The Impact of Employees' Demographic Factors and External Business Enviorment on Green Supply Chain Adoption: A Case of Small-Medium Enterprises with High Growth Rate in Thailand

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Abstract — Due to the importance of green supply chain influencing business performance, there should be an interest in finding factors affecting green supply chain adoption. Accordingly, the objectives of this research were to study about the factors including employees' demographic factors and external business environment factors influenced green supply chain adoption in Thai small-medium enterprises with high growth rate. The data was collected from 400 from employees, managers, and owners in Thai small-medium enterprises with high growth rate by using questionnaires. The purposive sampling method followed by convenient sampling method were used for data collection. Statistics used in the data analysis include descriptive statistics covering frequency, percentage, mean, standard deviation, and multiple regression analysis. The findings indicated that different employees with age, position, education, monthly income, and experience in organization had different degree of green supply chain adoption. In addition, the external business environment factors influenced green supply chain adoption in Thai small-medium enterprises with high growth rate at the statistically significant level as of 0.05. The result from this study can help entrepreneurs to manage the related factors in order to promote adoption of green supply chain management in the company.

Keywords – Green Supply Chain Management, Adoption, Small-Medium Enterprises with High Growth Rate

I. INTRODUCTION

Recently, green supply chain management is interested by many companies including the small and medium enterprise because it can create effective management in all processes from purchasing, operating, and distributing things from suppliers to customers, for example, reverse logistics, green design, green purchasing, green manufacturing, green packaging, green outsourcing, green warehousing, and green marketing [1, 2, 3, 4, 5, 6, 7, 8]. Furthermore, it can also create the satisfactory benefits to the companies, including economic aspects, social aspect, and environmental aspect. However, the recent problems and obstacles that company is encountering is that the companies cannot still adopt the green supply chain management. The terms of adoption mean the way to utilize the thing to benefit the organization [9], which consist of 5 stages from Rogers's [10] including awareness, interest, evaluation, trial, and adoption. In accordance, this is because there is a lot of factors from external sides such as government, customers, suppliers, competitors, and technology providers [6, 11]. These external factors are very important for helping the utilization of green supply chain management. In accounting to this, it is necessary to study about the factors affecting green supply chain adoption in small-medium enterprises with high growth rate in Thailand. The result of this study can benefit the

enterprises with high growth rate in Thailand and they will finally obtain economic, social, and environmental performance.

II. OBJECTIVES

Regarding the significance of external business environment on green supply chain adoption; therefore, the objectives of this research were to study about the factors including employees' demographic factors and external business environment factors influenced green supply chain adoption in Thai small-medium enterprises with high growth rate.

III. CONCEPTUAL FRAMEWORK

The conceptual framework had been drawn as follows:

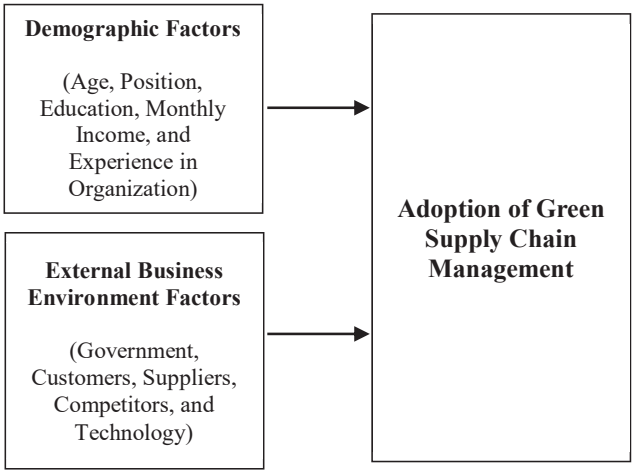

Figure 1. Conceptual Model

IV. HYPOTHESES

The hypotheses (H) had been written as follows:

H1: Different Employees had different degree of green supply chain adoption in Thai Small-Medium Enterprises with High Growth Rate.

H2: External business environment factors influenced green supply chain adoption in Thai small-medium enterprises with high growth rate.

V. LITERATURE REVIEWS

A. *Problems and Obstacles Related to External Business Environment Factors*

The theory of problem refers to the difficulty that occur to the human' attitude and behavior interacting to the subjects therefore there should be a lead to find the problem solving [12]. In the meantime, Duncker [13] advocated that the problem refers to the difficulty and uncertainty that occur at human and they do not know how to solve it. In the other aspect, the obstacle means something that interrupt or block the tasks or goals to be achieved, which is similar to the definition identified by Marguc et al. [14] in studying about obstacles impacting thinking and beyond thinking. The terms of problems and obstacles have been employed in various fields of the study since it is the first stage opening the ways to find the best solutions. In adopting to green supply chain management, the study done by Govindan et. al. [5] suggested to study the problems and obstacles in green supply chain management implementation in Indian industries. Meanwhile, Tseng et. al. [4] attempted to study future challenges on green supply chain management in order that the appropriate solution can be prepared. Literature review indicated that the problems and obstacles in adopting green supply chain management in organization can be explicitly from external business environment factors such as government, customers, suppliers, competitors, and technology providers [6]. In addition, Dhull, and Narwal [11] who studied about drivers and barriers in green supply chain management adaptation and found that external factors such as government support is important for companies for sustainable development. This is corresponding to the study done by Crum et al. [15] and Jenkin et al. [16] who found that both information technology and cleaner technology for production can link to the success of green supply chain practice adoption. Finally, Yang [17] who study about the analysis of institutional pressures, green supply chain management, and green performance in the container shipping context also indicated the importance of external factors on green supply chain management adoption.

B. *Adoption of Green Supply Chain Management*

Adoption is the way people behave to interact with choices occurs and benefit the choices effectively [9]. The elements of adoption can include organizational policy, supports, budgets, planning, and ways to achieve the effective adoption. The stages of adoption from Rogers's [10] can be about 5 stages consisting of awareness, interest, evaluation, trial, and adoption. The adoption concept has been used in various fields including green supply chain management. For green supply chain management, it consists of reverse logistics, green information technology and systems, green design, supplier environmental collaboration, customer environmental collaboration, internal management, green purchasing, green manufacturing, green packaging, green distribution and packaging, green logistics, green outsourcing, green warehousing and green marketing [1, 2, 3, 4, 5, 6, 7, 8]. Recently, adoption of green supply chain management has been found various problems and obstacles which it is needed to be understood so that there can be ways to remedy such problems and obstacles. Mostly, the problems and obstacles related to green supply chain management can be about the external business environment factors such as government, customers, suppliers, competitors, and technology providers [6].

VI. Research Methodology

A. Population and Samples

The samples were calculated by Krejcie, & Morgan, [18] and selected as of 400 employees at the confident level as of 95%.

B. Research Tools and Data Collection

Researchers used close–ended survey questionnaires divided into 3 parts. The first part consisted of check-list questions asking about the personal factors including gender, age, education level, position, working experience and monthly income. The second and third part consisted of rating scale questions (1-5 Likert scale) asking about problems and obstacles related to external business environment factors and adoption of green supply chain management. 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. The value was 0.853 for government, 0.878 for customers, 0.926 for suppliers, 0.879 for competitors, and 0.926 for technology. In the meantime, Cronbach's alpha coefficient of adoption of green supply chain management as of 0.939. 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

The problems and obstacles related to external business environment factors consisted of 16 items related to government, customers, suppliers, competitors, and technology providers, which questions can be about, for instances, difficulty in relating with suppliers, lack of government supports, lack of technology provision. In the meantime, the adoption of green supply chain management consists of 4 items identifying policy, budget, practices, and planning in adopting green supply chain management.

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 multiple regression. The research result was presented in tabulated and descriptive writing.

VII. Results

The result of this study can be mentioned as follows.

A. Study of Respondents' General Information, Problems and Obstacles Related to External Business Environment Factors, and Green Supply Chain Adoption

- Study of respondents' general information

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

Personal Factors	Frequency	Percent
Gender		
Male	199	49.8
Female	201	50.2
Age		
Less than 21 years old	0	0.0
Between 21-30 years old	224	56.0
Between 31- 40 years old	144	36.0
Between 41-50 years old	26	6.5
More than 51 years old	6	1.5
Education Level		
Lower than Bachelor's degree	10	2.5
Bachelor's degree	373	93.3
Master's degree	17	4.3
Higher than master's degree	0	0.0
Position		
Business Owner	24	6.0
Executive/ Manager	43	10.8
Project Header	15	3.8
Operational Staff	318	79.5
Working Experience		
Less than 1 year	81	20.3
Between 1-5 years	230	57.5
More than 5 years	89	22.3
Monthly Income		
Less than 15,000 baht	56	14.0
Between 15,001 - 25,000 baht	296	74.0
Between 25,001 - 35,000 baht	46	11.5
More than 35,001 baht	2	0.5
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 (50.2%), aged between 21-30 years old (56.0%), graduated bachelor's degree (93.3%), worked as operational staff (79.5%), had working experience between 1-5 years (57.5) and earned monthly income between 25,001 - 25,000 baht (74.0%).

- Study of Problems and Obstacles Related to External Business Environment Factors, and Green Supply Chain Adoption

TABLE II. MEAN, STANDARD DEVIATION AND INTERPRETATION OF PROBLEMS AND OBSTACLES RELATED TO EXTERNAL BUSINESS ENVIRONMENT FACTORS, AND GREEN SUPPLY CHAIN ADOPTION

Items	Mean	S.D.	Interpretation
External Business Environment Factors			
- Government	3.91	0.76	High
- Customers	3.73	0.92	High
- Suppliers	3.81	0.97	High
- Competitors	3.33	0.98	Medium
- Technology	3.73	1.04	High
Green Supply Chain Adoption	3.75	0.92	High

From the study, the Table II indicated that the mean scores of studied items including government, suppliers, adoption of green supply chain management, customers, technology providers, and competitors, were all in high level with mean score as of 3.91, 3.81, 3.75, 3.73, and 3.73, expect problems and obstacles related to external factors in terms of competitors with mean score as of 3.33.

B. *Hypothesis Investigation*

- H1: Different Employees had different degree of green supply chain adoption in Thai Small-Medium Enterprises with High Growth Rate.

TABLE III. T-VALUE, F-VALUE AND HYPOTHESIS RESULT

Personal Factors	Green Supply Chain Adoption		
	T-value/ F-value	Sig	Hypothesis Result
Gender	t = -1.02	0.310	Rejected
Age	F = 17.047	0.000	Accepted
Education	F = 5.027	0.007	Accepted
Position	F = 11.385	0.000	Accepted
Experience in Organization	F = 7.950	0.000	Accepted
Monthly Income	F = 7.150	0.000	Accepted

From the study, the Table III indicated that different employees with age, position, education, monthly income, and experience in organization had different degree of green supply chain adoption in Thai small-medium enterprises with high growth rate at the statistically significant level as of 0.05. Meanwhile, different employees with gender had no different degree of green supply chain adoption in Thai small-medium enterprises with high growth rate at the statistically significant level as of 0.05.

- H2: External business environment factors influenced green supply chain adoption in Thai small-medium enterprises with high growth rate.

TABLE IV. MULTIPLE REGRESSION RESULT

External Business Environment Factors	Green Supply Chain Adoption			t	Sig.
	B	Std. Error	Beta		
(Constant)	0.042	0.102		0.411	0.681
Suppliers	0.371	0.041	0.393	9.128	0.000
Government	0.276	0.041	0.228	6.765	0.000
Technology	0.274	0.039	0.311	6.971	0.000
Competitors	0.058	0.028	0.062	2.080	0.038
$R = 0.910$; R^2: = 0.827; Adjusted R^2: = 0.826; S.E.E. = 0.384; Durbin-Watson = 1.459; F = 473.369; Sig. = 0.000					

From the study, the Table IV found that external business environment factors influenced green supply chain adoption in Thai small-medium enterprises with high growth rate at the statistically significant level as of 0.05. In addition, the model has correlation coefficient (r) as of 0.910, meaning that the external business environment has high positive relationship with green supply chain adoption in Thai small-medium enterprises with high growth rate. The Adjusted R^2 is equal to 0.826, meaning that the model can accurately predict the effect of external business environment on business performance as of 82.6% at the significant level as of 0.05. The equation can be written as follows:

$$Y = 0.042 + 0.371 \text{ (Suppliers)} + 0.276 \text{ (Government)} + 0.274 \text{ (Technology)} + 0.058 \text{ (Competitors)}$$

VIII. DISCUSSION, LIMITATION AND RECOMMENDATION

A. *Discussion of the Study*

- *Different Employees had different degree of green supply chain adoption in Thai Small-Medium Enterprises with High Growth Rate*

The study indicated that different employees with age, position, education, monthly income, and experience in organization had different degree of green supply chain adoption in Thai small-medium enterprises with high growth rate at the statistically significant level as of 0.05. This is because that the adoption of green supply chain management also requires knowledge, skills, motivation, and experiences related to the works that associated with environmental management which there are a lot of technical management. Therefore, the organizational trainings related to green knowledge and green adoption were undertaken. The study matched with the study done by Teixeira et al. [19] studying about green training and green supply chain management: evidence from Brazilian firms. Furthermore, the study matched with Chaimongkol, Onputtha, and Chienwattanasook [20] who studied about transactional leadership and environmental supply chain

management in food and beverage business and found that age and education had significant impact on green supply chain adoption.

Meanwhile, different employees with gender had no different degree of green supply chain adoption in Thai small-medium enterprises with high growth rate at the statistically significant level as of 0.05. This is because the gender equality was promoted in the organization where both male and female employees were treated equally, they are assigned equally. The study matched with Chaimongkol, Onputtha, and Chienwattanasook [20] who studied about transactional leadership and environmental supply chain management in food and beverage business and found that gender was not significant.

- *External business environment factors influenced green supply chain adoption in Thai small-medium enterprises with high growth rate.*

From the study, the result indicated that external business environment factors influenced green supply chain adoption in Thai small-medium enterprises with high growth rate at the statistically significant level as of 0.05. This is because that the adoption of green supply chain in the small-medium enterprises still need collaboration from the external parties especially suppliers, government, technology providers, and forces from competitors. For example, the enterprises have to contact for the favor from the related suppliers to supply the environmental-friendly inputs for business operation. If the suppliers cannot supply such inputs and services, the enterprises cannot also achieve the adoption of green supply chain practices. The study is correspondent with the study done by Kuei et. al [6] who found that the enterprises should have cooperation in terms of environmental requirements for purchased items, environment objectives as well as second-tier supplier environmentally friendly practice evaluation.

In addition, the small-medium enterprises in Thailand are still small and dependent mostly on the subsidies such as fund, education, information sharing, green training, green regulation and law supports from the government. If the government lack supports for small-medium enterprises in Thailand, it can surely affect the adoption of green supply chain practices. This study has similar result from the study done by Kuei et. al. [6] who government supports were important in adopting green practices. In addition, the study also matched with Dhull, and Narwal [11] who studied about drivers and barriers in green supply chain management adaptation and found that the government support is important for companies for sustainable development.

In the same time, the technology was also found the significant level on adoption of green supply chain practices since the green supply chain practices also require the smooth works from the recent technology provision. This is corresponding to the study done by Crum et. al. [15] and Jenkin et al. [16] who found that both information technology and cleaner technology for production can link to the success of green supply chain practice adoption.

Lastly, the competitor aspect also found the crucial effect on green supply chain practices adoption. This happens due to the fact that the enterprises seem to lack the motivation to compete with the other competitors. This looks to be true because the competitive entrepreneurs in Thai small-medium enterprises with high growth rate also have similar problems and obstacles to adopt green supply chain practices and perhaps feel no reason why such adoption is important since the other entrepreneurs encounter the same phenomenon which cannot successfully utilize the concept of green supply chain in the organization. In addition, the study also matched with Dhull, and Narwal [11] who found that the competitors can be the good pressure for utilizing the concept of green supply chain in the organization. In addition, this study matched with Yang [17] who study about the analysis of institutional pressures, green supply chain management, and green performance in the container shipping context.

B. Limitation of the Study

The study was limited to the external business environment factors only. In addition, the population and samples of this study were about employees and entrepreneurs in small-medium enterprises with high growth rate sector. Lastly, the quantitative research was merely employed in this study. The recommendations for future research will be mention in the next part.

C. Recommendation of the Study

- *For Practitioners*

1) The entrepreneurs should understand that employees with different demographic factors can have different degree in adopting green supply chain management. Perhaps, the entrepreneurs can have a look at employees' information associated with age, education, monthly income, working experiences, and position; so that, the organizational activities such as green training, green recruitment as others are offered.

2) In order to drive the enterprises successfully adopting green supply chain in the organization, the enterprises should welcome the external forces from suppliers, government, technology, and competitors.

- *For Future Studies*

The future research can employ other factors such as internal factors affecting green supply chain adoption in order that the study can explore it precisely. In addition, the future research is encouraged to study about adoption of green supply chain management in other sectors such as tourism, housing, dining, and others. Lastly, the next research can use other research approaches such as qualitative or mixed method such as in-depth interview, focused group, and others.

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