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Corporate Sustainable Development Model: Employee Perceptions from Gold Mining and Aluminum Smelting Companies in Indonesia

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Abstract
At a corporate level, implementing sustainable development implies undertaking corporate activities which contribute to realizing a development that meets the needs of the present without compromising the ability of future generations to meet their own needs, as defined by the World Commission and Environmental and Development (1987). This research seeks to understand perceptions of employees about corporate sustainable development in social, economic and environmental areas. Additionally, it intends to understand a set of critical factors that underlies employee's orientation toward environmental sustainability. Two cases are scrutinized for these purposes: a gold mining company (in West Java, Indonesia) and an aluminum smelting company (in North Sumatra, Indonesia). Mining and smelting represent industrial operations which are highly exposed to, and define, a range of critical issues associated with sustainable development. Moreover, mining and smelting is expected to signify a varying context along the value chain of extractive industries. For these two selected cases, 60 and 80 managerial level employees are surveyed, respectively. Sustainable development model in this study is analyzed through a partial least squares approach of the Structural Equation Model (PLS-SEM). In general, the findings suggest a statistically significant difference in causal relation of the two samples of the structural model in concern, which is indicative of the role of corporate context to explain the variation. In more specific, the study found that the relation between employee behavior and attitude toward the environment is less significant in the case of gold mining; this is in contrast to the case of aluminum smelting which found a significant effect. Meanwhile, the relation between regulation and employee's attitude toward the environment in the case of aluminum smelting suggests no statistical significance.
Keywords: Corporate Sustainable Development, Environmental Sustainability Orientation, partial least square, gold mining, aluminum smelting, Indonesia.

1. Introduction

1.1 Background

Mineral-based industrial operations in Indonesia are frequently exposed to environmental problems associated with the use of harmful chemicals and environmental pollution issues, land clearing and overlapping of land surface (see e.g. MoE, 2012). Mineral deposits are often located in the forest areas and large quantity of water is used for production process, affecting society and the environment surrounding the area of operation. Demands of the fulfillment of a more stringent environmental regulations and stakeholder pressure from the surrounding communities, as well as the obligation to provide added value in the use of minerals have pushed the adoption of mining and processing methods that are more advanced and environmentally friendly, in addition to measures with more social concerns. The use of cheap energy sources, the employment of a more efficient process in the company, the optimization of a natural resource, and the implementation of an on-target corporate social responsibility, to mention a few of such methods and measures.

Minerals are non-renewable and depletable resources with no ability to regenerate. It is considered unsustainable. At the same time, some may perceive companies or investments that process the minerals are able to convert non-renewable resources into the flow of wealth and profits that can be used to support development in areas where companies operate (e.g. Auty, 2008; Brunnschweiler and Bulte, 2008). The enactment of Law No. 4 of 2009 on mineral and coal mining in Indonesia is believed to support the sustainability of the mining and mineral processing despite having led to declining revenue, the loss of jobs due to decreased activity or closure. The law mandates that the management of mineral resources must provide added value and requires a ban on exports of raw mined materials early in 2014. However, in the long term the law is expected to provide added value and encourages the growth of the country's mineral processing industry.

Implementation of corporate sustainable development is inseparable from the role of human resources. Within the industry, human resources are ones who understand and execute sustainable development. Managers exercise plenty of influence on the policies and behavior of companies regarding the use of carbon directly and indirectly, the use of toxic materials, waste disposal, labor and human rights, product responsibility, and economic wellbeing of the communities in which they operate. The success and the extent of sustainability initiatives performed by business organizations such as these are affected by the support of executive leadership

within the organization (see Laszlo, 2008).

A number of studies have looked at the role of corporate managers in sustainable development. Chow and Chen (2012) developed a model which analyzes social, economic, and environmental dimensions based on the experience of the managers. Using the case of companies in China, they found a set of construct concerning sustainable corporate development. A study by Roxas and Coetser (2012), looking at managers of small and medium enterprises in the Philippines, sought to understand environmental sustainability orientation by examining direct impact of institutional dimensions on managerial attitude towards the environment.

In this research, a case study is carried out to better examine the implementation of sustainable development and the role of manager in companies operating in mineral resources. In particular, it will investigate steps taken by the managerial level employee as well the views they hold concerning the implementation of corporate sustainable development. The latter includes measures to reduce or eliminate damage to the environment, social disruption, and the ability to provide added value for shareholders and other stakeholders. Two companies, representing gold mining and aluminum smelting contexts, were chosen for the purpose of this research. These are companies which are considered suitable to reflect the challenges in implementing corporate sustainable development in mineral resource-based industry. In addition, the two companies are deliberately chosen so as to signify contextual differences which might appear from varying core activities along the value chain of extractive industries; mining is in the upstream chain while smelting represents the chain's downstream part.

The research combines the methodological approaches of Chow and Chen (2012), which measured corporate sustainable development dimensions on the basis of manager's experience, and Roxas and Coetser (2012) which applied a structural equation model to assess employee's attitudes toward environmental sustainability orientation. Selected mineral resource companies in this study provide industrial contexts that may extend our understanding on areas of application for corporate sustainable development.

1.2. Research questions

The research is interested in answering the following questions. (1) How do rules, norms, and behavior of managerial employee influence employee's attitudes toward the environment? (2) How do employee attitudes and behavior influence employee's environmental sustainability orientation, and how does such orientation in turn influence corporate sustainable development? (3) Is there any difference in the employees' perception of sustainability in companies in the gold mining and aluminum producer?

Given these questions, the research intends (1) to test the influence of rules, norms, and behavior toward employee's attitudes to the environment; (2) to examine the influence of employee attitudes and behavior toward employee's environmental sustainability orientation; (3) to test the influence of environmental sustainability orientation towards sustainable corporate development; and (4) to compare the perceptions of employees from two distinct contexts of mineral resource industry about sustainable development.

1.3 Literature Review

Sustainability is an important subject related to the exploitation of natural resources which include ecological, economic and social factors simultaneously. The success of sustainability can happen provided that the result of the exploitation of natural resources has a productivity level that can be sustained in the long term, the benefits of non-renewable resources are also invested in the development of human resources, environmentally friendly technologies as well as environmental capacity to bear the burden of the environment are not undermined or exceeded (Field 1997), and the rate of extraction should be no greater than the rate of substitution of renewable resources (Daly 2002).

Utilization of natural resources should refer to sustainable development as defined by the World commission and Environmental and Development (1987) which states that sustainable development as development that tries to meet the needs of the present generation without compromising the ability of future generations to meet their own needs.

For a company, the core of environmental development is to operate within the carrying capacity of ecosystems by reducing environmental pollution and minimizing resource consumption (Lindgreen et al, 2009), which can be put into practice through corporate environmental management (Linnenluecke et al., 2010; Bansal 2005). Social development aims to positively affect all the company's current and future relationships with the stakeholders to ensure the loyalty of the stakeholders in the company (Baumgartner and Ebner 2010).

Economic sustainability is defined as the management of the company to be able to last long in the market with a positive impact on stakeholders at local, national and global markets, which proves to be important for companies as it is a prerequisite for company's survival (Steurer et al., 2005). Management commitment related to the company's approach to issues of social responsibility and the environment indicates that the most appropriate way for the company to continue its business is by developing both global position on these issues and a keen sensitivity to the uniqueness of the local (Marsh et al. 1998).

1.4 The Research Framework

A research framework as shown in Figure 1 is derived from reviewed literature and research interests of this study.

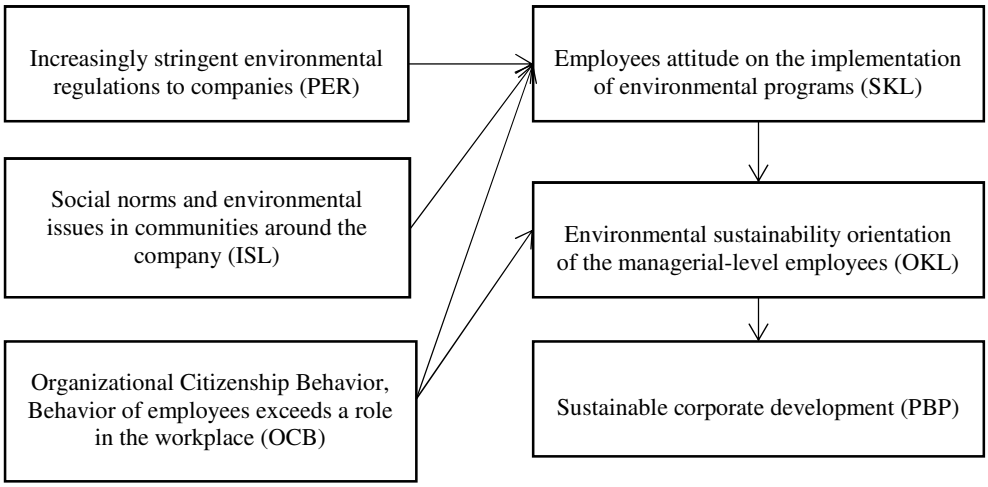

Figure 1. Research Framework

The hypothesis to be tested is six fold. **H1**: PER positively affecting SKL; **H2**: ISL positively affecting SKL; **H3**: OCB positively affecting SKL; **H4**: SKL positively affecting OKL; **H5**: OCB positively affecting OKL; and **H6**: OKL positively affecting PBP.

2. Research Methodology

2.1 Location and Time

Two companies were selected for this research, namely, Pongkor and Inalum companies. Pongkor operates an underground gold mining in West Java, on the border to Halimun-Salak national park. Inalum operates in North Sumatra and constitutes the first primary aluminum producer in Southeast Asia. The location choice of the companies is motivated by considerations related to current operations, problems encountered during the operation, and the challenges to sustainability. As sustainability concern is instrumental to both area of operation and the business itself, it is necessary to study how they are being managed as perceived by employees.

2.2 Types and Sources of Data

The data that used in this study are primary data and secondary data. Primary data is the primary source of information to answer research questions, obtained directly from managerial level employees through a survey questionnaire. Secondary data is a complementary and obtained from a review of literatures. This research was intended as a case study.

2.3 Data Collection and Processing

A purposive sampling technique was employed to tap perceptions of managerial level employees. Responses were ranked through a 1 to 5 Likert scale. Data was analyzed using SEM-PLS with the assistance of smart PLS ver 2.0 M3 software. The rule of thumb of sample size less than 100 and the number of indicators was taken into account and the study compared the number of coefficients that must be predicted in building a research model. Partial Least Square (PLS) is a suitable analytical method as it does not assume that the data must be by certain measurements, can be applied to all scales of the data, does not require a lot of assumptions and sample size rule (Ghozali, 2006). The conceptual model is shown in Figure 2.

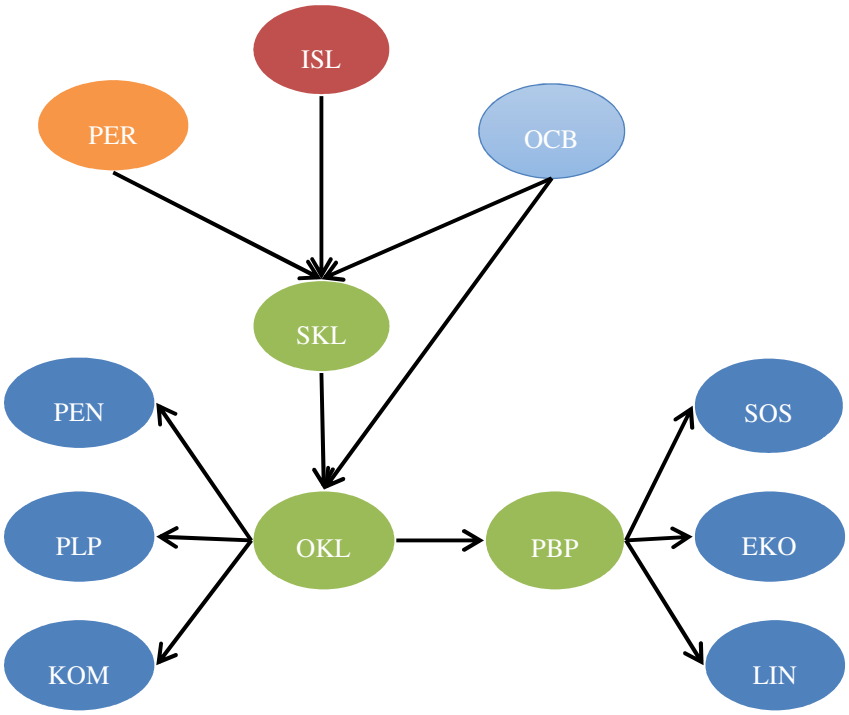

Figure 2 Conceptual Model

SKL: attitude of employees on the implementation of environmental programs; PEN: measurement of knowledge; PLP: implementation of the company's environmental program; KOM: employee's commitment to the environment; OKL: environmental sustainability orientation; SOS: main aspect of social sustainability; EKO: main aspects of economic sustainability; LIN: main aspects of environmental sustainability; PBP: sustainable corporate development.

3. Results and Discussion

3.1 Company Overview

Pongkor gold mine, an underground mining located around Halimun Salak National Park, is operated by Antam (PT) Pongkor Business Unit through cyanide leaching processing method. The gold reserve is estimated to be until 2019. Inalum, an aluminum smelter formerly operated under a Japanese consortium, recently became a state-owned enterprise. Its aluminum production in 2014 reached 266,000 tons, 80% of which served domestic demand. Inalum smelter is being advantaged by low energy costs generated from a hydro power plant with water intake from Asahan River which is part of Lake Toba watershed system.

3.2 Demographic Characteristics of Respondents (Employee)

A total of 60 respondents (Pongkor gold mining) and 80 respondents (Inalum aluminum smelting) were involved. Large part of respondents comes from managerial level position with a bachelor degree. In addition, supporting works make up a large proportion of the sample from the two companies (Table 1).

Table 1. Demographic Characteristics of Respondents

Demographic	Level of Education	Pongkor		Inalum	
		Total	(%)	Total	(%)
Education	High school	25	42	1	1,3
	Diploma	3	5	21	26,3
	Undergraduate	30	50	48	60,0
	Postgraduate	2	3	10	12,5
	Total	**60**	**100,0**	**80**	**100,0**
Field of work	Operation	21	35,0	14	17,5
	Maintenance	12	20,0	11	13,8
	Support	27	45,0	55	68,8
	Total	**60**	**100,0**	**80**	**100,0**

4 Evaluation of the Sustainable Corporate Development Model

4.1 Measurement Model

Evaluation results of the measurement model indicates latent variables have good validity and reliability, where AVE and CR in general have values above the critical value, i.e. AVE ≥ 0.5 and CR ≥ 0.7 as shown Table 2. The indicators developed to measure latent variables suggest that they are capable of measuring construct well in both research objects.

The OKL construct is measured by dimensions KOM, PEN and PLP, all of which have valid and statistically significant coefficients. Latent variable PLP contributes to the measurement of OKL with the highest at 0.9129 in Pongkor, while the highest in Inalum is KOM (0.9412). As for PBP construct, it is measured by three dimensions of EKO, LIN and SOS. The LIN dimension has the highest contribution to the measurement both in Pongkor and Inalum at 0.9383 and 0.9573, respectively, as can be seen in Table 3.

Table 2. Validity and Reliability Results

Latent Variable	Pongkor		Inalum	
	AVE	Construct Reliability	AVE	Composite Reliability
EKO	0.4918	0.8522	0.5096	0.8588
ISL	0.6143	0.8881	0.7208	0.9279
KOM	0.5681	0.8870	0.7414	0.9450
LIN	0.4405	0.9014	0.5974	0.9464
OCB	0.5319	0.9186	0.5424	0.9207
OKL	0.4495	0.9353	0.5178	0.9490
PBP	0.3696	0.9341	0.4981	0.9605
PEN	0.6840	0.9152	0.5494	0.8531
PER	0.5387	0.8225	0.6565	0.8839
PLP	0.5550	0.8946	0.5890	0.9076
SKL	0.6432	0.8779	0.8464	0.9566
SOS	0.5168	0.8805	0.5733	0.9028

4.2 Structural Model

The causal relationships in the structural model show different statistical significance of the two sample companies. The relationship between OCB to SKL in Pongkor is not statistically significant while in INALUM this relationship is statistically significant. In Inalum, the relationship between the PER to SKL is not statistically significant (Table 3). The rest of the relationships are statistically significant.

Table 3. Coefficients and t-Test Results

Path	Pongkor		Inalum	
	Coefficient	t-Stat.	coefficient	t- Stat.
ISL -> SKL	0.3506	4.2668	0.6062	5.2305
OCB -> OKL	0.6444	14.7862	0.4509	6.3573
OCB -> SKL	0.0333	0.3461	0.2063	2.6702
OKL -> KOM	0.8747	35.1629	0.9412	38.4761
OKL -> PBP	0.7658	13.5169	0.8701	14.1366
OKL -> PEN	0.8182	15.2616	0.8612	26.826
OKL -> PLP	0.9129	47.2027	0.9043	27.6533
PBP -> EKO	0.8088	17.8283	0.9121	18.3352
PBP -> LIN	0.9383	65.8021	0.9573	48.4192
PBP -> SOS	0.8667	30.525	0.9146	22.9733
PER -> SKL	0.4541	3.9165	0.103	1.1601
SKL -> OKL	0.3974	7.069	0.504	5.8631

Statistically insignificant relationship between OCB and SKL in Pongkor can be interpreted that the extra employees' behaviors do not significantly affect employees' attitudes toward the implementation of environmental programs. Statistically insignificant relationship between PER and SKL in Inalum can be interpreted that employees' perceptions of increasingly stringent environmental regulation for companies do not significantly influence employees' attitudes toward the implementation of environmental programs.

The variability of endogenous latent variable is explained by the variables that influence the variation which correspond to the coefficient of determination. The variability of SKL latent variable is explained by PER, ISL and OCB by 50.98 in the Pongkor model and 73.90% in Inalum model. OKL latent variable is explained by

SKL by 79.74% in Pongkor and 79.83 percent in Inalum while PBP latent variable is explained by OKL by 58.64% in Pongkor and 75.70% in Inalum.

5. Conclusions

The general findings of the study suggest that in both companies there are different causal relationships of factors toward employees' attitude on the implementation of environmental programs. For instance, regulation is found to have no statistically significant effect in Inalum aluminum smelting company, while behavior is not statistically significant in the case of Pongkor gold mine. These findings may suggest the importance that specific industrial contexts – i.e. two different mineral resource companies with different core business activities in this particular case – may play in explaining varying relations between attitude and program implementation. Moreover, the study also suggests that factors that affect the orientation to the environment, which explain attitude and behavior of employees, have statistically significant effects in both companies. It also suggests that sustainability orientation has a statistically significant effect on corporate sustainable development. For future research, a more systematic study can be carried out to test the role of differences and specific nature of companies' exposure to environmental issues they encounter in order to explore how these differences and specificities might shape the perception of employees about, and in turn employees' behavior toward, corporate sustainable development measures.

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