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DEVELOPING A STRATEGIC BUSINESS MODEL FOR LOGISTICS SERVICE PROVIDER AFTER THE COVID-19 OUTBREAK IN THAILAND

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Abstract

The COVID-19 pandemic severely affected Thailand's Logistics Service Providers (LSPs), requiring businesses to adapt rapidly to changing conditions. This study evaluates the pandemic's impact on Thai LSPs, examines factors influencing their adaptation, and proposes a post-pandemic business strategy model. A mixed-methods approach was employed, with qualitative data from 15 experts and quantitative data from 385 LSPs analyzed using SPSS and AMOS. Confirmatory Factor Analysis and Structural Equation Modeling were used to test hypotheses and investigate relationships among variables. The findings reveal the significant disruptions to supply and demand within the logistics sector caused by COVID-19, highlighting the necessity for operational changes among LSPs. The study underscores the importance of various factors in shaping adaptation strategies, providing empirical support for the proposed framework. The resulting business strategy model serves as a practical guide for LSPs to navigate challenges and opportunities post-pandemic. This research enhances the understanding of crisis management and organizational resilience, contributing to logistics industry discussions on supply chain adaptability and sustainability. The proposed strategies offer valuable insights for logistics professionals and policymakers to mitigate future disruptions and strengthen supply chain resilience.

Keywords: Logistics Service Provider, Eastern Economic Corridor, Industrial Logistics Performance Index, Logistics Scorecard

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Introduction

The COVID-19 pandemic, starting in 2019, has profoundly disrupted global logistics and supply chains due to government lockdowns and quarantines, leading to business closures, especially in tourism and logistics (International Finance Corporation, 2020). Thailand's logistics industry faced challenges such as inefficiencies and decreased demand (Siddiqui, 2020; Exemplars in Global Health, 2020). Efforts to mitigate these impacts included government strategies targeting critical health services and economic recovery (Exemplars in Global Health, 2020). Disruptions were exacerbated by the sector's reliance on raw materials from regions like Wuhan, China, leading to supply chain delays and factory shutdowns amid surging demand for medical supplies (Rakpendham et al., 2020). Additionally, the pandemic accelerated a shift towards e-commerce, with social distancing prompting increased online shopping. This contributed to the Bullwhip Effect, forcing businesses to adjust inventory strategies (Opananon, 2020). With 45% of Asian consumers planning to increase online spending (Electronic Transactions Development Agency, 2021), the shift's long-term impact on consumer behavior and supply chains remains critical. This research assesses the pandemic's effects on Thailand's logistics service providers, aiming to develop a strategic model for post-pandemic adaptation and sustainability, focusing on key factors influencing business adaptability and resilience.

Literature Reviews

Logistics Service Provider (LSP)

Logistics service providers (LSPs), commonly referred to as third-party logistics (3PL) providers, specialize in managing the transportation, storage, and delivery of goods, including both raw materials and finished products. As businesses, particularly in e-commerce, expand, they often rely on LSPs to handle these logistical challenges effectively (Callarman, 2020; Jenkins, 2023; Proykratok et al., 2024). LSPs provide essential services, such as transportation management, warehousing, order fulfillment, and customs compliance, improving overall supply chain efficiency.

LSPs are categorized based on the services they provide, which generally fall into three main areas: warehousing, freight shipping, and courier services (Jenkins, 2023). LSPs also differ in their ability to solve problems and adapt to customer requirements. According to Fabbe-Costes & Roussat (2011), supply chain integration divides LSPs into facilitator LSPs, integrated LSPs, and operational integrator LSPs.

LSPs range from first-party logistics providers (1PLs) that manage transportation internally, to fifth-party logistics providers (5PLs), which integrate 3PL services with advanced management and technological expertise (Świtała, 2016). These LSPs offer tailored solutions, enabling businesses to optimize their logistics, reduce costs, and enhance overall operational efficiency (Interlake Mecalux, 2020; Proykratok et al., 2024).

PESTEL Analysis

PESTEL analysis is a critical tool for understanding the macro-environmental factors that influence a company's strategic decisions. It examines six key factors: Political, Economic, Socio-cultural, Technological, Environmental, and Legal (Lynch, 2009; Yüksel, 2012). Political factors include government policies and international trade regulations that impact business decisions (Alanzi, 2018). Economic elements like GDP, tax rates, and consumer purchasing power are vital for adapting strategies to minimize losses. Socio-cultural factors, such as demographics and cultural influences, shape consumer behaviors and market penetration strategies.

Technological advancements, including innovations and internet-driven changes, necessitate continuous monitoring of R&D activities to maintain competitiveness. Environmental concerns, like climate change and pollution, have heightened the need for sustainable practices

(Matovic, 2020). Legal factors, including labor laws and trade regulations, vary by region and play a crucial role in avoiding disputes and maximizing business opportunities.

PESTEL is widely used in different industries to assess external factors and their impact on business adaptability, as shown in studies of the electric vehicle sector in Brazil (Sousa & Castañeda-Ayarza, 2022) and the tourism industry in Muğla, Turkey (Kara, 2018).

Logistics Management Strategy

Logistics management strategy involves systematically planning and executing activities to achieve specific goals within an organization's internal capabilities and the external business environment. These factors include controllable elements like labor, goods, and facilities, as well as uncontrollable variables like market conditions, technology, and economic climate (Klomjit, 2013). The integration of logistics into corporate strategy significantly influences inventory management, transportation, and location decisions, requiring companies to adopt methods such as standardization, consolidation, and differentiation (Heskett, 1977).

In response to global challenges like the COVID-19 pandemic and the need for sustainability, logistics organizations are increasingly adopting technologies such as Artificial Intelligence (AI) and the Internet of Things (IoT) to enhance operational efficiency. These technologies allow for real-time monitoring and advanced data analysis, which improve decision-making and flexibility (Frias et al., 2023). The pandemic highlighted the importance of robust, adaptable supply chains, with businesses now required to focus on digital resilience and sustainable practices to ensure continuity and competitiveness (Kashem et al., 2024; Siyodia & Chakraborty, 2022).

Logistics Scorecard

The Logistics Scorecard assesses an organization's logistics capabilities against global benchmarks and other firms in Thailand to identify strengths and weaknesses for operational improvement (Department of Primary Industries and Mines, 2017; Proykratok et al., 2024). It comprises five interconnected components. Corporate strategy ensures that logistics management aligns with overall business objectives, enhancing supplier and customer communication. Planning and execution capability focuses on standardizing operations to balance resources with demand, improving internal supply chain communication. Logistics performance evaluates efficiency in cost, time, and reliability, aiming to fortify relationships with customers and suppliers. IT methodologies and implementation emphasize the role of information technology in optimizing logistics through data-driven decision-making and better communication. Inter-organizational alignment encourages collaboration with external stakeholders, such as alliances and research institutions, to foster innovation and create shared value. Together, these elements enhance logistics performance and support continuous improvement in supply chain management.

Research Review

The research on logistics management during COVID-19 highlights critical elements impacting various industries and adaptation techniques. Key drivers include competitive challenges and regulatory changes, with operational decisions playing a pivotal role in logistics performance (Mishra et al., 2024). The pandemic introduced risks like shifts in demand, governmental regulations, and supply chain disruptions, affecting factors such as employee well-being and financial stability (Gültekin et al., 2022). In Thailand, it negatively impacted food, manufacturing, and transportation sectors, with small-scale manufacturers experiencing a 60% decline in sales (Kongsup & Ongkunaruk, 2022). Transport issues like labor shortages, container insufficiency, and increased costs further strained operations (Luypornsuksawang et al., 2023). Adaptation strategies, such as agility, collaboration, and resilience, were crucial for maintaining supply chain performance, with public sector involvement highlighted as supportive (Scala & Lindsay, 2021). Future research must prioritize global supply chain resilience and digitization, particularly through technologies like blockchain and IoT (Hirata

& Matsuda, 2022). Strategic management is essential for addressing post-pandemic challenges, with a focus on digital transformation (Vivaldini, 2023). These findings provide insights into logistics adaptation and the broader economic implications of the pandemic.

Research Hypothesis and Conceptual Framework

Here are the hypotheses translated into English using academic writing style, while maintaining the original content:

Hypothesis 1 (H1): Factors influencing business adaptation to COVID-19 have a direct effect on approaches to business operational adjustments.

Hypothesis 2 (H2): Factors influencing business adaptation to COVID-19 have a direct effect on approaches to logistics activity adjustments.

Hypothesis 3 (H3): Approaches to business operational adjustments have a direct effect on logistics management strategies.

Hypothesis 4 (H4): Approaches to logistics activity adjustments have a direct effect on logistics management strategies.

Based on these hypotheses, the conceptual framework for this research is presented in Figure 1.

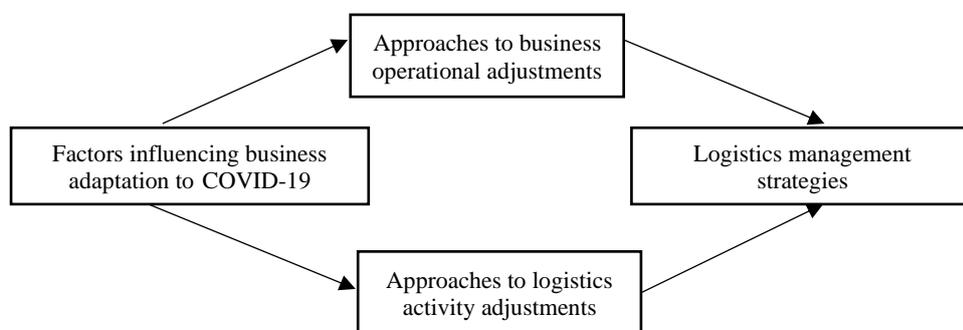


Figure 1 Conceptual Framework

Research Methodology

This study integrates qualitative and quantitative methods. Interviews with senior executives from 15 Thai logistics service providers, selected via purposive sampling, supported Exploratory Factor Analysis (EFA) to identify operational factors. Data from 385 providers, calculated using the Krejcie and Morgan formula, were analyzed through Confirmatory Factor Analysis (CFA) to explore post-COVID-19 adaptation strategies. A strategic business plan was derived from these insights. A validated questionnaire, “Developing a Strategic Business Model for Logistics Service Providers in the Aftermath of the COVID-19 Pandemic in Thailand,” was tested, yielding a high reliability score of 0.984 (Ahdika, 2017).

Table 1 Range of Reliability and Its Coefficient of Cronbach’s Alpha

No.	Coefficient of Cronbach’s Alpha	Reliability Level
1	0.00-0.20	Less Reliable
2	> 0.20-0.40	Rather Reliable
3	> 0.40-0.60	Quite Reliable
4	> 0.60-0.80	Reliable
5	> 0.80-1.00	Very Reliable

Note: Reprint from "Improvement of Quality, Interest, Critical, and Analytical Thinking Ability of Students through the Application of Research Based Learning (RBL) in Introduction to Stochastic Processes Subject," by Ahdika (2017).

Data Analysis

This study employs both qualitative and quantitative data analysis methods. Content analysis is used for qualitative data, while quantitative data from 385 questionnaires is analyzed using descriptive statistics, including percentages, frequencies, means, and standard deviations, along with inferential statistics. SPSS and AMOS software are utilized for analysis. Structural Equation Modeling (SEM) is applied to test hypotheses involving multiple latent variables, assessing correlations and consistency between the study model and empirical data. This approach ensures a robust evaluation of the relationships among the variables under investigation.

Research Results

Qualitative Data Analysis Results

The qualitative data analysis reveals that 15 experts, including professors and executives from logistics associations and service providers, acknowledged both positive and negative impacts of the COVID-19 pandemic on the logistics sector. The positive effects include heightened demand for medical supplies, increased domestic transportation, and a surge in e-commerce, particularly in food delivery and last-mile logistics. Furthermore, the importation of goods, especially medical equipment, remained robust, benefiting sea freight operators, as approximately 80% of imports typically arrive by sea. Increased demand for warehouse space due to the producers' operational needs also led to higher prices in the warehouse logistics sector.

However, several negative consequences emerged, including shortages of imported goods, disruptions in land transportation, particularly cross-border, and container shortages in maritime shipping. These challenges resulted in increased freight rates. Moreover, uncertainty in consumer demand, driven by fluctuating news and information, complicated cost control and inventory management, further exacerbated by the "Bullwhip Effect," where panic buying and stockpiling prevailed. Human resource shortages, especially in warehouse operations, added to the complexity, making cost management difficult.

The pandemic's effects on air transport were severe, with air cargo volumes dropping to 20-30% of pre-pandemic levels. Container shortages persisted due to reduced imports, leading to backlogs. Additionally, organizations had to downsize and adapt operations, with staff shortages due to infections forcing shifts in work processes. In some cases, businesses reduced operations from 24/7 to a single shift, leading to decreased sales. The study underscores the significant operational adjustments necessitated by the pandemic, affecting both strategic and day-to-day logistics management.

Quantitative Data Analysis Results

Analysis of Respondents' General Characteristics: The quantitative data analysis reveals the demographic characteristics of the 385 respondents. The majority were male (68.05%) and aged between 41-50 years (58.70%). Most respondents held a bachelor's degree (56.36%), and managers made up the largest job category at 44.94%. Work experience was most common in the 6–10-year range (26.75%). Regarding income, the most prevalent bracket was 75,001-100,000 baht per month (30.13%). These demographics provide insight into the respondent group's professional and educational backgrounds, informing further analysis of their business perspectives.

The Results of General Data Analysis of Entrepreneurs: The general data analysis of logistics service providers highlights that international freight forwarders were the most common, accounting for 31.95%. The majority were structured as limited companies (49.35%), with headquarters primarily in Bangkok (44.16%). Most firms had registered capital between 1 to 10 million baht (43.64%). Medium-sized enterprises formed the largest group, representing

40.26%. This overview provides insight into the typical structure, location, and financial standing of logistics companies in the region.

Results of Data Examination Prior to Causal Model Analysis: The preliminary statistical analysis of observed variables in the causal model of factors affecting business adaptation revealed significant findings. The model incorporated one exogenous latent variable (factors impacting business adaptation) and three endogenous latent variables (approaches to operational adjustments, strategies for modifying logistics activities, and logistics management strategies). Descriptive statistics, including mean, standard deviation, skewness, kurtosis, Bartlett's Test of Sphericity, and Kaiser-Meyer-Olkin (KMO), were employed. Mean values for variables influencing business adaptation ranged from 3.83 to 4.37, with standard deviations between 0.68 and 0.74. Skewness values mostly indicated a left-skewed distribution, while kurtosis values suggested platykurtic distributions. Bartlett's Test of Sphericity ($\chi^2 = 2324.621$, $df = 28$, $p = .000$) and a KMO value of .790 confirmed sufficient inter-variable correlation and sampling adequacy for factor analysis, in line with the criteria set by Tabachnick & Fidell (2007) and Hair et al. (2010) These findings are presented in Table 2.

Table 2 Statistical Values of Variables Impacting Business Adaptation for Causal Model Analysis

Variables	\bar{x}	S.D.	Min	Max	Skewness	Kurtosis
1) Changing customer and consumer behavior	4.32	0.74	3.00	5.00	-0.60	-0.96
2) Changes in trade patterns	4.22	0.73	3.00	5.00	-0.36	-1.07
3) Changes in the supply chain	4.07	0.73	3.00	5.00	-0.11	-1.11
4) Information technology	4.37	0.71	3.00	5.00	-0.67	-0.78
5) Competitors	4.21	0.72	3.00	5.00	-0.35	-1.03
6) Political/legal	3.83	0.68	3.00	5.00	0.22	-0.84
7) Suppliers	3.89	0.70	3.00	5.00	0.15	-0.93
8) Economic conditions	4.35	0.81	3.00	5.00	-0.72	-1.10

Barlett's Test of Sphericity = 2324.621, $df = 28$, $p = .000$, KMO = .790

The mean values for business operational adjustment variables ranged from 4.11 to 4.37, with standard deviations between 0.63 and 0.77. Most variables showed negative skewness (-0.37 to -0.32), except for personnel, which had a slight positive skew (0.01). All variables exhibited platykurtic distributions, with kurtosis ranging from -0.91 to -0.18, within the normal range according to Tabachnick & Fidell (2007). Bartlett's Test of Sphericity (1575.864, $p = .000$) indicated sufficient inter-variable correlation for factor analysis, supported by a KMO value of .780, as per Hair et al. (2010) These findings are presented in Table 3.

Table 3 Statistical Values of Variables Related to Business Operation Adjustment Strategies

Variables	\bar{x}	S.D.	Min	Max	Skewness	Kurtosis
1) Vision	4.37	0.63	3.00	5.00	-0.32	-0.55
2) Person	4.26	0.66	3.00	5.00	0.01	-0.62
3) Information technology	4.30	0.68	3.00	5.00	-0.34	-0.83
4) Business adaptability	4.32	0.67	3.00	5.00	-0.33	-0.91
5) Budget	4.11	0.77	2.80	5.00	-0.37	-0.68
6) Facilities	4.23	0.71	2.75	5.00	-0.33	-0.18

Barlett's Test of Sphericity = 1575.864, $df = 15$, $p = .000$, KMO = .780

The variables related to logistics adjustments had mean values from 3.94 to 4.28, with standard deviations between 0.64 and 0.89. Most variables showed negative skewness (-1.65 to -0.20),

except for procurement (0.05). Kurtosis values ranged from -1.03 to -0.07, indicating platykurtic distributions, with exceptions for warehouse management and transportation, which were leptokurtic (0.19 to 1.76). Skewness and kurtosis values within the -2 to 2 range suggest normal data distribution (Tabachnick & Fidell, 2007). The Bartlett's Test ($p = .000$) and KMO value (.784) confirmed sufficient correlation for factor analysis (Hair et al., 2010) These findings are presented in Table 4.

Table 4 Statistical values of variables for the operational adjustment of logistics activities.

Variables	\bar{x}	<i>S.D.</i>	Min	Max	Skewness	Kurtosis
1) Customer service and support activities	4.23	0.64	3.00	5.00	-0.20	-0.43
2) Customer demand planning and forecasting	4.10	0.67	3.00	5.00	-0.38	-0.50
3) Logistics communication and order processing	4.14	0.70	3.00	5.00	-0.25	-0.71
4) Procurement management	3.94	0.73	3.00	5.00	0.05	-1.03
5) Packaging management and goods handling	4.06	0.77	2.71	5.00	-0.33	-0.76
6) Warehouse and distribution center location selection	3.98	0.89	2.00	5.00	-0.58	-0.43
7) Warehouse management and storage	4.14	0.89	2.00	5.00	-0.91	0.19
8) Transportation and distribution management	4.28	0.77	2.00	5.00	-1.65	1.76
9) Reverse logistics management	4.01	0.87	2.00	5.00	-0.67	-0.07

Barlett's Test of Sphericity = 4354.401, $df = 39$, $p = .000$, KMO = .784

The variables representing logistics management strategies demonstrated mean values ranging from 4.11 to 4.31, with standard deviations between 0.60 and 0.69. Skewness analysis revealed that all variables displayed negative skewness, indicating a left-skewed distribution, with values ranging from -0.46 to -0.07. Regarding kurtosis, all variables exhibited platykurtic distributions, with negative kurtosis values ranging from -0.69 to -0.24. The skewness and kurtosis values fell within the -2 to 2 range, suggesting normal data distribution according to Tabachnick & Fidell (2007). The Bartlett's Test of Sphericity yielded a value of 2800.984 ($df = 10$, $p = .000$), indicating that the coefficient matrix was not an identity matrix at the 0.01 significance level. This suggests sufficient inter-variable correlation for factor analysis. Correspondingly, the Kaiser-Meyer-Olkin (KMO) value of .847 further confirmed that the observed variables were adequately related for factor analysis, aligning with Hair et al. (2010) criteria. These findings are presented in Table 5.

Table 5 Statistical Values of Logistics Management Strategy Variables

Variables	\bar{x}	S.D.	Min	Max	Skewness	Kurtosis
1) Formulating logistics and supply chain management strategies.	4.21	0.67	3.00	5.00	-0.27	-0.69
2) Planning and executing developments in accordance with the strategic logistics and supply chain management plan.	4.17	0.60	3.00	5.00	-0.07	-0.51
3) Measuring the performance of logistics and supply chain management.	4.17	0.69	3.00	5.00	-0.36	-0.24
4) Managing information systems and technology in logistics and supply chain management.	4.31	0.66	3.00	5.00	-0.46	-0.65
5) Collaborating on logistics and supply chain with external organizations.	4.11	0.62	3.00	5.00	-0.16	-0.37

Barlett's Test of Sphericity = 2800.984, df = 10, p = .000, KMO = .847

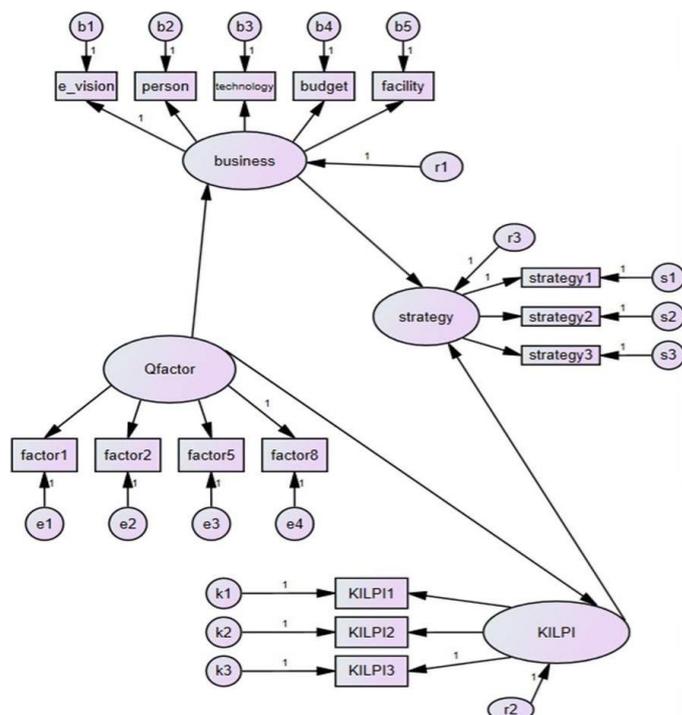
Analysis Results of the Causal Model of Factors and Patterns Affecting Business Adaptation in Response to the COVID-19 Pandemic: The analysis results of the causal model of factors and patterns influencing business adaptation in response to the COVID-19 pandemic are illustrated in Figure 2. The model yielded the following fit indices: Chi-Square = 114.158, df = 41, CMIN/df = 2.784, GFI = 0.963, CFI = 0.987, and RMSEA = 0.068. These values indicate that CMIN/df = 2.784 < 5.00, GFI = 0.963 > 0.90, CFI = 0.987 > 0.90, and RMSEA = 0.068 < 0.08, demonstrating that the causal model of factors and patterns affecting business adaptation in response to the COVID-19 pandemic exhibits a good fit with the empirical data. Regarding the direct and indirect effects on the Logistics Management Strategy variable, it was found to be directly influenced by the Business Operational Adjustment Approaches and Logistics Activity Adjustment Approaches variables, with direct effect sizes of 0.745 and 0.469, respectively, both statistically significant at the 0.01 level. Furthermore, the Logistics Management Strategy (Strategy) variable was indirectly influenced by the Factors Impacting Business Adaptation to COVID-19 variable, with an indirect effect size of 0.310, also statistically significant at the 0.01 level, and the reliability of observed variables, it was found that the observed variables had reliability values ranging from 0.341 to 0.785. Regarding the factor loadings of observed variables, it was found that the observed variables had factor loadings ranging from 0.709 to 1.839. These findings are presented in Table 6.

Table 6 Effect Sizes in the Causal Model of Factors and Patterns Influencing Business Adaptation in Response to the COVID-19 Pandemic

Variable	Factors influencing business adaptation (QFactor)			Approaches for adjusting business operations (Business)			Approaches for adjusting business operations (Business)		
	TE	IE	DE	TE	IE	DE	TE	IE	DE
Approaches for adjusting business operations (Business)	0.338**	-	0.338**	-	-	-	-	-	-
Approaches for adjusting business operations (Business)	0.125**	-	0.125**	-	-	-	-	-	-
Logistics management strategy (Strategy)	0.310**	0.310**	-	0.745**	-	0.745**	0.469**	-	0.469**

Chi-Square = 114.158, df = 41, CMIN/df = 2.784, GFI = 0.963, CFI = 0.987, RMSEA = 0.068

Note: **p < 0.01; TE = Total effect, IE = indirect effect, and DE = direct effect



Chi-square = 114.158, df = 41, p = .000, cmin/df = 2.784, GFI = .963, CFI = .987, RMSEA = .068

Figure 2 Causal Model of Factors and Patterns Influencing Business Adaptation in Response to the COVID-19 Pandemic

Note: **p < 0.01

Hypothesis Testing Results for the Causal Model of Factors and Patterns Influencing Business Adaptation in Response to the COVID-19 Pandemic: The hypothesis testing results for the causal model of factors and patterns influencing business adaptation in response to the COVID-19 pandemic revealed that all hypotheses (H1-H4) were supported at a 0.01 significance level, as shown in Table 7.

Table 7 Hypothesis Testing Results for the Causal Model of Factors and Patterns Influencing Business Adaptation in Response to the COVID-19 Pandemic

Hypothesis	Variables		Standardized influence coefficient	Test results
	Cause	Effect		
H ₁	QFactor	Business	0.514**	Acceptance
H ₂	QFactor	KILPI	0.275**	Acceptance
H ₃	Business	Strategy	0.665**	Acceptance
H ₄	KILPI	Strategy	0.269**	Acceptance

Hypothesis 1 (H1): The Factors Impacting Business Adaptation to COVID-19 (QFactor) variable had a significant direct effect on the Business Operational Adjustment Approaches (Business) variable at the 0.01 level, with a standardized path coefficient of 0.514.

Hypothesis 2 (H2): The Factors Impacting Business Adaptation to COVID-19 (QFactor) variable had a significant direct effect on the Logistics Activity Adjustment Approaches (KILPI) variable at the 0.01 level, with a standardized path coefficient of 0.275.

Hypothesis 3 (H3): The Business Operational Adjustment Approaches (Business) variable had a significant direct effect on the Logistics Management Strategy (Strategy) variable at the 0.01 level, with a standardized path coefficient of 0.665.

Hypothesis 4 (H4): The Logistics Activity Adjustment Approaches (KILPI) variable had a significant direct effect on the Logistics Management Strategy (Strategy) variable at the 0.01 level, with a standardized path coefficient of 0.269.

Conclusion and Discussion

The COVID-19 pandemic has caused a complex and varied effect on business operations, including changes in client behavior, the development of new business models, heightened competition, and unpredictable economic situations. Garrett and Covin argue that organizations need to demonstrate strategic adaptability to not only survive but also succeed in dynamic contexts marked by fierce rivalry, globalization, and technological progress. Strategic adaptability refers to the process of matching a company's strengths with the requirements of the industry by employing both reactive and proactive strategies. These strategies are crucial for sustaining a competitive advantage (Garrett & Covin, 2007). However, D. K. Kuleshov's research highlights the significance of creating and executing competitive strategies, including defensive, offensive, and retreating strategies, to improve the competitive stability of service firms in a constantly changing market. This entails employing diverse strategies and resources to establish enduring competitive advantages, ultimately enhancing the enterprise's market standing (Kuleshov, 2023). When it comes to planning for the future of a firm, the success of its operations is greatly impacted by the vision of its executives, the quality of its workforce, the effectiveness of its information technology, and the allocation of its budget. Punia (2005) asserts that a distinct and attainable vision held by executives, along with the appropriate personality attributes, is essential in directing enterprises towards their objectives. This highlights the significance of human resources in coordinating efforts. According to Sen (1986), it is important to strategically integrate information systems with business goals. This is because when executives are involved in IT planning, it improves operational efficiency and control. Kobelsky et al. (2008) demonstrate that IT expenditures that are properly allocated, and influenced by environmental, organizational, and technological factors, have a favorable correlation with future business performance. This includes improvements in operating profit margins and shareholder returns. These studies highlight the significance of having a clear plan for the future, competent staff, and efficient use of IT resources and finances in achieving business success. In the aftermath of the COVID-19 pandemic, logistics operations need to give top priority to certain crucial factors to achieve optimal performance and resilience. These encompass the creation of improved packaging techniques that prioritize safety and efficiency, the careful selection of warehouse locations to optimize distribution networks, the adoption of advanced automated warehouse management systems to streamline operations, and the development of strong transportation planning strategies. Organizations may enhance their capacity to guarantee the prompt and secure transportation of goods by prioritizing five essential aspects. This will enable them to adapt to the changing requirements of the global supply chain and sustain operational excellence despite persistent obstacles. Furthermore, it is crucial to effectively handle reverse logistics, utilize data and technology to predict client demand, establish dependable order processing systems, and enhance procurement operations. Ensuring prompt and efficient customer service is essential for improving overall efficiency and sustainability in logistics operations.

In conclusion, the COVID-19 pandemic led to substantial disruptions in the logistics sector due to government-imposed lockdowns and social distancing measures, which affected both production and transportation activities. This research found that the most significant impacts were supply chain disruptions and demand fluctuations, resulting in reduced business activities and changes in consumer behavior.

The study identified key factors driving logistics service providers' adaptation during the pandemic, such as shifting customer behaviors, changes in supply chain dynamics, and the

integration of technology. To continue operations, many businesses adopted digital platforms, increased their use of e-commerce, invested in automation, and restructured supply chains. Key strategies for adapting included improving cost efficiency and flexibility in logistics operations, upgrading technology, and collaborating more with third-party logistics providers. Additionally, enhancing digital services and ensuring supply chain resilience were crucial to address the challenges posed by the pandemic.

The research developed a strategic business model for logistics providers, which emphasized agility, technology-driven solutions, cost reduction, and process optimization. This model, validated through structural equation modeling, proved particularly relevant to Thailand's logistics sector.

The study concludes that the adaptation strategies employed by logistics providers, including the increased use of digital platforms and safety measures, offer valuable insights for future research on emerging technologies, market trends, and policy impacts on the logistics industry during global crises.

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