

A Causal Relationship Model of Business Performance Sustainable Supply Chain Management of Electronics Industry in Thailand

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Abstract - The purposes of this research were to: 1) develop and validate the causal model displaying the effect of causal factors on Business Performance Sustainable Supply Chain Management of Electronics Industry in Thailand, 2) study the effect sizes of Operational efficiency in the causal model of Business Performance Sustainable Supply Chain Management of Electronics Industry in Thailand, and 3) Guidelines for strategic planning of Electronics Industry in Thailand. The research sample consisted of 400 private entrepreneurs, randomly and multi stage select from 400 private entrepreneurs in Thailand. The research instruments were questionnaires Implementation Sustainable Supply Chain Management, Supply Chain Collaboration, Employee satisfaction, Operational efficiency and Performance of Sustainable Supply Chain Management Data analysis ware descriptive statistics, one-way multivariate analysis and The path analysis was used to test the hypotheses. The structural equation modeling: SEM. The major research findings were as follows: 1) The validation of the causal model indicating the effects of Business Performance Sustainable Supply Chain Management indicated that the model was fit empirical data ($X^2 = 319.80$; $df = 216$; $p = .0635$; $GFI .97$; $AGFI .98$; $RMR .045$) and 2) The validation of the Operational efficiency

in the causal model of Business Performance Sustainable indicated that the model was fit empirical data ($X^2 = 40.86$; $df = 28$; $p = .05536$; $GFI = .98$; $AGFI .96$; $RMR .0099$) with an acceptable stability index of .605. And Guidelines for strategic planning of private entrepreneurs and Training Needs Assessment Survey.

Keywords - A Causal Relationship Model, Business Performance Sustainable Supply Chain Management

I. INTRODUCTION

In the year 2014, it was stated that the use of electrical industry had the ratio of 1 to 5 comparing to the whole industries and expecting to increase which caused the needs of labor rose to 70.35 percent. The labor mentioned had significant to the development of country's objective and within the organization [1]. In the year 2016, ministers and committees from 1) Ministry of Industry, 2) Thai Board of Investment, and 3) Office of the National Economics and Social Development Board, and other 15 public sector related agreed to consider 10 principles for "New Engine of Growth". After that, they developed 5 industries from first S-Curve to improve economical issue which resulted 1 of 5 industries had developed to be smart

electronics which directly related to electrical industry [1] and focused on the policy of Thailand 4.0 which included the knowledge innovation and creativity for the changes and provide importance to “Labor Skilled Workers” to train them for knowledge and accepted in global standard [1]. At the same time, European Union announced the policy of “Waste Electrical and Electronic Equipment: WEEE” and Thailand was hired mainly to produce and export to Europe which could be said that it was the significant market which was the successful opportunity from attending Conference of States Parties to the UN Framework Convention on the 21st period as well as Meeting of States Parties to the Kyoto Protocol on the 11th period where General Prayuth Chan-o-ja, the President, had the target to make sustainable development in reducing greenhouse gases for the world community within the year 2030 for 20-25 percent. This leads to department and organization concern the importance of environment in every business operations and services [2]. The materials used in packaging for different products in the production line and transporting, there will be waste produce along the operations. Therefore, supply chain management sustainable is the way to solve problem in terms of production and human development in the organization to consider the growth of problem situation and prepare solutions for them [3]. In terms of logistics, there will be conscious in protecting environment as one of the processes or strategic plan to be related with supply chain management sustainability. There should be tools for innovative development for above problem [4]. That is accurate and reliable. The results of the study is also the guideline to human resources development plan to manage supply chain management sustainability for electrical industries in Thailand. The strategic planning should be considered for both short term and long term for the organization.

II. OBJECTIVES

1) To study the development of causal relationship of supply chain management sustainability for electrical industry in

Thailand.

2) To study the effective influence towards supply chain management sustainability for electrical industry in Thailand.

3) To present the procedures for human resources development planning in supply chain management sustainability for electrical industry in Thailand.

III. RESEARCH METHODOLOGY

This research study has procedures as follow:

Step 1: Study literature review about principles, related theories to develop conceptual framework.

Step 2: Design the conceptual framework. The samples used were managers, supervisor, or responsible person with the total of 360 departments followed by analysis of structural equation modeling (SEM) which, for this research, there are 18 equations equals to 360 departments. Also, another 40 departments were collected as substitutes in case there was a mistake from collecting data. Therefore, the total samples were 400 departments which related to 10-20 units per parameter [5]. Moreover, random sampling was using size proportional to make sure that all samples were covered according to type of products and set the number of organization for each product type as proportional size and use random sampling by picking name card one at a time to receive the total number for the organizations.

Step 3: The gather all information to create research tools which is questionnaires from 5 variables with the total of 87 questions, including, first part of the questionnaires contains the basic information about the organization. The second part of the questionnaires consist of variables, including Endogenous Variable which is the performance sustainable supply chain management (PSSCM); Intervening variables which is collaboration of supply chain (CSC); Employees Satisfaction (ES); Operational effectiveness (OE); and

Exogenous latent variable: Implementation sustainable supply chain management (ISSCM). After that, the questionnaires were checked for validity following content validity and suggestions from 5 academicians in professions. The IOC value equals to 1.00. After modifying the questionnaires related to the objectives and language use according to the academicians, the questionnaires were sent out for a try out in June 2017 in order to find the reliability for internal consistency reliability by analyzing Cronbach's Alpha Coefficient with the value of 0.921 and 0.929 which showed that the questionnaires can be used before distributing the questionnaires. Then, the questionnaires were checked by construct validity to analyze confirmatory factor by using LISREL program to measure 5 variables of the study. The results showed that each variable weighs over 0.5 which means reliable results.

Step 4: Making letter asking for collaboration from College of Logistics and Supply Chain, Sripatum University as well as Institute of Electrical and Electronics to be samples for the research.

Step 5: Analyze the descriptive statistics from the samples to know the description of the samples, including, frequency, classification variables, Percentage, mean, standard deviation, coefficient of variation, kurtosis, highest value, lowest value, metric variable, and analysis of differentiation in mean for supply chain management sustainability. The first part of the questionnaires includes: 1) type of organization; 2) size of organization; 3) length of operating; and 4) amount of investment. All variables are analyzed by One way-Multivariate Analysis of Variance (MANOVA) to test the differences between organization's

basic information and research variables as well as causal relationship and results for hypotheses to compare influences from variables by independent variables and dependent variables.

Step 6: Synthesize the results from the analyzed data to be procedures for application use for supply chain management sustainability by having focus group for 3 times for managers, supervisors, and responsible person who have experiences over 5 years of working.

IV. RESEARCH RESULTS

1) The general results showed that most of the organizations provide services and produce television set, power supply, electric lamps, light bulbs, adapters, electrical wires, electric fan, solar panels, refrigerator, compressors, and plastics molds. For electronics products, there are over 61.30 percent which are all big organizations with the staff over 60 people. The business has been running for over a decade. They are the targets for human resources development in processes and compares the differences between characters of organizations that affects supply chain management sustainability in high level with similar values.

2) The results for hypothesis testing showed that: $X^2=319.80$, $df=216$, $p=.0635$, $GFI=.98$, $AGFI=.97$, $RMR=.045$. The values showed that there is a significant relationship with empirical data. Therefore, this can be used as an application for supply chain management sustainability by collaborating between supply chain management and staff's satisfaction affects efficiency of the process directly, as shown in Fig. 1.

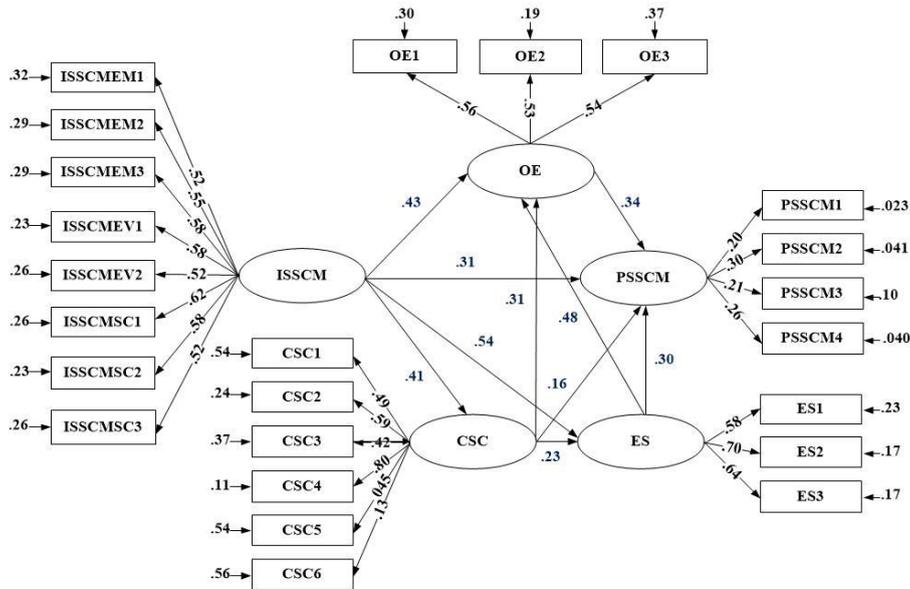


Fig. 1 Hypothesis Testing for Hypotheses (Null Hypothesis)

3) The results for hypothesis testing showed that: $X^2=40.86$, $df=28$, $p=.05536$, $GFI=0.98$, $AGFI=.96$, $RMR=.0099$. The values showed that there is a significant relationship from empirical data which means

electronics organizations give importance to staff's satisfaction towards effective process of supply chain management sustainability, as shown in Fig. 2.

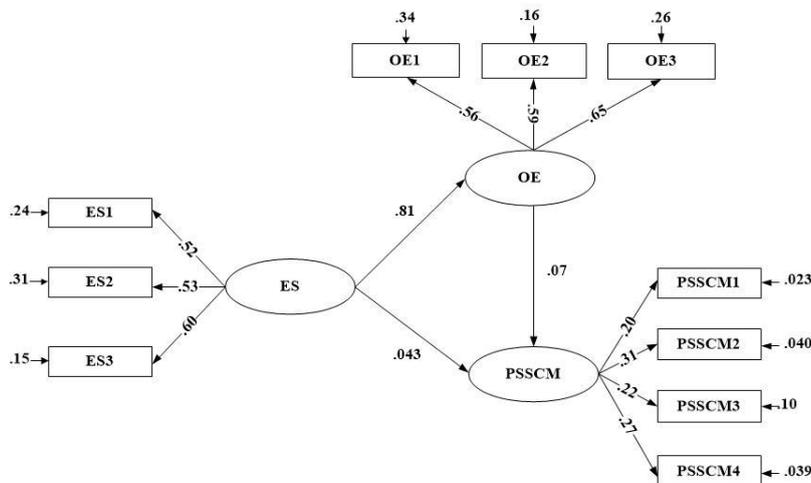


Fig. 2 Hypothesis Testing for Hypothesis (Research Hypothesis)

4) The results for human resources development plan to proceed sustainable supply chain management in electrical industry in Thailand showed that it can be adapted to use with Institute of Electrical and Electronics to run the business in organizations with related departments to increase productivity and human resources development in organizations in electrical industry. Industries should consider setting up the objectives to develop labor to the industry and increase the potential in skills

to accept workers and adapt themselves to modern production line and rapid changing in technologies in digital era or as known as industry 4.0. Also, this includes working with different culture in ASEAN Economic Community and Thailand 4.0 by setting the goals for electronic industry, including finished product factory, electronic part factory, and other industrial factory to support. The employees in those organizations include fresh graduates who are ready to enter the industry and

advanced electrical and electronic industry. Therefore, employee's development and training from experts could develop employees' skills in electronics industry. Also, the organizations can be distributed into SMEs and large organizations, then analyze the results from the study to set surveys for training need for employees in the industry.

V. DISCUSSION

1) From the research study, the results showed that most of the organizations provide services and produce television set, power supply, electric lamps, light bulbs, adapters, electrical wires, electric fan, solar panels, refrigerator, compressors, and plastics molds. For electrical products, the organizations are large and run for over a decade with the huge amount of samples for human resources development to process sustainable supply chain management for electrical industry in Thailand [6]. Stated that electronic industry could be distributed into 3 groups according to the type of products with over a decade of business running is the sample for human resources development and compare the differences of different types of organizations, size of organizations as well as length of business running to create strategic plan and human resources development plan as priority to create the best results from development.

2) The result hypothesis testing for hypothesis (research hypothesis) showed that hypotheses have a significant relationship with the empirical data where electronic organizations to process sustainable supply chain management by collaborating supply chain management and staff's satisfaction to increase efficiency in processing which is related to [7]. Study about literature review of application use in sustainable supply chain management with the objectives of finding causal factors for relationship between supply chain management and environment, society, and economical sustainability which showed that the affects from using supply chain management with environment, society, and economy are effective in processing.

3) The result hypothesis testing for hypothesis (research hypothesis) showed that hypothesis has a significant relationship with empirical data. Organizations in industry gives importance to staff's satisfaction towards process of sustainable supply chain management which affects supply chain management directly related to [8] about supply chain management that focuses on teamwork and motivation for all collaborating employees according to principles of staff's satisfaction towards teamwork and higher efficiency in working. Good efficiency in working leads to trust from organization which could cause better performance in supply chain management.

4) The recommendations for human resources development plan to process sustainable supply chain management in electronic industry in Thailand showed that analyzed data is able to adapt to plan and collaborate among Institute of Electrical and Electronics, organizations, and departments to process training. Therefore, employee's development to industry and to increase employees' potential skills for staff to enter standard labor market. Employees need to know how to adapt themselves towards modern production line as well as rapid changing of technologies in digital era and industry 4.0 which is related to [9] stated guidelines to develop electronics industry and electronics in Thailand which has importance of developing employees and technologies to be ready for human resources development in organizations throughout sustainable supply chain management.

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(Arranged in the order of citation in the same fashion as the case of Footnotes.)

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