

The Effect of Green Supply Chain Management on Environmental Performance in Food and Beverage Firms in Bangkok and Metropolitan Area, Thailand

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ABSTRACT

The research aimed to study the effect of green supply chain management on environmental performance in food and beverage firms in Bangkok and metropolitan area. A survey questionnaire was a tool for data collection. 400 samples were collected from the managers, team leaders, head of division and department, and employees who are working in food and beverage firms in Bangkok and Metropolitan area. Data analysis was based on descriptive statistics including frequency, percentage, mean and standard deviation; and inferential statistics including simple regression with enter method at the significance level of .05. The results showed that most of the respondents are female (244 persons or 61.0%), aged between 21 – 30 years old (191 persons or 47.8%, graduated in Bachelors' degree (262 persons or 65.5%), working in others such as operational staff (131 persons

or 32.8%) and work more than 5 years in the manufacturer (232 persons or 58.0%). Regression model analysis revealed that green procurement, green manufacturing and green distribution and marketing have an effect on environmental performance in food and beverage firms in Bangkok and Metropolitan area at the significant level as of 0.05.

Keywords: Green supply chain management, Environmental performance, Food and beverage firms, Bangkok and Metropolitan area

1. INTRODUCTION

The environmental issues are an important issue for all business operation parties including manufacturers, suppliers, consumers, and government. All activities in the supply chain starting from raw material procurement, production, transportation, consumption and waste management can all affect the environment. If the

organizations have good practices, there will be less negatively impact toward to environmental issue. Nevertheless, if the aforementioned assumption is not, there will be the opposite side effect toward the environment. With that, many countries in Europe and America who start realized the problems related to the environment and also are the key partners of Thai business entrepreneurs started to have agreement of trade that involved the environment as trade restrictions. With that, it has been created the big barriers to Thai entrepreneurs to do business with them. However, if the Thai entrepreneurs or exporters are able to adapt to the environmentally practical requirements, it will create a competitive advantages for Thai entrepreneurs or exporters as well as it will be good for the country as a whole both direct and indirect ways.

Supply chain management, one of competitive business strategies to do business, needs to be taken into account the environmental dimension. With combining between supply chain management and environmental issue is called as green supply chain management. In addition, the concepts of green supply chain management has the potential to reduce the environmental impact at all activities throughout the supply chain management process, such as carbon dioxide emissions and so on (Green Jr et al., 2012; Zhu et al., 2012 and Yang et al., 2013).

Thailand is one of many countries that are well aware of this adjustment and has implemented a number of initiatives in line with the green supply chain management concept, including the modification of transport modes from car to rail and waterways, renewable energy. Even there still is some barriers toward the countries and organization regarding the adjustment toward environmental issue, but they are improving it. By the way, when all organizations are able to implement the supply chain management in the dimension of

environmental consideration, there will be sustainability both in terms of business operations and environmental conservation (Yusuf et. al., 2013). Finally, the next generation persons can still have the resources to use in their age.

Therefore, the study aimed at studying the effect of green supply chain management on environmental performance in food and beverage firms in Bangkok and metropolitan area, Thailand. The result of this study can confirm the organizations to envisage more importance on environment issue and obtain the direction to implement the concept of green supply chain management in order to create the sustainable business operation toward business, society and environment.

2. OBJECTIVES

With the study of the effect of green supply chain management on environmental performance in food and beverage firms in Bangkok and metropolitan area, the searchers set the objectives as follows:

1. To study green supply chain management in terms of green procurement, green manufacturing and green distribution and marketing in food and beverage firms in Bangkok and metropolitan area.
2. To study the effect of green procurement on environmental performance in food and beverage firms in Bangkok and metropolitan area.
3. To study the effect of green manufacturing on environmental performance in food and beverage firms in Bangkok and metropolitan area.
4. To study the effect of green distribution and marketing on environmental performance in food and beverage firms in Bangkok and metropolitan area.

3. HYPOTHESESE

The hypothesis had been written as follows:

Hypothesis 1: Green procurement has an effect on environmental performance in food and beverage firms in Bangkok and metropolitan area.

Hypothesis 2: Green manufacturing has an effect on environmental performance in food and beverage firms in Bangkok and metropolitan area.

Hypothesis 3: Green distribution and marketing has an effect on environmental performance in food and beverage firms in Bangkok and metropolitan area.

4. CONCEPTUAL FRAMWORK

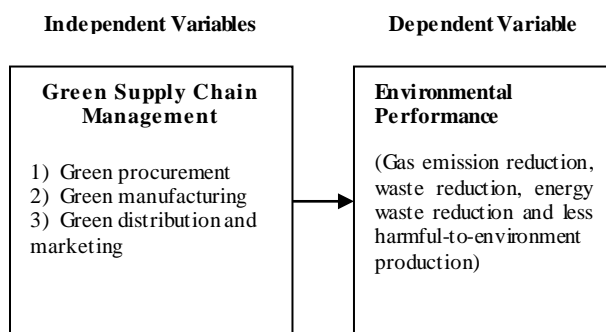


Figure 1. Conceptual framework.

5. LITURATURE REVIEWS

5.1. Concept of green supply chain management

The concept of green supply chain has been developed from the concept of supply chain management. The supply chain management (SCM) refers to the management activities related to supply chain activities that has been connecting among supplier, producers and customers in order to maximize customer value and achieve a sustainable competitive advantage such as cost leadership, product differentiation, quick responsiveness and others. After many years ago the world has realized about the importance of the environmental concern, especially global warming and many researchers found one of the causes of that situation comes from the industries around the world. Then, many organization have been aware of doing business with concerning more about the environment as well as the push by the domestic and

international government and collaboration. They have trying to implement the environment concept with supply chain management concepts. Therefore, the green supply chain management have been created. Recently, green supply chain management has been widely used and applied into the organizations (Cramer, 1996; Drumwright, 1994; Green, et al., 1996), not only the commercial organization but also include non-commercial organization. The green supply chain concepts consists of following aspects (Hervani, et al., 2005 and Tippayawong et al., 2015) including green procurement, green manufacturing, green distribution and marketing, green design and green logistics. The green procurement is the activity purchasing or coordinating with supplier about having the environmental friendly goods and services or lesser harmful to the environment compared to the same products and services. Next, green manufacturing and material management is the activities about using environmentally friendly technologies to produce the products or service and manage material efficiency in order to increase efficiency and profitability and reduce the impact on the environment. In the meantime, green marketing and distribution is the activity to promote the product/service to the customer with taking into account the environmental factors, such as packaging methods, distribution and communication with customers. Then, green design or eco-design is the activities to design product with focusing on eco-friendly. The designed product can achieve the goal that the products can be recycling or reused. Next, the reverse logistics is the activities to receive the used products or services from the customer back to the producers with the purposes to reused, recycle or reduce the waste. Lastly, the green logistics is the activities conveying the raw materials from the suppliers to the producer and the products/services from the producers to the customer with the method of considering the environment. However, in this study, the

researchers focused on green procurement, green manufacturing and green distribution and marketing which they are the importance part to create the environmental performance.

5.2. Concept of environmental performance

Many companies have adopted the concept of supply chain management and green ideas as a corporate strategy to optimize both economic and environmental performance. Zhu and Cote (2004) have found that the green supply chain management or environmental management is the key to reducing production costs by eliminating waste. Also, Zhu, Sarkis and Lai (2007) pointed out that Chinese entrepreneurs who have implemented green supply chain management and it improve both environmental and economic performance. Green Jr et al. (2012) have given the measurement of environmental performance that they consisted of air emission, effluent waste, solid waste, reduction of hazardous and toxic materials usage. Zhu et al. (2012) had included air emission, waste water, solid waste, consumption for hazardous/harmful/toxic materials, and frequency for environment accidents, energy consumption cost, waste treatment fee, waste discharge fee in their study about the environmental performance. Yang et al. (2013) study about the environmental performance and included these measures: reduction green house, waste water, noise pollution, other waste such as oily, sludge and rubbish, hazard, toxic and harmful consumption into their study. Klassen and Mclaughlin (1996) stated that environmental management performance is closely linked to organizational and functional strategies. Environmental management systems and green supply chains crucially have a positive relationship with environmental performance and organizational competitive advantage (Li, Ragu-Nathan, Ragu-Nathan, & Rao, 2006)

Align with this, the researchers used gas emission reduction, waste reduction, energy waste reduction and

less harmful-to-environment production as the measurement to measure the environmental performance.

6. METHODOLOGY

6.1. Population and samples

Population in this study are employees in food and beverage firms in Bangkok and Metropolitan area. With sampling computation employing unknown population (Silpcharu, 2005) at the confident level as of 95%, therefore, the samples were 400 managers, team leaders, head of division and department, and employees who are working in food and beverage firms in Bangkok and Metropolitan area for this study. After that, the researchers employed stratified random sampling to divide samples from Bangkok and its vicinities and hired convenience sampling to collect the data.

6.2. Research tools and data collection

Researcher used close-ended questionnaires divided into 3 parts. The first part consisted of check-list questions asking about the personal factors including gender, age, education, position, and working experience. The second and third part 2 consisted of rating scale questions (1-5 Likert's scale) asking about green supply chain management (green procurement, green manufacturing and green distribution and marketing) and environmental performance (gas emission reduction, waste reduction, energy waste reduction and less harmful-to-environment production).

6.3. Validity and reliability

For validity check, the researcher had experts in related fields inspect the accurate and consistency of contents and questions used in the questionnaires and recommend for improvement and edition. For reliability check, the finding discovered Cronbach's alpha coefficient as of .921 (green procurement), .876 (green manufacturing), .864 (green distribution and marketing)

and .880 (environmental performance) which they were higher than .80. This meant that the data derived from this survey questionnaire can be proceeded to have further study.

6.4. Data analysis

Researchers analyzed the data derived from samples by using descriptive statistics including frequency, percentage, mean and standard deviation and inferential statistics consisting of simple regression model analysis to oversee the effect of independent variables on dependence variables. All basic requirements before using the simple regression model analysis were required and tested.

7. RESULTS

7.1. Study of respondent's personal characteristics

TABLE 1: FREQUENCY AND PERCENTAGE OF RESPONDENT'S PERSONAL CHARACTERISTICS

Personal characteristics	Person (s)	Percentage
Gender		
Male	156	39.0
Female	244	61.0
Age		
Lower than 20 years old	0	0
21 – 30 Years old	191	47.8
31 - 40 Years old	167	41.8
41 - 50 Years old	28	7.0
Higher 50 Years old	14	3.5
Education		
Lower than bachelors' degree	23	5.8
Bachelors' degree	262	65.5
Master's degree	109	27.3
Higher than master's degree	6	1.5
Position		
Executives	12	3.0
Managers	95	23.8
Head of division/ department	126	31.5
Team leader	36	9.0
Others	131	32.8
Working experience		
Lower than 1 year	38	9.5
1 - 2 Years	54	13.5
3-5 Years	76	19.0
More than 5 years	232	58.0

From the Table 1, it can be briefly summarized that most of the respondents are female (244 persons or 61.0%), aged between 21 – 30 years old (191 persons or 47.8%, graduated in Bachelors' degree (262 persons or 65.5%), working in others such as operational staff (131 persons or 32.8%) and work more than 5 years in the manufacturer (232 persons or 58.0%).

7.2. Study of Green supply chain management and business performance in terms of environment

TABLE 2: MEAN AND S.D. OF GREEN SUPPLY CHAIN MANAGEMENT AND BUSINESS PERFORMANCE IN TERMS OF ENVIRONMENT

Items	Mean	S.D.	Interpretation
<i>Green supply chain management</i>			
Green procurement	3.957	.8181	High
Green manufacture	3.890	.7782	High
Green distribution and marketing	3.948	.8019	High
<i>Business performance</i>			
Environment performance	3.528	.6825	High

From the Table 2, it found that most respondents of this study have opinion about green supply chain management in terms of green procurement, green manufacture and green distribution and marketing in high level with mean score as of 3.957 (S.D = .8181), 3.890 (S.D. = .7782) and 3.948 (S.D. = .8019), respectively. In the meantime, the respondents of this study also have opinion about environment performance in high level with the mean score as of 3.528 (S.D. = .6825).

7.3. Result of hypothesis testing

Hypothesis 1: Green procurement has an effect on environmental performance in food and beverage firms in Bangkok and metropolitan area.

TABLE 3: SIMPLE REGRESSION ANALYSIS OF GREEN PROCUREMENT AFFECTING ON ENVIRONMENTAL PERFORMANCE.

Model	B	Std. Error	Beta	t	Sig.
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(Constant)	2.047	.151		13.559	.000
Green procurement	.374	.037	.449	10.015	.000
R = .449; R square = .201; S.E.E. = .6107; Durbin-Watson = 2.071; Sig. = 0.000					

Note: S.E.E. = Standard Error of the Estimate

From the Table 3, it found that the model has correlation coefficient (r) as of 0.449 and R square as of 0.201. This means that the green procurement has relationship with environmental performance in food and beverage firms in Bangkok and metropolitan area as of 44.9% and also the model can accurately predict the effect of green procurement on environmental performance as of 20.1%. In addition, the model has the unstandardized coefficients (b) as of 0.374 and standardized coefficients (β) as of .449. Align with these values, the green procurement can most significantly affect the environmental performance with weight as of 0.449, or accounted for 44.95%.

Hypothesis 2: Green manufacturing has an effect on environmental performance in food and beverage firms in Bangkok and metropolitan area.

TABLE 4: SIMPLE REGRESSION ANALYSIS OF GREEN MANUFACTURING AFFECTING ON ENVIRONMENTAL PERFORMANCE.

Model	B	Std. Error	Beta	t	Sig.
(Constant)	2.273	.162		14.018	.000
Green manufacturing	.323	.041	.368	7.892	.000
R = .368; R square = .135; S.E.E. = .6354; Durbin-Watson = 2.136; Sig. = 0.000					

Note: S.E.E. = Standard Error of the Estimate

From the Table 4, it found that the model has correlation coefficient (r) as of 0.368 and R square as of 0.135. This means that the green manufacturing has relationship with environmental performance in food and beverage firms in Bangkok and metropolitan area as of 36.8% and also the model can accurately predict the effect of green manufacturing on environmental performance as of 13.5%. In addition, the model has the unstandardized

coefficients (b) as of 0.323 and standardized coefficients (β) as of 0.368. Align with these values, the green manufacturing can most significantly affect the environmental performance with weight as of 0.368, or accounted for 36.8%.

Hypothesis 3: Green distribution and marketing has an effect on environmental performance in food and beverage firms in Bangkok and metropolitan area.

TABLE 5: SIMPLE REGRESSION ANALYSIS OF GREEN DISTRIBUTION AND MARKETING AFFECTING ON ENVIRONMENTAL PERFORMANCE.

Model	B	Std. Error	Beta	t	Sig.
(Constant)	2.382	.162		14.749	.000
Green distribution and marketing	.290	.040	.341	7.237	.000
R = .341; R square = .116; S.E.E. = .6424; Durbin-Watson = 2.128; Sig. = 0.000					

Note: S.E.E. = Standard Error of the Estimate

From the Table 5, it found that the model has correlation coefficient (r) as of 0.341 and R square as of 0.116. This means that the green distribution and marketing has relationship with environmental performance in food and beverage firms in Bangkok and metropolitan area as of 34.1% and also the model can accurately predict the effect of green manufacturing on environmental performance as of 11.6%. In addition, the model has the unstandardized coefficients (b) as of 0.290 and standardized coefficients (β) as of 0.341. Align with these values, the green distribution and marketing can most significantly affect the environmental performance with weight as of 0.341, or accounted for 34.1%.

8. CONCLUSION AND DISCUSSION

8.1. Discussion

8.1.1. Study of green procurement affecting environmental performance in food and beverage firms in Bangkok and metropolitan area.

From the study, the results indicated that green procurement has an effect on environmental performance in food and beverage firms in Bangkok and metropolitan area significantly because nowadays there are many requirements such as green industry, green contract and others for the organization to consider when they are doing business with the suppliers who supply them raw materials. With this, it can lead many organization to set the policy and their direction to purchase the raw material from the supplier who also commit to be friendly with environment. Not only that, the organizations also try to create relationship with environmental concern suppliers so that they would be more confident that their raw materials are supplied with environmental friendliness. To support this, the organizations also try to reduce the paper that is used to contact with supplier and replace it with information technology which it can give more accurate information (that for order and product). This result associated with study by Caniels, Gehrsitz, and Semeijn (2013) who studied about the participation of suppliers in greening supply chains: an empirical analysis of German automotive suppliers. Their study revealed the supplier readiness and customer requirements can lead to get green supply chain manage. Also, the study corresponded to Laari, Töyli, Solakivi, and Ojala, (2016) studied about firm performance and customer-driven green supply chain management with the aim to identify the direct and indirect relationships between customer-driven green supply chain management (GSCM) practices and environmental and financial performance in manufacturing. The findings confirm that GSCM can have an effect on environmental performance.

8.1.2. Study of green manufacturing affecting environmental performance in food and beverage firms in Bangkok and metropolitan area.

From the study, the results indicated that green manufacturing has an effect on environmental

performance in food and beverage firms in Bangkok and metropolitan area. Recently, the organization is trying to use the environmental friendly technology in producing the product and to reduce the greenhouse gases by using 3R concepts including reduce, reuse and recycle. Also, the organization try to develop the process of production and maximize the material utilization which they can give importance to the environmental friendliness easier. The result corresponded with Zhu et al. (2012) who studied about green supply chain management innovation diffusion and its relationship to organizational improvement: an ecological modernization perspective and their result indicated that the hazardous product reduction or avoidance during the manufacturing process are important in help improving environmental performance.

8.1.3. Study of green distribution and marketing affecting environmental performance in food and beverage firms in Bangkok and metropolitan area.

From the study, the results indicated that green distribution and marketing has an effect on environmental performance in food and beverage firms in Bangkok and metropolitan area. The distribution and marketing is another activities in the supply chain that take crucial part toward the environment. The organizations communicate with customers how to use the products correctly and encourage the customers to use friendly environmental products with thought of environmental issue. Also, the organization use the information technology such as social media network, e-mail and others, replacing using the paper in order to do the promotion. In addition, considering the way to distribute the products with the less harmfulness toward the environment implemented by many entrepreneurs. The result associated with Yang et al. (2013) who studied about the effect of green supply chain management on green performance and firm competitiveness in the context of container shipping in

Taiwan and their result indicated that green collaboration with customers such as company sets and achieves common goal, develops mutual understanding, works together with the aim at reducing environmental impact, plans to resolve problem together with customer can strengthen GSCM and provide service information on website in order to attract customers with green initiative and eco-service can enhance the environmental performance.

Overall, the green supply chain management has an effect on the environmental performance. However, the green supply chain management would be implemented successfully if there is the involvement at the top management level. Klassen and Mclaughlin (1996) stated that the green supply chain management closely linked to organizational and functional strategies. Li, Ragu-Nathan, Ragu-Nathan, & Rao, (2006) also revealed that the environmental management systems and green supply chains are crucially related to each other's and can create environmental performance and organizational competitive advantage.

8.2. Recommendation

After this study, the result can be implemented by the related managers, business owners or other stakeholders. According to study of effect of green procurement on environmental performance, the researchers recommend managers set the policy and their direction to purchase the raw material from the supplier who also commit to be friendly with environment. Moreover, the organizations also should build the relationship with the suppliers about the green material provision so that they would be more confident that their raw materials are supplied with environmental friendliness. Lastly, the organizations should reduce the paper that is used to contact with supplier and replace it with information technology which it can give more accurate information (that for order and product).

According to the study of effect of green manufacturing on environmental performance, the researchers recommended that the organization should use more technology in producing the product and reducing the greenhouse gases by using 3R concepts including reduce, reuse and recycle. Also, the organization should improve the process of production and maximize the material utilization which they can give importance to the environmental friendliness easier.

According to the study of effect of green distribution and marketing on environmental performance, the researchers recommended that the organizations should communicate with customers about the information of product how to use it. In addition, the organizations should also encourage the customers to use friendly environmental products with thought of environmental issue. Moreover, the organizations should use the information technology such as social media network, e-mail and others, replacing using the paper in order to do the promotion. Lastly, the organizations should consider the channel to distribute the products with the less harmfulness toward the environment.

8.3. Further study

After the study, the researcher would like to suggest the further studies as follows. The first is that the future research should extend the scope of the study method such as using qualitative research (depth interview or focused group) in order to have more insight data. The second is that, the future research should find and add more variables such as green logistic and green design that would be able to cover the industry chain which would give more view of the supply chain management. Lastly, the future research should also study other variables such as employees and their role toward the environmental concern so that there will be clearer how the organization would accomplish in doing business and be friend with environment.

9. ACKNOWLEDGMENT

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