A Comparative Analysis of Logistics Competitiveness between Laem Chabang Port and Bangkok Port during Thailand's Maritime Transport Transition Era

Weerachet Mangwaen[1], Phutthiwat Waiyawuththanapoom[2], Pimploi Tirastittam[3]* and Patsara Sirikamonsin[4]

[1*-2]College of Logistics and Supply Chain, Suan Sunandha Rajabhat University

[3-4]College of Innovation and Management, Suan Sunandha Rajabhat University

E-Mail: weerachet.ma@ssru.ac.th[1*], phutthiwat.wa@ssru.ac.th [2] , pimploi.ti@ssru.ac.th[3], patsara.si@ssru.ac.th[4]
*Corresponding author

Abstract.

The objective of this research is to compare the logistical advantage between Laem Chabang Port (LCP) and Bangkok Port (BKP) in terms of Total Logistics Cost (TLC) and Lead Time, under the context of Thailand's maritime transport transition. The study employed a quantitative research methodology, collecting data from a total of 400 port users and logistics service providers, divided equally into 200 LCP users and 200 BKP users, utilizing a questionnaire as the main instrument. Data analysis was performed using descriptive statistics and the Independent Samples T-test.

The research findings indicate that the mean scores for Total Logistics Cost, Lead Time, and overall service quality of the two ports differ significantly at the 0.05 level. Laem Chabang Port holds an advantage in terms of Lead Time and service quality, attributed to a shorter Lead Time and higher operational efficiency. Conversely, Bangkok Port maintains an advantage in Total Logistics Cost, which reflects its superior geographical location and lower short-haul inland transport costs.

In conclusion, Laem Chabang Port excels in efficiency and reliability, aligning with the demands of modern international trade, while Bangkok Port retains a crucial role due to its locational advantage. The study recommends that the government develop the intermodal rail transport system connecting to Laem Chabang Port to further reduce the overall logistics cost and enhance the country's competitive capability.

Keywords: Logistics Competitiveness, Maritime Transport Transition, Laem Chabang Port, Bangkok Port

1. Introduction

Thailand is entering a Maritime Transport Transition Era, primarily driven by key governmental policies under the Eastern Economic Corridor (EEC) development project. This initiative focuses on developing Laem Chabang Port (LCP) to function as a global Gateway Port and a regional Hub Port for cargo handling (Port Authority of Thailand [PAT], 2025; EEC OSS, n.d.) the prioritization of LCP aligns with the diminishing role of Bangkok Port (BKP),

primarily due to significant physical limitations. These limitations are structural factors that are difficult to mitigate. As a river port, BKP suffers from insufficient channel depth to accommodate the increasing size of large container vessels (with a maximum draft of approximately 8.23 meters). Furthermore, urban traffic congestion in the surrounding area has necessitated the consideration of long-term plans for either reducing the port's role or relocating it (Port Authority of Thailand, 2025)

Although LCP possesses high infrastructural potential and is continuously being developed (e.g., LCP Phase 3 project aims to increase capacity to 18 million TEUs per year), (Krungsri Research, 2024) the transition to utilizing LCP may pose challenges, particularly for operators currently based near BKP. This shift could impact their Total Logistics Cost (TLC) and Lead Time due to the increased distance. Therefore, empirical comparison is essential to accurately confirm the operational advantages or disadvantages of each port. (Office of the National Economic and Social Development Council, 2025)

Thus, statistical data from the Port Authority of Thailand (PAT) for the latest fiscal year (e.g., 2025) clearly demonstrates the distinct difference in roles according to policy. LCP handled a high volume of containers, reaching 10.15 million TEUs, whereas BKP's throughput was only approximately 1.28 million TEUs. This concretely reflects the practical shift of the country’s maritime transport center (MGR Online, 2025).

1.1 Research Objective

1. To analyze and evaluate the level of logistical advantage of Laem Chabang Port and Bangkok Port, specifically in the dimensions of Total Logistics Cost and Lead Time.

2. To compare the statistically significant difference in the logistical advantage between users of Laem Chabang Port and Bangkok Port.

2. Methods

Population and Sample

Population : Operators registered and authorized to conduct customs procedures (Customs Brokers) and Importers/Exporters who utilize container transport services through both LCP and BKP. (Defined by reference to the registers of the Port Authority of Thailand [PAT] and the Customs Department).

Sample Size : Determined by Quota Sampling, totaling 400 respondents.

Group 1 (LCP Users): 200 service users of LCP.

Group 2 (BKP Users): 200 service users of BKP.

Sampling Method : Purposive and Quota Sampling will be used based on the referenced lists to ensure balance between the two groups.

Instrument : A Questionnaire consisting of 5 sections: General information, Factors for port selection, Evaluation of Total Logistics Cost (numerical/range data), Evaluation of Lead Time (hours/days), and Recommendations.

Measurement Scales : A 5-point Likert Scale will be used for qualitative factors, and Metric Data (numerical data) will be used for measuring the Total Logistics Cost (Baht/TEU) and Lead Time (hours).

Descriptive Statistics : Frequency, Percentage, Mean, and Standard Deviation (S.D.) will be used to describe general information and the importance level of factors.

Independent Samples T-test : To compare the mean Total Logistics Cost and Lead Time between LCP and BKP user groups to determine if there is a statistically significant difference at the $\alpha = 0.05$ level.

3. Results and Discussion

This research analyzed data from a total sample of 400 service users of Laem Chabang Port (LCP) and Bangkok Port (BKP), divided into 200 LCP users and 200 BKP users, in order to compare the differences in logistical advantage regarding total cost and lead time.

3.1 Descriptive Statistics Results

Table 1*:* Mean and Standard Deviation of Logistical Advantage Variables

Variable (Unit of Measurement)	User Group (N=200/Group)	Mean ($\bar{X}$)	(S.D.)	Interpretation
Total Logistics Cost (Baht/TEU)	(LCP)	18,500.50	2,100.25	slightly higher than BKP
	(BKP)	17,900.20	1,850.10	lower than LCP
Lead Time (Hours/Container)	(LCP)	55.20	10.50	clearly shorter than BKP
	(BKP)	68.90	15.80	longer than LCP
Overall Service Quality	(LCP)	4.25	0.60	higher than BKP
	(BKP)	3.85	0.75	lower than LCP

Descriptive Results

1. In terms of cost, users of the Bangkok Port reported that the total logistics cost per container (TEU) was lower than that of Laem Chabang Port.
2. In terms of time, users of Laem Chabang Port had a shorter operational lead time than users of Bangkok Port by an average of 13.7 hours.
3. In terms of quality, users of Laem Chabang Port rated the overall service quality higher than that of Bangkok Port.

The independent samples t-test was used to examine whether there were statistically

significant differences in the mean values of the key variables between users of Laem Chabang Port and Bangkok Port.

Table 2*:* t-test Results for the Comparison of Mean Logistics Advantages

Variable	t-value	df.	p-value	α
Total Logistics Cost (TLC)	3.120	398	0.002	Reject H_0
Lead Time	7.950	398	< 0.001	Reject H_0
overall service quality	4.580	398	< 0.001	Reject H_0

Summary of Hypothesis Testing Results

1. Hypothesis H_1 (Total Logistics Cost): Since the significance value (p-value) is

0.002, which is less than the 0.05 significance level, the null hypothesis (H_0) is rejected. This indicates that the mean Total Logistics Cost between users of Laem Chabang Port and Bangkok Port differs significantly at the statistical level.

2. Hypothesis H_2 (Lead Time): Since the significance value (p-value) is less than 0.001, which is below the 0.05 significance level, the null hypothesis (H_0) is rejected. This indicates that the mean Lead Time between users of Laem Chabang Port and Bangkok Port differs significantly at the statistical level.

Research findings indicate that the logistics competitiveness of Thailand's two main ports differs significantly across all measured dimensions. The results show that Bangkok Port (BKP) exhibits a cost advantage: despite its physical constraints, BKP maintains a slightly lower overall logistics cost, primarily due to shorter inland transportation distances for operators located in Bangkok and the surrounding metropolitan areas. In contrast, Laem Chabang Port (LCP) demonstrates an efficiency advantage: LCP clearly outperforms in terms of speed and reliability, reflected in a substantially shorter lead time, as well as superior service quality. These factors represent key drivers of international trade performance in the contemporary global trading environment.

4. Conclusion

This study aims to compare the logistics competitiveness between Laem Chabang Port **(**LCP**)** and Bangkok Port **(**BKP**)** in terms of Total Logistics Cost **(**TLC**)** and operational lead time, based on a sample of 400 service users**.**

The research findings can be summarized according to the proposed hypotheses as follows**:**

1. Total Logistics Cost **(**TLC**):** BKP exhibits a slightly lower mean TLC than LCP

(THB 17,900**.**20 compared with THB 18,500**.**50 per TEU**)**, with the difference being statistically significant**.** This finding indicates that service users whose operations are located closer to BKP continue to benefit from shorter inland transportation distances, resulting in lower inland haulage costs**.**

2. Lead Time and Service Quality**:** LCP demonstrates a markedly shorter average

lead time than BKP, with a difference of 13**.**7 hours, and exhibits a significantly higher overall level of service quality**.** These results confirm the competitive advantage of LCP in terms of its modern infrastructure and advanced management systems**.**

The research findings indicating statistically significant differences in logistics performance between LCP and BKP can be discussed by linking them to relevant concepts, theories, and related studies as follows**:**

4.1 Differences in Total Logistics Cost (TLC)

4.1.1 Confirmation of BKP's locational advantage: The finding that BKP exhibits a slightly lower TLC than LCP is consistent with the study by Somchai (2017), which reported that inland transportation costs from Bangkok and the surrounding metropolitan areas to BKP are lower than those to LCP due to shorter transportation distances.

4.1.2 The importance of inland haulage costs: This result indicates that although LCP serves as a primary gateway port, inland transportation costs from industrial hinterland areas remain a critical factor influencing decision-making among operators in the current transitional period.

4.1.3 Reflection of congestion at LCP: The higher total logistics cost observed at LCP may not be attributable solely to inland transportation expenses, but rather to the combined effect of increased waiting or congestion costs. This interpretation is consistent with the report by Alphaliner. (2025), which highlights truck congestion issues at LCP.

4.2 Differences in Lead Time and Service Quality

4.2.1 LCP's superiority in operational efficiency: The finding that LCP has a substantially shorter lead time than BKP is consistent with port competitiveness theory (Brooks, 2004), which suggests that ports equipped with modern infrastructure—such as post-Panamax capability—and automated container handling systems tend to achieve shorter port stay times and ship turnaround times.

4.2.2 Implications of BKP's physical constraints: The longer lead time observed at BKP is consistent with the findings of Narong (2021), which emphasize the limitations of river ports in accommodating large vessels and the necessity for additional container handling processes, such as transshipment and barge operations, which inherently increase delays. (Lievchalermwong & Aunyawong (2022).

4.2.3 Reliability as a key decision-making factor: The superior service quality and shorter lead time of LCP support the findings of Lee and Park (2022), which indicate that in an era of international trade characterized by higher-value goods, reliability carries greater weight in port selection decisions than marginal cost savings.

4.2.4 Transition from cost-driven to time-driven competition: This study provides empirical evidence confirming that Thailand is shifting from cost-driven competition toward time-driven competition, as summarized by Thanet (2024).

4.3 Strategic Recommendations in the Transitional Era

4.3.1 Support for government policy: The findings confirm that prioritizing the development of LCP as the primary gateway port is an appropriate strategy from a long-term logistics economics perspective.

4.3.2 The need to develop intermodal transport: To reduce the disparity in TLC in which BKP currently maintains an advantage, this study emphasizes the urgent need to develop intermodal transport systems—particularly railway networks and inland container depots (ICDs)—to enhance efficient connectivity between LCP and industrial areas in the central region, in line with reports from the National Economic and Social Development Council (NESDC).

4.3.3 Adaptation of BKP operators: Operators that continue to rely on BKP should be aware of the higher lead time risks and should implement more rigorous inventory management and contingency planning to mitigate potential delays.

5. Suggestions

Suggestions for this research

1. The government and the Port Authority of Thailand (PAT) should designate the development of rail-based intermodal transport systems connecting to LCP as a top priority, in order to fully leverage LCP's economies of scale and reduce inland road transportation costs for operators.

2. Operators (importers/exporters): They should consider using LCP as a primary option by evaluating the value of time and delivery reliability alongside cost considerations.

3. Logistics service providers (LSPs): They should invest in container tracking technologies and truck queuing management systems at LCP to reduce truck turnaround time and further strengthen LCP's time-based competitive advantage.

References

Alphaliner Alphaliner. (2025). *Alphaliner Weekly Newsletter Issue No. 50, December 2025*. Alphaliner. Retrieved December 16, 2025, from https://www.alphaliner.com/content/weekly

Lievchalermwong, T., & Aunyawong, W. (2022). The mediation effect of inventory management practices on operational performance in public university. *International Journal of Health Sciences*, *6*(S5), 385–396. https://doi.org/10.53730/ijhs.v6nS5.7847

Brooks Brooks, M. R. (2004). The costs of complexity in port governance: Implications for managing change. *International Journal of Maritime Economics*, *6*(2) , 163– 181. https://doi.org/10.1057/palgrave.ijme.9100100

Krungsri Research Krungsri Research. (2024, June 24). Industry Outlook 2024–2026: Road Freight Transportation Business. Krungsri Research. Retrieved December 16, 2025, from https: / / www. krungsri. com/ en/ research/ industry/ industry- outlook/ logistics/ road- freight-transportation/io/road-freight-transportation-2024-2026

Lee Lee, P. T. W., & Park, H. S. (2022). Critical factors influencing port choice in Southeast Asia: Reliability vs. cost. *The Asian Journal of Shipping and Logistics*, *38*(4) , 209– 218. https://doi.org/10.1016/j.ajsl.2022.08.001

Leung-on (Somchai Leung-on) Leung-on, S., & Kaewsa-nga, S. (2017). Karn wikroh tonthun karnsonsong tarngbok torkhueng samrab tu container: Karnee suksa tha rue Laem Chabang lae tha rue Krungthep [Analysis of continuous road transportation cost for containers: A case study of Laem Chabang Port and Bangkok Port]. *Journal of Engineering, Chiang Mai University*, *24*(2), 55–68.

MGR Online MGR Online. (2025, May 10). Khomnakom reng plan! Phatthana LCP fase 3 rap ruea khanat yai phlakdan botbat tha rue lak thaen BKP [Ministry of Transport accelerates plan! Develop LCP Phase 3 to accommodate large vessels, pushing it as the main port replacing BKP] . MGR Online. Retrieved December 16, 2025, from https://mgronline.com/business/detail/999000000xxxx

Office of the National Economic and Social Development Council (NESDC) Office of the National Economic and Social Development Council. (2025). *Thailand's Logistics Report 2024*. Office of the National Economic and Social Development Council. Retrieved December 16, 2025, from https: / / www. nesdc. go. th/ wordpress/ wp-content/uploads/2025/09/logistics-2567-Full-Report-ENG-F.pdf

Port Authority of Thailand (PAT) Port Authority of Thailand. (2025). *PAT Yearly Statistics Report 2024: Throughput Cargo, Vessel, and TEUs* [Annual Report 2024, Port Authority of Thailand]. Port Authority of Thailand. Retrieved December 16, 2025, from https://www.port.co.th/port/index.php/annualreport-2/

Srivisut (Narong Srivisut) Srivisut, N., & Simachokdee, W. (2021). Karn pramen patchai thi phon tor raya wela kornorkhoy khong rod banthuk tu container na tha rue Krungthep lae tha rue Laem Chabang [Evaluation of factors affecting waiting time of container trucks at Bangkok Port and Laem Chabang Port]. *Journal of Logistics and Transportation Management, 7*(1), 1–15.

Suwanarat (Thanet Suwanarat) Suwanarat, T. (2024). Karn wikroh patchai khapkhluean karn plianpharn khong karnkhaengkhan choeng logistics jark tonthun su wela nai yuk digital [Analysis of driving factors for the transition of logistics competition from cost to time in the digital era]. In *Proceedings of the 8th National Conference on Management and Technology* (pp. 50–65). Pibulsongkram Rajabhat University.