2015), Wagner and Schaltegger (2004) support these results. Thus, firms should be proactive in formulating and implementing strategies to create benefits for society as well as businesses.

The studies of Spencer et al. (2013), Pondeville et al. (2013), Lisi (2015) mentioned and affirmed the commitment of top management to affect environmental performance positively. Our result also achieved as expected (H<sub>3</sub> is accepted). It can be said that a smart, sensitive manager with social changes, competitors, and customers will help run the business better, avoid unnecessary damage and increase economic efficiency for businesses.

## 6. Conclusions and Limitations

After collecting and analyzing survey data in Vietnamese firms, this study claims that

environmental problems are being paid more attention by firms, especially in environmental strategy, legal requirements, and information disclosure to ensure sustainable development goals. This study examines the combination of intangible resources in the business to consider the impact on environmental performance. These findings contribute to reinforcing confidence in the business activities related to the environment. It not only demonstrates environmental responsibility, information transparency, but also offer other financial benefits. Some suggestions for stakeholders are proposed.

Firms should be more proactive in building achieved ISO standards strategies, transparent information, allocate and invest more for environmental activities, and construction building an environmental management system to meet information. In addition, managers need to identify the changes in the market and nature so that the construction strategies can be put into practice to achieve environmental performance.

For management agencies, environmental issues in Vietnam are intensely concerned by the negative impacts of the changing natural environment, business productivity and business processes. Therefore, government agencies should have sanctions on fees, taxes, and incentive solutions for financial and non-financial also need more attention to guide the implementation of measures related to the environment.

During the research process, this research has some limitations. Firstly, the sample size is not large enough to comprehensive the research problems in all enterprises in Vietnam. The subjects participating in the survey are the directors and chief accountants, so it is difficult to collect data. Finally, information disclosure related to Vietnam firms' environmental issues is still limited, and enterprises are not proactive in environmental information transparency.

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**Thông tin tác giả:**

**1. Tran Thi Thu**

- Đơn vị công tác: University of Transport and Communications  
University of Economics Ho Chi Minh City

**2. Do Thi Hai Yen**

- Đơn vị công tác: University of Transport and Communications  
- Địa chỉ email: [yendth\\_ph@utc.edu.vn](mailto:yendth_ph@utc.edu.vn)

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