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Effect of Inventory and Technology Application on Logistics Performance

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Abstract:
; 3; 4Logistic performance is one of the most important area of logistic companies having central important to survive in the competitive market. Number of studies consider the logistic performance along with various influencing factors, however, the integration between technological applications and inventory applications is not considered. Thus, to fill this research gap, the objective of this study is to examine the influence of technology applications and inventory applications on logistic performance. Data were collected from the logistic companies of Thailand. Employee of logistic companies were selected to collect the data. 400 questionnaires were distributed, and 201 valid responses were used for data analysis. Results of the study highlighted that technology applications and inventory applications have major contribution to logistic performance. Technology applications and inventory applications have positive role to enhance service quality which has positive role to enhance logistic performance.

Keywords: *Agent technology, Online service tracking, Electronic payment, Inventory applications, Technology applications, Service quality, Logistic performance.*

INTRODUCTION

Logistic companies have most crucial role among all other companies. Logistic companies have vital role to transfer the finished and semi-finished goods to the various other industries. Therefore, for all industries logistic has most important role. Logistic companies have key contribution to transportation sector. As there is an important connection between transportation industry and logistic industry. Both industries are providing many advantages to each other's. In this direction, logistic companies are crucial for various other companies. Hence, the importance of logistic companies cannot be neglected (Erna, Surachman, Sunaryo, & Djajuli, 2019).

As the logistic companies has several benefits to other companies, therefore, performance of logistic companies is most important. To provide quality services to the other companies, the logistic companies must have high performance. The low performance of these logistic companies has

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negative effect on the services to the other companies. Therefore, logistic companies performance is important (Avelar-Sosa, Maldonado-Macías, Hernández-Arellano, & Estupiñan, 2020; Erna et al., 2019). To provide high quality services to the other companies, significant performance is required from the logistic industry.

Logistic companies of Thailand also have significant importance for the other companies. Logistic companies in Thailand are growing. The competition in Thai logistic market is also increasing which require high performance of companies. The number of logistic companies in Thailand are increasing. Figure 1 shows the number of companies and registered capital in Thailand. There are 215 registered logistic companies are working in Thailand with 7,586-million-baht capital. In total number of logistic companies, 30% companies are based on other countries and contribution is 53% in registered capital. However, Thai companies are contributing 47% in registered capital. Therefore, Thai logistic companies have contribution to overall nations capital. Better performance of logistic companies has crucial role in economic development (Arvis et al., 2016).

However, the performance of Thailand logistic companies can be increased with the help of different factors. Especially, technology has most important role in logistic companies. Therefore, introduction of technology application can increase the accuracy in logistic companies and technology applications can promote logistic companies (Erkan & Erkan, 2015, Duong & Thuy, 2020; Wang, 2019). Therefore, logistic companies of Thailand should introduce various technological applications to enhance the performance. Moreover, technological applications have vital role to enhance the operational performance of logistic companies and increase in operational performance shows positive effect on company performance.

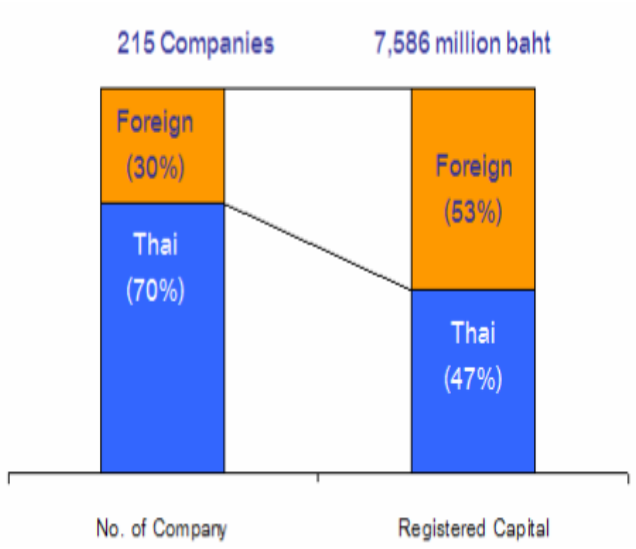

FIGURE I.
Number of Registered Companies and Registered Capital in Thailand

Furthermore, logistic companies are requiring the better management system of inventory. Inventory management system has influence on logistic operations. Better system of logistic operations has positive role to enhance performance. As it is given in literature that inventory management is most important in various companies (Atieh et al., 2016). In this direction, the better inventory system can be applied with the help of inventory applications. Different inventory applications can provide better system to manage the inventory. The Thailand logistic companies can enhance the logistic performance with the help of inventory applications.

The current study introduced three technology applications. First, agent technology has the importance to resolve various conflicts. Conflict management through technology increases the accuracy of the operations. Second, online service tracking also has important role in performance of logistic. Online service tracking is connected with the delivery of the gods. Better online tracking system can provide batter facility to the customer to know the status of the goods. It is also very helpful to the company's employees to manage various operations. Third, electronic payment system by the logistic companies is important for customer

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attraction and customer satisfaction. Secure electronic payment system is very important to satisfy the customers. Therefore, all these three applications, namely; agent technology, online tacking service and electronic payment has significant contribution to the logistic performance.

Number of studies consider the logistic performance along with various influencing factors (Gajewska & Grigoroudis, 2017; Hsiao, Kemp, Van der Vorst, & Omta, 2010, Kerdpitak, 2019), however, the integration between technological applications and inventory applications are not considered. Therefore, the objective of this study is to examine the influence of technology applications and inventory application on logistic performance. Both technology applications and inventory management applications have positive effect on service quality of logistic companies which finally increases the logistic performance. Hence, inventory applications, agent technology, online tacking service and electronic payment has positive contribution to service quality and service quality has positive contribution to logistic performance. Additionally, this study examined the mediating role of service quality. The mediating effect of service quality was examined between agent technology and logistic performance. The mediating role of service quality was also examined between online tracking and logistic performance. Finally, this study contributed to examine indirect effect of service quality between electronic payment and logistic performance. Hence, by examining the relationship between technology applications and inventory applications on service quality and logistic performance, this study contributed to the literature and provides vital insights for the logistic companies of Thailand. This is vital contribution to the Thailand logistic sector.

II. LITERATURE REVIEW

Logistics is usually the detailed organization as well as implementation of a multifaceted operation. In a usual business sense, logistics is described as the management of the important flow of goods between one point of origin and one point of consumption to encounter the necessities of customers as well the corporations. Logistic performance is most important in every country. As various operation in different countries of different industries are majorly based on the logistic companies. Major dependency of various firms on logistic increases the importance of logistic performance. Therefore, the importance logistic performance is most important among the nations which also require efforts to enhance the performance (Cakravastia & Diawati, 1999; Roeterink, Verwater-Lukszo, Weijnen, & Van Daalen, 2003). Thailand logistic sector also has importance among Asian countries. However, the performance of Thai logistic sector is not influential which requires significant strategies. According to current study, implementation of latest technology is most important to enhance logistic performance. In this regard, the current study introduced technology application and inventory applications to enhance the performance of logistics in Thailand. Technology applications has three major elements which has influence on the service quality of logistic companies. These elements include; agent technology, online tacking service and electronic payment having positive effect on service quality and logistic performance. Therefore, this study examined the relationship between inventory applications, agent technology, online tacking service, electronic payment and logistic performance as shown in Figure 2.

Technology Applications

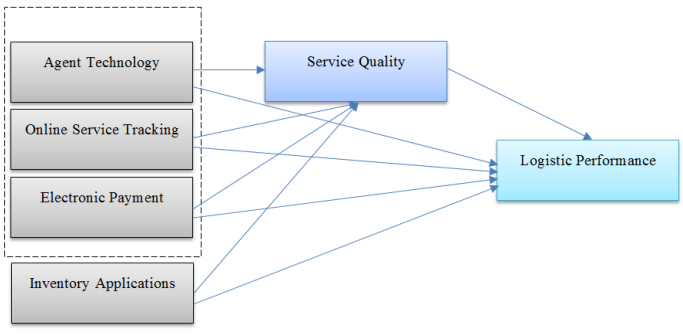

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FIGURE II.
Theoretical framework of the study showing the relationship between inventory applications, agent technology, online tacking service, electronic payment and logistic performance

2.1. Agent Technology, Service Quality and Logistic Performance

Agent technology is an important technology used in various companies to develop flexible information's. It is one of the systems managed to handle information on wide range. It is based on the collection of information, management of information and finally effect to resolve the conflicts. It is important to handle conflicts between various parties. Therefore, its has central importance for the companies. Previous studies also shows the importance of agent technology (B. Chen, Cheng, & Palen, 2009). It has positive effect on the service quality. Better implementation of agent technology among the logistic companies shows positive role to enhance service quality. Because it has the ability to satisfy the customers and increases the motivational level. Further service quality has positive effect on logistic performance. It is evident that; service quality is the major element which has significant influence on the logistic performance. Therefore, studies also show that service quality has relationship with logistic (M.-C. Chen, Hsu, & Lee, 2019; Huang, 2019). Along with this, agent technology has significant role in logistic performance.

Hypothesis 1. Agent technology has positive effect on service quality.

Hypothesis 2. Agent technology has positive effect on logistic performance.

2.2. Online Service Tracking, Service Quality and Logistic Performance

In logistic companies, goods transfer from one place to another place, during the transfer of goods, it is important to have known the status of goods. Because customer always want to know that how many days the good will take to reach at delivery point. On a specific time, where the goods are reached. Therefore, the status of the goods is very important for the customer. Logistic companies must have a system which provide the access to the customers to track goods. It has the ability to satisfy the customer and increases the motivational level. It also increases the employee retention which is most important for the companies. Therefore, technology applications provide better system to track the goods. Previous studies also shows the importance of online tracking system among the various companies (Accorsi, Ferrari, Gamberi, Manzini, & Regattieri, 2016; Cruces-Flores, Valdivia-Capellino, Ramirez-Valdivia, Alvarez, & Raymundo-Ibañez, 2019; Xiao, He, Li, Antoce, & Zhang, 2017, Guneri & Yildiz 2019). Online tracking system can be described as online traceability. Traceability denotes to the goods traceability in logistics. Traceability has positive role with service quality. Better system of traceability shows positive influence on service quality among firms. It also has influence on logistic performance. Therefore, better traceability system has relationship with service quality and logistic performance.

Hypothesis 3. Online service tracking has positive effect on service quality.

Hypothesis 4. Online service tracking has positive effect on logistic performance.

2.3. Electronic Payment, Service Quality and Logistic Performance

During the logistic operations, payment is the most crucial elements which must be met during any transection. In the current decade, the payment system is improved, and companies are providing various ways to pay for goods to the logistic company. Ease in payment system shows positive role to enhance employee customer satisfaction. Customer always remain careful while making payment. Fraud in payment is increasing which confuses the customer while payment. Customer always hesitate to provide information such as information related to the bank account as well as credit card. In this direction, electronic payment is

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the most significant way to make payment (Acheampong et al., 2017; MahbubulHye, Miraz, Sharif, & Hassan, 2020). The electronic payment has positive role in service quality. Better payment system increases the service quality which shows positive role to enhance customer satisfaction.

Hypothesis 5. Electronic payment has positive effect on service quality.

Hypothesis 6. Electronic payment has positive effect on logistic performance.

2.4. Inventory Application, Service Quality and Logistic Performance

Inventory or stock is the goods as well as materials that a business holds for the final objective of resale. Inventory administration is a discipline primarily about specifying the shape and placement of stocked goods. Inventory is the most significant element among various organization. Therefore, its management is another important task for the companies. Better management of inventory is always important for the companies. Now the electronic companies are providing various systems to promote inventory management. Therefore, there are many inventory management system applications being available which has significant role in service quality through better inventory management system (Douglas et al., 2020; Paul, Chatterjee, & Guha, 2019). Inventory applications shows positive role to enhance service quality which has positive effect on logistic performance.

Hypothesis 7. Inventory applications has positive effect on service quality.

Hypothesis 8. Inventory applications has positive effect on logistic performance.

Hypothesis 9. Service quality has positive effect on logistic performance.

Hypothesis 10. Service quality mediates the relationship between agent technology and logistic performance.

Hypothesis 11. Service quality mediates the relationship between online tracking service and logistic performance.

Hypothesis 12. Service quality mediates the relationship between electronic payment and logistic performance.

Hypothesis 13. Service quality mediates the relationship between inventory applications and logistic performance.

III. METHOD

Research method is the most crucial in every research study as it has significant effect on the results of research study. Therefore, suitable method selection in research has more value. As this study examining the effect of technological applications and inventory applications on logistic performance, therefore, this study selected quantitative research in which a questionnaire was used for data collection. It is evident that to collect the opinion of individuals, a survey questionnaire is important tool. By examining the relevance of this study, a survey questionnaire was used for the current study (Francis et al., 2004).

Questionnaire was designed with the help of adapting scales items from various previous investigations. Six variables were used in this study to approach the objective. These variables include; technology applications and inventory applications which are independent variables. Technology applications involve; agent technology, online tacking service and electronic payment. Quality service is mediating variable and logistic performance is dependent variable. Hence, agent technology, online tacking service, electronic payment, inventory applications, service quality and logistic performance is measured in this study. Scale items were adapted from previous studies and adapted to design the questionnaire. Data were collected from the logistic companies of Thailand. Employee of logistic companies were selected to collect the data. 400 questionnaires were distributed by using simple random sampling. In the context of the current study, simple random sampling is most suitable (Siuly, Li, & Wen, 2011). Finally, 201 valid responses were used for data analysis. Table 1 shows

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the data statistics including missing value (Aydin & ŞENOĞLU, 2018), outlier, normality of the data, mean and median.

TABLE I.
Data Statistics

	No.	Missing	Mean	Median	Min	Max	SD	Kurtosis	Skewness
AT1	1	0	5.233	6	1	7	1.815	0.104	-1.031
AT2	2	0	5.523	6	1	7	1.683	-0.273	-0.928
AT3	3	0	5.395	6	1	7	1.793	0.558	-1.181
AT4	4	0	5.233	6	1	7	1.763	-0.343	-0.841
OST1	5	0	5.314	6	1	7	1.734	0.468	-1.084
OST2	6	0	5.081	6	1	7	1.672	-0.643	-0.648
OST3	7	0	4.93	6	1	7	1.885	-0.677	-0.629
OST4	8	0	5.012	6	1	7	1.735	-0.6	-0.684
EP1	9	0	4.884	5	1	7	1.814	-0.568	-0.514
EP2	10	0	5.058	5	1	7	1.774	-0.799	-0.496
EP3	11	0	5.047	6	1	7	1.848	-0.804	-0.553
EP4	12	0	5.337	6	1	7	1.723	0.335	-1.08
IA1	13	0	5.395	6	1	7	1.727	-0.172	-0.895
IA2	14	0	5.105	6	1	7	1.739	-0.194	-0.825
IA3	15	0	5.198	6	1	7	1.711	-0.182	-0.825
IA4	16	0	5.035	6	1	7	1.728	-0.044	-0.894
IA5	17	0	4.256	4	1	7	2.001	-1.405	0.039
IA6	18	0	5.419	6	1	7	1.827	0.414	-1.143
SQ1	19	0	5.488	6	1	7	1.717	0.213	-1.074
SQ2	20	0	5.302	6	1	7	1.862	0.193	-1.08
SQ3	21	0	5.314	6	1	7	1.793	-0.268	-0.891
SQ4	22	0	5.36	6	1	7	1.797	0.176	-1.047
LP1	23	0	5.512	6	1	7	1.724	0.262	-1.109
LP2	24	0	5.198	6	1	7	1.854	0.058	-1.008
LP3	25	0	4.081	4	1	7	1.954	-1.209	0.008
LP4	26	0	4.965	5	1	7	1.92	-0.696	-0.562
LP5	27	0	5.326	6	1	7	1.781	0.046	-0.958
LP6	28	0	5	5	1	7	1.811	-0.831	-0.502

IV. DATA ANALYSIS

Table 1 indicates the data statistics and data screening. After that; the study applied Partial Least Square (PLS) for data analysis (F. Hair Jr, Sarstedt, Hopkins, & G. Kuppelwieser, 2014; J. F. Hair, Ringle, & Sarstedt, 2013; J. F. Hair, Sarstedt, Pieper, & Ringle, 2012). First of all, factor loadings were examined through measurement model assessment. Figure 3 shows the measurement model assessment. Table 2 and Figure 3 shows that; agent technology, online tacking service, electronic payment, inventory applications, service quality and logistic performance has factor loadings above 0.7 which is acceptable.

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FIGURE III.
Measurement Model

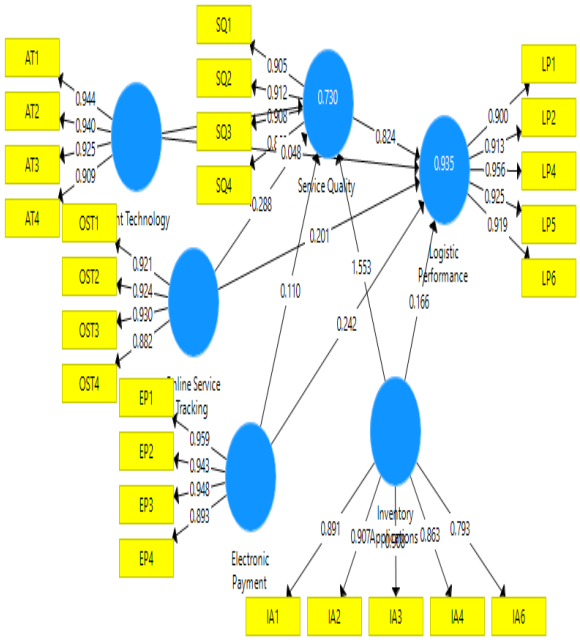

TABLE II.
Factor Loadings

	Agent Technology	Electronic Payment	Inventory Applications	Logistic Performance	Online Service Tracking	Service Quality
AT1	0.944					
AT2	0.94					
AT3	0.925					
AT4	0.909					
EP1		0.959				
EP2		0.943				
EP3		0.948				
EP4		0.893				
IA1			0.891			
IA2			0.907			
IA3			0.908			
IA4			0.863			
IA6			0.793			
LP1				0.9		
LP2				0.913		
LP4				0.956		
LP5				0.925		
LP6				0.919		
OST1					0.921	
OST2					0.924	
OST3					0.93	
OST4					0.882	
SQ1						0.905

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SQ2	0.912
SQ3	0.908
SQ4	0.86

The current study examined reliability, convergent validity and discriminant validity. Reliability and convergent validity are given in Table 3. Discriminant validity is given in Table 4 with the help of cross-loadings. Reliability was examined by examining the composite reliability (CR). Table 3 shows that CR for all variables; agent technology, online tacking service, electronic payment, inventory applications, service quality and logistic performance is above 0.7. Average variance extracted (AVE) was examined to assess the discriminant validity. AVE is also above 0.5 for all variables which shows the achievement of discriminant validity. J. Hair, Hollingsworth, Randolph, and Chong (2017); Hameed, Basheer, Iqbal, Anwar, and Ahmad (2018); Ul-Hameed, Mohammad, and Shahar (2018) mentioned that AVE must be above 0.5 and CR must be above 0.7.

TABLE III.
Reliability and Convergent Validity

	Cronbach's Alpha	**rho_A**	**Composite Reliability**	**(AVE)**
Agent Technology	0.948	0.948	0.962	0.864
Electronic Payment	0.953	0.956	0.966	0.876
Inventory Applications	0.922	0.928	0.941	0.763
Logistic Performance	0.956	0.957	0.966	0.852
Online Service Tracking	0.935	0.943	0.953	0.836
Service Quality	0.918	0.922	0.942	0.804

TABLE IV.
Cross-Loadings

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	Agent Technology	Electronic Payment	Inventory Applications	Logistic Performance	Online Service Tracking	Service Quality
AT1	0.944	0.844	0.865	0.656	0.865	0.642
AT2	0.94	0.804	0.855	0.668	0.84	0.643
AT3	0.925	0.827	0.863	0.636	0.875	0.642
AT4	0.909	0.826	0.863	0.639	0.854	0.621
EP1	0.874	0.959	0.9	0.744	0.909	0.715
EP2	0.826	0.943	0.843	0.65	0.888	0.618
EP3	0.813	0.948	0.867	0.74	0.87	0.681
EP4	0.807	0.893	0.857	0.673	0.846	0.651
IA1	0.798	0.842	0.891	0.695	0.821	0.662
IA2	0.872	0.895	0.907	0.706	0.88	0.68
IA3	0.867	0.885	0.908	0.724	0.865	0.701
IA4	0.822	0.853	0.863	0.617	0.865	0.596
IA6	0.693	0.606	0.893	0.844	0.659	0.876
LP1	0.55	0.626	0.708	0.9	0.577	0.89
LP2	0.636	0.632	0.74	0.913	0.611	0.875
LP4	0.734	0.772	0.839	0.956	0.749	0.921
LP5	0.613	0.706	0.773	0.925	0.634	0.881
LP6	0.689	0.73	0.79	0.919	0.696	0.859
OST1	0.922	0.862	0.896	0.725	0.928	0.709
OST2	0.849	0.861	0.861	0.642	0.924	0.618
OST3	0.835	0.897	0.855	0.656	0.93	0.647
OST4	0.754	0.809	0.785	0.549	0.882	0.552
SQ1	0.603	0.641	0.722	0.868	0.593	0.905
SQ2	0.63	0.648	0.763	0.89	0.628	0.912
SQ3	0.653	0.702	0.788	0.891	0.683	0.908
SQ4	0.567	0.56	0.666	0.787	0.586	0.86

The procedure of PLS structural model is used to test the relationship between agent technology, online tacking service, electronic payment, inventory applications, service quality and logistic performance. This is the most recommended procedure by the various authors (Henseler & Chin, 2010; Henseler et al., 2014; Henseler, Ringle, & Sinkovics, 2009). In this step, the effect of agent technology was examined on service quality and logistic performance. Results in the Table 5 shows that agent technology has positive effect on service quality and logistic performance. The direct effect of online service tracking was examined on service quality and logistic performance. Results of the analysis shows that online service tracking has positive effect on service quality and logistic performance. Moreover, the effect of electronic payment was examined on service quality and logistic performance which highlighted that electronic payment also has positive effect on service quality and logistic performance. Finally, the direct effect of inventory applications was examined on service quality and logistic performance. Results found that inventory applications have positive effect on service quality and logistic performance. Along with this, the direct effect of service quality was examined on logistic performance. In line with other results, it shows that service quality has positive effect on logistic performance. PLS structural model is given in Table 4.

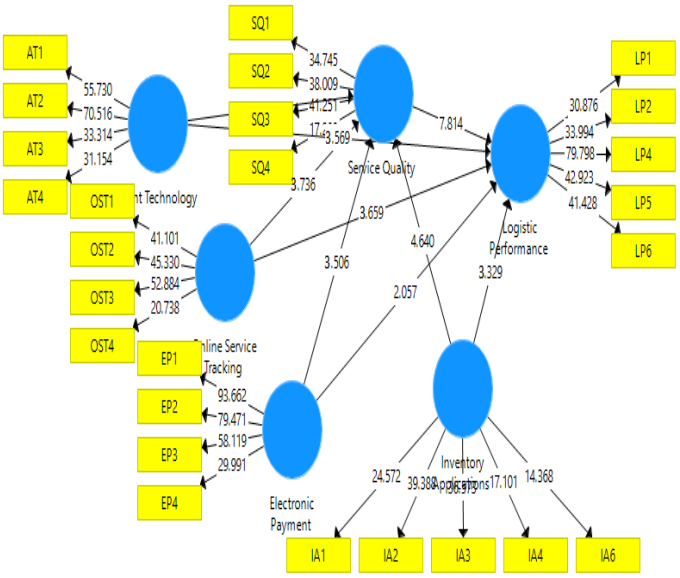

FIGURE IV.
Structural Model

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TABLE V.
Direct Effect Results

	(O)	(M)	T Statistics	P Values
Agent Technology -> Logistic Performance	0.048	0.042	3.569	0
Agent Technology -> Service Quality	0.39	0.367	3.595	0
Electronic Payment -> Logistic Performance	0.242	0.254	2.057	0.04
Electronic Payment -> Service Quality	0.11	0.053	3.506	0
Inventory Applications -> Logistic Performance	0.166	0.166	3.329	0.002
Inventory Applications -> Service Quality	1.553	1.472	4.64	0
Online Service Tracking -> Logistic Performance	0.201	0.193	3.659	0
Online Service Tracking -> Service Quality	0.288	0.272	3.736	0
Service Quality -> Logistic Performance	0.824	0.796	7.814	0

The mediation effect of service quality is given in Table 6. Four mediation effects of service quality are examined in the current study. First, the mediation effect of service quality was examined between agent technology and logistic performance. Second, the mediation effect of service quality was examined between online service tracking and logistic performance. Third, the mediation effect of services quality was examined between electronic payment and logistic performance. Four, the mediation effect of services quality was examined between inventory applications and logistic performance. Results in Table 6 shows that the mediation effect of services quality between agent technology and logistic performance is insignificant as the t-value is 1.538. The mediation effect of services quality between online service tracking and logistic performance is insignificant as the t-value is below 1.96 which is 1.626. The mediation effect of services quality between electronic payment and logistic performance is also insignificant with t-value 0.532. However, finally, the mediation effect of services quality between inventory applications

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and logistic performance is significant with t-value 3.564 which is above 1.96. This study also examined the r-square value which is 0.935. This r-square value is considered as strong (Chin, 1998). It indicates that all the variables; agent technology, online tacking service, electronic payment, inventory applications and service quality are expected to bring 93.5% change in logistic performance which is strong.

TABLE VI.
Indirect Effect Results

	(O)	(M)	SD	T Statistics	P Values
Agent Technology -> Service Quality -> Logistic Performance	0.321	0.305	0.209	1.538	0.125
Electronic Payment -> Service Quality -> Logistic Performance	0.091	0.052	0.171	0.532	0.595
Inventory Applications -> Service Quality -> Logistic Performance	1.28	1.196	0.359	3.564	0
Online Service Tracking -> Service Quality -> Logistic Performance	0.237	0.223	0.146	1.626	0.105

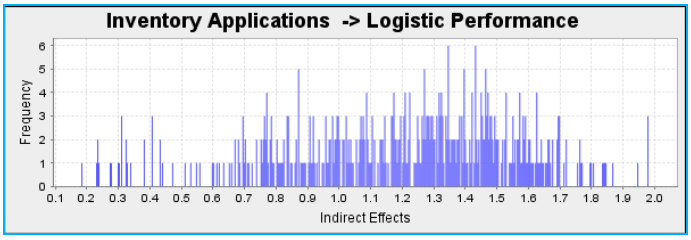

FIGURE V.
Indirect Effect Histogram: Inventory Applications -> Service Quality -> Logistic Performance

V. CONCLUSION

The objective of this study was to examine the influence of technology applications and inventory application on logistic performance. The

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relationship was examined between agent technology, online tacking service, electronic payment, inventory applications, service quality and logistic performance. Data were collected from the logistic companies of Thailand. Results of the study highlighted that logistic companies' performance in Thailand is most important which depends upon various factors. Particularly, technological factors are key in logistic performance. Various technology applications are vital to promote the logistic company performance in Thailand. Better implementation of technological application in logistic process increases the logistic performance. Moreover, inventory applications also have important contribution to Thailand logistic companies' performance. Better implementation or introduction of latest technology related to the inventory management has positive effect on logistic performance.

Results of the study highlighted that technology applications and inventory applications has major contribution to logistic performance. Technology applications and inventory applications has positive role to enhance service quality which has positive role to enhance logistic performance. Technology application like agent technology has positive effect on logistic performance. Agent technology also has positive effect on service quality of logistic companies. Introduction of agent technologies in logistic companies shows positive role to enhance service quality and increase in service quality increases the logistic performance. The second technology application is online tracking service. Now with the increase in competition, logistic companies are providing various services to track online which has positive effect on service quality and finally service quality increases the logistic performance by increasing the customer satisfaction level. Finally, the third technology application is electronic payment. Customer always remained worry about the payment for logistic services. The electronic payment system has several benefits which increases the easiness to pay for services. Therefore, better services by the companies related to the electronic payment has positive effect to increase service quality which has positive role to enhance logistic performance. Finally, applications related to the inventory management has several benefits to handle the operations. Similar to the agent technology and online tracking, inventory applications have positive effect on services quality which has positive influence on logistic performance.

VI. IMPLICATIONS OF THE STUDY

The current study has rich contribution to the literature. Particularly, it has contribution to the logistic company's literature. Moreover, it has several contributions to the field of technology applications among various companies. Many studies consider the logistic performance along with various influencing factors, however, the integration between technological applications and inventory applications are not considered. Therefore, integration between technological applications and inventory applications is vital contribution which fill the literature gap. Theoretically, this study also investigated service quality as mediating variable between inventory applications and logistic performance. Moreover, this study contributed by investigating that service quality is not a mediating variable between online tracking and logistic performance. Similarly, service quality is not a mediating variable between electronic payment and logistic performance. Furthermore, the relationship between technological applications, inventory applications, service quality and logistic performance has vital role through practical implications. The management of logistic companies can enhance the level of performance by implementing the technological applications such as agent technology, online tracking technology and electronic payment along with the inventory applications.

VII. LIMITATIONS OF THE STUDY

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There are number of technology applications available in the literature as well as practice, however, the current study only selected three; agent technology, online tracking technology and electronic payment. The future study should incorporate various other technology applications to examine the effect on logistic performance. As with the increase in competition, latest technologies are introducing by various electronic companies to facilitate the logistic performance. Furthermore, this study introduced the concept of inventory applications. However, the future study should test various applications of inventory management and examine the effect on service quality and logistic performance. The examination of each inventory management application will provide valuable insights for the management of logistic companies.

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