Green Supply Chain Management: Its effect on Supply Chain Performance and Business Performance: A Case of Food and Beverage Industry in Bangkok and Metropolitan Area, Thailand

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Abstract — This research is based on quantitative research aiming at 1) studying green supply chain management practices, supply chain performance and business performance, 2) studying the effect of green supply chain management practices on supply chain performance and 3) studying the effect of supply chain performance on business performance in food and beverage industry in Bangkok and metropolitan area. Data collection was obtained from 400 managers or employees who were related to green supply chain management activities in the food and beverage business, located in Bangkok and Metropolitan area. Data analysis employed descriptive statistics including frequency, percentage, mean and standard deviation. Hypothesis testing employed structural equation model.

The result indicated that green procurement, green material management and manufacturing, green distribution and marketing, green design, green logistics, production performance, resource performance, flexibility performance and customer satisfaction were rated in high level with the mean score as of 3.961, 3.892, 3.922, 3.773, 3.849, 3.811, 3.441, 3.543 and 3.862, respectively. The hypotheses testing revealed that green supply chain management had directly affected supply chain performance including production performance, resource performance and flexibility performance with regression weight as of 0.435, 0.640 and 0.614, and indirectly affected business performance in terms of customer satisfaction with regression weight as of 0.617. In the meantime, supply chain performance (production performance, resource performance and flexibility performance) had directly affected business performance in terms of customer satisfaction with regression weight as of 0.283, 0.291 and 0.502, respectively, at the significant level as of .000.

Keywords – Green Supply Chain Management Practices, Supply Chain Performance, Business Performance, Food and Beverage Industry

I. INTRODUCTION

Supply chain management has become an important factor for organizations to succeed in business operations. However, recent business and society are considering the environmental conservation or "green concept" which plays an important role in the business operations of various organizations and increases the operational efficiency of the organization through the activities of the supply chain by incorporating the concept of environmental conservation or "green". It is finally known as green supply chain management.

For the green supply chain management, it was found that it has much importance. Zhu and Sarkis [1] pointed out that the green supply chain practices consist of 4 important dimensions: internal environmental management, external environmental management, reverse logistics and eco-design. In the meantime, Hervani, Helms and Sarkis [2] have divided activities related to green supply chain management into 5 activities, namely green procurement, green materials and production management, green distribution and marketing, green design and reverse logistics.

Although the organization uses environmental management strategies to measure the efficiency of the green supply chain performance of organization in order to achieve the performance of the business of the organization success. But the importance and interest in implementing green supply chain management in the organization is still less. In addition, studies on the performance measurement of the green supply chain are mostly to reflect the success [3].

Therefore, researchers are interested in studying the impact of the green supply chain practices on business performance through the supply chain performance in the food and beverage industry in Bangkok and its vicinity.

II. OBJECTIVES

The objectives of this research were to:

1) To study green supply chain management practices, supply chain performance and business performance in food and beverage industry in Bangkok and metropolitan area.

2) To study the effect of green supply chain management practices on supply chain performance in food and beverage industry in Bangkok and metropolitan area.

3) To study the effect of supply chain performance on business performance in food and beverage industry in Bangkok and metropolitan area.

III. CONCEPTUAL FRAMEWORK

The conceptual framework had been drawn as follows:

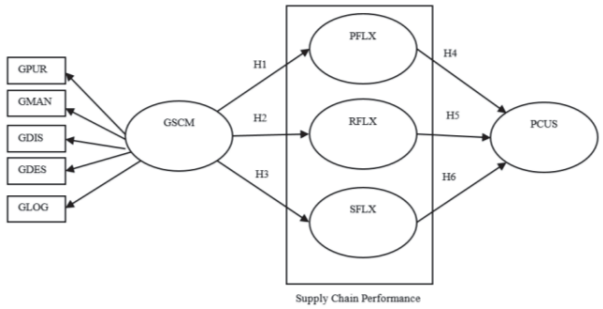

Figure 1. Conceptual Model

Remark: GPUR = green procurement, GMAN = green material management and manufacturing, GDIS = green distribution and marketing, GDES = green design, GLOG = green logistics, PFLX = production performance, RFLX = resource performance, SFLX = flexibility performance

IV. HYPOTHESES

The hypotheses (H) had been written as follows:

H1: Green supply chain management practices had an effect on supply chain performance in terms of production performance in food and beverage industry in Bangkok and metropolitan area.

H2: Green supply chain management practices had an effect on supply chain performance in terms of resource performance in food and beverage industry in Bangkok and metropolitan area.

H3: Green supply chain management practices had an effect on supply chain performance in terms of flexibility performance in food and beverage industry in Bangkok and metropolitan area.

H4: Supply chain performance in terms of production performance had an effect on business performance in terms of customer satisfaction in food and beverage industry in Bangkok and metropolitan area.

H5: Supply chain performance in terms of resource performance had an effect on business performance in terms of customer satisfaction in food and beverage industry in Bangkok and metropolitan area

H6: Supply chain performance in terms of flexibility performance had an effect on business performance in terms of customer satisfaction in food and beverage industry in Bangkok and metropolitan area.

V. LITERATURE REVIEWS

A. Green supply chain management practices

Green supply chain practices are the connection of production components and procedures by starting from the procurement process of raw materials to the provision of products or services to the users and by integrating the management of related companies in the supply chain with the consideration on business activities regarding the environment [4]. The green supply chain management consists of many components. These include the green procurement which is focusing on the procurement of goods and services that produce less environmental impact compared to similar products and services. Next, the green materials and production management which is related to the management of raw materials and production by using environmentally friendly technologies creating the most cost-effective production and increasing the efficiency and profitability as well as reducing the impact on the environment. Next, the green distribution and marketing which is the activity related to marketing and distributing the products and services with taking the environmental impact into account. Next, the green design or eco-design which is the activity considering the product design with serving environmentally friendly concepts, which starts from the selection of raw material types, appropriate procurement and production, related transportation, customer and others. The last is the green logistics which refers to the products or materials conveyed to the customers [5]. However, the green logistics including transporting and warehousing products or materials with regard to the environment as well.

B. Supply chain performance

Supply chain management focuses on the ways in which an organization can control the entire production process by using technology, modern management and the ability to improve the organizations to gain a competitive advantage. In managing the supply chain, the measurement issue which will monitor the efficiency or performance of the supply chain management performance is in discussion considering problems and obstacles in order to find the performance indicators, evaluation and implementation [6]. In fact, the supply chain efficiency normally has been measured by 4 categories: 1) cost, 2) combination of cost and customer response, 3) activity time and 4) flexibility in Supply chain [7,8,9].

Beamon [3] developed a system to measure the efficiency of operations of the supply chain by considering the productivity aspect, resource aspect and flexibility aspect in order to inherently measure the complexity of the supply chain. The productivity measure refers to the measurement focusing on the goal of reaching high level of customer service performance by focusing on supply chain management to obtain the products that are acceptable in order to avoid customers' dissatisfaction and shift to other supply chains. In the meantime, resource performance measurement refers to the goal to create a high level of organizational resource management efficiency considering the effectiveness, profitability and maximization. Lastly, the flexibility performance measurement refers to the creation of ability to respond to the changes in the organizational environment that is uncertain.

C. *Business performance in terms of customer satisfaction*

The concept of business performance is derived from the idea of measuring the effectiveness of work. The organization executives often adopt organizational performance metrics for strategic management and management [10]. Recently, the business performance measurement is widely accepted and used to measure the effectiveness of the organization by being designed to measure organizational success in terms of financial concepts and marketing concept [11]. The marketing idea focused on fully responding to customer needs. The organization must consider what to do, therefore customers will be satisfied and willing to buy or pay for the organization. The purpose of customer satisfaction often focuses on retaining the existing customers of the organization, increasing market share, adding new customers, offering quality products, providing fast service or maintaining the reputation of the business in the customer's perspective. The success of the business may perhaps be defined as one of the objectives measurement, depending on the vision of the organization leaders and executives who must pay special attention to customers and have clear performance indicators in providing customer service. Indeed, the measure must reflect the factors that the company expects customers to pay special attention to, such as the importance of operations in providing services, the time to deliver products to customers, the quality of products delivered to customers, the less returned or damaged products, as for instance. Therefore, creating satisfaction for customers at any level, the measurement to improve the satisfaction of customers is interesting.

VI. RESEARCH METHODOLOGY

A. *Population, Samples and Sampling Method*

Population in this study was unknown number of employees working in food and beverage companies which are located in Bangkok and its vicinity including Nakhon Pathom, Nonthaburi, Pathum Thani, Samut Prakarn, and Samut Sakhon Province. These companies must pass the green industry assessment from the Ministry of Industry at level 3, which indicates that the company has implemented a green operating system in the company [12]. Then, the researchers used Cochran [13] and the samples were 400 employees at the confident level as of 95%. The sampling method was purposive and convenience sampling method.

B. *Research Tools and Data Collection*

Researchers used close–ended survey questionnaires divided into 4 parts. The first part consisted of check-list questions asking about the personal factors including gender, age, marital status, education level, position, monthly income and work experience. The second, third and fourth part consisted of rating scale questions (1-5 Likert scale) asking about green supply chain management practices, supply chain performance and business performance in terms of customer. The score "1" refers to "Not at all agreeable", "2" refers to "Slightly agreeable", "3" refers to "Moderately agreeable", "4" refers to "highly agreeable" and "5" refers to "Extremely agreeable" on the statement in the questionnaires. For data collection, the researchers employed purposive and convenience sampling method to distribute the questionnaires. After the questionnaires returned, the researchers inspected the completion and correctness.

C. *Validity and Reliability*

For validity check, the researchers had experts in related fields inspect the accurateness and consistency of contents and questions, and recommend the improvement and edition. For reliability check, the researchers used the Cronbach's alpha coefficient. Its value was .921 for GPUR, .876 for GMAN, 864 for GDIS, .866 for GDES, .899 for GLOG, .761 for PFLX, .681 for RFLX, .786 for SFLX and .706 for PCUS. These values were higher than 0.70, this meant that the data derived from this survey questionnaire can be proceeded to have further study.

D. *Measurments*

Green Supply Chain Management Practices

The measurement of green supply chain management practices consisted of five dimensions including green procurement, green material management and manufacturing, green distribution and marketing, green design and green logistics. The sample statements include "the company has green policy and ways to purchase the inputs from the supplier"; "the company uses and improve process and equipment to produce the products with less pollution"; "the company communicates with the customers about the green concept given to product and process"; "the company designs the products with the green concepts" and "the company transports the products with great care of environmental issues"

Supply Chain Performance

The measurement of supply chain performance consisted of three dimensions including production performance, resource performance and flexibility performance. The sample statements included "the

company can produce the products according to the needs of customer"; "the company can reduce the waste and the cost of production" and "the company can adjust the production according to the changes from customers".

Business Performance in terms of customer satisfaction

The measurement of business performance in terms of customer satisfaction consisted of 1 dimension. The sample statement included "the customers satisfy with the products and services".

E. 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 structural equation modeling (SEM). All basic requirements before using the SEM including skew, kurtosis, multiple correlation, were required and tested. The model-fit indices, referring to the Table I, including relative chi-square (Cmin/df is not over than 2), Chi-square probability Level (p-value should be more than 0.05), goodness of fit index (GFI should be more than 0.90), adjusted goodness of fit (AGFI should be more than 0.90), standardized root mean square residual (SRMR should be Less than 0.08), root mean square error of approximation (RMRSEA should be less than 0.08), Tucker Lewis Index (TLI should be more than 0.90), comparative fit index (CFI should be more than 0.90), normed fit index (NFI should be More than 0.90) were employed to oversee the fitness of the model [14,15,16,17]. The modification indices were considered when the model was not fit.

VII. Results

The study of "The Effects of Green Supply Chain Management Practices on Business Performance through Supply Chain Performance in Food and Beverage Industry in Bangkok and Metropolitan Area, Thailand" was displayed as follows.

A. Study of Respondents' General Information, Green Supply Chain Mangement Practices, Supply Chain Performance, Business Performance in terms of Customer Satisfaction

- Study of respondents' general information

TABLE I. Frequency and Percentage of Employee's General Information

Items	Frequency	Percentage
Gender		
Male	156	39
Female	244	61
Age		
Lower than 20 years old	0	0
Between 21 – 30 years old	191	47.8
Between 31 - 40 years old	167	41.8
Between 41 - 50 years old	28	7
More than 50 years old	14	3.5
Marital Status		
Single	294	73.5
Married	86	21.5
Divorced	20	5
Education level		
Lower than bachelor's degree	23	5.8
Bachelor's degree	262	65.5
Master's degree	109	27.3
Higher than Master's degree	6	1.5
Position		
CEO/ Business owner	12	3
Managers	95	23.8
Head of department/division	126	31.5
Team leader	36	9
Others such an operational level	131	32.8
Income		
Less than or equal to 15,000 baht	31	7.8
Between 15,001 baht – 20,000 baht	61	15.3
Between 20,001 baht – 25,000 baht	69	17.3
Higher than 25,001 Baht	239	59.8
Work experience		
Lower than 1 year	38	9.5
Between 1 - 2 years	54	13.5
Between 3-5 years	76	19
More than 5 years	232	58
Total	**400**	**100**

From the Table I, there were 400 employees answering the questionnaires. As a result, it was found that most of the respondents were Female (61%), aged Between 21 – 30 years old (47.8%), were Single (73.5%), graduated from Bachelor's degree (65.5%) worked in operational level (32.8%), obtained monthly income Higher than 25,001 Baht (59.8%) and worked in this company for More than 5 years (58%).

- Green Supply Chain Management Practices, Supply Chain Performance, Business Performance in terms of Customer Satisfaction

TABLE II. Mean, Standard Deviation, Skewness, Kurtosis and Interpretation of Each Dimension

Items	Mean	Std. Deviation	Skewness	Kurtosis	Level
GPUR	3.961	0.818	-0.615	-0.622	High
GMAN	3.892	0.779	-0.662	-0.435	High
GDIS	3.922	0.792	-0.660	-0.456	High
GDES	3.773	0.724	-0.942	-0.025	High
GLOS	3.849	0.758	-1.284	1.188	High
PFLX	3.811	0.591	-0.625	0.108	High
RFLX	3.441	0.664	0.039	1.154	High
SFLX	3.543	0.670	-0.460	0.718	High
GPCUS	3.862	0.593	-0.692	0.932	High

Remark: GPUR = green procurement, GMAN = green material management and manufacturing, GDIS = green distribution and marketing, GDES = green design, GLOG = green logistics, PFLX = production performance, RFLX = resource performance, SFLX = flexibility performance, PCUS = customer satisfaction

From the study, the Table II indicated that the mean score of the green procurement (GPUR), green material management and manufacturing (GMAN), green distribution and marketing (GDIS), green design (GDES), green logistics (GLOG), production performance (PFLX), resource performance (RFLX), flexibility performance (SFLX) and customer satisfaction (PCUS) was in high level with the mean score as of 3.961, 3.892, 3.922, 3.773, 3.849, 3.811, 3.441, 3.543 and 3.862, respectively.

In addition, the study also revealed that the skewness values were in good number which they are higher than average. Also, the kurtosis values felt between -3 and +3, meaning that all data was distributed normally and appropriate in using for constructing the structure.

In addition, before employed SEM, the researchers tested the correlation of the variables to avoid the multicollinearity. The result found that the variables have coefficient (r) within the acceptable values (not higher than 0.90) as recommended by Tabachnick and Fidell [14].

B. Final Model

- Adjusted Model

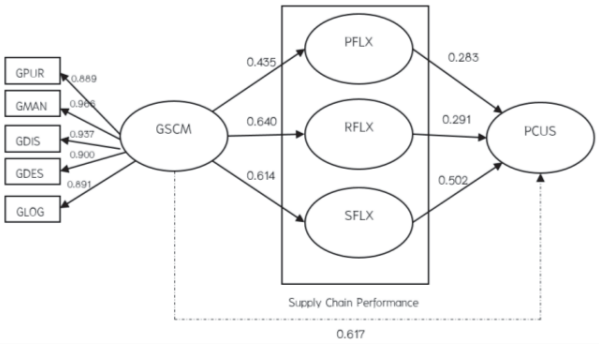

Figure 2. Adjusted Model

Remark: GSCM = green supply chain management, GPUR = green procurement, GMAN = green material management and manufacturing, GDIS = green distribution and marketing, GDES = green design, GLOG = green logistics, PFLX = production performance, RFLX = resource performance, SFLX = flexibility performance, PCUS = customer satisfaction

- Good-fit model analysis and modification

TABLE III. GOOD-FIT MODEL ANALYSIS AND MODIFICATION

Good-fit model indices	Adjusted
Cmin/df	2.657
df	455
p-value	0.000
GFI	0.865
AGFI	0.813
SRMR	0.054
RMRSEA	0.064
TLI	0.915
CFI	0.935
NFI	0.901

From the Table III, the model-fit indices showed the values which were adjusted according to the acceptability of good-fit model. The adjustment was made based on considering the modification indices.

- Summary of standardized estimate, standard error and critical value

TABLE IV. STANDARDIZED ESTIMATE, STANDARD ERROR AND CRITICAL VALUE

Items			Estimate	S.E.	C.R.	P
GSCM	--->	PFLX	0.435	0.065	4.641	***
GSCM	--->	RFLX	0.640	0.094	11.911	***
GSCM	--->	SFLX	0.614	0.077	7.466	***
PFLX	--->	PCUS	0.283	0.147	3.158	0.002
RFLX	--->	PCUS	0.291	0.037	5.169	***
SFLX	--->	PCUS	0.502	0.112	5.404	***

Remark: ** refers to 0.01 and *** refers to 0.001.

From the Table IV, the summary of standardized estimate, standard error and critical value (t) of GSCM had positive direction on PFLX, RFLX and SFLX and PFLX, RFLX and SFLX had positive direction on PCUS at the statistically significant level as of 0.001 and 0.01.

- Total Effect, Direct Effect and Indirect Effect

TABLE V. TOTAL EFFECT

Item	Total Effect			
	PFLX	RFLX	SFLX	PCUS
GSCM	0.435	0.640	0.614	0.617
PFLX	-	-	-	0.283
RFLX	-	-	-	0.291
SFLX	-	-	-	0.502

Remark: ** refers to 0.01 and *** refers to 0.001.

Remark: GSCM = green supply chain management, PFLX = production performance, RFLX = resource performance, SFLX = flexibility performance, PCUS = customer satisfaction

TABLE VI. DIRECT EFFECT

Item	Direct Effect			
	PFLX	RFLX	SFLX	PCUS
GSCM	-	-	-	0.617
PFLX	-	-	-	0.283
RFLX	-	-	-	0.291
SFLX	-	-	-	0.502

Remark: ** refers to 0.01 and *** refers to 0.001.
GSCM = green supply chain management, PFLX = production performance, RFLX = resource performance, SFLX = flexibility performance, PCUS = customer satisfaction

TABLE VII. INDIRECT EFFECT

Item	Indirect Effect			
	PFLX	RFLX	SFLX	PCUS
GSCM	-	-	-	0.617
PFLX	-	-	-	-
RFLX	-	-	-	-
SFLX	-	-	-	-

Remark: ** refers to 0.01 and *** refers to 0.001.
GSCM = green supply chain management, PFLX = production performance, RFLX = resource performance, SFLX = flexibility performance, PCUS = customer satisfaction

From the Table V, VI and VII, the study revealed that GSCM had positive direction on PFLX, RFLX and SFLX and PFLX, RFLX and SFLX had positive direction on PCUS. In the meantime, GSCM had positive indirection on PCUS at the statistically significant level as of 0.001 and 0.01.

C. Hypothesis Testing

- *H1: Green supply chain management practices had an effect on supply chain performance in terms of production performance in food and beverage industry in Bangkok and metropolitan area.*

From the study, it found that the Green supply chain management practices had an effect on supply chain performance in terms of production performance in food and beverage industry in Bangkok and metropolitan area at the statically significant level as of 0.001 due to the p-value is lower than 0.001. In addition, the study revealed that standardized estimate was as of 0.435, standard error was as of 0.065 and critical value (t-value) was as of 4.641.

- *H2: Green supply chain management practices had an effect on supply chain performance in terms of resource performance in food and beverage industry in Bangkok and metropolitan area.*

From the study, it found that the green supply chain management practices had an effect on supply chain performance in terms of resource performance in food and beverage industry in Bangkok and metropolitan area at the statically significant level as of 0.001 due to the p-value is lower than 0.001. In addition, the study revealed that standardized estimate was as of 0.640, standard error was as of 0.094 and critical value (t-value) was as of 11.911.

- *H3: Green supply chain management practices had an effect on supply chain performance in terms of flexibility performance in food and beverage industry in Bangkok and metropolitan area.*

From the study, it found that the Green supply chain management practices had an effect on supply chain performance in terms of flexibility performance in food and beverage industry in Bangkok and metropolitan area at the statically significant level as of 0.001 due to the p-value is lower than 0.001. In addition, the study revealed that standardized estimate was as of 0.614, standard error was as of 0.077 and critical value (t-value) was as of 7.466.

- *H4: Supply chain performance in terms of production performance had an effect on business performance in terms of customer satisfaction in food and beverage industry in Bangkok and metropolitan area.*

From the study, it found that the Supply chain performance in terms of production performance had an effect on business performance in terms of customer satisfaction in food and beverage industry in Bangkok and metropolitan area at the statically significant level as of 0.002 due to the p-value is lower than 0.01. In addition, the study revealed that standardized estimate was as of 0.283, standard error was as of 0.147 and critical value (t-value) was as of 3.158.

- *H5: Supply chain performance in terms of resource performance had an effect on business performance in terms of customer satisfaction in food and beverage industry in Bangkok and metropolitan area*

From the study, it found that the Supply chain performance in terms of resource performance had an effect on business performance in terms of customer satisfaction in food and beverage industry in Bangkok and metropolitan area at the statically significant level as of 0.001 due to the p-value is lower than 0.001. In addition, the study revealed that standardized estimate was as of 0.291, standard error was as of 0.037 and critical value (t-value) was as of 5.169.

- *H6: Supply chain performance in terms of flexibility performance had an effect on business performance in terms of customer satisfaction in food and beverage industry in Bangkok and metropolitan area.*

From the study, it found that the Supply chain performance in terms of flexibility performance had an effect on business performance in terms of customer satisfaction in food and beverage industry in Bangkok and metropolitan area at the statically significant level as of 0.001 due to the p-value is lower than 0.001. In addition, the study revealed that standardized estimate was as of 0.502, standard error was as of 0.112 and critical value (t-value) was as of 5.404.

VIII. DISCUSSION, LIMITATION AND RECOMMENDATION

A. Discussion of the Study

- *Green supply chain management practices had an effect on supply chain performance in terms of product performance, resource performance and flexibility performance in food and beverage industry in Bangkok and metropolitan area.*

From the study, it was found that the green supply chain management practices had an effect on supply chain performance in terms of product performance, resource performance and flexibility performance in food and beverage industry in Bangkok and metropolitan area. This is due to the effective green supply chain practices such as building good relationships with suppliers to deliver environmentally friendly production factors, communicating with customers about how to use the product correctly, using information technology to help promote products, selecting product distribution that less impacts the environment, transporting products with full capacity, using technology to manage the product design in order to meet the needs of customers both in terms of time and speed and other activities that have been conducted by the companies can result in good product performance to the company. This result corresponds to Caniëls, Gehrsitz and Semeijn [18], who studied about supplier participation in the implementation of the green supply chain management. The study found that the availability of suppliers and customers' needs is a key driving factor in the supplier's participation, which is a key driving force in the green supply chain practice for the organization. When the company has a good management of the green supply chain, it will result in a competitive advantage, which corresponds to study done by Li, Ragu-Nathan, Ragu-Nathan and Subba Rao [19] who have studied the impact of the supply chain management approach on competitive advantage and organizational performance. In addition, the result is consistent with Yang, Lu, Haider and Marlow [20] who have studied the impact of the green supply chain practice on competitiveness in the context of container shipping in Taiwan. The results of the research show that the company's environmentally friendly performance and environmental collaboration can create the company's competitiveness and have a positive effect on competition.

Furthermore, the green supply chain management can have positive impact on resources performance since the green ways implemented in managing supply chain can help manage the resources of the company as well. The resources of the company can also imply to financial aspect, human aspect, technological aspect or raw material and equipment, as for instance. For example, the green supply chain management foster the company to consider to use the environmental technology or concepts of reuse, recycle and reduce in the company. With this, the company which is green will try to save the energy, design the green policy and manipulate the green practice in the organization, which finally create the better resource performance. This study is consistent with Tippayawong, Tiwaratreewit, and Sopadang [21] who have studied about the positive effects of green supply chain operations affecting the financial performance of electronic companies in Thailand. The results showed that green manufacturing practices and green logistics practices were highly correlated with the financial performance of the organization. In addition, it was consistent with Zhu and Cote [22] who found important evidence indicating that green supply chain management or environmental management is an important issue that leads to lower production costs by eliminating waste. The study also was in accordance with Rao and Holt [23], suggesting that organizations that have adopted green supply chain practices in Southeast Asia have increased competitive advantage and economic efficiency.

Lastly, the effective green supply chain practices, such as building relationships with suppliers, developing information technology and databases for accurate orders and production forecasting, communicating with customers to match the need accurately, using information technology to help promote products, designing products and packaging that are suitable for moving and others as for instance, can create the company's ability and flexibility to adjust production to accommodate the volume of orders or the number of customers that are uncertain. In addition, it can also help distribute products widely to correspond the needs of the target market more easily. This study corresponds to Beamon [3] mentioning that the flexibility is the ability to respond and keep following the changes that happen in the supply chain.

- *Supply chain performance in terms of product performance, resource performance and flexibility performance had an effect on business performance in terms of customer satisfaction in food and beverage industry in Bangkok and metropolitan area.*

From the study on the supply chain performance, the study indicated that supply chain performance in terms of product performance can create the customer satisfaction in the food and beverage industry In Bangkok and its vicinity. This is due to the fact that the valuable activities in supply chain, such as the ability to deliver products on time, the speed of production to meet the needs of customers, the use of technology and information technology in environmental friendly production, the fast and up-to-date service to match the needs of customers, the combination of current competition in the business and competitive advantage derived business management, especially the management of supply chain. The study corresponds to Laari, Töyli, Solakivi and Ojala [24] who have studied the effectiveness of the company and guidelines for green supply chain and revealed that the green supply chain management can drive and improve the efficiency of the business performance.

In addition, the study also found that supply chain performance in terms of resource performance can affect customer satisfaction in the food and beverage industry in Bangkok and its vicinity. This is because the organization has lower production costs, lower distribution costs, lower inventory costs as well as spend more time efficiently in managing the production resources from import of inputs from suppliers more, making the organization more capable of caring for customers. The study is matched with Laari, Töyli, Solakivi and Ojala [24] who found that green supply chain can improve the efficiency of business performance.

Finally, supply chain performance in terms of flexibility can affect the customer satisfaction in the food and beverage industry in Bangkok and its vicinity. This is

because the organization has regularly monitored the relevant environment that has enabled the organization to adjust their production to accommodate the volume of orders or the number of customers that are uncertain. The organization can also distribute products widely and launch new products / services in response to changes in the environment and needs of the target market [3], which finally make customers more satisfied with products / services offered by the company [25].

B. Limitation of the Study

Firstly, this study was limited to the quantitative research which the study gain the data from the self-reported questionnaire only. Secondly, the study was conducted in only single area which is food and beverage. Thirdly, the variables just focused on green supply chain management, supply chain performance and customer satisfaction, which there perhaps be another important variables to be studied.

C. Recommendation of the Study

- *For Practitioners*

1) Based on studies on the green supply chain practices including Green procurement, Green materials and production management, Green distribution and marketing, Green design and green logistics found that all aspects were at a high level. Therefore, to increase a level of opinion about managing the green supply chain, the organizations as well as executives must focus on supply chain management by inserting importance and priority to the organization's strategy, goals, policies as well as guidelines which can be in personal or impersonal ways. Also, the organizations as well as executives must continue to stimulate the work of green supply chain management by creating an atmosphere of work, creating a culture for working and others.

2) From the study of supply chain performance in terms of product performance, the study found that it had a direct impact on the business operations. In order to create customer satisfaction, the organization must have the ability to deliver products on time, quick response to meet the needs of customers, utility of technology and information to produce product more efficient with good orders and production plans.

3) From the study on supply chain performance in terms of resource performance, it found that resource management had a direct impact on the business operations of customer satisfaction. Therefore, the organizations must find ways to reduce production costs, distribution costs and inventory cost and spend time managing resources effectively in order to produce and import inputs from suppliers in order to help create customer satisfaction.

4) Based on studies of supply chain performance in terms of flexibility performance, the study found that flexibility performance had a direct impact on the business operations of customers' satisfaction. Therefore, organizations must be able to adjust production in order to support the order quantity or the number of customers that are uncertain. In addition, the company must be able to distribute products widely, to launch new products / develop, to respond to changing needs of the target market with the concept of green.

- *For Future Studies*

1) The next study use the qualitative research techniques to interview employees in order to have clear understand about green supply chain management and related variables satisfying the customers' satisfaction.

2) The next study should expand their study area to other company in order to obtain the different methods and opinion toward green supply chain management.

3) The next study should focus on other variables, for example, the variables focusing on bettering green supply chain management by considering the organizational culture, leadership styles, corporate identity and other important variables.

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