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# The Nexus of Logistics Capabilities on Firm Performance: An Empirical Study on Logistics Service Providers' Perspective

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*ABSTRACT*

Despite their profitability, logistics service providers (LSP) face inefficiencies and instability. There is a need to scrutinize the factors that affect how well LSP performs. But, the research related to logistics is scarce. This research aims to create a model that incorporates factors related to logistics capabilities to influence and enhance logistics performance. Partial least square-structural equation modelling (PLS-SEM) was used to evaluate the data collected from 127 LSPs from the Federation of Malaysian Freight Forwarders Malaysia 2021/2022. The results show that the majority of the antecedents of logistics capabilities are significantly related to the logistics performance of LSP. However, logistics flexibility capability fails to relate to logistics performance. This study fills the existing knowledge gaps and enhances our comprehension of the antecedents influencing logistics performance. This is because there is a little empirical study on logistics performance outside manufacturing and retailers. Therefore, this study is dedicated to LSP. The limitation of this study is that the customers or clients of LSP are not included in the population. Thus, the result of the study cannot be tallied up with logistics performance and customer satisfaction.

## 1. Introduction.

Logistics is an integral component of the service sector, providing an indispensable structure for the effective administration, transportation, industrialization, and distribution of products, thereby enhancing the overall effectiveness of service - oriented businesses (Lan et al., 2020; Nguyen, Luong and Hoang, 2021). Logistics involves delivering a service or product to the recipient or requester, ensuring it arrives promptly, in the exact quantity and quality, at the appropriate cost, and at the designated location (Domingues, Reis and Macário, 2015; Premkumar, Gopinath and Mateen, 2020). Logistics emerged as a life force that catalysed the economy of nations and businesses, serving as the essential nourishment that propels their growth and success (Lan et al., 2020; Rozar et al., 2020, 2022). In earlier years, the predominant practice among organizations was to have direct ownership and management control over their assets. Organizations increasingly prioritize their core competencies to maximize economies of scale and strengthen their foundation, recognizing that focusing on strategic areas is more vital than attempting to handle every aspect of their operations.

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Therefore, organizations started outsourcing logistics services to logistic services provider (LSP). LSP is engaged in supply chain management and logistics when a business delegates a portion of its business distribution and fulfillment services to an external entity (Zailani et al., 2015).

The purpose of outsourcing is to lighten the logistics workload of an organization by entrusting it to experts who possess a deep understanding of the field, allowing the business to concentrate on its core products while leaving the management of the supply chain to the LSP (Rodrigues et al., 2018; Tan, Yuen and Ha, 2018; Zulkiffli et al., 2019; Premkumar, Gopinath and Mateen, 2020). Additionally, organizations that lack the necessary capabilities to sustain certain functions often opt for outsourcing, recognizing that they do not possess the required expertise internally (Chen, 2015; Zailani et al., 2015; Govindan, Khodaverdi and Vafadarnikjoo, 2016). The rapid evolution of the logistics industry in recent times has sparked the interest of scholars in exploring various aspects related to logistics and LSPs, aiming to offer valuable insights and understanding on these subjects (Selviaridis and Norrman, 2015; Mehmann and Teuteberg, 2016; Marchet et al., 2017; Akbari, 2018). Wilson et al. (2015) stated that despite the profitability of logistics firms, they still grapple with inefficiencies and instability as persistent challenges. Hence, analyzing the elements that might influence the effectiveness of LSP is essential (Roy & Sengupta, 2018). Despite that, research related to logistics is still lacking (Bakar and Jaafar, 2016; Maestrini et al., 2017; Roy and Sengupta, 2018; Cavaignac, Dumas and Petiot, 2021). Also, there is a shortage of study related to logistics outsourcing (Cavaignac et al., 2021; Bakar & Jaafar, 2016; Maelah et al., 2010), and most of the literature were related to retailers (Khan & Rattanawiboonsom, 2019; MahbubulHye et al., 2020; Yeung & Shan, 2015) or manufacturing firm (Banomyong, Trinh and Pham, 2017; Kim and Chai, 2017). Thus, there existed a problem with generalization as LSP's needs are dissimilar as they had to serve several sectors, such as transportation, containerization, warehousing, information technology, maritime expertise, and other industries (Lambourdière, Rebolledo and Corbin, 2017; Winkelhaus and Grosse, 2020).

This research enhancements the current understanding within the domains of strategic and supply chain management by illustrating how logistics capabilities (logistics service capability (LSC), logistics flexibility capability (LFC), value-added service (VAS), logistics service quality (LSQ) and innovation) affects logistics performance (LP). LSPs should prioritize enhancing performance by expanding or adapting their existing variables, which hold the potential to bolster valuable capabilities. Thus, this research seeks to assess the impact of logistics capabilities on LP.

## 2. Theory and Hypothesis.

### *2.1. Resource-Based View.*

The Resource-Based View (RBV) theory asserts that a company's expansion depends on its resources and capabilities (Wernerfelt, 1984, 1995; Barney, 1986, 2012; Grant, 1991). A firm would perform better if it could manage and control its ability to acquire valuable, non-substitutable, difficult-to-imitate, and uncommon resources and capabilities (Barney, 1991, 2012; Sakchutchawan et al., 2011; Alexy et al., 2018). Likewise, Wernerfelt (1984) and Schoemaker & Amit (1994) pointed out that RBV would maintain firm performance by properly deploying the resources and capabilities. This is because firms' resources and competencies help them maintain performance and competitiveness (Barney, 1991; Peteraf, 1993). Academicians have acknowledged the significance of the RBV from the perspective of logistics and supply chain management. (Pengman et al., 2022; Barney, 2012; Lai et al., 2012). By employing RBV, logistics firms would better understand their logistics capabilities and distinctive practices that can give them a competitive edge (Wong et al., 2016; Gligor & Holcomb, 2014).

### *2.2. The correlation between logistics service capability (LSC) and logistics performance (LP).*

The focal objective of LSC is to offer a range of facilities, including product transportation and warehousing to customers (Nur Fadiah, Sazali and Abdullah, 2016). It is established that the services were provided by the resources and capabilities of LSP to achieve better LP (Ho and Chang, 2015; Mohd Zawawi et al., 2016; Yang, 2016). As of today, LSPs need to prioritize competing based on the provision of services rather than solely focusing on cost reduction. This is because LSP performance depends on the superiority of their services, not just the price or quality of the products (Lu et al., 2011). Furthermore, it is crucial to emphasize that LSC exhibits a strong and significant correlation with LP (Pisitkasem, 2022; Lin & Lai, 2017; Yang, 2016; Zawawi et al., 2016; Ho & Chang, 2015). As a result, the subsequent hypothesis is put forward:

*H1: LSC has a positive relationship with LP of LSP.*

### *2.3. Relationship between logistics flexibility capability (LFC) and logistics performance (LP).*

LFC is delineated as a logistics system's capability to adapt and adjust to a new environment (Winkler, 2009); considering climate variations, regular demands, and diverse customer locations necessitates flexibility in logistics offerings. This flexibility aligns with earlier research that discovered a favorable connection between flexibility and performance (Ho and Chang, 2015; Mohd Zawawi et al., 2016; Pisitkasem, 2022). Sinkovics & Roath (2004) stated that LFC positively impacts the performance of both suppliers and LSPs. Similarly, Hartmann & de Grahl (2011) Identified a favorable association between the flexibility of LSP on customer loyalty and performance. Zhang et al. (2005) stated that firms must remain agile and responsive to changing consumer demands. Also, Pisitkasem (2022) stressed that LFC impacts LP and marketing performance. Correspondingly, both LP and marketing performance are positively related to financial performance. Thus, the subsequent hypothesis is postulated:

*H2: LFC has a positive relationship with LP of LSP.*

### 2.4. Relationship between value-added service (VAS) and logistics performance (LP).

VAS refers to distinctive activities that firms create to enhance their operational efficiency and effectiveness (Wang, 2018). VAS is critical to meet clients' increasing needs for various logistics services (Lai, 2004). Many prior research findings imply that VAS is crucial in achieving outstanding LP (Soinio, Tanskanen and Finne, 2012; Chen, 2015; Pisitkasem, 2022). In a study by Wang (2018) on VAS within the cold supply chains connecting China and Korea. It was revealed that enhancing these services could lead to a substantial reduction in tariffs and a considerable increase in import and export activities between the two countries. Consequently, it is theorized that:

*H3: VAS has a positive relationship with LP of LSP.*

### 2.5. Relationship between logistics service quality (LSQ) and logistics performance (LP).

Arshad & Su (2015) narrated that excellent service quality is significant in attaining a competitive edge over others. A firm's performance has implications beyond its financial income but also on favorable and good word of mouth, the development of brand loyalty, and the likelihood of repeat services (de Oña et al., 2016). Complaints will decrease when customer expectations are met, and customer service will be enhanced. Assorted previous studies found a strong linkage between LSQ and LP (Wang & Lin, 2016; Kao & Lin, 2016; Rao et al., 2011) such as in retail (Subramanian et al., 2014), logistics (Thai, 2013) and business (Williams and Naumann, 2011). In another study by Fernandes et al. (2018) on LSQ as a mediation between logistics capabilities and firm performance, the study concludes that LSQ significantly connects the relationship. Thence, it is conjectured that:

*H4: LSQ has a positive relationship with LP of LSP.*

### 2.6. Relationship between innovation and logistics performance (LP).

Innovation is emphasized as a vital capability in an organization, enabling the creative allocation of resources in novel ways to generate value, and it is recognized as a factor that positively influences overall performance (Panayides, 2006; Assabane and El Imrani, 2022). Furthermore, a multitude of research has illuminated that the capacity for adaptation and innovation can significantly enhance business outcomes, including sales, market share, productivity, cost-effectiveness, competitive advantage, and overall performance (Shin, Kim and Yang, 2018; Wong and Ngai, 2019). Consistently, preponderant empirical studies involving innovation and LP demonstrate a positive correlation (Ramanathan, Ramanathan and Bentley, 2018; Wong and Ngai, 2019; Dovbischuk, 2022). Hence, the proposition is suggested:

*H5: Innovation has a positive relationship on LP of LSP.*

## 3. Research Methodology.

### 3.1. Data Collection.

Multiple questions were used to measure each concept to improve validity, reliability, and measuring error. The survey instrument was customized from previous research and then submitted to experts to enhance reliability. Two top professionals and two academicians checked the survey items to ensure valid content that fits the logistics industry setting. After receiving the feedback, the questionnaire was revised to amend vague or unclear questions. A five-point Likert scale was used to gauge respondents' assessments and perceptions of their respective firms. Each item's response categories were measured from "strongly disagree" (1) to "strongly agree" (5). Then, the survey form was mailed in late 2022 to 600 LSPs from the Federation of Malaysian Freight Forwarders Malaysia 2021/2022. These included domestic and international LSPs working in dissimilar parts of the supply chain and having distinct responsibilities. The cover letter and phone call were completed to the person in charge of the logistics firm. The study's respondents were informed of the purpose and reassurance that their answers would be kept secret and that the results were purely academic. One hundred thirty-eight (138) surveys were received, representing a response rate of 23 percent. After raw data analysis, only 127 questionnaires returned were usable.

### 3.2. Non-response bias.

The evaluation of non-response bias was aimed at confirming no response disparities between early and late respondents. The early respondents were chosen using a selection criterion based on their response time, namely those who provided their responses within four weeks. The late respondents were those who answered after four weeks. A comparison was made between the two groups regarding the mean values of variables understudied utilizing an independent sample t-test. No statistical significance was noticed.

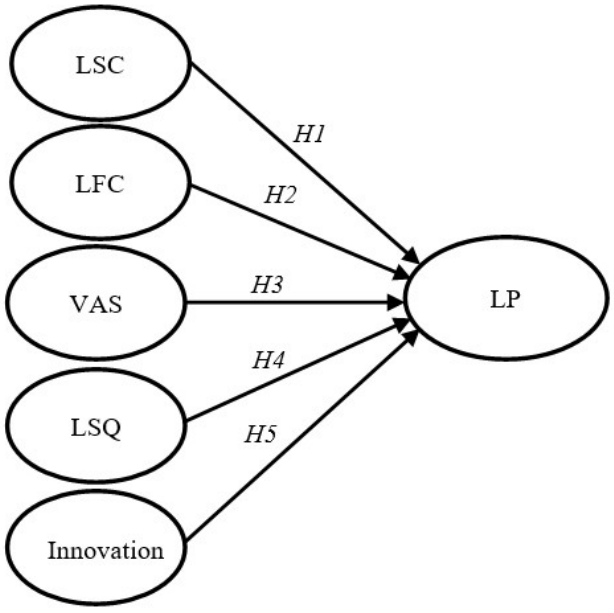
### 3.3. Common Method Variance.

Common Method Variance (CMV) occurs when respondents' answers are influenced by social desirability, halo effects, and the leniency effect (Podsakoff, MacKenzie and Podsakoff, 2012). Firstly, participants were not required to disclose their personal information and were assured complete confidentiality. The execution of exploratory factor analysis (without rotation) using Harman's single-factor analysis was done on all the research measures. The results yielded no individual factor portraying more than fifty percent of the variance, so CMV is not contaminating the data. Next, A comprehensive assessment of full collinearity was also conducted (Kock and Lynn, 2012; Kock, 2015). Each of the variables was subjected to regression analysis with dummy variables, and no indication of single-source bias was observed, as all the Variance Inflation Factors (VIF) fell within an acceptable range ($< 3.3$).

### *3.4. Partial Least Squares ? Structural Equation Modelling.*

The study analyzed the data using Partial Least Squares-Structural Equation Modelling (PLS-SEM) via SmartPLS 4.0. Partial Least Squares (PLS) is a study tool to examine a theory framework or hypothesized model. PLS is a common and useful Structural Equation Modelling (SEM) estimate that lets researchers look into the link between variables and determine the paths those variables follow (Hair et al., 2014, 2017). The proposed relationships among LSC, LFC, VAS, LSQ, and innovation on LSP performance are modeled in Figure 1.

Figure 1: Theoretical Framework.




Note: LSC= logistics service capability; LFC=logistics flexibility capability; VAS=value-added service (VAS); LSQ=logistics service quality; LP=logistics performance.
Source: Authors.

## 4. Analysis and Results.

### *4.1. Measurement model.*

Measurement model analysis evaluates the extent to which the indicators align with the measured construct. The convergent validity of the hypothesized model was evaluated by measuring the factor loadings, composite reliabilities (CR), and average variance extracted (AVE) (Hair et al., 2017). It has been explicitly indicated that the lowest acceptable threshold for factor loading is 0.70. Similarly, the critical value for the composite reliability (CR) has to be no less than 0.70, while the average variance extracted (AVE) ought to be at least 0.50 (Hair et al., 2017). Other than that, the factor loading of an item can still be accepted up to 0.6 if the AVE has met the requirement of at least 0.50. According to Table 1, all items and constructs adhere to the recommended criteria, indicating that the model satisfies the prerequisites for evaluating convergent validity.

Table 1: Measurement model.

| variables and items | | Indicator loadings |
|---|---|---|
| *LSP performance (CR=0.921; Cronbach's α=0.918; AVE=0.552)* | | |
| LP1 | Our firm is better at adapting to changing customer wants than our rivals. | 0.675 |
| LP2 | Our firm is more effective in competitors' changing strategies | 0.836 |
| LP3 | Our firm is more effective at developing new products compared to our competitors | 0.831 |
| LP4 | Our delivery services consistently meet their scheduled delivery times | 0.779 |
| LP5 | Our firm can handle a large number of shipments daily | 0.738 |
| LP6 | Our firm can support high loading capacity per shipment. | 0.691 |
| LP7 | Our firm provides cost-effective shipment for customers and suppliers | 0.709 |
| LP8 | Our firm provides low distribution costs for customers and suppliers | 0.732 |
| LP9 | Our overall logistics performance exceeds the industry average | 0.717 |
| LP10 | Overall, our logistics performance is outstanding. | 0.683 |
| LP11 | We excel in carrying out our logistics tasks. | 0.758 |
| *Logistics Service Capability (CR=0.811; Cronbach's α=0.808; AVE=0.511)* | | |
| LC1 | Our firm excels in customer service management | 0.700 |
| LC2 | Our firm efficiently manages logistics documentation | 0.642 |
| LC3 | Our firm delivers customer goods without damage. | 0.740 |
| LC4 | Our firm has a reliable tracking system. | 0.706 |
| LC5 | Our company offers punctual delivery services | 0.752 |
| LC6 | Our company can expedite shipments effectively. | 0.744 |
| *Logistics Flexibility Capabilities (CR=0.822; Cronbach's α=0.822; AVE=0.529)* | | |
| LFC1 | Our firm can handle non-standard customer requests | 0.735 |
| LFC2 | Our firm provides adjustable operational procedures and systems | 0.696 |
| LFC3 | Our firm can manage late customer orders effectively | 0.734 |
| LFC4 | Our firm employs flexible delivery management systems | 0.757 |
| LFC5 | Our firm can manage unforeseen situations | 0.716 |
| LFC6 | Our firm handles reverse logistics operations | 0.724 |
| *Value-added Services (CR=0.853; Cronbach's α=0.851; AVE=0.527)* | | |
| VA1 | Customers can get additional transportation services from our firm. | 0.679 |
| VA2 | Our firm offers personalized transportation services based on cargo type | 0.725 |
| VA3 | Our firm offers door-to-door service | 0.735 |
| VA4 | Our firm supports consolidation | 0.752 |
| VA5 | Our firm offers customs clearance. | 0.729 |
| VA6 | Our firm provides professional advice and suggestions | 0.747 |
| VA7 | Our firm is equipped with multimodal service. | 0.713 |

Source: Authors.

The model's discriminant validity included an examination of the Fornell-Larcker criterion and the Heterotrait-monotrait ratio (HTMT). According to the Fornell-Larcker criteria, it is

Table 2: Continue from Table 1.

| | | |
|---|---|---|
| *Logistics Service Quality (CR=0.860; Cronbach's α=0.856; AVE=0.536)* | | |
| LSQ1 | Our firm excels in freight movement and distribution techniques. | 0.744 |
| LSQ2 | Our firm maintains a low rate of freight damage or loss. | 0.760 |
| LSQ3 | Safety and health hold a significant importance within our firm. | 0.745 |
| LSQ4 | Our firm employs skilled and experienced personnel. | 0.703 |
| LSQ5 | Our firm consistently upholds service quality. | 0.742 |
| LSQ6 | Our firm ensures cargo safety and risk protection effectively. | 0.716 |
| LSQ7 | Our firm possesses the ability to deliver high-quality service. | 0.713 |
| *Innovation (Cronbach's α=0.917; CR=0.918; AVE=0.632)* | | |
| I1 | Our firm utilizes data acquisition technology such as RFID and barcodes for product handling. | 0.812 |
| I2 | Our firm manages logistics activities through data communication technologies | 0.801 |
| I3 | Our firm employs automated storage and retrieval systems | 0.818 |
| I4 | Our company uses GPS and other transportation-related technology | 0.807 |
| I5 | Our firm regularly enhances the company's operating systems. | 0.846 |
| I6 | Our firm implements a quality management system for logistics operations. | 0.780 |
| I7 | Management actively encourages innovative ideas within our firm. | 0.736 |
| I8 | Our firm has well-defined innovation strategies. | 0.757 |

Source: Authors.

anticipated that the square root of the average variance extracted (AVE) of a construct would demonstrate larger magnitudes in comparison to its correlations with other latent constructs (Henseler, Ringle and Sarstedt, 2015; Ab Hamid, Sami and Mohmad Sidek, 2017; Hair et al., 2017). Meanwhile, a 0.85 threshold value for HTMT is needed for discriminant validity to be properly established (Kline, 2011). Table 1 & 2 and Table 3 illustrate the Fornell-Larcker and HTMT values. It was established that all the values passed the requirement values for Fornell-Larcker and HTMT criteria.

Table 3: Fornell-Larcker Criterion.

| | Innovation | LFC | LSC | LSP Performance | LSQ | VAS |
|---|---|---|---|---|---|---|
| Innovation | 0.795 | | | | | |
| LFC | 0.644 | 0.727 | | | | |
| LSC | 0.578 | 0.675 | 0.715 | | | |
| LSP Performance | 0.766 | 0.687 | 0.692 | 0.743 | | |
| LSQ | 0.639 | 0.707 | 0.643 | 0.735 | 0.732 | |
| VAS | 0.636 | 0.702 | 0.683 | 0.725 | 0.699 | 0.726 |

Source: Authors.

Table 4: Heterotrait-monotrait ratio (HTMT).

| | Innovation | LFC | LSC | LSP Performance | LSQ | VAS |
|---|---|---|---|---|---|---|
| Innovation | | | | | | |
| LFC | 0.741 | | | | | |
| LSC | 0.669 | 0.827 | | | | |
| LSP Performance | 0.831 | 0.787 | 0.799 | | | |
| LSQ | 0.717 | 0.846 | 0.762 | 0.82 | | |
| VAS | 0.718 | 0.839 | 0.815 | 0.809 | 0.814 | |

Source: Authors.

### *4.2. Structural Model.*

The structural model's evaluation primarily centered on quantifying the interrelationships between constructs and the predictive capabilities of other constructs. There are five essential steps in appraising the structural model: (1) examining path coefficients; (2) assessing the coefficient of determination ($R^2$); (3) evaluating the effect size ($f^2$); (4) predictive relevance ($Q^2$); and (5) PLSPredict (Hair et al., 2022). To ascertain the statistical significance of the path coefficients, the study used a bootstrapping technique using 5,000 samples. The results of the structural model analysis are shown in Table 5. From the t-value, there are only four significant hypotheses. LFC failed to relate with LP as the p-value is below 0.05. The model explains a substantial 73.6 percent of the variance explained by LP. Thus, innovation contributes to the largest effect size (>0.35), with 0.269 while other variables, LSC, VAS, and LSQ, contribute to a small effect size (0.02-0.14) (Cohen, 1988).

Vice versa, LFC fails to contribute to any variance on LP. The variance inflation factors (VIF) for all the constructs are below limit (<3.3); therefore, no multicollinearity is contaminating the data analysis. Next, the predictive relevance (Q2) displayed a value of 0.393 which is more than zero depicting the predictive power of the model (Hair et al., 2022). Lastly, the PLSpredict assessment measures the ability of the hypothesized model to replicate or forecast by using the values in the model parameters. By following Shmueli et al. (2019) process for interpreting PLSpredict results, the model is found to have high predictive power.

## 5. Discussions.

The primary objective of this study was to explore the elements facilitating the growth of logistics capabilities and their influence on the logistics performance of LSPs. The antecedents are logistics service capability (LSC), logistics flexibility capability (LFC), value-added service (VAS), logistics service quality (LSQ), and innovation. A basic proposition in this study is that logistics capabilities are the enablers for improving logistics performance.

The results obtained showed that LSC significantly contributes to the LP of LSP. The results of this investigation are

Table 5: Structural Model Evaluation.

| Hypothesis | Relationship | Beta (β) | t-value | p- value | $R^2$ | $f^2$ | VIF | Decision |
|---|---|---|---|---|---|---|---|---|
| H1 | LSC-LP | 0.183 | 2.482 | 0.013 | 0.736 | 0.055 | 2.287 | Supported |
| H2 | LFC-LP | 0.036 | 0.452 | >0.05 | | 0.002 | 2.738 | Unsupported |
| H3 | VAS-LP | 0.183 | 1.985 | 0.047 | | 0.042 | 2.710 | Supported |
| H4 | LSQ-LP | 0.226 | 2.423 | 0.015 | | 0.074 | 2.596 | Supported |
| H5 | Inno-LP | 0.383 | 5.778 | 0.000 | | 0.269 | 2.062 | Supported |
| **Predictive Relevance ($Q^2$)** | | | | | | | | |
| WBO | | | | 0.393 | | | | |
| **PLSpredict** | | | | | | | | |
| High predictive power, as per Shmueli *et al.* (2019) assessment | | | | | | | | |

Source: Authors.

consistent with the existing body of previous studies (Lin & Lai, 2017; Ho & Chang, 2015). LSPs are entrusted to provide clients with various services, including transportation, procurement, storage, distribution, and inventory management. LSPs who exhibit these attributes experience LP in terms of efficiency, effectiveness, and dependability.

Vice versa, LFC fails to relate significantly to the LP of LSP. This finding conflicts with the prevailing body of prior research (Ho and Chang, 2015; Aziz et al., 2017; Zawawi et al., 2017; Phaxaisithidet and Banchuen, 2020). The COVID-19 plague has significantly impacted the worldwide supply chain, causing unparalleled disruptions. Consequently, this has posed challenges for LSPs in upholding their standards of service quality and flexibility (Liu et al., 2022). The combination of plant closures, pandemic-induced lockdowns, trade battles, imposition of tariffs, and European invasions has engendered a profound disruption, prompting speculation about the survival of the supply chain sector (Garrison, 2023). These limitations have posed challenges for LSPs in maintaining their customary degree of service flexibility, thereby impacting the efficiency of logistical operations.

VAS has a positive relationship with the LP of LSP. LSP needs to monitor the shifts in customer expectations to identify areas where strategic improvements are necessary. Leveraging supplementary logistics activities such as tailored logistics services, door-to-door service, consolidation, storage, warehouse facilities, and customs clearance enables LSPs to enhance their capabilities and performance. This finding agrees with previous studies that established a significant connection between VAS and LP (Shi et al., 2016; Aziz et al., 2017). LSQ has a positive influence on the LP of LSP. This finding follows prior study that found a positive association between LSQ and LP (Phaxaisithidet & Banchuen, 2020; Yu et al., 2017). Phaxaisithidet and Banchuen (2020) yielded empirical data supporting the correlation between LSQ and attaining a competitive advantage in logistics. Several scholars also found that LSQ leads to customer satisfaction (Kusumadewi and Karyono, 2019; Kusumawardani and Hastayanti, 2020). Lastly, innovation is substantially related to LP. Innovation contributes to the highest effect size in contributing to LP. The correlation between innovation and superior performance has consistently been acknowledged, such as productivity, profitability, and performance (Shin, Kim and Yang, 2018; Zhao et al., 2021). Innovative logistics firms can manage enormous orders and stockpiles, coordinate and monitor real-time delivery, and handle returned freight.

### *5.1. Implications for theory and management.*

LSPs must improve the services they offer to stay competitive. The lack of extensive LSP performance studies makes it hard to assess their position in market globalization and liberalization. The present study is a valuable input to the existing body of knowledge by examining LSP logistical performance. This study fills the void in business research on logistics performance (Maestrini et al., 2017; Roy and Sengupta, 2018; Cavaignac, Dumas and Petiot, 2021). Secondly, past studies focusing on the LSP perspective are limited (Wong et al., 2016; Yang, 2016). The majority of previous studies focused on the user of LSP (Bulgurcu and Nakiboglu, 2018; Fernandes, Moori and Filho, 2018; Tamir, Vishkin and Gutentag, 2020); therefore, this study contributes to the LSP perspective itself. Thirdly, the world is transitioning into the Fourth Industrial Revolution (IR 4.0) era marked by digitalization, e-commerce, the Internet of Things, Artificial Intelligence, and a knowledge-based economy. This research adds to the knowledge of innovation and LP by offering fresh insights into the factors affecting LP within the logistics industry. This is particularly valuable considering the comparative scarcity of previous studies examining innovation concerning resources and capabilities (Kucukaltan et al., 2022; Rahman et al., 2022; Cichosz et al., 2020; Kim & Shin, 2019; Oláh et al., 2018; Shin et al., 2018).

### *5.2. Limitations and Future Research.*

This study endeavor is not devoid of weaknesses. The main goal of this research is to examine logistics capabilities and their impact on the LP of LSP. This study did not include any customers or clients of LSP. Thus, the findings of this study are only on one side. Future research could focus on customers and LSP so that the study findings would have better validity and reliability. Secondly, this study's innovation variables consisted of organizational and technological innovation. Therefore, the

study's findings cannot distinguish or identify which organizational or technological innovation contributes more to the innovation construct. Future research could separate innovation variables into two or employ a second-order model.

To confront unpredictable IR 4.0, future studies could focus more on innovation as mediation or moderation that catalyzes logistics capabilities to another level. Third, the survey depends on a single source of information, a standard research approach in numerous studies. The study's validity and reliability can be enhanced by incorporating multiple sources of information. Fourthly, the study employed 127 sample sizes from 1138 populations of LSP. Even though the sample size is sufficient for the study, a larger sample size and response rate (>23%) can be achieved. The low response rate may be attributed to the catastrophic pandemic, where LSPs were severely understaffed. Consequently, employees did not have time and were reluctant to answer non-work-related emails.

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