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Environmental Management Accounting, Environmental Innovation and Corporate Environmental Performance

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Abstract- *This study was conducted to further investigate the relationship between the application of environmental management accounting of ISO 14001 certified companies and corporate environmental performance through, environmental innovations. This study uses the theoretical framework of RBV (Resource Based View) and NRBV (Natural Resource Based View), these two theories explain company's environmental strategy in affecting corporate environmental performance as based on company's specific resource.*

The study was conducted using a quantitative approach where the unit of analysis is an ISO 14001 certified company located in Indonesia which holds the certification up to 2013. Primary data were used in this study; primary data was generated from the survey through questionnaires distributed to the entire ISO 14001 certified companies. ISO 14001 certified companies list were obtained from KLH RI, Environmental Management System Certification Institute which is accredited by the National Accreditation Committee (KAN), various newspapers and company websites with the aim to find information from companies that have implemented environmental management system.

Empirical evidence suggests that there is a positive and significant influence between environmental strategy and the use of environmental management accounting, the use of environmental management accounting to environmental innovation, and as well as the use of environmental management accounting towards corporate environmental performance. There is a positive and significant influence between environmental innovation to corporate environmental performance. There is no significant influence between environmental strategy and environmental innovation. However, the results of this study suggest a solid foundation that intangible assets such as corporate environmental strategy (by using accounting practices particularly on environmental management accounting) improve corporate's environmental performance though environmental innovation.

Keywords-*corporate environmental performance; environmental management accounting; and environmental innovation.*

1. Introduction

Currently, themes on environment have been the important strategic issues (David, 2011). In the other side, most enterprises or companies in modern industrial era fully realize that environmental and social issues are also their indivisible and important parts, beside how to gain their profit (Pflieger et al, 2005). Mark Starik (in David, 2011) reaffirmed that environmental issues had been strategic issues which needed urgent and substantive attention from business sector, including the role of managers in it. The managers will face environmental issues and therefore the matter is not related with only environmental values, but it is also related with the possibility of their direct impacts to sustainable economic success. So, the ability of an enterprise to manage its environmental performance is always urgent as its strategic issue (Henry and Journeault, 2008).

Almost all multinational companies have even adopted global or local environmental standards as one of corporate environmental strategies (Epstein and Jose, 2007). It is an urgent challenge for implementation of this strategy. Managers should evaluate and control how corporate environmental strategies implemented to increase its environmental performance (Aragon Correa, 2004 in Epstein and Jose, 2007). Pflieger et al (2005) presented that environmental conservation efforts undertaken by the companies would result a number of advantages or benefits, including how shareholders and stake holders attracted to company's advantage due to their responsible environmental management perceived by public. Another result of researches indicated that good environmental management could avoid public and government claim and enhancing product quality that finally could increase economic profit.

The final result of corporate strategies implementation is profit achieving to increase financial, economic, and environmental performance. The social, ethics, and environmental exposures and the implementation of environmental management are determinant factors of the success of companies in achieving financial, economic, and environmental performance. Therefore, environmental

strategy is one of important components in corporate management strategy (Hoffman, 1999). Environmental strategy has been regarded being overlapped among environmental management variables (such as certification, practices, initiatives, and technologies) and environmental performance variables (the impacts of corporate activities on its natural environment) (Calver, Cortes et al in Walls et al, 2008).

Several preceding research were based on natural resources based view to relate environmental strategy toward corporate strategy, using environmental strategy measurements as the proxy of environmental strategy (Russo and Fouts, 1997). But, relationship between environmental strategy and financial performance is still debate and as the real fact it is possible to be mediated by environmental performance (Klassen, 1997, Clemens et al, 2010). An organization which more actively plans its environmental strategy will concern more measurements and use of environmental performance in achieving its environmental goals. However, both environmental strategy and environmental performance have a different concept so they are not related automatically (Ittner and Larcker, 2003 in Henry and Jouneault, 2008).

RBV theory classified the resources to tangible, intangible, and personnel based resources (Grant, 1991). Sustainable environmental improvement will bring two intangible assets integration of environmental issues in strategic planning process and the implementation of managerial accounting practices (Perez et al, 2007). The implementation of managerial accounting practices urges accountants as the part of business to take part in improving corporate environmental strategy performance and corporate performance by providing information of environmental costs so the current environmental friendly ideas are confessed as the progress result of environmental accounting (Ullman, 1976, Burrit, Hahn and Schaltegger, 2002). Usually, the managers of a corporate always try not just reducing cost, but minimizing environmental impacts caused by corporate operation, too. This demand comes from stake holders, including government, mass medias, consumers, investors, workers, suppliers, and non governmental organizations.

Tendency of organizations to implement environmental management system occurs and increases more intensively during recent periods. But, basically this system does not provide enough information for decision making of production activities and allocation of resources. How many resources allocated and settled, some managers often ignore it and they get difficulty to understand it caused by the lack of information provided by company's accounting system. Therefore, the needs of environmental managerial accounting as the modification means for an organization must be fulfilled by providing information on environmental costs calculation in order that it can be realized more easily. Environmental managerial accounting helps companies work and get some benefits to face their environmental responsibilities (Schaltegger & Burrit, 2000).

Environmental management accounting as indivisible part of environmental accounting has been claimed as a useful means to overcome the limitedness of conventional managerial accounting. Environmental management accounting is able to help managers in order that they are able to understand and measure environmental aspects related with managerial problems including decision making (Burritt et al, 2002;. de Beer et al, 2006). Therefore, environmental managerial accounting does not just help companies in managing costs better, but also providing profile of environmental friendly products or green products.

Environmental cost accounting and several matters related with environmental accounting will prove its role (Wiley, 2004). Clements et al (2010) declared that corporate environmental strategy was the pattern of decision making for its environment. The development process and implementation of new business strategies in order to face environmental challenges have been the main issues for many companies in the present. Recently, there have been many companies which have several corporate strategies to respect their environments (Chritman,2000; Darnall et al, 2000; Husted and Salazar, 2006; Ilinitch et al, 1998; Sharma, 2000; Sharma and Vredenburg,1998). Environmental strategies mentioned can be realized in energy cost reduction and environmental damage countermeasures in wider coverage. In this case, a company can be the model for the others.

Gonzales and Bebbington (2001) considered that environmental management initiatives carried out by a companies needed accounting functions which more integrated with their environmental strategies. Not just environmental strategies themselves, but they are also related with innovation strategies in which several companies try to compete through innovation in order to increase the quota market and then adopting innovation (Ferreira, 2010 : 924). It can be achieved through innovation.

Actually, the environmental awareness also arise due to various outside company parties push (Derry and Rondinelli, 1998 in Ja'far and Arifah, 2006) including government, consumers, stake holders, and market competition. Those various push must be responded later. So, proactively approach should be created to minimize occurring environmental impacts. The final result of this proactive environmental management actions is how to achieve a better corporate environmental performance.

Later, Christmann (2000) and Hart (1995) found that environmental issues or green issues should be center of attention for researchers by implementing resources based view. A corporate proactive environmental strategies in obeying laws and regulations have positive impact on corporate performance when it is mediated by corporate capability values (Russo and Fouts, 1997; Wagner, 2005). Contingency theory explained that environmental aspects strengthened relationship between strategy and performance and then identified significant sub environmental aspects for determination of relative

impacts between strategy and performance (Prescott, 1986).

In current periods, the research field of accounting grows more widely. While the researches in environmental management accounting still gets less attention from accounting researchers (Ferreira et al, 2010). Several preceding researches discussed relevance and benefit of environmental management system implementation in certain countries and industries and based on case studies (Burritt and Saka, 2006; Deegan, 2003 ;Masanet-Llodra, 2006; Staniskis and Stasiskiene, 2006) and learnt how to design general frame of environmental management which was possible to be used by business agents (Burritt et al, 2002). But, there are still least present academic researches which explore empirical environmental management accounting or focused at potential impacts for corporate internal process and outcome (Kihn, 2010), such as innovation developing process. Through improving awareness of environmental issues, especially generally accepted environmental friendly products and global warming phenomenon, environmental management accounting is an interesting topic which can help a business entity to allocate resources and make decision.

Meanwhile, environmental accounting researches in Indonesia are still limited to discussion of the impact of environmental performance to financial performance (Sarumpaet, 2005), influence of environmental management encouragement, proactive management, and environmental performance to public environmental reporting (Ja'far and Dista A,2006), and influence of environmental disclosure to environmental performance and economic performance (Bondan,Ign, 2006; Almilia and Wijayanto, 2007). While, the researches with the theme of environmental management accounting are still limited to the theory and benefit of environmental management accounting (Cahyandito, 2006; Wahyuni, 2009), implementation of environmental accounting and environmental management accounting as the base of corporate strategic planning (Putra, 2008) and implementation of environmental management accounting related with eco-efficiency (Kurniati et al, 2010). Based on present researches, the most important question is the role of environmental management accounting as the means of environmental strategy implementation, innovation trigger, and improving corporate environmental performance as the evidence of how far implementation of environmental management accounting in Indonesia.

The goals of research are to investigate several issues above, to test the role of corporate environmental strategy, the use of environmental management accounting, innovation and its influence to corporate environmental performance. This research is trying to contribute to the development of environmental accounting theory, especially natural resources based view related with corporate capability in interacting with its natural environment. The expectation for this research is that it will be able to give meaningful contribution in corporate environmental strategy settling and analyzing the role of environmental management accounting, identifying innovation chances, restoring reputation, decision making, and increasing corporate environmental performance. Furthermore, this research is expected to be able to develop an approach and to settle the right policy to increase environmental performance and fnally achieving sustainable development.

Theoretical studies come from Hart (1995), Klassen and Curtin (1996), Russo and Paul (1997), Jones (2010) and Clemens et al (2010). Theoretical model of Klassen and Kurtin (1996) suggested that relationship between corporate strategy and environmental management would influence environmental performance and then giving impact to corporate financial performance. But, Klassen and Curtin (1996) specifically emphasized on impact of financial performance in the form of profit and market response to sustainable environmental management efforts as the signal for the public through several corporate environmental events and made it less describe how the role of environmental management system as mediating factor.

2. LITERATURE REVIEW

Then, this research refers to Hart (1995), Russo and Paul (1997), Clemens et al (2010) through RBV (Resources Based View) and NRBV (Natural Resources Based View) theory. Both theories explained that corporate strategy especially environmental strategy would influence corporate environmental performance if a corporate had specific resources. Environmental management system was the way in order that a corporate could manage, measure, and restore all aspects of operation effectively and efficiently to avoid negative effects for its natural environment. This research also considered that the use of EMA variable and innovation variable were specific resources owned by corporate in order to improve environmental performance so they could create corporate competitive advantage, beside as the form of implementation of environmental management system.

This matter was inline with empirical researches development which were conducted by Wagner danSchaltegger (2004), Wagner (2005), and Ferreira, et al (2010). Wagner (2004,2005) suggested that environmental strategy oriented company (ESV- Environmental Shareholder Value) had significant correlation with its environmental performance and its economic performance. One of determinant key factors of this positive correlation was corporate strategy option, especially a strategy which emphasize the level of corporate orientation to its environmental strategy. Later, this environmental strategy surely would make a corporate try to make an environmental management system through implementation of environmental management accounting system and innovation in order to achieve better environmental performance (Ferreira et al, 2010).

At general, it can be understood that environmental management accounting and innovation are important for

almost all corporate which have significant attention to their environment and consider that their attention is not just public charity. Meanwhile, the profit gained from innovation process will be shown by the role of sustainable accounting system (such as environmental management accounting) as the driver of innovation process in a company (Ferreira et al, 2010 : 921). While, its correlation with corporate environmental performance is still less studied.

Stressing on the urgency environmental management accounting implementation was the research gap of accounting researches, especially on the role of corporate environmental strategy which was used as the base in appraisal of environmental performance on the impacts of environmental strategy settled by a corporate through environmental management accounting variable and innovation variable (Clemens et al, 2010). It was also endorsed by Jones (2010) who suggested that relationship between industry and environment in the environmental accounting theoretical model could be embodied through corporate policies including long term radical reorientation with development sustainability as the target which had to be achieved. This target could be achieved in the term of new holistic accounting system because the current accounting system was not adequate.

3. Hypothesis development

3.1. Influence of Environmental Management Accounting Implementation and Innovation

There had been some researches which underlined that companies which had environmental and social information and developed better internal control system would result better decision making process (Adams and Zutshi, 2004). New information encouraged the development of new products, advanced process technologies, and improvement of cost structure. Ferreira (2010) declared that the implementation of environmental management accounting negatively affected product innovation. While it positively affected process innovation.

The result of Ferreira's research (2010) was contrary to the statement of Hansen Mowen (2005) which found that implementation of environmental management accounting was able to drive the corporate to product innovation. In similar term, implementation of environmental management accounting probably influenced product and process innovation, and consequently it could improve the corporate competitive advantage. The result was the same with the result recorded in the cost-based activities. Management provided techniques with additional cost and its information would be more accurate (Cooper, 1988). So, it could create an increased number of process improvement (Drake et al, 1999).

In accordance with the resource-based view (RBV), differences in practices and patterns of practice required certain organizational capabilities (more than resource or size only). In line with the research of Correa (2008) which indicated that certain eco-efficient practices indirectly positively correlated with corporate performance through the implementation of innovation. Similar with program innovation, environmental management accounting was able to provide information of environmental cost. So, a corporate would be easily able to decide the environmental programs to be implemented. Based on the previous arguments, the following hypothesis are

H1. Implementation of environmental management accounting positively influences environmental innovation.

3.2. Influence of Environmental Management Accounting and Corporate Environmental Performance

Perez et al, (2007) found that there were two important key of intangible assets in the analysis of sustainable environmental improvement, including the integration of environmental issues in the process of strategic planning and implementation of management accounting practices. Two important keys of intangible assets contributed to corporate environmental performance improvement. T

his was consistent with resource-based view argument proposed by Russo and Fouts (1997) and typology of strategies proposed by Hart (1995). It was also consistent with conclusions proposed by Perego and Hartman (2005) which argued that the relationship between environmental strategy and the implementation of environmental performance measurement system was indirect but it was mediated by several attributes of environmental management accounting system and the scarcity of measurement systems.

The concept developed by Beer and Friend (2006) emphasized on the important present role of environmental accounting system for the corporate evaluation of various project alternatives and estimation of the environmental performance and economic performance, especially in the future. Environmental management accounting helped companies working to achieve the potential benefits and face environmental responsibilities (Schaltegger and Burrit, 2000). So, there were methods of financial controlling and environmental management strategies in its application such as special application of management control system. Controlling itself helped organizations to measure, control and disclose environmental performance.

In his researched conducted at 2008, Correa suggested that eco-efficient practices positively correlated with corporate performance. The more sophisticated implementation of management accounting practices (in this case was environmental management accounting), the better controlling process and decision-making. The more solid environmental management system, it would influence the corporate environmental performance. Based on these arguments, the following hypothesis formulated are:

H2 : The implementation of environmental accounting system influences corporate environmental performance.

3.3. Influence of Environmental Innovation and Corporate Environmental Performance

It was assumed that the higher level of innovativeness, the higher level of business performance. Several research conclusions confirmed this assumption and found that innovation positively influenced business performance improvement (Gima and Li, 2001; Manu, 1992; Spacapan and Bastic, 2007). In similar term, a company (or the branch of company) with high level of innovativeness would have better competitive advantage and business performance (Kessler and Cakrabarry, 1996; Salavou, et al, 2004).

Corporate management that is able to overcome the barriers of innovation, maximize innovation resources and achieve innovation targets in the form of better products or services creation will have better performance. Ability to identify and overcome innovation barriers and maximize innovation sources will create products or services that can be received by customers. Eventually, it will be able to compete with the better business performance (Bluementritt and Danis, 2005). It reinforces research findings of Spacapan and Bastic (2007) and Talke (2007). The high innovativeness will able able to guarantee the long term and sustainable business performance. Based on the research conducted by Research Chang (2011), it was found that environmental friendly product innovation (green product innovation) and environmental friendly process innovation (green process innovation) respectively positively and negatively influenced corporate competitiveness.

NRBV theory also explained that innovation activities reflected in the three pollution prevention strategies, product manufacturing, and sustainability of development would support the improvement of corporate environmental performance (Hart, 1995). Consumer awareness on environment required the company to redesign its products or develop new products in accordance with environmental rules or regulations (Nidumolu et al, 2009). Thus, the level of corporate innovativeness will not only possible to improve business performance, but it also increase corporate environmental performance when a corporate focus its capability at environment-oriented product innovation, process, and program. Therefore, the following hypothesis proposed are:

H3 : Environmental innovation positively influences corporate environmental performance.

4. RESEARCH DESIGN

4.1.Survey Design

The survey method is adopted in this study for several reasons. The first reason is that this method is able to direct researchers to study the larger numbers of random sample and with relatively low cost and the collection of data allows testing patterns of relationships between variables (Dillman, 2000; Salan and Dillman, 1994 in Ferreira, 2010). The second reason is that the survey does not force the respondents to rush and it provides flexibility in responding in order to feel able to reply anonymity. However, the survey will be able to make the possibility of a low response rate and bias (non-response bias) get lower.

The survey of this research will be conducted by sending questionnaires to approximately 258 general managers of ISO 14001 certified companies in Indonesia. List of ISO 14001 certified companies are obtained from the Indonesian National Committee of Accreditation database (as an indivisible part of the Indonesian National Certification Board). The general managers are selected because of their intensive involvement with the day-to-day corporate activities, especially financial and operational activities, and so their involvement with the another managerial functions. They are also involved intensively with their business environment, organizational strategies, and they have very adequate understanding of decision making process. (Chenhall and Morris, 1986; Shortell and Zajac, 1990). For this purpose, intensive contact by phone with their companies will be done to make sure the name of the targeted respondents and then with those names intensive correspondence will be held.

The subjects of this research are all existing industries, both manufacturing and services industries. These industries are chosen for two reasons. First reason, it has been known or predicted that the operating activities of their company will give negative impact on the environment. Secondly, the companies in these industries are particularly belong to natural resources users. Basically, when a company or business enterprise proves its compliance or attention by getting ISO 14001 certification, it indicates that those companies are likely to gain more benefit from implementation of environmental management accounting than the other companies that are not certified.

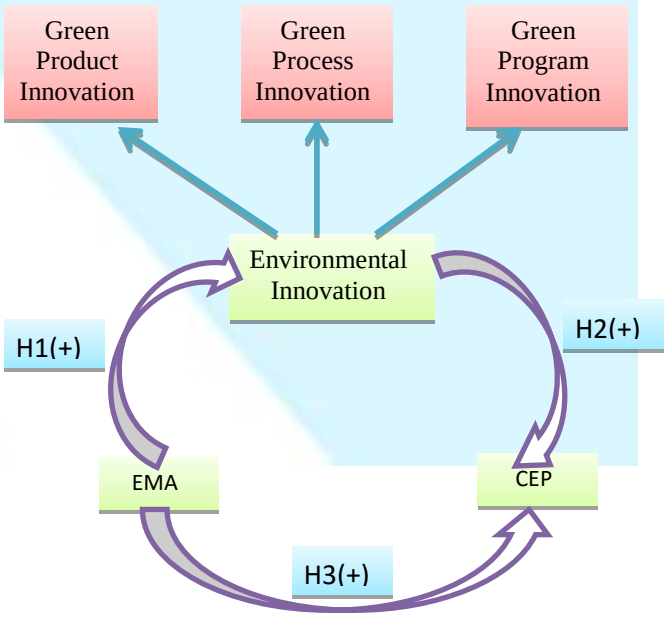

Figure 1 Research model

4.2 Research Variables and Operational Definition

4.2.1. Implementation of Environmental Management Accounting

Construction of environmental management accounting implementation consists of 12 items and it is adapted from measurements developed by Ferreira (2010) which aims to reflect the environmental management accounting activities. The selection of environmental management accounting activities comes from a various sources (such as Hansen and Mowen, 2005; IFAC, 2005) and those activities are different from other common management accounting activities. Some of these items are focused on the monetary aspect.

While, another environmental management accounting researches emphasis more on the physical aspect, as proposed by Burritt et al (2002). One of the questions proposed to the respondents is "Please ,indicate how far your company has done each of the following activities in the last three years!" through the seven-point Likert scale with three categories: "Not doing at all", "Done until a certain extent", and "Done most " to the 12 items including:

1. Identification of environmental costs.
2. The estimation of contingent liability related to the environment.
3. Classification of environmental costs.
4. Allocation of environmental costs related with the production process.
5. Allocation of environmental costs related with the product.
6. The introduction or improvement of the environment related with management cost.
7. Preparation and use of environmental cost accounts.
8. The development and use of Key Performance Indicators (KPIs) related with Environmental Indicators.
9. Product life cycle costs assessment.
10. Product inventory analysis
11. Product impact analysis.
12. Product repair analysis.

4.2.2.Environmental Innovation

To measure the level of green product innovation, this research uses four-item instrument developed by Bisbe and Otley (2004) and the tool is also adapted to measure the green level of innovation process according to the research conducted by Ferreira (2010). Respondents of the research are asked to indicate the position of their organization than their industrial average throughout the continuum. This approach has also been used in other researches (Bisbe and Otley, 2004; Capon et al, 1992; Scott and Tiessen, 1999;. Thomson and Abernethy, 1998). Some items on product and process innovation will be presented to the respondents. It is adopted from the research conducted by Ferreira (2010). Meanwhile program innovation is adopted from Jalal (2004) including:

Green Product Innovation

1. New product launching.
2. Launching of existing product modifications
3. First products to be available in the market
4. New product compared to industrial average

Green Process Innovation

1. The existence of a new production process
2. Modification of the production process
3. New production process launching
4. Frequency of production process improvement than the industrial average

Green Program Innovation

1. Internal CSR (Corporate Social Responsibility) program for all employees
2. Community development programs
3. Environmental activities funding
4. Public participation in the business
5. Interest group responding program

4.2.3 Corporate Environmental Performance

Some measures of environmental performance are adopted from research conducted by Henri and Journeault (2010). Then, some questions about the implementation of environmental performance indicators (EPI) through an instrument based on the ISO 14031 standard (a sub category of ISO 14001) will be given to respondents. This instrument consists of 13 items in three categories with seven-point Likert scale.

1. Compliance with the requirements or expectations of the standard
2. Energy input
3. Relationship with community
4. Solid waste output
5. Air emission output
6. Financial impact
7. Maintenance of the installations, operations, facilities, and physical equipments
8. Liquid waste output
9. Raw materials input
10. Water input
11. Implementation of environmental policies and programs
12. Supporting materials input
13. The indicators which provide information about the environmental conditions with local, regional, and national scope.

AML = Environmental Management Accounting
IL = Environmental Innovation
IPRL = Green Product Innovation
IPSL = Green Process Innovation
IPGL = Green Progrm Innovation
KLP = Corporate Environmental Performance

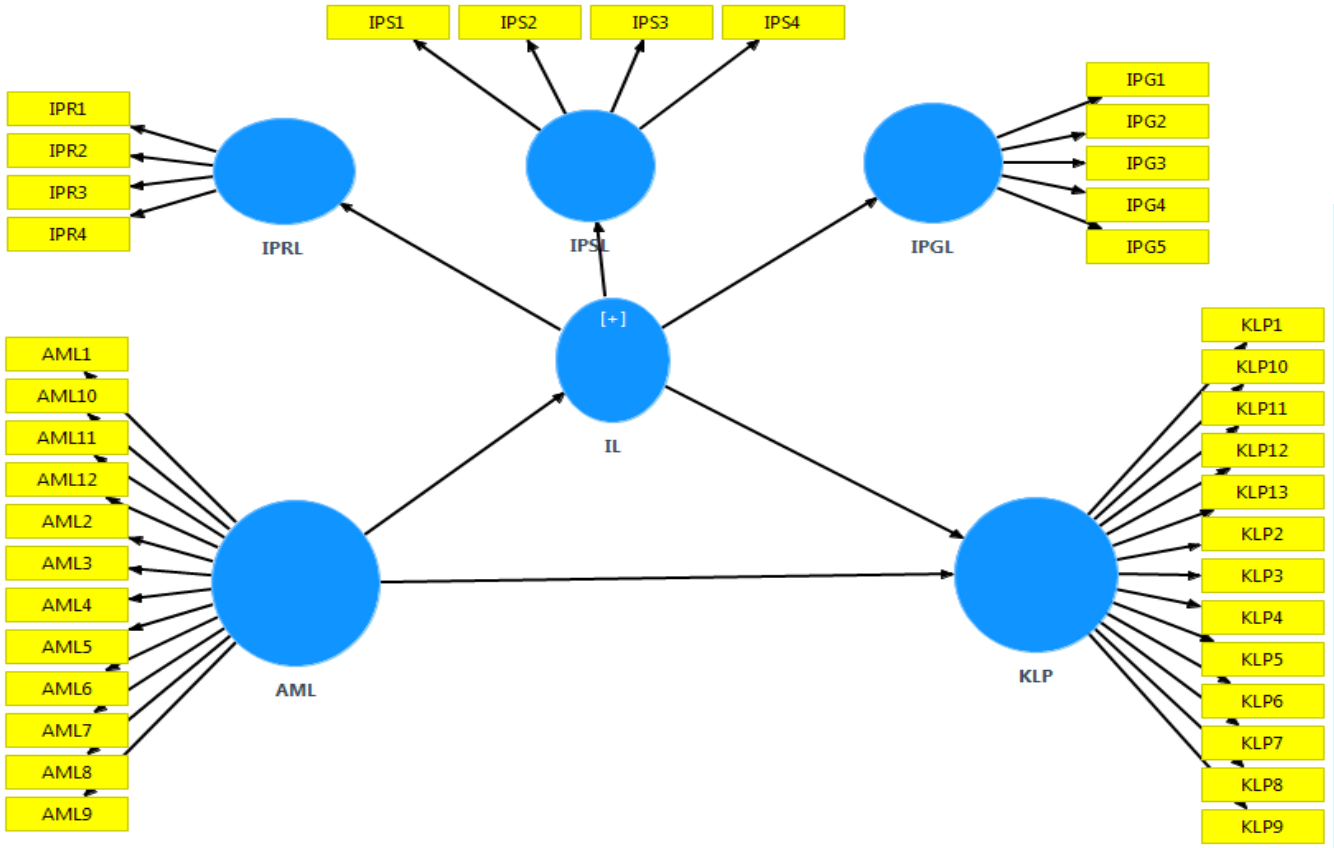

Figure 2

5. Data analysis

This study uses Structural Equation Model of technique (SEM) for its data analysis where Partial Least Square (PLS) method is applied. PLS is used to describe the relationship between latent variables (prediction), PLS can also be used to confirm the theory (Chin and Newsted 1999). Moreover the use of PLS is also appropriate where the conceptual model and its measurement has not been well developed or the model is still in the exploratory of development theory stage (Ghozali 2011).

5.1. Results of Testing Hypothesis and Data

5.1.1. Measurement Model Assessment (Outer Model)

In order to test the measurement model, Partial Least Square is applied using convergent and discriminant validities as block indicators. Convergent validity can be assessed by looking at each indicator reliability, composite reliability, and averaged variance extracted (AVE). Validity and reliability data testing are accomplished using the SmartPLSprogram.Convergent validity measures the consistency of loading factorsof various operational activities which are tested using two different criteria: (1) each item has particularly loading factor against each construct which is statistically significant. In this study, loading factor used is above 0.6 as suggested by Chin (1998), and Ghozali (2011). Thus, loading factors that are below 0.6 will be excluded from the analysis:and (2) each construct has averaged variance extracted (AVE) above 0.5 (Fornell and Larcker 1981).

There are 38 items / number of question asked to measure all of the latent variables as proposed in the questionnaire. Based on Figure 2, Smart PLS 3.2 output, loading factors values for the constructs of environmental management accounting, environmental innovation (with 3 dimension) and corporate environmental performance.

Table5.2- Loading factor for the entire construct variable

	Loading Factor	STDEV	TStatistic
AML1	0,785	0,082	9,568
AML10	0,666	0,114	5,823
AML11	0,727	0,049	14,759
AML12	0,721	0,055	13,177
AML2	0,872	0,046	19,007
AML3	0,730	0,117	6,266
AML4	0,706	0,070	10,027
AML5	0,779	0,126	6,164
AML6	0,797	0,109	7,291

AML7	0,787	0,122	6,476
AML8	0,722	0,110	6,564
AML9	0,844	0,030	28,598
IPGL1	0,837	0,056	14.868
IPGL2	0,879	0,031	28,615
IPGL3	0,820	0,074	11,079
IPGL4	0,872	0,061	14,231
IPGL5	0,890	0.036	24,994
IPRL1	0,888	0,044	20,228
IPRL2	0,864	0,058	14,817
IPRL3	0,900	0,028	31,958
IPRL4	0,864	0,065	13,387
IPSL1	0,928	0,024	39,337
IPSL2	0,951	0,015	64,231
IPSL3	0,934	0,017	55,984
IPSL4	0,878	0,052	16,755
KLP1	0,743	0,104	7,139
KLP10	0,757	0,070	10,822
KLP11	0,842	0,045	18,629
KLP12	0,872	0,033	26,107
KLP13	0,846	0,046	18,274
KLP2	0,838	0,062	13,547
KLP3	0,852	0,050	17,145
KLP4	0,742	0,086	8,650
KLP5	0,765	0,053	14,451
KLP6	0,807	0,074	10,952
KLP7	0,791	0,051	15,476
KLP8	0,755	0,116	6,495
KLP9	0,716	0,054	13,222

Source: Adapted from research data

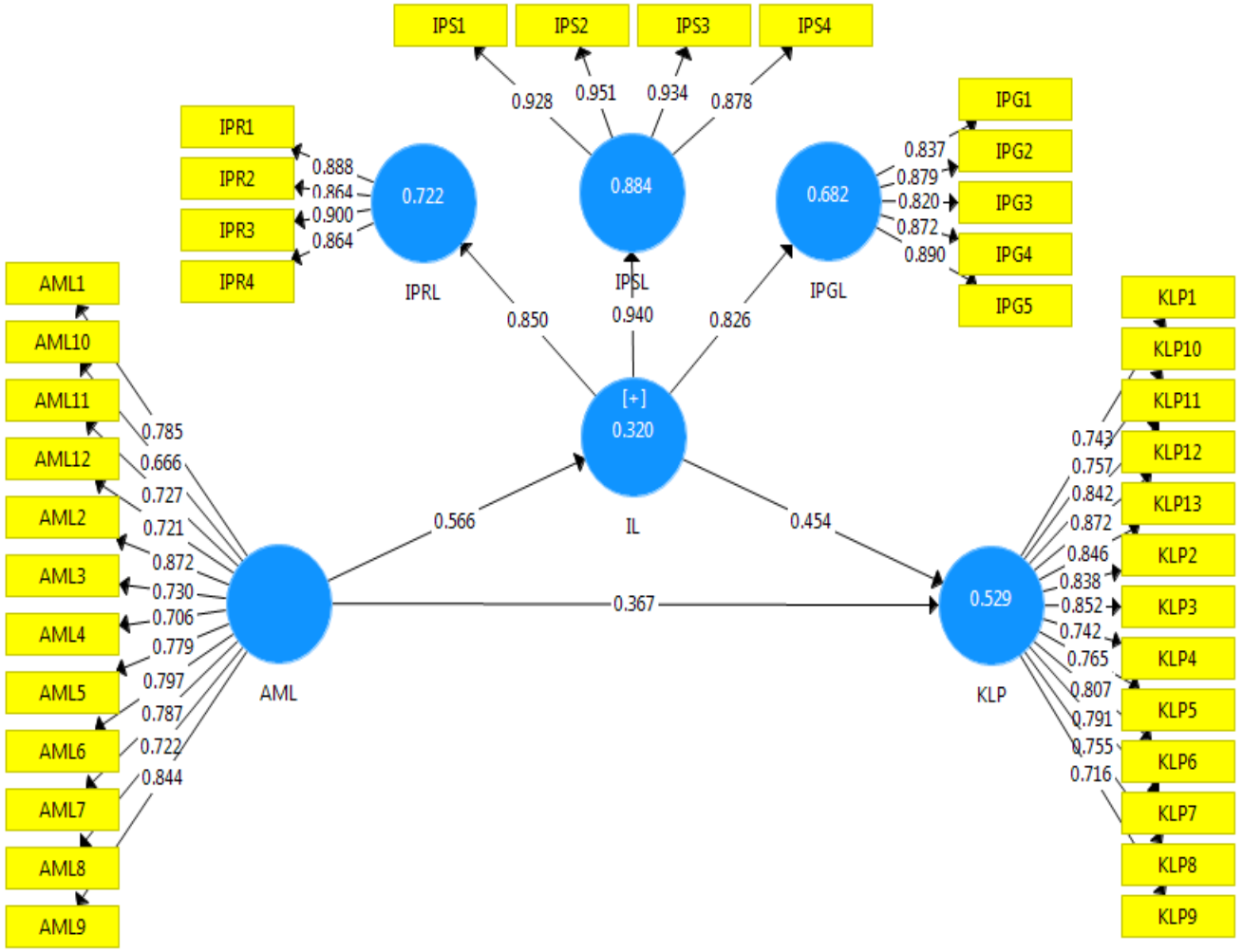

Figure 3: Outer Model Path

innovations and corporate environmental performance are presented in Table 5.2. All of the indicators of each construct were found to be statistically significant at $p < 0.05$, and this is for each construct of environmental management accounting, green product, green process, green program innovations, and environmental performance as described by the overall indicator which has a t statistics value greater than 1.96. In addition, all indicators on each variable also has a loading factor value greater than 0.6. Thus all indicators to construct AML, IL (IPRL, IPSL, IPGL) and KLP are all valid and can be used in the analysis.

An assessment of the discriminant validity in this study is done in two different ways. First, it is assessed based on a comparison of cross loading measurements with the constructs. If construct correlation with measurement item is larger than the size of the other constructs, this indicates that the latent constructs predict the size of their block better than the size of the other blocks. The test results of crossloading show the entire factor loading values of each indicator which is greater than the size of the other constructs. It can be concluded that any latent constructs can predict the size of their block better than the other block sizes, so that the model has good discriminant validity. The second assessment is done by looking at the ratio of the value of the square root of average variance extracted (AVE square root) of each construct with correlations between constructs and other constructs in the model. Furthermore, a comparison between the square root of AVE and the correlation between construct are presented in Table 5.3. This Table shows that all constructs have AVE square root value greater than correlation values between construct in the model, this can be concluded that the model in general has a good discriminant validity values as has been mentioned by (Fornell and Larcker 1981).

Table 5.3. Fornell-Larcker Criterion

	AML	IL	IPGL	IPRL	IPSL	KLP
AML	0,764					
IL	0,566	0,773				
IPGL	0,578	0,826	0,860			
IPRL	0,356	0,850	0,470	0,879		
IPSL	0,521	0,940	0,656	0,800	0,923	
KLP	0,624	0,662	0,590	0,550	0,582	0,796

Source: Adapted from SmartPLS 3.2 output

Table 5.4. Composite Reliability

	Composite Reliability
AML	0,943
IL	0,950
IPGL	0,934
IPRL	0,932
IPSL	0,958
KLP	0,957

Composite reliability (ICRS) is a block of indicators which measure reflective construct. Composite reliability with a value of more than 0.7 indicates good internal consistency. SmartPLS3.2 results are shown in Table 5.4, Table 5.4. shows the value of the entire composite reliability construct which is above 0.7. Thus, all constructs are consistent.

5.2.2. Measurement Model Assessment (Inner Model)

Two types of information to be obtained by using SmartPLS3.2, based on Figure 3, these are: (1) information which indicate show well the predicted structural models;and(2) the hypothesized relationships that have been determined earlier. The first information is obtained by looking at the value of R square as a test of goodness-fit model to explain the variation percentage of the overall construct of the model. Value of R square of each endogenous variable using SmartPLS3.2 is shown in Table 5.5.

Table 5.5 - Values of R Square

	R Square
IL	0,310
IPGL	0,677
IPRL	0,718
IPSL	0,882
KLP	0,515

Source: Adapted from processed data

Structural model of SmartPLS3.2 showed five exogenous variables, namely AML, IPRL, IPSL, and IPGL, all explained 51.5 % of the variation of the KLP. This value indicates a less substantial explanatory power which is much smaller when compared to 67.0 % according to Chin (1998). Exogenous variable Explanatory powers of green product innovation, green process innovation, and green program innovations respectively are 71,8 %, 67,7 %, and 88,2 % as dimension of environmental innovation 31.0% explained of the variation of the KLP. Information obtained through the second parameter coefficient values and significance values of t - statistic values are used to test the hypotheses. Table 5.6 shows that all path coefficients provide significant value (at the $p = 0.05$ level). Value of the path coefficient for the effect of AML against IL with t values greater than 1.96, namely 6,897, significant at the $p = 0.05$ level. Thus, Hypothesis 1, which states the use of environmental management accounting has positive influence with environmental innovation,is accepted.

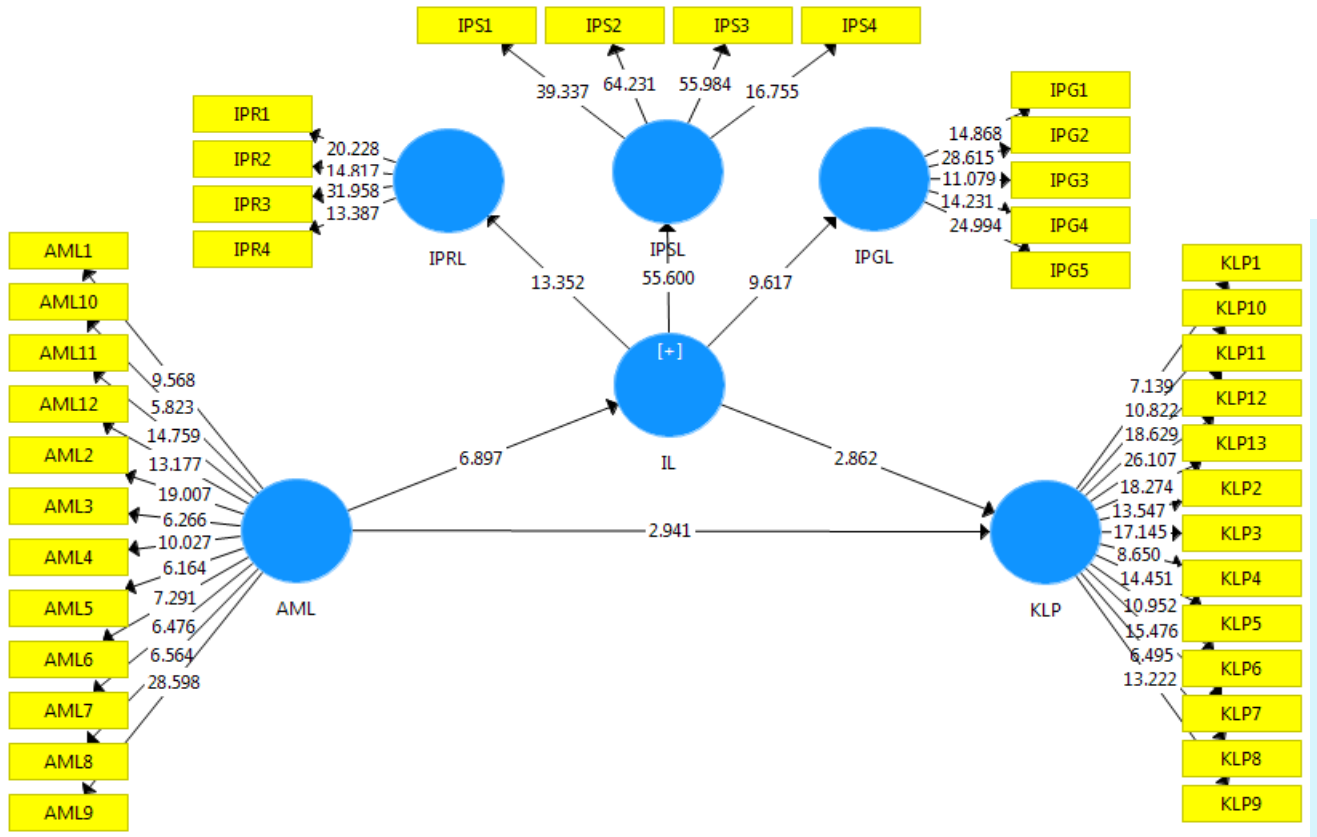

Figure 4: Inner Model Path

Hypotheses 2 respectively state that the use of environmental management accounting positively influence corporate environmental performance, hypotheses are declared to be acceptable as indicated by the path coefficient of AML to KLP 0.317 (t=2,941) is significant at the p=0.05 level. Thus, Hypothesis 2 which use of environmental management accounting positively influence corporate environmental performance is accepted. Similarly, the value of the path coefficient for the IL to KLP - 0,454 (t=2,862) is significant at p=0.05; thus, Hypothesis 3which states that environmental innovation (IL) has a positive effect on the corporate environmental performance is also accepted.

Table5.6-Coefficient Value Line and T

	Path Coeff.	Standard deviation	T-Statistic	P Values
AML → IL	0,566	0,082	6,897	0.000*
AML → KLP	0,367	0,125	2,941	0.003*
IL→ KLP	0,454	0,159	2,862	0.004*

***Acceptance hypothesisi T-statistic >1.96 for p=0.05**
(Source: Adapted from SMartPLS 3.2 output)

Path coefficients for AML to IL for 0,566 (t=6,897) is significant at p=0.05 level. Thus, Hypothesis 1, which states that the use of environmental management accounting has positive effect on company's environmental innovation, is accepted.Summary of test results of the three hypothesis in this study is shown in Table 5.6.

6. DISCUSSION

This study is aimed to examine the effect of environmental management accounting on corporate environmental performance through environmental innovation. Based on the analysis of the data and testing models, and based on the hypotheses that have been discussed in the previous section, this discussion section is based on the analysis of the measurement model and structural equation models with reference to the research issues, theories, and previous studies described in the previous chapter.

Table 5.5 - Summary of the Hypothesis Testing Results

Hypotheses	Results
H1: Environmental management accounting has positive effect on environmental innovation	accepted
H2: Environmental management accounting has positive effect on corporate environmental performance	accepted
H3 : Environmental innovation has positive effect on corporate environmental performance	accepted

6.1 The use of environmental management accounting has positive effect on Environmental Innovation.

Empirical evidence of this study significantly supports Hypotheses 1 the results indicate that the use of environmental management accounting has a positive effect on environmental innovations. This means that each of the three innovations (green product, green process and gree program) is influenced by the use of environmental management accounting. The better environmental management accounting is used in the company; this will have more influential on product, process and program innovations (environmental innovation) which has shown the success in the implementation of environmental management accounting for the company. Environmental management accounting is able to provide social and environmental information as well as to develop internal control systems for better decision-making. Results of this study could encourage the development of new green products, advanced process technologies, improved cost structure, as well as environmental programs that are more oriented to the environmental performance.

This study supports the statement made by Hansen and Mowen (2005) which state that the use of environmental management accounting is able to steer the company on product innovation. The use of the environmental management accounting will influence product, processes and program innovations which at the end will result in increasingcompany'scompetitive advantage. In line with the research done by Ferreira et al (2010), the use of environmental management accounting will affect innovation process. Research done by Aragon - Correa (2008) also indicates that eco-efficient practices specified indirectly to have positive relationship to corporate performance through the implementation of innovation.

The use of environmental management accounting has a positive effect on the corporate environmental performance

Hypothesis 2 states the use of environmental management accounting has positive effect on corporate environmental performance, this is empirically supported. The results of this analysis indicate that corporate environmental performance is affected by how frequent the use of environmental management accounting is. The more frequent the use of environmental management accounting in the company, this will increasingly affect corporate environmental performance. Support for this study is in line with the previous research done by Aragon - Correa (2008). It is explained that eco-efficient practices are positively related to firm performance. The more sophisticated the use of management accounting practices (in this case the environmental management accounting), the better the control and decision-making process for the company, the more solid environmental management system will have an impact on the environmental performance.

6.2 Environmental innovation has a positive effect on the corporate environmental performance

Hypotheses 3 respectively state that environmental innovation with 3 dimensions are green product, green process, and green program innovations have positive effects on corporate environmental performance, this is supported by the available empirical evidence. This result support NRBV theory which states that innovation activities are reflected in the three pollution prevention strategies, product manufacturing, and sustainability of development will support an increase in the corporate environmental performance (Hart 1995). Empirical evidence support previous studies such as the study conducted by Chang (2011), that the eco-friendly product innovation has a positive effect on the competitiveness of the company while the results of the study are consistent with other findings that the innovation process negatively affect the competitiveness of enterprises . This shows the environmental innovation variable support corporate environmental performance improvement, which is reflected by the company's competitiveness.

7. CONCLUSION AND RESEARCH LIMITATIONS

7.1. Conclusion

The use of environmental management accounting as one of the intangible assets has given some benefits to the companies in providing information on company's operational activities especially related to the environment and the results of good environmental performance. Several studies have examined the benefits of using good environmental management accounting. This study attempts to examine the effect of the use of environmental management accounting on corporate environmental performance by using intermediaries environmental innovation. Environmental innovation is the variable that has shown to influence the performance of the environment, though empirical evidence suggests that there is a positive and significant effect between the use of environmental management accounting on environmental innovation (green product innovations, green processes and green programs) as well as the use of environmental management accounting to corporate environmental performance. However, the results provide strong arguments where intangible assets such as the usage of accounting practices, particularly environmental management accounting could improve environmental performance of the company with environmental innovation as intermediary.

7.2. Limitations of Research

This study uses a relatively small sample size. This is due to the fact that many companies do not release information related to corporate environmental performance as most of the companies still treat the above information as "confidential information". Information related to strategy, the use of environmental management accounting, innovation, and environmental performance are not

publicly known. Small response rate that this study has (26%) provides an indication companies ISO 14001 observed doesn't want to participate because of environmental items are sensitive and not allowed to publish. In general, this research has not been able to show the results to confirm the above models as level of determination is only equal to 51.5 %, so it is suspected there are other factors which influence the model and not been examined in this study .

7.3 Research Implications

The results of this study indicate that importantly the company has implemented an environmental management system (through ISO 14001) where environmental strategies is applied and could be used to encourage the use of environmental accounting for a better management decision-making process. With positive influence of environmental management accounting and environmental innovation, it is expected that the existence of information related to cost of environmental management accounting on innovation activities will encourage its use of green product, green process and green environmental programs. Future research is expected to take some opportunities to examine case studies (specifically in one type of industry) and qualitatif research so that the use of environmental management accounting and environmental innovation like green products, green processes and green programs in the same industry will not have differences among different companies, and thisis expected to be more focus study related to corporate environmental performance improvement.

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