

The Impact of Supply Chain Capabilities on the Performance of Food Industry in Thailand

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Abstract--- This study investigates the impact of the capabilities of supply chain management on the performance of the food industry in Thailand. Data were collected from the managers of the supply chain of the firm that are listed in the Department of Industrial Work Thailand by distributing the survey through the mail. PLS-SEM has been used to test the links between the variables under study. The results of the multiple regressions revealed that effective SCM capabilities could increase the performance of the firm. Results highlighted that supply chain integration, supply chain operations and human resource management are significantly related to business performance. The SCM of the food industry of Thailand has that type of effective capabilities that enhance the performance of the business.

Keywords: Supply Chain Management, Business Performance, Supply Chain Integration, Supply Chain Operations, Human Resource Management

1. Introduction

Supply chain management (SCM) is the term that was introduced in the 1980s. This term was used to enhance the capability of the integrated functions such as manufacturing, purchases, distribution, and sales of the businesses [1]. The scope of the SCM has widened with time to include the inter-organizational issues and all the major process and functions of the business. A study by Min and Zhou [2] defined the supply chain in a way that, it is referred to the integrated system that synchronizes the series of processes of inter-related business in respect to acquire parts and raw material, transformation of raw material into final products, add value to that

products, distribute the products to customers and facilitate in exchanging the information between the different businesses. Moreover, the foremost aim of SCM is to improve the competitive position, profitability, and operational efficiency of the business as well as its partners of the supply chain. As the market becomes global and competition becomes intensified, the challenges about getting the product to the right place at low cost and at the right time have been extensive critical for the organization.

The organizations now realized that the improvement in the efficiency within the business is not possible without the improvement of the whole supply chain that made a competitive advantage. Thus, the practicing and understanding of SCM is an important prerequisite for the organization to stay in global competition race and to increase the profitability of the business. Many organizations have responded to such situations by outsourcing the “non-core activities” and focusing on the core competencies of the firms. However, increasing level of outsourcing reduces the benefits of “vertically integrated companies” whose capabilities to produce competitive products depend upon the supply chain competencies. Thus, it is necessary that the external and internal outsourcing activities must be balanced to achieve the desired goal of an organization associated with the supply chain. Integrity in internal functions of the firm and effectively link with external operations of partners firms in the supply chain must be needed for the implementation of SCM [3].

Moreover, supply chain enhanced not only the performance of the firm but also increase the capacity of the supplier about supplying the goods, the production capacity of the manufacturer and also the demands of almost all channels. Figure 1.1 given below illustrated the importance of the supply chain on the performance of all the above-mentioned

activities. Due to better “supply chain management” the performance of the firm increase up to 60%, supplier capacity increase 15%, the production capacity of the manufacturer increase 13% and also positive impact on the other activities of the firms that are mention in Figure 1.1 given below:

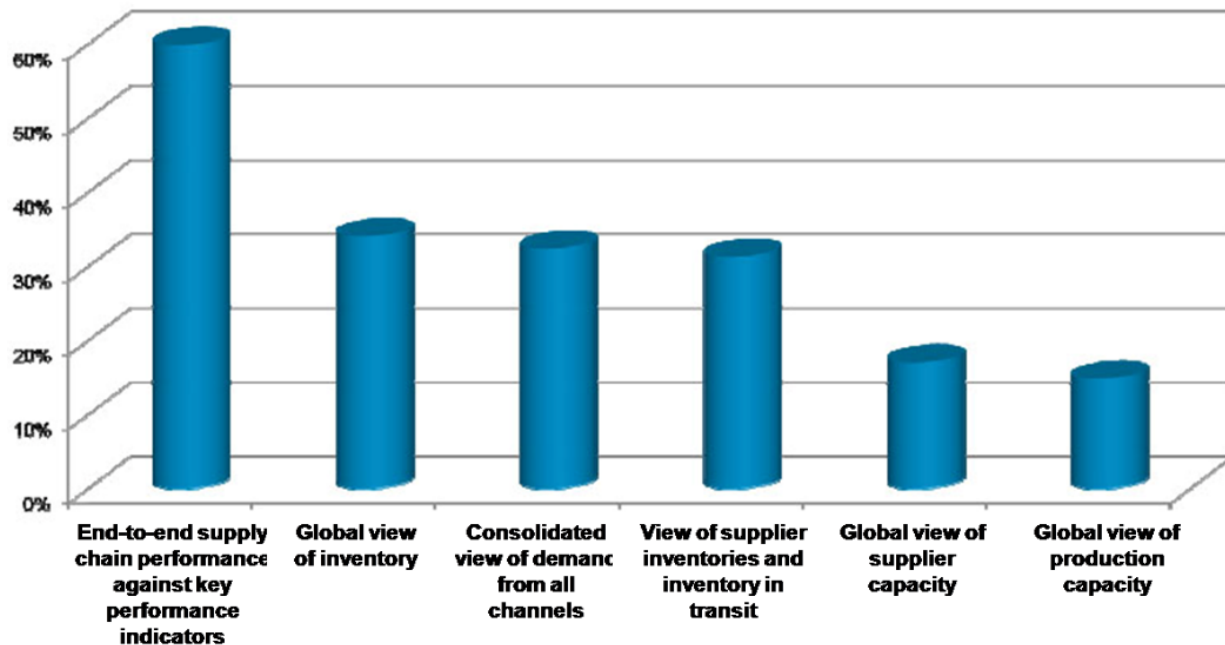


Figure 1. *Supply Chain and Performance Measurement*

Thus, better SCM increase its capabilities to enhance the performance of the company. Therefore, this study examined the impact of the capability of the supply chain on the performance of the food industry in Thailand.

2. Background of the Study

Food products belong to the agricultural products that are only for human consumption. According to the definition of “Food and Agricultural Organization” (FAO) of the United Nations, the food industry is a subpart of manufacturing industry and also included in agro-processing industry, agro-industry or agricultural processing industry [4]. Thus, this industry receives raw materials and intermediates agricultural output, process them to produce the final product for consumption or use as material in other processes of the businesses. The government of Thai selected this food industry that severely damaged in

the period crisis 1997. Moreover, the food industry is also considered high income generated for the investors of the agricultural sector. Additionally, factories of food are spread throughout the country that supports the ruler development as well as reduces the migration issues of rural-urban [5]. Although, the promoting of this business is not an initial idea for Thailand because this industry was firstly promoted in the 1st “National Economic and Social Development Plan” in 1961. After that, this industry was again promoted with the name of agro-industry in the 1980s. After this promotion, the food industry supported rural development as well as earned the foreign currency for the country.

In addition, the policymakers of the country decided to promote this industry into a heavy industry that it becomes a “newly industrializing country” (NIC) instead of “newly agro-industrializing country” (NAIC) that the country takes advantages of Foreign

Direct Investment (FDI). The government of Thailand made a huge investment in the infrastructure of the food industry to attract FDI by showing this industry as a capital intensive industry. This industry was also chosen as a targeted industry in 2002 by the government of Thailand due to its export performance. Moreover, due to high performance in the export, the “National Competitiveness Committee” (NCC) selected the food industry as the “niche product industry” for exports. In addition, Thailand considered as one of the larger exporter and producer of food products in the world. According to the “Thailand Board of Investment report,” the exports of food products that include tapioca, rice, fresh food, frozen food, and sugar are more than \$22 billion in 2010. The part of this export includes \$1.4 billion of each export of sugar and tapioca, more than \$2.3 billion associated with fresh and frozen vegetables, while \$4.1 billion exports related to frozen sea food and \$2.2 billion related to frozen shrimp. Moreover, this country is also a vital source of other products, namely; vegetables, coffee, fruits, nuts, pineapple, juice, vegetable oil, and canned food. Furthermore, it is the world best country for the export of rice. In addition, Thailand is much diversified in new products of rice, including organic rice, rice noodles, and rice snakes.

3.Literature Review:

This section of the study provides a review of the literature regarding SCM capabilities and performance. SCM is one of the ways to enhance the competitive advantages in the market [6]. Collaboration and strong relationships with suppliers are the major elements for successful SCM [7]. One of the barriers in the implementation of SCM is the size of the organization. Large firms are more comfortable and aggressive to engage in SCM practices than small firms [8]. Moreover, lack of training, weak supervisory control, and lack of understanding are major causes of failure of SCM in the company. In addition, a weak commitment between suppliers, government, and competitive pressure have also proved the barriers in the implementation of SCM [9]. However, the prime benefit of implementation the SCM in the firm is to reduce the cost of the products (Ahmed, Isa, Majid, Zin & Amin, 2017). SCM is the management of the

network in which the organizations are interconnected to provide their services to provision the products to end customers [10]. In addition, more sustainable SCM incorporated the benefits for the organization while unsustainability in the supply chain could not bring the desired benefits of an effective SCM. Sustainable SEM refers that the organizations are responsible for social and environmental conditions and performance of their respective suppliers.

Sustainable SCM considers the social issues that are affected the supply chain such as a comfortable working condition for suppliers, ethics and fair code of conduct regarding supplying of goods that are attached with supply chain [11]. The focus of the organizations is different with respect to their supply chain issues. Some of the organizations prefer green issues regarding the supply chain, but some of them prefer the social issues of the supply chain. However, some external and internal barriers are face by the organization to implement sustainable SCM [12]. Moreover, effective SCM can reduce the cost and issues and enhance the performance of the company. A study by Tan, et al. [13] conducted on the performance of SCM with respect to supplier and firm. They found that effective strategies regarding the implementation and execution of SCM enhance the performance of the suppliers as well as the organization. Moreover, Li, et al. [14] conducted the study on the performance of SCM on competitive advantages and data were collected from 196 companies. They found that effective SCM is a valuable way in respect of securing the competitive advantage and enhancing the performance of the organization. Their results are indicated that high capable SCM can lead the organization towards high performance and competitive advantage.

3.1 Capabilities of SCM and Business Performance

The performance of the organization depends upon the capabilities of the strong practices of SCM [15]. These practices depend upon the strong internal control, high level of relationship with suppliers and other associated firms [16]. Moreover, a study by Beamon [17] conducted on measuring SCM and found that the selection of appropriate measures regarding supply chain performance is a very difficult

task for the organizations due to systems are very complex in the country. In addition, Hult, et al. [18] conducted a study on SCM and its performance by collecting the data from 201 firms. They indicated that nowadays, the supply chain is considered as a competitive weapon for the firm in the market. They also found that knowledge development regarding SCM is the crucial element that helps improve the performance of the firm through the SCM tool. Furthermore, internal management also influenced the performance of the SCM in the improvement of firm performance [19]. If the internal management is experienced and has knowledge regarding the capabilities of SCM, then the SCM have a more positive and strong relationship with the performance of the firm and vice versa [20]. Similarly, if the relationship with the suppliers and other associated firms are strong, then SCM have more positively and strongly affected the performance of the firm and vice versa [21].

The SCM is a very effective tool that moves the organization towards cost-effectiveness and high performance. Moreover, a study by Bhagwat and Sharma [22] conducted on “balanced scorecard for supply chain management” by evaluating the daily operations of “small and medium-sized enterprises” (SMEs) in India. They explored the four perspectives, namely; customer, learning, finance, and growth and found that effective SCM practices could have the abilities and capabilities that enhance the performance of all above mentioned filed of the firm. They also found that SCM is also a helpful guideline for the implementers in evaluating the performance of SCM to improve the performance of the firm. In addition, SCM is an effective tool that is used by almost all of the organization to reduce their cost and improve their performances in every respect (Haseeb, Abidin, Hye & Hartani, 2019). This tool helps the organization to maintain the affordable level of stock in the business, to minimize the cost of selling, to reduce the time frame of the good to be deliver, to increase the efficiency of the selling activities, to improve the overall performance of production, purchases and selling of the goods and services to the customers [23]. Similarly, the effective supply chain can increase the capabilities of competition in the market. It improves the organization in a way that the

organization competes with other strong rivals exist in the market [24].

The SCM tool is very effective in minimizing the time and cost of the organization and increase the performance and profitability of the firm [25]. However, the effectiveness of the tool depends upon the strong, experienced and knowledgeable internal management as well as the quality of relationship with suppliers and the associated organization of the firm [26]. Furthermore, a study by Kuei, et al. [27] conducted on the practices of SCM and organizational performance by collecting the data form three groups based on the quality of the supply chain (Haseeb, Iqbal-Hussain, Ślusarczyk, & Jermstittiparsert, 2019). They found that “high-quality tendency systems” perform better than the “low-quality tendency systems” based on saving cost, time and increase the performance. While, the differences between high-quality tendency systems and “medium quality tendency systems” are the level of sales growth, earning growth, and productivity [28]. Whereas, differences between the “medium quality tendency systems” and “low-quality tendency systems” are the level of productivity, employee satisfaction, and sales growth [29]. In addition, Kuei, et al. [27] also strongly recommended that the performance of the firm can be enhanced through effective SCM tool. Moreover, Bayraktar, et al. [30] conducted the study on the impact of SCM of the operational performance of the firm. The data of the study were collected from the 203 “small and medium manufacturing enterprises” working in the area of Istanbul in Turkey. They found a positive association among the effective practices of the supply chain and the operation performance of the firms. In similar to mentioned above studies, this study is also investigated the impact of capabilities of an effective supply chain on the performance of the entity.

4. Hypotheses Development

This study divides the capabilities of the firm regarding SCM into three categories, namely; supply chain integration (SCI), supply chain operations (SCO), and human resource management (HRM). Based on all above-mentioned literature of previous

studies, this study development the hypotheses given below:

4.1 Supply Chain Integration and Business Performance

All of the previous study indicated that effective supply chain integration could increase the performance of the business, and based on this literature, this study also makes the following hypothesis:

H1: Supply chain integration has a positive impact on the performance of the business.

4.2 Supply Chain Operations and Business Performance

All of the previous studies indicated that effective supply chain operations could increase the performance of the business, and based on this literature, this study also make the following hypothesis:

H2: Supply chain operations have a positive impact on the performance of the business.

.3 Human Resource Management and Business Performance

All of the previous studies indicated that effective human resource management could increase the performance of the business, and based on this literature, this study also makes the following hypothesis:

H3: Human resource management has a positive impact on the performance of the business.

5. Research Methods

A survey is conducted to gather the data for the analysis purpose of the study. The supply chain managers were the respondents of the survey that were selected from the companies that are listed in the "Department of Industrial Work Thailand." However, if any company did not has any separate SCM department, then production manager or top-level executives were selected as respondent for the survey. Total 1,500 questionnaires were distributed among the managers of the supply chain and other related personals. Only 470 responses were received in which forty questionnaires were not up to the mark

and excluded from the study, and the remaining 430 valid responses were used for the data analysis. Therefore, the response rate was 28.67% that was an appropriate rate for analysis. Moreover, some of the questions were altered according to the nature of the environment and norms of the scope of the study. For answer, every question in the questionnaire 5 points Likert scale were used (from 1 for strongly disagree to 5 for strongly agree).

5.1 Measures

The first dimension of capabilities of SCM is the supply chain integration that has five items and 5 points Likert scale. Similarly, the second dimension of the capability of SCM is the supply chain operations that also have five items. Moreover, the third dimension of the capabilities of SCM is human resource management that also has five items. However, the main variable of the study is a business performance that has five items and 5 points Likert scale [31].

5.2 Data Collection Procedure

For data collection from the managers of the supply chain, an email sent to all the managers of the supply chain to obtain their consent regarding fulfilling the questionnaire and send back for analysis. After getting the consent, 1500 surveys were mailed to all the managers, but only 470 were returned, and out of them, only 430 are valid that were consider for analysis.

5.3 Research Framework

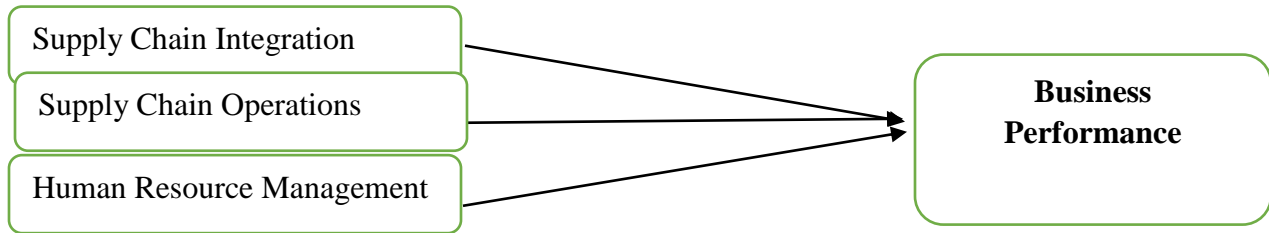


Figure 2. Theoretical Framework

6. Results

This study has been used the PLS-SEM to examine the link between the variables under study. In PLS-SEM, two models are used for analysis, namely the structural and measurement model. To examine the association between the items of the constructs and between the constructs, this study has been used the discriminant and convergent validity in the measurement model. Moreover, “Average Variance Extracted (AVE), Cronbach’s Alpha and composite reliability” were used to test the convergent validity while Fornel Lachher and Heterotrait and Monotrait Ratio (HTMT) were used to test the discriminant validity of the constructs.

Outer loading is the first criteria through which we check the convergent validity of the items and the thumb rule is that the value of outer loading of all the items should be more than 0.50. The values of outer loading of almost all the items used in this study are greater than 0.50 that are shown in Table 1. Thus, according to these criteria, there is no issue with convergent validity of the items. In addition, Cronbach’s Alpha is the second criteria through

which we check the convergent validity of the items, and the thumb rule is that the value of Cronbach’s Alpha should be more than 0.70. The values of Cronbach’s Alpha of all the variables are greater than 0.70 that are shown in Table 1. Thus, according to these criteria, there is no issue with convergent validity of the items. Moreover, composite reliability is the third criteria through which we check the convergent validity of the items, and the thumb rule is that the value of composite reliability should be more than 0.70. The values of the composite reliability of all the variables are greater than 0.70 that are shown in Table 1. Thus, according to these criteria, there is no issue with convergent validity of the items. Additionally, the Average Variance Extracted (AVE) is the last criteria through which we check the convergent validity of the items and the thumb rule is that the value of AVE should be more than 0.50. The values of AVE of all the variables are greater than 0.50 that are shown in Table 1. Thus, according to this criteria, there is no issue with convergent validity of the items. The convergent validity of the constructs are shown in Table 1 given below:

Table 1. *Convergent Validity*

Constructs	Items	Alpha	CR	AVE	
Business Performance	BP1	0.742	0.774	0.841	0.523
	BP2	0.835			
	BP3	0.868			
	BP4	0.575			
	BP5	0.534			
Human Resource Management	HRM1	0.802	0.776	0.846	0.551
	HRM2	0.843			

	HRM3	0.814			
	HRM4	0.829			
	HRM5	0.222			
Supply Chain Integration	SCI1	0.85	0.744	0.824	0.522
	SCI2	0.91			
	SCI3	0.885			
	SCI4	0.473			
	SCI5	0.227			
Supply Chain Operations	SCO1	0.847	0.768	0.845	0.533
	SCO2	0.78			
	SCO3	0.719			
	SCO4	0.432			
	SCO5	0.797			

Fornell and Larcker are the first criteria through which we check the discriminant validity of the constructs and the thumb rule is that the value first value of the construct should be greater than the rest of the values. The first value of all the constructs is greater than the rest of the values that are shown in

Table 2. Thus, according to this criteria, there is no issue with convergent validity of the items, but most of the previous research discourage to use the Fornell Larcker because it became an old criterion of discernment validity.

Table 2. *Discriminant validity (Fornell Larcker)*

	BP	HRM	SCI	SCO
BP	0.723			
HRM	0.58	0.742		
SCI	0.53	0.485	0.722	
SCO	0.499	0.585	0.443	0.73

The values of cross loading also full filling the criteria, which means that there is no problem with

discriminant validity of the constructs that are shown in Table3 given below:

Table 3. *Cross Loadings*

	BP	HRM	SCI	SCO
BP1	0.742	0.507	0.463	0.575
BP2	0.835	0.483	0.408	0.373
BP3	0.868	0.475	0.425	0.403
BP4	0.575	0.251	0.274	0.112
BP5	0.534	0.286	0.29	0.144
HRM1	0.477	0.802	0.391	0.491
HRM2	0.512	0.843	0.406	0.469
HRM3	0.468	0.814	0.398	0.478
HRM4	0.453	0.829	0.401	0.489
HRM5	0.023	0.222	0.089	0.117

SCI1	0.43	0.391	0.85	0.353
SCI2	0.492	0.416	0.91	0.394
SCI3	0.453	0.38	0.885	0.374
SCI4	0.289	0.381	0.473	0.287
SCI5	0	0.2	0.227	0.091
SCO1	0.449	0.522	0.376	0.847
SCO2	0.355	0.374	0.307	0.78
SCO3	0.353	0.416	0.387	0.719
SCO4	0.216	0.311	0.214	0.432
SCO5	0.403	0.482	0.314	0.797

Heterotrait and Monotrait (HTMT) are the second criteria and the latest criteria through which we check the discriminant validity of the constructs and the thumb rule is that the value should be less than 0.80.

The value of HTMT of all the constructs is less than 0.80 that are shown in Table 4. Thus, according to these criteria, there is no issue with convergent validity of the items.

Table 4. *Heterotrait-Monotrait Ratio (HTMT)*

	BP	HRM	SCI	SCO
BP				
HRM	0.696			
SCI	0.631	0.664		
SCO	0.587	0.735	0.576	

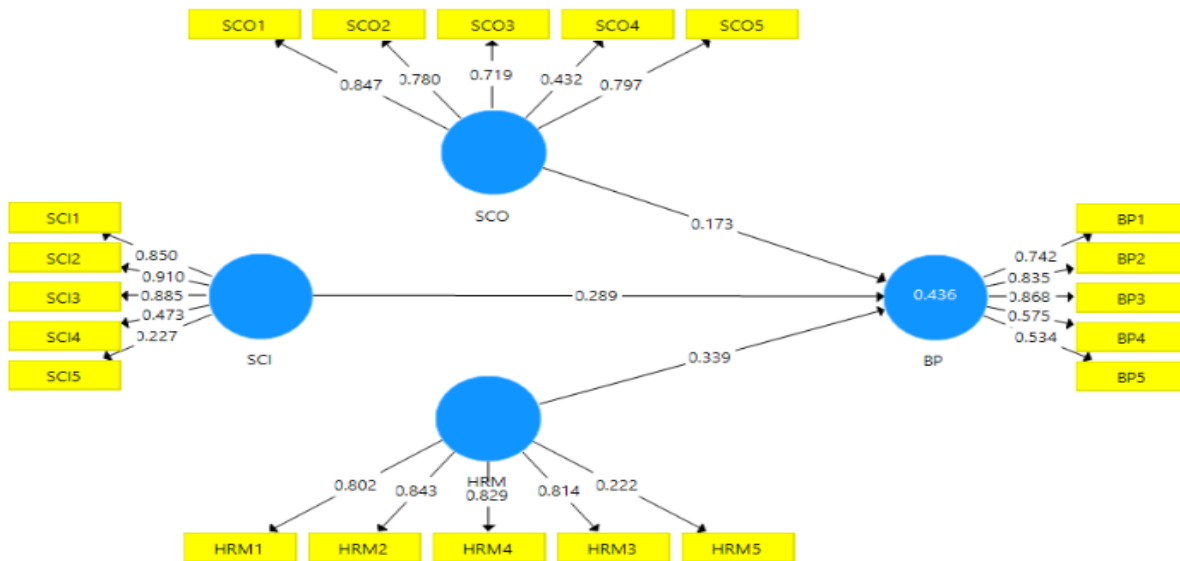


Figure 3. *Measurement Model Assessment*

The structural model is the second model of PLS-SEM through which we examine the links among the under study variables. The direct relationship between the variables is shown in Table 5 of the study. The results elaborated that the effective capabilities of SCM can increase the performance of the business. As results are given below shown that SCI has significant and positive linked with business

performance ($\beta = 0.399$; $t = 8.696$), and supported the H1. In addition, SCO has significant and positive linked with business performance ($\beta = 0.289$; $t = 8.068$) and supported the H2. Moreover, HRM has significant and positive linked with business performance ($\beta = 0.173$; $t = 4.365$) and supported the H3.

Table 5. Path Analysis

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
HRM -> BP	0.339	0.339	0.039	8.696	0
SCI -> BP	0.289	0.288	0.036	8.068	0
SCO -> BP	0.173	0.176	0.04	4.365	0

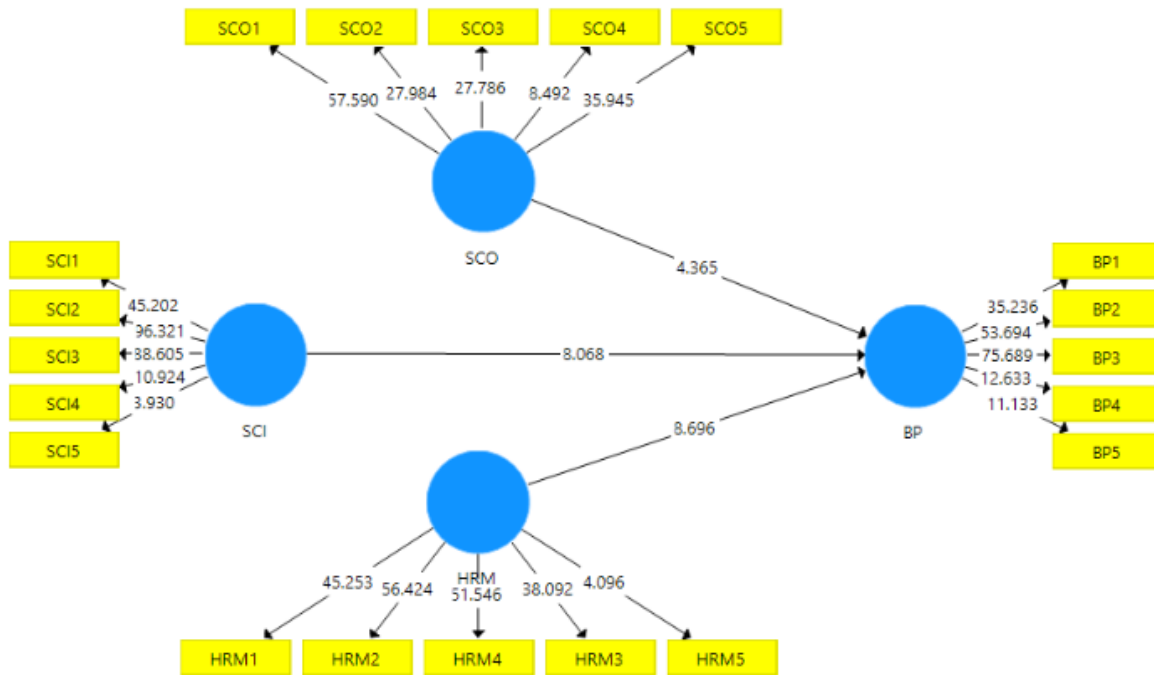


Figure 4. Structural Model Assessment

7. Discussion

Discussion regarding the results that are mentioned above is presented in this last section of the study. Furthermore, this section also provides a comparison of the results with past studies and the conclusion, limitation, and suggestion for further studies.

The foremost aim of every organization is to maximization of the wealth of their owners. The

organizations always strive to achieve this goal by applying different tools in the processes of the businesses. The SCM is one of the tools for the organization through which they improve the production and supplies that is one of the way to enhance the performance of the institution. This study also investigated the capabilities of SCM impact on the performance of the business. This study is used the three capabilities of SCM, namely;

SCI, SCO and HRM, and every capability can improve the performance of the business. The results of the study revealed that the effective capabilities of SCM could enhance the performance of the business. The results are similar with Wieland and Marcus Wallenburg [32]; Lockamy III and McCormack [33]; Agus and Shukri Hajinoor [34] and Perona and Miragliotta [35] who also examined that the capabilities of SCM can enhance the performance of the entity.

In the end, this study concluded that the effectiveness of capabilities of SCM is essential to enhance the performance of the business. The food industry of Thailand has effective capabilities of SCM that is the reason the performance of the business is beyond the standard. Moreover, this study enriches the body of knowledge related to the SCM and the performance of the businesses. Also, this study also facilitates the owners and policy makers that they should emphasize the capabilities of SCM that would be helpful to enhance the performance of the business.

Moreover, this study also has some limitation that are the key elements for new researchers to explore this area further. The first limitation of the study is that it focuses only on the capabilities of SCM and ignore the other factors of the supply chain that have a major influence on the performance of the business. The second limitation of the study is that it focuses only on the food industry of Thailand and ignore the other important industries of the country. Thirdly, the scope of the study is very [36-38] limited because it only examines one country. Thus, this study suggested the future researcher that they can add more countries and expand the scope of the study that makes the results more reliable.

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