

The Supply Chain Integration And Knowledge Development In Manufacturing Business In Thailand

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Abstract

Manufacturing business is important for the increase of the Gross Domestic Product (GDP). In the present day, there is intense competition in terms of business. Consequently, entrepreneurs are seeking ways to reduce the investment cost and increase the flow of the operation that still maintains the product quality. This research, therefore, aimed to investigate the factors in supply chain integration and learning organization and their influences on the competitive advantage and the performance of manufacturing business organizations in Thailand. Data were collected from 400 authorities who had purchasing/procuring powers in business organizations who worked on consumer goods in Bangkok and Bangkok metropolitan areas. Data were analyzed by using Structural Equation Modeling (SEM). The results of the study showed that the factors of supply chain integration and learning organization directly influenced the competitive advantage and indirectly influenced the performance of manufacturing business via the competitive advantage. Internal integration was the strong factor in the supply chain, whereas the consciousness of the employees was the strong factor in learning organization. The results of the study were beneficial for manufacturing business development by working together to enhance maximum competitive advantage and influence on the national higher GDP.

Keywords: Supply Chain Integration, Learning Organization, Business Competitive Advantage, Manufacturing Business

Introduction

The manufacturing business is the business working on raw materials production used as materials in other business organizations. The example is plastic manufactures that produce plastics for other business organizations in Thailand who produce and sell plastic consumer goods. Normally, the operation process is from the purchasing of raw materials following by the production process and ending with delivering to the customers. Most of the costs of manufacturing businesses come from labor and manufacturing costs. The income of the manufacturing business is the sale of production products as raw materials for the continuous process in consumer goods production. However, the enterprises are facing various business problems in their operations; for example, the conflicts in trading among the world's superpower countries, the rapid development of technologies, the changes of population structure, climate change, Covid-19 pandemic, and the changes in business

competition and customers' needs due to the high-performance production and communication technologies. Therefore, manufacturing businesses must develop their organizations to be able to adapt to such mentioned problems to create competitive advantages for the organization (Kiatruangkrai, Thepkham & Chinworaphattana, 2020);

These mentioned problems resulted in all business entrepreneurs trying to retain old customers and find new customers more to maintain sales and business growth. As the business competitions tend to operate at lower costs than their competitors, Supply Chain Integration plays an important role in creating cost advantage which increases flow rate and maintains consistency of products and information from the beginning to the consumer's hand (Chaimankong & Chimankong, 2014). Moreover, personnel should be developed to be able to adapt to those problems and able to run their organizations following the supply chain integration concept. Additionally, the learning organization concept also plays a big role in the performance of the organization for many generations as it helps continuously develop the organization's performances (Senge and Fulmer, 1993; Senge, 1997). It also cultivates good values in increasing higher efficient operation for the personnel (Phrapratanporn, Wararatchai, Aunyawong and Nik, 2019). These two factors are considered the significant factors that increase competitive advantage in today's competition and further leads to success (Maat, Syamsu, Armayah, Munizu & Musran, 2020).

The objectives of the study

The objectives of the study were to investigate the factors in supply chain integration and learning organization and their influences on the competitive advantage and the performance of manufacturing business organizations in Thailand and to find out the key factors of the supply chain integration and knowledge development of manufacturing business organizations in Thailand.

Literature review

The concepts and related studies were retrieved from national and international resources to confirm the conceptual framework of the study as follows:

Business Performance

Business performance of manufacturing business in learning organization and supply chain integration context is from the study of the indicators of the operation from customer's point of view further from profit. Therefore, business performance can be evaluated from other outcomes that reflect business success rather than money or profits. According to learning organization and supply chain integration concepts, these factors affect customer's satisfaction, new customer's purchasing decision, quality corporate image, service providing speed, recommendation, and repeat customer that can gain market and maintain customers with brand royalty (Samerjai, 2018; Han &

Kim, 2016). Brand royalty directly results in the ability to make profits for the business. More customers with brand royalty can make the business gain much more profits (Reichheld and Sassor, 1990) and increase the market share without having to invest much in advertising because customers will recommend your products and services to other customers (Wangkananon&Saomung, 2011).

Supply Chain Integration

The supply chain integration concept is the connection of the operating activities of the manufacturing organization and suppliers of the raw material production with the customers of the manufacturing organization. The objective of the supply chain integration is to increase the circulation of the products including product and service speed providing with high quality but the lower cost (Sezen, 2008; Youn & Hong (2008); Aunyawong, Wararatchai & Hotrawaisaya, 2019; Termsri, 2021). Previous studies confirmed that the appropriate collaboration in the supply chain integration between the manufacturer, the suppliers, and the customers will lead to cost reduction and increase competitive advantage that further result in the growth of the organizations in terms of finance, market share, and sale rate (Maat, Syamsu, Armayah & Musran, 2020; Muntaka, Haruna & Mensah, 2017). Supply chain management is the entire organization's operation lines that can increase customer relations and competitive advantage and make the organization sustainably survives (Horthamarat, Jamjumrus, & Chandarasorn, 2021). Supply chain management that creates alliances between the manufacturer, the suppliers, and the customers can influence competitive advantage due to the lower cost and the quality products that can respond to the customer's needs (Brammi & Wanarat, 2013). Consequently, the hypotheses of the study were as follows:

H₁= supply chain integration directly influences competitive advantage

H₂= supply chain integration directly influences the performance of manufacturing business

H₃ = supply chain integration indirectly influences the performance of manufacturing business

Learning organization

Peter Senge (1997) mentioned that the key practice of learning organization consists of 5 components: Personal Mastery, Mental Model, Shared Vision, Team Learning, and System Thinking. Previous studies found that the learning organization concept enhanced development in the organization and led to personnel development to work more effectively in terms of lowering the cost, enhancing the quality of services, and increasing trust from customers. These outcomes then led to the success of the company's marketing and finance (Khaoplod & Laohavichien, 2018) and empowered the responsibility of the personnel in working with constructive knowledge. Finally, the

organization got competitive advantages and sustainably survived in the rapidly changing supply chain (Thongrawd & Rittiboonchai, 2018). The competitive advantages of the SMEs in Thailand 4.0 Era happens when the organization working together with the personnel in the organization by integrating learning organization concept and creativity with the intervention of new technology and innovation (Kruasom, 2017). Moreover, continuous learning, questioning and response, cooperation and teamwork, increasing human resource limitation, creating systems, connecting the organization with environmental issues, and developing strategic leadership are also considered factors that directly influenced the performance of the organization in terms of organizational missions. In addition, knowledge management is considered the key factor to success as the knowledge is bound with tasks or activities of the organization, core knowledge, and creative innovation (Khunsoonthornkit & Panjakajornsak, 2018). The business that supports personnel to learn more from their work and provides new knowledge that can be used in their works tends to get successful and effective outcomes (Kittikunchotiwut, 2014). Consequently, the hypotheses of the study were as follows:

H₄= learning organization directly influences competitive advantage

H₅= learning organization directly influences the performance of manufacturing business

H₆ = learning organization indirectly influences the performance of manufacturing business

Competitive advantages

Competitive advantages refer to the ability of the organization to operate differently from other competitors; for example, the application of the supply chain integration and the learning organization. The results of the operation must reduce the cost to be lower than other competitors, raise more profits, gain cost and quality advantages, and provide faster delivery to the customers. These outcomes will further result in the better performance of the organization compared to their competitors (Ambrosini & Bowman, 2010; Tongchim & Rassameethes, 2012; Pongwirittorn & Utomang, 2011). The previous study showed that competitive advantages in terms of appropriate cost and quality products that can respond to the customer's needs influenced higher profits, sales, and marketing share. This outcome can be occurred by using supply chain integration with the manufacturer, the suppliers, and the customers (Maat, Syamsu, ARMAYAH & Musran, 2020). The ability of the organization to make the differences in terms of cost, product quality, reliable delivery, production innovation compared to other competitors directly enhance the effectiveness of the operation including the growth in profits, finance, market share, and sales (Ploenhad, Laoprawatchai, Thongrawd and Jermstittiparsert, 2019). The organization that gains competitive advantages, normally, operates differently from the competitors especially in terms of lower cost and higher profits (Pawef, 2016). Consequently, the hypotheses of the study were as follows:

H₇= competitive advantages directly influence the performance of the plastic SMEs manufacturing business in Bangkok and Bangkok metropolitan areas.

Materials and method

This research was quantitative research with literature reviews from national and international resources based on the supply chain integration and learning organization concepts that influenced competitive advantages and the performance of the business organization. The methodology of the research was as follows:

The population of the study

The population of the study was the authorities who had power in purchasing/procuring materials in the organizations that work on producing consumer goods and purchase/procure materials from plastic manufacturing in Thailand.

The sample of the study

The samples of the study were the authorities who had power in purchasing/procuring materials in the organizations with 31 to 100 personnel in Bangkok, Samut Prakan, Nonthaburi, Pathum Thani, Nakorn Pathom, and Samut Sakhon. One sample was selected from each organization. The sample organizations must purchase/procure materials from plastic manufacturing in Thailand that included 12,271 manufacturers (National Statistical Office, 2017). The sample size was considered to be more than 20 times of the variables in the conceptual framework (Andsuchote & Wijitwanna & Pinyopanuwat, 2014). The model in this study consisted of 4 latent variables and 16 observed variables; thus, the sample size should be at least 400 samples.

Sampling method

Phase 1, the probability sampling method was used by using the stratified sampling method due to the similar characteristics in each group (Vanichbuncha, 2010). There were 6 sample groups of the authorities who had power in purchasing/procuring materials in the organizations with 31 to 100 personnel in Bangkok, Samut Prakan, Nonthaburi, Pathum Thani, Nakorn Pathom, and Samut

Sakhon. The proportion to size was analyzed, and the suggested numbers for this study were at least 400 samples (Fig. 1).

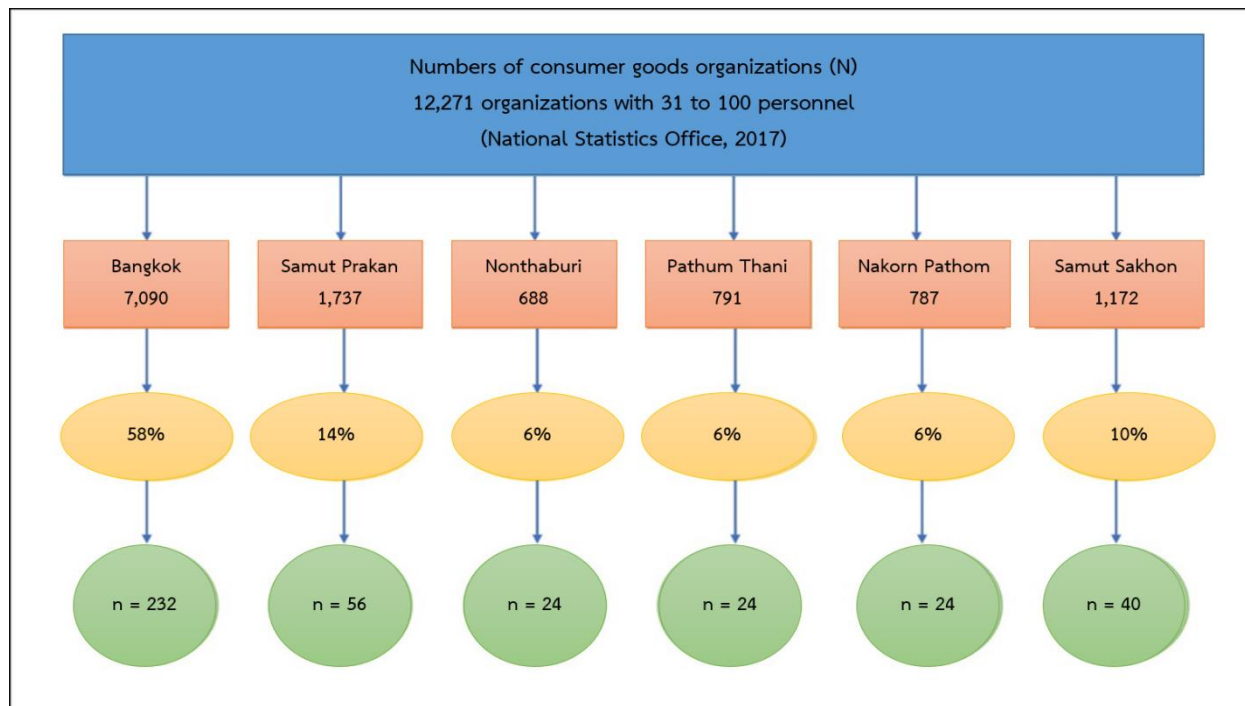


Figure 1: Sample analysis

Source. Research procedure

Phase2, after getting the sample size from phase 1 sample analysis, the samples were selected by using the nonprobability sampling method with the purposive sampling method (i.e. the sampling was based on the researcher’s consideration and the objectives of the study). The population in this study was considered to have high reliability as they were the actual authorities who used raw plastic materials for consumer goods.

Research Instrument

Quantitative data were collected by using questionnaire. Content validity of the questionnaire was analyzed, and the IOC should be higher than 0.50 (Petchroj & Chamniprasart, 2004). The Index of item objective congruence of the questionnaire in this study had been analyzed, and the IOC was higher than 0.50 for all questions. The reliability of the entire questionnaire was analyzed by using Cronbach’s Alpha Coefficient, and the results showed that it was .956 which was in between .874 to .910; thus, this questionnaire had high reliability (Vanichbuncha, 2010). Moreover, Composite reliability (CR) was analyzed. All latent variables had reliability from .769 to .839 that were higher than .60, and the Average Variance Extract (AVE) were from .512 to .558 that were higher than .50 (Diamantopoulos & Siguaw, 2000; Andsuchote, et. al., 2014).

Table 1 Validity and reliability of the questionnaire

Variables in the conceptual framework	Cronbachs'Alpha Coefficient	Construct Reliability (CR)	Average Variance Extracted (AVE)
supply chain integration	.874	.786	.551
learning organization	.883	.839	.512
competitive advantages	.884	.769	.528
performance of the manufacturing business	.910	.838	.515

Source. Research procedure

Analysis and Statistical Treatment

Data analyses had followed the objectives of the study. Path Analysis and Structural Equation Modeling (SEM) were selected to use for investigating the relationship among supply chain integration, learning organization, competitive advantages, and the performance of the manufacturing business in Thailand.

The results of the study

SEM analysis was used for investigating the relationship among supply chain integration, learning organization, competitive advantages, and the performance of the manufacturing business in Thailand and suggesting the key factors of the supply chain integration and knowledge development of manufacturing business organizations in Thailand. The results of the study were as follows:

Personal information

Most of the samples were male (55%), aging 41 – 50 years old (50.70%), having bachelor degree (47.80%), working as purchasing manager (53%), having more than 15 years of experience (42.50%), and having salary higher than 55,001 Baht (%)

The results of research hypotheses tests

Research hypotheses were tested to analyze factors concerning supply chain integration, learning organization, competitive advantages, and the performance of the manufacturing business in Thailand.

Table 2 Factors influencing the performance of the manufacturing business based on research hypotheses

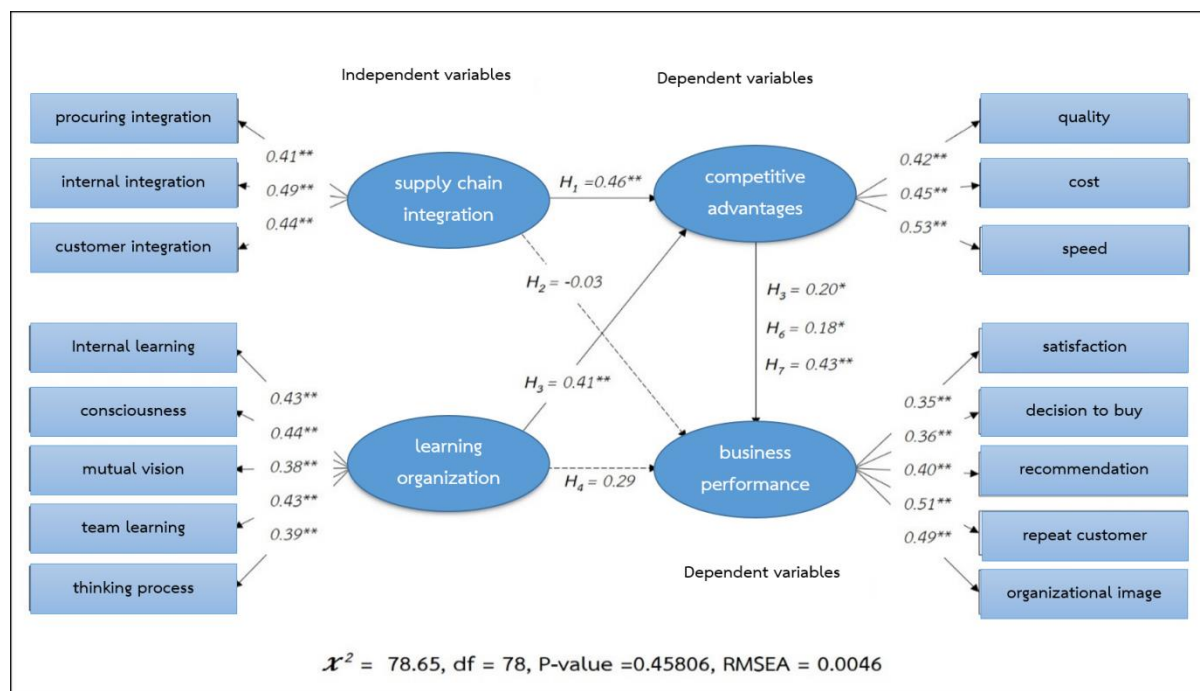
Independent variables/	Competitive advantages(ADV)	Performance (PER)
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Dependent variables	R ² = 0.73			R ² = 0.65		
	TE	DE	IE	TE	DE	IE
Supply chain integration(SCI)	0.46**	0.46**	-	0.17	-0.03	0.20*
Learning organization(LEO)	0.41**	0.41**	-	0.47* *	0.29	0.18*
Competitive advantages(ADV)	-	-	-	0.43* *	0.43**	-
Research hypotheses			accept	reject		
H ₁ SCI → ADV			✓			
H ₂ SCI → PER				✓		
H ₃ SCI → ADV→PER			✓			
H ₄ LEO → ADV			✓			
H ₅ LEO → PER				✓		
H ₆ LEO → ADV→PER			✓			
H ₇ ADV→PER			✓			

*p < 0.05 or | t | > 1.96 (significance at 0.05)

**p < 0.01 or | t | > 2.58 (significance at 0.01)

Table 2 revealed that supply chain integration and learning organization influenced competitive advantages (R² = 73%) and performance (R² = 65%). The effect sizes of the influences were various. 1) supply chain integration directly influenced competitive advantages with the effect size of 0.46 (p<0.01). Thus, H₁ was accepted. Moreover, supply chain integration indirectly influenced performance via competitive advantages with the effect size of 0.20 (p<0.05). Thus, H₃ was accepted. Learning organization directly influenced competitive advantages with the effect size of 0.41 (p<0.01). Thus, H₄ was accepted. Moreover, learning organization indirectly influenced performance via competitive advantages with the effect size of 0.18 (p<0.05). Thus, H₆ was accepted. 3) Competitive advantages directly influenced performance with the effect size of 0.43 (p<0.01). Thus, H₇ was accepted. Supply chain integration and learning organization had no direct influence on performance (p>0.05). Thus, H₂ and H₅ were rejected.



* $p < 0.05$ or $|t| > 1.96$ (significance at 0.05)

** $p < 0.01$ หรือ $|t| > 2.58$ (significance at 0.01)

Figure 2: Model of supply chain integration and knowledge development in manufacturing business in Thailand

According to figure 2, the model of supply chain integration and knowledge development in manufacturing business in Thailand was appropriate (Chi-Square= 78.65, $df = 78$, $p = 0.45806 > 0.05$, $RMSEA = 0.0046 < 0.03$, $GFI = 0.98 > 0.95$, $AGFI = 0.96 > 0.90$). The effect sizes of the influences were various. 1) internal integration was the significant factor of supply chain integration ($p < 0.05$), and directly influenced competitive advantages and indirectly influenced manufacturing business performance. 2) Consciousness of the personnel, personnel’s learning, and teamwork were the significant factors of learning organization ($p < 0.05$), and directly influenced competitive advantages and indirectly influenced manufacturing business performance. 3) Service speed was the significant factor of competitive advantages ($p < 0.05$), and directly influenced manufacturing business performance. 4) Repeat customer and quality corporate image were the significant factors of manufacturing business performance ($p < 0.05$).

Discussion

Internal integration was the key factor of supply chain integration that directly influenced competitive advantages and indirectly influenced manufacturing business performance. Additionally, internal integration was the medium that connected suppliers and customers and can increase flow and prevent obstacles in operation. It also took effects on external integration including customer

maintaining and raw material sales. Initially, the organization should have the appropriate internal operation by cooperating and planning strategies, responsibilities, inter-department integration, and authority appropriately for all personnel within the organization. Moreover, organizational development can be more effective by lowering costs and enhancing the limitation of the operation in organizational sections to confirm that the organization will reach the most effective goal (Flynn, Huo & Zhao, 2010). The appropriate internal management can enhance the effectiveness of the operation; for example, lowering the cost and considering the abilities of internal sections to be able to perform appropriately in the entire organizational process (Ralston, Blackhurst, Cantor & Crum, 2014). Furthermore, appropriate communication and cooperation within the organization together with the appropriate connection with suppliers and customers can influence customer's satisfaction as well (Traisanun & Thuannadee, 2013).

Consciousness was considered the key factor of learning organization that directly influenced competitive advantages and indirectly influenced manufacturing business performance. Working with consciousness is focused on achieving operation goals effectively. It raises awareness in working and prevents careless practice that may lead to loss (Phra Brahmaganabhorn, 2003). The organization should also develop personnel and administrators to have rational thinking and open-minded points of view. Personnel and administrators should be able to separate work from personal stuff and be able to work logically and be ready for any changes that can be always happened anytime (Phrapratanporn, Wararatchai, Aunyawong and Nik (2019).

Supply chain integration and learning organization are the significant factors that should be working together to reach the highest competitive advantages such as the speed in providing services and products. The effective flow operation in the entire process from the suppliers, manufacturer, and customers as well as the learning management of personnel and administrators can make the organization reach the highest goals. Therefore, the administrators should focus on the development of knowledge and supply chain integration at the same time (Maat, Syamsu, Armayah & Musran, 2020;

If the organizations has faster services providing with the lower costs and standard quality, they are considered to be able to serve customer's needs and will further gain competitive advantages as comfortable and accessible services are issues to be considered in today's business operation.

Recommendations of the study

The findings of this study were beneficial for developing manufacturing business that is considered to have intense competition. The complete development in supply chain integration can result in increasing speed, lowering cost, and increasing the quality of products. Moreover, the organization

should emphasize internal operation; for example, developing teamwork and international standardized working process. The administrators should get easy access to the purchasing/procuring information, monitoring marketing and delivery situations, and product stock for the most effective performance. Effective performance can also be from the consciousness at work as the consciousness makes personnel be able to think and analyze their task efficiently. Consciousness also refers to the ability to separate work and personal stuff to work properly every time and be able to adapt themselves to any situation. These factors will enhance maximum competitive advantages and influence the national higher GDP.

Recommendations for the future study

There should be studies about the performance of business concerning store management and repeated purchasing, and various categories of business can be studied in depth. Store management is also an important issue for cost management as well as repeated purchasing that is linked to cost management and production flow. The studies on these two issues will create quality products that can effectively respond to the customer's needs.

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