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Article

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Importance of Environmentally Managerial Accounting to Environmental and Economic Performance

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ABSTRACT

The role of environmentally managerial accounting between environmental performance and economic performance has been investigated in the current project. On the one hand, this project tried to re-examine the causal links among environmentally managerial accounting, environmental performance and economic performance that have been discussed in previous research; on the other hand, it also explored the moderation of environmentally managerial accounting between environmental performance and economic performance that has been overlooked. The data was collected from 298 publicly listed enterprises in Vietnam's three main stock exchanges. To test the causal linkages, multiple regression analyses were employed; whereas to test the moderating effect, hierarchical regression analyses with the interaction were undertaken. The results indicate positive influences of environmentally managerial accounting on economic performance and environmental performance that in turn puts a positive impact on economic performance. The adoption of environmentally managerial accounting in business is revealed as a moderator between economic performance and environmental performance. The causal link from environmental performance to economic performance becomes tougher when enterprises take more environmentally managerial accounting into consideration in business.

Keywords: Environmentally Managerial Accounting, Environmental Performance, Economic Performance, Vietnam

JEL Classifications: Q01, Q51, E01

1. INTRODUCTION

Kamruzzaman (2012) highlighted on the benefits of adopting environmentally managerial accounting in running firms. This scholar claimed that, to obtain the advantages of such a practice, a framework is based on to build and adopt an environmentally managerial accounting in business. The polluting extent in environment is one of the most severe worldwide issues (Pandey and Singh, 2019), and it is considered as a barrier to the economical exploitation of natural resources. Holdgate (1979) referred to environmental pollution resulted from the activities by human into the natural environment. The serious effects of environmental pollution on the health of communities have drawn much attention from human (Rai, 2016).

Therefore, it is necessary to decrease the level of environmental pollution in the surroundings (Khan and Ghouri, 2011). The

reduction in environmental pollution can be reached by the environmental protection activities of individuals, businesses and governments. The success of environmental protection is mainly dependent on environmentally responsible behaviors of human. Environmentally responsible behaviors that refer to as actions which deliberately try to lessen the harmful influences of human activities into the natural environment, should be implemented in business committed to efficient initiatives of workplace sustainability (Kollmuss and Agyeman, 2002).

The pollution of environment in Vietnam has been a hot and serious area (Quyen et al., 1995). Therefore, numerous home and global papers have emphasized that the environmental issue is tremendously severe and alarmingly. In particular, the pollution in water and air are the most considerable. The figures

have indicated Vietnam as one of the top economies creating the most severe environmental issues related to water and air. Currently, Vietnam has been facing giant challenges relevant to environmental pollution which has been arising from natural agents and anthropogenic activities (Chu, 2018). The adoption of environmentally managerial accounting in business is an action related to environmentally responsible behaviors. Furthermore, the adoption of environmentally managerial accounting in business has been confirmed as a vital determinant of organizational performance including environmental performance and economic performance that are interplayed (Christine et al., 2019; Zandi and Lee, 2019; Purnomo and Widianingsih, 2012; Koo et al., 2014; Chuang and Huang, 2018; Angelia and Suryaningsih, 2015; Sari and Tjen, 2017; Borger and Kruglianskas, 2006; Agan et al., 2016).

Overall, the current research work tries to scrutinize the role of environmentally managerial accounting in building organizational performance in Vietnam, in which the influences of the adoption of environmentally managerial accounting on environmental and economic performance in Vietnamese enterprises will be discussed and investigated. Furthermore, the adoption of environmentally managerial accounting could take moderating role in the research model, which but has been ignored in the prior literature. Therefore, this research tries to explore a possible moderating mechanism in the relationship among the adoption of environmentally managerial accounting in business, environmental performance and economic performance.

2. DEVELOPMENT OF RESEARCH HYPOTHESES

2.1. Environmentally Managerial Accounting and Environmental Performance

Hameed (2018) investigated ecological accounting, revealing that environmentally managerial accounting has integrated identifiable evidence, judgment and description of ecological expenses. Besides, the research results indicate that environmentally managerial accounting is a vital practice for conveying environmental expenses into firm control and direction to motivate them to adopt new techniques to decrease environmental pollution, and thus augment organizational effectiveness. Likewise, Hughes et al. (2001) highlighted the importance of environmentally managerial systems and their effects of environmental performance in business. In a recent analysis, Latan et al. (2018) assessed the task of environmentally managerial accounting in detail. The authors investigated the direct impact of environmentally managerial accounting in influencing environmental performance and also the contribution of other ecologically driven factors to impact both environmental performance and ecological performance. Susanto and Meiryani (2019) identified the internal and external elements that affect firms' accepting environmentally managerial accounting in business, revealing its consequent influences on environmental performance. The empirical findings verify the implementation of environmentally managerial accounting imposes a positive influence on environmental performance. The acceptance of environmentally managerial accounting for business is also deemed essential in increasing

environmental performance for firms (Gul and Chia, 1994). According to de Beer and Friend (2006), industrial sectors that are more concerned about environmental responsibility, are relevant to environmentally responsible activities, which lead to improved environmental performance. Other researchers asserted environmentally managerial accounting could lead firms to fulfill environmental responsibility, which help to obtain superior environmental performance (Burritt et al., 2002; Ferreira et al., 2010; Zhou et al., 2017).

The practices of environmentally managerial accounting allow manager to employ available resources successfully to advance environmental performance (Pondeville et al., 2013). They are established to achieve organizational goals of sustainable ecological performance (Journeault, 2016; Guenther et al., 2016). The planning of environmental strategies is confirmed to maximize environmental performance of firms by using the practices of environmentally managerial accounting in business (Henri and Journeault, 2010; Journeault, 2016). Furthermore, Gholami et al. (2013) explored the effects of information systems on environmental performance, indicating that there exists an influence of environmental system adoption by a firm on environmental performance. Grounded on Magsi et al. (2018), management control practices play a vital role as a tool used to garner information and evaluate resources in adopting strategies in business successfully. The mediation role of environmentally managerial systems is discovered in the correlation between corporate culture and environmental performance. The positive influences of environmentally managerial information practices on environmental performance have been clear (Spencer et al., 2013). The systems of environmentally managerial accounting help to reduce environmental expenses, obtain better product pricing, improve production process, retain skilled workers as well as improve organizational image (Gibson and Martin, 2004; Burritt et al., 2002). Firms with good practices of environmentally managerial accounting likely enjoy lower expenses connected with environmental actions, and therefore leading to higher environmental performance (Adams, 2002). Therefore, it can hypothesize that:

H₁: The adoption of environmentally managerial accounting in business improves environmental performance

2.2. Environmentally Managerial Accounting and Economic Performance

The results of Christine et al. (2019) assert that economic performance is positively determined by environmentally managerial accounting. According to de Beer and Friend (2006), environmentally managerial accounting supports in conveying environmental liabilities as environmental expenses. San Ong et al. (2016) indicated there is a significant relation of environmentally managerial practices and economic performance in a developing country. The reason is that, environmental management practices offer numerous benefits to firms such higher sales or investors' confidence. Environmentally managerial accounting has been still questioned by several scholars whether to bring any benefits for the firms as a result of the mixed research results obtained in prior studies. Link and Naveh (2006) stressed the standardization of quality assuring practices could result in improved environmental

performance and then higher economic performance. Based on Dunk (2007), environmentally managerial accounting plays a necessary role in contributing to competitive advantage, which potentially improves the links among customers, shareholders, employees and governments by assisting the meeting of environmentally responsible expectations.

The advantages of environmentally alert plan consist of decreased disposal expenses, inferior environmental risks, minimized waste and superior efficiency (Zhang et al., 1997) and the frame offered by environmentally managerial accounting contributes to product quality leading to competitive advantages. Furthermore, Gamble et al. (1996) stated international activities on environmental pollution enable companies to consider production and marketing of products based on the environmentally friendly viewpoint, because a reduction in environmental expenses can lead to better economic performance. Magara et al. (2015) concentrated on the influence of environmentally managerial accounting on economic performance of firms, because environmentally managerial accounting is useful to classify and assign environmental expenses. The acceptance of environmentally managerial accounting in business is positively interrelated to economic performance of firms. Additionally, alternative methods are utilized calculate environmental expenses such as the 'environmental expenditure deciding tree' as Rinner (2001) explained. Environmentally managerial accounting and economic performance was suggested to go hand-in-hand (Darnall et al., 2007), which indicates that there is room for supplementary environmental policies to encourage the implementation of environmentally managerial accounting in business, which results in improved economic performance.

In several businesses, the intention of adopting better environmentally responsible practice is that the main indices that they refer to as competitive advantages are the usage and implementation of environmentally responsible practices (Gunarathne and Lee, 2015). The systems of environmentally managerial accounting require the continuous involvement of managerial accountants in economic performance of firms through better environmentally responsible practices (Appiah et al., 2020). Grounded on the managerial aspect of environmentally managerial accounting, Henri and Journeault (2010) investigated the linkage between environmental controlling systems and economic performance, suggesting an indirect influence of environmental controlling systems on economic performance through environmental processing. In addition, another research by Dunk (2002) referred to environmentally responsible accounting practices as important drivers of organizational performance of that deliberately improve economic performance. Firms with the practices of environmental responsibility more likely result in positive perceptions by stakeholder, leading to superior economic performance (Marie-France et al., 2007). Thus, it can recommend that:

H₂: The adoption of environmentally managerial accounting in business augments economic performance

2.3. Environmental Performance and Economic Performance

Environmental performance is assessed by companies that are concerned about environmental pollution caused by organizational

activities. Organizations expect stakeholders to react confidently to organizational reputation related to the natural environment, and so augment the benefits of stakeholders that lead them to increase their investments in business (Hersugondo et al., 2019), which will maximize organizational value. In a study regarding environmental and economic performance, Djuitaningsih and Ristiawati (2011) discovered a positive influence of environmental performance on economic performance that is because a firm with excellent environmental performance likely obtains positive responses by its stakeholders, resulting in a sustainable growth in profit.

On the standpoint of environmental performance, if companies take impulsive measures on environmental damage, they could achieve possible benefits such as better organizational image, the satisfaction of consumers that are concerned about environmental pollution, cost saving by conserving power, and strong relations with the communities (Hutchinson, 1992). In addition, positive and sustainable activities in businesses could develop environmental performance, which leads to a higher level of satisfaction in stakeholders, so augmenting competitive advantages (Stock et al., 1997). Furthermore, Chuang and Huang (2018) declared that the adoption of environmentally managerial practices to enhance environmental performance results not only in business opportunities, but also in a reduction in environmental pollution, environmental conflicts, organizational risks, and manufacturing expenses as well as an increase in product quality and production efficiency, which will improve organizational image and economic performance.

Various organizations have tendency to improve productivity, reduce expenses, and enhance effectiveness due to environmentally managerial practices, the results of which can be evaluated at organizational and environmental levels (Melville, 2010; Watson et al., 2010; Ryoo and Koo, 2013). In addition, empirical evidence where environmental performance positively affects economic performance has been established in numerous studies (e.g. Klassen and Whybark, 1999; Seuring and Müller, 2008). Environmentally managerial practices are adequate to distract the attention of stakeholders concerning environmental issues, which have been becoming international problems. Rakhiemah and Agustia (2009) indicated social responsibility disclosure and environmental performance simultaneously impose a positive influence on economic performance. Russo and Fouts (1997), anchored in the resource-based view, conjectured that the relation of environmental with economic performance is positive. Conversely, Porter and Van Der Linde (1995) asserted that directors who do not pay sufficient attention to environmental matters likely suffer poor economic performance. The findings of Al-Tuwaijri et al. (2004) and San Ong et al. (2014) discovered a positive relation of environmental with economic performance on the grounds in which stock price is decided as a variable of economic performance. Melnyk et al. (2003) indicated that environmental performance positively affects economic performance measures. Consequently, it can theorize that:

H₃: Environmental performance enhances economic performance

2.4. Role of Environmentally Managerial Accounting in Environmental and Economic Performance

As the suggestions mentioned, the adoption of environmental managerial accounting in business improves both environmental performance and economic performance. In addition, environmentally performance enhances environmental performance. Christine et al. (2019) studied factors influencing environmental and economic performance, revealing that the adoption of environmentally managerial accounting in business not only provide the firms with the ability to enhance environmental performance, but also improve economic performance. Likewise, Susanto (2018) indicated that, there are effects of environmental accounting information system alignment both on environmental and on economic performance. In addition, Russo and Fouts (1997) found out environmental performance and economic performance are positively correlated and the growth of industry moderates the causal linkage from environmental performance to economic performance. The abovementioned arguments could lead to the hypothesis that the adoption of environmental managerial accounting in business likely moderates the link between environmental performance and economic performance, because it determines both of the aspects of the relationship. Overall, it can conjecture that:

H₄: The adoption of environmentally managerial accounting in business could moderate the association between environmental performance and economic performance

3. INSTRUMENTS

3.1. Environmentally Managerial Accounting

Drawing on Christ and Burritt (2013), in the current research, environmentally managerial accounting (EAM) was measured with thirteen dimensions (EAM 1 to EAM 13). These dimensions are calculated with a five-point scale ((1) never considering; (2) decided not to introduce; (3) favored to introduce; (4) intended to introduce; (5) under application of environmentally managerial accounting).

3.2. Environmental Performance

Drawing on Latan et al. (2018) and Chuang and Huang (2018), in the current research, environmental performance (ERN) was measured with eight dimensions (ERN 1 to ERN 8). These dimensions focus on compliance with current environmental protection set of laws, environment related effects and advantages relating to environmental friendly activities. The dimensions were evaluated with a five-point Likert scale ((1) completely disagreement; (2) quite disagreement; (3) neutral attitude; (4) quite agreement; completely agreement).

3.3. Economic Performance

Anchored in Delaney and Huselid (1996), this research measured economic performance (EPR) using eleven dimensions (EPR 1 to EPR 11), which are comparative. These eleven dimensions were generated by evaluating informants' perceptions on the organizational performance of their enterprises in comparison

with other enterprises during the last 3 years. The dimensions were computed with a five-point Likert scale ((1) completely disagreement; (2) quite disagreement; (3) neutral attitude; (4) quite agreement; completely agreement).

4. DATA COLLECTION

The data was collected from publicly listed enterprises in Vietnam. This research decided on Vietnam as a case study, because it is a fast developing economy. Issues related to environmental deterioration have been on the increase there. Therefore, environmentally friendly activities related to environmental sustainability in Vietnam, which has been understated (Nguyen, 2014), are desired to be expansively evaluated to help the governmental services issue proper environmentally friendly policies for Vietnam's business environment to become more environmentally sustainable and then more economically sustainable. The research sample compassed publicly listed enterprises in the chief Stock Exchanges of Vietnam. There were three big Stock Exchanges in Vietnam (Ho Chi Minh Stock Exchange, Unlisted Public Company Market and Hanoi Stock Exchange). Simple random sampling was employed to select 400 out of the enterprises that were still being operated at the research time. Nonetheless, only 298 suitable replies were collected, satisfying the sample size for this research (Hair et al., 2010). The survey technique was applied for each environmental manager for every chosen enterprise.

5. FINDINGS

The reliability analyses that are procedures used to assess numerous common measures of scale reliability as well as to offer information on the connections among separate dimensions in the factor. The results are exhibited in Tables 1-3. All of the 32 items take their own item-total correlations greater than the 0.5 value. Furthermore, all of the Cronbach's α s surpass the 0.7 level. The α s if their own dimensions are removed are all lower than their current α s. Additionally, KMOs are larger than 0.7, the lowest acceptable value (Hair et al., 2010). Therefore, they are all soundly retained for subsequent steps.

Table 1: Reliability analyses (EAM)

Item	Item-total correlations	α if dimension is removed	Cronbach's α	KMO
EAM 1	0.615	0.776	0.789	0.772
EAM 2	0.657	0.762		
EAM 3	0.735	0.748		
EAM 4	0.718	0.756		
EAM 5	0.723	0.753		
EAM 6	0.645	0.769		
EAM 7	0.715	0.757		
EAM 8	0.629	0.771		
EAM 9	0.714	0.758		
EAM 10	0.763	0.741		
EAM 11	0.697	0.762		
EAM 12	0.629	0.771		
EAM 13	0.598	0.781		

The causal relations in the research model are analyzed using regression analyses. The outcomes are presented in Table 4. Regarding the causal effect of EAM in business on ERN as being displayed in Model 1, EAM in business positively affects the adoption of EAM in business at the 1% significance level. The fit of model is significant at the 1% threshold with F of 225.99 and R^2 of 0.433, implying EAM explains 43.3% of variant in ERN. The influential coefficient gets the 0.634 value. The Durbin-Watson obtains the 1.86 value that ranges between du and $(4 - du)$; consequently, it could suggest no autocorrelation in the research model. Additionally, the 0.58 value of χ^2 with the P_{value} of 0.43 larger than the 10% threshold shows no heteroskedasticity in the analyzed data. The VIF achieves the 1.00 value showing no

multicollinearity. Generally, the fit of model is appropriate to the research model.

As regards the effects of ERN and EAM on EPR, the results are displayed in Model 2. ERN and EAM positively determines EPR at the 1% significance level. The fit of model is significant at the 1% threshold with F of 85.25. The 0.366% R^2 implies that ERN and EAM collectively explains 36.6% of variant in EPR. The effect of ERN and EAM on EPR obtain the 0.401 and 0.374 estimates. The 1.93 estimation of Durbin-Watson that falls between du and $(4 - du)$; indicating no autocorrelation in the research models. Additionally, the 1.22 value of χ^2 with the P_{value} of 0.27 larger than the 10% threshold demonstrates that the model gets no heteroskedasticity. The VIFs achieve the 1.76 value showing no multicollinearity. Overall, the model fits well to the research data. the above mentioned findings are in support of the hypotheses H_1 , H_2 and H_3 .

To test the hypothesis H_4 , the hierarchical regression analyses (suggested by Baron and Kenny 1986) that underwent two separate regressions were undertaken. The main effects of ERN and EAM on EPR were explored in Model 2, where EPR is in charge of a predicted variable. Then, the interaction was included to Model 2 to consider Model 3. The results are shown in Table 5. ERN and EAM positively affect EPR at the 1% significance level with the influential estimators of 0.401 and 0.374 respectively in Model 2; and 0.163 and 0.163 respectively in Model 3. The adding of the interaction between ERN and EAM into Model 2 to establish Model 3 augments the explanatory power from 36.6% to 38.6%. A change of the explanatory power is 0.02% at the 1% significance level. Moreover, the interrelation between ERN and EAM positively influences EPR with a 0.159 influential estimate at the 1% statistical significance level. These findings provide support for Hypothesis 4 at the 1% statistical significance level. It implies that, EAM moderates the causal connection from ERN to EPR in the way that strengthens the causal link between ERN to EPR.

Table 2: Reliability analyses (ERN)

Item	Item-total correlations	α if dimension is removed	Cronbach's α	KMO
ERN 1	0.683	0.799	0.811	0.793
ERN 2	0.645	0.809		
ERN 3	0.694	0.787		
ERN 4	0.728	0.756		
ERN 5	0.717	0.777		
ERN 6	0.687	0.789		
ERN 7	0.646	0.807		
ERN 8	0.696	0.785		

Table 3: Reliability analyses (EPR)

Item	Item-total correlations	α if dimension is removed	Cronbach's α	KMO
EPR 1	0.715	0.798	0.823	0.801
EPR 2	0.688	0.802		
EPR 3	0.721	0.793		
EPR 4	0.856	0.780		
EPR 5	0.769	0.790		
EPR 6	0.857	0.779		
EPR 7	0.647	0.812		
EPR 8	0.649	0.811		
EPR 9	0.625	0.814		
EPR 10	0.668	0.809		
EPR 11	0.678	0.806		

Table 4: Causal relationships

Model	Explained factor	Explanatory factor	β	Std. error	t	P_{value}	VIF	Durbin-Watson	χ^2	P_{value}	R^2	F	P_{value}
1	ERN	Constant	1.411	0.162	8.73	0.000	1.00	1.86	0.58	0.43	0.433	225.99	0.000
		EAM	0.634	0.042	15.03	0.000							
2	EPR	Constant	1.014	0.228	4.45	0.000	1.76	1.93	1.22	0.27	0.366	85.25	0.000
		ERN	0.401	0.073	5.49	0.000							
		EAM	0.374	0.070	5.31	0.000							

Table 5: Moderating relationship

Model	Explained factor	Explanatory factor	β	Std. error	t	P_{value}	VIF	Durbin-Watson	χ^2	P_{value}	R^2	F	P_{value}
3	EPR	Constant	2.849	0.632	4.51	0.000	2.29	1.89	1.43	0.22	0.386	61.71	0.000
		ERN	0.163	0.019	8.35	0.000							
		EAM	0.163	0.018	8.74	0.000							
		ERN.EAM	0.159	0.051	3.11	0.002							

ΔR^2 from Model 2 to Model 3 = 0.02 with F of 9.64 and P_{value} of .002

6. CONCLUSION AND POLICY IMPLICATIONS

The current research investigated the causal relations among ERN, EAM and EPR, then taking into account the moderation of EAM in the research model. Preceding researchers have examined the effect of EAM on ERN and EPR (Pondeville et al., 2013; Henri and Journeault, 2010; Journeault, 2016), as well as the influence of ERN on EPR (Magara et al., 2015; Marie-France et al., 2007). However, those studies explored the effects in separate research models. Moreover, none of them has scrutinized the moderation of EAM between ERN and EPR. The current project provides thorough analyses on the friendship among ERN, EAM and EPR by examining the moderation of EAM in the research model.

The empirical outcomes exposed that EAM plays an important role in improving ERN and EPR; and especially it functions as a moderator in the causal connection from ERN to EPR. The correlation between ERN and EPR becomes stronger at higher levels of EAM. This implies that enterprises where EAM is considered can achieve better ERN and EPR, and the effect of ERN on EPR is higher as well. The findings offer an insight into the complex relations among ERN, EAM and EPR to environmentally managerial accounting researchers as well as to managers who should pay more attention to the adoption of environmentally managerial accounting in business, which could lead to better environmental performance and economic performance. Moreover, environmental performance strongly improves economic performance. Overall, the enterprises with sound environmentally managerial accounting in business can win stakeholders' confidence, which help to gain more competitive advantages and finally better organizational performance.

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