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The Effect of Levers of Control System on Sustainability Performance: Evidence from Indonesian Batik Industry

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ABSTRACT

Small and Medium Enterprises (SMEs) are significant contributors to the world's economy, particularly in times of crisis. SMEs also constitute an integral part of Indonesia's self-sustaining economic system and hold considerable promise for enhancing societal well-being. One of the SMEs that plays a big role in the Indonesian economy is the batik industry. However, with the development of fashion and modernization, batik clothing faces challenges to survive. The purpose of this study is to examine the effect of four levers of management control systems on sustainability performance. The Indonesian batik industry was chosen as the object of this study. Information was collected through a survey of batik makers throughout Indonesia. The result from the survey shows that four levers of the management control system positively affect sustainability performance.

Keywords: batik industry; four levers control system; small and medium enterprises (SMEs); sustainability performance

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INTRODUCTION

Poor sustainability performance recorded by Indonesia. According to a report by Yale University and Columbia University, in collaboration with the World Economic Forum, Indonesia ranks 116 out of 180 countries, with a score of 37.8 on the Environmental Performance Index (EPI, 2020). Meanwhile, based on data from WHO, Indonesia is one of the countries with the 6th highest water pollution in the world. It reflects a serious environmental threat to nature. Based on a report from the Indonesian Ministry of Environment and Forestry, the environmental and water quality index in Indonesia still need improvement (Ministry of Environment, 2017).

Ministry of National Development Planning reported that 96% of rivers in Indonesia have been polluted. It is hard to make fresh, clean water even scarcer. Water pollution in Indonesia is contributed to by both household and industrial waste. One of the major industry players in Indonesia is the batik industry. A report showed that a large amount of water pollution was caused by the disposal of liquid waste from the batik industry (Kencana, 2019). Chemical dyes, as raw materials, harm the environment (Basyar, 2018). In making batik, after the coloring process, batik is washed. Batik washing water is commonly discharged into the river, so the river becomes a site for wastewater (Purwanto, 2019). This waste can disrupt soil ecosystems and cause water pollution (Agung, 2013). This pollution can disrupt the need for clean water for the community and the agricultural activities of the local area. Moreover, the health of the surrounding community can be affected (Kencana, 2019; Nazaruddin, 2018). The Ministry of Environment and Forestry claimed that 53,4% of rivers in Indonesia were polluted by household and industrial waste (Greeners.co, 2013). The environmental service body in one of the cities in Indonesia claimed that 55% of water pollution was disposed into the rivers (Susanto, 2019). The batik-making process, particularly the finishing stage, is not environmentally friendly. This condition can harm the environment, leading to polluted well water that is cloudy, smelly, and itchy (Wiryatmoko, 2020).

The data from the Indonesian Ministry of Industry showed that the production and export value of Indonesian batik began to increase in 2009. However, starting in 2016 it has decreased. The highest peak of batik export value was US\$185 million. Then, it declined by an average of 40 percent per year (Industry Statistics, 2019). The decline in export value has an impact on the decline in batik production. Thus, many batik workers were laid off (Budiyono & Vincent, 2018).

Those conditions resulted in decreased sustainability performance. Purwaningsih, Yudha, and Susanto (2016) found that the sustainability score of the batik industry in Indonesia is low. They used three dimensions of sustainability, namely environmental, socio-cultural, and economic.

Stakeholder theory states that companies should give attention to everything related to the company. They should not only focus on accumulating shareholder needs. A good company does not only focus on the company's financial performance but also its social and environmental performance. They must try to understand, respect, and meet the needs of all the people who have a stake in the actions and outcomes of the organization (Chariri & Ghozali, 2007). Some research in the field of business and organizations discusses the importance of corporate responsibility in involving stakeholders in the company and the interaction between companies and stakeholders (Gray, 2007a).

To respond to the sustainability issue, organizations need to manage their resources. The previous study claimed that Management Control Systems (MCS) have a significant role in response to pressures from within organizations. The implementation of MCS has important implications for organizational change and improvements (Fauzi & Rahman, 2008; Ilias, Abdulatiff, & Mohamed, 2016; Wijethilake, Munir, & Appuhami, 2015).

The impact of management control systems (MCS) on organizations' performance in developing and emerging economies has been studied by some researchers (Alkhafaji, Talab, Flayyih, & Hussein, 2018). Management Control Systems provide important information for the decision-making process, planning, and evaluation of the firm (Merchant & Otley, 2006). MCS also has a role in ensuring the organization's goals, strategies, and plans are carried out in the right way (Anthony & Govindarajan, 2007).

Management Control Systems are tools for formulating and implementing the company's strategies to achieve goal congruence (Nilsson & Rapp, 2005). Simons (1990) viewed Management Control Systems not only for formulating and implementing strategies, but also for observing, learning, signaling, constraining, surveilling, and motivating. The Management Control System is implemented by the company to ensure that the company always runs on track according to the company's goals and it also plays a crucial role in controlling company's resources to work effectively and efficiently (Anthony & Govindarajan, 2007).

Management Control Systems is implemented to achieve organizational objectives and strategies. Therefore, it should respond the environmental issue faced by the company (Chenhall, 2003). The role of control systems is changing, in response to environmental change (Otley & Soin, 2014). Environmental change is unpredictable (Govindarajan, 1984). Beusch, Frisk, Rosén, and Dilla (2016) claimed that control system of the firm can manage the strategic uncertainties, regarding to sustainability. Emmanuel et al. (1990) claimed that there are characteristics of environment which affect Management Control Systems: the predictability rate, the business competition, and the number of different product-markets (prices, products, technological, and distribution competitions). In a stable environment or certain environment, traditional Management Control Systems may be more appropriate for decision making (Simons, 1995). On the contrary, when the condition of environmental is unstable or unpredictable, it is needed a more complicated and sophisticated Management Control Systems to respond the changing environment and help make more effective decisions. Ussahawanitchakit (2017a) also claimed that Management Control Systems encourage companies to survive and achieve sustainability in highly uncertain environments.

In this Indonesian batik context, Soetjianto (2013) discovered that batik industry has not implemented management control system, since it is categorized as a creative industry, Batik industry needs a special management control system to achieve goals that have been set.

There are many frameworks of management control system, for example Levers of Control (Simons, 1995) and Management Control Systems as a package (Malmi & Brown, 2008). This study used four Levers of Controls, which are belief, boundary, diagnostic, and interactive control system since this framework is comprehensive and suit for sustainability condition. Four levers of control show the full potential of organizations when they work together. Thus, they can facilitate the implementation and achievement of the company's strategic objectives (Lisi, 2015).

Problem Statement

Some researchers found that firm performance is also affected by management control systems. The use of MCS has a positive influence on business performance (Bisbe & Otley, 2004; Durendez, Ruiz-Palomo, Garcia-Perez-de-Lema, & Dieguez-Soto, 2016). Meanwhile, Ussahawanitchakit (2017b) found that management control systems affected the sustainability performance of businesses in Thailand. Jamil and Mohamed (2013) claimed that Simon's four levers of control influence the system of performance measurement. Four levers of control were developed by Simons (1995) which consist of belief systems, boundary systems, interactive control systems, and diagnostic control systems.

There are many studies on the batik Industry in Indonesia. However, the studies related to the implementation of Management Control Systems and sustainability are still limited. Therefore, this study aims to examine the effects of the MCS on sustainability performance. This study used Levers of Controls by Simons (1995) since they have the most complete and comprehensive typology (Fauzi & Rahman, 2008).

Research Questions

The research questions for this study are as follows:

1. What is the effect of a Management Control System on firm sustainability performance?
2. What is the effect of the Belief system on sustainability performance?
3. What is the effect of the boundary system on sustainability performance?
4. What is the effect of a diagnostic control system on sustainability performance?
5. What is the effect of an interactive control system on sustainability performance?

Scope of The Study

The data were taken from several islands in Indonesia, covering Sumatra, Bali, East Java, West Java, and Central Java. These islands are the largest batik producers. Batik is dominantly produced in Java. Eighty-seven percent of the batik industry in Indonesia spread in West Java (38.42%), Central Java (26.22%), Special Region Yogyakarta (DIY) (19.52%), East Java (2.66%), Banten (0.23%), and the Special Capital Region of Jakarta (0.05%) while in outside Java, the largest batik industry is in Jambi Province.

This study used a questionnaire survey approach to the batik industry, which produces hand-written batik. The questionnaire was aimed at the owner or management of the batik industry because these parties are considered to have an understanding of the business processes and controls in the company. Questionnaires were distributed by post and Google forms were sent via WhatsApp, email, or phone call to get a decent response rate.

Operational Definition

This section discusses the definitions and terminology used in this research to avoid confusion in interpreting the concepts used in this research, including management control systems, sustainability performance, and the relationship between the four levers of control and sustainability performance.

Management control system

MCS represents the organization's desire to achieve its goals by providing information that is useful in decision-making, planning, and performing. Four types of management control systems work together as Levers of Control (LoC), namely belief systems, boundary systems, interactive control systems, and diagnostic control systems (Simons, 1995).

The terms control, management control system, and management accounting systems have lots of meanings and connotations. Anthony and Govindarajan (2007) defined management control systems (MCS) as the process by which management ensures that resources are obtained and used efficiently and effectively to achieve the organization's objectives. Simons (1995) introduced a Management Control Systems framework named Levers of Control, which contains four different key constructs by different control levers. Four control levers are belief systems, boundary systems, diagnostic control systems, and interactive control systems. The strength of this framework is not related to the way they are used individually, but in the way, they complement each other when used at the same time. This philosophy is adapted from the Chinese philosophy of Yin and Yang. The belief system and the

interactive control system create positive and inspirational (Yang) forces, while the boundary system and diagnostic control system represent negative (Yin) forces. By keeping it balanced, the organization can create dynamic tensions that lead to effective strategic control (Simons, 1995). McCarthy and Gordon (2011b) linked the levers with specific strategic objectives. They argue that a belief system can help organizations encourage employees to overcome inertia and support growth as a strategic goal. Moreover, the boundary system can create boundaries to limit employee freedom, build trust, and support control as a strategic objective. Finally, they found that interactive control systems can contribute to innovation as a strategic goal, as they enhance exploration and learning.

Otley (1999) and Ferreira and Otley (2009) also developed “performance management” as a comprehensive tool for understanding MCS. Simons (1995) resembled the levers with the Chinese philosophy of Yin and Yang, where belief systems and interactive control systems create positive and inspirational forces (Yang). Boundary systems and diagnostic control systems on the other hand represent the negative force (Yin) that creates constraints and ensures compliance with orders. By balancing the levers of control, organizations create a dynamic tension that allows for effective control of strategy (Simons, 1995). However, Simons (1995) provides little clarity on how these levers should be balanced. Balance can be achieved in several different ways, and the emphasis that should be put on each lever depends on the strategic challenges that the firm faces and the circumstances in which it operates (Kruis, Speklé, & Widener, 2016). They further state that organizations need to balance exploitation, by predictable goal achievement, and exploration, by strategic renewal and innovation. Belief systems and interactive control systems expand the opportunity space (Simons, 1995) and motivate employees to be creative with new ideas (Simons, 2000). This relates to exploration. Boundary systems and diagnostic control systems on the other hand constrain the opportunity space (Simons, 1995) and creativity to keep the organization focused (Simons, 2000). This relates to exploitation.

Furthermore, McCarthy and Gordon (2011a) related the levers of control to certain strategic goals. They say that belief systems can help organization to inspire the employees to overcome inertia, and to contribute to the strategic goal of growth. The boundary systems create boundaries to limit the freedom of the employees and increase trustworthiness in processes, and can therefore contribute to the strategic goal of control. McCarthy and Gordon (2011a) also state that the diagnostic control system can measure performance, and help to put focus on maximizing productivity. Thus, it contributes to the strategic goal of efficiency. Lastly, they mention that an interactive control system can contribute to the strategic goal of innovation since it promotes exploration and learning. The levers of control, as well as the relations between them, are illustrated in Figure 1 and the different levers are described in detail below.

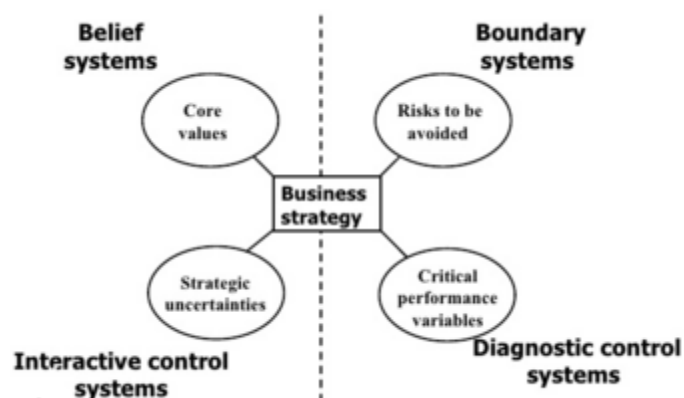


Figure 1. MCS framework by Simons (1995)

Four constructs have to be analyzed to enhance firm performance and to implement the strategy, namely core values, risks to be avoided, critical performance variables, and strategic uncertainties. Every construct is controlled by a different system or lever and its usage has different implications.

Sustainability performance

In recent years, the topic of sustainability has become an interesting topic in business research (Gray, 2007b). The concept of sustainability is related to the role and responsibilities of the company and also the company's performance (Radu, 2012). The sustainability concept is related to developments in the economy to meet the needs of the present generation, without neglecting the opportunities and needs of future generations (Cassen, 1987). The concept of sustainability has many dimensions, including nature conservation, energy use, stakeholder satisfaction, and economic outcomes (Gray, 2007a). Sustainability is originally related to immortality and endurance, stability, and sustainability (Cheney, Nheu, & Vecellio, 2004). However, this understanding of sustainability is not only related to economic development but also environmental and social issues (Ehrenfeld, 2005). For some people, sustainability relates to "environmentally friendly", but it is broader than that (Enquist, Edvardsson, & Sebhatu, 2007). It represents more than just ecological protection, the recycling process, and the reduction of waste and energy (Epstein, 2008). Sustainability performance can be understood as the company's performance and achievements in all areas and dimensions and triggers for corporate sustainability (Schaltegger & Wagner, 2006).

Relationship between four levers of control and sustainability performance

Previous studies of management control systems used either the Levers of Control (LOC) framework (Simons, 1995) or MCS as a package (Malmi & Brown, 2008). This study prefers to focus on using the Levers of Control framework since this framework is more appropriate for the sustainability context.

Jamil and Mohamed (2013) used four levels of control in small and medium hotel sectors in Malaysia. They discovered that the Performance Measurement System is correlated to each of the four selected individual management control systems (MCS) and also suggested that the development of performance measurement systems will influence the overall performance in the small and medium hotel sector through the acting of management control systems. Meanwhile, Henri and Journeault (2010) have found the influence of the integration of environmental matters within management control systems on environmental and economic performance.

Other studies also found that levers of control management control systems have a positive impact on firm performance (Ittner & Larcker, 1997). Handayani and Bastian (2017) studied all manufacturing companies in Indonesia and found that diagnostic control systems and interactive control systems affect financial performance. Meanwhile, Widener (2007) claimed that all four levers of control work together to affect company performance. This result is supported by Simons (2000), who stated that an integrated control environment effectively facilitates competitive sustainability and strategy implementation.

Furthermore, Albertini (2019) discovered that all levers of control work together and influence positively on environmental performance since a growing number of companies implement proactive management strategies. Unfortunately, research linking MCS and social performance is very limited. Fauzi and Rahman (2008) found that the interaction between all control lever systems, as well as the Corporate Financial Performance (CFP) can affect the Corporate Social Performance (CSP) since an increase in CFP results from the appropriate use of control system components. It enables the company to have more chances to do the CSP. The levers of control are deemed to form an integral part

of employee socialization and support the development of an organization’s culture, the system of shared beliefs, values, norms, and more of organizational members which are deemed to be a primary determinant of the direction of employee behavior. Therefore, the hypothesis will be proposed as follows: Four Levers of the Control System (Belief System, Boundary System, Diagnostic System, and Interactive Control System) positively affect sustainability performance.

RESEARCH METHOD

Population and Sample

The target population is a subset of the population as the actual target or focus of the research. The target population in this study is the batik industry in Indonesia. According to the Ministry of Industry's data, 441 batik companies in Indonesia are registered with the Indonesian Ministry of Industry. Based on the data, it is observed that the distribution of these companies: Bali (0.975%), West Java (11.11%), Central Java (75.74%), Sumatera (5.21%), and East Java (7.03%). As the population is not large enough, this study used the population as a sample size.

Unit of Analysis

The unit of analysis is defined as the degree to which the level of aggregation of investigation (Sekaran & Bougie, 2016). The unit of analysis of this study is batik companies that produce handwritten batik scattered throughout Indonesia. Nonetheless, the effective respondents are managers and/or owners of batik companies as they are the rightful party to answer this questionnaire.

Data Collection and Data Analysis

This study used primary data collected from questionnaires. This study used a questionnaire since the number of respondents is quite large and spread over a wide area. The questionnaires were distributed to the owners or management of the batik industry. The questionnaires were sent by mail or in electronic form. The main advantage of using a questionnaire survey is the anonymity of respondents, so they can enjoy confidentiality express themselves freely, and give fair responses. However, there are limitations to using questionnaires, which are low return rates and possibly incomplete or inconsistent responses (Hair, Money, Samouel, & Page, 2007).

In this study, two statistical software programs were employed to analyse the data collected. SPSS 20.0 was used for descriptive statistics, reliability testing, exploratory factor analysis, regression analysis, and SMARTPLS V2.0 M3, which used partial least squares (PLS). It was employed for confirmatory factor analysis and hypothesis testing. This study used a regression model.

$$\begin{aligned}
 SP &= \alpha + \beta_1MCS + \varepsilon \\
 &= \alpha + \beta_1BS + \beta_2BoS + \beta_3DCS + \beta_4ICS + \varepsilon \dots\dots\dots (1)
 \end{aligned}$$

- SP = sustainability performance
- MCS = management control system
- BS = belief system
- BoS = boundary system
- DCS = diagnostic control system
- ICS = interactive control system
- α = intercept
- β = beta coefficient
- ε = error

RESULT AND DISCUSSION

This section shows the result from data analysis using SPSS. Table 1 shows the effect of four levers control system on sustainability performance.

Table 1. The effect of four levers control system on sustainability performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.962 ^a	.926	.925	.15894

a. Predictors: (Constant), MeanICS, MeanBO, MeanDCS, MeanBE

This regression model has a very good fit in explaining the influence of the variables ICS (Interactive Control System), BO (Boundary System), DCS (Diagnostic Control System), and BE (Belief System) on sustainability performance. Table 2 shows the significance of the effect of four levers of control on sustainability performance.

Table 2. The significance of the effect of four levers of control on sustainability performance

Model		Unstandardized		Standardized	t	Sig.
		Coefficients		Coefficients		
		B	Std. Error	Beta		
1	(Constant)	.093	.070		.,327	.186
	MeanBE	.512	.060	.686	8,518	.000
	MeanBO	.580	.051	.676	11,365	.000
	MeanDCS	.918	.044	1,029	20,664	.000
	MeanICS	.055	.037	.068	1,504	.134

a. Dependent Variable: MeanSP

Based on the analysis, the result shows that four lever control systems positively affect sustainability performance. It means that the higher the implementation of the management control system is, the higher the sustainability performance.

Discussion

The Four Levers of Control (Simons, 1995) can positively impact sustainability performance by balancing flexibility and control in sustainability strategy execution. These levers—belief systems, boundary systems, diagnostic control systems, and interactive control systems—guide organizations in embedding sustainability into their operations.

1. Belief Systems – Embedding Sustainability Values
 - a. Establish sustainability as a core organizational value.
 - b. Encourage employees and stakeholders to align their actions with long-term environmental and social goals.
 - c. Example: A company's mission statement emphasizing carbon neutrality and ethical sourcing motivates sustainable decision-making.
2. Boundary Systems – Setting Sustainability Limits
 - a. Define ethical and operational constraints to prevent unsustainable practices.
 - b. Ensure compliance with environmental regulations and corporate sustainability standards.
 - c. Example: Implementing strict policies against deforestation or unethical labor practices in the supply chain.
3. Diagnostic Control Systems – Measuring Sustainability Performance

- a. Track sustainability key performance indicators (KPIs) such as carbon footprint, energy efficiency, and waste reduction.
 - b. Ensure accountability by linking sustainability goals to incentives and rewards.
 - c. Example: A company monitors and reports CO₂ emissions reduction progress to stakeholders annually.
4. Interactive Control Systems – Driving Continuous Sustainability Innovation
- a. Encourage open discussions and collaboration on sustainability challenges and opportunities.
 - b. Enable organizations to adapt and innovate in response to emerging sustainability trends and stakeholder expectations.
 - c. Example: Regular sustainability workshops and cross-functional teams brainstorming eco-friendly business solutions.

CONCLUSION

The Four Levers of Control serve as a valuable framework for promoting sustainability in the Indonesian batik industry. By integrating sustainability into organizational values (Belief Systems), adhering to ethical and environmental regulations (Boundary Systems), tracking key performance indicators (Diagnostic Control Systems), and encouraging collaboration and innovation (Interactive Control Systems), batik enterprises can achieve long-term environmental and social sustainability while ensuring continued economic growth.

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