



Navigating Indonesia's Logistics and Supply Chain Challenges: A Data-Driven Analysis of Logistics Performance Indeks

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ABSTRACT

Sektor logistik Indonesia menghadapi tantangan yang kompleks, termasuk kurangnya kebijakan terpadu antar kementerian dan lembaga pemerintah. Indeks Kinerja Logistik (Logistics Performance Index - LPI) 2023 menyoroti masalah ini, dengan adanya peningkatan pada indikator kepabeanan dan infrastruktur tetapi penurunan pada indikator lainnya. Penelitian ini memberikan panduan bagi pemerintah Indonesia, khususnya Bea dan Cukai Indonesia, untuk menciptakan kebijakan logistik yang seragam. Dengan menganalisis peringkat LPI dan strategi yang efektif dari negara lain, Indonesia dapat meningkatkan kinerja logistik nasionalnya. Riset ini juga memberikan wawasan bagi pemangku kepentingan di semua tingkatan, untuk meningkatkan efisiensi rantai pasokan dan logistik. Penurunan LPI Indonesia adalah masalah yang beragam, menekankan peran penting Bea dan Cukai dalam mengoptimalkan rantai pasokan nasional dan memfasilitasi perdagangan internasional. Tantangan ini perlu ditangani untuk meningkatkan daya saing ekonomi dan menarik investasi di sektor logistik Indonesia

Indonesia's logistics sector faces complex challenges, including a lack of integrated policies among government ministries and institutions. The 2023 Logistics Performance Index (LPI) highlights this issue, with improvements in customs and infrastructure indicators but declines in others. This paper offers guidance for the Indonesian government, especially the Indonesian Customs and Excise, to create a unified logistics policy. By analyzing LPI rankings and successful strategies from other countries, Indonesia can improve its national logistics performance. The research also provides insights for stakeholders at all levels, promoting supply chain and logistics efficiency. Indonesia's LPI decline is a multifaceted problem, emphasizing the Customs and Excise's pivotal role in optimizing the national supply chain and facilitating international trade. Addressing these challenges is crucial for improving economic competitiveness and attracting investments in Indonesia's logistics sector.

1. INTRODUCTION

1.1. Background of Study

In this era of globalization, logistics and supply chain performance have become key elements in measuring a country's competitiveness in the international market.

All countries are competing to improve the efficiency and effectiveness of their logistics systems. This not only affects the level of investment received by the country, but also has a significant impact on improving the investment climate and increasing the competitiveness of the national economy as a whole (Irtyshcheva et al., 2020). One of the most obvious ways to improve logistics performance is to build infrastructure that supports it, such as building roads, airports, ports and other means of transportation (Cedillo-Campos, Piña-Barcenas, Pérez-González, &

Mora-Vargas, 2022). Many countries have allocated significant resources to improve their logistics infrastructure, and most have made considerable progress. Improving logistics and supply chain performance has become a major focus for many countries around the world. This is not only triggered by increasingly fierce global competition, but also due to recognition of the crucial role of logistics in driving a country's economic growth (Li, Hou, & Wu, 2017). In an effort to achieve greater efficiency in their logistics systems, many countries have allocated significant resources to building better logistics infrastructure, such as more modern highways, larger airports, and more efficient ports (He, Shen, Wu, & Luo, 2018; Ojala & Celebi, 2015). While these steps have had a positive impact, there are still challenges that need to be

overcome, in particular, the impact of logistics infrastructure development is still limited, even though large investments have been made (Salim & Negara, 2018). This issue is at the heart of the ongoing debate about how to maximize the economic benefits of investment in logistics infrastructure and is a key focus in efforts to achieve stronger economic competitiveness at the global level.

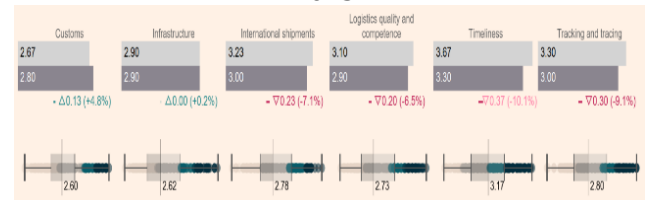
At the national level, Indonesia faces similar challenges in developing its logistics and supply chain performance. As an archipelagic country with a wide geographical spread, efficient logistics infrastructure is crucial in supporting sustainable economic growth. The Indonesian government has committed to improving logistics infrastructure, including building a road network, modernizing ports, and developing airport facilities (Izharsyah & Lubis, 2020). While these steps have had some positive impacts, there are challenges that must be resolved like an efficiency in the national supply chain. Obstacles such as complicated bureaucracy, regulatory obstacles, and ineffective coordination between various related parties, all contribute to obstacles in the Indonesian logistics system (Sandee, 2016; Turner, Prasajo, & Sumarwono, 2022). This impacts the overall performance of the supply chain, reducing the country's economic competitiveness in the global market. Additionally, investments in logistics infrastructure also raise questions about environmental impacts, including issues of ecological sustainability and climate change. Therefore, a deeper understanding of how to improve logistics efficiency while considering environmental aspects is important in the Indonesian context.

Indonesia, as a country with large economic potential and diverse geography, has made developing the logistics sector one of its main priorities in efforts to increase its economic competitiveness (Rochwulaningsih, Sulistiyono, Masruroh, & Maulany, 2019). Investment in logistics infrastructure, such as ports and roads, has become a focus of government attention. However, the main challenge faced is imperfections in logistics policies that have not been integrated across all ministries and government agencies involved in the national supply chain (Voak & Fairman, 2023). As a very important measure in evaluating a country's logistics performance, the Logistics Performance Index (LPI) provides a clear picture of the extent of the efficiency and effectiveness of the Indonesian logistics system (Beysenbaev & Dus, 2020; Rezaei, van Roekel, & Tavasszy, 2018). Understanding the LPI results is key in motivating the Indonesian government to continue improving its logistics efficiency, while creating a more integrated and comprehensive policy framework.

LPI is a benchmarking tool developed by the World Bank that measures performance along the logistics supply chain within a country. Arvis, Alina Mustra, Ojala, Shepherd, and Saslavsky (2010) explains that the LPI allows for comparisons across

167 countries, helping countries identify challenges and opportunities to improve their logistics performance. Beysenbaev and Dus (2020) proposes a modified index that represents an objective view of 159 countries' logistics systems and subsystems, based on international statistical data, which can be used as a benchmarking tool for governments. However, LPI can be biased towards a subjective view on different countries' logistics systems. Eyob and Kahsai (2019) explores the relationship of critical logistics factors with the LPI and how a landlocked and low-income country like Rwanda was able to improve its logistics performance. The estimated logistics index can be used to improve the ability to compete and improve logistics performance. The logistics performance index published by the World Bank Group plays a vital role in companies' performance as well as the economies of nations (Minnow, Eric, & Bányai, 2022).

Figure 1. Indonesia's Logistics Performance Index 2023



Source: Authors adopted from the World Bank 2023

What drives Indonesian LPI is a critical question that sheds light on the overall state of logistics performance in the country. In Figure 1, among the six indicators that make up the LPI, the fact that only two have shown improvement over the past five years indicates that the logistics performance in Indonesia is facing significant challenges and complexities. The LPI, as a composite index, comprises various aspects of logistics performance, such as customs clearance, infrastructure quality, timeliness, and tracking and tracing. The increase in scores for customs and infrastructure indicators suggests some positive developments in these areas, which can be attributed to the government's efforts to invest in infrastructure development and streamline customs procedures. These improvements are crucial as they contribute to the overall efficiency of the supply chain, reducing bottlenecks and delays. However, the fact that four out of the six indicators have declined, including international shipments, logistics quality and competence, timeliness, and tracking and tracing, raises important questions. These declines signify challenges in other critical aspects of logistics, such as the speed of international shipments, the quality and competence of logistics services, adherence to delivery schedules, and the ability to track and trace goods accurately. These challenges can lead to increased costs, delays, and decreased competitiveness in the global market.

The current logistics condition in Indonesia still faces several significant challenges. One of the main issues that needs attention is the lack of integrated logistics policies between various ministries and government institutions (K/L). To date, there is no single, unified, or integrated logistics policy framework in one effective coordinating body. The impact of these imperfections is reflected in the 2023 LPI results. In the LPI 2023, as seen in Figure 1, that Indonesia is experiencing mixed developments. Of the six indicators measured, there were two indicators that experienced an increase, in terms of customs measures and infrastructure. On the contrary, four other indicators experienced a decline, which included international shipping, logistics quality and competence, timeliness, and tracking and tracing. What is more worrying is that customs indicators, despite improving, remain the lowest scores over decades. However, it is important to remember that the impact of massive Indonesia's infrastructure development, although positive, is still not fully maximized. Therefore, further analysis is needed to understand some reasons for the impact which is still limited and less efficiency and economic benefits resulting from investment in logistics infrastructure. Understanding what drives the Indonesian LPI requires a comprehensive analysis of various factors, from infrastructure development to the digitalization of logistics processes and the competence of logistics service providers. While some positive strides have been made in certain areas, the overall logistics performance in Indonesia appears to be facing complexities and hurdles. Addressing these challenges will be essential for enhancing the country's logistics efficiency, boosting economic competitiveness, and attracting investments in the long run.

This paper contributes to providing a key reference in the formulation of a more focused, unified and integrated government logistics policy especially under the roles of the Indonesian Customs and Excise. With a deeper understanding of the issues affecting LPI rankings and the steps other countries have successfully taken to overcome similar challenges, the Indonesian government and the Indonesian Customs and Excise can design more effective policies to address falling LPI rankings. This, in turn, can help drive improvements in national logistics performance. Besides, it is a guide for parties involved in building logistics entities at various levels, including intra-government sector (G to G), public-private sector (G to B), and between intra-private sectors (B to B). In this context, the results can provide valuable insights into best practices, strategies and effective measures in improving supply chain and logistics efficiency for all stakeholders including the Indonesian Customs and Excise. Thus, logistics entities at all levels can refer to this research to guide their efforts in achieving better and more competitive logistics performance.

Against this background, we argue that the decline in Indonesia's LPI ranking is a complex and multifactorial problem. Although this study seeks to

identify the underlying causes, it must be remembered that the global and internal factors contributing to this decline can be very complex. In addition, there is an important role for the Indonesian Customs and Excise in the context of the decline in the LPI ranking and its impact on the national supply chain. As one of the main actors in supervising the export and import process, the Indonesian Customs and Excise has a very important role in determining the extent of the flow of goods through the entrances and exits of the country. The development of policies and best practices by the Indonesian Customs and Excise can be key in increasing the efficiency of the national supply chain. It also creates an opportunity to explore the role of the Indonesian Customs and Excise in facilitating smoother international trade.

2. LITERATURE REVIEW

Countries worldwide have made significant strides in improving their logistics performance, driven by a growing recognition of the pivotal role that logistics and supply chain efficiency play in economic development. This progress is often assessed through various LPI and supply chain systems from multiple angles. Some countries have progressed towards different logistics performance indexes of different countries. Supply management is going through a significant paradigm shift. Supply chain management from the perspective of government involves responding to changes in demand, investing in information technology, identifying crucial supplies and strategic issues, and innovating incrementally (Helmold & Terry, 2021). The paradigm shift in supply management is driven by factors such as globalisation, increasing cost pressures, and concentration on core competencies (Helmold, Terry, Helmold, & Terry, 2021). Supply chain management can yield innovative procurement techniques and improve the supply of production, technology, factors, and institutions (Holt & Ghobadian, 2009). Supply management can achieve the transformation of economic development.

The performance of logistics and supply chain system from four aspects are finance, customers, inner managing flow and study development. As Lin and Ho (2009) constructed a scorecard to measure logistics and supply chain performance in Chinese firms, while Paddeu (2016) reviewed the main methods and indicators used to evaluate supply chain performance. Yildiz (2017) investigated the relationship between logistics performance and global competitiveness, finding that logistics performance is positively associated with global competitiveness. Some variables in global competitiveness scores contribute much higher to the logistics performances than other variables through analysis. Meanwhile, Islam (2014) assessed logistics performance in selected developing and developed countries, finding that progress in logistics performance varies across countries and that

country-specific actions are needed to improve less-well performing areas of logistics services.

In recent years, the field of supply chain management has undergone a transformative evolution, largely driven by the integration of cutting-edge technologies. Researchers and industry experts alike have recognized the profound impact of these advancements, leading to a surge in scholarly investigations into the realm of Supply Chain Management 4.0 (SCM 4.0). Two noteworthy studies in this domain have contributed significantly to our understanding of this paradigm shift. Zekhnini, Cherrafi, Bouhaddou, Benghabrit, and Garza-Reyes (2020) present a review of the existing literature on supply chain management 4.0 and identify the impact of novel technologies on different supply chain processes. By synthesizing a wide range of studies and insights, it provides a holistic perspective on the potential of SCM 4.0 to revolutionize the way supply chains operate. Yuan and Xue (2023) discusses the new generation of supply chain management, including SCM 4.0, and its potential to transform the industry. As global supply chains become increasingly complex and interconnected, the need for agile and tech-driven solutions is more pressing than ever. It sheds light on the innovative approaches and strategies that can enable businesses to harness the power of SCM 4.0 effectively.

A Single Window system is a solution for improving logistics efficiency. The absence of single window guidelines for maritime transport is a problem for many countries. Ahn (2010) proposes guidelines for a Single Window system in maritime logistics, which can reduce processing time and cost due to single submission. Qenaatzadeh, Emad, and Saybani (2015) argues that a Single Window system can save time and costs by allowing different trading and transportation through a window of information and documentation for all imports and exports. Oliveira, Barros, de Carvalho, and Melo (2017) presents an innovative Logistics Single Window system that offers optimized and integrated door-to-door services. Osório, Camarinha-Matos, and Afsarmanesh (2013) discusses the need for collaboration among stakeholders with a diversity of processes and technology in the development of a Single Window concept for multimodal door-to-door freight transport management.

The topic of Performance Measurement within the Customs context is thoroughly examined, encompassing both theoretical and practical aspects. Specifically, the paper delves into four overarching approaches: Customs Data Mining, Service Charters, Perception Indexes, and Monitoring Mechanisms (Ireland, Cantens, & Yasui, 2011). The central conclusion drawn from this analysis is that the primary objective of performance measurement in Customs should revolve around enhancing the efficacy and efficiency of Customs administrative functions. Furthermore, it highlights that as a secondary benefit,

such as performance measurement can also play a role in attracting financial support from donors. Matsuda (2012) offers an introduction to the 2011 version of the Time Release Study (TRS) Guide created by the World Customs Organization (WCO). It presents an overview of the WCO TRS Guide, highlighting its fresh components, and showcases practical examples of TRS findings. Furthermore, the paper explores the central focus of TRS, examining ways to employ the TRS methodology at an international level. This utilization aims to assess the performance of both a supply chain and an international corridor, critical elements in strengthening regional collaboration and integration.

3. RESEARCH METHODOLOGY

This paper employs a data-driven analysis (Van Waarde, Eising, Trentelman, & Camlibel, 2020) to analyse and identify factors that influence logistics performance, measure their impact, and formulate more appropriate policy recommendations. However, data-driven analysis in this study is limited to a descriptive statistical visualization rather than employing fuzzy Delphi method (FDM) and Entropy weighted method (EWM). It helps the Indonesian government, the Indonesian Customs and Excise and related stakeholders to make more effective decisions to improve Indonesia's logistics and supply chain performance. Data-based analysis has an increasingly important role in guiding sustainable policies and strategies for improving Indonesia's logistics performance. In doing so, some steps are undertaken in a data-based analysis approach. First, we collect relevant data about Indonesia's logistics performance from various trusted sources, especially open data available through the World Bank. This data will include information on LPI indicators in 2023, such as customs, international shipping, logistics quality, timeliness, tracking and tracing, as well as other data related to the national supply chain including ASEAN countries. Once the data is collected, we conduct descriptive statistical analysis and data visualization to identify significant trends, patterns and relationships. This analytical method answers research questions about the factors that influence Indonesia's logistics performance by referring to data available through the World Bank.

This study raises questions to what extent are the steps and changes in logistics policy implemented by the Indonesian government able to respond to the LPI's decline such as international shipping, logistics quality, timeliness, and tracking and tracing? We analysed actions have been taken by the Indonesian government to overcome the logistics and supply change issues and the impact of a decline in the LPI ranking on Indonesia's overall economic competitiveness. Another question is how Indonesia's LPI 2023 ranking compares with other ASEAN member countries. It explores lessons that can be learned from ASEAN countries that have managed to

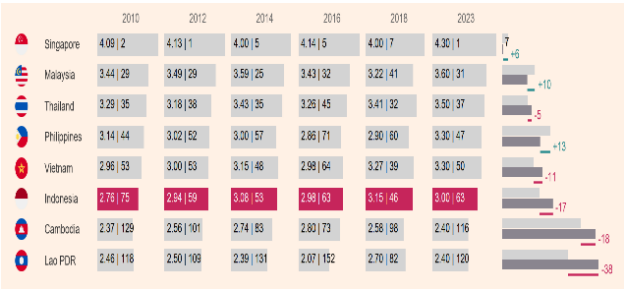
maintain or improve their LPI rankings. A long-term plan to overcome these challenges and improve Indonesia's overall logistics competitiveness are also analysed. We evaluate the integration of logistics policies among the various ministries and government agencies involved in the national supply chain be improved.

In the analysis step, we examine whether there is a correlation between improvements in customs indicators and improvements in overall logistics performance. The results of this analysis will provide a deeper understanding of how certain factors contribute to Indonesia's LPI ranking. Then, we interpret the results of this analysis to answer our research questions and identify the most influential factors in Indonesia's logistics performance and formulate relevant policy recommendations. For example, if the analysis shows that customs issues have a significant impact on logistics performance, we will recommend concrete steps that the government can take to improve customs processes.

4. RESULTS AND FINDINGS

4.1. Findings

Indonesia's drop of 17 ranks in the World Bank's LPI for the year 2023 is a notable shift in its logistics competitiveness. This decline in position over the past five years now places Indonesia at the 63rd position among 139 countries. The LPI is a key indicator of a nation's efficiency in managing its logistics and supply chain operations, making this decline a matter of significant concern. What's particularly intriguing about Indonesia's performance in the 2023 LPI is that, despite the overall drop in rank, certain indicators have shown improvement. Notably, Indonesia's customs and infrastructure scores have seen an uptick compared to the previous edition. These improvements are reflective of government efforts to streamline customs procedures and invest in infrastructure development, both of which are crucial factors in enhancing logistics efficiency. However, it is essential to put Indonesia's performance into regional context. As shown in Figure 2, among its neighboring countries, Malaysia and the Philippines have emerged as top performers in the 2023 LPI. Both nations have made significant jumps in their rankings, indicating effective strategies and robust logistics systems. These improvements may offer valuable insights for Indonesia as it seeks to reverse its downward trend in the LPI rankings. In light of these developments, it becomes imperative for Indonesia to analyze the key drivers behind its decline in logistics competitiveness and to understand what has contributed to the successes of its neighbors. This analysis can serve as a basis for crafting a strategic roadmap to improve logistics performance, thereby bolstering Indonesia's economic competitiveness and attractiveness on the global stage.



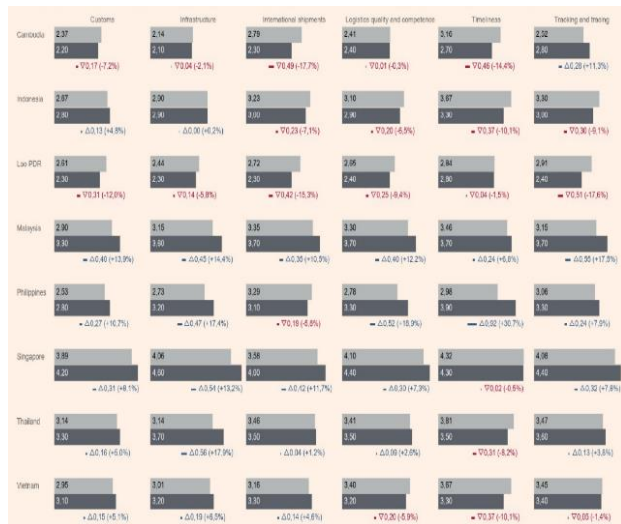
Source: Authors adopted from World Bank 2023

Comparing Indonesia's Logistics Performance Index (LPI) ranking within the ASEAN region provides a valuable perspective on the country's logistics competitiveness. In recent years, Indonesia has faced challenges in maintaining and improving its LPI ranking, with indicators such as international shipping, logistics quality, timeliness, and tracking and tracing showing decline. To address these issues effectively, it is essential to compare Indonesia's performance with that of its ASEAN counterparts. By comparing against other countries in the region, Indonesia can identify best practices, successful strategies, and areas for improvement. This comparative analysis allows policymakers and stakeholders to gain insights into what has worked well in neighboring nations and adapt relevant strategies to enhance Indonesia's logistics competitiveness.

As demonstrated in Figure 3, the LPI for the year 2023 provides a comprehensive snapshot of logistics efficiency and competitiveness in ASEAN countries across various indicators. These indicators offer valuable insights into the strengths and weaknesses of each nation's logistics systems, reflecting their ability to facilitate the smooth movement of goods and drive economic growth. Among the ASEAN countries, Malaysia and the Philippines stand out as top performers in the LPI rankings for 2023. Both nations have shown a significant improvement in their rankings compared to previous editions, indicating their commitment to enhancing logistics efficiency and competitiveness. These improvements can be attributed to various factors, including investments in infrastructure, streamlining customs processes, and fostering an environment conducive to trade and logistics.

Figure 2. LPI 2023 of ASEAN Countries in over Decades

Figure 3. LPI 2023 in ASEAN Countries by Indicators



Source: Authors adopted from World Bank 2023

The LPI's breakdown by indicators in Figure 3, provides a nuanced view of each country's logistics strengths and areas that require improvement. For example, some nations may excel in customs procedures but face challenges in infrastructure development, while others may have efficient transport networks but struggle with timeliness in deliveries. Analyzing these indicators allows governments and stakeholders to target their efforts effectively and adopt strategies that align with their specific logistics needs. Overall, the LPI 2023 in ASEAN countries offers a valuable tool for assessing logistics performance, benchmarking against regional peers, and crafting strategies to enhance competitiveness. It serves as a foundation for regional collaboration and knowledge sharing, fostering a conducive environment for the development of robust and efficient logistics systems across Southeast Asia.

Moreover, comparing Indonesia's LPI ranking within ASEAN helps highlight potential areas of collaboration and cooperation among member countries. As logistics often involves cross-border movements, harmonizing practices and standards within the region can lead to more efficient and cost-effective supply chains. Lessons learned from ASEAN countries that have managed to maintain or improve their LPI rankings can inform Indonesia's long-term planning to overcome logistics challenges. This strategic approach involves a careful examination of the policies, infrastructure investments, and institutional frameworks that have contributed to success in logistics management within the region. The impact of the decline in Indonesia's LPI mainly due to the indicator experiencing a decline, has a very significant impact on various aspects of the economy and business in this country. One of the most obvious impacts is an increase in logistics costs. Decreased efficiency in the supply chain, delays in shipping

goods, and other problems associated with lower LPI can lead to higher logistics costs. This has an impact on the prices of goods, which are likely to rise, and this can affect consumer purchasing power and overall inflation.

Figure 4. LPI GAP 2023 in ASEAN Countries



Source: Authors adopted from World Bank 2023

Figure 4, illustrating LPI gap analysis for ASEAN countries in 2023, offers critical insights into Indonesia's logistics competitiveness within the regional context. Indonesia finds itself in Quadrant II, a position that reflects its logistics-friendliness exceeding the global median but also highlights a concerning trend of a declining LPI ranking over the years. The fact that Indonesia is categorized as "more logistics-friendly" suggests that it has the potential and capability to provide efficient logistics services. However, the simultaneous downward trajectory in its LPI ranking signals challenges within the nation's logistics landscape that have not yet been fully addressed. These challenges might include delays in customs clearance, infrastructure bottlenecks, or issues related to timeliness and tracking within the supply chain.

The aspiration to move into Quadrant IV, positioned in the upper right-hand corner, is a compelling one. This quadrant represents a scenario where Indonesia not only maintains its logistics-friendliness but also significantly improves its LPI ranking, signalling both efficient and competitive logistics operations. Achieving this goal would require a comprehensive strategy that addresses the specific bottlenecks and challenges currently impeding Indonesia's logistics performance. To advance towards Quadrant IV, Indonesia should focus on enhancing key areas, such as customs efficiency, infrastructure development, and streamlining logistics processes. Regional cooperation within ASEAN can also play a vital role in facilitating cross-border trade and addressing logistics challenges collectively. This LPI gap analysis emphasizes the importance of recognizing Indonesia's logistics strengths while

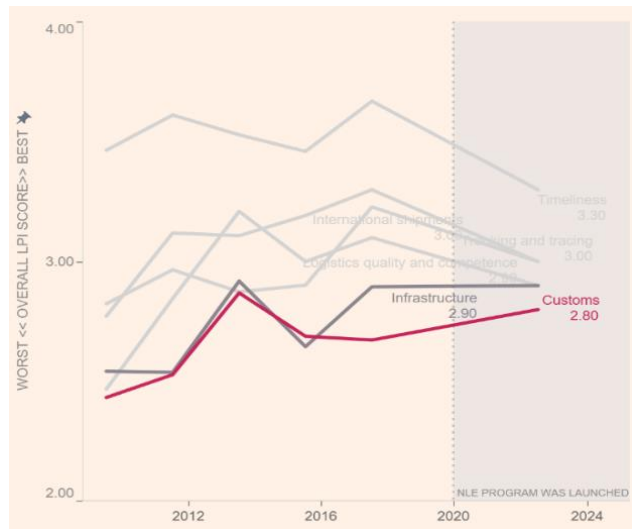
acknowledging the pressing need for improvements. The aim to transition to Quadrant IV reflects a vision of a more competitive and efficient logistics sector that not only benefits the nation but also contributes to the broader economic growth and prosperity of the ASEAN region.

The decline in LPI also has an impact on Indonesia's global competitiveness. With a declining LPI ranking, Indonesia may be less attractive to foreign investors and international trading partners. This could result in a deterioration of the investment climate, which could impact long-term economic growth. High information asymmetry, which can occur due to uncertainty and non-transparency in supply chains, can also be an obstacle for investors seeking stability and certainty in doing business in Indonesia. In addition, the impact of the decline in LPI is also reflected in price disparities across the country. The inability to address logistics efficiency issues can lead to significant price differences between well-connected areas with better logistics infrastructure and less connected areas. This can create economic and social inequality in society. In this context, LPI benchmarking with neighboring countries in ASEAN becomes increasingly important. Through this comparative analysis, Indonesia can identify factors that contribute to the decline in LPI and learn from best practices in other countries. In this way, efforts to overcome the negative impacts of the decline in LPI can be more focused, coordinated and effective, thereby enabling Indonesia to rebuild its logistics competitiveness and improve its position in the global market.

The Indonesian Customs and Excise as part of Indonesia's logistics and supply chain ecosystem, plays a very important role in the smooth running of exported and imported goods as well as in providing trade facilitation and assistance to industry. It is not only a service provider in the supply chain, but also has a strategic role in improving the LPI ranking, especially in the Customs or Border Control Management (BCM) indicator which currently has the lowest score compared to other indicators. The active participation of the Indonesian Customs and Excise in efforts to improve the LPI score, especially in the Customs/BCM indicator, is a very positive thing. By increasing efficiency in the customs process, it can contribute significantly to improving Indonesia's overall logistics performance. However, the main problem is the public's wrong perception that all logistics and supply chain matters are the responsibility of the Indonesian Customs and Excise. In fact, the supply chain involves many other stakeholders, such as logistics actors, manufacturers, distributors and other government institutions. It is important to clearly communicate the role of each stakeholder in the supply chain and increase public understanding of the broader logistics ecosystem. In addition, cooperation between the Indonesian Customs and Excise, the private sector and other government institutions should be increased to create

greater synergy in efforts to improve Indonesia's logistics performance. With an integrated approach and closer cooperation between all stakeholders, Indonesia can improve its LPI ranking and optimize the national supply chain.

Figure 5. Indonesia's LPI by Indicators in Editions



Source: Authors adopted from World Bank 2023

As seen in Figure 5, the importance of improving customs and infrastructure within Indonesia's logistics sector cannot be overstated. These two aspects play a pivotal role in determining the efficiency and competitiveness of the country's supply chain. Customs processes and the quality of trade and transport-related infrastructure are vital factors that directly impact the speed and reliability of goods movement. One stunning observation is that both customs and infrastructure-related indicators have experienced significantly longer delays compared to other LPI indicators. These delays can lead to a cascade of problems within the supply chain, such as increased logistics costs, reduced reliability in meeting delivery schedules, and decreased overall efficiency. Delays in customs clearance, for instance, can result in unnecessary storage costs and prolonged lead times for businesses.

The persistence of delays in the customs indicator, which has remained relatively unchanged since 2010, despite higher position in 2016, highlights a concerning issue. It suggests that improvements in customs processes have been slower to materialize, despite their critical role in facilitating trade and boosting economic competitiveness. In this sense, the customs indicator used at LPI is customs and border management clearance, meaning not only customs but K/L and other logistics actors at the port. Delays in customs can deter foreign investors and hinder the flow of goods across borders, impacting not only logistics but also the overall investment climate. Indonesia has not prioritized efforts to streamline customs procedures and enhance trade-related

infrastructure. This disregards the involvement of investments in port facilities, road networks, and digitalization of customs processes. Additionally, ensuring coordination and collaboration between customs agencies and other stakeholders is crucial for reducing delays and improving efficiency. In the broader context, the need to improve customs and infrastructure highlights the urgency of crafting a strategic roadmap for enhancing logistics competitiveness. While benchmarking with neighboring countries can offer valuable insights, addressing these specific issues will be instrumental in revitalizing Indonesia's logistics sector, attracting investments, and ultimately bolstering its economic growth and competitiveness on the global stage.

Crafting a roadmap for enhanced logistics competitiveness in Indonesia is a multifaceted endeavor. It requires a comprehensive understanding of the factors influencing logistics performance, including infrastructure development, regulatory frameworks, and the capacity of logistics service providers. The comparing process plays a crucial role in shaping this roadmap by providing a clear picture of where Indonesia stands in comparison to its peers. With this information in hand, policymakers can develop targeted initiatives to address specific weaknesses and leverage strengths within the logistics sector. Additionally, the roadmap should consider the integration of logistics policies among various ministries and government agencies involved in the national supply chain. Efficient coordination and collaboration among these entities are vital for streamlining logistics operations, reducing bottlenecks, and ensuring the seamless movement of goods. An integrated approach to logistics policy can enhance Indonesia's overall competitiveness and attractiveness as a destination for trade and investment.

Comparing Indonesia's LPI ranking within ASEAN serves as a critical starting point for crafting a roadmap to enhance logistics competitiveness. By drawing insights from regional peers, Indonesia can identify strategies to address its logistics challenges effectively. This roadmap should encompass a holistic approach, including infrastructure development, policy reforms, and improved coordination among stakeholders, to position Indonesia as a competitive player in the global logistics landscape.

4.2. Discussion

Enhancing logistics and supply chain productivity has emerged as a significant priority for many countries worldwide. To support it, the budget allocated for Indonesia's logistics infrastructure has increased significantly in recent years. This increase includes the construction of roads, ports and airports which are core infrastructure in the supply chain. In the context of the LPI's downgrade, this budget increase can be interpreted as a positive response from the government to address infrastructure

problems that may affect logistics performance. However, in addition to increasing infrastructure budgets, data analysis also reveals that there are significant challenges related to digitalization in the logistics industry. Although some progress has been made in terms of digitalization, there are still a large number of logistics players who have not fully adopted digital technology in their operations. This affects efficiency and visibility in national supply chains.

The increase in the budget allocated for Indonesia's logistics infrastructure is a positive action that shows the government's commitment to addressing infrastructure problems that have long been an obstacle in the national supply chain. With greater investment in the construction of roads, ports and airports, it can anticipate improvements in connectivity and accessibility which are critical for the smooth movement of goods. However, it is important to remember that budget allocation alone is not enough; Effective planning and implementation are also required to ensure that these investments produce a real impact on logistics performance. Therefore, careful evaluation and monitoring of these infrastructure projects will be key to ensuring efficient use of the budget.

The limitations in digitalization of logistics actors highlight important challenges that must be overcome in improving Indonesia's logistics performance. Digitalization is a key factor in increasing efficiency, transparency, and timeliness in supply chains. In this context, the government needs to consider concrete steps to encourage and facilitate the adoption of digital technology by logistics players. This could involve training, incentives or developing a regulatory framework that supports innovation in the logistics industry. In addition, collaboration between the public and private sectors in encouraging digitalization can also produce faster results. Improving Indonesia's logistics performance requires a holistic approach. Infrastructure improvements must be supported by effective digital transformation, and vice versa. Careful planning, efficient implementation, and cooperation between various stakeholders will be the key to achieving significant improvements in logistics performance.

Apart from the aspects of increasing infrastructure budgets and limitations in digitizing logistics actors, there is no widely applicable standardization of logistics data. A lack of standardization in logistics data can be a serious obstacle in achieving the required efficiency and visibility in the supply chain. In a logistics industry that involves multiple stakeholders, including manufacturers, distributors, logistics providers and regulatory authorities, data standardization can facilitate information exchange and better cooperation across the supply chain. The rapid advancement of digital technologies has significantly altered the competitive landscape of the logistics service industry,

compelling established logistics service providers (LSPs) to embrace digitalization (Cichosz, Wallenburg, & Knemeyer, 2020). The benefits of blockchain in supply chains, such as BCT-based tracking and tracing, rely on a critical mass of supply chain participants adopting the technology (Sternberg, Hofmann, & Roeck, 2021). However, in the vertical context, the adoption and integration decisions made by one supply chain participant have a recursive impact on the adoption and integration decisions of other supply chain actors. Meanwhile, using radio-frequency identification (RFID) in the context of supply chain management (SCM), offers a range of benefits compared to its predecessor, the barcode, its current cost remains a significant barrier for many businesses (Michael & McCathie, 2005). Addressing the lack of standardization in logistics data is vital for enhancing efficiency and visibility across the supply chain, especially in a multi-stakeholder logistics industry. Embracing digitalization, including technologies like blockchain and RFID, presents opportunities for overcoming these challenges and driving supply chain excellence.

It emphasizes the importance of addressing the issue of logistics data standardization in improving Indonesia's logistics performance. The Indonesian government, together with other stakeholders, has not actively participated in initiatives to create a nationally applicable data standardization framework. This has not helped facilitate system integration and more effective communication between various actors in the supply chain, which in turn can support efforts to achieve better logistics performance. Otherwise, by focusing on standardizing logistics data, Indonesia can build a stronger foundation to support economic growth and national competitiveness through a more efficient and integrated supply chain. Wahyuni, Taufik, and Hui (2020) reveals that a disparity between policy expectations and the actual facilitation of ports was identified, primarily due to inefficiencies in government bureaucracy, customs procedures, and strategic decision-making. Port competitiveness hinges on government-related factors, and while government initiatives are a step in the right direction, they are insufficient.

There has been no significant integration or collaboration between the Indonesian government through relevant stakeholders and the private sector in efforts to improve logistics performance, which is one of the inhibiting factors and shortcomings in policy practice. In complex supply chains, close cooperation between the public and private sectors is essential to achieve optimal results. However, this ecosystem has not been built towards the importance of building stronger partnerships between government and logistics industry players. Current collaboration has not involved various forms, including more intensive dialogue, the formation of joint working teams, and the formulation of joint policies. Indonesia relies heavily on sea transportation for the movement of goods between its islands due to

its cost-effective capacity for large cargo volumes. However, achieving consistent pricing standards across regions, especially those distant from production centers, poses challenges. Sunitiyoso et al. (2022) argue that several systemic factors influencing system performance were identified, with infrastructure development, encompassing both physical and non-physical aspects such as information technology, service protocols, and workforce capacity, emerging as crucial levers in enhancing the service system.

Integration between the public and private sectors has not overcome existing obstacles, such as standardization of logistics data, and support the implementation of effective solutions for supply chain improvement. Therefore, to improve Indonesia's logistics performance, it is important to encourage closer integration and collaboration between various stakeholders, so that improvement efforts can be carried out in a more coordinated and efficient manner. Pugliatti (2011) suggests that the remedy involves a fundamental reconsideration of supply chain management. This entails capturing cargo-related information as early as possible, ideally from the consignor, and ensuring that this data remains unaltered when shared with border authorities downstream. To implement this concept, Hesketh proposed the creation of a web-based, smooth-flowing electronic "data pipeline" that connects the seller/consignor, the buyer/consignee, as well as relevant economic operators in between, all in collaboration with customs authorities.

Currently, a quite striking finding is the lack of clarity from the Indonesian government regarding which LPI indicators are the main priority in efforts to improve logistics performance. To increase national logistics competitiveness, the Indonesian government have not determined a clear focus on the most impactful LPI indicators, so that resources and efforts can be directed effectively. It raises important questions about poor strategies for improving Indonesia's logistics performance. Along with increasing infrastructure budgets, digitizing logistics players, standardizing data, and integrating the private and public sectors, the Indonesian government has not identified the most significant LPI indicators in the national context and commit to prioritizing them. If setting clear priorities, improvement measures can be focused on aspects that have the greatest impact on Indonesia's overall logistics performance. To achieve significant improvements in the national supply chain, the government needs to establish clarity in the priority of LPI indicators which will become the basis for targeted improvement steps. Roy, Mitra, Chattopadhyay, and Sahay (2018) mentions that by associating the dataset with relevant variables of interest, one can extract additional insights into logistics performance. It suggests linking the six LPI dimensions with a significant macroeconomic variable.

The absence of tracking and tracing services available in all logistics services is a problem that delays the improvement of Indonesia's logistics performance. The ability to track and trace the movement of goods is critical in ensuring timeliness and efficiency in the supply chain, as well as providing the necessary visibility for all stakeholders. It has not been expanded and improved towards the availability of track and trace services in all logistics services in Indonesia. Governments, together with the private sector, lack to work together to develop standards and frameworks that require logistics providers to provide these services. As a result, it has not created transparency in the national supply chain, reduce the risk of lost or delayed goods, and overall support improved logistics performance. In the context of LPI, the provision of track and trace services can contribute to better LPI rankings and can be one of the priority indicators for the government. By increasing visibility and overcoming limitations in track and trace services, Indonesia can take significant steps in supporting improved logistics performance and increased competitiveness of its national economy. Bal, Rajput, and Alizada (2017) mentions that various international organizations have made efforts to support the implementation of national and regional single windows, and the logical next step is to internationalize and ensure their interoperability to enable more effective collaborative information sharing. The objective of this paper is to assess the legal framework needed to establish an international single window environment (ISWE) and, in that context, explore specific economic and financial aspects related to ongoing developments. The discussion underscores the desirability of ISWE, as it has the potential to create a fairer playing field for small and medium-sized enterprises (SMEs) participating in global supply chains. The paper examines the ASEAN Single Window (ASW) to identify opportunities and challenges, emphasizing the legal and economic feasibility of interoperability.

In addition to tracking and tracing inefficiency, low punctuality in cargo delivery is a prominent issue in the case of Indonesia's logistics performance. Timely delivery of goods is crucial in maintaining a smooth supply chain and meeting customer needs. In the LPI context, timeliness indicators are an element that is of great concern because of its impact on efficiency and trust in the supply chain. So far, it has not been comprehensively exposed the causes of low on-time delivery of cargo in Indonesia. Factors such as inadequate infrastructure, customs constraints, and challenges in regional distribution can impact timeliness. Therefore, the Indonesian government has disregarded the focus on improving these aspects as part of a national logistics improvement strategy. By overcoming the obstacles that hinder punctuality, Indonesia can improve its image in the international logistics arena and increase national economic competitiveness. Threats to seaports can disrupt

supply chain continuity, making it essential to assess and understand these risks (Martí, Puertas, & García, 2014). It reveals that a risk score is used to gauge the level of clarity regarding risk probability, with lower scores indicating a higher likelihood of seaport risk leading to supply chain disruptions. Twenty-four risk attributes are evaluated, and the top five risk factors identified include inadequate storage risk planning, poor punctuality in delivering goods, limited port capacity, waterway congestion, and insufficient distribution risk planning.

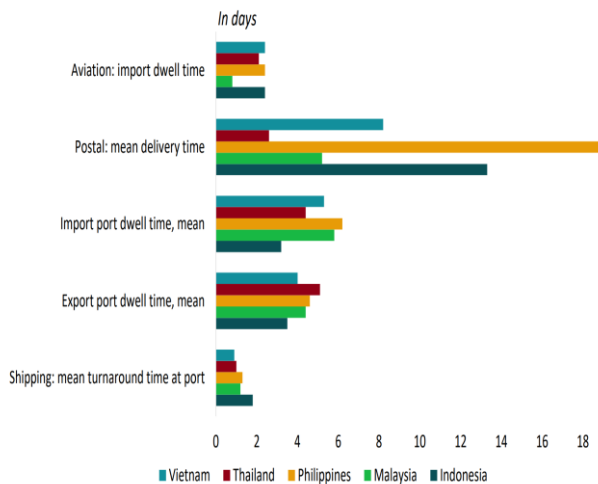
In the context of Indonesia's logistics performance, the inequality of competencies in the logistics industry is a significant concern. The success of the supply chain depends greatly on the competence and professionalism of the logistics actors involved, including logistics providers, expeditions, and customs agencies. However, it finds that there are brokers or logistics actors with low competence (low logistics competence) indicating that there are still obstacles in efforts to improve the quality of logistics services in Indonesia. Competency inequality can also have a negative impact on Indonesia's LPI ranking, especially in indicators related to competency and quality of logistics services. The government has not contributed to setting competency standards, providing training and certification, and monitoring practices in this industry. In addition, collaboration between the private sector and educational institutions has not been initiated in producing a more skilled and trained workforce in the field of logistics. Hence, increasing the competence of logistics players, especially brokers or logistics agents, must be one of the main focuses in the strategy to improve national logistics performance.

Based on United Nation on ESCAP (2021), to improve the effectiveness of transportation and logistics connectivity in the ESCAP region in Indonesia, the ESCAP Transport Division consistently engages in initiatives such as research projects, studies, and training programs, including the Training-of-Trainers (TOT) program. These efforts aim to enhance technical knowledge in the transport and logistics sector and facilitate capacity-building, particularly in developing countries within the ESCAP region. In the context of Southeast Asia, Indonesia, which is the most populous and economically significant country in the subregion, faces distinctive transportation and logistics challenges due to its archipelagic nature, comprised of thousands of islands. In response, ESCAP conducted a comprehensive study project.

In relation with docking process time at the port (turnaround time) and delivery time at post offices in Indonesia as demonstrated in Figure 6, these two aspects have a significant impact on national logistics performance. It shows that there are slow turnaround times at ports which result in delays in the movement of goods, while slow delivery times at post offices has affected the timeliness of goods delivery. It indicates

the Indonesian government has not focused on improving efficiency in logistics processes at ports and post offices. The government lacks to identify the causes of slow turnaround times at ports and work with port authorities to implement the necessary changes. On the other hand, improving technology and processes at post offices has not been fully deployed and integrated to reduce slow delivery times.

Figure 6. Turnaround and Delivery Time in ASEAN Countries in Days



Source: Authors adopted from World Bank 2023

In the LPI context, these two aspects are very important indicators that can influence Indonesia's overall logistics ranking. Therefore, efforts to overcome the problem of turnaround time at ports and delivery time at post offices must be part of the strategy to improve national logistics performance. By reducing the time required for this process, Indonesia can increase its competitiveness in the world of global logistics and improve its LPI ranking. Banomyong, Cook, and Kent (2008) provided essential components, including guiding principles, six major policy areas, and a logistics sector integration roadmap, which was subsequently finalized and approved by ASEAN. The formal endorsement of this policy, crucial for ASEAN's economic integration, is expected to facilitate logistics liberalization and progress within the region. In addition, the willingness to utilize port digitization services is likely to increase when users perceive the service as more useful (Iman, Amanda, & Angela, 2022). Conversely, if the negative coefficient associated with user trust rises, it will lead to a substantial decrease in users' intentions to use the service. Moreover, the high estimated value of the context variable indicates that users anticipate a positive experience while using the application, expecting it to bring benefits to their business.

Overall, the impact of Indonesia's downgrade in the 2023 World Bank LPI covers various aspects that have significant consequences on the national supply chain and the economy as a whole. In general, this decline has an impact on inefficiencies in the supply

chain, delays in supplies, and disrupted movement of goods. The inability to maintain punctuality and efficiency in logistics can result in increased operational costs, losses in production, and uncertainty in the supply of goods. However, the impact of a decline in LPI is not only micro in the sense of direct effects on supply chains and companies. At a macro level, the impact includes economic activity, competitiveness, and the national investment climate. A decline in logistics competitiveness could reduce Indonesia's attractiveness as an investment destination for foreign companies, hinder long-term economic growth, and create challenges in maintaining competitiveness in global markets. The increase in information asymmetry that occurs due to a lack of transparency in the supply chain can also have an impact on the investment climate. Investors tend to look for a stable and reliable environment in which to do business. Therefore, increasing transparency and efficiency in the supply chain can help increase investor confidence and encourage greater capital flows to Indonesia. Along with the decline in LPI, there is also an impact on the prices of goods which can affect inflation. Uncertainty in the supply chain can lead to increased logistics costs, which in turn can cause the price of goods to rise. This can affect consumer purchasing power and overall economic stability.

5. CONCLUSIONS

The logistics landscape in Indonesia presents a mix of challenges and opportunities. While there have been positive developments in certain areas such as customs measures and infrastructure, the overall LPI for Indonesia remains a cause for concern. Four out of six indicators, including international shipping, logistics quality and competence, timeliness, and tracking and tracing, have shown a decline. Despite substantial investments in infrastructure, the full potential of these developments has not been realized, and inefficiencies persist in the logistics sector. There is a lack of integrated logistics policies among various government ministries and institutions. The absence of a unified and comprehensive logistics policy framework hinders the country's ability to leverage its infrastructure investments effectively. While Indonesia has made progress in some areas, such as infrastructure development and customs measures, there are lingering issues that need to be addressed. The decline in LPI rankings highlights the urgency of comprehensively tackling these challenges to enhance logistics efficiency and competitiveness.

Customs and infrastructure indicators, as areas subject to government policy regulations, fall fully under the authority of the government. In contrast, indicators related to service quality, timeliness, international shipments, tracking, and tracing are in the realm of the private sector, representing service delivery performance that generates outcomes. This division signifies the need for collaboration among stakeholders. Notably, while logistic performance

appears to be declining, economic growth is on the rise, making such collaboration even more crucial in ensuring the efficient movement of goods and fostering sustained economic development.

Indonesia can learn valuable lessons from successful ASEAN countries in maintaining and improving their Logistics Performance Index (LPI) rankings. While Indonesia currently falls within Quadrant II, indicating its logistics-friendliness surpasses the global median, the decline in its LPI ranking over time points to unresolved logistics challenges. This shows potential issues such as customs delays, infrastructure bottlenecks, and supply chain timeliness. In this sense, Indonesia has not conducted a thorough LPI gap analysis and benchmark itself against neighboring ASEAN nations. It implies that Indonesia can pinpoint specific areas for improvement and leverage best practices from other countries, enhancing its logistics competitiveness, contributing to economic growth in the ASEAN region, and transitioning to Quadrant IV, reflecting a more competitive and efficient logistics sector.

6. RECOMMENDATIONS

Addressing the challenges in Indonesia's logistics performance is essential for the country's economic competitiveness and attractiveness to investors. This study recommends that the Indonesian government should prioritize the development of an integrated logistics policy that involves cooperation between various ministries and government institutions. This unified framework can provide clear objectives and strategies to enhance the efficiency of the national supply chain. Furthermore, the Indonesian Customs and Excise should continue their efforts to streamline customs procedures and implement digital solutions to expedite clearance processes. Also, investment in infrastructure optimization, especially in road connectivity and energy infrastructure, can significantly improve operational performance. Besides, digitalization is another crucial aspect, where the adoption of digital platforms and technologies for tracking and tracing shipments can enhance transparency and logistics competence. This is to create collaboration among stakeholders, including government agencies, the private sector, and industry associations. Towards seamless supply chain management, regular monitoring and evaluation of logistics policies and initiatives are essential to track progress and make data-driven adjustments. In this sense, exploring the expanded role of the Indonesian Customs and Excise in facilitating international trade can help streamline trade processes and reduce bottlenecks. Further research should explore sector-specific logistics challenges, regional disparities, case studies of successful logistics initiatives, comparative analyzes with neighboring countries.

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