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## Article

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## Provided in Cooperation with:

International Journal of Energy Economics and Policy (IJEPP)

**Reference:** Gholamreza Zandi/Lee, Hoyoung (2019). Factors affecting environmental management accounting and environmental performance : an empirical assessment. In: International Journal of Energy Economics and Policy 9 (6), S. 342 - 348.  
<http://econjournals.com/index.php/ijeep/article/download/8369/4666>.  
doi:10.32479/ijeep.8369.

This Version is available at:  
<http://hdl.handle.net/11159/5174>

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# Factors Affecting Environmental Management Accounting and Environmental Performance: An Empirical Assessment

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Received: 05 May 2019

Accepted: 06 September 2019

DOI: <https://doi.org/10.32479/ijee.8369>

## ABSTRACT

In today's world, businesses have no apparent geographical boundaries for functioning, trading and delivering products and services. However, given the threats to environmental sustainability, modern businesses are restricted to adopt several environmental policies to operate in existing the present globalized ecosphere. Thus, the present study aims to examine the relationship between internal and external drivers of environmental management accounting (EMA). In doing so, the study seeks out the association of customer influence (CIN), regulatory pressure (RPR) and firm's moral and social responsibility (MSR) on environmental management systems in the Indonesian manufacturing industry. Moreover, the current study is also motivated to investigate the impact of EMA on a firm's environmental performance (ENP). The current study applied a partial least square structural equation modelling. The results of PLS-SEM confirm that all variables have a positive and significant impact on ENP. The results conclude that CIN, RPR, and MSR have a positive and significant contributor in enhancing EMA system. Moreover, the results further confirm that EMA system also plays a significant role in boosting the ENP in Indonesia. Therefore, the current study recommends SMEs to give more focus on enhancing the MSR among its employees and also make a good control over the regulation and CIN.

**Keywords:** Customer Influence, Moral and Social Responsibility, Environmental Performance, Indonesia

**JEL Classifications:** Q55, Q50

## 1. INTRODUCTION

In the present time, businesses from all around the world, are facing severe environmental challenges (Perring et al., 2015). Knowing the continuous decline in the ecological conditions, the corporate world is confined with several limitations and regulations that caused the organizations to implement ecologically driven strategies that ensure environmental performance (ENP) (Le Gouill et al., 2019; Bromley, 2007). In addition, the internal organizational consciousness for improving ecological environment also motivate organizations (Dibrell et al., 2015). Hence, moral and social responsibilities encourage the corporations for adopting sustainable organizational practices, also referred to as green practices, against the traditional course of business operations (Hussain, 1999).

The rising emphasis on environmental management has led to instigate research in the relevant fields (Schaltegger and Synnestvedt, 2002; Hervani et al., 2005; Reed, 2008; Molina-Azorin et al., 2009). However, a pressing question, in this regard, concerns the attainment of improved performance in the process of going green (Albertini, 2013). Hence, the association between being green and firm performance have been the notion of higher interest in literature, especially in recent time (El-Kassar and Singh, 2018; Famiyeh et al., 2018; Zaid et al., 2018).

Many studies argued that inclusion of environmental practices raise firm's cost and thus put pressure on firm's economic performance (Watson et al., 2004; Klassen and Whybark, 1999; Cordeiro and Sarkis, 1997). However, the majority of the studies argued that implementation of eco-friendly business methods

enhances firm's competitiveness by bringing efficiency in organizational methods and thus reduce organizational costs and augments profitability (Albertini, 2013; King and Lenox, 2002). In addition, the improvement in market attractiveness resulted from green process adoption also raises a firm's reputation and paid off in the form of providing a competitive edge and higher market share (Hart, 1995).

Corresponding to the adoption of management tools to encourage environmental management, many organizations utilized the support of management systems to improve a firm's ENP (Haseeb et al., 2019). In the field of accounting, several studies evaluated the significance of accounting systems in improving firms and managerial performance (Gul and Chia, 1994; Gul, 1991; Govindarajan, 1984). More recently, the focus of accounting research is diverted in identifying and aiding the notion of sustainable development (Bebbington et al., 2017). As a result, organizations are pursuing environmental accounting to recognize their impact on the environment and consequently augment their ENP (Latan et al., 2018).

In this regard, the contribution of Environmental management accounting (EMA) is significant in identifying the firm's environmental cost and influence on the natural environment and lending support to the organizational motive of higher sustainability. EMA is comprehended as the administration of financial, quantitative and qualitative evidence regarding firm's ecological effects and the economic significance of ecologically driven organizational practices and their information which aids managerial decision making and firm's environmental responsibility (Schaltegger et al., 2003). The role of EMA is eminent in improving a firm's ENP (Latan et al., 2018). However, there are certain factors that motivate organizations to adopt ecologically driven accounting systems, that enhances their cost and carry significant modification in existing organizational practices.

Witnessing the extreme environmental deterioration, organizations have been observed to possess higher environmental consciousness which is primarily linked to the firm's responsibility towards natural habitat. However, the notion of sustainability is encouraged by numerous external pressures along with the firm's internal moral consciousness. In the current era of augmented environmentalism, there exist higher societal awareness regarding the continuous decline in environmental qualities resulted from massive economic and industrial development. In a similar context, consumers in modern times are more ecologically aware and possess a greater demand for green products and services. This involves the consumption trend that motivates the utilization of goods and services that are processed through eco-friendly methods and delivered minimal damage to the environment.

In addition, the increased ecological legislations are also regarded as the crucial driver of environmental information systems. In today's world, businesses have no apparent geographical boundaries for functioning, trading and delivering products and services. However, given the threats to environmental sustainability, modern businesses are restricted to adopt several environmental policies

to operate in existing the present globalized ecosphere. Hence, environmental regulation and strategic guidelines form the vital influencer of firm's adoption of environmental accounting systems (Yakhou and Dorweiler, 2004).

Thus, the present study aims to examine the relationship between internal and external drivers of EMA. In doing so, the study sought out the association of customer influence (CIN), RPR and firm's moral and social responsibility (MSR) on environmental management systems in the Indonesian manufacturing industry. Moreover, the current study is also motivated to investigate the impact of EMA on a firm's ENP (Jermisittiparsert, 2016). The understanding emerged from the current investigation would assist in recognizing crucial internal and external drivers of EMA and thus assist organizations in evaluating their environmental influence and performance measures.

The later part of the current examination is defined as follow. Next chapter defines and evaluates the prevailing studies on EMA and performance nexus along seeking critical drivers of environmental management. In addition, chapter three of this study demonstrate the utilized methods of data collection and sampling. Chapter four of the present examination delivers empirical outcomes by utilizing sophisticated statistical methods. Finally, chapter five presents a study conclusion and important implications of the findings.

## 2. LITERATURE REVIEW AND HYPOTHESES

The association of accounting management is considered crucial in boosting performance in past literature (Gul and Chia, 1994; Gul, 1991; Govindarajan, 1984). More recently, many studies strived to assess the contribution of environmental accounting in enhancing the firm's ecological and economic performances. Based on theoretical foundations of legitimacy, stakeholder and institutional theories, Johnstone, (2018) examined the vitality of ecologically motivated decisions in influencing Corporate's social responsibility and ecological accounting management of firms (Jermisittiparsert et al., 2019). The study stressed that environmental accounting is significant in shaping managerial decision making not only from the external environment but also by improving internal informational efficiency through improved CSR practices.

In another study, Latan et al., (2018) study several drivers of EMA and their impact on a firm's ENP. Using the data of Indonesian firms, the authors investigated the impact of ecological strategies, external uncertainty and organizations commitment from managers in shaping the usefulness of firm's EMA. the results of the study found statistically significant support for the positive association the studied variables and EMA. The results also found support for the subsequent positive effect of EMA on a firm's ENP.

In acknowledging the significance of accounting management systems in influencing firm performance, Mia and Clarke (1999) examined the relationship between competitive environmental pressure, management accounting systems and business unit performance. They were utilizing the responses from sixty-one managers. The findings of the study established that competitors'

pressure significantly drives the usage of accounting information that subsequently improves performance. Likewise, Gul and Chia, (1994) also examined the connection between accounting information systems, environmental uncertainty, and managers' performance (Ali and Haseeb, 2019). Analyzing the response from forty-eight managers, the results comprehended that under high environmental uncertainty, management accounting systems enhance performance, however, with a lower uncertainty in the external environment, accounting information systems tend to decline managers' performance.

Focusing on the controlling aspect of environmental accounting systems, Henri and Journeault, (2010) analyzed the implementation of eco-controls on firms economic and ENP and utilizing the data of Canadian organizations, the findings of the investigation established that eco-control has an insignificant direct relationship with a firm's economic performance (Umrani et al., 2016; Orji et.al., 2018). Moreover, the study further reported that eco-control indirectly influences a firm's economic performance via environmental processing. In particular, the results implied that measures of eco-control affect economic performance through greater ecological exposure, greater community visibility, greater ecological concerns, and the firm's size. In another study, Dunk (2002) reported that product quality and environmental accounting are significant drivers of a firm's quality performance that strategically enhanced firm competitiveness and performance.

Analyzing environmental management systems and performance, Agan et al. (2013) analyzed the critical drivers of a firm's green procedures and performance. Examining the responses from the Turkish SMEs, the results of the analysis reported the significant relationship between CIN and firm's moral responsibility in utilizing environmental management systems. In addition, regulatory pressures (RPR) have been found significant to influence green treatment but failed to impact pollution reduction and recycling. Finally, the study found a significant positive association of environmental management systems in enhancing firm performance. In another study, Yalabik and Fairchild, (2011) also examined the drivers of ecologically driven innovations that help to improve a firm's ENP. The study found a significant role of CIN, RPRs and competitor pressure in driving the firm's ecological innovation.

Davidson and Worrell, (2001) also investigated the role of regulations in influencing environmental management practices in organizations. The results of the study established that RPR is

a significant driver of a firm's implementation of green practices. Also, Kammerer, (2009) studied the contribution of consumer influence and environmental legislation in influencing ecological innovations in the German manufacturing industry. The outcomes of the examinations found that Customer advantage and ecological regulations are crucial in driving environmental innovation. Andrew and Cortese (2011) also assessed the role of self-regulation in a firm's disclosure of environmental costs. The findings of the investigation found that self-regulation significantly influenced the firm's carbon disclosure and thus improved ENP.

Therefore, on the basis of the above literature review, the current study proposed to test the following hypotheses;

Hypothesis 1: CIN has a significant impact on EMA

Hypothesis 2: RPR has a significant impact on EMA

Hypothesis 3: Firm's Moral and Social responsibilities have a significant impact on EMA

Hypothesis 4: EMA has a significant impact on the Firm's ENP.

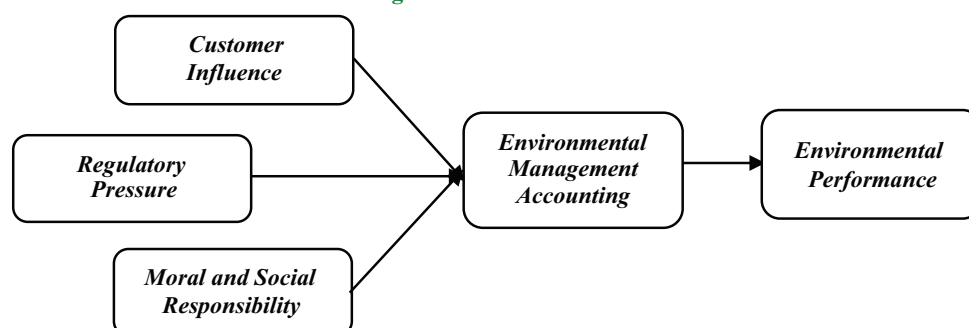
The hypothesized model of the present study is displayed in the following Figure 1.

### 3. METHODOLOGY

The present examination investigates the impact of CIN, RPR and MSR on EMA system and further examining the impact of EMA on ENP in Indonesia small and medium enterprises. To achieve this target, the present investigation built up a model which depends on prior research studies, and the model appears in Figure 1. The main properties of the variables are characterized by utilizing the Likert scale methodology from 5 (Strongly Agree) to 1 (Strongly Disagree). Moreover, the present examination uses five variables. The five variables used in this examination are the CIN, RPR, MSR, EMA and ENP. Moreover, the four items of CIN are adopted from the prior study of Agan et al., (2013). Also, the four items of RPR and MSR are adopted from the earlier research of Agan et al. (2013). On the other hand, the four items of EMA are adopted from the prior study of Latan et al. (2018). Finally, the four items of ENP are adopted from the previous study of Zhu et al., (2017).

For the data collection purpose, the technique for information collection in the present examination is done by collecting the data from the SMEs of Indonesia. In like manner, we select 79 diverse SMEs of Indonesia. For a speedy and smooth information gathering process, we make a comprehension of our survey questionnaire into the English language and send to the selected

Figure 1: Research model





particular SMEs. At last, a total of 364 sample information was gathered by using both printed and social media. The procedure for data gathering took a period of 2 months and 3 weeks and collected 329 sample information with the response rate of 90.38%.

#### 4. DATA ANALYSIS AND INTERPRETATION

In the current study, the data investigation is done by using two eminence statistical programming software which is the SmartPLS Version 3.2.8 (Ringle et al. 2015; Olowa, 2018) and Statistical Package for Social Sciences (Version-23). The ultimate data utilized for the current study is 303 resulting in taking out univariate and multivariate anomalies. The philosophy for the seeing of univariate and multivariate anomalies are Z-test score and Mahalanobis Distance (D2) by using SPSS (V-23), and further data investigation is finished by applying SmartPLS. Shown Table 1 is the organization and structure of the final data utilized in this examination. Besides, Table 2 report the mean and Pearson's Correlation of the factors utilized in the current study. Moreover, to deal with the issue of multicollinearity, we pursue Hair et al. (2013) clarified that by a wide range in Pearson's correlation examination should underneath 0.90. Thusly, affirm the nonappearance of multicollinearity among the variables (Hair et al., 2013; Frooghi et al. 2015; Onyinye et al., 2018).

The results of descriptive statistics are reported in Table 1 with complete structure and composition of the collected data. The descriptive statistics are further divided into four different sub-categories which are gender, age, work experience, and education. Table 1 explains the percentage decomposition of all the sub-categories.

Moreover, content legitimacy is created if the items using in the data investigation load with high values in their specific factor in correlation with the items appeared in the model, while internal consistency is perceived whether the estimation of Cronbach's alpha and composite reliability esteem discovered more noticeable than 0.7 (Hair et al. 2013; Waseem et al. 2013). Factor loadings and composite reliability value show up in Table 3 which demonstrate that a smooth estimation of the items factor loadings higher than 0.7. Besides, these loadings appear in their individual factor which ensuring the inner consistency of the chose construct.

Moreover, convergent legitimacy uncovers to what degree an item regarding a specific factor loaded to different parts where they expected to be loaded (Mehmood and Najmi, 2017; Olaoye and Olanipekun 2018). In this examination, convergent legitimacy is appeared by using an average variance extracted (AVE) for each factor (Fornell and Larcker, 1981). They gave the benchmark of more critical than and gave differently in association 0.5 for ensuring the convergent legitimacy. The consequences of AVE in Table 3 is confirming the essential parameters.

In the further stage, discriminant validity is revealed as how much an item of a factor is discriminant and novel from various variables used in a model (Frooghi et al., 2015; Okon, 2018). As exhibited by Fornell and Larcker (1981), the discriminant legitimacy is said to be built up if the AVE square root esteem is more than the

**Table 1: Descriptive statistics**

Variables	Frequency	Percent
Gender		
Female	94	31
Male	209	69
Total	303	100
Age		
20-30 years	43	14
31-40 years	197	65
41-50 years	33	11
51 and above	30	10
Total	303	100
Working experience (Years)		
1-5	43	14
6-10	190	63
11-15	27	9
>15	43	14
Total	303	100
Education		
Undergraduate	26	9
Graduate	201	66
Postgraduate	19	6
Others	57	19
Total	303	100

Source: Authors estimation

**Table 2: Means and pearson correlations**

Variables	MEAN	CIN	PRP	MSR	EMA	ENP
CIN	4.392	-				
PRP	3.985	0.312**	-			
MSR	4.018	0.285**	0.412**	-		
EMA	4.112	0.336**	0.442**	0.401**	-	
ENP	3.954	0.300**	0.372**	0.344**	0.374**	-
n=303						

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

**Table 3: Measurement model results**

Variables	Factor loadings	Cronbach's alpha	Composite reliability	AVE
Customer influence				
CIN1	0.820	0.902	0.894	0.583
CIN2	0.792			
CIN3	0.834			
CIN4	0.853			
Regulatory pressures				
RPR1	0.801	0.919	0.872	0.601
RPR2	0.768			
RPR3	0.778			
RPR4	0.772			
Moral and social responsibility				
MSR1	0.774	0.894	0.835	0.594
MSR2	0.754			
MSR3	0.804			
MSR4	0.728			
Environmental management accounting				
EMA1	0.784	0.884	0.804	0.612
EMA2	0.746			
EMA3	0.702			
EMA4	0.746			
Environmental performance				
ENP1	0.763	0.921	0.856	0.608
ENP2	0.755			
ENP3	0.729			
ENP4	0.711			

Source: Authors estimation

**Table 4: Discriminant validity Fornell and Larcker criterion**

	CIN	PRP	MSR	EMA	ENP
CIN	0.764				
PRP	0.382	0.775			
MSR	0.305	0.395	0.771		
EMA	0.412	0.412	0.285	0.782	
ENP	0.402	0.394	0.339	0.422	0.780

Source: Authors estimation

**Table 5: Results of loadings and cross loadings**

Variable	CIN	PRP	MSR	EMA	ENP
Customer influence	0.820	0.150	0.209	0.101	0.212
	0.792	0.245	0.159	0.148	0.179
	0.834	0.062	0.117	0.135	0.201
	0.853	0.207	0.201	0.161	0.219
Regulatory pressures	0.120	0.801	0.272	0.125	0.165
	0.104	0.768	0.165	0.254	0.140
	0.064	0.778	0.121	0.223	0.156
	0.156	0.772	0.137	0.166	0.202
Moral and social responsibility	0.141	0.165	0.774	0.128	0.177
	0.223	0.106	0.754	0.140	0.227
	0.110	0.106	0.804	0.129	0.200
	0.205	0.252	0.728	0.089	0.174
Environmental management accounting	0.213	0.177	0.167	0.784	0.181
	0.148	0.225	0.338	0.746	0.256
	0.168	0.274	0.315	0.702	0.181
	0.091	0.205	0.261	0.746	0.156
Environmental performance	0.349	0.208	0.176	0.242	0.763
	0.250	0.169	0.256	0.300	0.755
	0.293	0.249	0.385	0.278	0.729
	0.282	0.391	0.182	0.318	0.711

Source: Authors estimation

pair-wise relationship of the latent factor. The results appeared in Table 4, bold and italic qualities are the square base of AVE which is more than the cut-off limit which is the pair-wise relationship of each factor. Additionally, Table 5 exhibits the factor loadings of other and individual factor, in like way, articulating the cut-off benchmark. In this way, the discriminant validity is likewise affirmed if the Hetro Trait and Mono Trait parameter are lower than 0.85 as proposed by Henseler et al. (2015). The outcomes in Table 6 uncovered that all factors have discriminant validity.

In the last stage, we related a partial least square structural equation modelling to examine the model structure and hypothesis testing which showing path coefficients, t-statistics, and P-value. As showed up by Chin (1998) proposal, a bootstrapping structure utilizing 1000 sub-test was associated with asserting the quantifiable key appraisal of the significant number of values. Table 7 uncovers beta coefficients, t-stats, and their P-value with the remarks about the theory testing.

The outcomes of the partial least square structural equation modelling are shown in Table 7. It confirmed that the outcomes with regression path coefficient, t-statistics, probability values (P-values) and the remarks related to the hypothesis testing. Generally, the outcome confirms that all selected variables have a positive and significant impact on EMA in small and medium enterprises in Indonesia. Furthermore, EMA also has a positive and

**Table 6: Results of HTMT ratio of correlations**

	CIN	PRP	MSR	EMA	ENP
CIN	-				
PRP	0.683	-			
MSR	0.472	0.643	-		
EMA	0.421	0.482	0.531	-	
ENP	0.338	0.333	0.444	0.503	-

Source: Authors estimation

**Table 7: Results of path coefficients**

Hypothesized path	Path coefficient	C.R	P-value	Remarks
EMA←CIN	0.295	3.994	0.000	Supported
EMA←RPR	0.302	4.204	0.000	Supported
EMA←MSR	0.332	4.009	0.000	Supported
ENP←EMA	0.273	3.799	0.000	Supported

Level of significance (5% i.e., 0.050)

Source: Authors' estimation

significant impact on ENP. Moreover, the outcomes of the PLS-SEM confirm that CIN ( $\beta = 0.295$ ,  $P < 0.000$ ) have significantly and positively impact on EMA hence affirming H1. The results of PLS-SEM also confirm that RPR ( $\beta = 0.302$ ,  $P < 0.000$ ) have a positive and significant impact on EMA, therefore, confirming H2. Finally, the results of partial least square modelling confirm that MSR ( $\beta = 0.284$ ,  $p < 0.000$ ) also have a positive and significant impact on EMA System; hence, confirming H3. Moreover, the results also confirm that the Environmental Accounting System ( $\beta = 0.273$ ,  $P < 0.000$ ) have a positive and significant impact on ENP in different small and medium enterprises in Indonesia. In conclusion, the results of PLS-SEM confirm that all three variables which are CIN, RPR and MSR play a significant and positive role in enhancing EMA system. Furthermore, the results also confirm that good EMA system also help to enhance the ENP of Indonesia small and medium enterprises.

## 5. CONCLUSION AND DISCUSSION

In the recent decade, knowing the continuous decline in the ecological conditions, the corporate world is confined with several limitations and regulations that caused the organizations to implement ecologically driven strategies that ensure environmentally. In addition, the internal organizational consciousness for improving ecological environment also motivate organizations. Hence, moral and social responsibilities encourage the corporations for adopting sustainable organizational practices, also referred to as green practices, against the traditional course of business operations. Many studies argued that the inclusion of environmental practices raise a firm's cost and thus put pressure on the firm's economic performance. However, the majority of the studies argued that the implementation of eco-friendly business methods enhances a firm's competitiveness by bringing efficiency in organizational methods and thus reduce organizational costs and augments profitability. Moreover, the contribution of EMA is significant in identifying the firm's environmental cost and influence on the natural environment and lending support to the organizational motive of higher sustainability. EMA is comprehended as the administration of financial, quantitative

and qualitative evidence regarding firm's ecological effects and the economic significance of ecologically driven organizational practices and their information which aids managerial decision making and firm's environmental responsibility.

In today's world, businesses have no apparent geographical boundaries for functioning, trading and delivering products and services. However, given the threats to environmental sustainability, modern businesses are restricted to adopt several environmental policies to operate in existing the present globalized ecosphere. Hence, environmental regulation and strategic guidelines form the vital influencer of firm's adoption of environmental accounting systems. Thus, the present study aims to examine the relationship between internal and external drivers of EMA. In doing so, the study seeks out the association of CIN, RPR and firm's MSR on environmental management systems in the Indonesian manufacturing industry. Moreover, the current study is also motivated to investigate the impact of EMA on a firm's ENP. The current study applied a partial least square structural equation modelling. The results of PLS-SEM confirm that all variables have a positive and significant impact on ENP. The results conclude that CIN, RPR, and MSR have a positive and significant contributor in enhancing EMA system. Moreover, the results further confirm that EMA system also plays a significant role in boosting the ENP in Indonesia. Therefore, the current study recommends SMEs to give more focus on enhancing the MSR among its employees and also make good control of the regulation and CIN.

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