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Implementation of Environmental Management at Universities in Indonesia

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Abstract

Environmental sustainability is currently the main concern of various parties because there are facts that environmental damage is getting worse. This research aims to evaluate the implementation of environmental management in terms of organizational commitment and the implementation of green information systems in universities in Indonesia. To achieve the research objectives, researchers used a descriptive analytical approach. The sample used in this research was purposive sampling, where the respondents for this research consisted of 164 lecturers from 26 universities. The questionnaire contains 30 question items using 5 answers based on a Likert scale. Data analysis used SEM PLS. The research results show that organizational commitment does not influence higher education environmental management, while the implementation of green information systems has a significant effect on higher education environmental management. Meanwhile, organizational commitment and implementation of green information systems have a positive effect on higher education environmental management. The results of this study can be used as important input for university managers to improve environmental management.

Keywords: *Organizational Commitment, Implementation of Green Information Systems, Environmental Management.*

INTRODUCTION

The climate change phenomenon directly or indirectly affects industries and countries. Governments and organizations have been challenged to identify their environmental impacts to address environmental sustainability issues (Shahrzad & Marta, 2020). Awareness of the need for sustainable living has given rise to a new concept in society, namely sustainable development. Sustainable development is defined as development that meets the world's current needs without compromising the ability of future generations to meet their own needs. In the context of sustainable development, it is important to ensure that economic growth can be maintained, so that the life of society as a whole continues to progress in balance with the maintenance of ecological conditions (Soemarwoto, 2008). Environmental governance refers to the written and unwritten policies,

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decision-making and behavior that influence the way the environment is managed particularly those related to openness, participation, accountability and effectiveness. The success of environmental governance in an organization is influenced by several factors including organizational commitment (Paille et al., 2020; Roxas & Coetzer, 2012; Siagiana & Tarigan, 2021) and the implementation of green information systems (Anthony, 2019; Anthony Jnr, 2016; Melville, 2010; Mustfid, 2013; Sahu & Singh, 2016; Waston et al., 2010)

Universities are an important part of resource development in a country because universities are the spearhead of human resource development. As an institution that plays a role in development, of course universities must determine activities that support government programs in protecting the environment (Mustafid, 2013; Pracasitaram et al., 2019; Shima et al., 2016). To support the sustainability of life, universities are required to participate in implementing good environmental management. This research aims to analyze how environmental management is implemented at universities in accordance with applicable laws and regulations. This research is different from previous research in that generally the subjects studied were business organizations. The hope is that the results of this research can be input for university managers to improve environmental management performance in realizing participation in preserving the environment.

LITERATURE REVIEW

Environmental Management

An organization's activities will have an impact on the environment. Efforts to increase awareness of environmental sustainability emerged because there was pressure from government and non-government on organizations to utilize resources efficiently to achieve sustainability goals (Gholami et al., 2013; Anthony et al., 2019). Political and institutional changes are needed to shift the paradigm towards a sustainable society. These changes are happening now and organizations need to respond to them proactively. Therefore, organizations should start setting sustainable environmental performance targets of their organizational operations by trying to meet self-defined environmental guidelines or regulations set by governmental and non-governmental associations. Environmental management refers to the written and unwritten policies, decision making and behavior that influence the way the environment is managed-particularly those related to openness, participation, accountability and effectiveness.

To maintain environmental sustainability, the Indonesian government issued Law no. 32 of 2009 concerning Environmental Protection and Management where Article 1 explains that the living environment is a spatial unity with all objects, forces, conditions and living creatures, including humans and their behavior, which influence

nature itself, the continuity of life and human welfare as well as other living creatures.

Environmental management can be interpreted as a conscious effort to maintain or improve the quality of the environment so that basic needs can be met as well as possible. Because perceptions about basic needs, especially for human survival, are not the same for all groups of society and change from time to time, environmental management must be flexible (Soemarwoto, 2008:76). Law no. 32 of 2009 CHAPTER II article 4, states that the scope of environmental management is seen from planning, utilization, control, maintenance and supervision.

Organizational Commitment

Organizational commitment is defined as a strong desire to continue to exist in competition, a willingness to make quality efforts for the benefit of the organization, as well as belief in and acceptance of the organization's values and goals (Robbin & Judge, 2014). Organizational commitment basically consists of affective commitment, continuance commitment, and normative commitment, or better known as the Three-Component Model of Commitment developed by Meyer & Allen (1997). Organizational commitment is basically described by how committed the leader (top management) is to achieving company goals which are described by the policies set within the organization (Chun et al., 2013; Lee et al., 2016; Lee & Joo, 2020; T.W. Lee et al.,1992).

In order to support the achievement of environmental sustainability, organizations must be involved in supporting environmental sustainability in accordance with regulations issued by the government. Various policies must be established by the organization to achieve organizational participation in protecting the environment and are contained in existing policies in the organization's tactical and strategic planning. This policy must be well socialized to members so that it will motivate members to participate and apply it in their daily activities.

H_1: Organizational commitment has a positive effect on environmental governance

Implementation of Green Information Systems

In recent years, the term green information systems (GIS) become familiar with the holding of various conferences discussing this matter. Several companies in Indonesia are starting to implement it in their company operations. However, the impact of GIS in higher education has not yet been seen. GIS is aimed at enabling environmental sustainability in organizational processes and institutional activities aimed at improving environmental and economic performance. Universities, as organizations contribute to the deterioration, and enhancement, of the natural environment. and GIS Belief (Melville, 2010).

GIS implementation has been carried out by many organizations and has shown success in improving organizational performance, especially for educational institutions (Fernandez-Feijoo et al, 2014, Hariyanti & Wirapraja, 2017; Kurkalova & Carter, 2017; Novi & Akexander, 2017; Ermawati, 2016; Nugroho, 2013; Hartikayanti & Rahmah, 2022). Organizational adoption of environmental sustainability strategies requires new data on environmental impacts, new information about cause and effect, and shared knowledge about what works, what doesn't, and why (Melville, 2010).

Therefore, companies are starting to assess the sustainable environmental performance of their organizational operations by trying to meet self-defined environmental guidelines or regulations set by governmental and non-governmental associations. For this reason, it is necessary to design a system to dynamically facilitate environmental sustainability. GIS is the backbone of environmental management practices in data centers by supporting the company's internal environmental governance policies and guidelines (Melville, 2010).

H_2: Implementation of a green information system has a positive effect on environmental management

METHODS

The populations in this study were universities in Indonesia. There are 164 lecturers from 26 universities. This research uses a purposive sampling technique to determine the sample. Data collection was carried out by distributing questionnaires to respondents. This study uses a five-point Likert scale with a value of 5 for strongly agree and 1 for strongly disagree. Inferential statistical analysis is divided into two, namely descriptive analysis and path analysis with the Partial Least Square program (Hair Jr & Page, 2015). In the Partial Least Square program, the outer model assessment uses the Convergent Validity and Composite Reliability tests, while the structural model (inner model) is used to predict the relationship between latent variables and those hypothesized. The validity test aims to determine the validity of the data obtained from the questionnaire. The aim of the reliability test is to determine the reliability of the measuring instrument. The measurement indicators for each variable can be seen below in Table 1:

Table 1 Measurement indicators of research variables

No	Variables	Indicators
1	**Organizational Commitment**	
	Affective Commitment	Policy easy understood (AC1)
		Problem system information understood together (AC2)
		Engaging all party (AC3)
	Continuance Commitment	Planning Environment life good (CC1)
		Development system information planned (CC2)
		Accept input (CC3)
	Normative Commitment	There is repair for sustainability environment. (NC1)

		College_worthy get appreciation. (NC2)
		Repair environment information (NC3)
2	**Implementation System Green Information**	
	GIS Planning	Understand the impact of technology Information (P1)
		Investment in green technology information (P2)
		Understand the factors motivation for adoption green technology (P3)
		Optimization decision for objective eco-efficiency (P4)
	GIS Implementation	Understand IT's impact on sustainability environment (I1)
		Understand the impact of GIS to environment (I2)
		Effective GIS design (I3)
	GIS Evaluation	There is Deep data integration eco - efficiency (E1)
		Understand information what is needed (E2)
		Understand information what to do reported (E3)
3	**Management Environment**	
	EM Planning	Information management environment life complete (PN1)
		Information availability source Power nature (PN2)
	EM Maintenance	Environmental Governance with characteristics region (M1)
		Utilization source Power natural appropriate (M2)
	EM Control	Planning preservation environment complete (C1)
		Control utilization source Power natural good (C2)
	EM Utilization	Prevention efforts damage environment good (U1)
		Countermeasures damage environment good (U2)
	EM Supervisor	Supervision licensing use environment (S1)
		Conservation (improvement) of resources Power nature (S2)

RESULTS AND DISCUSSION

The organizational commitment variable obtained a score of 75% of the ideal score or in the fairly high category. Respondents assessed that the organization's commitment to environmental management was good. What needs to be improved by the organization is to include members in reducing environmental problems faced by universities. Respondents are not involved enough so that universities do not deserve to be given appreciation.

The Green Information System (GIS) implementation variable achieved a score of 75% of the ideal score or was in the quite high category. This means that higher education institutions have been quite

successful in implementing the concept of a green environment in their information systems. Universities must improve their information system planning to focus more on providing data and information about environmental policies.

The environmental management (EM) variable achieved a score of 75% of the ideal score or was in the quite high category. This means that universities have been quite successful in implementing the concept of environmental management. Universities must improve environmental management system planning by focusing on providing data and information about environmental management policies that are socialized to all members so that members will participate in implementing them in their activities. The results of the questionnaire on all variables studied are depicted in table 2:

Table 2 Tabulation Results Questionnaire from All Variable

No	Variable	Score	Ideal	%
1	Organizational Commitment	6,179	8,200	75
2	Implementation of green information system	6.115	8,200	75
3	Environmental Management	6.114	8,200	75

The results of the validity test and reliability estimation can be seen from Construct Reliability and Validity, so the following results are obtained:

Table 3 Reliability and Validity Test Results Construct

Construct Reliability and Validity				
	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Affective Commitment	0.724	0.736	0.763	0.723
Continuance Commitments	0.815	0.815	0.890	0.731
Normative Commitments	0.702	0.766	0.836	0.637
GIS Planning	0.916	0.918	0.941	0.799
GIS Implementation	0.884	0.887	0.928	0.811
GIS Evaluation	0.942	0.944	0.963	0.896
EM Planning	0.957	0.959	0.979	0.959
EM Utilization	0.850	0.857	0.930	0.869
EM Control	0.951	0.952	0.976	0.954
EM Maintenance	0.884	0.922	0.944	0.894
EM Supervisor	0.860	0.874	0.934	0.877

The test results show that the variables have good reliability estimates because all reliability measures exceed 0.7. The validity is also good because the AVE value of 0.717 is more than 0.5. To test whether the model created is fit or not, a model fit test is carried out which Standardized Root Mean Square Residual (SRMR). The results showed that the SRMR value found was 0.078. Next, to form the SEM model, direct and indirect relationships were tested. Path Coefficients which are the results of direct effect testing so it can be concluded that only Organizational Commitment has no effect on Environmental Management.

The results above reflect Path Coefficients which are the results of direct effect testing so it can be concluded that only Organizational

Commitment has no effect on Environmental Management. The results above reflect Path Coefficients which are the results of testing indirect effects which are smaller than the 0.05 significance level so it can be concluded that all variables are significant. All loading factors show numbers above 0.5 and all have p values below 0.05, so it can be said that all observed variables can measure the latent variables well.

The resulting research model structure is shown in Figure 1 below:

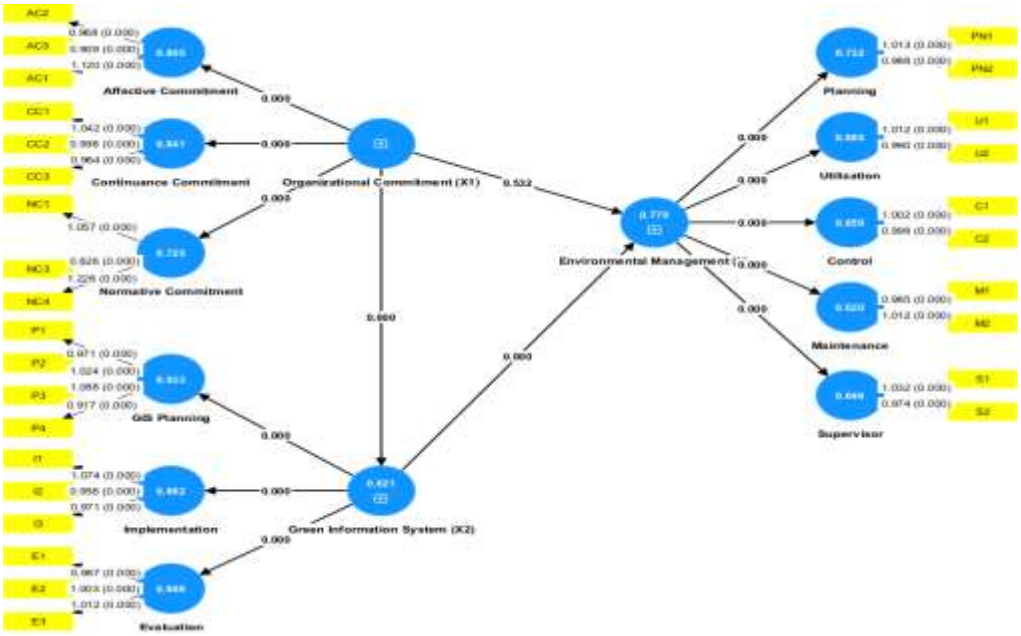

Figure 1 Structural Model Between Latent Variables

The results of this research show that organizational commitment has no effect on the management of the university environment. This result is not in line with the results of previous research (Cantor et al,2013. This finding is in line with previous studies that have also found no significant relationship between organizational commitment and environmental management (Basher Rubel et al,2017; Vuong et al, 2020). One possible explanation for this result is that the respondents in this study, who are lecturers, are not directly involved in decision-making process regarding the environmental management (Chasanah et al., 2020). In order to successfully address this matter, it is advisable for higher education institutions to offer socialization initiatives pertaining to management environment policies and actively engage members in the implementation and supervision processes. This approach has the potential to significantly impact members' perception and performance within the management environment (Chasanah et al., 2020).

CONCLUSIONS

The implementation of a green information system (GIS) has been found to have a substantial impact on the management environment, as demonstrated by the research conducted by Hasugian et al. (2022). The aforementioned observation is corroborated by prior research, which has similarly demonstrated the favorable influence of green initiatives

on the managerial milieu (Hasugian et al., 2022; Santhi & Shankar, 2021). The significance of employing information technology for environmental management is reinforced by the perception of lecturers in fulfilling their responsibilities within the Covid-19 pandemic, which strongly relies on technological information (Baggia et al., 2016). Nevertheless, it is imperative that institutions of higher education furnish pertinent facts and knowledge concerning the managerial landscape via the daily information systems employed by educators (Hasugian et al., 2022).

The limitation of this research is that the data only comes from the perceptions of respondents (lecturers). It is necessary to explore more deeply other factors such as established policies, environmental performance achievements and internal and external inhibiting factors.

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REFERENCES

Anthony, B., Jr. (2019). Green information system integration for environmental performance in organizations: An extension of belief–action–outcome framework and natural resource-based view theory. *Benchmarking: An International Journal*. https://doi.org/10.1108

Baggia, A., Brezavšček, A., Maletič, D., Šparl, P., Raharjo, H., & Žnidaršič, A. (2016). Awareness and Attitude Towards Green IS in Slovenian Enterprises. *Organizacija*. https://doi.org/10.1515/orga-2016-0001

Basher Rubel, M. R., Rimi, N. N., & Walters, T. (2017). *Roles of Emerging HRM and Employee Commitment: Evidence from the Banking Industry of Bangladesh*. Global Business Review. https://doi.org/10.1177/0972150917692223

Cantor, D. E., Morrow, P. C., McElroy, J. C., & Montabon, F. (2013). The Role of Individual and Organizational Factors in Promoting Firm Environmental Practices. *International Journal of Physical Distribution & Logistics Management*. https://doi.org/10.1108/ijpdlm-03-2012-0071

Chasanah, U., Hidayat, A., & Mustafa, Z. (2020). Internal Marketing: Study of Lecturer Organizational Commitments on Private University in Indonesia. *Ejbm*. https://doi.org/10.7176/ejbm/12-2-06

Chun, J. S., Shin, Y., Choi, J. N., & Kim, M. S. (2013). How does corporate ethics contribute to firm financial performance? The mediating role of collective organizational commitment and organizational citizenship behavior. *Journal of Management, 39*(4), 853–877. https://doi.org/10.1177/0149206311419662

Ermawati, Y. (2016). Strategy Analysis for Implementing Green Computing in Higher Education (Case Study at Baturaja

University. *IncomTech: Journal of Telecommunications and Computers, 7*(2), 179–212.

Fernandez-Feijoo, B., Romero, S., & Ruiz, S. (2014). Commitment to Corporate social responsibility measured through global reporting initiative reporting: Factors affecting the behavior of companies. *Journal of Cleaner Production, 81*, 244–254. https://doi.org/10.1016/j.jclepro.2014.06.034

Gholami, R., Sulaiman, A. B., Ramayah, T., & Molla, A. (2013). Senior Managers' Perception on Green Information Systems (IS) Adoption and Environmental Performance: Results from a Field Survey. *Information & Management*. https://doi.org/10.1016/j.im.2013.01.004

Gohar, S. R., & Indulska, M. (2020). Environmental Sustainability through Green Business Process Management. *Australasian Journal of Information Systems, 24*, 1–30.

Hair Jr, J. F., & Page, M. (2015). *The Essentials of Business Research Methods*. Routledge.

Hartikayanti, H. N., & Rahmah, N. A. (2022). Factors Affecting the Use of Green Information Systems (GIS) in Higher Education. *Tec Empresarial*, *17*(2), 112-120.

Hariyanti, N. T., & Wirapraja, A. (2017). Analysis Utilization Technology Gteen Computing in Support Management Performance Educational Institutions. *EXECUTIVE Journal, 14*(2), 229–240.

Hasugian, H., Murwaningsari, E., & Sudibyo, Y. A. (2022). The Implementation of Environmental Management System to Moderate the Relationship Between the Green Strategy and Company Performance. *Journal of World Science*. https://doi.org/10.58344/jws.v1i11.109

Jnr, B. A. (2016). Green Information Systems Integration in Information Technology Based Organizations. An Academic Literature Review. *Journal of Soft Computing and Decision Support Systems, 3*(6), 45–66.

Kurkalova, L. A., & Carter, L. (2017). *Sustainable production: Using simulation modeling to identify the benefits of green information systems*. https://doi.org/10.1016/j.dss.2017.02.006

Lee, J. C., Shiue, Y. C., & Chen, C. Y. (2016). Examining the impacts of organizational culture and top management support of knowledge sharing on software process improvement success. *Computers in Human Behavior, 54*, 462–474.

Lee, J., & Joo, H. Y. (2020). The Impact of Top Management's Support on the Collaboration of Green Supply Chain Participants and Environmental Performance. *Sustainability, 12*, 9090.

Lee, T. W., Ashford, S. J., Walsh, J. P., & Mowday, R. T. (1992). Commitment propensity, organizational commitment, and voluntary turnover: A longitudinal study of organizational entry processes. *Journal of Management,18*(1),15-32. https://doi.org/10.1177/014920639201800102

Melville, N. P. (2010). Information System Innovation for Environmental Sustainability. *MIS Quartely, l34*(1), 1-21.

Mustafid. (2013). *Green Information System: Innovation for Environmental Sustainability*. Proceedings CITACEE (pp. 18–22).

Nugroho, B. A. (2013). Application Green Computing in The Environment Regional Government and Sector Companies Technology Information. *Journal Study Communication, 16*, 91–100.

Paillé, P., Valéau, P., & Renwick, D. W. (2020). Leveraging green human resource practices to achieve environmental sustainability. *Journal of Cleaner Production, 260*, 121137. https://doi.org/10.1016/j.jclepro.2020.121137

Pracasitaram, I. G. M. S. B., Linawati, & Hartati, R. S. (2019). The Concept and Application of Green Computing in the Environment Campus. *Magazine Scientific Technology Electro, 18*(3), 299–302.

Robbins, S. P., & Judge, T. A. (2014). *Essentials of Organizational Behavior*. Pearson Education, Inc.

Roxas, B., & Coetzer, A. (2012). Institutional environment, managerial attitudes and environmental sustainability orientation of small firms. *Journal of Business Ethics, 111*(4), 461-476.

Sahu, G. P., & Singh, M. (2016). Green Information System Adoption and Sustainability: A Case Study of Select Indian Banks. *15th Conference on E-Business, e-Services and e-Society (I3E, 292-304).*

Santhi, V., & Shankar, R. (2021). Collision of Green Employee Engagement and Green Human Resource Management in Employee's Productivity. *Huss International Journal of Research in Humanities and Social Sciences*. https://doi.org/10.15613/hijrh/2021/v8i1/209148

Shima, R. D., Wimala, M., & Akmalah, E. (2016). Study of the Education Category in the Implementation of Green Campus in Itenas. *Design of the Institute's Online Journal National Technology, 2*(3), 105–115.

Siagiana, H., & Tarigan, Z. J. H. (2021). The Impact of Top Management Commitment and Supply Chain Management. *Practices on Operational Performance, 15*(4), 87–102.

Soemarwoto, O. (2008). *Ecology, Environment and Development. Bridge.*

Vuong, B. N., Tung, D. D., Hoa, N. D., Chau, N. P., & Tushar, H. (2020). An Empirical Assessment of Organizational Commitment and Job Performance: Vietnam Small and Medium-Sized Enterprises. *Journal of Asian Finance Economics and Business*. https://doi.org/10.13106/jafeb.2020.vol7.no6.277

Watson, R. T., Boudreau, M. C., & Chen. (2010). AJ Information Systems and Environmentally Sustainable Development: Energy Informatics and New Directions for the IS Community'. *MIS Quarterly, 34*(1), 23-38.