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Article

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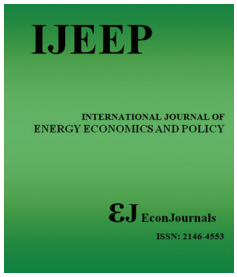
International Journal of Energy Economics and Policy

Provided in Cooperation with:
International Journal of Energy Economics and Policy (IJEEP)

Reference: Sisdyani, Eka Ardhani/Subroto, Bambang et. al. (2020). Levers of eco-control and green behavior in medical waste management. In: International Journal of Energy Economics and Policy 10 (4), S. 194 - 204.
https://www.econjournals.com/index.php/ijeep/article/download/9342/5121.
doi:10.32479/ijeep.9342.

This Version is available at:
http://hdl.handle.net/11159/8408



International Journal of Energy Economics and Policy

ISSN: 2146-4553

available at http: www.econjournals.com

International Journal of Energy Economics and Policy, 2020, 10(4), 194-204.

Levers of Eco-control and Green Behavior in Medical Waste Management

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Received: 03 February 2020 **Accepted:** 04 May 2020 **DOI:** https://doi.org/10.32479/ijeep.9342

ABSTRACT

This research examines the mediating role of the levers of eco-control on the effect of the green behavior intention on actual behavior, in the context of the management of medical waste. Data were collected using a questionnaire survey method, from a randomly selected sample of 125 top managers of Indonesian public hospitals. The results show that the green behavior intention affects the importance use of the four eco-control mechanisms, namely belief, boundary, diagnostic, and interactive eco-control. However, only boundary and interactive eco-control influence actual green behavior. Furthermore, the indirect effect of the test results shows the role of boundary eco-control in mediating the relationship of green behavior's intention and green behavior. This means that the stronger the intention is, the more likely that the actual behavior will be realized through the implementation of boundary eco-control. Accordingly, the main implication of the study is that the government should formulate mandatory regulations regarding medical waste's management. The mandatory nature of the regulation will provide a coercive way to force compliant behavior, as the underlying dimension of the boundary control mechanism.

Keywords: Behavior, Levers of Eco-control, Management Control System, Waste Management, Health-care Industry
JEL Classifications: Q56, M41

1. INTRODUCTION

Environmental issues have become a global focus for protecting intergenerational life (Mensah, 2017. p. 21). Communities are becoming more concerned about the environment and demanding organizations behave correspondingly. Thus, organizations are obliged to align their activities within the limits and norms according to their social contracts with the communities (Deegan, 2013. p. 325), including those related to environmental issues. Well-performing organizations, both economically and environmentally, will acquire a positive image and legitimacy, which is crucial to access the resources provided by the community (Fernando and Lawrence, 2014). Therefore an organization should link its economic interests and environmental preservation to improve its organizational performance (Agustia et al., 2019).

As public health service organizations, hospitals are very vulnerable to environmental issues, due to the medical waste generated by their activities. Indonesian hospitals have produced a greater amount of medical waste compared to some other developing countries in Asia (WHO, 2017). However, <5% hold incinerator operational licenses, while only six hazardous waste services companies are available throughout the country (Office of the Ministry of Environment and Forestry of Republic of Indonesia, data as of July 2018). Furthermore, the budget to fund waste management and sanitation is very limited; it is about only 1% of the total budget. This condition is worsened by the fact that only 42% of hospitals comply with waste management regulations (WHO, 2017). This condition will harm society and the environment if waste management is not effectively controlled. An effective waste management program is important to protect society from the infectious spread of harmful substances (Windfeld and Brooks, 2015; Caniato et al., 2015; Reinhardt, 2018).

One way to achieve effective pro-environment waste management is to promote green behavior, which is behaving in a manner that

favors the environment (Stern, 2000). In the context of medical waste management, this behavior includes sorting, reducing, recycling, storage, collecting, transporting, and disposing of the waste (Abdulla et al., 2008; Paulraj, 2009; Shahbod et al., 2017). Green behavior commences with the intention to improve the quality of the environment (Stern, 2000; Amel et al., 2009); although, in an organizational context, the intention might be unstable, especially when there is a significant time lag between the intention's formulation and the behavior's realization. During this period, intention stability can be affected by resources availability, individual capabilities, cooperation and commitment among individuals, as well as the emergence of new information. To maintain the intention stability and ensure the realization of the intention into actual behavior, an organization will need a management control system (Chenhall, 2008; Naranjo-Gil, 2016; Maas et al., 2016), which in the context of environment protection is called the levers of eco-control (Henri and Journeault, 2010; Journeault et al., 2016).

Previous researches into the levers of eco-control (LOEC) have mainly been conducted in the manufacturing industries, which are considered as having the most impact on the environment (Koefoed, 2010; Setthasakko, 2010; Jalaludin et al., 2011; Lee, 2011; Arjaliès and Mundy, 2013; and Journeault et al., 2016). Meanwhile, research in the context of the service industries is still limited, especially in developing countries (Zvezdov, 2012; Lee, 2015). Hospitals, as part of the health service industry, are very vulnerable to environmental issues due to the production of harmful medical waste (Frumkin, 2016; Wilson et al., 2015; Caniato et al., 2015). Thus, this is a suitable setting to apply the LOEC concept to effectively control the waste management system. Furthermore, research into medical waste has, so far, focused on technical aspect (Askarian et al., 2010), staff's understanding about the procedures (Lakbala and Lakbala, 2013), and waste structure (Tesfahun et al., 2014). Limited attention has been dedicated to behavioral factors, indeed these are important, especially in developing countries with limited economic resources to effectively manage the waste (Ali et al., 2016). Therefore, to bridge the gaps, this research addressed behavioral issues, aiming to investigate the role of LOEC in mediating the effect of green behavior's intention on realized behavior in medical waste management's context.

2. LITERATURE REVIEW AND HYPOTHESIS FORMULATION

In responding to urgent environmental issues, Henri and Journeault (2010); and Journeault et al. (2016) have developed an eco-based control mechanism, namely the levers of eco-control (LOEC), based on the concept of the levers of control (LOC) (Simons, 1995). Four eco-control mechanisms consisting of belief, boundary, diagnostic, and interactive are designed to control the activities and behavior of an organization's members, to achieve goals without sacrificing environmental interests. Simons (1995, 2000) defines each mechanism as follows. Belief systems are the basic morals that are adopted by an organization, officially transferred and systematically confirmed by top managers as the basic norms, goals, and direction of the organization. Boundary systems communicate risks to be avoided and provide limits on activities for members of the organization, including ethical limits for employees and strategic limits for management when exploring innovative ideas. A diagnostic control system that communicates key performance variables is a formal information system that is used by managers to monitor organizational performance and avoid deviations from previously established performance standards. An interactive control system is a formal information system used by managers to engage in decision-making activities by subordinates and stimulates exploration and education to come up with new approaches.

LOEC is a formal system and procedure that uses economic and environmental information to maintain or change patterns in environmental activities. In addition, LOEC helps organizations to measure, control and disclose their environmental performance by providing information for decision making to achieve environmental goals (Henri and Journeault, 2010). LOEC also integrates environmental interests with the management control system to improve environmental performance, which is done by helping organizations adapt to their environmental context and delivering results according to stakeholder expectations (Merchant and Otley, 2007). As such, the process ensures that economic and environmental resources are obtained and used effectively and efficiently in order to achieve organizational goals.

The role of LO(E)C as a control mechanism has been studied by Henri and Journeault (2010), Arjaliès and Mundy (2013), Naranjo-Gil (2016), and Journeault et al. (2016). Henri and Journeault (2010) find that eco-control can enhance environmental learning, sustainable eco-innovation, stakeholder participation, as well as the vision about environmental protection, which contribute directly to ecological performance, then to economic performance. In addition, there is evidence that different eco-control practices will support different environmental capabilities, and that the use of combined eco-control practices is important to support the implementation of comprehensive environmental capabilities. Arjaliès and Mundy (2013) explore the application of management control systems that are important in the practice of corporate social responsibility (CSR) using the levers of control (LOC) framework of Simons (1995). The main finding is that the LOC mechanism allows management to identify and manage opportunities and threats related to CSR strategies, so as to support the organization in achieving its objectives.

Naranjo-Gil (2016) states that boundary and diagnostic control systems positively affect planned strategies' realization, while belief and interactive control systems have positive impacts on realized spontaneous as well as deliberate strategies. On the other hand, Journeault et al. (2016) studied the control system by examining how intended strategies are related to the alternative use of beliefs, boundaries, interactive and the diagnostic levers of eco-control. The two studies have built a fundamental concept of the relationship among three variables: strategic intention, LO(E)C, and realized strategy. These studies would be the starting point to offer an alternative framework to study the role of LOEC, related to intention and behavior in an organizational context.

The relationship between intention and behavior has been widely studied. Intention is an important determinant of behavior, because one will behave after settling the intention (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980; Fishbein and Ajzen, 2011). Some of the studies about the intention and behavior relationship include the following: Deng et al. (2016) found that farmers' intentions and behavior are related; Morren and Grinstein (2016) investigated green behavior in different countries and national cultures. They found that in developed and individualist countries, there is a greater tendency to translate intentions into actual behavior. A subsequent study by Echegaray and Hansstein (2017) found a positive intention to recycle and the realization of the intention into actual behavior. The relationship between the intention and behavior of green consumption was examined by Yadav and Pathak (2017), resulting in them finding that consumers' intentions to buy green products had a positive effect on their buying behavior of green products. These studies conclude that the intention to undertake green behavior has a positive effect on actual green behavior. This provides support that individual behavior is determined by previously formulated intentions. Therefore, the first hypothesis is as follows.

H_1: A green behavior intention will have a positive impact on actual green behavior.

In the organizational context, intention could be formulated in terms of planning objectives (Ajzen and Fishbein, 198. p. 47), in the form of strategic intentions (Journeault et al., 2016), or intended strategies (Naranjo-Gil, 2016). Strategic intentions need to be translated into implementation intentions, which clearly indicate when, where, and how the intentions are to be implemented (Gollwitzer, 1999; Gollwitzer and Sheeran, 2006; Wieber et al., 2015). Thus, an implementation intention might include planned activities, a program and the related budget. However, an intention is likely to change due to certain factors, for example, changes in the availability of resources, individual capabilities, and new information. This condition occurs because the intention is formed by individuals, as members of the organization, and the realization of intentions becomes dependent on cooperation and commitment within the group (Fishbein and Ajzen, 1975. p. 371). Thus, it is a great challenge to maintain an intention's consistency and therefore, a control mechanism is needed to stabilize the intention and ensure the commitment of the organizations members to realize the intention into actual behavior.

In Indonesian hospitals, the green behavior intention (GBI), in terms of medical waste management (MWM), is formulated based on government regulations, i.e., the minister of the environment's regulation No. 56/2015 about procedures and technical requirements for hazardous and toxic waste management from health service facilities; and the minister of health's regulation No. 7/2019 about hospital environmental health. The two regulations are in line with the WHO guidelines on health-care's waste management, including separation, transportation, treatment and disposal procedures (WHO, 2017). However, the non-mandatory nature of these regulations will likely make the intention unstable. LOEC are expected to play important roles in stabilizing the intention and moreover, the strictly formulated regulation-base of GBI will influence management to employ all the four control mechanisms to ensuring green behavior (GB) can be materialized. Therefore, the next hypotheses are formulated as follows.

H_2 a, b, c, d: GBI will positively affect the importance use of (a) belief, (b) boundary, (c) diagnostic, and (d) interactive eco-control mechanisms.

With the four mechanisms of LOEC in place, it is expected that GBI is more stable and is likely to materialize into actual GB; even though the role of each control mechanism varies. Belief eco-control will enable the communication and understanding of the basic values and norms of the organization, related to environmental concerns, to the members as operational guidance in MWM. Boundary eco-control restricts members' behavior so they do not perform prohibited actions that are harmful to the environment, while diagnostic eco-control forces management to focus on the targeted eco-friendly output. Although the MWM programs are regulation-based, an interactive control mechanism is also important to allow organizational members to find new methods or ways that give rise to new creativity and innovation (Simon, 1995). Adopting the interactive control is important due to the creative and innovative characteristics of health-care service industries (Acar and Acar, 2012; Altuntaş et al., 2013), and as the major place in the adoption, reproduction, creation, and the development of medical knowledge (Thakur et al., 2012; Yang, 2015; Thune and Mina, 2016). Thus the last hypotheses are as follows.

H_3 a, b, c, d: The implementation of (a) belief, (b) boundary, (c) diagnostic, and (d) interactive eco-control mechanisms will increase GB.

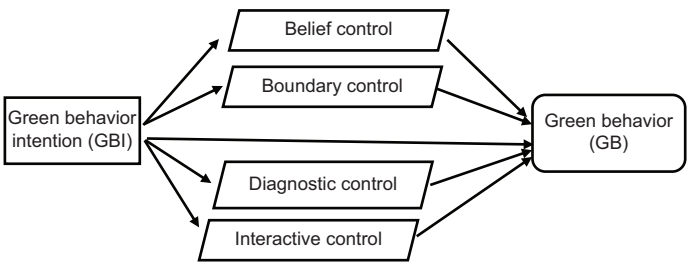
The research framework is presented in Figure 1.

3. RESEARCH METHODOLOGY

3.1. Research Design

The first step in the data collection process was conducted using a cross-sectional mail survey. The target sample frame consisted of the top management of general hospitals in Indonesia, who were randomly selected. All mailings, including a cover letter, the questionnaire set, ethical clearance, a consent form and information sheets clarifying the purpose of the study, were sent via expedition courier. Three weeks after the first mailing, a second mailing, again containing the questionnaire set, was sent to those who did not respond. Five weeks after the initial mailing, direct visits were conducted to meet the potential respondents. From 320 people in the targeted sample, 125 responses were received, resulting in a response rate of 39%. A response rate of 35-50%

Figure 1: Research framework



is considered sufficient for survey research in the management context (Mellahi and Harris, 2016). To confirm the validity of the data, a non-response bias test was performed by comparing the first and last 30% of responses received, assuming that the last responses would have the same characteristics of non-respondents. The t-test resulted in no statistically significant differences between the two groups for the main constructs. Thus, non-response does not seem to be a major concern.

3.2. Measurement of Construct

The constructs were measured by adapting the existing literature and Indonesia's regulations on medical waste management. All measures were scored using seven-point Likert-type scale as follows: one (strongly disagree), four (neutral), and seven (strongly agree). Before the data were collected, the instrument was validated through a pilot test involving 30 directors/deputy directors of eight public hospitals. Convergent and discriminant validity analysis showed that three indicators were not valid and these were dropped from the instrument. Composite reliability analysis showed that all the dimensions and constructs were reliable. The final instrument (as provided in Appendix 1) consists of: GBI measures (six indicators); GB measures (five indicators), adapted from Abdulla et al. (2008), Paulraj (2009), Akulume and Kiwanuka (2016), which considered the Indonesian regulations on medical waste management; and LOEC measures (19 indicators) adopted from Journeault et al. (2016) and Naranjo-Gil (2016).

3.3. Data Analysis

Due to data nonlinearity found in this study, warp partial least squares (WarpPLS) was used for estimating both the measurement and structural model of this research. This technique recognizes nonlinear relationships among latent variables and consequently produces multivariate coefficients (Kock, 2017). Data analysis started with the descriptive statistics, followed by the measurement model, goodness of fit, and hypotheses testing.

4. RESULTS

4.1. Descriptive Statistics

Table 1 shows the descriptive statistics of all the variables of this study. The main variables are perceived as important by the respondents, and indicated by their relatively high mean values.

Table 1: Descriptive statistics (n=125)

Variable	Minimum	Maximum	Mean	St. deviation
Green behavior intention	1.00	7.00	6.51	0.73
Belief control	1.00	7.00	6.06	0.77
Boundary control	1.00	7.00	5.99	0.98
Diagnostic control	1.00	7.00	5.97	0.83
Interactive control	1.00	7.00	5.84	0.93
Green behavior	1.00	7.00	6.39	0.89
Age	26	65	46.38	8.2
Tenure (year)	1	12	3.73	4.02
Male (female)			59% (41%)	
Hospital size (number beds)	147	1600	442	364

The final sample consisted of 102 directors/chief/deputy directors (82%) and 23 heads of environmental health/waste management (18%). These respondents normally control the overall waste management activities and are likely to be well informed about the organizational control systems. Demographic characteristics reveal that 59% of the respondents are male, having an average age of 46 and a tenure of 3.73 years. All the respondents worked for Class A and B hospitals, from 13 provinces in Indonesia, which consists of 35% small hospitals (<250 beds), 34% medium hospitals (between 250 and 600 beds), and 31% large hospitals (more than 600 beds). Indonesian hospitals' classification depends on the scope of the health-care services provided. Class A is the highest rank, providing the most complete health treatments.

4.2. Measurement Model

The measurement model shows how the dimensions and indicators that form each of the underlying construct are related. Convergent and discriminant validity were used to analyze the construct's validity, to determine whether the indicators reflect the construct. The second order convergent validity was used for belief control (BC) and boundary control (BOC) constructs, since these two constructs were measured by dimensions and indicators; while other constructs used the first order. Table 2 shows the validity and reliability test results, consisting of the loadings, composite reliability and average variance extracted (AVE).

Table 2 demonstrates that all the indicators have loading factors larger than the minimum requirement of 0.70; composite reliability of more than 0.70; and AVE >0.5. It means that all the measures are valid and reliable. The measures' validity can also be assessed using discriminant validity to ensure that the different constructs' measures should not be highly correlated. The discriminant validity of the measures also indicates that all the indicators are valid for measuring the corresponding dimensions and construct (Appendix 2).

4.3. Goodness of Fit

Goodness of fit (GOF) is used to determine the contribution of the exogenous variables to the endogenous variables. The GOF model in the WarpPLS analysis is performed using R-square and Q-square predictive relevance (Q2). Table 3 shows the GOF of the research model.

The R-square value of the green behavior variable is 0.411, which indicates that variations in green behavior can be explained by the green behavior intention and the four levers of control by 41%, while the remaining 59% is contributed by other variables. Meanwhile, the Q-square predictive relevance (Q^2) of green behavior is 0.395, meaning that the model presents a strong relationship between the exogenous and endogenous variables.

4.4. Hypothesis Testing

Figure 2 displays the model tested, showing a path diagram with reflective indicators of the dimensions and latent variables. The figure also shows the value of R-square, the path coefficients, and

Table 2: Results of validity and reliability test

Construct	Dimension	Indi-cators	Loading factor		Composite reliability	AVE
			1st order	2nd order		
Green behavior intention (GBI)		GBI1	0.833		0.918	0.652
		GBI2	0.774			
		GBI3	0.832			
		GBI4	0.893			
		GBI5	0.633			
		GBI6	0.856			
Belief control (BC)	BC1	BC1.1	0.937	0.925	0.935	0.879
		BC1.2	0.937			
	BC2	BC2.1	0.859	0.925	0.849	0.738
		BC2.2	0.859			
Boundary control (BOC)	BOC1	BOC1.1	0.91	0.904	0.906	0.829
		BOC1.2	0.91			
	BOC2	BOC2.1	0.85	0.904	0.839	0.723
		BOC2.2	0.85			
Diagnostic control (DC)		DC1	0.785		0.936	0.709
		DC2	0.875			
		DC3	0.884			
		DC4	0.816			
		DC5	0.853			
		DC6	0.836			
Interactive control (IC)		IC1	0.637		0.876	0.588
		IC2	0.752			
		IC3	0.822			
		IC4	0.796			
		IC5	0.811			
Green behavior (GB)		GB1	0.704		0.880	0.597
		GB2	0.669			
		GB3	0.878			
		GB4	0.723			
		GB5	0.865			

Table 3: Goodness of fit

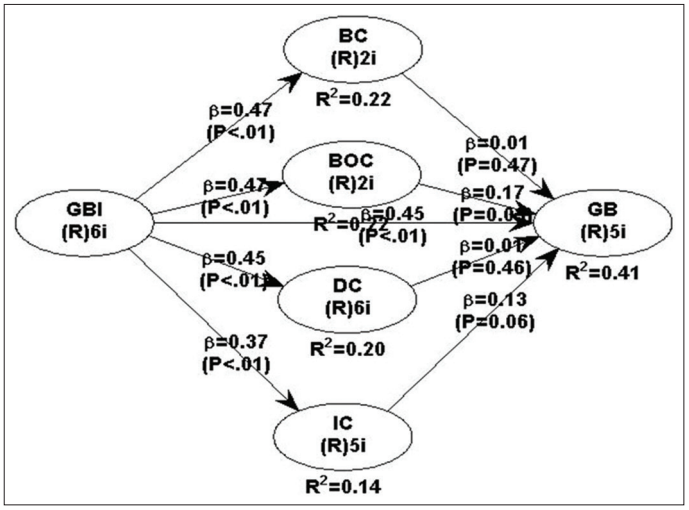
Endogenous variable	R-square	Q-square
Belief control	0.222	0.221
Boundary control	0.221	0.214
Diagnostic control	0.201	0.206
Interactive control	0.14	0.145
Green behavior	0.411	0.395

two tailed P-values. Meanwhile, the hypotheses testing results are presented in Table 4.

Figure 2 and Table 4 show that all the path coefficients are positive, meaning that all the direct relationship between the variables are positive, although not all of them are significant. As indicated by Table 4, the direct relationship between belief control and green behavior, as well as diagnostic control and green behavior are not significant. Thus, except for H3a and H3b, all the hypotheses are supported. The indirect relationship between the green behavior intention and green behavior through the four levers of eco-control is calculated using a Sobel test. Table 5 presents the results.

Table 5 shows that the four eco-control mechanisms have positive coefficients, thus together they all contribute to the total coefficient of the indirect relationship between the green behavior intention and green behavior through the levers of eco-control. However, when it is seen individually, only boundary control provides a significant path.

Figure 2: Path diagram of research model. GBI (Green Behavior Intention); BC (Belief Control); BOC (Boundary Control); DC (Diagnostic Control); IC (Interactive Control); GB (Green Behavior)



5. DISCUSSION

5.1. Green Behavior Intention and Green Behavior

The relationship between intention and behavior has been investigated in various contexts. When an individual has confirmed an intention, it is probable that the intention will be realized into behavior. The first hypothesis of this study states that the green

Table 4: Results from WarpPLS analysis (path coefficients, n=125)

Variable	Green behavior	Belief control	Boundary control	Diagnostic control	Interactive control
Green behavior intention	0.455**	0.472**	0.471**	0.449**	0.374**
Belief control	0.007				
Boundary control	0.168*				
Diagnostic control	0.010				
Interactive control	0.134*				

** significant at 0.01 level (one tailed); * significant at 0.05 (one tailed)

Table 5: Results from sobel test – indirect relationship

Indirect relationship	Indirect coeff.	SE	t-stat.
Green behavior intention→Belief control→Green behavior	0.003	0.042	0.079
Green behavior intention→Boundary control→Green behavior	0.079	0.043	1.854*
Green behavior intention→Diagnostic control→Green behavior	0.004	0.040	0.112
Green behavior intention→Interactive control→Green behavior	0.050	0.034	1.459

* significant at 0.05 (one tailed)

behavior intention (GBI) will positively affect the actual green behavior (GB).The result supports the hypothesis (Table 4), meaning that the stronger the intention is, the more likely is the occurrence of green behavior in medical waste management activities.

This result is parallel with the finding of Morren and Grinstein (2016) that people tend to translate intentions into actual behavior; also with Yadav and Pathak (2017), who studied the relationship between intention and behavior in a developing country and found that consumers' intention has a positive effect on the buying behavior of green products. Research exploring the relationship between intention and behavior was conducted by Shirokova et al. (2016) on student entrepreneurial intentions with the behavior of starting a real business. The result also showed a very strong positive effect of intention on behavior. This is in line with the result of this study, which supports behavioral theories, including the theory of reasoned action (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980; Fishbein and Ajzen, 2011) and the theory of planned behavior (Ajzen, 1991).

5.2. Green Behavior Intention and Levers of Eco-control

The hypotheses related to the relationship between the green behavior intention (GBI) and the levers of eco-control state that GBI will positively affect the importance and use of belief control systems (H_2a), boundary control systems (H_2b), diagnostic control systems (H_2c), and interactive control systems (H_2d).The results indicate that the influence of GBI on the four control mechanisms is positive and significant (Table 4). This means that the stronger the GBI, the more important is the application of the four levers of the eco-control mechanisms, namely belief, boundary, diagnostic, and interactive control. The managers of Indonesian hospitals perceive the importance of implementing all the levers of the eco-control mechanisms to ensure green behavior's realization in medical waste management. Supports for the hypotheses are consistent with the findings of Arjaliès and Mundy (2013); Journeault et al. (2016); and Naranjo-Gil (2016). Managers choose to implement all the control mechanisms, both for control over compliant behavior (beliefs, boundaries and diagnostic control systems) and creative search efforts (beliefs and interactive control systems). Although the intention is formulated and strictly based on the regulations, managers still consider that it is important to implement the creative controls such as interactive controls, because it is almost impossible that a behavior is manifested without being intended at all (Mintzberg and Waters, 1985). The managers keep trying to engage and interact routinely with subordinates, to come up with new creative ways for medical waste management. These are probably the reasons why they adopt all the levers of the eco-control mechanisms, including interactive control, even though the intention is rigidly formulated. This could also be a reflection of strong motivation from the managers to realize GBI into actual GB.

5.3. Levers of Eco-control and Green Behavior

The third hypothesis in this study states that the application of belief, boundary, diagnostic and interactive control will have positive impact on the realization of the green behavior (H_3a, H_3b, H_3c, and H_3d). The four control mechanisms are applied to ensure the realization of intended behavior. Though the results show that the hypotheses are partially supported, H_3b and H_3d are supported, but H_3a and H_3c are not.

Belief control was found to have no significant effect on the realization of planned green behavior. This finding contradicts the previous research, which states that belief control can increase the certainty of achieving goals by communicating and ensuring understanding of the vision, mission, goals and values of the organization to individuals as members of the organization (Arjaliès and Mundy, 2013; Journeault et al., 2016; and Naranjo-Gil, 2016). However, in the context of this research, communication and understanding of the vision, mission, goals and organizational values have probably not been considered sufficient for the embodiment of belief systems, because belief systems require more than just restating an organization's vision and mission statement (Frow et al., 2010).

This is consistent with Otley (2003), who states that control will be more effective if the vision and values of the organization are built into the organizational culture. Likewise, norms and expectations that are mutually agreed upon and serve as guidelines for thinking and behaving within the organization, are important dimensions of organizational culture in the mechanism of belief control (Scott et al., 2003). Nevertheless, to be integrated into the organizational culture, the vision, mission, norms, expectations and values must be realized in the patterned behavior agreed by the members of the organization (Gao, 2017; Nightingale, 2018). So the control

that puts forward the belief system must pay attention to how the values believed are shown in daily practice (Naranjo-Gil, 2016), and not merely as a statement of the vision or mission.

Furthermore, Kraus et al. (2017) state that belief systems should be parallel with ideological control to regulate the behavior of organizational members by controlling their experiences, thoughts, and feelings. Ideological control is the way managers use symbols and verbal communication about organizational ideology that targets the beliefs, emotions and values of organizational members. For "normative organizations" such as hospitals, ideological control is needed, because most of the members are bound to the moral commitment of humanity (Etzioni, 1975). Therefore, to be effective, belief control systems should accommodate organizational ideology, which can be reflected in organizational culture.

Support is also not obtained for diagnostic control influencing green behavior. Diagnostic control is more effectively applied to control output, not behavior, while output is the result of behavior (Jermias and Setiawan, 2008). In this study, control mechanisms are applied to ensure intentions are realized into behavior. Therefore, the focus of control is on behavior, not the result of behavior. Thus, H_3c is not supported. This result differs from previous studies (Arjaliès and Mundy, 2013; Journeault et al., 2016; and Naranjo-Gil (2016). Arjaliès and Mundy (2013) found that the LOC mechanism allows management to identify and manage opportunities and threats related to CSR strategies, so as to be able to support the organization in achieving its goals. Journeault et al. (2016) examined the relationship between management control and environmental strategies. The results show that different strategies cause different combinations of the four levers of eco-control mechanisms. Naranjo-Gil (2016) found that a diagnostic control system influences the realization of deliberate strategies positively.

Hypothesis 3b, which states that a boundary control system will positively influence the green behavior, is supported. Support for this hypothesis shows that boundary control is an appropriate control mechanism to ensure the realization of intentions into behavior (Naranjo-Gil, 2016; Camisón, 2010; Deakins et al., 2016; Ferry and Ahrens, 2017).The intention is formulated based on medical waste management regulations, with reference to the minister of the environment of the republic of Indonesia's Regulation No. 56 of 2015 concerning procedures and technical requirements for the management of hazardous and toxic waste from health service facilities, and the Minister of Health of the Republic of Indonesia's Regulation No. 7 of 2019 concerning hospital environmental health. Therefore, it can be said that the intention in this context is rigidly formulated, based on the government's regulations. Thus, the appropriate controls would be coercive controls (Camisón, 2010; Deakins et al., 2016; Ferry and Ahrens, 2017), which emphasize the process of control through coercion, punishment, and suggestions for improvement.

Hospitals perform various functions in the health innovation system, such as using various new technologies, adopting innovative operational and organizational processes, and conducting medical education and training systems. Overall, a hospital is a major place of innovation and for the development of medical knowledge (Thakur et al., 2012; Yang, 2015; Thune and Mina, 2016). This characteristic requires interactive control mechanisms rather than diagnostics (Simon, 1995). Interactive control systems allow an organization's members to find new methods or ways that give rise to new creativity and innovation, through the creation of a positive information environment for sharing information (Chong and Mahama, 2014). In addition, in the context of behavioral control, interactive control is more necessary, and is therefore referred to as behavior control. In a behavior control system, responsibility is delegated to subordinates with the main goal of controlling procedures and methods, so that the assessment of subordinates will be based on them observing behavior, not on the output of the behavior (Jermias and Setiawan, 2008). Thus, Hypothesis 3d is supported. This finding is consistent with Arjaliès and Mundy (2013), Journeault et al. (2016); and Naranjo-Gil, (2016).

5.4. Green Behavior Intention, Levers of Eco-control, and Green Behavior

The results of the indirect effect testing, as presented in Table 5, show that only boundary control is significant in mediating the relationship of the green behavior intention (GBI) and green behavior (GB).This means that the stronger the GBI is, the more likely it is that the GB will be realized through the implementation of boundary eco-control. This finding is in line with the compliance theory, which states that compliance is correlated with strict supervision and sanctioning practices (Etienne, 2011). Sanctions send normative signals and strengthen the achievement of objectives, and punishment serves as a reminder to abide by previously determined commitments. Boundary systems, as one of the coercive mechanisms, communicate risks to be avoided, impose limits on activities for members of the organization, including ethical boundaries, and promote compliant behavior. Thus, boundary control is the most appropriate control mechanism to ensure the realization of regulation-based intentions into intended green behavior. Other control mechanisms are also important, considering the positive paths of the mediating effects.

6. CONCLUDING REMARKS

6.1. Conclusion and Implication

In general, it can be concluded that managers' green behavior, in the context of medical waste management in Indonesia, can be improved by increasing the green behavior intention and implementing the mechanisms of boundary eco-control. Regulation-based intentions require coercive controls, which carry out control by emphasizing coercion, imposing penalties, suggesting remedies, and compliant behavior, as facilitated by boundary control mechanisms. Intention is also proven to directly influence the application of the LOEC mechanism. Thus, the stronger the GBI is, the more intensive is the application of beliefs, boundaries, diagnostics, and interactive eco-control. While, in the relationship between LOEC and GB, only boundary and interactive eco-control have a direct effect on GB.

The main implication of the study is to the determination of government regulations regarding medical waste management.

The research findings show that green behavior can be improved by implementing boundary eco-control, a coercive way to force compliant behavior by imposing sanctions and strict supervision. Therefore, regulations regarding the management of hazardous and toxic waste from health service facilities should be made mandatory. Accordingly, the effectiveness of medical waste management will increase and the spread of infections that endanger the public and environment can be avoided.

6.2. Limitation and Suggestion for Future Research

This study has several limitations. The following outline the limitations of this research and suggestions for future research: First, this research used survey methods to collect individual perceptions' data at a certain point of time, so behavior is assumed to be static, in fact behavior might change from time to time. To anticipate changes in behavior, it is recommended to conduct a longitudinal study. For example, measuring behavior at two different points to determine behavior changes, and changes in the mix of control mechanisms that are applied (Henri et al., 2017). Second, the use of the same raters for all the variables raises the potential of common method biases (self-report bias and item characteristics bias). This research tried to reduce the bias by using a procedural remedy ensuring the anonymity of the respondents, and by conducting pilot tests to confirm the instrument's validity and reliability. Future research should use statistical common method bias testing, in addition to a procedural remedy. Third, the conclusions of this study should be applied cautiously, especially for generalization purposes, due to the presence of under-sampled (Kalimantan, Papua and Maluku) and over-sampled areas (East Java). This research has tried to anticipate the problem by applying several data collection methods, namely sending questionnaires via mail service; courier; and presenting directly to the respondents, which is the most effective data collection method. Thus, it is recommended to employ the direct visit, to have an official ethical clearance and research permission from the respective hospitals, and thus optimizing the data's collection.

7. ACKNOWLEDGEMENT

We are grateful to LPDP of The Ministry of Finance, Republic of Indonesia for supporting the research behind this paper. We also thank our colleagues from University of Brawijaya who shared insight and expertise that prominently supported the research.

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Appendix 1: Questionnaire items

- GBI measures

Hospital owns specific and detailed budget and procedures for:

1. Separating
2. Reducing
3. Storing
4. Internal transporting
5. External transporting
6. Disposing the medical waste.

- LOEC measures

Belief control:

1. Our mission statements clearly communicate environmental values to employees.
2. Top managers communicate environmental values to employees.
3. Our employees have knowledge and understanding about environmental values.
4. Our mission statements inspire employees about environmental values.

Boundary control:

1. Our organization relies on a code of conduct to define appropriate environmental behaviors for our employees.
2. Our code of conduct informs our employees about environmental behaviors that are off-limits.
3. Our firm has a system that communicates to our employees the environmental risks that should be avoided.
4. Our employees are aware of the organization's environmental code of conduct.

Diagnostic control:

Managers rely on environmental performance indicators for:

1. Aligning performance measures with organization's goals
2. Comparing environmental outcomes to expectation
3. Enabling the organization to focus on common issues
4. Enabling the organization to focus on critical success factors
5. Monitoring environmental results.
6. Reviewing key environmental measures.

Interactive control:

1. Managers pay day-to-day attention to the environmental performance indicators
2. Managers interprets information from environmental performance indicators
3. Managers are frequently involved with environmental performance indicators
4. Managers use management accounting system for challenging new ideas and ways for doing tasks
5. Managers use management accounting system for debating data assumptions and actions plans.

- Green behavior measures

Hospital always:

1. Separates
2. Reduces
3. Stores
4. Transports
5. Disposes of the medical waste based on predetermined budget and procedures.

Appendix 2: Discriminant validity

Indicator	GBI	BC1	BC2	BOC1	BOC2	DC	IC	GB
GBI1	**0.833**	0.097	0.017	−0.233	0.069	−0.022	0.014	−0.132
GBI2	**0.774**	−0.315	0.169	0.555	−0.158	0.083	−0.130	0.075
GBI3	**0.832**	−0.047	−0.303	−0.085	0.192	−0.079	0.316	−0.070
GBI4	**0.893**	−0.085	−0.022	−0.116	0.128	−0.039	−0.034	0.036
GBI5	**0.633**	0.282	0.229	0.100	−0.218	0.124	−0.513	0.224
GBI6	**0.856**	0.116	−0.022	−0.146	−0.083	−0.028	0.212	−0.074
BC1.1	−0.003	**0.937**	−0.113	−0.068	0.089	−0.180	0.090	0.021
BC1.2	0.003	**0.937**	0.113	0.068	−0.089	0.180	−0.090	−0.021
BC2.1	0.067	−0.557	**0.859**	−0.220	0.158	0.039	0.113	−0.048
BC2.2	−0.067	0.557	**0.859**	0.220	−0.158	−0.039	−0.113	0.048
BOC1.1	−0.048	0.249	−0.086	**0.910**	0.159	0.058	−0.056	0.022
BOC1.2	0.048	−0.249	0.086	**0.910**	−0.159	−0.058	0.056	−0.022
BOC2.1	0.000	0.414	−0.545	0.093	**0.850**	0.011	−0.094	−0.038
BOC2.2	0.000	−0.414	0.545	−0.093	**0.850**	−0.011	0.094	0.038
DC1	0.039	−0.126	−0.226	−0.065	0.288	**0.785**	0.235	0.030
DC2	0.115	−0.026	−0.047	0.265	0.067	**0.875**	−0.085	−0.074
DC3	0.049	0.191	0.080	−0.253	−0.060	**0.884**	−0.056	0.049
DC4	−0.015	0.201	−0.214	−0.282	0.074	**0.816**	0.056	−0.117
DC5	−0.011	−0.131	0.286	0.103	−0.234	**0.853**	−0.189	−0.012
DC6	−0.183	−0.119	0.093	0.222	−0.110	**0.836**	0.066	0.123
IC1	−0.046	0.553	−0.586	−0.258	0.049	0.118	**0.637**	−0.011
IC2	0.013	0.536	−0.100	−0.101	−0.348	0.329	**0.752**	−0.031
IC3	0.055	0.077	0.170	−0.084	−0.053	−0.017	**0.822**	0.058
IC4	−0.049	−0.530	0.176	0.248	0.146	−0.203	**0.796**	0.033
IC5	0.017	−0.490	0.209	0.139	0.195	−0.182	**0.811**	−0.054
GB1	0.045	−0.291	−0.098	−0.006	0.178	0.032	−0.036	**0.704**
GB2	−0.201	0.476	−0.487	−0.405	0.440	0.157	0.234	**0.669**
GB3	0.080	−0.254	0.059	0.170	−0.107	−0.044	0.085	**0.878**
GB4	−0.084	0.282	0.410	−0.034	−0.201	−0.028	−0.385	**0.723**
GB5	0.108	−0.110	0.054	0.175	−0.209	−0.079	0.084	**0.865**

GBI: Green behavior intention; BC: Belief control; BOC: Boundary control; DC: Diagnostic control; IC: Interactive control; GB: Green behavior