Strategic Alignment of Eco-Practices: The Mediator of Eco-Controls in Translating Environmental Strategy

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Abstract

This study aims to explore the role of eco-controls in translating competitive environmental strategic intents into eco-practices, as well as the associations between eco-practices and environmental and economic performance. A web-based survey is used to collect data from Thai manufacturing firms in high-polluting industries. Structural Equation Modeling (SEM) is employed for data analysis. Findings from the study show most firms use more bureaucratic forms of eco-control (151 out of 169 firms). Firms with more bureaucratic forms of eco-controls show a high level of alignment between environmental strategic intents and eco-practices, regardless of their environmental strategic intents. While firms with eco-marketing practices exhibit high environmental and economic performance, firms with eco-production practices show high environmental and economic performance only when they also adopt eco-marketing practices. The study extends existing literature by explicitly distinguishing between intended environmental strategy (i.e. environmental strategic intent) and realized environmental strategy (i.e. eco-practice) and extends the analysis to examine environmental and economic performance. For practical implication, it is recommended that firms should use more bureaucratic forms of eco-control, such as action control, formal control, and tight control, to create a strategic alignment of eco-practices, which in turn, will lead to high performance.

Keywords: Competitive Environmental Strategy; Eco-control; Strategic Alignment of Eco-practice; Environmental Performance; Economic Performance

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Introduction

Environmental issues have become increasingly important for business organizations. Many firms have developed competitive environmental strategies by integrating environmental determination into their strategic intention (Journeault et al., 2016). Environmental strategic intention can be broadly classified into two dimensions – eco-efficiency and eco-branding (Journeault et al., 2016; Marchi et al., 2013; Orsato, 2009). On the one hand, eco-efficiency intent refers to the focus on improving efficiency and productivity of the production process. On the other hand, eco-branding intent refers to offering and promoting environmentally-friendly products that are different from those of competitors (Journeault et al., 2016).

The proponents of eco-efficiency intent argue that inefficient production processes create pollution and increase business costs. By improving the efficiency of production processes, firms can benefit from material and energy savings, and can therefore improve their economic performance (Burnett & Hansen, 2008; Chen et al., 2016; Dixon-Fowler et al., 2013; Henri & Journeault, 2010; Journeault et al., 2016; Pérez-Calderón et al., 2011; Plaza-Úbeda et al., 2009; Porter & Van der Linde, 1995; Schaltegger, 2011). Firms that pursue eco-branding intent can enhance economic performance by accessing new markets and by responding quickly to green consumers' expectations (Ginsberg & Bloom, 2004; Jeeravorawong & Hoonsopon, 2015; Journeault et al., 2016; Moravcikova et al., 2017; Schaltegger, 2011).

Despite claims and some empirical evidence showing that having an explicit strategic environmental intent can enhance a firm's economic performance, firms may fail to translate their intended strategy into a realized strategy. Such a failure is possibly due to unrealistic expectations, misinterpretation of the environment, or changes to a plan during implementation (Mintzberg, 1978). In order to ensure that environmental strategic intent is translated into practice, management control systems (MCSs), particularly eco-controls, can play an important role.

Eco-controls are a part of management control systems. They are implemented by management to ensure that the behaviour of their subordinates is consistent with the environmental objectives and strategies of the firm (Henri & Journeault, 2010; Hoonsopon & Puriwat, 2021; Merchant, 1982; Slagmulder, 1997). Prior literature has provided some evidence on the association between eco-controls and firm's environmental and economic performance (Henri & Journeault, 2010; Henri & Journeault, 2018; Journeault, 2016; Lisi, 2015).

While empirical studies have revealed relationships between environmental strategy, eco-control adoption and firms' environmental and economic performance, Journeault et al. (2016) argue that existing literature has not yet distinguished between intended and realized environmental strategy. When investigating environmental strategy, extant literature has tended to focus on the implementation of various eco-practices (i.e., realized strategy), rather than intended strategy. The links between intended and realized strategy and the role of eco-control in translating intended strategy into realized strategy have received little attention.

Journeault et al. (2016) conduct a survey among Canadian manufacturing firms and find that firms displaying predominantly eco-efficiency intent and firms displaying predominantly eco-branding intent implemented levers of eco-control differently. Although their study shed some light on the role of eco-controls in translating competitive environmental strategic intent into eco-practices, linkages to performance are left unexamined. Therefore, in this study, linkages to environmental and economic performance will also be explored.

In the study, the following research questions are addressed:

(1) Whether and how do eco-controls play a role in creating alignment between intended environmental strategy (i.e. eco-strategic intent) and realized environmental strategy (i.e. eco-practice)?
(2) Are eco-practices associated with environmental and economic performance?

Key objectives of the study are (1) to understand how different forms of eco-controls may help translate intended environmental strategy into realized environmental strategy and (2) to understand the relationship between eco-practices and environmental and economic performance.

To examine the issues, managers in manufacturing firms were contacted to participate in a web-based survey. Manufacturing firms in high-polluting industries were chosen as samples, as they tend to embed environmental aspects into their activities more than low-polluting firms (Henri & Journeault, 2018). The study was conducted in Thailand where high power distance and high uncertainty avoidance are exhibited (Hoonsopon & Ruenrom, 2012; Shutibhinyo & Wongkaew, 2018). In this cultural context, formal rules and acceptance of a hierarchical order are commonly found (Chenhall, 2006; Hofstede, 1984; Vance et al., 1992). The findings from the study are complementary to the existing literature, which has tended to focus on firms in western contexts.

The remainder of the article is organized as follows. The next section provides a review of the existing literature and a development of hypotheses. Then, research design is presented, followed by the results, discussion, and conclusion of the study.

Literature Review and Hypotheses Development

Environmental Strategy – Environmental Strategic Intents and Eco-practices

A competitive environmental strategy refers to the integration of environmental issues into a firm's strategic process to create a competitive advantage (Banerjee et al., 2003; Dixon-Fowler et al., 2013; Perego & Hartmann, 2009). In the existing literature, two main environmental strategic intentions have been identified, namely eco-efficiency and eco-branding (Journeault et al., 2016). Eco-efficiency intent adopts technological processes to reduce cost and improve efficiency. By contrast, firms pursuing eco-branding intent focus on seeking market opportunities and attempt to be the first to respond to change and uncertainty (Aragón-Correa, 1998). It is important to note that these dimensions are not mutually exclusive. Firms may adopt multiple competitive environmental strategic intents at the same time with varying degrees of intensity (Journeault et al., 2016; Stead & Stead, 1995).

In line with environmental strategic intent, eco-practices can be classified into two different sets, namely eco-production practices and eco-marketing practices. Eco-production practices refer to actions related to the environmental redesign of products and processes, material substitution, reduction of energy consumption, waste disposal, and recycling (González-Benito & González-Benito, 2005; Henri & Journeault, 2018; Journeault et al., 2016; Melnyk et al., 2003; Orsato, 2009; Shrivastava, 1995). On the other hand, eco-marketing practices refer to the integration of environmental activities into marketing processes. This could involve surveillance of the market for environmental opportunities, the use of environmental arguments in marketing activities, and communications about the firm's

environmental awareness and commitment to stakeholders (Aragón-Correa, 1998; Ginsberg & Bloom, 2004; González-Benito & González-Benito, 2005; Journeault et al., 2016; Marchi et al., 2013; Melnyk et al., 2003; Orsato, 2009).

While having environmental strategic intentions may be important, it may be insufficient to enhance firms' environmental and economic performance. Existing literature which has examined and found positive relationships between environmental strategy and performance has tended to focus on the implementation of eco-practices which represent realized strategies, rather than strategic intentions or intended strategy (Journeault et al., 2016). It is, therefore, important to have mechanisms to translate environmental strategic intents into eco-practices.

Eco-controls

Eco-controls refer to devices or systems that managers use to ensure consistency between employees' behaviour and the firm's environmental objectives and strategies (Henri & Journeault, 2010; Lopez-Valeiras et al., 2015). Well-designed eco-controls can maintain and alter patterns of employees' behaviour towards environmental goals (Arjaliès & Mundy, 2013; Heggen & Sridharan, 2020; Henri & Journeault, 2010; Henri & Journeault, 2018; Journeault, 2016; Journeault et al., 2016; Lopez-Valeiras et al., 2015; Pondeville et al., 2013). To be more specific, eco-controls can mitigate some problems, such as employees' lack of direction, personal limitations and lack of motivation. Directions for achieving environmental objectives are provided by specific detailed instructions on how environmental-related tasks are to be performed. The availability of ecological information for decision-making will enhance the personal ability to process new information, and performance measurement and reward systems which are linked to the firm's environmental objectives will stimulate goal congruence between employees and the firm (Lueg & Radlach, 2016; Merchant, 1982).

Good control is multi-dimensional (Merchant, 1982). It can be measured in three dimensions. The first dimension is related to environmental performance measures (action control versus result control). The second dimension is the degree of formality in communicating environmental policies and procedures to organizational members (formal control versus informal control), and the third dimension is the degree of tightness in environmental expenses and investment controls (tight control versus loose control) (Auzair & Langfield-Smith, 2005). These three dimensions of eco-controls can be placed along the continuum of bureaucratic forms of eco-controls. Specifically, action control, formal control and tight control are at one end of a more bureaucratic form of eco-controls. The other end of the continuum, a less bureaucratic form of eco-control, consists of result control, informal control and loose control. Practically, firms may adopt eco-controls along this bureaucratic continuum (Auzair & Langfield-Smith, 2005).

Contingency-based management literature has posited that performance of a firm is likely to be high when controls and strategies are compatible (Chenhall, 2006; Christ & Burritt, 2013; Govindarajan & Shank, 1992; Otley, 2016; Otley, 1980). Appropriate eco-controls can help create alignment between strategic intent and eco-practice. When strategic intent is communicated and implemented at the functional level, it may lead to a better use of resources (Slagmulder, 1997) and a competitive advantage (Chenhall, 2005).

Strategic Alignment of Eco-practices

Firms are considered successful in translating their competitive environmental strategic intents into a realized strategy when their environmental strategic intents are aligned with their

eco-practices. Drawing on the definitions of eco-efficiency and eco-branding strategic intents and the definitions of eco-production practices and eco-marketing practices, it can be argued that firms achieve environmental strategic alignment when they adopt eco-efficiency intent and have successfully implemented eco-production practices, or when they adopt eco-branding intent and have successfully implemented eco-marketing practices. However, in practice, eco-practices at a firm may not be consistent with its competitive environmental strategic intents. Strategic misalignment may result from information asymmetry, uncertainty or goal incongruence (Slagmulder, 1997). The strategic misalignment may lead to inappropriate investment, delayed decision-making or inefficient use of resources.

To create strategic alignment, Slagmulder (1997) suggests that the implementation of appropriate MCSs can play an important role. In an environmental context, Henri & Journeault (2018) argue that eco-controls help promote environmental goal congruence, provide relevant information for environmental decision making and support better resource allocation. Appropriate eco-controls can help provide information for managers to ensure that a firm's policies, investments and activities are consistent with its environmental strategic intent.

Since literature has suggested that firms rely on eco-controls in translating competitive environmental strategic intents into eco-practices (Arjaliès & Mundy, 2013; Heggen & Sridharan, 2020; Henri & Journeault, 2018; Journeault, 2016; Journeault et al., 2016; Lopez-Valeiras et al., 2015; Pondeville et al., 2013), the following hypotheses are proposed to address Research Question 1:

H1a: Eco-efficiency intent has a positive direct effect on eco-production practices.
H1b: Eco-branding intent has a positive direct effect on eco-marketing practices.
H2a: Eco-efficiency intent has a positive direct effect on eco-controls.
H2b: Eco-branding intent has a positive direct effect on eco-controls.
H3a: Eco-controls have a positive direct effect on eco-production practices.
H3b: Eco-controls have a positive direct effect on eco-marketing practices.
H4a: Eco-controls have a positive direct effect on the strategic alignment of eco-production practices.
H4b: Eco-controls have a positive direct effect on the strategic alignment of eco-marketing practices.
H5a: The strategic alignment of eco-production practices has a positive direct effect on eco-production practices.
H5b: The strategic alignment of eco-marketing practices has a positive direct effect on eco-marketing practices.

Eco-practices and Firm Performance

Existing studies have found an association between eco-practices and a firm's environmental performance (Aragón-Correa, 1998; Chen et al., 2016; Henri & Journeault, 2010; Henri & Journeault, 2018; Suansawat, 2013). Eco-production practices, such as redesigning a production process, may reduce emissions, water waste, solid waste and hazardous waste (Henri & Journeault, 2018). They could also prevent unexpected incidents that potentially harm the ecosystem (Suansawat, 2013). The redesign of the product for ease of disassembly and reassembly may prolong product life (Bocken et al., 2016). These eco-production practices not only bring better environmental performance, but also yield economic performance. For instance, increasing process efficiency can reduce manufacturing and waste disposal costs (Burnett & Hansen, 2008; Dixon-Fowler et al., 2013; Hart, 1995; Henri &

Journeault, 2010; Henri & Journeault, 2018; Pérez-Calderón et al., 2011; Porter & Van der Linde, 1995; Schaltegger, 2011; Shrivastava, 1995). Reducing emissions below the requirement and avoiding toxic materials can lower environmental discharges and liability (Henri & Journeault, 2010; Henri & Journeault, 2018; Pérez-Calderón et al., 2011). Using recycled materials may reduce organizational risk such as resource scarcity in the future (Henri & Journeault, 2010; Shrivastava, 1995).

While eco-production practices help improve internal processes to reduce environmental impacts, eco-marketing practices influence the behaviour of stakeholders. For instance, promoting products made from recycled or recyclable raw materials lessens natural resource consumption and demand for primary products (Zink & Geyer, 2017). The use of environmental arguments, or applying a non-consumerist approach in marketing, encourages responsible consumption (Bocken et al., 2016; Shrivastava, 1995). Collaboration with stakeholders helps firms identify environmental opportunities to reduce its environmental impact on communities (Henri & Journeault, 2018). Voluntary disclosure of a firm's environmental management encourages firms to be more responsible for their environmental performance (Henri & Journeault, 2018). These eco-marketing practices not only benefit the environment, but also benefit the firm's economic performance. Firms can increase revenue by being the first to respond to the demand for green products (Ginsberg & Bloom, 2004; Henri & Journeault, 2018; Schaltegger, 2011; Shrivastava, 1995). Sponsorship of environmental events helps enhance public relations. Environmental reputation also brings social legitimacy (Ginsberg & Bloom, 2004; Hart, 1995; Henri & Journeault, 2010; Henri & Journeault, 2018; Shrivastava, 1995) and enhances the potential to attract and retain qualified employees (Dixon-Fowler et al., 2013; Russo & Fouts, 1997).

To conclude, it can be predicted that eco-production practices and eco-marketing practices have a positive relationship with environmental performance and economic performance. The following hypotheses are proposed to address Research Question 2:

H6a: Eco-production practices have a positive direct effect on environmental performance.
H6b: Eco-marketing practices have a positive direct effect on environmental performance.
H7a: Eco-production practices have a positive direct effect on economic performance.
H7b: Eco-marketing practices have a positive direct effect on economic performance.

The Relationship between Environmental Performance and Economic Performance

The study of the relationship between environmental performance and economic performance has yielded two contrasting opinions. The win-lose paradigm suggests that environmental investments lead to higher costs and lower profit (Burnett & Hansen, 2008; Henri & Journeault, 2010; Plaza-Úbeda et al., 2009; Schaltegger, 2011). For example, firms may spend more on pollution-controlling technologies; environmental engineers may need to spend more time on environmental projects; and plant workers probably would have an additional workload to deal with recycled waste (Whitehead & Walley, 1994). Therefore, implementing eco-practices passes on societal costs to the firms (Dixon-Fowler et al., 2013).

While a win-lose paradigm indicates that there is a negative relationship between environmental performance and economic performance, a win-win paradigm suggests a positive relationship. Literature on this paradigm has suggested that firms can achieve environmental performance while having economic benefits (Burnett & Hansen, 2008; Chen et al., 2016; Dixon-Fowler et al., 2013; Hart, 1995; Henri & Journeault, 2010; Pérez-Calderón et al., 2011; Porter & Van der Linde, 1995; Russo & Fouts, 1997; Schaltegger, 2011). Pollution

represents the inefficient use of resources. Improving efficiency through enhanced environmental performance may reduce costs. Strong environmental performance can be viewed as representative of a firm's capabilities in regard to continuous innovation leading to increased competitiveness (Puriwat & Hoonsopon, 2022), in terms of environmental reputation, social legitimacy, the ability to retain quality employees and product differentiation (Dixon-Fowler et al., 2013).

Since this study predicts that the strategic alignment of eco-practices leads to enhanced environmental and economic performance, it is expected that a win-win situation is likely to occur. This leads to the following hypothesis:

H8: Environmental performance has a positive direct effect on economic performance.

Conceptual Model

The conceptual model of this study is presented in Figure 1. Extant literature has suggested that there are connections between competitive environmental strategic intents, eco-controls, eco-practices and firm performance. Journeault et al. (2016) find that competitive environmental strategic intents affect eco-controls. They also find linkages between eco-controls and eco-practices. Eco-control literature suggests relationships between eco-controls, eco-practices and firm performance (Henri & Journeault, 2010; Henri & Journeault, 2018). Therefore, this study proposes the strategic alignment of eco-practices as a mediator on the relationship between eco-controls and eco-practices.

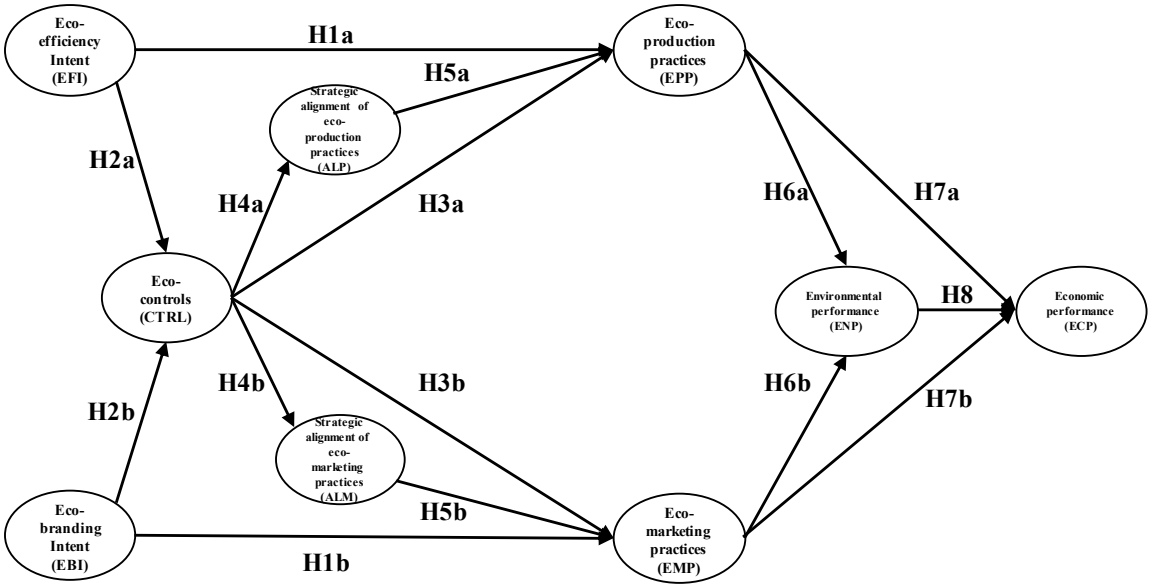

Figure 1: The Conceptual Model

Research Methodology

To conduct the study, a web-based questionnaire survey is used. The questionnaire was formulated based on the literature review. Two academics and one practitioner who are experts in environmental management were contacted to review the draft of the questionnaire to ensure

that key issues were covered and the questions were clearly articulated. The questionnaire was developed in English, translated into Thai language, and then back translated into English by an independent person to ensure the effectiveness of the translation.

The questionnaire contains two sections. The first section concerns the respondent's and company's profile. The later sections contain questions about the firm's competitive environmental strategy, eco-controls, strategic alignment of eco-practices, eco-practices, and environmental and economic performance on a seven-point Likert scale. A list of 43 questions of the final questionnaire are shown as items in the Appendix.

The unit of analysis of this study is a firm that operates in a high-polluting industry. The study focuses on practices of firms in high-polluting industries because these firms tend to be more concerned with environmental issues and adopt environmental practices more extensively (Christ & Burritt, 2013; Henri & Journeault, 2018; Mokhtar et al., 2016; Setthasakko, 2010; Suansawat, 2013). Firms in ten high-polluting industries were selected, using the code of Thailand Standard Industrial Classification (TSIC). High-polluting industries are wood and wood products (TSIC20), paper and pulp (TSIC21), petroleum and coal products (TSIC23), chemical products (TSIC24), metal products (TSIC26, 27, 28), machinery (TSIC20), electronics (TSIC31, 32), automotive and compartments (TSIC34, 35), textiles (TSIC17) and recycling (TSIC37).

From the list of 1,323 manufacturing firms in high-polluting industries located in the central and the eastern industrial estates under the responsibility of the Industrial Estate Authority of Thailand (IEAT), telephone calls were made as a first contact to identify the most appropriate respondents. The target respondents are management who have a comprehensive knowledge about the firm's environmental strategy, MCSs, and environmental and economic performance. From the first contact, 537 firms were willing to participate in the study.

From the 537 firms, 100 emails with a link to the web-based questionnaire survey were sent out in order to assess the reliability of the questionnaire. 28 responses were received. Cronbach's alpha was more than 0.70 for the 43 questions (Hair et al., 2009). The questionnaires were then sent out to the remaining contacts. In order to increase the response rate , a reminder email was sent two-weeks after the first email was sent (Muñoz-Leiva et al., 2010).

Out of 537 emails, 169 usable responses were received with a final response rate of 31.47%. The 169 usable responses included the 28 initial responses from the sample test, as the questionnaire was not significantly changed and the results of the analysis were unchanged if initial responses were excluded. The response rate is acceptable when compared with prior environmental management survey-based studies in Thailand (Suansawat, 2013) as suggested by Van der Stede et al. (2005). Most of the respondents were middle management directly responsible for the firms' environmental practices and performance.

Structural Equations Modeling (SEM) was executed to explain the relationship between multiple variables in this study (Hair et al., 2009). Out of 169 responses, 18 responses (10.65%) have an average score of eco-control items equal or less than 4.00, which is the cutoff point of more bureaucratic forms of eco-control from a seven-point Likert scale. The sample size of 18 is not sufficient to estimate a model. Therefore, only 151 responses (89.35%) that adopt more bureaucratic forms of eco-control (average score on eco-control more than 4.00) are used. Since

there are three or more indicators per factor (Anderson & Gerbing, 1984) and the model had strong factor loading in this study (Wolf et al., 2013) (see Appendix for factor loading), a sample size of 150 or more is sufficient for SEM analysis.

Research Findings

The Role of Eco-controls in Translating Intents into Practices

Structural Equation Modeling (SEM) is used to test H1 to H8 by exploring how eco-controls translate competitive environmental strategic intents into eco-production practices and eco-marketing practices, and whether such eco-practices lead to enhanced environmental and economic performance. Table 1 presents a correlation matrix (Pearson) of the constructs. The diagonal elements are the square roots of the average variance extracted (AVE).

Measurement Model

The appendix presents the results from the Confirmatory Factor Analyses (CFA) of the constructs. The output from AMOS revealed high (greater than 0.70) loadings for all items on their latent constructs, except for the eco-control items (0.623-0.678) which may be acceptable. In addition, the high composite reliability measures for all latent variables (from 0.693 to 0.935) confirm the alpha scores by presenting acceptable construct reliability (Hair et al., 2009). The convergent validity of constructs was evaluated by employing the average variance extracted (AVE). The AVE for each variable was well above 0.50, except for eco-controls (0.428), so convergent validity was demonstrated (Fornell & Larcker, 1981; Hair et al., 2009). Regarding discriminant validity, the square roots of AVE of all constructs were above the correlation with other constructs, except for the correlation between eco-controls construct and the strategic alignment of eco-production practices construct (Table 1.). These attributes show that each latent construct explained more of the variance in their item measures than they shared with other constructs (Bedford & Speklé, 2018; Hair et al., 2009). Overall, all latent constructs exhibited adequate convergent validity and discriminant validity.

Structural Model

Structural Equation Modelling (SEM) is used to test the model. For the model fit, Root Mean Square Error of Approximation (RMSEA) is suggested to be less than 0.080 for a model absolute fit; the comparative fit index (CFI) is suggested to be greater than 0.900 for an incremental fit; and Chi-square/degree of freedom (CMIN/DF) is suggested to be less than 2.000 for a parsimonious fit (Hair et al., 2009; Vanichbuncha, 2019). The original model presents an appropriate fit of RMSEA =0.070, CFI = 0.905, and CMIN/DF = 1.736. The results are shown in Table 2.

For hypothesis testing, eco-efficiency intent has no direct effect on eco-production practices. In contrast, a positive direct effect of eco-branding intent on eco-marketing practices is found ($\beta = 0.176$, $p < 0.10$). Thus, H1a is not supported whereas H1b is supported.

Eco-efficiency intent has no direct effect on eco-controls. On the other hand, eco-branding intent has a positive direct effect on eco-controls ($\beta = 0.527$, $p < 0.01$). Thus, H2a is not supported whereas H2b is supported.

Eco-controls have no direct effect on eco-production practices or eco-marketing practices. Thus, H3a and H3b are not supported. However, eco-controls have a positive direct effect on the strategic alignment of eco-production practices ($\beta = 0.723$, $p < 0.001$). In addition, eco-controls have a positive direct effect on the strategic alignment of eco-marketing practices ($\beta = 0.586$, $p < 0.001$). Thus, H4a and H4b are supported.

The strategic alignment of eco-production practices has a positive direct effect on eco-production practices ($\beta = 0.855$, $p < 0.001$). The strategic alignment of eco-marketing practices has a positive direct effect on eco-marketing practices ($\beta = 0.397$, $p < 0.001$). Therefore, H5a and H5b are supported.

Eco-production practices have no direct effect on environmental performance nor economic performance; hence, H6a and H7a are not supported. Nevertheless, eco-marketing practices have a positive direct effect on environmental performance ($\beta = 0.414$, $p < 0.05$). Furthermore, eco-marketing practices have a positive direct effect on economic performance ($\beta = 0.537$, $p < 0.01$). Thus, H6b and H7b are supported. Finally, environmental performance has a positive direct effect on economic performance ($\beta = 0.147$, $p < 0.10$); hence, H8 is supported. The unexpected result shows that eco-production practices are found to have a positive direct effect on eco-marketing practices ($\beta = 0.522$, $p < 0.001$).

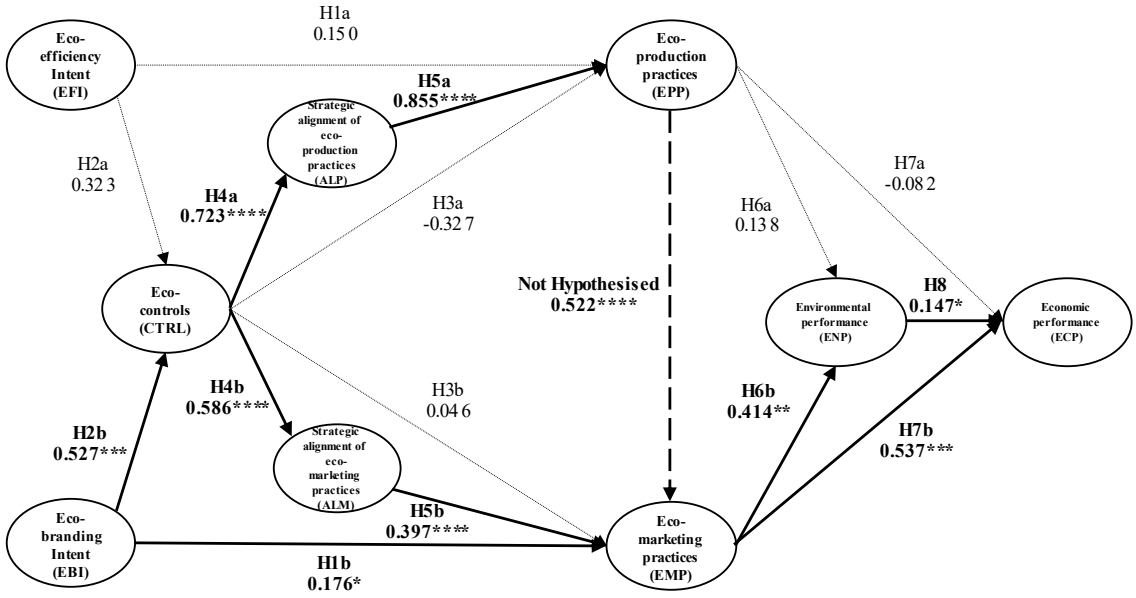

Figure 2: Relationship between Environmental Strategic Intents, Eco-controls, Strategic Alignment of Eco-practices, Eco-practices and Firm Performance

H3a and H3b are not supported while H4a, H4b, H5a and H5b are supported. This indicates that the strategic alignment of eco-practices fully mediates the relationship between eco-controls and eco-practices. Specifically, the strategic alignment of eco-production practices fully mediates the relationship between eco-controls and eco-production practices, while the strategic alignment of eco-marketing practices fully mediates the relationship between eco-controls and eco-marketing practices.

Table 1: Correlation Matrix (Pearson) of The Constructs and Square Root of AVE (on Diagonal)

	EFI	EBI	CTRL	ALP	ALM	EPP	EMP	ENV	ECP
EFI	0.743								
EBI	0.638***	0.806							
CTRL	0.454***	0.550***	0.654						
ALP	0.487***	0.546***	0.661***	0.764					
ALM	0.533***	0.473***	0.386***	0.664**	0.905				
EPP	0.317***	0.449***	0.303***	0.595***	0.441***	0.809			
EMP	0.458***	0.631***	0.485***	0.693***	0.644***	0.735***	0.809		
ENV	0.039	0.178**	0.177**	0.188**	0.175**	0.353***	0.389***	0.842	
ECP	0.182**	0.225***	0.258***	0.266***	0.181**	0.284***	0.387***	0.297***	0.859

[a]Level of significance of $p < 0.10$, 0.05, and 0.01 are denoted as *, **, ***, respectively. N = 151

[b]Diagonal elements are the square roots of the AVE. Off-diagonal elements are the correlations between the constructs.

[c]EFI-Eco-efficiency intent, EBI-Eco-branding intent, CTRL-Eco-controls, ALP-Strategic alignment of eco-production practices, ALM-Strategic alignment of eco-marketing practices, EPP-Eco-production practices, EMP-Eco-marketing practices, ENP-Environmental performance, ECP-Economic performance.

Table 2: Standardized Results of Structural Equation Modeling

Hypotheses	Relationships			Expected Result	Model		
					Coefficient	t	Results
H1a	EFI	→	EPP	Positive	0.150	1.000	Not supported
H1b	EBI	→	EMP	Positive	0.176	1.652*	Supported
H2a	EFI	→	CTRL	Positive	0.323	1.576	Not supported
H2b	EBI	→	CTRL	Positive	0.527	2.611***	Supported
H3a	CTRL	→	EPP	Positive	-0.327	-1.638	Not supported
H3b	CTRL	→	EMP	Positive	0.046	0.345	Not supported
H4a	CTRL	→	ALP	Positive	0.723	4.339****	Supported
H4b	CTRL	→	ALM	Positive	0.586	3.437****	Supported
H5a	ALP	→	EPP	Positive	0.855	6.574****	Supported
H5b	ALM	→	EMP	Positive	0.397	5.833****	Supported
H6a	EPP	→	ENP	Positive	0.138	0.855	Not supported
H6b	EMP	→	ENP	Positive	0.414	2.257**	Supported
H7a	EPP	→	ECP	Positive	-0.082	-0.538	Not supported
H7b	EMP	→	ECP	Positive	0.537	2.902***	Supported
H8	ENP	→	ECP	Positive	0.147	1.753*	Supported
Not Hypothesized	EPP	→	EMP	N/A	0.522	8.126****	

[a] Level of significance of $p < 0.10$, 0.05, 0.01, and 0.001 are denoted as *, **, ***, and **** respectively.

[b] Goodness-of-fit indices: RMSEA = 0.070; CFI = 0.905; CMIN/DF = 1.736

Discussion

Results from the study suggest that eco-efficiency intent does not have a direct effect on eco-production practices, while eco-branding intent has a positive direct effect on eco-marketing practices. Eco-branding intent is translated into eco-practices through eco-controls and the strategic alignment of eco-practices. Although previous literature has proposed that eco-controls are related to eco-practices (Henri & Journeault, 2018; Journeault et al., 2016), only indirect paths are found. In other words, the strategic alignment of eco-practices fully mediates the relationship between eco-controls and eco-practices in our 151 sample firms, which all adopt more bureaucratic forms of eco-control. These indirect paths show that more bureaucratic forms of eco-control are found to have the ability to transform environmental strategic intents into actions.

The unexpected finding is that eco-production practices are found to have a positive direct effect on eco-marketing practices. It can be implied that firms may firstly implement eco-production practices to lower the environmental impact and to produce environmentally-friendly products, and then employ eco-marketing practices to attract green consumers and increase revenue. It confirms prior literature that eco-branding intent may depend on both eco-production practices and eco-marketing practices to achieve its purpose (Journeault et al., 2016).

In relation to firm performance, eco-production practices do not have a direct effect on environmental and economic performance. Nevertheless, eco-marketing practices exhibit a positive direct effect on environmental and economic performance. Thus, the effect of eco-production practices on environmental and economic performance is an indirect path through eco-marketing practices. Lastly, environmental performance has a positive direct effect on economic performance. Hence, it can be argued that a win-win situation (i.e., the situation where firms can achieve both environmental and economic performance) can be realized through the direct effect of eco-marketing practices and the indirect effect of eco-production practices.

Theoretical Contributions

This study explicitly distinguishes between intended environmental strategy and realized environmental strategy, which is similar to Journeault et al. (2016). However, this study extends Journeault et al. (2016) by identifying the relationship between eco-controls and eco-practices through the strategic alignment of eco-practices, and its effect on environmental and economic performance. Further, while extant literature measures eco-controls based on a levers of control framework (Arjaliès & Mundy, 2013; Heggen & Sridharan, 2020; Journeault et al., 2016; Martyn et al., 2016) or MCS package (Guenther et al., 2016; Henri & Journeault, 2018; Lueg & Radlach, 2016), this study provides an alternative measurement by using the multi-dimensional continuum of the bureaucratic forms of eco-control (Auzair & Langfield-Smith, 2005)

Managerial Implications

The study provides several practical implications. One of the practical implications is that more bureaucratic forms of eco-control (i.e., action control, formal control, tight control) are recommended regardless of environmental strategy, since they are linked to environmental and economic performance through the strategic alignment of eco-practices. More bureaucratic forms of eco-control can be implemented to create a strategic alignment of eco-practices in several ways. First, management needs to ensure that environmental policies, rules, and

procedures are written and communicated formally to all staff to facilitate formal control. Second, process-oriented environmental performance indicators can be adopted to monitor staff decisions and action on an ongoing basis for action control. Examples of the indicators include the ratio of strategic decisions made when considering environmental issues in relation to the total number of decisions, the investment ratio in environmental-oriented technology research and development projects in relation to the total number of R&D projects, the degree of value chain partners' involvement in improving the environmental performance of products, the integration level of environmental issues into marketing methods and tools, and the number of employees properly trained or capable of using eco-design methods and tools (Rodrigues et al., 2017). Third, with regard to tight control, Material Flow Cost Budgeting, which estimates material flows and related costs for the next period, as well as Material Flow Investment Appraisal, which considers the net present value of expected future material flow costs, could both be adopted to reach the desired targets and could be used to closely monitor eco-efficiency progress (Schaltegger & Zvezdov, 2015).

Another practical implication is that eco-labelling, such as green or carbon labelling, is recommended. As an indirect path from eco-production practices to environmental and economic performance through eco-marketing practices is found, eco-labelling can be considered as one of the eco-marketing practices which reflects and communicates eco-efficiency practices in the production process.

Conclusion

Brief Summary

The purpose of this study is to explain how environmental strategic intents are translated into eco-practices, and whether this will, in turn, lead to enhanced environmental and economic performance. A web-based survey was conducted to collect data. Key findings of the study are as follows. Firstly, firms tend to adopt more bureaucratic forms of eco-control (i.e. action control, formal control, tight control). Secondly, although the adoption of eco-controls is motivated by an eco-branding intent to a greater extent than by an eco-efficiency intent, more bureaucratic forms of eco-control can translate environmental strategic intents into eco-production practices and eco-marketing practices through mediators. Specifically, the strategic alignment of eco-production practices fully mediates the relationship between eco-controls and eco-production practices. In addition, the strategic alignment of eco-marketing practices fully mediates the relationship between eco-controls and eco-marketing practices. Lastly, a win-win situation, in which firms achieve enhanced environmental and economic performance, is driven by the direct effect of eco-marketing practices, the indirect effect of eco-production practices and the adoption of more bureaucratic forms of eco-control.

Limitations and Directions of Future Research

As with any study, this study is subject to some limitations. New instruments are developed to measure the bureaucratic forms of eco-control and the strategic alignment of eco-practices. Although the instruments exhibit convergent validity, discriminant validity is a matter of concern. Future research may refine the instrument to enhance its validity. Also, since findings from this study are based on firms with more bureaucratic forms of eco-control, future research may investigate such relationships in firms adopting less bureaucratic forms of eco-control.

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Appendix

Results from the Confirmatory Factor Analyses (CFA)

Item	Description	Standardized Factor Loading	Composite Reliability (CR)	Average Variance Extracted (AVE)
EFI	**Eco-efficiency intent**		0.879	0.552
	Increasing production efficiency	0.657		
	Reducing costs related to energy and material consumption	0.868		
	Reducing costs related to waste management	0.822		
	Reducing the risk of environmental liabilities and disasters	0.589		
	Extending natural resources and product value for a circular economy	0.742		
EBI	**Eco-branding intent**		0.883	0.649
	Responding to the green market need	0.757		
	Providing high quality products with low environmental impact	0.911		
	Providing environmental advantages of the product compared to competing conventional products	0.800		
	Gaining emotional durability, attachment, and trust from green consumers	0.743		
CTRL	**Eco-controls**		0.693	0.428
	Rather than focusing on the attainment of the environmentally desired targets, monetary and non-monetary environmental performance measures are used to monitor staff decisions and action on an ongoing basis	0.661		
	Written rules, policies, procedures, and targets related to environmental aspects are communicated formally to all staff	0.678		
	Budgets for environmental expenses and investment are very detailed	0.623		
ALP	**Strategic alignment of eco-production practices**		0.851	0.584
	Links between environmental strategy and production policy are clearly formulated	0.713		
	Links between environmental strategy and production policy are pursued	0.751		
	Investments in production are screened for consistency with environmental strategy	0.742		
	Production activities are consistent with environmental strategy	0.845		

Item	Description	Standardized Factor Loading	Composite Reliability (CR)	Average Variance Extracted (AVE)
ALM	**Strategic alignment of eco-marketing practices**		0.935	0.819
	Links between environmental strategy and marketing policy are clearly formulated	0.869		
	Links between environmental strategy and marketing policy are pursued	0.924		
	Investments in marketing are screened for consistency with environmental strategy	0.886		
	Marketing activities are consistent with environmental strategy	0.941		
EPP	**Eco-production practices**		0.839	0.654
	Redesigning the product and process to reduce the use of energy and materials (e.g., alternative materials or components, cleaner production)	0.777		
	Redesigning the product and process to reduce emissions and waste	0.815		
	Redesigning the product and process to eliminate any potential environmental problems	0.909		
	Redesigning the product and process for ease of disassembly, material separation, and reassembly	0.797		
	Using waste outputs from one process into feed stock for another process or to turn into new forms of value	0.734		
EMP	**Eco-marketing practices**		0.877	0.654
	Surveillance of the market for environmental opportunities	0.891		
	Sponsorship of environmental events	0.808		
	Use of environmental arguments in marketing (e.g., environmental advantages)	0.882		
	Making the product more appealing to green consumers (e.g., use of recycled, recyclable, and certified raw materials)	0.839		
	Applying a non-consumerist approach to sales (e.g., not over-selling, no sales commission)	0.742		
	Collaboration with stakeholders to address and solve environmental problems and issues	0.820		
	Voluntary disclosure of a firm's environmental management and impacts	0.651		

Item	Description	Standardized Factor Loading	Composite Reliability (CR)	Average Variance Extracted (AVE)
ENP	**Environmental performance**		0.883	0.709
	Waste management	0.770		
	Water management	0.861		
	Air emission control	0.947		
	Noise management	0.920		
	Smell management	0.914		
	Energy management	0.589		
ECP	**Economic performance**		0.905	0.738
	Market share	0.725		
	Total revenue	0.803		
	Cash flow from operations	0.92		
	Operating profits	0.939		
	Return on investment (ROI)	0.891		