Contents lists available at Science-Gate

International Journal of Advanced and Applied Sciences

Journal homepage: https://www.science-gate.com/IJAAS.html

Logistics capabilities in freight forwarding operations: A resource-based perspective from Thailand

Kankanit Kamolkittiwong [1], Yotsaphat Kittichotsatsawat [2, *]

[1]*Department of International Business and Logistics, Faculty of Business Administration, Rajamangala University of Technology Thanyaburi, Pathum Thani 12110, Thailand*
[2]*Department of Management, Commercial Entrepreneurship, Innovation, and Logistics, Faculty of Business Administration and Accountancy, Khon Kaen University, Khon Kaen, Thailand*

ARTICLE INFO

Article history:
Received 16 June 2026
Received in revised form
29 September 2026
Accepted 8 October 2026

Keywords:
Freight forwarding
Logistics capabilities
Logistics integration
Resource-based view
Supply chain management

ABSTRACT

Freight forwarding companies play an important role in coordinating logistics activities within increasingly complex and digitally connected supply chains. Understanding their logistics capabilities is essential for improving operational performance and competitiveness. Drawing on the Resource-Based View (RBV) and Dynamic Capabilities Theory, this study examined the relationships among logistics capabilities in freight forwarding companies in Thailand. A quantitative research design was employed using survey data from 240 freight forwarding professionals. Data were analyzed using Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), and Structural Equation Modeling (SEM). The proposed framework comprised nine logistics capability dimensions. The measurement model demonstrated satisfactory reliability and validity, while the structural model achieved an acceptable fit (CMIN/DF = 1.320, CFI = 0.942, TLI = 0.936, RMSEA = 0.037). Forecasting and Planning showed the largest standardized coefficient towards Warehousing and Storage (β = 0.568). However, this reference path was not statistically tested because it was used for model identification. The remaining hypothesized relationships were not statistically significant. These findings suggest that logistics capability integration may also depend on organizational, technological, and inter-organizational mechanisms not included in the proposed model. The study provides an initial framework and identifies future research directions, including information sharing, digital logistics integration, and collaborative logistics management.

© 2026 The Authors. Published by IASE. This is an open access article under the CC BY-NC-ND license (https://creativecommons.org/licenses/by-nc-nd/4.0/).

1. Introduction

Logistics and transportation industries are very important in providing supply chain connectivity and helping to foster economic development, which in turn supports international trade. Nowadays, global trade activities have become more complicated, and as such, freight forwarding companies must handle many logistics tasks: forecasting, inventory, purchasing, warehousing, distributing, sending in, maintaining customer support, and reverse logistics. Their operating performance, service quality, and even competition as an organization is predicated on the success of such operations (Zhao et al., 2023). In order to succeed with freight forwarding, companies need a strategic understanding of logistics, and they need to know how to carry out their own logistics tasks while also knowing how best to plan operations. With its geographic location and the great amount of transportation infrastructure, Thailand has been popularly cited as one of the major logistics centers of Southeast Asia for many years (Komchornrit, 2021). Because of this, freight forwarders serve as intermediaries, organizing supply chain partners with regard to cargo movement, customs paperwork, warehousing, transportation, and information flows. Thus, the optimization of logistics processes is one of the strategic objectives of freight forwarding companies to grow and become more efficient and more competitive in rapidly changing markets (Setthachotsombut et al., 2024).

However, previous studies generally identified logistics functions such as transportation

* Corresponding Author.
Email Address: yotkit@kku.ac.th (Y. Kittichotsatsawat)
https://doi.org/10.21833/ijaas.2026.10.001
Corresponding author's ORCID profile:
https://orcid.org/0000-0002-1819-2843
2313-626X/© 2026 The Authors. Published by IASE.
This is an open access article under the CC BY-NC-ND license (https://creativecommons.org/licenses/by-nc-nd/4.0/)

management, inventory management, warehouse operations, or customer service as core logistics functions. To date, there are only a few studies that have examined the effect or correlation of different logistics activities of freight forwarding operations in a similar context. Specifically, very limited empirical data exist, especially around the interaction and impact of these logistics processes as part of a holistic operational system. Furthermore, there is insufficient empirical evidence to show that all logistics activities are related to operational effectiveness. As a result, this limitation narrows the analysis of the logistics processes of developing and coordinating freight forwarding capabilities, underlining the importance of a more inclusive model that can include the links among the key logistics activities (Hauge et al., 2021; Kramarz and Kmiecik, 2022). The resource-based view (RBV) suggests that organizational capabilities are a strategic resource for improving and maintaining operational performance and competitive advantage. These logistics activities are organizational capabilities within freight forwarding and comprise forecasting and planning, procurement, inventory management, warehousing, transportation, and reverse logistics in a business that contributes to service effectiveness and operational success. Unfortunately, how these capabilities interact and affect the performance of operations is unknown, particularly within freight forwarding corporations operating in an environment that is particularly competitive and dynamic when it comes to logistics (Nayak et al., 2023).

In order to bridge this research gap, this study proposes a holistic framework of the most crucial logistics processes of freight forwarding and examines their interconnectedness, which underpins the research analysis. For example, nine logistics-related dimensions (Forecasting and Planning (FOP), Customer Service and Supporting Activities (CSS), Logistics Communication and Order Processing (LCO), Purchasing and Procurement (PPR), Inventory Management (INM), Warehousing and Storage (WHS), Materials Handling and Packaging (MHP), Transportation (TRN), and Reverse Logistics (RLG)) were mainly investigated (Kramarz and Kmiecik, 2022). This research employs a combination of exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and structural equation modeling (SEM) to examine the proposed framework and to assess the hypothesized structural relationships among logistics activities. To some extent, the results add to the broader logistics and supply chain management literature. First, this study expands the literature by considering logistics business processes as an integrated operational system rather than as logistics functions executing individually to accomplish a function. Secondly, the study empirically examines the proposed interrelationships among logistics activities and the interconnected nature of some of the important logistics activities in the freight forwarding field. Thirdly, the study provides the foundation for related research on the integration of logistics capabilities in freight forwarding operations in the future. The article ends with an outline of the future refinement of logistics capability integration theory.

2. Literature review

2.1. Logistics activities and freight forwarding operations

Logistics activities comprise integrated processes that help materials, information, and services flow efficiently in supply chains. As a result, according to the resource-based view (RBV), logistics capabilities are valuable organizational resources contributing to operational efficiency and sustainable competitive advantage. Within freight forwarding operations, these activities include forecasting and planning, customer service, communication and information management, procurement, inventory management (Gupta et al., 2018), warehousing, transportation, materials handling, and reverse logistics. Digitalization, technological integration, and logistics coordination have recently been recognized among the most significant factors to improve logistics performance (Heinbach et al., 2022). Digital technologies enhance supply chain connectivity, information visibility, collaboration, and operational efficiencies. Similarly, the intersection of optimization and analytics features enables information systems useful for route planning, scheduling, and service effectiveness (Gayialis et al., 2022). Industry 4.0 technologies have further enhanced logistics responsiveness and operational performance through visibility, automation, and decision-making (Yavas and Ozkan-Ozen, 2020). The performance of efficient logistics beyond technological capabilities also requires integrated and coordinated logistics operations. As such, sustainable freight transportation is a coordinated effort between stakeholders, in addition to the efficient allocation of resources (Hu et al., 2019). Real-time information sharing and collaborative decision-making, among others, are also found to be key success factors for responsive logistics systems (Giusti et al., 2019). Based on their data-driven monitoring and process redesign processes, which prevent operational bottlenecks in freight forwarding environments, they can be seen as improving service effectiveness (Oktaviana and Mahendrawathi, 2025). The collective findings of these studies indicate that logistics activities are not simply operational functions but should thus be considered an integrated system of capabilities within organizations. In addition, Huang et al. (2019) applied Quality Function Deployment (QFD) to evaluate service quality in international freight forwarding. Competitive pricing, door-to-door delivery, and rapid response were key customer needs, and customer relationship management, information systems, and network coverage were identified as critical drivers of service quality improvement. Bae (2019) stated that strategic

information systems (IS) significantly improve freight forwarders' performance. Therefore, the integration of internal and external IS increases financial performance; supply chain IS adoption gives the greatest contribution to overall organizational performance. Gruchmann et al. (2020) pointed out how digitalization transforms sea freight logistics, creating services that are more efficient, flexible, and customer-oriented. Business models, and notably 4PL platforms, give rise to competitive advantages that reshape traditional freight forwarding operations. Taken together, these research studies provide us with evidence that digitalization, information integration, and logistics coordination are critical elements in improving the performance of freight forwarding. They largely focus on these factors; however, they provide little evidence of the interplay between various logistics capabilities in an integrated operational system.

2.2. Logistics activities, operational performance, and capability integration

The resource-based view (RBV) and dynamic capabilities theory suggest that organizational performance depends on the successful deployment and integration of strategic capabilities. The logistics activities enable moving, storing, and coordinating the products and information; hence, they are important components of the performance of the organization. Dynamic capabilities theory further argues that organizations need to continuously adapt and reconfigure logistics assets as technological shifts, sustainability needs, and changes in customer preferences continue to evolve across the network (Helfat and Peteraf, 2003). Previous studies have shown that logistics performance is positively related to strategic planning, sustainable activities, technological application, and the exchange of information. Assessing logistics performance can help in cost reduction, stock management, inventory optimization, and management decisions (Moons et al., 2019).

Sustainable logistics practices are fundamental for resource efficiency and competitiveness in the long run (Martins et al., 2019), while logistics networking and sharing of information increase organizational performance (Trivellas et al., 2020). Technological innovation has also transformed logistics operations through smart IoT, blockchain, artificial intelligence systems, and automation, thus improving warehouse management, transportation planning, and the distribution of resources (Chen et al., 2024; Jagtap et al., 2021). A human-centered Industry 4.0 approach further promotes efficiency and sustainability in operations (Sgarbossa et al., 2020). Likewise, technological capabilities help an entire organization overcome operational limitations and improve logistics performance (Orji, 2019). In freight forwarding operations, knowledge exchange, planning precision, and stakeholder linkages have been shown to be crucial to effectiveness (Bae, 2025). Overall, the literature suggests that logistics capabilities contribute to organizational performance through resource integration and dynamic capability development. Nevertheless, previous studies have mainly focused on the direct effects of individual capabilities on performance rather than examining the structural interrelationships among multiple logistics capabilities.

2.3. Relationships among logistics activities and hypothesis development

RBV and dynamic capabilities theory argue that organizational capabilities act as complementary and interdependent resources. Forecasting, inventory management, warehousing, transportation, communication, and reverse logistics are related activities within logistics systems that ultimately affect organizational performance, and the effectiveness of one logistics activity often affects the efficiency of all subsequent logistics processes (Barney, 1991; Teece et al., 1997). According to previous studies, accurate forecasting leads to better logistics planning, coordination, and distribution performance (Kramarz and Kmiecik, 2022). Warehouse management is a key factor in operational efficiency, cost savings, and customer satisfaction (Batarlienė and Jarašūnienė, 2024), while warehousing and transportation contribute to value and service effectiveness in freight forwarding (Mubarak et al., 2026).

Sustainable logistics systems, such as reverse logistics and green logistics and their counterparts, are also known to aid operational performance and strengthen relationships with relevant stakeholders (Agrawal and Singh, 2019; Richnák and Gubová, 2021). In addition, logistics integration, visibility of information, and technology capabilities help improve supply chain coordination and competitiveness of organizations (Larson, 2021). Based on these theoretical and empirical foundations, this study argues that logistics activities within freight forwarding operations function as an interwoven system in which upstream logistics activities affect downstream operational processes. In particular, Forecasting and Planning (FOP), Customer Service and Supporting Activities (CSS), Logistics Communication and Order Processing (LCO), Purchasing and Procurement (PPR), and Inventory Management (INM) are suggested to have an influence on Warehousing and Storage (WHS). Then, Warehousing and Storage should also impact Transportation (TRN) and Materials Handling and Packaging (MHP), and transportation should impact Reverse Logistics (RLG). In general, the literature continues to confirm that logistics capabilities are significant drivers of organizational performance. Yet, such capabilities have largely been investigated independently or examined with direct effects on operational outcomes. Limited empirical studies have thus far looked into the interaction between multiple logistics capabilities, functioning as an integrated system, in freight forwarding operations.

This indicates a gap between the theoretical and empirical perspectives that lie in the structural interrelationships among logistics capabilities. The current research fills this gap by presenting and testing a comprehensive logistics capability integration framework based on EFA, CFA, and SEM.

Accordingly, the following hypotheses are proposed:

H1: Forecasting and Planning positively influences Warehousing and Storage.
H2: Customer Service and Supporting Activities positively influence Warehousing and Storage.
H3: Logistics Communication and Order Processing positively influence Warehousing and Storage.
H4: Purchasing and Procurement positively influences Warehousing and Storage.
H5: Inventory Management positively influences Warehousing and Storage.
H6: Warehousing and Storage positively influences Transportation.
H7: Warehousing and Storage positively influences Materials Handling and Packaging.
H8: Transportation positively influences Reverse Logistics.

Based on the proposed conceptual framework, the relationships among logistics activities can be represented by the following structural equations:

$$WHS = \beta_1 FOP + \beta_2 CSS + \beta_3 LCO + \beta_4 PPR + \beta_5 INM + \varepsilon \quad (1)$$

$$TRN = \beta_6 WHS + \varepsilon \quad (2)$$

$$MHP = \beta_7 WHS + \varepsilon \quad (3)$$

$$RLG = \beta_8 TRN + \varepsilon \quad (4)$$

where, FOP = Forecasting and Planning; CSS = Customer Service and Supporting Activities; LCO = Logistics Communication and Order Processing; PPR = Purchasing and Procurement; INM = Inventory Management; WHS = Warehousing and Storage; TRN = Transportation; MHP = Materials Handling and Packaging; RLG = Reverse Logistics; β_1–β_8 = structural path coefficients representing the magnitude and direction of the hypothesized relationships; and ε = error term representing unexplained variance.

The proposed conceptual framework is presented in Fig. 1. The framework reflects the interconnected nature of logistics activities and provides the theoretical basis for examining logistics capability integration within freight forwarding operations.

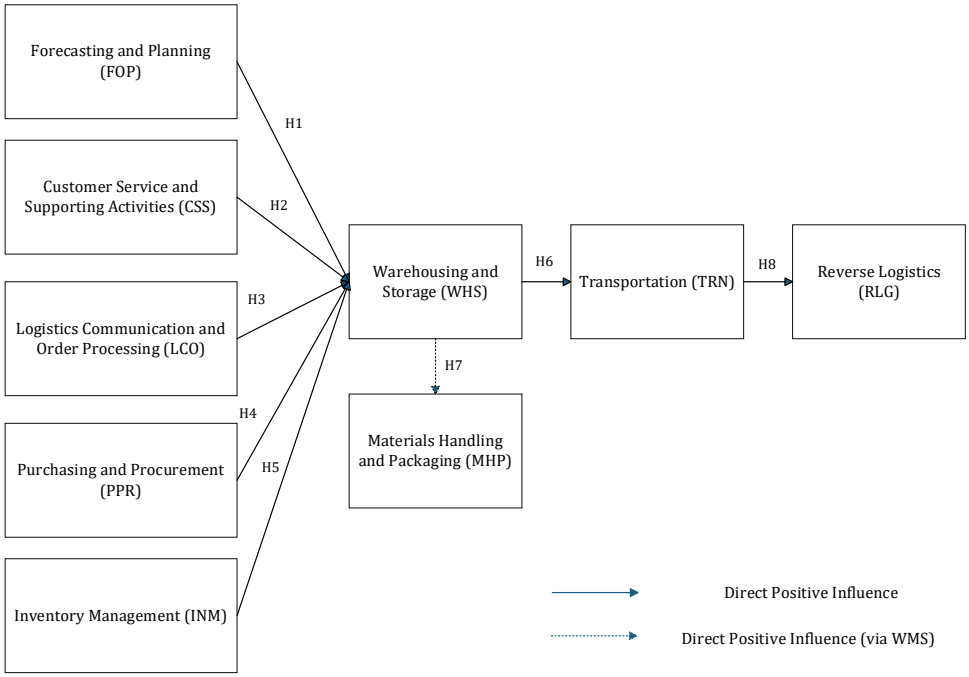


Fig. 1: Proposed research framework

3. Methodology

This study employed a quantitative research design supported by preliminary expert interviews. The measurement instrument was developed through a literature review and expert consultation. Five logistics experts with substantial experience in freight forwarding operations, logistics management, and supply chain management participated in the expert review process. The expert interviews focused on evaluating the clarity, relevance, and completeness of the questionnaire items and were used exclusively to establish content validity and refine the measurement instrument prior to pilot testing. The expert interviews were not intended as a qualitative component of the study; therefore, no qualitative findings are presented or analyzed in this research. Nine logistics activity dimensions were identified and operationalized using 26 observed indicators. The questionnaire was reviewed by five logistics experts to ensure content validity. A pilot test involving 30 practitioners confirmed acceptable reliability levels. A paper-based survey was administered using purposive sampling among freight forwarding professionals in Thailand. The questionnaires were administered in person to

respondents at their workplaces during the data collection period. A total of 300 questionnaires were distributed, and 260 completed questionnaires were returned, yielding a response rate of 86.7%. Following data screening, questionnaires containing substantial missing data or incomplete responses were excluded, resulting in a final sample of 240 valid questionnaires for subsequent statistical analyses. The final sample size exceeded the minimum recommendations for Structural Equation Modeling (SEM) (Hair and Alamer, 2022; Kline, 2023).

Data analysis was conducted using SPSS and AMOS. Exploratory Factor Analysis (EFA) was first employed to identify the underlying factor structure, followed by Confirmatory Factor Analysis (CFA) to examine the measurement model. Structural Equation Modeling (SEM) was then performed to examine the hypothesized relationships among logistics activities. Model estimation was conducted using the Maximum Likelihood (ML) method. To achieve model identification, the path from Forecasting and Planning (FOP) to Warehousing and Storage (WHS) was fixed as the reference path. This constraint was applied by AMOS to ensure parameter identification within the structural model. Consequently, no Critical Ratio (C.R.) or p-value was estimated for this path. Therefore, the FOP → WHS path was not statistically tested, and its standardized coefficient should not be interpreted as empirical evidence supporting the proposed relationship. In addition, to assess the potential influence of common method bias (CMB), Harman's single-factor test was conducted using an unrotated principal component analysis (PCA) in which all measurement items were entered simultaneously. Common method bias was considered unlikely to represent a serious concern when the first unrotated factor accounted for less than 50% of the total variance.

4. Results

4.1. Respondent characteristics

Respondents fell into a range of organizational functions in freight forwarding corporations, ranging from operations, customs documentation, customer service, and planning to logistics technology management. The majority of respondents worked in supervisory or managerial roles and had some applicable experience in logistics.

The demographic characteristics of respondents are listed in Table 1. Of 240 subjects, 46.3% were male, 31.7% were female, and 22.1% did not wish to reveal their gender. Most (32.1%) were 45 years and older, followed by those aged 35–44 years (26.7%). Results of work experience were found to be 40.8% with one to three years of experience and 38.3% in managerial roles. Respondents belonged to different functional areas of the freight forwarding business, i.e., operations, customs and documentation, customer service, planning, and business development.

Table 1: Respondent profile

Characteristics	Category	Frequency	Percentage (%)
Gender	Male	111	46.3
	Female	76	31.7
	Prefer not to say	53	22.1
Age	< 25 years	46	19.2
	25–34 years	53	22.1
	35–44 years	64	26.7
	≥ 45 years	77	32.1
Work experience	< 1 year	65	27.1
	1–3 years	98	40.8
	4–6 years	25	10.4
	> 6 years	52	21.7
Position	Operational	67	27.9
	Supervisor	81	33.8
	Managerial	92	38.3

4.2. Exploratory factor analysis

From Table 2, EFA was done to ascertain the underlying dimensions of logistics activities in freight forwarding operations. The dataset was assessed in terms of its suitability before factor extraction by calculating the Kaiser–Meyer–Olkin (KMO) measure and Bartlett's test of sphericity. Based on the data from Table 2, this study resulted in a KMO of 0.683 and a statistically significant Bartlett's test (χ^2 = 2571.091, df = 351, $p < 0.001$), indicating that the dataset was valid for factor analysis.

Subsequently, principal component analysis (PCA) with Varimax rotation was used to extract the latent factor structure. Nine factors with eigenvalues greater than one were identified and had a cumulative explanation of 74.95% of total variance. This cumulative variance surpassed the 60% threshold recommended range for explanatory power, which provides evidence that logistics activities in freight forwarding are multifaceted. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was 0.683 (minimum acceptable threshold 0.50), further confirming the appropriateness for factor analysis of the datasets. KMO was not quite below the value of 0.70; however, higher than 0.60 is commonly acceptable for exploratory research regarding multidimensional constructs (Hair and Alamer, 2022). In addition, Bartlett's test of sphericity was significant (χ^2 = 2571.091, $p < 0.001$), indicating that there was enough coherence to support the possibility of factor analysis. With the complex character of logistics and the heterogeneous nature of freight forwarding activities, the KMO was sufficient for factor extraction and construct development.

Table 2: Results of KMO, Bartlett's test, and total variance explained

Measure	Value
Kaiser–Meyer–Olkin (KMO)	0.683
Bartlett's test chi-square (χ^2)	2571.091
Degrees of freedom (*df*)	351
Significance (p-value)	< 0.001
Number of factors extracted	9
Total variance explained (%)	74.951

Table 3 presents the reliability and validity assessment of the measurement model. The standardized factor loadings ranged from 0.596 to

0.949, exceeding the recommended threshold of 0.50 and confirming indicator reliability. Cronbach's alpha coefficients ranged from 0.813 to 0.836, indicating satisfactory internal consistency across all constructs. Composite reliability (CR) values ranged from 0.707 to 0.802, exceeding the recommended threshold of 0.70. Furthermore, seven constructs achieved AVE values greater than 0.50, demonstrating adequate convergent validity. While Warehousing and Storage (WHS) and Materials Handling and Packaging (MHP) provided AVE values slightly below the suggested cutoff value, both dimensions obtained composite reliability (CR) higher than 0.70 and were retained for use in the subsequent analyses following Fornell and Larcker (1981). However, these findings point to some marginal convergent validity and need to be treated cautiously.

In general, the findings yield some confidence in the model as being reliable and measurement valid. The convergent validity of the WHS and MHP constructs should be considered, however, with caution since their AVE values were just below the recommended value.

Table 3: Reliability and validity assessment

Construct	Loading range	Cronbach's α	CR	AVE	Assessment
Forecasting and planning (FOP)	0.669–0.715	0.814	0.802	0.575	Accepted
Customer service and supporting activities (CSS)	0.696–0.800	0.832	0.785	0.550	Accepted
Logistics communication and order processing (LCO)	0.726–0.781	0.828	0.795	0.564	Accepted
Purchasing and procurement (PPR)	0.712–0.804	0.816	0.792	0.560	Accepted
Inventory management (INM)	0.697–0.811	0.815	0.800	0.572	Accepted
Warehousing and storage (WHS)	0.596–0.949	0.814	0.707	0.448	Marginally accepted
Materials handling and packaging (MHP)	0.599–0.721	0.836	0.713	0.455	Marginally accepted
Transportation (TRN)	0.716–0.758	0.813	0.786	0.550	Accepted
Reverse logistics (RLG)	0.732–0.770	0.828	0.790	0.557	Accepted

Cronbach's alpha values greater than 0.70 indicate satisfactory internal consistency. Composite reliability (CR) values exceeding 0.70 demonstrate construct reliability, while average variance extracted (AVE) values above 0.50 indicate adequate convergent validity. Following Ab Hamid et al. (2017), constructs with AVE values slightly below 0.50 may still be considered acceptable when CR exceeds 0.70 (Fornell and Larcker, 1981)

4.3. Confirmatory factor analysis

Confirmatory factor analysis (CFA) was utilized to validate the EFA-developed measurement model. Model fit was satisfactory (CMIN/DF = 0.980, GFI = 0.921, AGFI = 0.901, NFI = 0.904, CFI = 1.000, RMSEA = 0.000), with each criterion meeting or exceeding required thresholds. Standardized factor loads were larger than the minimum required value (i.e., above 0.50), which provided evidence for the reliability and construct validity of indicators. Composite reliability (CR) values indicated that they ranged between 0.707 and 0.802, beyond the recommended cut-off of 0.70. Additionally, average variance extracted (AVE) values from seven constructs were above 0.50, which constituted sufficient convergent validity. With WHS and MHP, although their AVE values did not exceed 0.50, both constructs achieved composite reliability above 0.70 and were therefore retained. For the most part, the CFA results proved the reliability and validity of the measurement model and confirmed its appropriateness for the later analysis of structural models.

As shown in Table 4, the measurement model demonstrated a satisfactory fit to the empirical data. All goodness-of-fit indices met or exceeded the recommended thresholds. The results support the adequacy of the measurement model and confirm its suitability for subsequent structural model analysis.

4.4. Structural model assessment

Evidence of adequate fit of the structural model to empirical data (CMIN/DF = 1.320, CFI = 0.942, TLI = 0.936, RMSEA = 0.037) showed that the model fitted the observed relationships between logistics activities. Fig. 2 shows the structural model employed to analyze the relationships between logistics activities in freight forwarding operations. The goodness-of-fit indices are presented in Table 5. The observed results were within the accepted thresholds, suggesting some degree of fit in the case of empirical data by the model. Results indicate that the model has valid expectations and thus would be suitable for hypothesis testing.

Table 4: Goodness-of-fit indices of the measurement model

Fit index	Recommended threshold	Observed value	Assessment
χ^2/df (CMIN/DF)	< 3.00	0.980	Good fit
GFI	> 0.90	0.921	Good fit
AGFI	> 0.90	0.901	Good fit
NFI	> 0.90	0.904	Good fit
CFI	> 0.90	1.000	Excellent fit
RMSEA	< 0.08	0.000	Excellent fit

Recommended thresholds were adopted from Hair and Alamer (2022), where χ^2/df < 3.00, GFI, AGFI, NFI, and CFI > 0.90, and RMSEA < 0.08 indicate acceptable model fit

Table 5: Structural model fit

Fit index	Threshold	Value	Assessment
CMIN/DF	<3.00	1.320	Good fit
CFI	>0.90	0.942	Good fit
TLI	>0.90	0.936	Good fit
RMSEA	<0.08	0.037	Good fit

The FOP → WHS path was specified as the reference path for model identification during SEM estimation. Consequently, AMOS did not estimate a Critical Ratio (C.R.) or p-value for this path, and H1 was therefore not statistically tested. Although Forecasting and Planning (FOP) exhibited the largest standardized coefficient toward Warehousing and Storage (β = 0.568), this coefficient resulted from the model identification constraint and should not be interpreted as empirical evidence supporting the proposed relationship. The remaining hypothesized relationships were statistically evaluated, and none

were supported at the 0.05 significance level, as presented in Table 6.

4.5. Common method bias assessment

To evaluate the effect of common method bias (CMB), Harman's single-factor test using an unrotated principal component analysis was performed. The initial unrotated factor comprised 11.67% of the total variance, which is significantly lower than the commonly used norm of 50%. Accordingly, no individual cause dominated the covariance among the measurement items, suggesting that common method bias did not seriously threaten the validity of the results.

5. Discussion

In order to identify the associations of logistics activities in freight forwarding operations (FRE) within Thailand, the Resource-Based View (RBV) and Dynamic Capabilities Theory in this research are used as the fundamental theories.

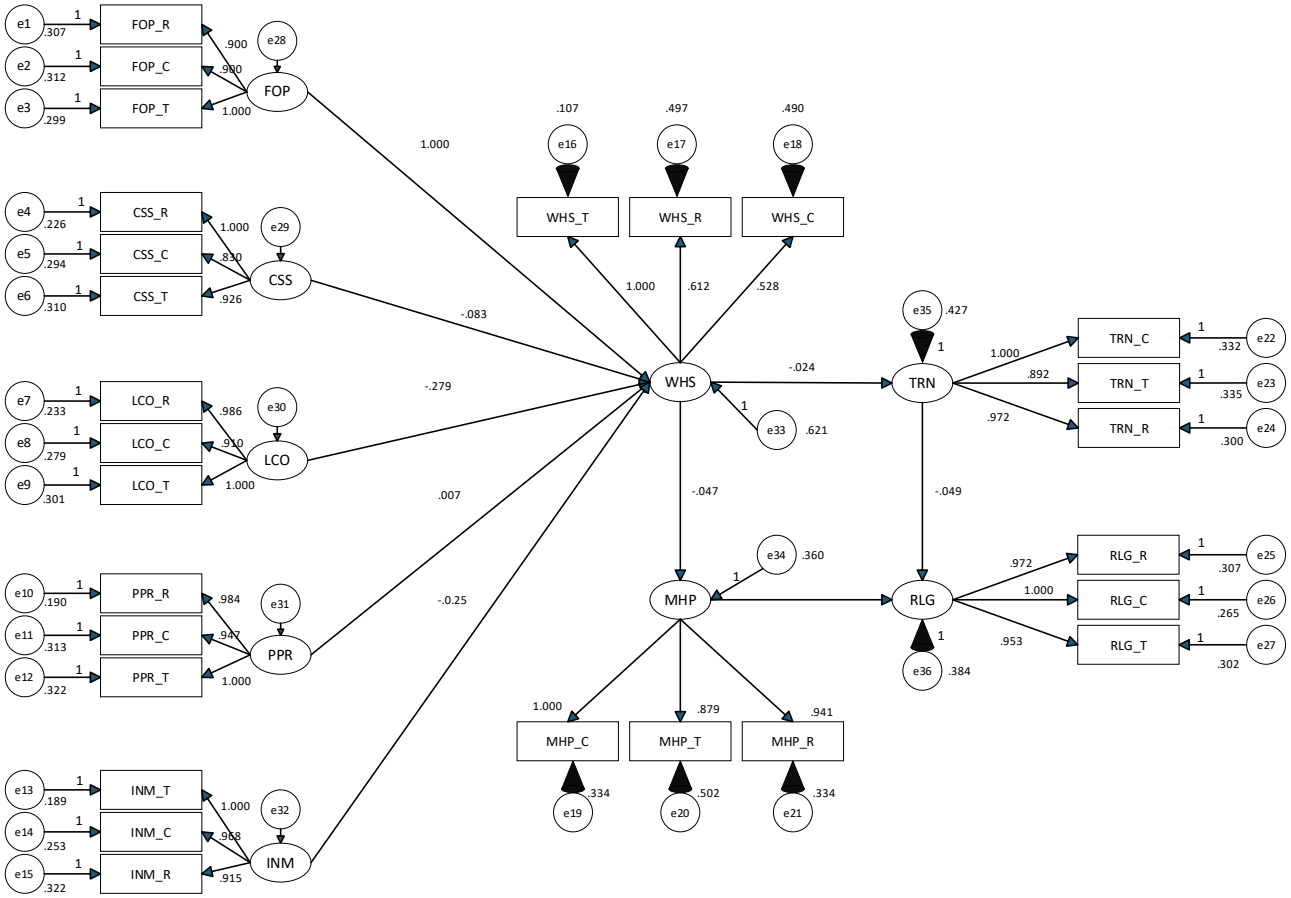


Fig. 2: Structural equation model of freight forwarding logistics activities

Table 6: Hypothesis testing results

Hypothesis	Path	Standardized β	C.R.	p-value	Decision
H1	FOP → WHS	0.568	N/A	N/A	Reference path
H2	CSS → WHS	-0.046	-0.762	0.446	Not supported
H3	LCO → WHS	-0.104	-1.705	0.088	Not supported
H4	PPR → WHS	-0.008	-0.132	0.895	Not supported
H5	INM → WHS	-0.010	-0.173	0.863	Not supported
H6	WHS → TRN	0.026	0.368	0.713	Not supported
H7	WHS → MHP	0.006	0.088	0.930	Not supported
H8	TRN → RLG	-0.018	-0.240	0.811	Not supported

β represents the standardized regression coefficient, and C.R. denotes the critical ratio. When $p < 0.05$, a hypothesis is considered statistically supported. Therefore, the FOP → WHS path was not statistically tested, and its standardized coefficient should not be interpreted as empirical evidence supporting the proposed relationship

Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), and Structural Equation Modeling (SEM) were used to analyze key logistics capabilities correlations. Results offer a number of theoretical and managerial implications for the integration of logistics capabilities of freight forwarding organizations. None of the hypothesized relationships were statistically supported, but that of Forecasting and Planning (FOP) was the one with the largest standardized coefficient among the proposed relationships (β = 0.568). This path was specified as the reference path for model identification in AMOS and was not statistically tested.

Thus, no statistical inference can be made regarding this relationship. On a theoretical level, there is a growing body of evidence to indicate that

an effective forecasting and planning system can enable freight forwarding enterprises to predict customer requirements, enhance warehouse utilization, optimize resource allocation, and inventory positioning. These capabilities are also likely to result in increased organizational effectiveness by facilitating better resource utilization, which enhances the coordination of operations and aligns with the Resource-Based View (RBV). Thus, the coefficient found is more of a theoretical indication that merits further study than data support for the proposed connection. Moreover, since freight forwarding organizations undertake coordination efforts among many service providers from outside, the planning capacity is theoretically still potentially necessary in facilitating coordination between the transportation schedule, warehouse utilization, cargo consolidation, and customer needs. It is to be explored further how this may be possible by adopting different model specifications to analyze the relationship with statistical analysis in future studies.

Conversely, the relationships as hypothesized did not reach statistical significance for others. More specifically, Customer Service and Supporting Activities (CSS), Logistics Communication and Order Processing (LCO), Purchasing and Procurement (PPR), and Inventory Management (INM) did not show significant direct relationships with Warehousing and Storage (WHS). Likewise, Warehousing and Storage did not exert a significant impact on Transportation (TRN) or Materials Handling and Packaging (MHP), while Transportation did not exert a significant impact on Reverse Logistics (RLG). While several relationships presented positive or negative coefficients, none reached statistical significance to support the mentioned hypotheses. The lack of any meaningful relationships detected in most of the logistics actions indicates that the freight forwarding activities may not follow the straightforward network of logistics structures that has been shown by previous research. Classical theories of logistics assume strong operational linkages between warehousing, transportation, inventory, procurement, and communication. However, freight forwarding companies increasingly function in logistics ecosystems that are digitally connected with a very high degree of connection – a network of logistics services and logistics activities that heavily involves third-party suppliers. In this type of environment, efficiency is determined less by direct internal logistics processes and more by the coordination of external resources and information flows across organizational boundaries.

One possible theoretical explanation suggested in previous logistics literature is the increasing adoption of digital logistics technologies. In the present study, as digital logistics technologies were not directly measured, this interpretation should be considered as a literature-based explanation and not an empirical basis based on the present data. Digital integration thus emerges as just one of the various theoretical explanations for what are arguably unsupported structural relationships. Such technologies can help in the sharing of information and coordination between logistics functions and reduce dependency on the direct operational interdependencies between them. While some previous studies have shown that Industry 4.0 technologies and human-centered operational capabilities are critical to improving logistics performance, these drivers were not measured explicitly in the current study. Therefore, they should be evaluated only as a literature-based explanation, as opposed to actual data in the current dataset. Future research should directly explore how Industry 4.0 technologies impact the integration of logistics capability and digital logistics systems and human-centered operational capabilities in freight forwarding operations.

Moreover, even though customer service and supporting activities (CSS) were not directly involved in the proposed model, previous empirical studies have demonstrated that customer service outcomes are often impacted by many indirect factors (such as service quality, technology utilization, transportation performance, and operating conditions) (Kittichotsatsawat et al., 2025). This suggests that customer service capabilities may be mediated by more complicated mechanisms than those currently considered in our model, and therefore we need to look to more detailed structural models. Our results also suggest that logistics capability integration in freight forwarding may involve more organizational and inter-organizational processes than the direct relationships proposed in the model.

Another possible explanation suggested by previous studies is the network-oriented nature of freight forwarding operations. Freight forwarders also organize among shipping lines, airlines, trucking companies, customs brokers, warehouse operators, and other third-party logistics providers. But in those scenarios, organizational performance generally relies more on the elements mentioned above (cooperation, relationship, network coordination, and network integration) than on internal logistics. This finding further refines the application of the Resource-Based View (RBV) by indicating that relational resources and inter-organizational capabilities might be as significant as internal organizational resources in the accounting of logistics capability integration in freight forwarding operations. In addition to this, these findings are consistent with emerging paradigms of dynamic capabilities theory, underscoring organizational adaptability, the coordination to allocate and manage resources, and the entire network of interconnected supply chains. The results indicate that the ability to mobilize resources across organizational boundaries may represent a more important source of competitive advantage. A third potential explanation for the absence of significant structural relationships is that the structural model design does not include contextual organizational

attributes. Freight forwarding companies vary widely with respect to organizational size, service focus, digitalization maturity, and operational complexity. These contextual features can affect the interrelationships between logistics capabilities and organizations and thus moderate the structural associations explored in this paper. However, since these patterns of organizational characteristics were not explicitly included in the current SEM model, future studies should also examine their moderation effects in the form of multi-group SEM or moderation analysis to achieve a better contextualized understanding of logistics capability integration.

On a measurement level, this study extends the literature on logistics capability by empirically validating a multidimensional logistics capability integration framework. Although forecasting and planning had the largest standardized coefficient, the FOP–WHS path was used as a reference path for the model identification process and was not statistically tested. For this reason, this coefficient ought not to be seen as empirical evidence of an independent significant relationship, but as a potential sign that future research may be needed. With no statistically significant relationships among the remaining structural pathways, this research may indicate that the integration of logistics capability reflects mediating mechanisms, digital information infrastructure, and external network coordination not specifically included in the existing model. Consequently, in future research, further studies should aim to adopt more profound structural models and to integrate mediating and moderating variables to offer insights into logistics capability integration in contemporary freight forwarding activities.

Thus, the recommended conceptual framework is to be seen as a simplifying structural representation of logistics capability integration, not the totality of logistics activities' possible interdependencies. Future studies need to look into interrelationships, feedback loops, and dynamics among logistics capabilities to better capture the complexity of modern-day freight forwarding operations. Thus, the present results can be seen as guiding rather than proving the proposed RBV-based logic. Studies in the future should investigate how internal logistics capabilities work with organizational and network-based capabilities to better understand the integration of logistics capabilities in modern freight forwarding.

This research contributes to the logistics and supply chain management literature by extending current understanding of logistics capability integration in freight forwarding operations. First, this study contributes to the application of the Resource-Based View (RBV) in freight forwarding by demonstrating that internal logistics capabilities alone may not adequately explain logistics capability integration. Rather than proving the direct relationships among capacity, the findings suggest that internal logistics capabilities alone are unlikely to suffice to account for the linkage of capabilities and that a wider variety of organizational, technological, and network mechanisms is relevant. This finding also extends earlier conceptual work on integrated operational capability development (Kittichotsatsawat and Tippayawong, 2021) by providing empirical evidence that the proposed relationships require further theoretical refinement before they can be generalized to freight forwarding operations.

Second, the findings indicate that traditional assumptions regarding the direct interdependence between logistics activities are not always an adequate framework for understanding logistics capability integration in today's freight forwarding market. None of the hypothesized direct relationships between logistics activities were statistically established, as in traditional logistics theories. Thus, this finding suggests that if there are no statistically significant direct associations or relationships, integration of logistics capability involves other organizational, technological, or inter-organizational mechanisms that were not specifically represented in the present model. Thus, this research contributes to the logistics capability literature, emphasizing the significance of network and organizational integration in modern logistics ecosystems. Forecasting and Planning (FOP) provided a relatively high standardized coefficient compared to the structural paths we proposed, but the FOP–WHS path was considered a reference path for model identification and thus was not tested statistically. Hence, this coefficient is not empirical evidence in favor of the proposed relationship. On the other hand, it arrives at a potentially significant link that merits more exploration with alternative specifications for this model that could statistically assess this link.

From a management standpoint, the firms of freight forwarding companies should reinforce their forecasting and planning skills, as a significant amount of previous logistics research has emphasized that this phenomenon drives operational coordination, resource allocation, and service functionality, rather than due to the present research (which was able to corroborate its empirical evidence). The findings from this study also suggest that improvement of logistics roles alone will not be sufficient to comprehensively address the integration of logistics capability into the proposed structural model. Managers should be wary of presupposing that the enhancements of isolated logistics functions will result in enhanced logistics capabilities integration across the entire value chain. Instead, organizations could explore coordination mechanisms at a larger organizational and inter-organizational level, which can be studied empirically in the future.

Therefore, managers may additionally take care regarding enhancing information integration, digital connection, and coordination of logistics activities to ensure the logistics capability is widely covered in the past in the study of logistics, either directly in a recent study or not. Additionally, freight forwarding

organizations would also have to investigate cooperation and partnership processes with various logistics stakeholders (warehousing or transport providers, customs brokers, and third-party logistics service companies), as recommended by the literature reported on this point, based on the findings. The results of previous logistics studies show that those organizations with a good network system and collaborative logistics policies can face much better operational demands and compete more effectively. However, the observed relationships have not been analyzed in the present study, nor have they been adequately empirically examined to form firm managerial claims.

6. Conclusion

This research has been conducted to examine the cross-relation between logistics capabilities in freight forwarding in Thailand using a model based on Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), and Structural Equation Modeling (SEM). A logistics capability integration model has been formed and empirically verified, which includes nine dimensions of logistics capability: Forecasting and Planning (FOP), Customer Service and Supporting Activities (CSS), Logistics Communication and Order Processing (LCO), Purchasing and Procurement (PPR), Inventory Management (INM), Warehousing and Storage (WHS), Materials Handling and Packaging (MHP), Transportation (TRN), and Reverse Logistics (RLG). Of the developed structural pathways, the Forecasting and Planning (FOP) structure showed the highest standardized coefficient toward Warehousing and Storage ($\beta = 0.568$).

However, given that this path remained the baseline path for model identification, this was not statistically tested, nor should it be taken as quantitative evidence of an existing relationship. The proposed structural model was insufficiently supported empirically with respect to the current dataset, suggesting that the proposed direct relationships do not fully capture the integration of logistics capability in freight forwarding operations. Since there are no statistically significant associations between the remaining structural paths, we infer that these findings suggest that logistics capability integration in freight forwarding operations may also be influenced by other organizational, technological, and environmental factors that were not included in the proposed model.

This work adds to the logistics and supply chain management literature by further shaping the utility of the Resource-Based View (RBV) in freight forwarding. Although the present study found no statistically significant direct relations between logistics capabilities, existing logistics literature agrees that strategic planning, information sharing, digital logistics technologies, and collaborative logistics practices are significant organizational capabilities. Therefore, these capabilities should be regarded as theoretically relevant for future empirical investigation rather than as empirically validated managerial practices. There are a number of limitations to the present study. First, the study was conducted solely within the domestic freight forwarding industry of Thailand, and the results may not be applicable to other logistics sectors or national contexts.

The research also used purposive sampling to identify freight forwarding professionals. While this is an appropriate sampling approach to identify respondents who have relevant industry knowledge and the sample size fulfills SEM recommendations, it did not necessarily reflect the overall population of freight forwarding companies. Thus, the findings should be contextualized regarding the organizations investigated and not generalized to any logistics enterprise. The use of probability-based sampling, including stratified or random sampling, across wider geographical regions and logistics sectors to establish external validity and generalizability will be recommended and encouraged for future studies. Secondly, the cross-sectional research design analyzed only direct relationships between logistics capabilities across the structural field.

Consequently, findings should be treated as evidence of associations between logistics capabilities rather than causal results. Additionally, the proposed conceptual framework is to be considered a simplified version of logistics capability integration rather than a full integration of all logistics activity interactions. This raises the possibility for other studies to consider reciprocal relationships, feedback networks, and the dynamic interaction of logistics work in the context of long-term or systems-based theoretical modeling. Third, although the measurement model presented an adequate overall reliability of the outcomes, two constructs (Warehousing and Storage and Materials Handling and Packaging) reported an AVE that was marginally less than the threshold of 0.50, suggesting a marginal level of convergent validity. Fourth, all parameters were obtained from self-reported questionnaires; thus, the influence of common method bias cannot be excluded completely. To reduce response bias, procedural remedial measures such as expert validation of the questionnaire, pilot testing, and anonymous questionnaire administration were utilized.

Though Harman's single-factor test showed that common method bias was unlikely to be a serious concern, the single-factor test alone cannot completely rule out common method bias. Future research might consider more advanced statistical techniques, such as the common latent factor (CLF) approach or marker variable techniques, to examine further for potential method bias. In addition, future research could enhance the measurement of the constructs, test the measurement model with a larger and more diverse sample, and construct more robust structural models that include organizational, technological, environmental, mediating, and

moderating variables like digitalization, outsourcing intensity, supply chain integration, service specialization (or type of freight forwarding service), organizational size, and environmental uncertainty. These improvements would further reveal the integration of logistics capabilities across heterogeneous freight forwarding organizations operating in increasingly complex organizational and supply chain environments.

List of abbreviations

4PL	Fourth-party logistics
AGFI	Adjusted goodness-of-fit index
AMOS	Analysis of moment structures
AVE	Average variance extracted
CFA	Confirmatory factor analysis
CFI	Comparative fit index
CMB	Common method bias
CMIN/DF	Chi-square divided by degrees of freedom
C.R.	Critical ratio
CR	Composite reliability
CSS	Customer service and supporting activities
df	Degrees of freedom
EFA	Exploratory factor analysis
FRE	Freight forwarding operations
FOP	Forecasting and planning
GFI	Goodness-of-fit index
INM	Inventory management
IoT	Internet of Things
IS	Information systems
LCO	Logistics communication and order processing
MHP	Materials handling and packaging
ML	Maximum likelihood
N/A	Not applicable
NFI	Normed fit index
PCA	Principal component analysis
PPR	Purchasing and procurement
QFD	Quality function deployment
RBV	Resource-based view
RLG	Reverse logistics
RMSEA	Root mean square error of approximation
SEM	Structural equation modeling
SPSS	Statistical package for the social sciences
TLI	Tucker–Lewis index
TRN	Transportation
WHS	Warehousing and storage

Acknowledgment

This research was supported by the National Science, Research and Innovation Fund, Thailand Science Research and Innovation (TSRI), through Rajamangala University of Technology Thanyaburi (FRB69E0511B.4) (Grant No.: FRB690069/0168).

Compliance with ethical standards

Ethical considerations

The study was approved by the Research Ethics Committee of Rajamangala University of Technology Thanyaburi, Thailand (Certificate of Approval No. 24; Reference No. Exp 24/69) through an expedited review process. The review covered the research protocol, participant information sheet, informed consent form, and research instruments.

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

Ab Hamid MR, Sami W, and Mohmad Sidek MH (2017). Discriminant validity assessment: Use of Fornell & Larcker criterion versus HTMT criterion. Journal of Physics: Conference Series, 890(1): 012163. https://doi.org/10.1088/1742-6596/890/1/012163 **PMCid:PMC8189480**

Agrawal S and Singh RK (2019). Analyzing disposition decisions for sustainable reverse logistics: Triple bottom line approach. Resources, Conservation and Recycling, 150: 104448. https://doi.org/10.1016/j.resconrec.2019.104448

Bae HS (2019). The interaction effect of strategic information systems on performance of international freight forwarders: An analysis of gaps in performance. The Asian Journal of Shipping and Logistics, 35(2): 108-117. https://doi.org/10.1016/j.ajsl.2019.06.003

Bae HS (2025). The effects of internal influencing factors on supply chain collaboration and performance of multimodal transport operators. Journal of Business & Industrial Marketing, 40(8): 1672-1685. https://doi.org/10.1108/JBIM-12-2024-0976

Barney J (1991). Firm resources and sustained competitive advantage. Journal of Management, 17(1): 99-120. https://doi.org/10.1177/014920639101700108

Batarlienė N and Jarašūnienė A (2024). Improving the quality of warehousing processes in the context of the logistics sector. Sustainability, 16(6): 2595. https://doi.org/10.3390/su16062595

Chen W, Men Y, Fuster N, Osorio C, and Juan AA (2024). Artificial intelligence in logistics optimization with sustainable criteria: A review. Sustainability, 16(21): 9145. https://doi.org/10.3390/su16219145

Fornell C and Larcker DF (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research, 18(1): 39-50. https://doi.org/10.1177/002224378101800104 **PMCid:PMC13390845**

Gayialis SP, Kechagias EP, and Konstantakopoulos GD (2022). A city logistics system for freight transportation: Integrating information technology and operational research. Operational Research, 22: 5953-5982. https://doi.org/10.1007/s12351-022-00695-0

Giusti R, Manerba D, Bruno G, and Tadei R (2019). Synchromodal logistics: An overview of critical success factors, enabling technologies, and open research issues. Transportation Research Part E: Logistics and Transportation Review, 129: 92-110. https://doi.org/10.1016/j.tre.2019.07.009

Gruchmann T, Pratt N, Eiten J, and Melkonyan A (2020). 4PL digital business models in sea freight logistics: The case of Freighthub. Logistics, 4(2): 10. https://doi.org/10.3390/logistics4020010

Gupta S, Kumar S, Singh SK, Foropon C, and Chandra C (2018). Role of cloud ERP on the performance of an organization: Contingent resource-based view perspective. The International Journal of Logistics Management, 29(2): 659-675. https://doi.org/10.1108/IJLM-07-2017-0192

Hair J and Alamer A (2022). Partial Least Squares Structural Equation Modeling (PLS-SEM) in second language and

education research: Guidelines using an applied example. Research Methods in Applied Linguistics, 1(3): 100027. https://doi.org/10.1016/j.rmal.2022.100027
PMCid:PMC13669037

Hauge JB, Birkie SE, and Jeong Y (2021). Developing a holistic decision support framework: From production logistics to sustainable freight transport in an urban environment. Transportation Research Interdisciplinary Perspectives, 12: 100496. https://doi.org/10.1016/j.trip.2021.100496

Heinbach C, Beinke J, Kammler F, and Thomas O (2022). Data-driven forwarding: A typology of digital platforms for road freight transport management. Electronic Markets, 32: 807-828. https://doi.org/10.1007/s12525-022-00540-4
PMid:35602110 PMCid:PMC9014777

Helfat CE and Peteraf MA (2003). The dynamic resource-based view: Capability lifecycles. Strategic Management Journal, 24(10): 997-1010. https://doi.org/10.1002/smj.332

Hu W, Dong J, Hwang BG, Ren R, and Chen Z (2019). A scientometrics review on city logistics literature: Research trends, advanced theory and practice. Sustainability, 11(10): 2724. https://doi.org/10.3390/su11102724

Huang ST, Bulut E, and Duru O (2019). Service quality evaluation of international freight forwarders: An empirical research in East Asia. Journal of Shipping and Trade, 4: 14. https://doi.org/10.1186/s41072-019-0053-6

Jagtap S, Bader F, Garcia-Garcia G, Trollman H, Fadiji T, and Salonitis K (2021). Food logistics 4.0: Opportunities and challenges. Logistics, 5(1): 2. https://doi.org/10.3390/logistics5010002

Kittichotsatsawat Y and Tippayawong KY (2021). Conceptual framework of performance improvement in coffee production using integrated lean technique. In the Proceedings of the International Conference on Industrial Engineering and Operations Management, IEOM Society, Singapore: 105-112. https://doi.org/10.46254/AN11.20210027

Kittichotsatsawat Y, Wattanutchariya W, Jongjareonrak A, and Seesuriyachan P (2025). Enhancing manufacturing operations within the supply chain for sustainable frozen shrimp production. Sustainability, 17(6): 2412. https://doi.org/10.3390/su17062412

Kline RB (2023). Principles and practice of structural equation modeling. 5th Edition, The Guilford Press, New York, USA.

Komchornrit K (2021). Location selection of logistics center: A case study of greater Mekong subregion economic corridors in Northeastern Thailand. ABAC Journal, 41(2): 137-155.

Kramarz M and Kmiecik M (2022). Quality of forecasts as the factor determining the coordination of logistics processes by logistic operator. Sustainability, 14(2): 1013. https://doi.org/10.3390/su14021013

Larson PD (2021). Relationships between logistics performance and aspects of sustainability: A cross-country analysis. Sustainability, 13(2): 623. https://doi.org/10.3390/su13020623

Martins VW, Anholon R, Quelhas OL, and Leal Filho W (2019). Sustainable practices in logistics systems: An overview of companies in Brazil. Sustainability, 11(15): 4140. https://doi.org/10.3390/su11154140

Moons K, Waeyenbergh G, and Pintelon L (2019). Measuring the logistics performance of internal hospital supply chains–A literature study. Omega, 82: 205-217. https://doi.org/10.1016/j.omega.2018.01.007

Mubarak A, Sahoo S, and Song DW (2026). Freight forwarders as value creators in maritime logistics: A system dynamics approach. Maritime Business Review, 11(1): 39-62. https://doi.org/10.1108/MABR-02-2025-0015

Nayak B, Bhattacharyya SS, and Krishnamoorthy B (2023). Integrating the dialectic perspectives of resource-based view and industrial organization theory for competitive advantage – A review and research agenda. Journal of Business & Industrial Marketing, 38(3): 656-679. https://doi.org/10.1108/JBIM-06-2021-0306

Oktaviana R and Mahendrawathi ER (2025). Evaluation of business processes in goods delivery at a digital freight forwarding logistics company. Journal Transnational Universal Studies, 3(11): 364-379. https://doi.org/10.58631/jtus.v3i11.197

Orji IJ (2019). Examining barriers to organizational change for sustainability and drivers of sustainable performance in the metal manufacturing industry. Resources, Conservation and Recycling, 140: 102-114. https://doi.org/10.1016/j.resconrec.2018.08.005

Richnák P and Gubová K (2021). Green and reverse logistics in conditions of sustainable development in enterprises in Slovakia. Sustainability, 13(2): 581. https://doi.org/10.3390/su13020581

Setthachotsombut N, Sommanawat K, and Sua-iam G (2024). Logistics business management of provider in Thailand with smart logistics. Journal of Open Innovation: Technology, Market, and Complexity, 10(4): 100422. https://doi.org/10.1016/j.joitmc.2024.100422

Sgarbossa F, Grosse EH, Neumann WP, Battini D, and Glock CH (2020). Human factors in production and logistics systems of the future. Annual Reviews in Control, 49: 295-305. https://doi.org/10.1016/j.arcontrol.2020.04.007

Teece DJ, Pisano G, and Shuen A (1997). Dynamic capabilities and strategic management. Strategic Management Journal, 18(7): 509-533. https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z

Trivellas P, Malindretos G, and Reklitis P (2020). Implications of green logistics management on sustainable business and supply chain performance: Evidence from a survey in the Greek agri-food sector. Sustainability, 12(24): 10515. https://doi.org/10.3390/su122410515

Yavas V and Ozkan-Ozen YD (2020). Logistics centers in the new industrial era: A proposed framework for logistics center 4.0. Transportation Research Part E: Logistics and Transportation Review, 135: 101864. https://doi.org/10.1016/j.tre.2020.101864

Zhao Y, Wang S, Liu X, and Tang X (2023). Effect of the logistics industry on the promotion of China's position in the global value chain: An international trade perspective. International Review of Economics & Finance, 86: 834-847. https://doi.org/10.1016/j.iref.2023.03.029