International Journal of Marine Engineering Innovation and Research, Vol. 10(4), Dec. 2025. 1302-1308
(pISSN: 2541-5972, eISSN: 2548-1479)

Comparison Analysis of the Port Business Between PT. Pelabuhan Indonesia (Persero) and PSA International Singapore

Syifa Fajar Maulani[1], Ira Nirmala[2], Muhammad Rizky[3], Maskur Faris Ardani[4], Rubby Rahman Tsani[5], Melia Handayani[6], Muhammad Alfalah[7]

(Received: 22 November 2025 / Revised: 4 Decemberr 2025 /Accepted: 4 December 2025 / Available Online: 10 December 2025)

***Abstract*— Maritime transportation, as a key element of global trade, offers significant economic advantages, with ports playing a crucial role in ensuring the smooth flow of goods. The increasing number of ship visits highlights the need for port infrastructure development to improve operational efficiency. This study aims to compare the port business between PT. Pelabuhan Indonesia (Persero) and PSA International in Singapore. The research employs a qualitative method, using the Business Model Canvas (BMC), PESTEL analysis, and gap analysis to compare key elements in both ports. The findings reveal significant differences in technology and infrastructure between Pelindo and PSA. PSA excels in the application of advanced technology, while Pelindo focuses more on domestic infrastructure development. These recommendations are expected to provide insights for Pelindo to improve its business processes and competitiveness in the international market, as well as to support the achievement of the Sustainable Development Goals (SDGs), specifically Goal 9.**

Keywords—Port, Pelindo, PSA International, Business Model Canvas (BMC), PESTEL, Gap Analysis

[*]*Corresponding Author: syifa.fajar@upi.edu*

I. INTRODUCTION

The role of transportation today is closely linked to the industrial world. The development of transportation continues to be enhanced to support a more advanced industrial sector. Maritime transportation plays the most crucial role in facilitating the trade industry due to its high economic value, offering a large carrying capacity at relatively low costs [1]. Ports are essential facilities for maritime transportation. A port is aworkplace environment consisting of land and water areas equipped with facilities for ships to dock and moor, enabling the loading and unloading of goods as well as the embarkation and disembarkation of passengers [2].

Containerization has become the primary choice for cargo shipping in global trade. Over 90% of international cargo is transported through ports as transfer interfaces [3]. According to the Central Statistics Agency (2022), Indonesia experienced an increase in the number of ship visits in 2022, totaling 258,703 ships at 25 strategic ports in Indonesia [4]. This highlights the importance of developing port infrastructure to expedite the loading and unloading process andpassenger transport, thereby enhancing the credibility of ports.

Ports with excellent facilities attract importers and business operators both domestic and international, for loading and unloading activities, as they can reduce ship waiting times. Every country competes to develop its port infrastructure, both physically and digitally. In Southeast Asia, PSA International in Singapore became the busiest port with a throughput of 39.01 million TEUs in 2023 [5], ranking second globally below Shanghai Port in China. In contrast, Indonesian ports (Pelindo) only handled 17.7 million TEUs in 2023 [6].

PT. Pelabuhan Indonesia (Persero) has long been a major player in the port industry, with various sub-holdings managing specific aspects of port operations. One such sub-holding is Pelindo Terminal Petikemas, managed by PT. IPC Terminal Petikemas. The containers handled are both domestic and international, making Pelindo a strategic port in global trade routes. According to Putra et al. (2024), Tanjung Priok Port is the busiest port in Indonesia, with 70% of Indonesia's imports and exports passing through it each year.

PSA International is the world's busiest transshipment hub. Located at the southern tip of the Malay Peninsula, 30 km southwest of Johor port in Malaysia, it provides connectivity to over 600 ports in 123 countries [7]. According to Ridwan et al. (2023), PSA's success in attracting foreign investors as business partners has led to increased investment and revenue streams, establishing Singapore as one of the world's

Syifa Fajar Maulani is with Maritime Logistics Study Program, Indonesia University of Education, Bandung, 40154, Indonesia. Email: syifa.fajar@upi.edu
Ira Nirmala is with Maritime Logistics Study Program, Indonesia University of Education, Bandung, 40154, Indonesia. Email: iranis@upi.edu
Muhammad Rizky is with Maritime Logistics Study Program, Indonesia University of Education, Bandung, 40154, Indonesia. Email: muh.rizky355@upi.edu
Maskur Faris Ardani is with Maritime Logistics Study Program, Indonesia University of Education, Bandung, 40154, Indonesia.
Rubby Rahman Tsani is with Maritime Logistics Study Program, Indonesia University of Education, Bandung, 40154, Indonesia. Email:
Melia Handayani is with Maritime Logistics Study Program, Indonesia University of Education, Bandung, 40154, Indonesia. Email: melia.handayani@upi.edu
Muhammad Alfalah is with Maritime Logistics Study Program, Indonesia University of Education, Bandung, 40154, Indonesia. Email: alfalah0803@upi.edu

trading hubs. Singapore has positioned itself as a country with the most globally competitive port business costs and the best business environment in the Asia-Pacific region [8].

Both ports benefit from being on global trade routes, but there are significant differences in infrastructure, with Indonesian ports lagging far behind PSA International in terms of technology and infrastructure. Such issues should be addressed promptly to demonstrate Indonesia's seriousness in becoming a global maritime axis. Additionally, this is closely related to the Sustainable Development Goals (SDGs), particularly point 9, which focuses on industry, innovation, and infrastructure.

In-depth research is needed to develop innovative business plans for port companies using the Business Model Canvas (BMC) framework. According to Sepriyadi et al. (2023), the Business Model Canvas (BMC) excels in business model analysis, providing a simple and comprehensive depiction of a company's current condition based on customer segments, value propositions, value delivery channels, customer relationships, revenue streams, key assets, partnerships, and cost structures [9]. This study is also analyzed using the PESTEL analysis, which examines Political, Economic, Social, Technological, Environmental, and Legal factors [10]. Furthermore, gap analysis can be used to identify disparities between Indonesian ports and PSA International, aiming to provide recommendations to improve the quality and infrastructure of Indonesian ports, hoping they can compete globally and rank among the top 10 ports in the world, and encouraging Pelindo to achieve.

II. METHOD

In this port business research, a qualitative method is used for a comprehensive investigation. The qualitative research method is an approach derived from postpositivist philosophy, where the researcher plays a central role as the primary instrument in the context of scientific research [11]. This approach is chosen for its ability to understand phenomena from the perspective of those directly involved in the port business.

This research is conducted on two companies engaged in port services: PT. Pelabuhan Indonesia (Persero) subholding PT. IPC Terminal Petikemas, and PSA International in Singapore. Data is collected through direct interviews with representatives from both ports, namely Pelindo and PSA, in July and October 2024. Additionally, participatory observations involving various stakeholders at the ports are conducted, including port managers, workers, port service users, and regulatory bodies. The data is analyzed comprehensively to build a holistic understanding of the port business dynamics, including challenges, strategies, and opportunities.

Figure. 1. Map of PT Pelindo IPC TPK

Figure. 2. Map of PSA Singapore

This research is further deepened using three analytical techniques: the Business Model Canvas (BMC). BMC is a business model described by business actors in formulating a company's business strategy. BMC was created and developed by Alexander Osterwalder and Yves Pigneur to facilitate strategic

planning and explain the strategic concepts a company will implement. Additionally, to increase customer loyalty, BMC can help explain a crucial aspect that can influence product success and revenue [12]. The BMC approach can creatively and innovatively describe, analyze, and design the formation, delivery, and capture of market dimensions, boosting demand by innovating value. It is also an effective tool for identifying business performance levels [13].

This research is also expanded using the PESTEL analysis technique, which examines the Political, Economic, Social, Technological, Environmental, and Legal factors in detail [10]. According to Fasa et al. (2022), this approach aims to analyze six external factors that can significantly impact the sustainable development of the port business in Indonesia [14]. This approach is also useful for understanding situational factors, both internal and external. To analyze the differences in business management between the two ports, gap analysis is used. According to Yoshana et al. (2021), gap analysis is a crucial step in the planning and performance evaluation stages [15]. Gap analysis identifies the gaps between Indonesian ports and PSA International.

The data used includes both primary and secondary data, processed directly to produce a comprehensive study. The use of BMC, PESTEL, and gap analysis allows researchers to systematically evaluate and understand the port business models implemented by Pelindo and PSA. Additionally, researchers can identify solutions and innovations as well as develop sustainable and competitive strategies in the international port cycle.

The workflow of this port business research includes several steps, as illustrated in the following flowchart:

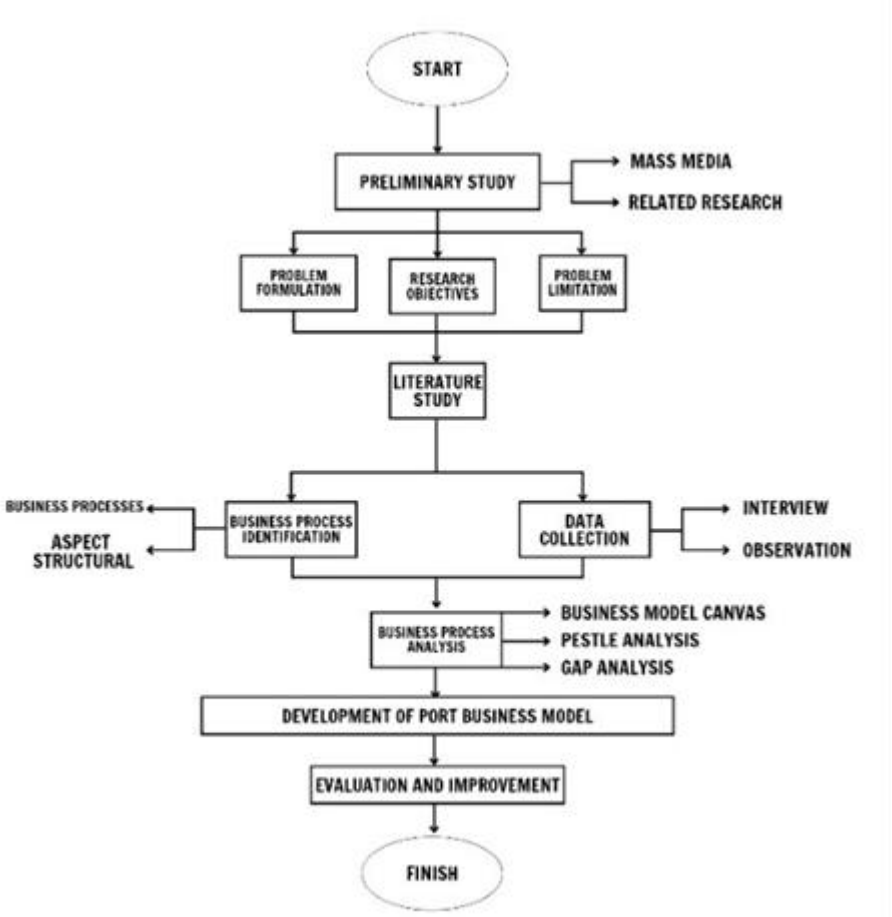

Figure. 3. Flowchart

This research begins with a preliminary study by searching for information from publicly available company documents on their websites or previous studies discussing these companies, to establish the problem formulation, objectives, and limitations. Next, the researcher conducts a literature review to comprehensively understand the digital port business. The researcher also identifies existing business activities within the ports, ranging from documentation, loading and unloading, to storage. Following this, in-depth observations and interviews are conducted with PT. Pelabuhan Indonesia (Persero) and the Port of Singapore Authority to obtain concrete data. The results of the identification and interviews are then comprehensively analyzed using three analytical methods: BMC, PESTEL, and Gap Analysis. This comprehensive analysis will yield recommendations that can be used by PT. Pelabuhan Indonesia, with the aim of advancing the port business and achieving the goals of its merger.

III. RESULT AND DISCUSSION

Based on direct observations at PT Pelabuhan Indonesia (Persero) and PSA International Singapore, the results include a comprehensive Business Model Canvas

(BMC) covering all elements and a Gap Analysis, as shown in Table 1, identifying various differences between these two companies. These observation results provide a strong foundation for developing strategies to enhance performance and competitiveness, particularly for PT Pelabuhan Indonesia (Persero).

Based on the results of the gap analysis comparing PT Pelabuhan Indonesia (Persero) and PSA International Singapore in terms of technology and infrastructure, there are significant differences, particularly in the aspects of technology and the approach to facility development. PSA International Singapore excels in advanced technology with the use of the NAVIS port operating system, embracing smart port technology, and implementing renewable energy solutions such as wind and solar panels. This allows PSA International Singapore to offer higher operational efficiency, with an average dwelling time of just 1.5 days. Additionally, PSA has deeper port basins, measuring 23 meters, supporting a larger and more modern container handling capacity. Meanwhile, Pelindo focuses more on domestic infrastructure development and container terminal operations for the local market. Although Pelindo is also undertaking development, such as allocating USD 1.5 billion for infrastructure, technological development and innovation have not yet matched those of PSA International Singapore.

TABLE 1.
GAP ANALYSIS OF THE BUSINESS MODEL CANVAS OF PT PELABUHAN INDONESIA (PERSERO) AND PSA SINGAPORE

BMC Elements	Pelindo	PSA Singapore
Key Activities	Container terminal operations, global logistics services, infrastructure development.	Advanced container terminal operations, global logistics services, smart port technology.
Key Partners	Indonesian government, local port operators, logistics companies, other state-owned enterprises.	Global port operators, technology providers, Singaporean government, international logistics companies.
Value Propositions	Integrated port services, competitive operational costs, supports local economic development. Pelindo has an average dwelling time of 2.9 days.	High operational efficiency, smart port technology, and a green port concept, fast loading and unloading times. Utilizes wind and solar panels for electricity. PSA has an average dwelling time of 1.5 days.
Customer Relationships	Personalized customer service, loyalty programs, 24/7 call center.	Advanced digital services that enable efficient communication through PORTNET.
Channels	Branch offices, website, marketing agents, online services.	Digital platforms, mobile applications, global offices.
Customer Segments	Domestic and international port service users, local logistics companies, other state-owned enterprises.	Global port service users, multinational companies, large shipping operators.
Key Resources	Ports, ships, skilled labor, infrastructure, basic IT systems equipped with 16-meter deep port basins.	Advanced technology (NAVIS port operating system), global network, skilled labor, advanced port facilities, and 23-meter deep port basins.
Cost Structure	Port operational costs, infrastructure investment (Pelindo allocates USD 1.5 billion for infrastructure development), labor wages.	Technology costs (PSA invests over SGD 1 billion in technology), global operations, R&D investment.
Revenue Streams	Port service fees, warehouse rental, logistics costs, additional services (total revenue in 2023 amounted to USD 1.7 billion).	Advanced port service fees, logistics costs, technology system rentals and franchises, value-added services (total revenue in 2023 amounted to SGD 4.5 billion).
	Gap Analysis	
Key Activities	PSA excels in technology, while Pelindo focuses more on infrastructure development and domestic operations.	
Key Partners	PSA has a broader and stronger global partnership network, including collaborations with advanced technology providers.	
Value Propositions	PSA offers higher efficiency and more advanced technology, while Pelindo places more emphasis on local development and competitive costs.	
Customer Relationships	PSA takes a more digital and efficient approach to customer relations, while Pelindo focuses more on a personalized approach.	
Channels	PSA leverages a broader and more effective digital channel compared to Pelindo, which still relies on branch offices and marketing agents.	
Customer Segments	PSA serves a broader and more global customer segment, while Pelindo focuses more on the domestic market. This aligns with the fact that domestic container flows dominate.	
Key Resources	PSA has stronger technological resources and a global network, while Pelindo focuses more on infrastructure and domestic workforce.	
Cost Structure	PSA incurs high operational costs related to technology and R&D, while Pelindo focuses more on infrastructure and labor costs.	
Revenue Streams	PSA generates revenue from advanced port services, while Pelindo focuses more on basic services.	

On the other hand, PSA International Singapore has a broader global partnership network with 45 countries, involving various technology providers and international port operators. This approach expands the service coverage of PSA International Singapore, including collaborations with multinational companies and the Singaporean government. Pelindo, although it has partnerships with the Indonesian government and other

state-owned enterprises, is more limited in terms of international partnerships, focusing primarily on ASEAN countries. In terms of costs, PSA allocates a significant budget for R&D and technology, while Pelindo focuses more on infrastructure and domestic operational costs. As a result, PSA generates higher revenue from advanced port services and technology, while Pelindo relies more on revenue from basic services and domestic logistics.

The results of the PESTEL analysis for PT Pelabuhan Indonesia (Persero) are shown in Table 2.

TABLE 2.
GAP RESULTS OF THE PESTEL ANALYSIS FOR PT PELABUHAN INDONESIA (PERSERO)

Political	Economic	Social
1. Pelindo operates in a relatively stable political environment in Indonesia. However, sudden changes in government or political policies can impact regulations and the investment climate in the port sector. 2. Pelindo is heavily influenced by government regulations, particularly related to tariffs, licensing, and safety standards. Regulatory changes can affect operational costs and Pelindo's competitiveness. 3. Protectionist policies implemented by the government can impact the flow of goods and the volume of activities at the port. 4. As a state-owned enterprise, Pelindo has a close relationship with the government. Government support is crucial for securing strategic projects and access to resources. 5. Corruption issues in the public sector can be a challenge for Pelindo, especially in obtaining permits and project tenders.	1. Indonesia's economic growth directly affects trade volumes and port activities. Economic slowdowns can reduce the demand for port services. 2. Fluctuations in the rupiah exchange rate can affect Pelindo's operational costs, especially if many imported components are involved in its production processes. 3. High inflation rates can increase production costs and reduce purchasing power, which in turn can affect the demand for port services. 4. Fluctuations in the prices of Indonesia's export-import commodities can impact trade volumes and Pelindo's revenue. 5. Global competition in the port sector is becoming increasingly intense. Pelindo must continually improve efficiency and competitiveness to face competition from foreign port operators. 6. The availability and quality of supporting infrastructure, such as roads, railways, and inland waterways, are crucial for the smooth operation of ports. 7. The availability of skilled labor and labor costs are important factors in determining Pelindo's operational costs.	1. Population growth and urbanization in Indonesia affect the demand for transportation and logistics. Changes in demographic structures can also influence consumption patterns and the types of goods transported. 2. Changes in lifestyle, such as the rise of the middle class and increased awareness of quality of life, can affect the demand for certain products and drive the growth of e-commerce, which in turn impacts shipping volumes through ports. 3. The availability of skilled and highly educated labor is crucial for Pelindo to enhance productivity and competitiveness 4. Health and safety issues are a major concern, especially regarding the handling of hazardous goods. Increasingly stringent regulations in this area can raise Pelindo's operational costs. 5. The public is increasingly demanding that companies be environmentally and socially responsible. Pelindo needs to demonstrate its commitment to CSR to maintain its corporate reputation

Technology	Environment	Legal
1. The adoption of automation and mechanization technology in loading and unloading processes can improve efficiency and productivity. However, investing in this technology requires significant costs. 2. The implementation of IoT can enhance supply chain visibility and more efficient asset management. 3. The use of AI can aid in decision-making, demand forecasting, and optimizing shipping routes. 4. Cyber threats are becoming increasingly serious. Pelindo needs to invest in robust cybersecurity systems to protect customer data and critical infrastructure. 5. The growth of e-commerce drives an increase in shipping volumes through ports. Pelindo needs to adapt to these changing consumption patterns.	1. Climate change can lead to rising sea levels, extreme weather, and damage to port infrastructure. Pelindo needs to take adaptive measures to address these risks. 2. Port activities can cause various types of pollution, such as water, air, noise, and soil pollution. Increasingly stringent environmental regulations require Pelindo to implement environmentally friendly technologies. 3. Ports located in coastal areas can impact marine biodiversity. Pelindo needs to maintain a balance between economic activities and environmental preservation. 4. Managing hazardous and toxic waste (B3) generated from port activities is a unique challenge. Pelindo must have an effective waste management system.	1. Trict security regulations, especially related to port security and terrorism prevention, can increase Pelindo's operational costs. 2. Changes in international trade laws can affect the flow of goods and customs tariffs, which in turn will impact the volume of activities at the port. 3. Increasingly stringent environmental regulations require Pelindo to implement environmentally friendly practices. Violations of environmental regulations can result in legal sanctions and a poor reputation. 4. Changes in labor laws can affect labor costs and industrial relations at Pelindo. 5. Intellectual property protection is crucial for innovation and the development of new technologies in the port sector.

Overall, the PESTEL analysis shows that PT. Pelindo operates in a complex and dynamic environment where political, economic, social, technological, environmental, and legal factors interact and influence the company's performance. Political stability and government support are key for Pelindo to operate effectively, while strict regulations and protectionist policies can impact costs and the flow of goods. Economic growth and exchange rate fluctuations also play a significant role in determining the demand for port services. Socially, demographic changes and lifestyle shifts drive the need for more efficient transportation and logistics. In terms of technology, Pelindo needs to invest
in innovation to improve operational efficiency and address cyber threats. Environmental concerns are paramount, requiring Pelindo to comply with stringent

regulations and manage the environmental impacts of its activities. Lastly, adherence to applicable laws and regulations is crucial for maintaining Pelindo's reputation and operational sustainability. By understanding and managing these factors, Pelindo can enhance its competitiveness and adapt to market changes.

The PESTEL analysis results for PSA International Singapore are presented in Table 3.

TABLE 3.
PESTEL ANALYSIS RESULTS OF PSA INTERNATIONAL SINGAPORE

Political	Economic	Social
1. As a multinational company, PSA Singapore is greatly influenced by political stability in the various countries where it operates. Sudden changes in regime or political policies can disrupt operations and investments. 2. Singapore's involvement in various free trade agreements (FTAs) provides significant opportunities for PSA Singapore to expand its business. However, changes in global trade policies can affect the flow of goods and investments. 3. PSA Singapore is subject to various international maritime regulations governing navigation safety, environmental pollution, and maritime security. Changes in these regulations can increase operational costs. 4. Strong diplomatic relations between Singapore and its trade partner countries are crucial for attracting investments and expanding business networks. 5. Maritime security issues such as piracy and terrorism can disrupt port operations and increase insurance costs	1. Global economic growth directly affects trade volume and port activity. A slowdown in the global economy can reduce demand for port services. 2. Fluctuations in the Singapore dollar exchange rate can affect PSA Singapore's competitiveness in international markets. 3. High inflation rates can increase operational costs and reduce consumer purchasing power, which in turn can affect demand for port services. 4. Fluctuations in oil prices can affect maritime transportation costs and overall production costs. 5. Competition in the port sector is very intense, especially from ports in Southeast Asia and the Middle East. PSA Singapore must continue to innovate and improve efficiency to maintain its competitive advantage. 6. Investing in information and communication technology is key to improving efficiency and competitiveness. PSA Singapore needs to continuously invest in the latest technologies to remain relevant	1. Singapore has a diverse ethnic and cultural population. This requires PSA Singapore to have inclusive policies and be sensitive to cultural differences. Additionally, demographic changes, such as an aging population, can affect the demand for certain types of services. 2. The people of Singapore tend to have a modern and environmentally conscious lifestyle. This creates opportunities for PSA Singapore to offer sustainable and eco-friendly services. 3. The Singapore government is highly focused on the social welfare of its citizens. PSA Singapore needs to ensure that its operations do not negatively impact the surrounding community, particularly in terms of pollution and noise. 4. The high level of education among Singapore's population presents an opportunity for PSA Singapore to attract a skilled workforce. However, the company also needs to provide training programs to develop employees' skills in line with industry needs.
Technology	**Environment**	**Legal**
1. The adoption of automation and mechanization in the loading and unloading process can improve efficiency and productivity. However, investment in this technology requires significant costs. 2. The implementation of IoT can enhance supply chain visibility and more efficient asset management. 3. The use of AI can assist in decision-making, demand forecasting, and optimizing delivery routes. 4. Big data analysis can provide valuable insights into market trends and consumer behavior, allowing PSA Singapore to develop better business strategies. 5. Cyber threats are becoming increasingly serious. PSA Singapore needs to invest in robust cybersecurity systems to protect customer data and critical infrastructure.	1. Singapore has very strict environmental standards. PSA Singapore must comply with various regulations related to waste management, emissions, and natural resource conservation. 2. Rising sea levels and extreme weather are threats to port infrastructure. PSA Singapore needs to take adaptive measures to mitigate the impact of climate change. 3. The public is increasingly concerned about environmental issues. PSA Singapore must demonstrate its commitment to sustainable business practices to maintain the company's reputation. 4. The ports of Singapore are located in coastal areas rich in biodiversity. PSA Singapore must ensure that its operations do not harm marine ecosystems.	1. As a global port company, PSA Singapore is subject to various international maritime regulations governing navigation safety, environmental pollution, and maritime security. Changes in these regulations could increase operational costs and business complexity. 2. Free trade agreements (FTAs) involving Singapore can affect customs duties and rules of origin, which in turn will impact the flow of goods through the port. 3. Labor laws in Singapore are very strict and protect workers' rights. PSA Singapore must ensure compliance with all labor regulations. 4. Singapore has high environmental standards. PSA Singapore must comply with various environmental regulations related to waste management, emissions, and natural resource conservation. 5. Intellectual property protection is essential for innovation and the development of new technologies in the port sector. PSA Singapore must ensure that its innovations and developments are legally protected.

As one of the leading ports in the world, PSA Singapore demonstrates excellence in addressing the challenges and dynamics of the complex port industry. The PESTEL analysis reveals that the company is influenced by various political, economic, social, technological, environmental, and legal factors.

Politically, PSA Singapore is impacted by the political stability in the countries where it operates, as well as free trade agreements that can affect the flow of goods and investments. In terms of economics, global economic growth and exchange rate fluctuations are key factors influencing the demand for port services, while intense competition in the sector drives PSA to

continuously innovate. Socially, Singapore's ethnic and cultural diversity requires the company to have inclusive policies, while public awareness of environmental issues creates opportunities for sustainable services. In terms of technology, investment in automation and digitization is key to improving efficiency, although cybersecurity challenges must also be addressed. The environment is a major concern with strict regulations regarding pollution and the impact of climate change on port operations. Finally, compliance with legal regulations, including maritime safety and intellectual property protection, is crucial for maintaining PSA Singapore's reputation and business sustainability. By understanding and managing these factors, PSA Singapore can enhance its competitiveness and adapt to changes in the global market.

IV. CONCLUSION

Based on the discussion, it can be concluded that PT Pelabuhan Indonesia (Persero) and PSA International Singapore exhibit significant differences in technology and infrastructure. PSA International Singapore excels with advanced technologies such as the NAVIS port operating system, smart port concepts, and renewable energy, enabling high operational efficiency with a dwelling time of only 1.5 days. In contrast, Pelindo focuses on developing domestic infrastructure and operating container terminals for the local market, with a large budget but not yet matched by technological innovations equivalent to PSA's. PSA also boasts an extensive global partnership network and allocates substantial budgets for R&D and technology, generating significant revenue from advanced port services, whereas Pelindo relies more on basic services and domestic logistics.

The PESTEL analysis reveals that PT Pelindo operates in a complex environment with interactions among various political, economic, social, technological, environmental, and legal factors. Political stability and government support are crucial for Pelindo, although strict regulations and protectionist policies can affect costs and the flow of goods. Economic growth and exchange rate fluctuations impact the demand for port services, while demographic changes drive the need for efficient transportation and logistics. Pelindo needs to invest in technological innovation to enhance operational efficiency and tackle cyber threats, as well as comply with stringent environmental regulations. By understanding and managing these factors, both Pelindo and PSA Singapore can enhance their competitiveness and adapt to changes in the global market.

REFERENCES

[1] Putra, A. A., & Djalante, S. (2016). Pengembangan Infrastruktur Pelabuhan Dalam Mendukung Pembangunan Berkelanjutan. Jurnal Ilmiah Media Engineering, 6(1).

[2] Ricardianto, P., Suhalis, A., & Sirait, D. P. (2018). Integrasi Antara Dwelling Time Dan Bongkar Muat Peti Kemas Pelabuhan Tanjung Priok Integration Between Dwelling Time And Loading-Unloading At Tanjung Priok Port. J. Manaj. Transp. Dan Logistik, 5(03), 193-203.

[3] Widyaningrum, R. O. S. Y. (2014). Persepsi Masyarakat tentang Keberadaan Pelabuhan Petikemas di Kelurahan Bukuan Kota Samarinda. e Journal Ilmu Administrasi Negara, 3(2), 690-701.

[4] Badan Pusat Statistik (2022). URL : https://www.bps.go.id/id/statistics-table/1/MTQxOCMx/jumlah-kunjungan-kapal-di-pelabuhan-yang-diusahakan-dan-tidak-diusahakan-tahun-1995-2022.html . Accessed on 2 Oktober 2024.

[5] Indo shipping gazette (2024) URL : https://indoshippinggazette.com/2024/pelabuhan-singapura-menikmati-rekor-arus-peti-kemas-2023/ . Accessed on 2 Oktober 2024

[6] Pelindo (2024) URL : https://indoshippinggazette.com/2024/pelabuhan-singapura-menikmati-rekor-arus-peti-kemas-2023/ . Accessed on 2 Oktober 2024

[7] Mindur, M. (2020). Significance of the port of Singapore against the country's economic growth. Zeszyty Naukowe. Transport/Politechnika Śląska, (106), 107-121.

[8] Ridwan, R., & Pambudi, M. A. L. (2023). Singapore International Hub-Port And Its Effects On The Smooth Running Of The Sea Freight Transportation System In Indonesia. Maritime Park Journal of Maritime Technology and Society, 125-134.

[9] Sepriyadi, M. I., Wardani, A., Syahfitri, M., Alfayyadh, M., & Resmaliana, R. (2023). Analisis Business Model Canvas (BMC) Pada UMKM Cimol Aa di Kota Tanjungpinang. Innovative: Journal Of Social Science Research, 3(4), 2270-2281.

[10] Riwayadi, E., & Mariatie, N. (2021). Penetrasi Pasar Dengan Menggunakan Analisis Pestle: Studi Kasus di PT. HSI Cabang Bandung. Action Research Literate, 5(2), 67-75.

[11] Sugiyono, P. D. (2017). Metode penelitian bisnis: pendekatan kuantitatif, kualitatif, kombinasi, dan R&D. Penerbit CV. Alfabeta: Bandung, 225(87), 48-61.

[12] Ocviany, D. L., Akhmad, B., Desmon, A. D., Yusar, Y., Akib, I. M., Mitrady, J., & Jamaan, A. (2023). Analisis Kelayakan Peluang Bisnis Non Diklat BP3IP Sebagai Satker BLU Dengan Pendekatan Bisnis Model Canvas. Jurnal Penelitian Transportasi Laut, 25(2), 118-130.

[13] Partalidou, M., Paltaki, A., Lazaridou, D., Vieri, M., Lombardo, S., & Michailidis, A. (2018). Business model canvas analysis on Greek farms implementing Precision Agriculture. Agricultural Economics Review, 19(2), 28-45.

[14] Fasa, A. W. H., Berliandaldo, M., & Prasetio, A. (2022). Strategi pengembangan desa wisata berkelanjutan di Indonesia: Pendekatan analisis PESTEL. Kajian, 27(1), 71-88.

[15] Yoshana, A., Putra, M. F., & Ulina, N. S. (2021). Gap Analysis Implementasi ISO 14000: 2015 pada PT. SAS International. Jurnal Teknologi dan Manajemen, 19(2), 125-132.

[16] Nugraha, W.A., Budiarto, U. and Amiruddin, W., 2015. Analisa Waktu Bongkar Muat Kapal Peti Kemas Pada Terminal III Pelabuhan Tanjung Priok Jakarta. Jurnal Teknik Perkapalan, 3(4).

[17] Riski, R., Rahmawati, U. E., & Ananto, P. K. F. (2022). Mengoptimalkan perencanaan strategis sistem informasi perusahaan untuk meningkatkan kinerja pelayanan (studi kasus: BUMN pengelola pelabuhan). Journal of Information System, Graphics, Hospitality and Technology, 4(01), 39-45.

[18] Saragiotis, P. (2019). Business process management in the port sector: a literature review. Maritime business review, 4(1), 49-70.

[19] TITANIA, A.T.D., 2020. Pelayanan Bongkar Muat Heavy Cargo MV. Zea Challenger Pada PT. Citra Jateng Stevedoring. KARYA TULIS.