The Impact of Supply Chain and Supplier Evaluation Related Practices on the Performance of Automotive Industry in Thailand

Sudawan Somjai[1], Voradej Chandarasorn[2], Saroge Vasuvanich[3]

[1,3]*Graduate School, Suan Sunandha Rajabhat University, Bangkok, Thailand*
[1]sudawan.so@ssru.ac.th
[2]*Institute of Public Administration and Governance, Shinawatra University, Pathum Thani, Thailand*
[3]saroge.va@ssru.ac.th

ABSTRACT- **This study explores the practices of supply chain and evaluation practices of supplier concerning the firm performance of automotive industry of Thailand. Data were collected from the managers of the supply chain and the production managers through a questionnaire. PLS-SEM is used to explore the association among the understudy variables. The results revealed that effective practices of the supply chain could increase the performance of the industry in the country. Similarly, effective practices of supplier evaluation also can increase the performance of the firm. This study suggested to the policymakers and the manager of the supply chain that they must apply only an effective SCM and supplier evaluation practices in the firm. These effective practices can only have the ability to enhance the performance of every process of the firm.**

Keywords: *Supplier Evaluation Practices, Supply Chain Management, Firm Performance, Automotive Industry*

1. Introduction

Intensified global competition and the shrinkage in the product life cycle forced the manufacturers that they must collaborate with their suppliers in order to attain the lead-time and quality of the product after the 1990s. Correspondingly, many of the retailer as well as wholesaler integrated their all the functions to attain the competitive advantage. Moreover, these functional areas of a firm can force them to adopt the practices of SCM and the supplier's evaluation that are helpful to enhance the progress of the firm. This term of SCM is widely used to explain this type of management philosophy. In addition, this philosophy was very helpful to attain a competitive advantage and enhanced the financial performance of the firm. Indeed, the council of the supply chain has issued many standards for SCM and the operations of the supply chain. The firm that implemented these standards given by the council could increase the competitive advantage that enhances the firm performance [1, 2].

Table 1 given below is one of the evidence that elaborated the increase in performance due to the supply chain implementation in the firm. According to Table 1 mentioned below, the increase in growth rate due to the supply chain (SC) was a minimum of 1% and a maximum of 13% while the increase in operating margin was minimum 0.01 and maximum of 0.17. Whereas the increase in inventory turnover was a minimum of 5 units and a maximum of 13 units. Moreover, the increase in return on investment was a minimum of 3% and a maximum of 21%. In the end, the increase in price to book value increased a minimum of 1.40 and maximum 43.51.

Table 1. Improvement in Performance due to Supply Chain

Company	Growth	Operating Margin	Inventory Turns	Return on Invested Capital	Price to Tangible Book Value	Supply Chain Index Rank
The Archer Daniels Midland Company	-1%	0.03	7	7%	1.40	1
Campbell Soup Company	0%	0.15	6	17%	-6.81	3
ConAgra Foods, Inc.	5%	0.07	5	6%	18.43	11
Danone SA	2%	0.12	9	3%	-6.49	7
General Mills, Inc.	4%	0.16	7	11%	-4.36	10
Glanbia plc	1%	0.06	5	11%	2.72	12
The Hershey Company *FINALIST*	5%	0.17	6	21%	43.51	5
Kellogg Company	1%	0.13	7	12%	-5.72	5
Maple Leaf Foods Inc.	-8%	0.01	13	9%	4.68	8
Mondelez International, Inc.	-4%	0.13	6	8%	-3.08	2
Nestlé S.A.	0%	0.14	5	17%	9.59	9
The J.M. Smucker Company	13%	0.15	4	7%	-11.94	3
Average	2%	0.11	7	11%	3.49	NA

The practices of SC can increase the productivity of every process in the firm. Similarly, Figure 1 given below elaborated the improvement and growth in the operations of the firm due to the implementation of the supply chain. According to Figure 1, the growth in the performance of the supply chain was around 60%. While growth in the inventory level of the firm increased by more than 30%. The demand of the products grew up with the rate of 30%, whereas, the growth in the capacity of the supplier was recorded more than 10% and the growth in production capacity of the manufacturer was increased by 10% due to effective SCM practices (Sanchez, 2018).

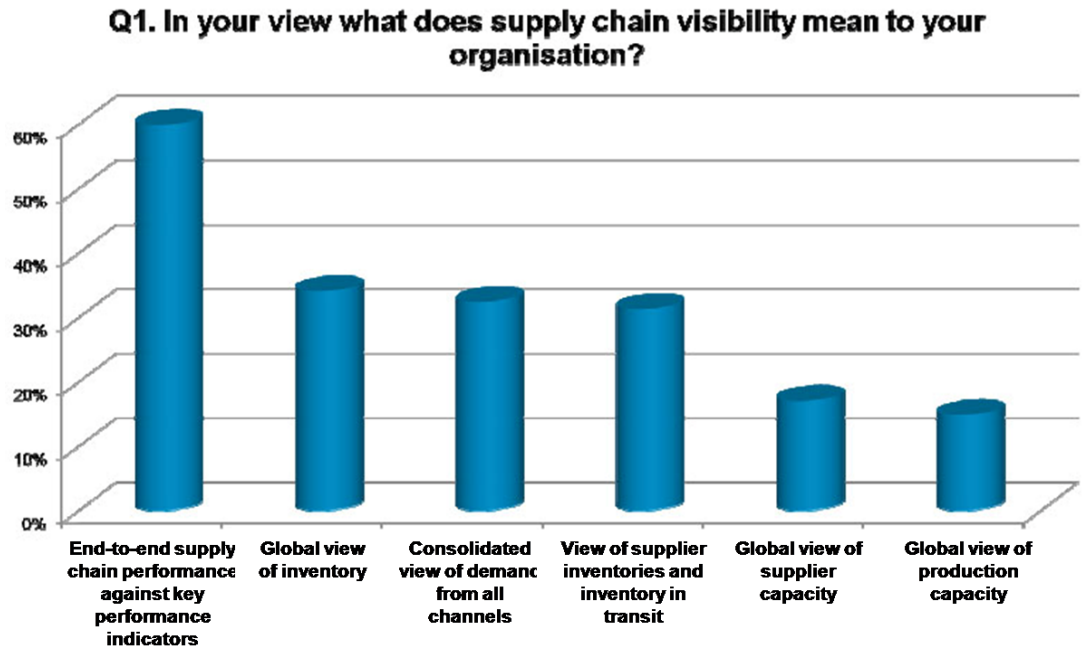

Figure 1. Improvement in Operations due to Supply Chain

One of the major drivers in the economy of Thailand is the automotive sector that has a vast network of foreign and local firms, strong infrastructures, and a wide range of products. It is considered a huge hub in Asia and ASEAN. Moreover, this industry of Thailand is moving towards the green production base automotive. It is an important sector that contributed at least 12% of the GDP of the country. This sector has employed approximately more than 550,000 people that was the highest figure in any other auto-parts manufacturer in the country. Furthermore, the production of the car was approximately 1.9 million, out which 0.8 million sold domestically and the remaining 1.1 million exported to other countries. On the other hand, the production of motorcycles was 1.8 million out of which 1.6 million sold domestically and the remaining 0.2 million exported to other countries.

The government of Thailand is always assisted to its private sector that it move towards supply chain and create more value for the country. This goal of the government can make Thailand as the base of global production that improving the value creation as well as a strong environment for both domestic and export markets. Figure 2 presented the structure of the automotive industry of Thailand. According to Figure 2 given below, two types of enterprises exist in the Thai automotive industry, namely; "small and medium enterprises" and "large scale enterprises." Small scale deals with local suppliers, while large scale deals with international suppliers. The majority of foreign suppliers are 54% while the majority of Thai suppliers are 23%, and the majority of pure Thai suppliers are also 23%. Total 550,000 people are employed in the industry out of which 100,000 employed in assembler industry and remaining 450,000 employed in manufacturing processes.,

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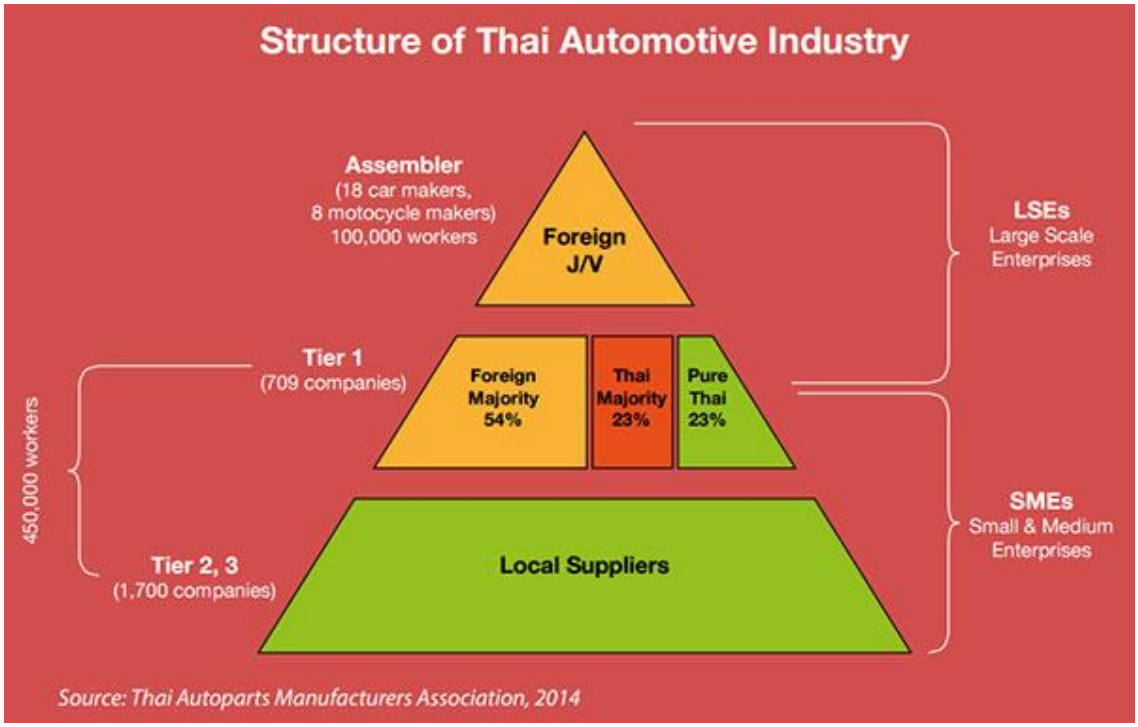

Figure 2. Structure of the Thai Automotive Industry

Despite the popularity of SC practices, there are very limited studies available on the combined impact of SC practices and practices supplier evaluations on the performance of the firm. Thus, this study is going to explore the practices of SC and supplier evaluation impact on the firm performance of automotive industry of Thailand. In addition, the following sections of the study deal with literature regarding understudy variables, methods of research, data collection, results, conclusion, recommendation, and limitations of the study.

2. LITERATURE REVIEW

This section provides a review of the literature regarding understudy variables and also the literature about the relationship among the variables used in the study.

2.1. Practices of Supply Chain

The supply chain is described as the linking between every process of manufacturing and supplying of the products from unmanufactured raw material to the users of the end products [1]. Similarly, this new philosophy of the management converts the focus of the organization towards the point that how they use their capabilities, processes, technologies, and suppliers to attain the competitive advantage [2]. Moreover, SC practices integrated all the process of the business that would help the business in improving the transportation and distribution process of the business. In addition, SC is the concept that is used by many manufacturers in their business to improve the product delivery, development, and quality goals of the firm. Additionally, SC also eliminates the product wastage and extra handling cost of the firm by providing the "Just in Time" JIT concept to the manufacturer and wholesaler [3]. The study by Bayraktar, et al. [4] conduct on the manufacturing firms of Turkey. They argued that SC is a cost-effective tool that helps the firm to reduce its cost in different process of the business. It helps to reduce the cost of handling the inventory by applying the JIT technique in the process. It also reduces the cost of finding the appropriate

customer for the products. It also reduce the cost of putting order to the supplier when the goods are scare in the stock. Hence, the SC can help the firm to reduce the cost in every process of the business.

2.2. Practices of Supplier Evaluation

Supplier evaluation is a critical activity for the companies for the selection of the right supplier for the business. The increasing level of competition is required extra attention to the evaluation and selection of the right supplier for the business [5]. Moreover, Supplier evaluation is a technique that is used by the business to check the importance of supplier for the business and helps in the selection of an appropriate supplier for the business. The study by Huang and Keskar [6] conducted on the supplier selection and provided a comprehensive list regarding the criteria of supplier selection. Moreover, Govindan, et al. [7] mentioned the three criteria for the selection of supplier such as quality, delivery performance, and cost but the quality criteria are consider relatively most important among other selection of supplier process. However, increasing the level of competition in the global environment, and a wide variety of products, the traditional criteria for the selection of the supplier has been changed. These changes are due to the important role of supplier in the chain and requirement of changing environment with time [8]. Furthermore, the evaluation of the suppliers includes the assessment of practices of suppliers such as practices of quality, managerial, and finance. In addition, evaluation of the suppliers also includes the assessment of capabilities of the suppliers such as capabilities regarding cost reduction, technical skills, and delivery performance [9]. Moreover, there are a lot of methods for the selection of supplier suggested by the different researchers in their studies. Similarly, the study by De Boer, et al. [10] conducted on the selection of the supplier and argued that the problems about the selection of the suppliers are four types namely; qualification of supplier that is suitable, formulation of criteria, problem definition and final selection. However, the majority of past researchers classified these problems into three categories, such as programming model, linear models, and artificial intelligence [11].

2.3. Firm Performance

Firm performance includes the improvement in any respect and any activity of the business, such as improvement in production, sales, profitability, demand, and output of the business. On the other hand, the firm performance also includes the reduction in cost, wastage, and expenses of the business concern [12]. In addition, the performance of the firm depends upon the effective control, practices, and policies of the business concern. Moreover, a study by Bharadwaj [13] argued in his study that improvement in output, sales, and profitability of the business concern is considered as the better firm performance. Additionally, the prime focus of every owner and the manager of the company is to increase the performance of the business because the foremost of any business concern is to enhance the performance of the business [14]. Thus, business performance is the main goal of any entity and the reasons for the existence of any business in the world [15]. This study also used firm performance as the main variable of the study and evaluated the changing the performance of the business due to the practices of SC and supplier evaluation.

2.4. Practices of Supply Chain and Firm Performance

Firm performance of the firm can be affected by the effective implementation of SC practices in the organization. A study by Chan, et al. [16] indicated that better control and effective SC of the firm could improve the financial as well as the environmental performance of the organization. Likewise, Forman and Jørgensen [17] conducted the study on the textile sector and found that SC practices can improve every process of the business concern by providing the JIT techniques that reduce the cost of caring the goods. Moreover, these practices can enhance the demand of the product by providing the goods at the right time and the accurate place and bearing the minimum cost. In addition, SC practices improve the association of business concern with the suppliers that are also necessary for the improvement of supply the goods to the appropriate place by bearing low cost within a given period. These factors can improve all the process of the business that moves the organization towards better financial as well as environmental performance [18].

Furthermore, A study by Kannan and Tan [19] conducted the study on JIT practices that is the part of the supply chain. They found that JIT technique of SC improved the process of supply the goods to the end consumers that become the cause of the reduction in the cost and increase in the turnover of the firm and these are the factors of enhanced firm performance in this competition situation in the market. Similarly, SC is an effective tool that aligned all the associated entities connected with the supply chain in a way that they work for itself as well as its connected entity by providing the best services to them. This association not only increase the performance of the company itself but also increase the performance of all associated entities in the SC [20]. Likewise, Zhu and Sarkis [21] conducted the study on SC of manufacturing firms

of China and found that best practices of SC improved not only the firm performance but also the performance associated entities. Moreover, it aligned all the business process in a way that they work automatically and improve the performance of the entity. Based on all this literature, this study developed the hypothesis as follow:

H1: The practices of the supply chain significantly improve the performance of the firm.

2.5. Practices of Supplier Evaluation and Firm Performance

The effective practices regarding the evaluation of an effective supplier that would help in the supplier selection can improve the firm performance. A study by Krause, et al. [22] conducted the study on the selection of supplier and found that the evaluation regarding supplier is an effective tool that helps in the selection of an appropriate supplier that improve the process of SC that ultimately increase the performance of the firm. Similarly, an effective and competent supplier can help you to enhance the business process, and selection of that supplier is not an easy task. A strong and effective process of evaluation of supplier is required to select the competent supplier for the business entity because the competent supplier improved the business processes and the performance [23]. Moreover, supplier selection is not an easy task for any entity in the market. It required a complete evaluation process that needs to adopt by the firm for the selection of a competent supplier. This competent supplier improves the business processes in terms of cost minimizing, quick delivery of goods and deliver the goods to the appropriate consumer that leads the organization towards enhanced business performance [24].

Likewise, Molin, et al. [25] also conducted the study of firm performance with reference to the supplier evaluation and indicated that performance of the SC depends upon the effective role of competent suppliers. The selection of competent suppliers needs a strong evaluation process. Thus, practices of effective evaluation process resulted in the selection of competent supplier that leads the entity towards high performance. Moreover, the performance of the process of SC depends upon the activities of an appropriate supplier and appropriate supplier only selected through the strong evaluation process [26]. In addition, a study by Shen, et al. [27] conducted on suppliers performance and found that the role of suppliers has a significant effect on the performance of the organization. This significant effect depends upon the skills of the suppliers, and these skills are selected trough evaluation process of supplier selection. Based on all of these literature this study develop the following hypothesis:

H2: The practices of supplier evaluation significantly improve the performance of the firm.

3. Research Methods

The supply chain managers of the automotive industry in Thailand are the respondent of the study. However, data were also collected from the production mangers form the company where no separate department of the supply chain existed. Primary data collection technique was used to collect the data from respondents. A survey was sent to the 1800 respondents through the mail, but only 620 questionnaires were returned from the respondents that showed approximately 34.44% response rate. Out of them, 20 responses were not up to the standard and eliminated from the analysis; the remaining 600 responses considered valid and used for analysis purpose in the study. In addition, the language, sentence structure, and format of the questionnaire were changed due to the requirement of the scope of the study. Five points Likert scale was used to answer the questions (from 1 for strongly disagree to 5 for strongly agree) [28].

3.1. Measures

There are six dimensions of SC practices (SCP) variable used in the study namely; SC integration (SCI) that has five items, information sharing (IS) that also has five items, characteristics of SC (SCC) that has four items, management of customer services (CSM) that has five items, geographical proximity (GP) that has three items and JIT capabilities that has only two items. In addition, there are three dimensions of supplier evaluation practices (SEP) such as product and delivery assessment (PDA) that has five items, capacity assessment (CA) that has four items and information assessment (IA) that has only three items. While the main variable firm performance (FP) has only one dimension and also has six items.

3.2. Data Collection Procedure

The following is the procedure of data collection used to collect the data from the respondents of the study. Firstly, a list of the automotive industry is selected from the "Department of Industrial Work Thailand." Secondly, to get the willingness regarding data providing, a mail was sent to all the managers of SC and get willingness of 1800 mangers. Finally, a survey was sent to 1800 respondent through email, but only 620 responses were received back, but out of them, only 600 responses were valid and used for analysis purpose.

3.3. Research Framework

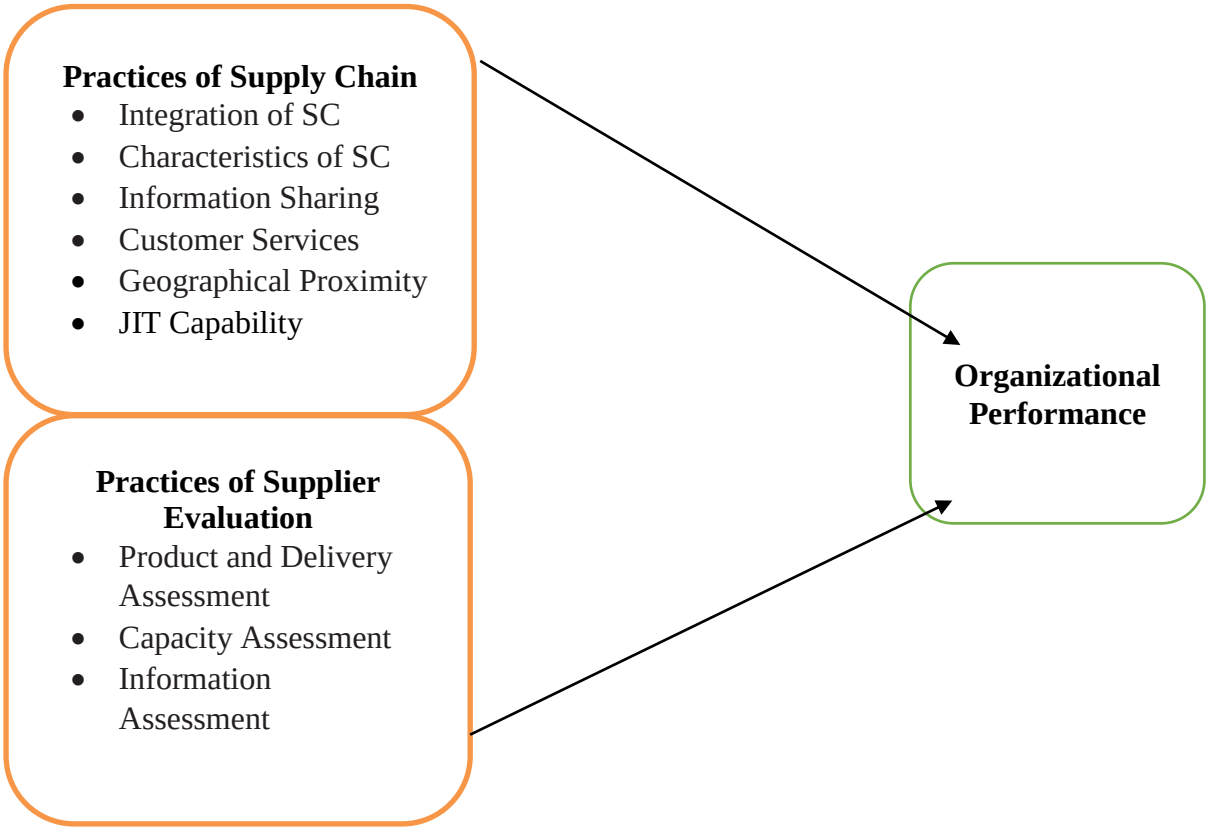

Figure 3. Research Framework

4. RESULTS

The association among the variables under study is checked by using the PLS-SEM. There are two types of model used in the study, namely; structural and measurement model. The measurement model is used to check the reliability and correlation between the item used in the study, while the structural model is used to test the reliability and correlation between the construct used in the study. Convergent and discriminant validity can be verified through measurement model. There are four standards to verify the convergent validity of the items. The first of them is outer loading; the thumb rule for outer loading is that it must be greater than 0.50. Table 2 shows that the value of outer loadings of almost all item is more than 0.50, that means convergent validity is fine. The second measure is Cronbach's Alpha, and its value is greater than 0.70 for all the constructs, that means no problem with convergent validity. In addition, the third measure is Composite Reliability (CR), and the values of CR of all the constructs are greater than 0.70, that means convergent validity is fine. Moreover, the final measure is Average Variance Extracted (AVE), and the value of AVE is greater than 0.50, that means no issue with convergent validity.

Table 2. Convergent Validity

1ST Order Constructs	2nd Order Constructs	Items	Loadings	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Financial Performance		FP1	0.814	0.907	0.931	0.729
		FP2	0.888			
		FP3	0.853			
		FP4	0.894			
		FP5	0.816			
PDA		PDA1	0.873	0.908	0.936	0.785
		PDA2	0.931			

		PDA3	0.914			
		PDA4	0.823	0.942	0.958	0.851
CA		CA1	0.944			
		CA2	0.921			
		CA3	0.913			
		CA4	0.912			
IA		IA1.	0.961	0.743	0.86	0.687
		IA2.	0.953			
		IA3.	0.482			
	Supplier Evaluation Practices	PDA	0.87	0.892	0.908	0.39
		CA	0.826			
		IA	0.748			
IS		IS1	0.82	0.869	0.911	0.718
		IS2	0.864			
		IS4	0.82			
		IS5	0.884			
JIIC		JIIC1	0.879	0.638	0.846	0.733
		JIIC2	0.833			
SCI		SCI1	0.826	0.905	0.934	0.78
		SCI3	0.909			
		SCI4	0.92			

Table 2 (Continue)

1ST Order Constructs	**2nd Order Constructs**	**Items**	**Loadings**	**Cronbach's Alpha**	**Composite Reliability**	**Average Variance Extracted (AVE)**
		SCI5	0.875			
GP		GP1	0.779	0.763	0.864	0.68
		GP2	0.874			
		GP3	0.818			
CSM		CSM1	0.856	0.908	0.935	0.784
		CSM3	0.916			
		CSM4	0.885			
		CSM5	0.883			
SCC		SCC1	0.882	0.844	0.906	0.763
		SCC3	0.862			
		SCC4	0.875			
	Supply Chain Practices	IS	0.811	0.939	0.945	0.431
		JIIC	0.421			
		SCI	0.772			
		GP	0.694			
		CSM	0.807			
		SCC	0.812			

Discriminant validity elaborates on the correlation between the constructs used in the study, and Heterotrait and Monotrait (HTMT) ratio are used to test the discriminant validity of the constructs. The thumb rule is the value should be less than 0.50, and Table 3 shows that almost all the values are less than 0.50, that means no issue with discriminant validity of the constructs.

Table 3. Discernment Validity (HTMT)

	CA	CSM	FP	GP	IA	IS	JIIC	PDA	SCC	SCI	SCP	SEP
CA												
CSM	0.119											
FP	0.164	0.533										
GP	0.095	0.611	0.595									
IA	0.168	0.345	0.573	0.453								
IS	0.056	0.589	0.499	0.504	0.311							
JIIC	0.036	0.609	0.774	0.811	0.599	0.469						
PDA	0.177	0.46	0.836	0.507	0.537	0.495	0.614					
SCC	0.087	0.698	0.579	0.511	0.369	0.704	0.55	0.607				
SCI	0.071	0.562	0.511	0.372	0.245	0.796	0.352	0.511	0.693			
SCP	0.098	0.866	0.693	0.847	0.462	0.887	0.861	0.644	0.896	0.825		
SEP	0.533	0.51	0.82	0.652	0.883	0.477	0.777	0.894	0.589	0.418	0.682	

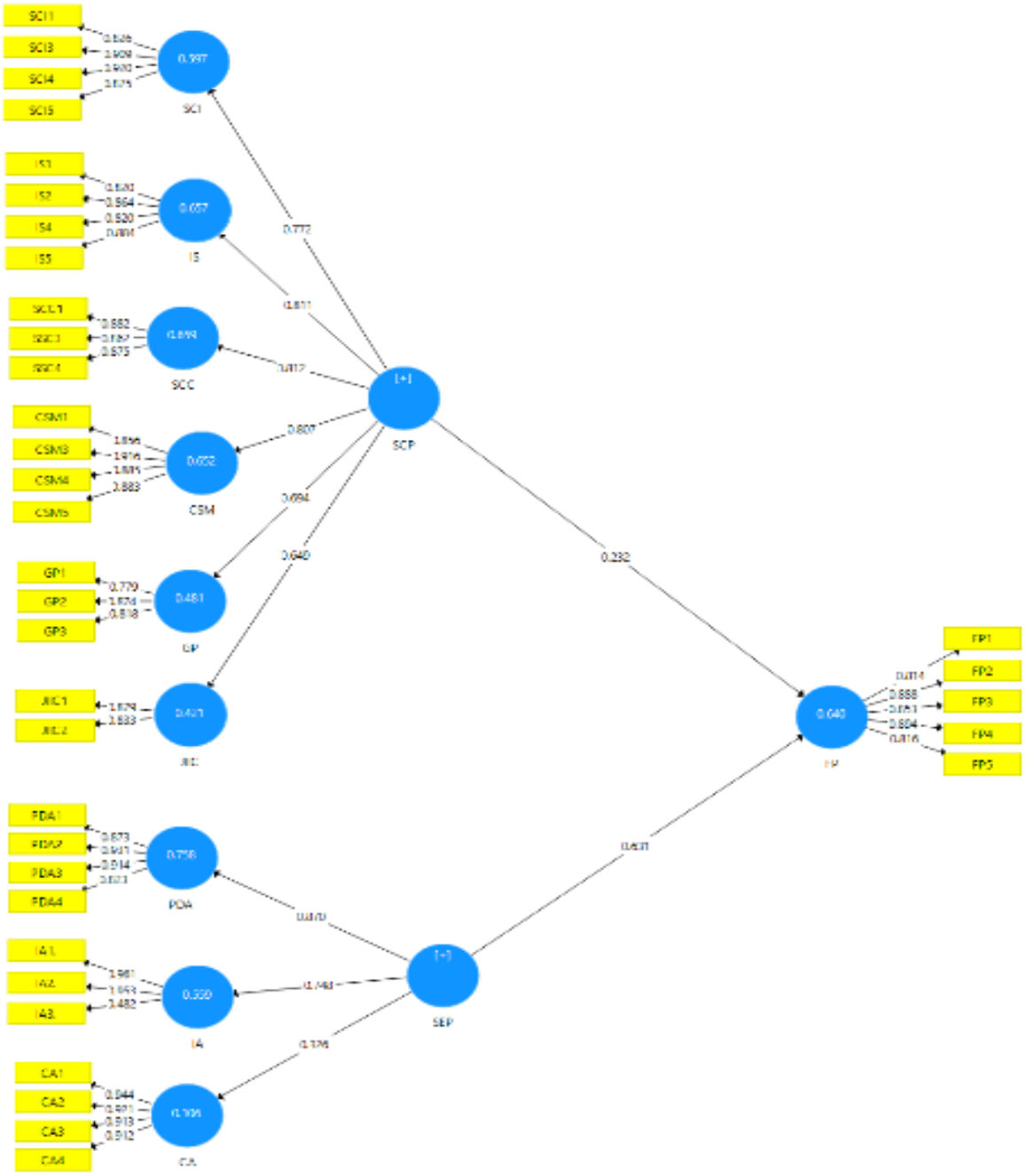

Figure 3. Measurement Model Assessment

The association among the variables is checked through the regression analysis mentioned in Table 4 given below. The findings revealed that the practices of SC has a positive impact on the firm performance (β = 0.232; t = 5.077), and supported the hypothesis H1 whereas practices of supplier evaluation have also increased the firm performance of the automotive industry in Thailand (β = 0.631; t = 15.077) and supported the hypothesis H2.

Table 4. Path Analysis

	Original Sample (O)	**Sample Mean (M)**	**Standard Deviation (STDEV)**	**T Statistics (|O/STDEV|)**	**P Values**	**R Square**
SCP -> FP	0.232	0.235	0.046	5.077	0	0.64
SEP -> FP	0.631	0.629	0.042	15.077	0	

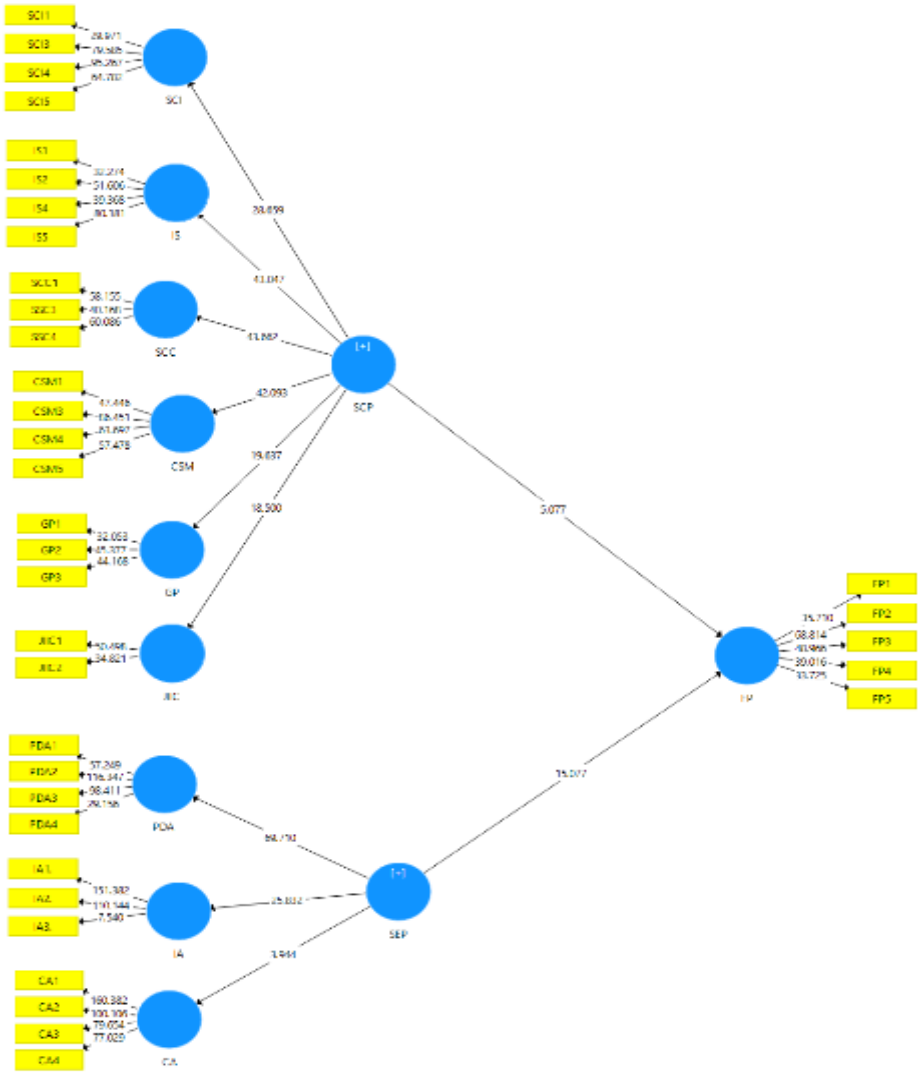

Figure 3. Structural Model Assesment

5. Discussion

The discussion on the findings that are mentioned-above is presented in this section of the study. Moreover, this section also shows the comparison of the results with the finding of previous studies. In addition, the conclusion of the study, recommendation, and limitation of the study also presented in this section.

The foremost aim of every organization is to enhance the performance of the entity and increase the wealth of their owners. There are several ways and tools for increasing the performance of entity such as SC practices, appropriate supplier selection, and supplier evaluation. This study has also investigated the practices of supply chain and supplier's evaluations impact on the firm performance. The findings revealed that the practices of SC that are effective enough could increase the performance of the automotive industry in Thailand. These findings are similar with the findings of Lockamy III and McCormack [29] and Otto and Kotzab [30] who also found that effective practices of SC improved the firm financial as well as environmental performance. In addition. The findings of this study also indicated that practices of supplier evaluation are also necessary for the selection of a competent supplier, who contribute to the performance of the automotive industry in Thailand. These findings are also similar to the results of Carr and Kaynak [31] and Day and Lichtenstein [32] who investigated that evaluation practices selected the competent suppliers that lead the institutions towards high performance.

Based on the above findings, this study concluded that the performance of the firm affected by the practices of SC and the practices of supplier evaluation. The practices of supply chain improved the business processes that eliminate the cost and enhance the supplying activities. The cost of handling the goods by applying the JIT practices

and it also improve the demand, supply, and production of the business. In addition, the practices of supplier evaluation help in selecting a reasonable and competent supplier for the business. These competent suppliers enhance the selling process of the business that increases the financial performance of the entity.

This study also recommended to the future researcher that they also explore this area in a way that they should add more factors that affected the firm performance. This study focuses only on the automotive industry of Thailand, and the future researcher can widen the scope of the study by adding more sector or industry in the study. Only one country investigated in this study; the future researcher can investigate multi-country analysis on this area of research.

References

[1] S. J. New and P. Payne, "Research frameworks in logistics: three models, seven dinners and a survey," *International Journal of Physical Distribution & Logistics Management*, vol. 25, pp. 60-77, 1995.

[2] S. Li, N. B. Ragu, N. T. Ragu, and S. S. Rao, "The impact of supply chain management practices on competitive advantage and organizational performance," *Omega*, vol. 34, pp. 107-124, 2006.

[3] A. Agus and M. Shukri Hajinoor, "Lean production supply chain management as driver towards enhancing product quality and business performance: Case study of manufacturing companies in Malaysia," *International Journal of Quality & Reliability Management*, vol. 29, pp. 92-121, 2012.

[4] E. Bayraktar, M. Demirbag, S. L. Koh, E. Tatoglu, and H. Zaim, "A causal analysis of the impact of information systems and supply chain management practices on operational performance: evidence from manufacturing SMEs in Turkey," *International Journal of Production Economics*, vol. 122, pp. 133-149, 2009.

[5] C. Araz and I. Ozkarahan, "Supplier evaluation and management system for strategic sourcing based on a new multicriteria sorting procedure," *International journal of production economics*, vol. 106, pp. 585-606, 2007.

[6] S. H. Huang and H. Keskar, "Comprehensive and configurable metrics for supplier selection," *International journal of production economics*, vol. 105, pp. 510-523, 2007.

[7] K. Govindan, S. Rajendran, J. Sarkis, and P. Murugesan, "Multi criteria decision making approaches for green supplier evaluation and selection: A literature review," *Journal of Cleaner Production*, vol. 98, pp. 66-83, 2015.

[8] D. Çelebi and D. Bayraktar, "An integrated neural network and data envelopment analysis for supplier evaluation under incomplete information," *Expert Systems with Applications*, vol. 35, pp. 1698-1710, 2008.

[9] A. D. Pressey, H. M. Winklhofer, and N. X. Tzokas, "Purchasing practices in small-to medium-sized enterprises: An examination of strategic purchasing adoption, supplier evaluation and supplier capabilities," *Journal of purchasing and supply management*, vol. 15, pp. 214-226, 2009.

[10] L. De Boer, E. Labro, and P. Morlacchi, "A review of methods supporting supplier selection," *European journal of purchasing & supply management*, vol. 7, pp. 75-89, 2001.

[11] W. Thanaraksakul and B. Phruksaphanrat, "Supplier evaluation framework based on balanced scorecard with integrated corporate social responsibility perspective," in *Proceedings of the International MultiConference of Engineers and Computer Scientists*, 2009, pp. 18-20.

[12] B. E. Becker, M. A. Huselid, B. Becker, and M. A. Huselid, "High performance work systems and firm performance: A synthesis of research and managerial implications," in *Research in personnel and human resource management*, 1998.

[13] Mohajan, H. K. Knowledge is an Essential Element at Present World. International Journal of Publication and Social Studies, vol.1,pp. 31-53., 2016.

[14] Mohamed, B. M., Rasheli, G. A., & Mwagike, L. R. Marginal Effects of Factors Influencing Procurement Records Management: A Survey of Selected Procuring Entities in Tanzania. International Journal of Social and Administrative Sciences,vol. 3,pp. 22-34., 2018.

[15] Mokhtar, S. B. Teaching-Learning Model of Islamic Education at Madrasah Based on Mosque in Singapore. International Journal of Asian Social Science,vol. 7, pp.218-225., 2017.

[16] R. Y. Chan, H. He, H. K. Chan, and W. Y. Wang, "Environmental orientation and corporate performance: The mediation mechanism of green supply chain management and moderating effect of competitive intensity," *Industrial Marketing Management*, vol. 41, pp. 621-630, 2012.

[17] M. Forman and M. S. Jørgensen, "Organising Environmental Supply Chain Management: Experience from a Sector with Frequent Product Shifts and Complex Product Chains: The Case of the Danish Textile Sector,"

Greener Management International, pp. 1-13, 2004.

[18] A. Gunasekaran and B. Kobu, "Performance measures and metrics in logistics and supply chain management: a review of recent literature (1995–2004) for research and applications," *International journal of production research*, vol. 45, pp. 2819-2840, 2007.

[19] V. R. Kannan and K. C. Tan, "Just in time, total quality management, and supply chain management: understanding their linkages and impact on business performance," *Omega*, vol. 33, pp. 153-162, 2005.

[20] S. K. Vickery, J. Jayaram, C. Droge, and R. Calantone, "The effects of an integrative supply chain strategy on customer service and financial performance: an analysis of direct versus indirect relationships," *Journal of operations management*, vol. 21, pp. 523-539, 2003.

[21] Q. Zhu and J. Sarkis, "Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprises," *Journal of operations management*, vol. 22, pp. 265-289, 2004.

[22] D. R. Krause, R. B. Handfield, and B. B. Tyler, "The relationships between supplier development, commitment, social capital accumulation and performance improvement," *Journal of operations management*, vol. 25, pp. 528-545, 2007.

[23] C. W. Wong, K.-h. Lai, K.-C. Shang, C.-S. Lu, and T. Leung, "Green operations and the moderating role of environmental management capability of suppliers on manufacturing firm performance," *International Journal of Production Economics*, vol. 140, pp. 283-294, 2012.

[24] P. D. Cousins, B. Lawson, and B. Squire, "Performance measurement in strategic buyer-supplier relationships: the mediating role of socialization mechanisms," *International Journal of Operations & Production Management*, vol. 28, pp. 238-258, 2008.

[25] A. J. F. Molin, J. J. Tarí, C. E. Claver, and G. M. D. López, "Quality management, environmental management and firm performance: a review of empirical studies and issues of integration," *International Journal of Management Reviews*, vol. 11, pp. 197-222, 2009.

[26] S. Vickery, C. Droge, P. Setia, and V. Sambamurthy, "Supply chain information technologies and organisational initiatives: complementary versus independent effects on agility and firm performance," *International Journal of Production Research*, vol. 48, pp. 7025-7042, 2010.

[27] L. Shen, L. Olfat, K. Govindan, R. Khodaverdi, and A. Diabat, "A fuzzy multi criteria approach for evaluating green supplier's performance in green supply chain with linguistic preferences," *Resources, Conservation and Recycling*, vol. 74, pp. 170-179, 2013.

[28] Moustafa, H., Tourkia, F. B., & Ramadan, R. M. Application of Artificial Neural Networks Modeling for Evaluation of ELearning/Training Convergence Time. American Journal of Education and Learning,vol. 2, pp .159-179., 2017.

[29] A. Lockamy III and K. McCormack, "The development of a supply chain management process maturity model using the concepts of business process orientation," *Supply Chain Management: An International Journal*, vol. 9, pp. 272-278, 2004.

[30] Mujtaba, M., Jamal, S., & Shaikh, Y. Development without Human Resource Development (HRD): Analysis of HRD Policy of Pakistan. Asian Themes in Social Sciences Research,vol. 2,pp. 9-15., 2018.

[31] A. S. Carr and H. Kaynak, "Communication methods, information sharing, supplier development and performance: an empirical study of their relationships," *International Journal of Operations & Production Management*, vol. 27, pp. 346-370, 2007.

[32] M. Day and S. Lichtenstein, "Strategic supply management: the relationship between supply management practices, strategic orientation and their impact on organisational performance," *Journal of Purchasing and Supply Management*, vol. 12, pp. 313-321, 2006.