

## Green Supply Chain Management: Procurement Context

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### Abstract

This study investigates the procurement process effecting green-supply chain management in manufacturing industry in Thailand. Empirical data was collected from the sample group which consists of CEOs, sale managers, and procurement managers from 210 organizations in 4 manufacturing industries: electrical and electronics, auto parts, metal and aluminum, and plastics. Structural equation consists of; antecedent variables which involve top management commitment and customer pressure; dependent variables which concern business performance and environmental performance; and mediator variables which contain employee involvement, green regulations and collaborative partners. The result of the investigation indicates that top management commitment affects employee involvement, green regulations, and collaborative partners. In addition, employee involvement affects business performance rather than environmental performance while green regulation solely affects environment performance. Ultimately, collaborative partners affect business and environmental performance significantly.

**Keywords:** Green procurement; Top management commitment; Customer pressure; Employee involvement; Green regulation; Collaborative partner; Business performance; Environment performance

### Introduction

Nowadays global warming continues to get the attentions and creates negative effects on environment and economy all over the world. The use of natural resources and the process of manufacturing are the most important factors in creating global warming [1]. In developing countries, natural resource will be deteriorated by 30-40% by manufacturing industries [2]. According to Trends in Global CO<sub>2</sub> Emissions in 2013, the release of CFC all over the world still continues to increase especially in developing countries. Thailand is ranked the 27<sup>th</sup> from the 4<sup>th</sup> position, earth submit report involving international chemical management which was held in Malaysia in March 2014. There was an agreement among Asian-Pacific countries to use chemicals that will not cause health problems for human or harm the environment by the year 2020. This corresponds to the model of industrial development in Thailand which aims towards environmental-friendly manufacturing process, which leads to green industry entirely by 2021. Environmental responsibility of manufacturing industry need cooperation from organizations in the green supply chain, which start from the suppliers (upstream) to consumers (downstream). Each organization could serve as downstream or upstream. Procurement is the unit that could enforce collaborative partnership effectively. The procurement process complies with International Standard Organization: ISO, which involves procurement and selection of suppliers. The effectiveness of procurement will affect the ability to compete among organizations both in responding to consumers' needs and reducing operating expense. According to the research of Rudolf, procurement creates environmental collaborations from suppliers, which in turn increases the environmental efficiency. Awasthi [3] stated that procurement is the key success to collaborative partnership in manufacturing industries. Martin Murry, the editor of logistic networks of green supply chain, and expert of suppliers from USA, mentioned in the article "Implementing a World Class Purchasing Organization" published on about.com website, that the best procurement must be supported by the CEOs. Procurement units have power to control operating expenses. Lamming and Hampton [4] confirmed that procurement is important to the permanent success of the industry. Therefore, the company should focus on procurement process and set the goals in order to conduct

the business while reducing the environmental impacts to address the issue of global warming. The rules and regulations in Thailand are not very strict. Only large organizations implement the practice to create positive image. The mid-sized and small organizations which are not well-equipped in term of funding do not give priority to reducing environmental impacts. In order to create green supply chain, there should be a clear procurement process that is effective for the business and environment. The researcher divided green purchasing into 3 sections: involvement of procurement in green supply chain, environmental regulations in selecting products and suppliers that are environmentally responsible, and collaboration partnership in green supply chain to reduce environmental impacts from manufacturing industries.

The study of green supply chain management will benefit manufacturing industries which are going to implement green process by 2021 according to Thailand's models of manufacturing business in order to fully operating as environmental-friendly practices. In addition, the research provides the path in procurement management which efficiently reduces the environmental impact of supply chain and alleviates effects of global warming from manufacturing industries.

### Literature Review

Lee [5] found that organizations focus more on environmental marketing strategies, which shows that consumers give priority in reducing environmental impacts by purchasing more green products. Therefore procurement of firm are necessity beginning to work together to motivate and assist their common suppliers to improve environmental performance [2]. Suppliers have the responsibilities to satisfied consumers' needs. Therefore, in order to reduce environmental

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problems according to the models of green industry, green supply chain could be implemented by procurement that is environmentally friendly. The researcher divided procurement in 3 sections in order to study which one is the most effective in creating green supply chain

### Top management commitment

According to Management by Objective by Drucker 1954, management that follows a set of goals will help organizations to work more efficiently. The researcher applies this thinking to the determination of CEO in order to reduce environmental impacts, by setting goals for the organization. Managers will be assigned to implement the process to attain the set goals. The idea of management according to the set goals requires inspection of business practices. Therefore, this type of management needs to focus on workers, who work voluntarily in order to attain productivity. General Electric and General Motors employ this method in their organizations. Akkermans, Bogerd, Vos [6] Fawcett, Ogden, Magnan, Cooper [7] indicate that determination of CEO affects green supply chain. Preston, Chen, and Leidner state that consideration of CEO affects boundaries of environmental practices and helps reduce environmental impacts. In addition, it motivates the positive effects in environmental framework as per the investigations of Modi and Mabert [8].

### Customer pressure

Under Stakeholder Theory, Freeman 1984 applies the change to the process of organizations which demonstrate responsibilities in operating the business, directly and indirectly. The researcher studied customer pressure in order to reduce environmental impacts by purchasing from responsible manufacturers. This theory is the basis of the development of environmental responsibilities. Chen and Chai [9] and Lee focus on green marketing strategies to get attentions from customers, which shows that consumers are interested more in environmental friendly products, become more concerned about the environment, and create positive influence of green consumer behaviors. All these aspects correspond with point of view of researchers in the past. Bansal and Roth [10] and the research of Yu-Xiang Yen, Shang-Yung Yen [11] discovered customer pressure affects conditions of green procurement, which is correspondent with the study of Pruess. Customer pressure affects decision making in environmentally friendly activities which reflects in Hashem and Tann [12], Hall [13], De Bakkeretal, The European Commission, Michel senetal [14].

### Employee involvement

According to Expectancy Theory, Victor Vroom, motivation of employee is created by the change of behaviors, by making an effort in expecting good works and using rewards Fred C Luenburg. The researcher applies the theory in this study to establish employee involvement which creates green procurement affecting the business performance and environmental concerns. The previous research has shown that successful green supply chain is the result of employee involvement [15].

### Green regulations

Rational Choice Theory by Scott [16] explains reflection before decision-making in order to achieve the set goals. The researcher applies this theory in green procurement and green supplier selections. According to the study of Lage Junior and Godinho Filho [17], basic condition in selecting green suppliers efficiently reduce environmental impacts. The previous part of has research shown that integration of regulations became a part of evaluating conditions [18-20].

### Collaborative partner

According to Green Chain Supply, Walton [21] stated that organizations were not able to ignore environmental issues or environmental responsibilities regarding rules and regulations. Therefore, the organizations need to create marketing strategies which enable them to compete in cost reduction, and respond to consumers' need by addressing green chain supply. These strategies apply to upstream and downstream industries, starting with selecting raw ingredients and product designs which environmentally friendly [22]. The researcher applies this theory in this study in creating collaborative partnership among suppliers in order to reduce both direct and indirect environmental impacts by adopting green chain supply. Green procurement involves 3R: reduce, reuse, and recycle by focusing on reducing the loss from upstream [23]. In addition, we need to ensure that once the products are no longer in used or become expired, they will not cause any harms to the environment. According to the research of Vachon, Klassen [24,25] collaboration among upstream and downstream industries, suppliers and manufacturers, manufacturers and consumers, create positive effects in reducing environmental issues. Nowadays, Charoen Pokapan Food or CPF and Toyota Motors, Thailand applies green chain supply in order to reduce both direct and indirect environmental impacts created by their organization.

### Business performance

The researcher applies green supply chain theory to this study to investigate green procurement in order to reduce environmental impacts created by manufacturing industries in the green supply chain. Min and Galle [26] indicated that green procurement affect environmental practices and create positive business conducts [27].

### Environmental performance

The researcher applies green supply chain theory to this study to investigate green procurement in order to reduce environmental impacts created by manufacturing industries in the green supply chain. The research of Ellaram and Pearson showed that green procurement reduces environmental impacts, which correspond with Min and Galle [26-28].

In reviewing the analysis and different empirical evidence, team of analyst constructed the following conceptual framework which is shown in Figure 1.

### Research Methodology

This research is a study of confirmatory analysis of green supply management in green procurement context. Data was collected using confirmatory questionnaires from a sample group consisting of 210 organizations, 104 of which are electrical and electronics, 140 in auto parts, 68 metal and aluminum, and 88 plastic industries. There are 3 set of questionnaires for CEO. Related topics include Top management commitment (TC) with 10 item scale from Simpson [29] Customer Pressure (CP) with 7 scale from Yu-Xiang Yen , Shang-Yung Yen, Theyel, Vachon and Klassen [30] Employee Involvement (EI) with 7 item scale from Yu-Xiang Yen [11], Green Regulation (GR) with 9 item scale from Thanaraksakul W, Phruksaphanrat B, Collaborative Partner (COP) with 5 item scale from Yu-Xiang Yen, Shang-Yung Yen [11] Constantin Blome, Daniel Hollos and Antony Paulra [31], Business Performance (BP) with 7 item scale from Zhu et al. [32]. Environment Performance (EP), with 7 item scale from Paille, Constantin Blome, Daniel Hollos and Antony Paulra, Large, RO, Thomsen SG, Zhu and Sarkis Zhu et al. [32-38]. Variables for top management commitment

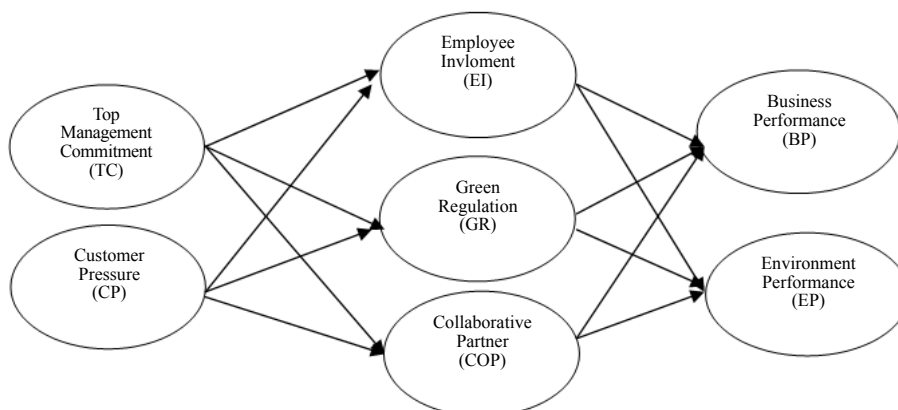


Figure 1: Conceptual framework.

No.	Hypothesis	Coet.	t-stat	Result
H1	Top management commitment affecting to Employee involvement	0.399	3.197	Support
H2	Top management commitment affecting to green revolution	0.459	3.944	Support
H3	Top management commitment affecting to collaborative property	0.269	1.909	Unsupport
H4	Customer pressure affecting to employee involvement	0.247	1.855	Unsupport
H5	Customer pressure affecting to green regulation	0.191	1.485	Unsupport
H6	Customer pressure affecting to collaborative partner	0.238	1.634	Unsupport
H7	Employee involvement affecting to business performance	0.286	3.301	Support
H8	Employee involvement affecting to environment performance	0.194	2.005	Support
H9	Green regulation affecting to business performance	0.173	1.782	Unsupport
H10	Green regulation affecting to environment performance	0.471	4.963	Support
H11	Collaborative partner affecting to business performance	0.422	5.998	Support
H12	Collaborative partner affecting to environment performance	0.178	1.987	Support

Table 1: Test of hypothesis.

and (TC) and consumer pressure (CP) were measured by formative method while the rest used reflective method. Likert scale of 5 levels was employed to analyze by SEM by PLS-Graph 3.0 [39,40].

Convergent validity is tested by Cronbach's-alpha showing the results of employee involvement, green regulation, collaborative partner, business performance, and environmental performance of 0.919, 0.933, 0.922, 0.901 and 0.942 respectively

## Results and Discussion

The results are discussed in Table 1.

This study confirms the important components of green procurement which affect green supply management. The researcher divided green procurement into 3 sections: (1) employee involvement, (2) green regulation, and (3) collaborative partner in green supply chain. The findings of the study confirm that CEO affect employee involvement and greatly influence the practice of green regulation and green procurement. Employee involvement significantly contributes to the success of the organizations in term of business and environment. Furthermore, green regulation affects the organization's environmental practices, along with collaborative partner in green supply chain of the green procurement.

## Future Research

According to the study, determination of CEO is important to green procurement process in term of employee involvement and green regulation, which affect business and environmental practices

of the organization. However, CEO's determination does not affect collaborative partner in green supply chain. Therefore, in order to create green industry in Thailand, future research should study factors impacting determination of CEO in the aspect of building collaborative partner in green supply chain.

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