The Effects of Innovation Management, Supply Chain Management, and Freight Forwarder Potential on Service Competitiveness of Road Transportation Entrepreneurs in Thailand

Sasiwimon Wongwilai*, Chattrarat Hotrawaisaya
College of Logistics and Supply chain, Suan Sunandha Rajabhat University, Thailand

Chattrarat Hotrawaisaya,
College of Logistics and Supply chain, Suan Sunandha Rajabhat University, Thailand

Abstract

      This research aims to study the effects of innovation management, supply chain management, and freight forwarder potential on service competitiveness of road transportation entrepreneurs in Thailand. This quantitative research was conducted to collect data from 456 executives of transportation and logistics service companies in Thailand, registered with the Department of Business Development, using a 10 times the observed variables. A multistage sampling method was used. The data was collected with questionnaires and analyzed by the structural equation modelling. The results showed that innovation management, supply chain management, and freight forwarder potential affected the competitiveness of road transportation entrepreneurs in Thailand. The statistical significance was at .05 level. The research model was consistent with the empirical data with statistical values: $\chi^2 = 95.713$, $\chi^2/df = 1.243$, df = 77, p = 0.073, RMSEA = 0.022, RMR = 0.014, GFI = 0.979, AGFI = 0.953, CFI = 0.998, which could predict service competitiveness by 79.40 percent. The findings were useful for freight forwarders to develop their establishments to be able to compete in changing situations, in line with the government's policy in enhancing the potential of the freight forwarders.

Keywords: Competitiveness, Innovation Management, Supply Chain Management, Freight Forwarder Potential, Road Transportation

1. Introduction

    The advancement of globalization and technology as well as the outbreak of the COVID-19 pandemic has impacted the global economy, severely disrupting the supply chain across the world. This forces the firms to devise management strategies to respond to the changing global value chain for improving their competitiveness (Shin & Shin, 2021). Abrupt changes in the economy and the development of information technology affect the operations of freight forwarders. Entrepreneurs who previously had a competitive advantage without adaptation would lose that advantage in a relatively short period of time (Drucker, 1999). The exponential growth of online commerce has resulted in a huge growth in logistics and delivery businesses. Therefore, logistics service businesses need to develop their operations to be efficient in areas such as: management, trade, investment, marketing, technology, personnel, regulations and other related matters so that the logistics service businesses can develop the economic potential of the country and compete in trade with higher potential countries (Department of Business Development, 2021). Logistics service providers must understand and seek ways to develop their organizations to be able to operate under the changing circumstances today and face inevitably fierce competition (Bacigalupo, Kampylis, Punie & Brande, 2016). In addition, the efficiency of logistics services can be assessed by the service provider's ability to deliver the products the customer needs within the delivery time and at an acceptable price (Bowersox & Closs, 2002). It is a source of competitive advantage and the key to efficient customer service. Entrepreneurs prefer to serve customers mainly in the form of road transportation because it can meet the needs of Door-to-Door Transportation increasingly, which is in line with the continued growth of e-commerce businesses (Logistics Development Strategy Division, 2020). Transporting goods within Thailand using road transport, accounted for more than 86% of the total weight of goods transported within Thailand since there is an infrastructure that is quite complete. Furthermore, the government has given a lot of support for road transport when compared to the development of other forms of transport and services (Aunyawong et al., 2021; Nualkaw et al., 2021). Innovative management, moreover, is used as a tool to gain a competitive advantage to improve efficiency. It will survive the businesses, even in the main industrial sectors. Businesses and organizations which are facing the pressures of today's highly competitive business operations and the rapid changing rates of innovation, technology and consumer expectations have transformed the forms and types of competition in the global marketplace (Christensen, Horn & Soares 2011; Ponomarov & Holcomb, 2009; Waiyawuththanapoom et al., 2021).

    The above information shows the importance of road transport which is a service business that plays an important role in distributing products to both domestic and international markets. The freight forwarders move goods at each stage of the supply chain from raw materials / primary products, intermediate products, and finished goods. Business conditions therefore move in the

same direction as the quantity of goods and grow according to the country's economy. Therefore, the researchers have an idea to study the effect of innovation management, supply chain management, and entrepreneurial potential that affects the competitiveness of the service providers, according to Christopher (1998), suggesting that entreprenuers to achieve must strive for excellence in service delivery to gain competive advantage, in order to use the results to develop the potential of freight forwarders to compete with large freight forwarders.

2. Research objectives
To study the effects of innovation management, supply chain management, and freight forwarder potential on service competitiveness of road transportation entrepreneurs in Thailand

3. Literature review
3.1 Competitive Advantage
Competitive advantage is the development and discovery of resources in an organization that competitors do not have, or to do something that competitors cannot do as a core competencies or distinctive competencies, thereby creating a competitive advantage. Such advantages will be a necessary factor for success and long-term survival of an organization that cannot be compared with other organizations (Tukker, 2015; Robbins, 2005). An organization needs to create a competitive advantage, as Porter (2005, 2011) represents that the competitive advantage derives from 3 main strategies: 1. Cost Leadership, 2. Differentiation, and 3. Focus. Moreover, the use of business alliance strategies to create networking groups together is one of the key factors of creating competitive advantages (Bretherton & Chaston, 2005). The creation of competitive advantages to achieve goals depends on the environment of each organization and bringing the environment to create potential for the organization because organizations with competitive advantages will develop and maintain continuous operating results. The organizations can survive in the entire competition, build market share, and create continuous profit growth, especially to satisfy customers with better quality of service (Barney, 2012).

3.2 Innovation Management
The beginning of innovation comes from the ability to use knowledge, creativity, skills, expertise, and experience to create new products, processes or services. In transforming ideas into tangible reality by inventing invention, science and technology play an important role. Innovation is the result of commercial application of an invention to increase market or organizational value (Capozzi, et al, 2010; Tirastittam et al., 2020; Sommanawat et al., 2021). Innovation, therefore, means bringing ideas to create a new process or make improvements and use them in the organization to provide accessible and acceptable products and services as new products, new services or new technologies. This may be due to an acute or gradual change. Innovations are divided into four main categories (OECD, Oslo Manual, 2005), including Product Innovation, Process Innovation, Organizational Innovation, and Marketing Innovation. The scholars' works on innovation management define innovation as something new in a product, process or service (Wongwilai et al., 2022). Drucker (1985, 1993) added that innovation management is an important tool for entrepreneurs to build competitiveness and wealth in business. Innovation comes from both internal and external sources (Tidd & Bessant, 2009), leading to supply chain performances (Phrapratanporn et al., 2019)

According to a study of the positive relationship between innovation management and business performance, the results found that innovation management capability is the most important factor affecting business performance along with the success of business strategy and goals in order to gain competitive advantages in the present (Izadi, at al.,2020; Crowley, 2017; DilaraDereli, 2015). we propose the first hypothesis:

H1: Innovation management has a direct effect on competitiveness in logistics service.

Furthermore, technological advances that have occurred in recent years have a direct effect on supply chain management (Zekhnini, el al., 2021). Moreover, past studies depicts that innovation management has a direct positive effect on supply chain management in terms of collaboration and trust (Dansomboon & Pingta,2019; Paula, et al., 2019). The researchers, accordingly, hypothesize that:

H2: Innovation management has a direct effect on supply chain management.

Innovation management is a key element that affects the sustainability and capability of an organization (Beltramino, et al., 2020), where innovation capability directly contributes to a company's potential (Shou, et al., 2017). The researchers, consequently, hypothesize that:

H3: Innovation management has a direct effect on freight forwarder potential.

3.3 Supply Chain Management
Supply chain management involves planning and managing all supply chain activities from suppliers, manufacturers, retailers/wholesale to consumers with sourcing and purchasing, including coordination and cooperation with partners. Supply chain is an integrated management with primary responsibility for linking critical business functions and internal business processes throughout the company (Hotrawaisaya et al., 2020; Lambert et al., 2005). Supply chain management is a network of elements that facilitate business processes. This starts with the process of procuring raw materials from suppliers, processing from raw materials to goods, and distributing products to consumers, respectively (Lambert et al.,2005; David et al., 2000; Pintuma et al., 2020). Hotrawaisaya & Jermsittiparsert (2020) and Sinthukhammoon et al. (2021) claimed that Supply Chain Management

(SCM) involves planning and management of all supply chain activities from suppliers, manufacturers, retailers/wholesale to consumers.

Supply chain management is a source of complete competitive advantage (Feizabadi, et al., 2019; Nguyen, et al., 2017). The results of past research found that reliability and agility in supply chain affects the ability to create innovation and competitive advantage (Chen, 2019). The researchers, therefore, hypothesize that:

H4: Supply chain management has a direct effect on competitiveness in transportation Service.

In addition, the implementation of supply chain management in the company will affect business operations. It creates a positive relationship with the company's potential (Kumar, et al., 2020; Kitchot, et al., 2020). Besides, Dansomboon & Pingta (2019) identify that supply chain management is the factor that has a direct positive effect on the potential of Thailand automobile organization, with an effect size of 0.697 at a significant level of 0.01. The researchers, thus, hypothesize that:

H5: Supply chain management has a direct effect on freight forwarder potential.

3.4 Freight Forwarder Potential

Freight forwarder potential according to the concept of Bacigalupo et al. (2016), known as The Entrepreneurship Competence Framework (Entre Comp), is a concept of service provider/entrepreneurial potential consisting of 3 main areas: 1. Idea and Opportunity, 2. Resources, and 3. Operations. All three of which are critical to the success of an organization. If any organization has low potential, it must to develop its own organization to have better potential. Potential refers to the level of competence of various departments within the organization (Wilton, 2013). Logistics and transportation entrepreneurs include Delivery Flexibility, Delivery Speed, Delivery Reliability, Responsiveness, and Low-cost Distribution (Kisperska-Moron, 2005; Wilding & Juriado, 2004). Good logistics services relate with the efficiency of the organization and are a source of competitive advantage and a key to effective customer service (Emel, et al., 2011; Hunt & Morgan, 1995) by taking advantage of the potential of entrepreneurs in learning logistics to increase their competitiveness and efficiency of logistics services (Yang, 2016). In addition, the logistics potential of entrepreneurs can improve logistics operations and create a competitive advantage for the company (Wang, et al., 2018, 2020). The researchers, so, hypothesize that:

H6: Freight forwarder potential has a direct effect on competitiveness in transportation service.

From the review of concepts, theories and related research, the researchers have summarized the research conceptual framework as shown in Figure 1.
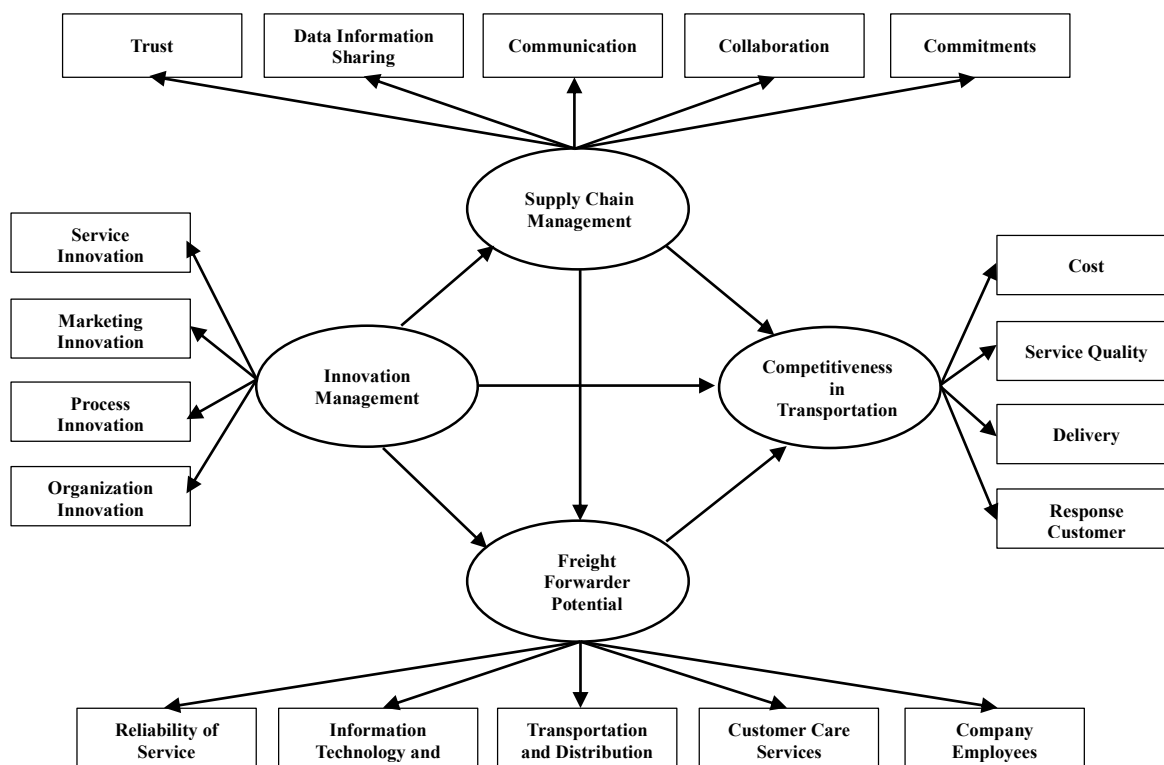

Figure 1. Theoretical framework

4. Methodology

The research process began with a review of the related literature to study the effect of variables affecting competitiveness in various service businesses and to formulate a research conceptual framework, as well as to define the terminology of the research variables.

4.1 Population and Sample

In this study, there were 6,474 freight and logistics service companies in Thailand registered with the Department of Business Development. The respondents were company owners or the managers, arisen from multistage random sampling.

4.2 Data collection

Data collection was carried out with questionnaires with a sample of 496 companies. The researchers considered the sample size that was suitable for data analysis by using the Structural Equation Model (SEM) technique by calculating the sample size according to Kline's (2011)'s criterion, which recommended that the sample size should be approximately 5-10 per parameter used to estimate the SEM analysis (Bentler & Chou, 1987; Nunnally, 1967).

4.3 Research Instruments

The research instrument, the 5-Level Likert Scale questionnaire (Likert, 1932), was created and its validity was checked using the Item Objective Congruence (IOC) with a criteria of greater than 0.60 (Petchrot & Chamniprasat, 2004). After that, the reliability was tested by considering Cronbach Alpha's coefficient with a criteria of greater than 0.80 (α =0.986) (Cronbach, 1990).

4.4 Data Analysis

The mean, standard deviation, skewness, kurtosis, and correlation of observed and latent variables were analyzed to answer the research objectives. Finally, the Structural Equation Modeling (SEM) was analyzed to study the effect size of variables affecting the service competitiveness of road transportation entrepreneurs in Thailand.

5. Results

The researchers analyzed the distribution of data for observation variables used in the research from 496 collected questionnaires with basic statistical values, i.e. arithmetic mean ($\bar{x}$), standard deviation (SD), skewness (Sk), kurtosis (Ku), and %C.V. The criterion for determining the normal distribution of the data was that the Skewness (Sk) must be between -3 and +3 and the Kurtosis (Ku) must be less than 10 (Kline, 2005; Schumacker & Lomax, 2010). A detailed analysis of the distribution of observed variable data for each latent variable used in the research was shown in Table 1.

Table 1: Basic Statistic Analysis

Variable	Mean	S.D.	Max	Min	%C.V.	Skewness	Kurtosis
Competitiveness in Transportation Service: CTS							
COS	3.99	0.76	1.67	5.00	19.15	-.245	-.816
SVQ	3.59	1.16	1.00	5.00	32.25	-.689	-.382
DEL	3.82	0.92	1.00	5.00	24.12	-.491	-.417
RPC	3.81	1.07	1.00	5.00	28.02	-.712	-.531
Supply Chain Management: SCM							
TRU	4.12	0.74	1.00	5.00	17.91	-.555	-.226
CMC	3.88	0.84	1.00	5.00	21.65	-.360	-.377
CLB	3.77	0.95	1.00	5.00	25.32	-.438	-.508
CMM	3.91	0.79	1.00	5.00	20.29	-.158	-.579
DIS	3.94	0.82	1.00	5.00	20.80	-.539	-.164
Innovation Management: INM							
SVI	4.00	0.81	1.00	5.00	20.14	-.656	.340
MKI	4.02	0.78	2.00	5.00	19.32	-.482	-.435
PCI	4.09	0.72	2.00	5.00	17.47	-.410	-.377
OGI	4.13	0.72	2.00	5.00	17.39	-.508	-.299
Freight Forwarder Potential: FFP							
RES	4.16	0.58	3.14	5.00	13.95	-.022	-.905
IFS	3.91	0.79	2.67	5.00	20.16	-.178	-.996
TAD	4.50	0.46	3.80	5.00	10.14	-.306	-1.518
CCS	4.50	0.51	3.67	5.00	11.24	-.495	-1.199
CEM	4.09	0.61	3.00	5.00	14.91	-.028	-.817

The internal correlation coefficient among 18 observed variables of the measurement model showed that there were 153 pairs and 134 pairs with statistical significance greater than zero at the 0.05 level. It reflected a positive relationship in the same direction, valued from 0.003 to 0.886. The Bartlett's Test of Sphericity statistic depicting Chi-square = 9392.660 , df = 153, p-value = 0.000 shows that this correlation matrix differs from the identity matrix with statistical significance at 0.05 level. This was consistent with the Kaiser-Meyer-Olkin (KMO) value of 0.925, which was close to 1, indicating that the variables are highly correlated and appropriate to be used in the analysis of SEM in the next step, as shown in Table 2.

Table 2: Correlation Coefficient

	COS	SVQ	DEL	RPC	TRU	CMC	CLB	CMM	DIS	SVI	MKI	PCI	OGI	RES	IFS	TAD	CCS	CEM
COS	1.000																	
SVQ	.722**	1.000																
DEL	.692**	.856**	1.000															
RPC	.684**	.886**	.825**	1.000														
TRU	.719**	.718**	.738**	.804**	1.000													
CMC	.711**	.780**	.815**	.798**	.777**	1.000												
CLB	.697**	.829**	.850**	.828**	.781**	.872**	1.000											
CMM	.773**	.758**	.765**	.755**	.784**	.849**	.842**	1.000										
DIS	.747**	.749**	.738**	.740**	.762**	.800**	.811**	.864**	1.000									
SVI	.684**	.696**	.660**	.711**	.704**	.763**	.766**	.755**	.812**	1.000								
MKI	.687**	.602**	.554**	.552**	.556**	.634**	.590**	.745**	.700**	.687**	1.000							
PCI	.682**	.572**	.530**	.564**	.600**	.633**	.606**	.693**	.702***	.724**	.832**	1.000						
OGI	.681**	.597**	.592**	.635**	.677**	.683**	.679**	.700**	.717**	.772**	.647**	.767**	1.000					
RES	.129**	.141**	.132**	.090*	.069	.086	.095*	.106*	.137**	.187**	.125**	.141**	.131**	1.000				
IFS	.154**	.107*	.127**	.035	.051	.126**	.072	.140**	.129**	.144**	.214**	.167**	.093*	.482**	1.000			
TAD	.102*	.096*	.045	.065	.095*	.099*	.104*	.126**	.139**	.181**	.090*	.112*	.130**	.536**	.501**	1.000		
CCS	.099*	.094*	.044	.080	.092*	.061	.075	.080	.051	.104*	.003	.034	.098*	.484**	.273**	.722**	1.000	
CEM	.115*	.118**	.097*	.039	.061	.090*	.088	.110*	.084	.146**	.154**	.126**	.092*	.644**	.706**	.562**	.398**	1.000

Bartlett's Test of Sphericity Chi-Square = 9392.660; df = 153, p = .000
Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .925

The SEM analysis to study the effect sizes of Innovation Management (INM), Supply Chain Management (SCM) and Freight Operator Potential (FFP) on the competitiveness of transportation services (CTS) of road transportation entrepreneurs in Thailand was summarized in Table 3-5 and Figure 2.
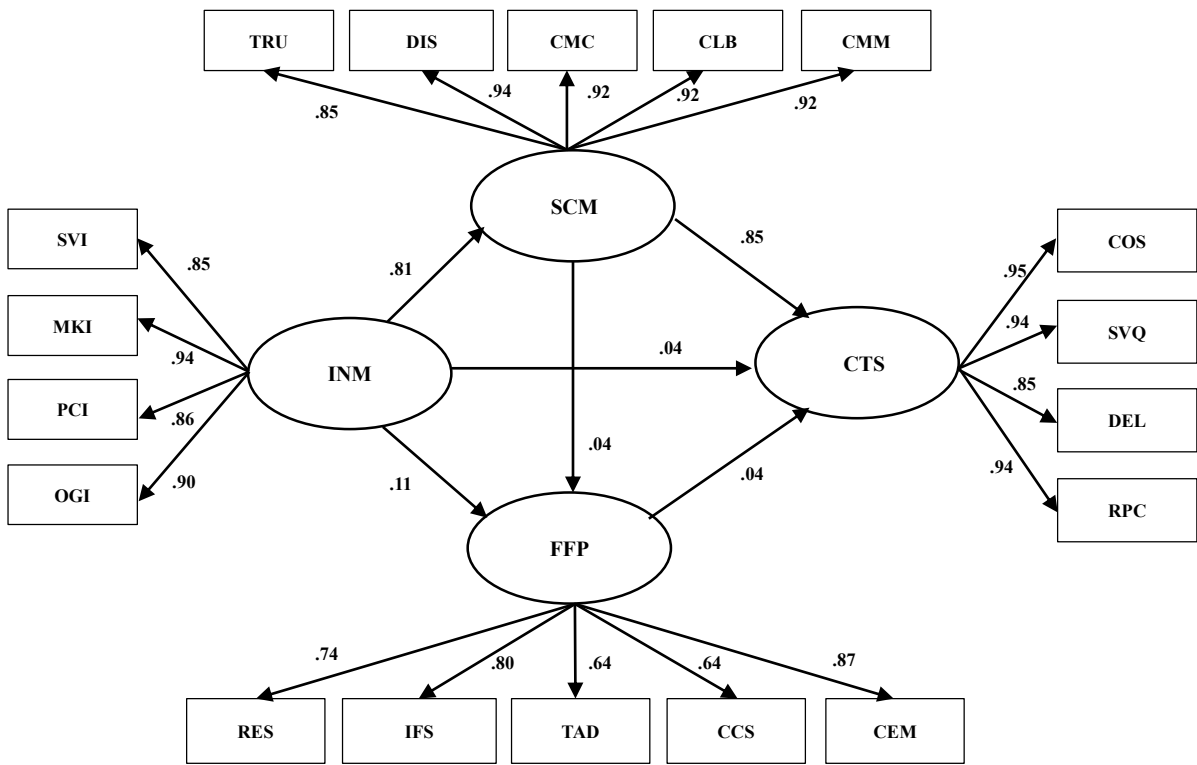

Figure 2 : Model Fitness Analysis after Model Modification

Table 3: Structural Equation Model Analysis

Variable	b	β	SE	T	R²	Factor Score

Variable	b	β	SE	T	R²	Factor Score
Competitiveness in Transportation Service: CTS						
COS	.665	.952	.027	25.043***	.882.	.211
SVQ	1.000	.939	<- ->	<- ->	518	.011
DEL	.720	.854	.023	31.836***	.829	.362
RPC	.914	.942	.023	39.348***	.881	.460
Supply Chain Management: SCM						
TRU	.712	.848	.025	28.373***	.718	.138
CMC	.883	.922	.023	38.919***	.850	.273
CLB	1.000	.919	<- ->	<- ->	.845	.253
CMM	.838	.918	.024	35.131***	.843	.079
DIS	.880	.940	.030	29.135***	.877	.090
Innovation Management: INM						
SVI	1.000	.847	<- ->	<- ->	.718	.094
MKI	1.000	.945	.047	23.217***	.892	.785
PCI	.909	.863	.036	25.381***	.745	.214
OGI	.956	.903	.038	24.925***	.815	.520
Freight Forwarder Potential: FFP						
RES	.679	.744	.045	15.036***	.554	.198
IFS	1.000	.803	<- ->	<- ->	.645	.336
TAD	.460	.641	.033	14.152***	.410	.301
CCS	.517	.645	.055	9.437***	.415	.542
CEM	.843	.872	.052	16.123***	.761	.434

Chi-Square = 95.713, df =77, p =0.073,
RMSEA =0.022, RMR = 0.014, GFI = 0.979, AGFI = 0.953, CFI=998

Note: β = standardized regression weight, R^2 = R-Square, <- -> = Constrained Parameter, S.E. and t-value was not shown

Table 4: Overall Fit Index Analysis before and after Model Modification

Goodness of Fit Indices	Criteria of Acceptable Fit*	Before		After	
		Value	Remark	Value	Remark
Chi-Square: χ^2	p>0.05	.000	Fail	.073	Pass
χ^2/df	< 2.00	9.462	Fail	1.243	Pass
Goodness of Fit Index: GFI	≥ 0.95	.770	Fail	.979	Pass
Adjusted Goodness Fit Index: AGFI	≥ 0.95	.695	Fail	.953	Pass
Comparative Fit Index: CFI	≥ 0.95	.884	Fail	.998	Pass
Root Mean Square Error of Approximation: RMSEA	< 0.05	.131	Fail	.022	Pass
Root Mean Residual: RMR	< 0.05	.030	Fail	.014	Pass

Note: * Schumacker& Lomax (2016); Kline (2016).

From Table 2-4 and Figure 2, it was found that the results of checking the structural validity of the research model by analyzing SEM were consistent with the empirical data since Chi – Square = 95.713, df = 77, p-value = 0.073, that was χ^2 was not significantly different from zero at the 0.05 level and χ^2/df = 1.243, which was less than 2. In addition, RMSEA = 0.022, RMR = 0.014, which were close to 0, GFI = 0.979, AGFI = 0.953, CFI = 0.998, were close to 1, indicating that the model was consistent with the empirical data. All variables in the model were able to explain service competitiveness by 79.40 percent and the factor loadings of all variables were positive and significantly different from zero at the 0.05 level.

The analysis results of the effect size of variables affecting the influence of the competitiveness of transportation service entrepreneurs in Thailand. It was found that INM had a direct effect on SCM (β = 0.808) and FFP (β = 0.107), including an indirect effect on CTS (β = 0.695). SCM had a direct effect on CTS (β = 0.853) and FFP had a direct effect on CTS (β = 0.042), as shown in Table 5.

Table 5: Analysis of Direct Effect, Indirect Effect and Total Effect

Dependent Variable	Effects	Independent Variable		
		Supply Chain Management: SCM	Freight Forwarder Potential: FFP	Competitiveness in Transportation Service: CTS
R²		**.653**	**.019**	**.794**
Innovation Management: INM	Direct Effect	.808**	.107**	.039
	Indirect Effect	-	.031	.695**
	Total Effect	.808**	.137**	.734**
Supply Chain Management: SCM	Direct Effect	-	.038	.853**
	Indirect Effect	-	-	.002
	Total Effect	-	.038	.855**
Freight Forwarder Potential: FFP	Direct Effect	-	-	.042*
	Indirect Effect	-	-	-
	Total Effect	-	-	.042*

Note: **p < .01, *p < .05

6. Conclusions and Discussion

From the construct validity check, the model was consistent with the empirical data with statistical values: $\chi^2$2 = 95.713, $\chi^2$2/df = 1.243, df = 77, p = 0.073, RMSEA = 0.022, RMR = 0.014, GFI = 0.979, AGFI = 0.953, CFI = 0.998, which can predict competitiveness by 79.40 percent. Supply chain management have a more direct effect on service competitiveness than others areas (β = 0.853), in line with Feizabadi, et al. (2019) that conclude supply chain management as a source of complete competitive advantage. This is also in accordance with Kwak, Seo, & Mason (2018) that examined the relationship between supply chain management and competitive advantages in global supply chains, stating that supply chain management has many driving forces to increase competitive advantage such as cost, reliability, customer service, and delivery dependability, by which technological advances that have occurred in recent years have an undeviating impact on supply chain management (Wisedsin et al., 2020), resulting in a direct effect of innovation management on supply chain management (β = 0.808). Accordingly, Dansomboon, & Pingta (2019) portrays that Innovation management has a direct positive effect on supply chain management of Thailand automotive companies, with an effect size of 0.086 and a statistical significance at 0.01 level. Furthermore, innovation management has a direct effect on freight forwarder potential (β = 0.107), in agreement with Beltramino et al. (2020), affirming that innovation is a key element that affects the viability of an organization. As for the results of this research, it was found that freight forwarder potential has the least direct effect on service competitiveness (β = 0.042). This may be due to varying levels of

user satisfaction based on individual expectations (Rust & Zahorik, 1993). This is consistent with Aunyawong et al. (2020), sustaining that user satisfaction is an expression of the level of personal sentiment generated by comparison between the perceived performance of the service received and the personal expectations.

References

1. Aunyawong, W., Waiyawuththanapoom, P, Setthachotsombut, N., & Wisedsin, T. (2020). Roles of 7R Logistics Management and Consumer Satisfaction on Marketing Performance of Local Bottled Water SMEs in Thailand. *Test Engineering and Management Journal*, 83, 12220-12229.
2. Aunyawong, W., Wararatchai, P., Shaharudin, M.R., Hirunpat, A., & Rodpangwan, S. (2021). The Mediating Role of Transportation Practices during the COVID-19 Crisis in Thailand. *The Open Transportation Journal*, 15(1), 170-181.
3. Bacigalupo, M, Kampylis, P, Punie, Y and van den Brande, G (2016). *EntreComp: The Entrepreneurship Competence Framework*, Brussels, Belgium: The European Commission.
4. Bacigalupo, M, Kampylis, P, Punie, Y and van den Brande, G (2016). *EntreComp: The Entrepreneurship Competence Framework*, Brussels, Belgium: The European Commission.
5. Barney, J. B. (2012). Purchasing, supply chain management and sustained competitive advantage: The relevance of resource-based theory. *Journal of Supply Chain management*, 48 (2).
6. Beltramino, N.S., García-Perez-de-Lema, D. and Valdez-Juárez, L.E. (2020), The structural capital, the innovation and the performance of the industrial SMES, *Journal of Intellectual Capital*, 21(6), 913-945, available at: https://doi.org/10.1108/JIC-01-2019-0020
7. Bentler, P. M., and Chou, C. P. (1987). Practical issues in structural modeling. *Sociological Methods & Research*, 16(1), 78-117
8. Bowesox, D. J., Closs, D. J., and Cooper, M. B. (2002). *Supply chain logistics management*. McGraw-Hill.
9. Bretherton, P., and Chaston, I. (2005). Resource dependency and SMEs strategy: An empirical study. *Journal of Small Business and Enterprise Development*, 12(2), 274-298.
10. Capozzi, M. M., Gregg, B., and Hawe, A. (2010). McKinsey global survey results: Innovation and commercialization. *The Mckinsey Quarterly*, 2, 1-8.
11. Christensen, C. M., Horn, M. B., Caldera, L., and Soares, L. (2011). *Disrupting college: How disruptive innovation can deliver quality and affordability to postsecondary education*. available at: https://cdn.americanprogress.org /wp-content/uploads/issues/2011/02/pdf/disrupting_college.pdf
12. Christopher, M. (1998). Logistics and supply chain management: strategies for reducing cost and improving, *International Journal of Physical Distribution and Logistics Management, 30*(5), 443-453.
13. Cooper M.C. and Ellram L.M.. (1997). Characteristic of Supply Chain Management and the Implications for Purchasing and Logistics Strategy. *Journal of Logistics Management. 4*(993) : 13 -24.
14. Cronbach, L. J. (1990). Essentials of Psychological Test (5th ed.). New York: Harper Collins.
15. Crowley, F. (2017), Product and service innovation and discontinuation in manufacturing and service firms in Europe, *European Journal of Innovation Management, 20*(2), 250-268, available at: https://doi.org/ 10.1108/EJIM-03-2016-0027
16. Dansomboon, S., Phimonsathienand, T. and Fongsuwan, W.. (2016). Cross Cultural Logistics and Supply Chain Management Towards of Organizational Effectiveness With in the ASEAN/Thai Automotive Industries : A SEM Analysis. *Management and Production Engineering Review*, 7(3), 23–38, available at: DOI: 10.1515/mper-2016-0023
17. David, Phillip and Edith. (2000). *Designing and managing the supply chain*. New Yorkc : McGraw- Hill Press.
18. Department of Business Development, (2021). *DBD Data Warehouse*. available at: https://datawarehouse.dbd.go.th/
19. DilaraDereli, D. (2015). Innovation Management in Global Competition and Competitive Advantage, *Procedia - Social and Behavioral Sciences*, 195(2015),1365 – 1370, available at: https://doi.org/10.1016/j. sbspro.2015.06.323
20. Drucker, P. (1999) Knowledge Worker Productivity: The Biggest Challenge. California Management Review, 41, 79- 94.
21. Drucker, P. F. (1985). The discipline of innovation. *Harvard Business Review*, 63(3) : 67-72.
22. Drucker, P. F. (1993). *Post-Capitalist Society*. New York : Butterworth Heineman
23. Emel Aktas, Berrin Agaran, Fusun Ulengin, and Sule Onsel. (2011). The use of outsourcing logistics activities: The case of turkey. *Transportation Research Part C*, 19, 833-852
24. Feizabadi, J., Gligor, D. and Alibakhshi Motlagh, S. (2019), The triple-As supply chain competitive advantage, *Benchmarking: An International Journal*, 26(7), 2286-2317. available at: https://doi.org/10.1108/BIJ-10-2018-0317
25. Hotrawaisaya, C., & Jermsittiparsert, K. (2020). Impact of Supply Chain Uncertainties on Supply Chain Performance in Manufacturing Companies: Moderating Role of Organizational Centralization. Int. *J Sup. Chain. Mgt.*, 9(2), 990 -998. https://core.ac.uk/download/pdf/322571514.pdf
26. Hotrawaisaya, C., Srisawat, S. and Shaharudin, M.R.. (2020). Development Of Collaborative Forecasting Planning Logistics And Replenishment Model For Orchid Supply Chain In In The Great Bangkok Metropolitan, Thailand. *Palarch's Journal Of Archaeology Of Egypt Egyptology*, 17(4), 3026-3049
27. Hunt, S. D., & Morgan, R. M. (1995). The comparative advantage theory of competition, *Journal of Marketing*, 59(2), 1-15
28. Izadi Z.D., J., Ziyadin, S., Palazzo, M. and Sidhu, M. (2020), The evaluation of the impact of innovation management capability to organizational performance, *Qualitative Market Research*, 23(4), 697-723, available at: https://doi.org/10.1108/QMR-04-2020-0052
29. Kisperska-Moron, D. (2005). Logistics customer service levels in Poland: Changes between1993 and 2001, *International Journal of Production Economics*, 121-128.

30. Kitchot, S., Siengthai, S. and Sukhotu, V. (2020), The mediating effects of HRM practices on the relationship between SCM and SMEs firm performance in Thailand, *Supply Chain Management*, *26*(1), 87-101, available at: https://doi.org/10.1108/SCM-05-2019-0177

31. Kline, R. B. (2011). *Principles and practice of structural equation modeling* (3rd ed.). Guilford Press.

32. Kline, R. B. (2016). *Principles and Practice of Structural Equation Modeling* (4th ed.). New York, NY: The Guilford Press.

33. Kumar, A., Singh, R.K. and Modgil, S. (2020), Exploring the relationship between ICT, SCM practices and organizational performance in agri-food supply chain", *Benchmarking: An International Journal, 27*(3), 1003-1041, available at: https://doi.org/10.1108/BIJ-11-2019-0500

34. Kwak, D.-W., Seo, Y.-J. and Mason, R. (2018), Investigating the relationship between supply chain innovation, risk management capabilities and competitive advantage in global supply chains, *International Journal of Operations & Production Management*, *38*(1), 2-21, available at: https://doi.org/10.1108/IJOPM-06-2015-0390

35. Lambert, D. M. Garcia-Dastugue, S.J. and Croxton, K.L. (2005). An evaluation of process-oriented supply chain management frameworks, *Journal of Business Logistics*, *26*(1), 25-51.

36. Likert, R. A. (1932). Technique for the Measurement of Attitude. *Archives Psychological*. *3*(1), 42-48.

37. Nguyen, T.V., Nguyen, N.C. and Bosch, O.J.H. (2017), Identifying key success factors in supply chain management for increasing the competitive advantages of Vietnamese coffee, *Competitiveness Review, 27*(5), 438-461. available at: https://doi.org/10.1108/CR-10-2016-0066

38. Nualkaw, S., Wararatchai, P., Sommanawat, K., & Aunyawong, W. (2021). Service Value of Transportation Service Providers for E-Commerce Products in the New Economy Era: Creativity, Society and Environment. *Psychology and Education Journal, 58*(4), 2016-2023.

39. Nunnally, J. C., Bernstein, I. H., and Berge, J. M. T. (1967). *Psychometric theory*. New York: McGraw-hill.

40. OECD. (2005). *Boosting Innovation*, The Cluster Approach. New York: Regional Studies.

41. Paula, I.C.d., Campos, E.A.R.d., Pagani, R.N., Guarnieri, P. and Kaviani, M.A. (2019), Are collaboration and trust sources for innovation in the reverse logistics? Insights from a systematic literature review", *Supply Chain Management, 25*(2), 176-222, available at: https://doi.org/10.1108/SCM-03-2018-0129

42. Phrapratanporn, B., Wararatchai, P., Aunyawong, W., & Nik Ramli Nik Abdul Rashid (2019). Enhancing Supply Chain Performance of SMEs in Thailand Using the Integrated Personnel Development Model. *International Journal of Supply Chain Management, 8*(5), 176-186.

43. Pintuma, S., Khaengkhan, M., Waiyawuththanapoom, P., & Aunyawong, W. (2020). Moderating effect of information sharing on the relationship of supply chain management capabilities and business performance: A study of the food industry. *International Journal of Supply Chain Management, 9*(2), 341-351.

44. Ponomarov, S. Y., and Holcomb, M. C. 2009. Understanding the concept of supply chain resilience, *The International Journal of Logistics Management. 20*(1),124–143.

45. Porter, M. E. (2005). *The competitive advantage creating and sustaining superior performance*. New York: The Free Press.

46. Porter, M. E. (2011). *Competitive advantage of nations: creating and sustaining superior performance.* Simon and Schuster

47. Robbins, S.P. (2005). *Essential of Organizational Behavior*. 8th ed. U.S.A. : Pearson Education, Inc.

48. Schilling , M.A. (2008). *Strategic Management of Technological Innovation*. 2nd ed. NY: McGraw-Hill Education.

49. Schumacker, R. E., & Lomax, R. G. (2010). *A beginner's guide to structural equation modeling* (3rd ed.). Routledge/Taylor & Francis Group.

50. Schumacker, R. E., & Lomax, R. G. (2016). *A Beginner's Guide to Structural Equation Modeling* (4th Ed.). New York: Routledge.

51. Shin, S.H., & Shin, S.Y. (2021). A Study on the Reinforcement of Supply Chains Corresponding to Global Value Chain Reforms in the Automobile Parts and Component Industry. *Journal of International Logistics and Trade*, *19*(3), 163-179.

52. Shou, Y., Shao, J. and Chen, A. (2017), Relational resources and performance of Chinese third-party logistics providers: The mediating role of innovation capability, *International Journal of Physical Distribution & Logistics Management, 47*(9), 864-883, available at: https://doi. org/10.1108/IJPDLM-09-2016-0271

53. Sinthukhammoon, K., Hiranphaet, A., Aunyawong, W., Chaladtanyakit, S. (2021). The Supply Chain Management of the Vannamei Shrimp in Nakhon Pathom Province. *Turkish Online Journal of Qualitative Inquiry, 12*(7), 8758-8768.

54. Sommanawat, K., Hotrawaisaya, C., Waiyawuththanapoom, P., Srisawat, S., Aunyawong, W., Jermsittiparsert, K. (2021). The Role of Technological Management, Idea Implementation, Sustainable Process Innovation and Logistic Competency, *Journal of Management Information and Decision Sciences 24*(S1), 1-13.

55. Tidd, J. and Bessant, J.R. (2009). *Managing innovation: Integrating Technological, market and organizational change*. (4thed.). Chichester: John Wiley nd Sons.

56. Tirastittam, P, Jermsittiparsert, K., Waiyawuththanapoom, P., & Aunyawong, W. (2020). Strategic Leadership, organizational innovativeness and the firm supply performance: The mediating role of information technology capability. *International Journal of Supply Chain Management, 9*(2), 291-299.

57. Tukker, A. (2015). Product services for a resource-efficient and circular economy – a review, *Journal of Cleaner Production*, 97, 76-91.

58. Utterback, J.M. (2004). The dynamics of Innovation. *Educause Review*. 39(1), 42.

59. Waiyawuththanapoom, P., Tiratittam, P., Aunyawong, W., & Keerativutisest, V. (2020). The Impact of Innovation Related Organizational Climate and Organizational Performance: Mediating Role of Innovative Work Behavior in Thailand. *International Journal of Innovation, Creativity and Change, 14*(10), 774-794.

60. Wang, M., Asian, S., Wood, L.C. and Wang, B. (2020), Logistics innovation capability and its impacts on the supply chain risks in the Industry 4.0 era, *Modern Supply Chain Research and Applications, 2*(2), 83-98. https://doi.org/10.1108/MSCRA-07-2019-0015

61. Wang, M., Jie, F. and Abareshi, A. (2018), Improving logistics performance for one belt one road: a conceptual framework for supply chain risk management in Chinese third-party logistics providers**,** *International Journal of Agile Systems and Management, 11*(4), 364-380.

62. Wilding. and Juriado. (2004). Customer perceptions on logistics outsourcing in the European consumer goods industry*, International Journal of Physical Distribution & Logistics Management*, *34*(8), 628-644.

63. Wilton, N. (2013). *An introduction to Human Resource Management*. London: SAGE.

64. Wisedsin, T., Jermsittiparsert, K., Thitrat, P., & Aunyawong, W. (2020).   Role of advanced manufacturing technology, Human Capital and Employee Empowerment to enhance Manufacturing Industry Supply Chain Performance. *International Journal of Supply Chain Management, 9*(2), 411-418.

65. Wongwilaia, S., Phudetcha, P., Saeleka, P., Khuptawatinb, A., Wongcharoensinc, K., Chaitongratc, S., Vaiyavuthd, R., & Jermsittiparserte, K. (2022). The role of innovative ideas in business sustainability: Evidence from textile industry. *Uncertain Supply Chain Management*. 10(2022) 285–294. http://www.growingscience.com/uscm/Vol10/uscm_2021_84.pdf

66. Yang, C.-C. (2016), Leveraging logistics learning capability to enable logistics service capabilities and performance for international distribution center operators in Taiwan, *The International Journal of Logistics Management, 27*(2), 284-308, available at: https://doi.org/10.1108/IJLM-09-2014-0157

67. Zekhnini, K., Cherrafi, A., Bouhaddou, I., Benghabrit, Y. and Garza-Reyes, J.A. (2021), Supply chain management 4.0: a literature review and research framework, *Benchmarking: An International Journal*, *28*(2), 465 - 501. available at: https://doi.org/10.1108/BIJ-04-2020-0156