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Article

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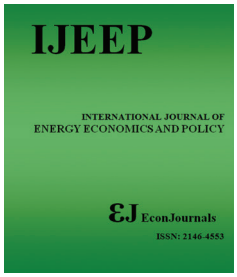

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The Dynamic Association of Energy, Environmental Management Accounting and Green Intellectual Capital with Corporate Environmental Performance and Competitive Advantages

Morni Hayati Jaafar Sidik*, Winwin Yadiati, Hoyoung Lee, Nadeem Khalid

[1]Universiti Kuala Lumpur Business School, Malaysia, [2]Department of Accounting, Universitas Padjadjaran Indonesia, [3]Bang College of Business, KIMEP University, Kazakhstan, [4]Executive Education Centre, KIMEP University, Kazakhstan. *Email: mornihayati@unikl.edu.my

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ABSTRACT

The current study aims to investigate the impact of energy efficiency (EE), green intellectual capital (GIC) and environmental management accounting system on environmental performance and competitive advance in Indonesia manufacturing industry. In doing so, we utilized the sophisticated methodology of partial least squares structural equation modeling (PLS-SEM) to identify the potential association among the variables of interest. Even after the growing consciousness for environmental management, there exist some companies that consider the acceptance of environmental trend as an obstacle to their growth and performance. The results confirm that all selected variables have a positive and significant impact on environmental performance and competitive advantage in the manufacturing industry in Indonesia. Moreover, the outcomes of the PLS-SEM confirm that environmental performance and competitive advantage have positively and expressively impacted by green intellectual, EE and environmental accounting system. In general, the results of PLS confirm that the three factors, i.e., GIC, EE, and environmental accounting management system are the positive and significant contributor to enhance the environmental performance and competitive advantage of the firm in Indonesia manufacturing industry.

Keywords: Energy Efficiency, Green Intellectual Capital, Environmental Performance, Competitive Advantage, Indonesia
JEL Classifications: Q55, Q50, O34

1. INTRODUCTION

In the existing era of enhanced ecological pressures, economies tend to be more cautious about environmental management. This led to a greater emphasis on the notion of sustainable development. The course of sustainability cannot be achieved without the collaboration of businesses and society. However, with time, peoples' awareness of environmental issues is witnessed to be improved followed by the higher demand for sustainable goods and services. Thus, in compliance, modern firms have seen to give supreme attention to eco-friendly business methods and processes (Phan et al., 2018).

From the last two decades, the aspect of "going green" is been identified as the prime motivation for organizations to enhance their competitiveness. Also, rising international concerns and environmental laws are also among the reasons for organizations' adoption of green practices (Chen, 2008). Similarly, witnessing the adverse effects of energy for causing carbon emissions and environmental degradation, the local and international firms are keen to reduce their energy dependence. In this regard, findings the alternatives for utilizing green energy and enabling technologies to attain energy efficiency (EE) are considered effective for enhancing the firm's response to environmental management (Jasch, 2003; Gabriel, 2017).

In a similar context, the role of green intellectual capital (GIC) has been regarded as an effective tool for improving a firm's environmental performance and competencies. It encompasses organizational intangible resources and competencies that can help to attain a firm's vision of sustainable development and assist in improving the firm's productivity and performance. The domain of GIC underlies several attributes of environmental administration. It postulates the combination of firm's ecologically driven human, structural and customer capitals that can serve efficiently under the inclinations for environmentalism consciousness to improve growing disruptions in environmental conditions (Chen, 2008; Edwin et al., 2017).

The importance of EE in modern business practices has been seen in adopting several ecologically sound processes. In this regard, organizations inclination in initiating strategies to curtail or limit energy consumption can be observed in several measures, such as submetering, lighting retrofits, executing a constricted control on energy utilization, replacement of old and inefficient machines, adoption of renewable sources of energy, inclusive utility expenditure supervision, etc. The role of EE has been witnessed to aid firms in multiple ways. First, it helped the organizations to fulfill the objectives of sustainability. Second, it provides a monetary benefit to the organizations in reducing operational costs that resulted in improved operating income. Third, it supports the company's mission of green marketing, that enable to build green organizational image and enhance the firm's competitiveness.

Likewise, the motives for ecological sustainability have also been successfully fulfilled by environmental management accounting (EMA). The field of EMA makes certain that organizational accounting information favoring or disrupting environment are easily available for the course of managerial decision making. The excess of physical and monetary information resulted from EMA not only help to support the fundamentals of environmental management but also aid decision making for building superior environmental protection agencies. The augmented efficiency attained through the firm's EMA improves the company's sales trends, decrease organizational costs, decrease a firm's cost of failure and improve the firm's image. With efficiency in EMA, firms are likely to have boosts in their environmental performance along with monetary and non-monetary benefits that help organizations to gains superior competitive advantages.

Hence, the current study seeks to empirically investigate the impact of EE, EMA and GIC on environmental performance in Indonesian manufacturing industries. In addition, the present study also motivated to empirically examined the role of studied variables in enhancing a firm's competitive advantage. In doing so, the authors utilized the sophisticated methodology of partial least squares structural equation modeling (PLS-SEM) to identify the potential association among the variables of interest. Even after the growing consciousness for environmental management, there exist some companies that consider the acceptance of environmental trend as an obstacle to their growth and performance. The findings achieved from the present study could help to resolve companies' reluctance for accepting the methods of environmental management and therefore provide value addition to the prevailing limited environment literature.

The remaining of the article is outlines as follow. Discussed in chapter two is the conceptual background of the studied variables and proposed hypotheses for the study. Chapter three highlights the information regarding instrument and data collection. Chapter four presents empirical findings and finally, chapter five summaries research findings and offers policy implications.

2. CONCEPTUAL BACKGROUND AND HYPOTHESES

The popular theory of resource-based view (RBV) explained the status of the firm's resources and capabilities to achieve higher competencies. The foundation of RBV approach lies in giving importance to organization's exclusivity in terms of tangible and intangible resources, skills, expertise, wisdom, reputation, etc. to attain supreme competitive advantages (Amit and Schoemaker, 1993). The theory further analyzed that firm's with greater competencies that are not likely to be imitated or copied have greater potentials of improving their performance and maintain sustainable competitive advantages (Barney, 1991; Egbunike and Okoye, 2017). In similar ways, organizational adoption and efficient utilization of energy efficiencies, GIC, and EMA can help to increase company' likelihood of better functioning, reduced costs, improved image, etc. This can support a firm to gain a superior advantage over its competitors, increase its market share and attained sustainable performance.

2.1. GIC

In the present world, the willingness of the organization for going green is vastly increasing. The need for organizations to enhance the efficiency and benefits of intangible assets are supported and augmented by eco-friendly utilization of such resources. By definition, intellectual capital is regarded as the organization's stock of intangible resources, skills, expertise, wisdom, reputation, knowledge that can enhance a firm's competencies (Johnson, 1999). In the existing era of augmented environmentalism, the notion of intellectual capital is more efficient when utilized with ecologically driven objectives. With similar motives, Chen (2008) explored the association between GIC and the firm's competitiveness. In order to perform empirical estimations, the author used the data of SMEs and Multinationals of Taiwan. The study elaborated the notion of GIC by using three disaggregated measures of green human capital, green relational capital and green structural capital. The results of the study established a significant relationship between the variables. In specific, the findings elaborated that an increase in all three forms of structural capital enhanced the firm's competitive advantage. Furthermore, the results found that green structural capital is the most dominant driver of the firm's competitiveness.

In another study, Chang and Chen, (2012) explored the drivers of GIC. The authors aimed to examine the impact of environmental consciousness (EC) and corporate social responsibility (CSR) on three GIC namely, green structural capital, green human capital

and green customer capital. The outcomes of the study reported that both EC and CSR brought significant positive impact on all three kinds of GIC. Similarly, Baharum and Pitt, (2009) also analyzed the role of intellectual capital in the context of facilities management (FM). The study in particular evaluated the role of FM intellectual capital to identify the role it played in environmental management. The findings of the investigation based on a literature analysis framework established that FM intellectual capital is vital to extend the importance of environmental management and intangible resources through greater focus on green strategy and the firm's knowledge management.

Wang et al. (2014) also investigated the contribution of intellectual capital in influencing firm's performance. Focusing on the technology firms in China, the authors used the data of 228 Chinese companies. Similar to Chen (2008), the study utilized three measures of intellectual capital, i.e., human, structural and relational capital. The results of the study reported that all measures of intellectual capital are significant to enhance the firm's operational performance (Haseeb et al., 2019a). Similarly, the results also found the significant positive contribution of intellectual capital on the financial performance of Chinese technology firms. Using the measure of green customer capital, also examined the impact of relationship learning on firm's ecologically driven intellectual capital and innovation performance (Eketu, 2018; Dawabsheh et al., 2019**)**. In doing so, the authors used the data of manufacturing companies in Spain. The outcomes of the study found that relational capital is positive to influence both green human capital and green innovation.

Therefore, on the basis of the above literature, we hypothesize that;

H_1: GIC is significant to influence a Firm's Competitive Advantage.

H_2: GIC is significant to influence Firm's Environmental Performance.

2.2. EMA

The vision of sustainable development is impossible to achieve without the collaborative efforts of organizational departments. In a similar context, the importance of environmental management has been extensively appreciated in the field of accounting. The notion of EMA in this regard is prominent to offer environmental management by proving internal and external informational efficiency for managerial decision making. The empirical findings related to environmental accounting are very limited. Very few studies performed the empirical evaluations of accounting attributes in affecting environmental conditions. Among them, Jasch, (2003) examined the role of EMA in identifying corporate's environmental costs (Umrani et al., 2016). Utilizing the transitional data of accounting departments, the results of the study found the vitality of EMA in measuring and identifying several environmental costs.

Qian et al. (2018) examined the role of EMA in offering carbon management (CM) and discloser quality (DQ). In order to perform empirical investigations, the authors used the data of 114 companies in the United States, Australia, Japan and Germany. The results of the study reported that EMA is a substantial tool for performing carbon management and assisting quality disclosure. In particular, the findings reported that EMA tools of auditing and control significantly drive CM and DQ. On the other hand, the results failed to find the support of measurements tool of EMA in influencing CM and DQ in the sampled companies. Likewise, Phan et al. (2018) also examined the role of environmental accounting in influencing a firm's environmental performance (Jermsittiparsert et al., 2019). In doing so, the authors used the data of environmental activity management by using the measures of ecological activity analysis (EAA), ecological activity cost analysis and ecological activity-based costing (EABC) (Haseeb et al., 2019b). Utilizing the sample of 208 firms of Australia, the findings confirmed the substantial contribution of the studied variables on environmental performance in terms of resource utilization, regulation, productivity and stakeholder's interaction. In particular, the authors found the major influence of EAA in enhancing regulations and stake holder's interaction. On the other hand, EABC is found to drive resource usage dominantly.

In another recent study, Latan et al. (2018) examined the contribution of EMA in influencing the environmental relationship strategies and managerial commitment to a firm's environmental performance. Utilizing the sample of 107 Indonesian firms, the results of the investigation established the significant association of the studied variables with environmental performance. In particular, the outcomes elaborated that environmental strategies, managerial commitment, and environmental uncertainty are positively associated with EMA. Furthermore, the result also reported that environmental strategies, managerial commitment, and EMA are crucial drivers of a firm's environmental performance.

Thus, on the basis of the above literature, we hypothesize that;

H_3: EMA is significant to influence a Firm's Competitive Advantage.

H_4: EMA is significant to influence Firm's Environmental Performance.

2.3. EE

Energy consumption is vital for the course of development. Similar in the case of corporations, energy utilization is inevitable even after observing its harmful impact on environmental conditions in terms of releasing Greenhouse Gases. The solution for such conditions lies in finding environmentally friendly energy sources and higher energy efficiencies. Organizations that can avail superior levels of EE are likely to enhance performance and competencies. Many studies identified the significant relationship between EE with growth and sustainability. These included among others, the noble work of Ayres et al. (2007), Banerjee and Solomon, (2003), Mikučionienė et al. (2014) and Keong (2005).

Hanley et al. (2009) focus on resource productivity of EE and its role in improving environmental performance. The study stated the EE could improve the environment but may backfire in some cases. In particular, the discussion by the author highlighted that improvements in EE are companies with a decline in energy prices. This will result in initiating output with substitution effect that escalated demand for energy. The study recommended that alone emphasis on EE is inadequate to curtail environmental performance. They should be accompanied with relevant policies

such as energy tax, that has the potential to limit future energy usage.

Emphasizing on the utilization of green energy, Shin et al. (2018) examined the role of renewable energy usage in affecting a firm's financial performance. using the data of seven years from 2007 to 2013 of top 500 fortune companies, the authors considered Annual Returns on investments, Tobin's Q, and operating margin as the measures of firm's financial performance. The findings of the study reported that the utilization of green energy significantly improved the financial performance of the sampled companies relevant to the industry. Similarly, Dangelico and Pontrandolfo, (2015) also stressed on the importance of energy efficiencies, pollution reduction and green energy usage in influencing firm performance. Using the data of 122 Italian firms, the results found a significant contribution of all the variables on the firm's performance. In particular, the result found a significant contribution of energy and pollution in influencing market and image performance.

Thus, on the basis of the above literature, we hypothesize that;

H_5: EE is significant to influence a Firm's Competitive Advantage.

H_6: EE is significant to influence Firm's Environmental Performance.

3. METHODOLOGY

3.1. Measures

The ongoing research investigates the impact of GIC, EE and EMA system on environmental performance and firm competitive advantage in Indonesia manufacturing industry. In order to achieve this purpose, we investigate the research framework focused on earlier studies, and the model is presented in Figure 1. The main characteristics of the opted variables are explained by utilizing the Likert scale method from 1 (Strongly Disagree) to 5 (Strongly Agree). Overall, the current study uses five variables. The variables used into this investigation are the GIC, EE (EEF), EMA, environmental performance (ENP) and firm performance (COM). The six items of GIC are adopted from the research of Chen, (2008). In addition, the four constructs of EEF are adopted from the prior study of Chang, (2011). The four items of EMA are embraced from the research of Latan et al. (2018). Moreover, the present investigation utilizes four items of ENP which are taken from the study of Zhu et al. (2013). Finally, the current research took four items of (COM) from the research of Chang (2011).

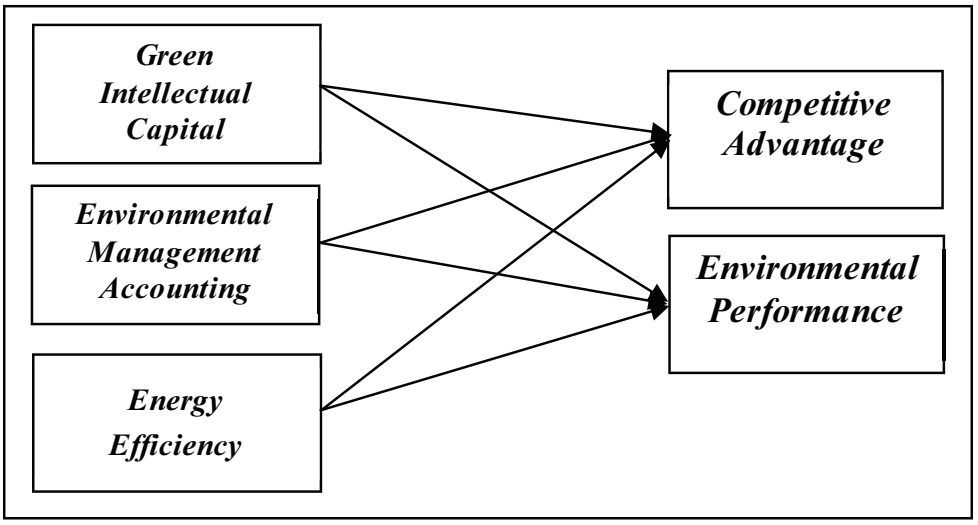
3.2. Sample and Data Collection

The procedure of information collection in the present examination is done by collecting the data from the manufacturing industry sector of Indonesia. Additionally, we select 127 different small firms in the manufacturing sector of Indonesia. For fast and smooth information gathering process, we make an interpretation of our instrument into the English language and send to the selected various small manufacturing firms. Therefore, a sum of 309 survey instrument was referred to using both on the printed copy and hard copy of the survey instrument. The technique for data gathering obtained a period of just about seven months, 3 days and got 300 reactions with the response rate of 97%.

4. DATA ANALYSIS AND DISCUSSION

In this study, the data investigation is done by using two software which is the SmartPLS Version 3.2.8 (Ringle et al., 2015) and Statistical Package for Social Sciences (Version-23). Valid information taken for the present study is 280 after eliminating uni-variate and multivariate outliers. The method for detecting of univariate and multivariate anomalies are Z-test score and Mahalanobis Distance (D2) by using SPSSS (V-23) and remaining of the data investigation is finished by applying SmartPLS. Shown Table 1 is the structure and composition of the valid response of the collected data utilized in this investigation. Moreover, Table 2 explain the mean and Pearson's Correlation of the variables utilized in the current investigation. Also, to tackle the problem of multicollinearity, the current research applies to Hair et al. (2010) commence that by a wide edge in Pearson's Correlation investigation should below 0.90. Consequently, confirm the nonappearance of multicollinearity among the factors (Hair et al., 2013; Frooghi et al., 2015; Fengyang, 2018).

Figure 1: Displayed the conceptual model of the current study



Moreover, content legitimacy is validated if the items using in the data investigation load with dynamic value in their specific factor in contrast with different items appeared in the framework, while inner constancy is confirmed if the estimation of Cronbach's alpha and composite reliability value found >0.7 (Hair et al., 2013; Waseem et al., 2013). Factor loadings and composite reliability values showed up in Table 3 which display that an enormous value of the items factor loading is more prominent than 0.7. Besides, these loadings appear in their individual parts which ensuring the internal consistency of the selected constructs.

Table 1: Results of descriptive statistics

Descriptive statistics		Frequency	Percent
Gernder			
Valid	Female	113	40
	Male	167	60
	Total	280	100
Age			
Valid	20–30 years	32	11
	31–40 years	102	36
	41–50 years	82	29
	51 and above	64	23
	Total	280	100
Working experience			
Valid	1–5 years	63	23
	6–10 years	138	49
	11–15 years	29	10
	More than 15 years	50	18
	Total	280	100
Education			
Valid	Undergraduate	57	20
	Graduate	178	64
	Post Graduate	15	5
	Others	30	11
	Total	280	100

Source: Authors estimation

Table 2: Means and Pearson correlations (N=280)

Variables	Mean	GIC	EEF	EMA	ENP	COM
GRC	4.324	–				
GSC	4.12	0.327**	–			
GHC	4.309	0.302**	0.287**	–		
ORR	4.049	0.320**	0.302**	0.321**	–	
ENP	3.954	0.292**	0.287**	0.288**	0.382**	–

**Correlation is significant at the 0.01 level (2-tailed)

Also, convergent legitimacy teaches to what extent an item regarding a specific factor established and loaded to an adjoining variable where they thought to be loaded (Mehmood and Najmi, 2017). In this research, convergent legitimacy is presented by using an average variance extracted (AVE) for each factor (Fornell and Larcker, 1981). They give the benchmark of more fundamental than and appeared differently in relation to 0.5 for ensuring up to the convergent legitimacy. As requirements are, AVE in Table 3 is affirming the fundamental parameters.

In the following procedure, discriminant authenticity is revealed as how much an item of an explained factor is discriminant and novel from other factors (Frooghi et al., 2015). As per Fornell and Larcker (1981), the discriminant authenticity is said to be declared if the AVE square root value is more than the pair-wise relationship of the latent factor. The results appeared in Table 4, bold and italic values are the square root of AVE which is more than the off-diagonal estimates which are the pair-wise relationship of each factor (which are GIC, EEF, EMA, ENP, and COM). Moreover, Table 5 shows the factor loadings of a various and separate factor, thusly, pronouncing the cut-off threshold. Similarly, the discriminant authenticity is moreover imparted if the Hetro Trait and Mono Trait parameter are lower than 0.85 as grasped by Henseler et al. (2015). The outcomes in Table 6 uncovered that all factors have Discriminant legitimacy.

In the last stage, we connected a PLS system to explore the model structure and hypothesis testing which exhibiting path

Table 3: Measurement model results

Variables	Items	Factor loadings	Cronbach's alpha	Composite reliability	AVE
Green Intellectual Capital	GIA1	0.932	0.792	0.812	0.621
	GIA2	0.947			
	GIA3	0.927			
	GIA4	0.895			
	GIA5	0.943			
	GIA6	0.924			
Energy Efficiency	EEF1	0.905	0.846	0.873	0.602
	EEF2	0.869			
	EEF3	0.880			
	EEF4	0.873			
Environmental Management Accounting	EMA1	0.875	0.824	0.843	0.663
	EMA2	0.853			
	EMA3	0.909			
	EMA4	0.823			
Environmental Performance	ENP1	0.887	0.806	0.793	0.593
	ENP2	0.844			
	ENP3	0.793			
	ENP4	0.844			
Competitive Advantage	COM1	0.863	0.812	0.843	0.623
	COM2	0.854			
	COM3	0.824			
	COM4	0.804			

Source: Authors estimation. AVE: Average variance extracted

Table 4: Discriminant validity Fornell-Larcker criterion

Variables	GIC	EEF	EMA	ENP	COM
GIC	***0.788***				
EEF	0.323	***0.776***			
EMA	0.372	0.435	***0.814***		
ENP	0.332	0.403	0.338	***0.770***	
COM	0.423	0.382	0.432	0.392	***0.789***

Source: Authors estimation

Table 5: Results of loadings and cross loadings

Variables	GIC	EEF	EMA	ENP	COM
Green Intellectual	**0.932**	0.349	0.301	0.479	0.335
Capital	**0.947**	0.473	0.414	0.375	0.357
	0.927	0.377	0.526	0.256	0.534
	0.895	0.447	0.401	0.374	0.452
	0.943	0.157	0.294	0.339	0.507
	0.924	0.437	0.506	0.405	0.356
Energy Efficiency	0.294	**0.905**	0.524	0.314	0.415
	0.256	**0.869**	0.416	0.447	0.352
	0.157	**0.880**	0.304	0.421	0.394
	0.383	**0.873**	0.344	0.419	0.509
Environmental	0.347	0.405	**0.875**	0.322	0.445
Management	0.418	0.259	**0.853**	0.352	0.338
Accounting	0.270	0.259	**0.909**	0.325	0.504
	0.501	0.534	**0.823**	0.225	0.438
Environmental	0.270	0.434	0.364	**0.887**	0.456
Performance	0.403	0.474	0.435	**0.844**	0.382
	0.508	0.456	0.367	**0.793**	0.455
	0.421	0.502	0.414	**0.844**	0.393
Competitive Advantage	0.243	0.336	0.284	0.389	**0.863**
	0.404	0.273	0.414	0.484	**0.854**
	0.472	0.402	0.323	0.449	**0.824**
	0.455	0.201	0.294	0.512	**0.804**

Source: Authors estimation

coefficients, t-statistics, and significant value. As shown by Chin (1998) suggestion, a bootstrapping method utilizing 1000 sub-sample was connected with asserting the quantifiable fundamental estimates of all the values. Table 7 uncovers beta coefficients, t-statistics, and their significant value with the remarks about the hypothesis testing.

The results of the PLS-SEM are presented in Table 7. It established the outcomes of with regression path coefficient, t-statistics, probability values (P values) and the remarks related to the theorized path. Overall, the results suggested that all selected variables have a positive and significant impact on environmental performance and competitive advantage in the manufacturing industry in Indonesia. Moreover, the outcomes of the PLS-SEM confirm that environmental performance ($\beta = 0.221$, $P < 0.000$) and competitive advantage ($\beta = 0.291$, $P < 0.000$) have positively and expressively impacted by GIC hence affirming H1 and H2. The outcomes of PLS-SEM also indicate that environmental performance ($\beta = 0.343$, $P < 0.000$) and competitive advantage ($\beta = 0.274$, $P < 0.000$) have also positively and noteworthy influenced by the EE, therefore, confirming H3 and H4. Finally, the results also specified that environmental performance ($\beta = 0.339$, $P < 0.000$) and competitive advantage ($\beta = 0.382$, $P < 0.000$) have significantly and positively affected by environmental accounting management system henceforth supporting H5 and H6. In general, the results of PLS confirm that the three factors, i.e., GIC, EE, and

Table 6: Results of HTMT ratio of correlations

Variables	GIC	EEF	EMA	ENP	COM
GIC					
EEF	0.563				
EMA	0.502	0.592			
ENP	0.472	0.483	0.593		
COM	0.593	0.579	0.624	0.602	

Source: Authors estimation

Table 7: Results of path coefficients

Hypothesized Path	Path Coefficient	t-statistics	P value	Remarks
ENP←GIC	0.221	3.982	0.000	Supported
COM←GIC	0.291	11.335	0.000	Supported
ENP←EEF	0.343	4.128	0.000	Supported
COM←EEF	0.274	3.888	0.000	Supported
ENP←EMA	0.339	5.029	0.000	Supported
COM←EMA	0.382	4.034	0.000	Supported

Level of Significance (5% i.e., 0.050), Source: Authors' estimation

environmental accounting management system are the positive and significant contributor to enhance the environmental performance and competitive advantage of the firm in Indonesia manufacturing industry.

5. CONCLUSION

During the last two decades, the aspect of "going green" is been identified as the prime motivation for organizations to enhance their competitiveness. In addition, rising international concerns and environmental laws are also among the reasons for organizations' adoption of green practices. In a similar context, the role of GIC has been regarded as an effective tool for improving a firm's environmental performance and competencies. It encompasses organizational intangible resources and competencies that can help to attain a firm's vision of sustainable development and assist in improving the firm's productivity and performance. The domain of GIC underlies several attributes of environmental administration. Moreover, the importance of EE in modern business practices has been seen in adopting several ecologically sound processes. In this regard, organizations inclination in initiating strategies to curtail or limit energy consumption can be observed in several measures, such as submetering, lighting retrofits, executing a constricted control on energy utilization, replacement of old & inefficient machines, adoption of renewable sources of energy, inclusive utility expenditure supervision, etc. Likewise, the motives for ecological sustainability have also been successfully fulfilled by EMA. The field of EMA makes certain that organizational accounting information favoring or disrupting environment are easily available for the course of managerial decision making. The excess of physical and monetary information resulted from EMA not only help to support the fundamentals of environmental management but also aid decision making for building superior environmental protection agencies.

Keeping in mind the above discussion, the present study also motivated to empirically examined the role of studied variables in enhancing a firm's competitive advantage. In doing so, the authors

utilized the sophisticated methodology of PLS-SEM to identify the potential association among the variables of interest. Even after the growing consciousness for environmental management, there exist some companies that consider the acceptance of environmental trend as an obstacle to their growth and performance. The results confirm that all selected variables have a positive and significant impact on environmental performance and competitive advantage in the manufacturing industry in Indonesia. Moreover, the outcomes of the PLS-SEM confirm that environmental performance and competitive advantage have positively and expressively impacted by green intellectual, EE and environmental accounting system. In general, the results of PLS confirm that the three factors, i.e., GIC, EE, and environmental accounting management system are the positive and significant contributor to enhance the environmental performance and competitive advantage of the firm in Indonesia manufacturing industry.

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