Improving logistics performance index in Myanmar: lessons from Thailand

Khaing Zar Zar Htun

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Improving Logistics Performance Index in Myanmar: Lessons from Thailand

By

KHAING ZAR ZAR HTUN
Myanmar

A dissertation submitted to the World Maritime University in partial fulfilment of the requirements for the award of the degree of

MASTER OF SCIENCE
In
MARITIME AFFAIRS

(SHIPPING MANAGEMENT AND LOGISTICS)

2021

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Declaration

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

(Signature): 

(Date) : 2021. 09. 21

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World Maritime University

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Acknowledgments

I am deeply indebted to the president of the World Maritime University, the Chairman of the Nippon Foundation, and the Director General of the Department of Marine Administration, Myanmar, for granting me the opportunity to take part in the Master programme at World Maritime University (WMU) in Malmo, Sweden.

I wish to extend my gratitude to my supervisor, Professor Dong-Wook-Song, for his substantial guidance and advice, time and supervision received during the writing of this dissertation. In addition, I do appreciate your moral support, knowledge and expertise given to me during the entire work.

I would like to express my appreciation to all professors and visiting lecturers for their tremendous support and guidance throughout the course and all my classmates who helped me sincerely during my studies.

Further, I wish to express my sincere thanks to the non-academic staff of WMU for assisting me at all levels and in every way possible during my stay in Sweden.
Abstract

**Title of Dissertation:** Improving Logistics Performance Index in Myanmar: Lessons from Thailand

**Degree:** Master of Science

Due to various changes in manufacturing and industrialization, global logistics services have improved dramatically. Consequently, the logistics industry is evolving in several ways, including integrating efficient transport network operators and excessive utilization of information technology. In addition, as global market demand gradually shifts, companies must develop intellectual strategies, including international logistics techniques, to compete competitively in managing supply chains. Therefore, the logistics sector is a competitive tool for businesses that want to maintain price power and provide additional services. The Logistics Performance Index (LPI) can be defined as one of the benchmarking tools published by the World Bank that measures the performance of the country’s logistics sector. LPI can help address the challenges and opportunities encountered in implementing the country's logistics performance and improving efficiency.

The objective of this study is to recommend the best practice for further developing LPI in Myanmar by reviewing the performance of Thailand, which has been progressed to the top performer group in the World Bank's LPI rankings in 2018. It was analysed on the performance of Thailand’s how to progress in LPI ranking. It examined how progress was being made at the LPI ranking in Thailand based on the six components of LPI. To develop Myanmar’s logistics sector needs the integration of significant components structuring the logistics system, including infrastructure, institutional framework and logistics service providers. Therefore, the government, professionals from the logistics sector, and the stakeholders need to work together to improve the country's logistics sector. In this way, the transport infrastructure and logistics sector will be in line with international standards and Myanmar's LPI rank is probable to rise in the coming years.

**Key words:** Logistics, Logistics Performance Index (LPI), Infrastructure, Myanmar, Thailand
### Improving Logistics Performance Index in Myanmar: Lessons from Thailand

#### Table of Contents

Declaration ......................................................................................................................................................... ii
Acknowledgments ................................................................................................................................................ iii
Abstract ........................................................................................................................................................... iv
Table of Contents ........................................................................................................................................... v
List of Tables .................................................................................................................................................... vii
List of Figures .................................................................................................................................................... viii
List of Abbreviations ..................................................................................................................................... ix

**Chapter 1 : Introduction** ............................................................................................................................ 1
  1.1 Background ............................................................................................................................................... 1
  1.2 Problem Statement ................................................................................................................................... 5
  1.3 Research Objectives and Research Questions ....................................................................................... 7
  1.4 Research Methodology ............................................................................................................................. 8
  1.5 Dissertation Structure ............................................................................................................................... 8

**Chapter 2 : Review on Logistics Sector in Myanmar** .................................................................................. 10
  2.1 Background Information of Myanmar .................................................................................................... 10
  2.2 Administration of Logistics Sector (Institutional Set-up) ....................................................................... 12
    2.2.1 Ministry of Transport and Communications (MOTC) .................................................................... 13
    2.2.2 Ministry of Construction (MOC) .................................................................................................... 14
    2.2.3 Yangon City Development Committee (YCDC) ............................................................................ 15
    2.2.4 Mandalay City Development Committee (MCDC) ....................................................................... 16
  2.3 Current Situation of Players of Logistics Sector ....................................................................................... 16
    2.3.1 Private Sector .................................................................................................................................... 16
    2.3.2 Public Sector ..................................................................................................................................... 17
  2.4 Domestics Transport Infrastructure ......................................................................................................... 17
    2.4.1 Road Transport .................................................................................................................................. 20
    2.4.2 Air Transport ..................................................................................................................................... 20
    2.4.3 Maritime Transport ........................................................................................................................... 22
    2.4.4 Rail Transport .................................................................................................................................... 24
  2.5 Quality of the logistics industry in Myanmar ........................................................................................... 25

**Chapter 3 : Overview of the Logistics Performance Index** ........................................................................ 27
  3.1 Description of the Logistics Performance Index ...................................................................................... 27
  3.2 The components of the Logistics Performance Index ............................................................................. 31
    3.2.1 Customs ............................................................................................................................................. 33
    3.2.2 Infrastructure ...................................................................................................................................... 33
    3.2.3 International Shipments .................................................................................................................... 34
    3.2.4 Service Quality .................................................................................................................................. 34
3.2.5 Tracking and Tracing System .................................................................35
3.2.6 Timeliness .........................................................................................35
3.3 Logistics Performance Index of Myanmar .............................................35

Chapter 4: Research Methodology .............................................................39
4.1 Introduction .........................................................................................39
4.2 Types of Methodology .........................................................................39
4.3 Research Design ..................................................................................41

Chapter 5: Examination of Logistics Performance Index in Thailand ..........43
5.1 Introduction .........................................................................................43
5.2 A brief overview of Thailand ...............................................................43
5.3 GDP and economic growth ..................................................................46
5.4 Logistics Performance Index of Thailand .............................................47
5.5 The components of the Logistics Performance Index ...........................50
  5.5.1 Customs .........................................................................................52
  5.5.2 Infrastructure .................................................................................53
  5.5.3 International Shipment .................................................................55
  5.5.4 Competence and quality of logistics services .................................56
  5.5.5 Tracking and Tracing .................................................................57
  5.5.6 Timeliness ....................................................................................58
5.6 Overview on Thailand’s LPI Performance ............................................60

Chapter 6: Recommending to Myanmar’s logistics sector after Learning Thailand’s LPI practices .................................................................61
6.1 Introduction .........................................................................................61
6.2 Challenges encountering Myanmar Logistics Sector ..........................61
6.3 A study on Thailand’s LPI practices for the improvement of Myanmar’s LPI ......63
  6.3.1 Customs (LPI score of 2.17) ..........................................................64
  6.3.2 Infrastructure (LPI score of 1.99) .......................................................64
  6.3.3 International Shipment (LPI score of 2.20) .....................................65
  6.3.4 Logistics competence (LPI score of 2.28) ......................................66
  6.3.5 Tracking and Tracing (LPI score of 2.20) .......................................67
  6.3.6 Timeliness (LPI score of 2.91) .......................................................68
6.4 Recommendations for Myanmar’s logistics sector ................................68

Chapter 7: Conclusion ................................................................................71
7.1 Summary .............................................................................................71
7.2 Contributions ......................................................................................71
7.3 Limitations ..........................................................................................72
References ..................................................................................................73
List of Tables

Table 1: Road Transport Information .................................................................20
Table 2: Air Transport Information .................................................................21
Table 3: Facilities of International Wharves in Myanmar ................................23
Table 4: Railway transport infrastructure and equipment ..............................25
Table 5: Top 10 LPI countries ...........................................................................30
Table 6: Bottom 10 LPI countries .....................................................................30
Table 7: The average LPI scores of the top 10 and the bottom 10 countries, 2007 to 2018 .................................................................31
Table 8: LPI ranks and scores of Myanmar from 2007 to 2018 ........................36
Table 9: LPI for Myanmar and Neighbouring Countries, 2018 ........................37
Table 10: LPI ranks and scores of Thailand from 2007 to 2018 .......................48
Table 11: Top-performing upper-middle-income group ..................................49
Table 12: Thailand’s sub-indicators LPI scores, 2007 to 2018 .........................51
Table 13: Trading across Borders in Thailand and East Asia Pacific – Score ....53
List of Figures

Figure 1: GDP of Myanmar ................................................................. 4
Figure 2: Annual GDP Growth Rate of Myanmar ...................................... 5
Figure 3: Structure of Dissertation .......................................................... 9
Figure 4: Map of the Republic of the Union of Myanmar ......................... 11
Figure 5: Organizational Structure of MOTC ........................................... 14
Figure 6: Organizational Structure of MOC ............................................. 15
Figure 7: Myanmar Transport Network .................................................. 19
Figure 8: Quintile of LPI scores ............................................................ 29
Figure 9: Input and Outcome of LPI Indicators ....................................... 32
Figure 10: LPI ranks and scores of Myanmar from 2007 to 2018 ............... 36
Figure 11: Sectoral results of Myanmar from 2007 to 2018 in the six components Source: World Bank ................................................................. 37
Figure 12: Comparison among Myanmar, East Asia & Pacific region and lower-middle-income countries ......................................................... 38
Figure 13: Map of Thailand .................................................................. 45
Figure 14: GDP of Thailand ................................................................ 46
Figure 15: GDP per capita of Thailand .................................................... 47
Figure 16: LPI ranks and scores of Thailand from 2007 to 2018 ............... 48
Figure 17: LPI ranks and scores of Thailand, East Asia & Pacific and Upper-middle-income group for the year 2018 .................................................... 50
Figure 18: Thailand’s sub-indicators LPI scores of 2018 .......................... 51
Figure 19: Quality of trade and infrastructure index of Thailand, East Asia & Pacific and Upper-middle-income group, 2018 ................................................. 55
Figure 20: Thailand’s logistics cost to GDP ............................................. 56
Figure 21: Competence and quality of logistics services indicator for Thailand, East Asia & Pacific region and upper-middle-income group ........................................ 57
Figure 22: The results of the six components of LPI in 2018 ....................... 59
## List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
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<tr>
<td>AH</td>
<td>Asia Highway</td>
</tr>
<tr>
<td>ASEAN</td>
<td>Association of South-East Asia Nations</td>
</tr>
<tr>
<td>BOT</td>
<td>Build, Operate, Transfer</td>
</tr>
<tr>
<td>CBTA</td>
<td>Cross-border trade agreement</td>
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<td>CBTI</td>
<td>Infrastructure for cross-border trade</td>
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<td>CLM</td>
<td>Council of Logistics Management</td>
</tr>
<tr>
<td>CSCMP</td>
<td>Council of Supply Chain Management Professionals</td>
</tr>
<tr>
<td>DCA</td>
<td>Department of Civil Aviation</td>
</tr>
<tr>
<td>DOB</td>
<td>Department of Bridges</td>
</tr>
<tr>
<td>DOH</td>
<td>Department of Highways</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GMS</td>
<td>Greater Mekong Sub-region</td>
</tr>
<tr>
<td>GMS FFA</td>
<td>GMS Freight Forwarding Association</td>
</tr>
<tr>
<td>GPS</td>
<td>Global Positioning System</td>
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<tr>
<td>ICT</td>
<td>Information and communication technology</td>
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<tr>
<td>ITF</td>
<td>International Transport Forum</td>
</tr>
<tr>
<td>ISM</td>
<td>Institute of Supply Management</td>
</tr>
<tr>
<td>IWT</td>
<td>Inland Water Transport</td>
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<tr>
<td>JICA</td>
<td>Japan International Cooperation Agency</td>
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<tr>
<td>LDC</td>
<td>Least Developed Countries</td>
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<td>LPI</td>
<td>Logistics Performance Index</td>
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<td>MAI</td>
<td>Myanmar Airways International</td>
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<td>MCDC</td>
<td>Mandalay City Development Committee</td>
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<tr>
<td>MCTA</td>
<td>Myanmar Container Truck Association</td>
</tr>
<tr>
<td>MHTSA</td>
<td>Myanmar Highway Freight Transportation Service Association</td>
</tr>
<tr>
<td>MIFFA</td>
<td>Myanmar International Freight Forwarders Association</td>
</tr>
<tr>
<td>MNA</td>
<td>Myanmar National Airline</td>
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<tr>
<td>MOC</td>
<td>Ministry of Construction</td>
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<tr>
<td>MOTC</td>
<td>Ministry of Transport and Communications</td>
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<tr>
<td>MPA</td>
<td>Myanmar Port Authority</td>
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<tr>
<td>MR</td>
<td>Myanmar Railway</td>
</tr>
</tbody>
</table>
MS - Myanmar Shipyards
MTLF - Myanmar Transport Logistics Federation
NESDC - National Economic and Social Development Council
NLMP - National Logistics Master Plan (2018-2030)
OECD - Organisation for Economic Co-operation and Development
PPP - Public-private partnership
SEZs - Special Economic Zones
SOE - State-Owned Enterprise
UN - United Nations
UNCTAD - United Nations Conference On Trade and Development
YCDC - Yangon City Development Committee
Chapter 1
Introduction

In the present day, communications between the eastern and western parts of the world, south and north, have increased with the globalization’s enlargement. Countries and regions that have never met and have almost no economic relations overlap strengthen reciprocal links and escalation in the global economic structure. Emerging markets rise to the fore even in a world where abundant products, services, and marketplaces are fiercely competitive. Countries that have been regarded as third world countries by the international community today become an object of world leaders’ competition. Among them, one of the most evident is the Republic of the Union of Myanmar, positioned on the access of the current economic retrieval. The evolution of the economy of Myanmar reached its 13th position in the world in 2015 (Ministry of Commerce, 2015).

1.1 Background

As a result of various manufacturing and industrial production transformations, global logistics services have increased dramatically and become incredibly dynamic and complex. Consequently, the logistics industry is evolving in several ways, such as mergers to form effective transport network operators, outsourcing, and excessive utilization of information technology. Furthermore, as global market demand becomes progressively sophisticated, companies must develop intelligent strategies, including international logistics techniques, to achieve a competitive edge in managing supply chains. As a result, the logistics sector is more attractive as a competitive tool for businesses wishing to maintain pricing power and provide additional services (Yildiz, 2014).
The Council of Logistics Management (CLM) defines “Logistics” as follows:

"Logistics management is that party of the supply chain process that plans, implements, and controls the efficient, effective flow and storage of goods, services and related information from the point of origion to the point of consumption in order to meet customers’ requirements."

The organization was renamed the Council of Supply Chain Management Professionals (CSCMP) in 2005 and provides a wide range of global support for logistics and supply chain management processes (Aye, 2019).

Moreover, according to the Institute of Supply Management (ISM), Supply Chain Management can be considered as:

"The design and management of seamless, value-added process across organizational boundaries to meet the real needs of the end customer."

On the other hand, the right type of service or product at the right place, at the right time and in the right condition is what logistics is all about. In recent years, the global logistics sector has expanded dramatically, with logistics being a progressively significant part of the economic business system and a significant global economic activity (Erkan, 2014). Moreover, logistics performance is a significant contributor to the country’s income, which is influenced by various commercial and public players (ITF, 2015).

The Logistics Performance Index (LPI) is the country performance index of the logistics sector, which has been published by the World Bank every two years since 2007. LPI is a rating system surveyed by the World Bank to attain better performance in fulfilling the nation's commercial logistics process. LPI evaluates the six components of the related logistics performance of the country (World Bank, 2018).
Logistics' significance in the world's marketplace is increasingly recognized today than it used to be a decade ago. The trade cost can be reduced by efficient logistics services. Moreover, the efficiency in which supply chains link businesses to domestic and international opportunities is referred to as logistics output. The LPI attempts to measure a country's logistical availability or how well it is integrated into the physical network of global logistics. (Arvis et al., 2018)

Myanmar is one of the Southeast Asia countries situated along the west coast of the peninsula of Indochina. There are five neighboring countries that border Myanmar: Thailand and the Lao PDR to the east; China to the northeast; India to the northwest; and Bangladesh to the west. Myanmar is also located within the three economic evolution poles, bounded by India to the west, China to the north, and ASEAN Countries to the south. Therefore, Myanmar lies at the heart of three vast consumption markets. Geographical location within the international transport corridor is another crucial reason for the country to gain a competitive benefit in the global supply chain. (Benassi, 2015). When the infrastructure for cross-border trade (CBTI) and regulations for cross-border trade agreement (CBTA) was accurately developed, Myanmar may become a pivotal and essential transit point for trade and investment for neighboring countries and global investors.

Moreover, Myanmar's economic structure has been rapidly evolving since 2010, as measured by the economic sector's proportion of total added value. The country's exports in 2019-2020 fiscal year amounted to 17.66 billion US dollars, and its import value was 19.03 billion US dollars, and total trade volume accounted for 36.7 billion US dollars (MOC, 2021).

In 2011, the Myanmar government's market economy policy lifted restrictions on investment and trade, allowing private companies to contribute to national and international trade (Black et al., 2017). Consequently, more investments are being made in Myanmar, especially in Special Economic Zones (SEZs). Three Special
Economic Zones are developing in Myanmar – Kyaukphyu, Thilawa and Dawei, for multinational companies and international investors as developers and partners. Among them, Dawie SEZ is the largest of the three SEZs in Myanmar and aims to boost its economic development (Dawei SEZ, 2020).

The economic structure of Myanmar has been rising gradually over the last 20 years period, with an average yearly rate of about ten per cent due to the growth of the economy and trade growth (Aye, 2012). By the Central Bank of Myanmar and the World Bank’s records, the Gross Domestic Product (GDP) in Myanmar in 2018 was US$ 76.17 billion, and in 2019, it was US$ 76.09 billion. The following figures show the GDP of Myanmar and annual GDP Growth Rate of Myanmar

![GDP of Myanmar](image)

**Figure 1: GDP of Myanmar**

Source: World Bank (2021)
The most distinctive geographical characteristic in Myanmar is a broad, gentle plain extending from north to the south within a horseshoe-shaped mountain range. The border with neighboring countries stretches for approximately 4,600 kilometers. The advancement of transportation links with neighboring countries is hampered because of the steep and lengthy mountain ranges. The sea coastline faces the Bay of Bengal and the Andaman Sea, and the total length is about 2,000 km. In general, the water depth along the coastline is shallow, so foreign vessels, including those plying feeder routes, must wait for adequate tidal depth before entering ports. Due to its geographical position, Myanmar's challenge is to establish gateway(s) with significant and secure handling volumes to handle international and regional cargo transportation.

According to the ASEAN Strategic Transport Plan (2011-2015), the logistics performance index (LPI) for Myanmar is far below the ASEAN countries and the world averages. It is highlighted that the significant constraints of Myanmar are undeveloped infrastructure, poor logistics quality and weak logistics competence.
In 2018, the National Logistics Master Plan (NLMP, 2018-2030) of Myanmar was formulated with the vision “to create an efficient, competitive and environmentally friendly logistics system in accordance with regional and international perspectives including the enhancement of multimodal transportation for the economic development and the poverty reduction of Myanmar”. This plan aims to develop a comprehensive Logistics Master Plan based on the Myanmar National Transport Master Plan (MYT-Plan). Moreover, it intends to develop industries that can sustain rational development, develop an urban-rural balance, and improve logistics capabilities (Aye, 2019). After three years, little progress has been made, with only a lack of human resources and inadequate infrastructure to catch up to international or at least regional logistics service practice standards in the shortest possible timeframe. (JICA et al., 2018).

According to the NLMP, the main issues faced by Myanmar concerning the logistics sector at present are stated as below:

- inadequate present transport infrastructure capacity needs to be upgraded
- the existing standard of roads, domestic and river ports are unacceptable for transport and cargo handling
- The freight transport cost is higher than the neighbouring countries.

High freight costs are one of the main obstacles for developing countries, including Myanmar, to compete with developed countries in the global market (Aye, 2019)

According to the United Nations (UN), Myanmar has been listed as a Least Developed Country (LDC) for more than twenty years. Myanmar is a member country of the Association of South-East Asia Nations (ASEAN) and Greater Mekong Sub-region (GMS). According to the trade statistics of ASEAN, amongst the ASEAN member countries, Myanmar was in the bottommost place for international trade and maritime trade (except Lao PDR). According to the LPI determined by World Bank, the quality of the logistics facilities in Myanmar was relatively lower than the neighbouring regional countries. (Aye, 2013)
According to the World Bank LPI result 2018, among the 160 countries, Myanmar was placed at 137 with the LPI score of 2.3. Accordingly, it was dropped 24 places than the 2016 ranking result. (World Bank, 2018). By reviewing from 2007 to 2018, Myanmar's LPI scores were at the bottom quintile (logistics unfriendly) of the World Bank’s ranking index.

To achieve the country's development goal, every industry has to improve and integrate with other related industries. Furthermore, economic growth can be expected as countries raise their logistics research investment and emphasise their LPI development. (Erkan, 2014)

1.3 Research Objectives and Research Questions

The research objectives are as follows:

1. To review the current operations and management of the Myanmar Logistics sector system: Administration, Present Situation of Players in the Logistics Sector, Domestics Transport Infrastructure and Logistics Performance Index (LPI)
2. To examine the opportunities and challenges faced in Myanmar Logistics Sector
3. To recommend the best practice for further developing LPI in Myanmar by reviewing the performance of Thailand, which has been progressed to the top performer group in the World Bank's LPI rankings in 2018

The research questions for this study are as follows:

1. What are the current roles of the Myanmar Logistics Service sector and the challenges for further developing the Myanmar Logistics Performance Index?
2. What are the possible recommendations for the implementation of Myanmar LPI and its development?
1.4 **Research Methodology**

In this research, the method used the qualitative in general and the case study as the main one. A qualitative method will be used to collect data in order to provide answers to the research questions and meet the objectives. This research data will be collected from the World Bank, Central Bank of Myanmar, Ministry of Commerce and Ministry of Transport and Communications in Myanmar. The rest of the necessary background information and data are being planned through official websites, published reports, brochures, previous studies, collection of documents, studies, and data from concerned Ministries and Department in Myanmar. Moreover, this study analyzes the relationship between logistics performance indicators and its segments such as customs, infrastructure, international shipments, logistics quality and competence, tracking and tracing and finally, timeliness. The case study will look at the neighboring country, Thailand, which has a higher LPI than Myanmar, and use them as examples for comparative analysis.

1.5 **Dissertation Structure**

The research is designed to develop the LPI in Myanmar by analyzing the challenges faced by Myanmar and the factors influencing the LPI development and giving recommendations for further improvement by reviewing the case studies from Thailand’s LPI performance. Chapter (1) starts with an introduction that includes the research background, the purpose of the study, methodology, and structure. Following, Chapter (2) start from the review of the logistics sector in Myanmar starts from the administration and present situation of players in the logistics sector, domestics transport infrastructure and quality of the logistics industry in Myanmar. Chapter (3), about the review on Logistics Performance Index includes a description of LPI and its components and an analysis of the LPI of Myanmar. Chapter (4) is about the research methodology. Then, Chapter (5) is about an examination of Logistics Performance in Thailand, reviewing the performance of the brief logistics sector and LPI of Thailand to learn the best practice. In Chapter (6), the challenges
to the enlargement of Logistics services in Myanmar are identified and study on how to improve Myanmar’s LPI, lessons learned from Thailand practices. Chapter (7) summarises the study, and its contributions and limitations will be presented.

Figure 3 : Structure of Dissertation
Chapter 2
Review on Logistics Sector in Myanmar

2.1 Background Information of Myanmar

The Republic of the Union of Myanmar is located in Southeast Asia. It has a total area of 677,000 square kilometres (261,228 square miles), with an east-west distance of 936 kilometres (581 miles) and a north-south distance of 2051 kilometres (1275 miles). Myanmar's coastline is 2,228 kilometers (1,385-mile) long and lies to the southwest. Thus, Myanmar is geographically located in ASEAN's western edge region (especially for the continental countries of ASEAN). There are nine ports for coastal and international maritime traffic along Myanmar's coastline. The Port of Yangon is Myanmar's main important port, handling roughly 90% of the country's average exports and imports.

Myanmar is bordered by China, India, Bangladesh, Thailand, and Lao PDR, and accounting for 40 per cent of the world’s population (World Bank, 2019). Myanmar's strategic position, which connects the Asian continent's two economic giants (China and India) and South and Southeast Asia, offers many advantages and opportunities for facilitating the country's transition to a market economy (ADB, 2012). Myanmar's government has recognized the necessity to increase connection with its bordering, regional economies by upgrading the investment on cross-border and trade as key components of its robust obligation to economic, social, political, and reforms (ADB, 2008). The government has placed a strong emphasis on the enlargement of the country's transportation and logistics sectors, acknowledging the critical importance of the country's transportation system, which includes adequate infrastructure for the expansion of regional and international trade and improved logistics connectivity to ensure national economic growth.
Figure 4: Map of the Republic of the Union of Myanmar.

Source: www.un.org
2.2 Administration of Logistics Sector (Institutional Set-up)

Administrators in the logistics sector of Myanmar operate as the regulators, formulating policies and organizing the development plans based on those strategies and policies and guiding the private sector to build infrastructure and control the logistics sector's operations to keep investment levels as high as possible. The administrative bodies in charge of Myanmar's transportation and logistics developments are composed of the following ministries and committees:

1. Ministry of Transport and Communications (MOTC)
2. Ministry of Construction (MOC)
3. Yangon City Development Committee (YCDC)
4. Mandalay City Development Committee (MCDC)

The governance of the transport and logistics sector in Myanmar is fragmented. City Development committees or Municipal Councils in Yangon, Mandalay and Naypyidaw are responsible for the governance of urban transport systems in these three large metropolitan areas. The Ministry of Transport and Communications (MOTC) has the governing authority over four subsectors – air transport, inland water transport, railway and maritime transport, while the MOC presides over maintenance and construction of national bridges and roads. The roads and bridges of the rural areas are constructed and maintained by the Ministry of Agriculture, Livestock.

Three other powerful ministries, such as the Ministry of Border Affairs, the Ministry of Defense and the Ministry of Home Affairs, are also responsible for transport and logistics systems in some strategic regions in Myanmar. For example, the Ministry of Border Affairs exercises direct authority over the roads and bridges in the border areas. Given the diffused and fragmented governance structure over national transport systems, it has been challenging to identify and implement coherent and consistent national policy priorities.
2.2.1 **Ministry of Transport and Communications (MOTC)**

According to the institutional structure of Myanmar’s government, in logistics and transport sectors, the MOTC has governing authority over four subsectors, including responsibility for maritime transport, air transport, road and rail transport. Continuous and robust coordination is needed between the line departments of the MOTC and other concerned ministries and agencies to progress and manage the logistics system of Myanmar, since the logistics system is composed of four major components such as institutional framework, infrastructure, service providers and shipper/consignees. The logistics sector's productivity cannot be maximized without the harmonious integration of such four components. The MOTC is the core ministry that can integrate such resources to develop and manage the logistics sector in Myanmar. Therefore, MOTC's key role in the development and management of the transport and logistics sector is to coordinate the logistics of all stakeholders.
2.2.2 Ministry of Construction (MOC)

The Ministry of Construction (MOC) is responsible for constructing and maintaining bridges, roads, and airfields in the country. The Department of Highways (DOH) and the Department of Bridges (DOB) under the Ministry of Construction (MOC) in Nay Pyi Taw are responsible for planning and implementing roads and bridges in the country through the stages of planning, design, and construction. Because of security concerns, the Army Corps of Engineers or The Ministry for Progress of Border Areas and National Races and Development Affairs (NATALA) undertakes responsibility.
for roads in border areas of Myanmar, while the MOC is primarily accountable for the design, construction, and maintenance of national roads and union highway.

![Organizational Structure of MOC](image)

**Figure 6**: Organizational Structure of MOC  
Source: MOC

The other three powerful ministries such as the Ministry of Home Affairs, the Ministry of Defense, and the Ministry of Border Affairs are also accountable for transport and logistics sectors in specific areas of Myanmar. For instance, the Ministry of Border Affairs gives direct authority to bridges and roads in border areas of Myanmar. (Hein et al., 2017)

### 2.2.3 Yangon City Development Committee (YCDC)

The Yangon City Development Committee (YCDC) is a Yangon Municipal Authority that interacts with various public and private stakeholders in the sector to play a vital role in urban development, planning, and management. It was founded in 1990. The YCDC is in charge of service delivery in Yangon City, which encompasses 33 of the Yangon Region's 45 townships. The "Revenue Department" under YCDC is explicitly responsible for handling the Truck Terminal, which is one of the main infrastructure facilities for logistics development and performance. The YCDC operates and maintains the common area of the truck terminal, which is used
for truck parking, the internal road network. It shows that private companies operate the Yangon truck terminal separately rather than collectively. Moreover, it is the main reason for fragmentation in the transportation/logistics industry regarding domestic cargo transportation, and it accounts for poor performance. From the perspective of logistics growth, Yangon City is the most important gateway point in Myanmar (NLMP, 2030).

2.2.4 Mandalay City Development Committee (MCDC)

Mandalay consists of seven townships and is administered by the Mandalay City Development Committee (MCDC), which is in charge of municipal services and public works. The position at MCDC in terms of truck terminal planning, management, development and improvement is the same as it is at YCDC.

2.3 Current Situation of Players of Logistics Sector

The following are the major players in Myanmar's logistics sector, which include both the public and private sectors.

2.3.1 Private Sector

Various types of private organizations are involved in the logistics sector: companies operating warehousing, trucking, coastal shipping, inland water transport, air cargo transport, logistics providers, and freight forwarding companies that engage in all necessary cargo transportation services for both international and domestic freight transport. At the moment, these companies work in a variety of fields associated with freight transport and logistics, and they have formed the following associations in Myanmar logistics private sector:

(1) Myanmar Container Truck Association (MCTA)
(2) Myanmar Highway Freight Transportation Service Association (MHTSA)
(3) Myanmar International Freight Forwarders Association (MIFFA)
2.3.2 Public Sector

The public sector transportation operators are formed with the State-Owned Enterprise (SOE), excluding the Department of Civil Aviation (DCA), one of the departments under MOTC. DCA operates and manages for civil aviation sector and airports of country as a whole. The inland waterway transport, seaports and railway transport are functioned by the following State-Owned Enterprises:

(1) Myanmar Railway (MR)
(2) Inland Water Transport (IWT)
(3) Myanmar Port Authority (MPA)

A number of SOEs and the Departments under MOTC have introduced and implemented public-private partnership (PPP) collaboration in various forms, such as DCA’s international airport project and MPA’s container terminal operation. Furthermore, PPP projects must be implemented for transport and logistics infrastructure in which highly sophisticated management is required, like logistics parks serving as a multimodal freight logistics hub in Myanmar.

2.4 Domestics Transport Infrastructure

In Myanmar, transportation and logistics costs are high due to several years of the lack of investment, strict rules and regulations, and inadequate infrastructure connecting rail, river and road transport systems (Wong & Wai, 2013). According to the Asian Development Bank (2012) projection, transport-related infrastructure and quality of logistics ranks of Myanmar are lowest in the Association of South-East Asia Nations (ASEAN) region. The country’s major rivers provide potentially inexpensive internal transportation in the country. However, intermodal linkages’ supervision, which connects road, water transport, air, rail, is underdeveloped.
Therefore, investments in multimodal transportation logistics systems can assist agricultural activities in reducing the transport charges, making the country's agricultural business trad connectivity more attractive (Min & Kudo, 2012). According to a recent ADB study, investment in the sector for the last two decades has concentrated primarily on new railways and major highways, with far less attention paid to maintenance and operation and upgrades in lower-level networks. One of the most challenging issues to improving the logistics sector in Myanmar is to upgrade lower-level networks and to connect with main networks to improve connectivity within the country by reducing transportation costs and expanding operations (JICA et al., 2018).

Myanmar's existing infrastructure connectivity still seems to be underdeveloped and cannot keep up with the increasing demands. Moreover, due to the limited port facility and about one-third of its paved road, the inadequate transport networks can also be regarded as substandard (ADB, 2014). Transportation costs are relatively high due to the high congestion of road traffic and a shortage of multimodal transportation systems (ADB, 2016). Generally, the logistics performance of Myanmar is said to lag far behind that of its regional countries due to the deficiency of the trade-related infrastructure of the country (World Bank, 2014). In addition, border procedures with limited transparency and predictability increase the cost of transport within the country and make border transport more difficult (OECD, 2018).
Figure 7: Myanmar Transport Network
Source: ADB, Myanmar Transport Sector Policy Note, How to reform transport institutions
2.4.1 **Road Transport**

In Myanmar, most roads connect north to south along the mountains and rivers. Before 1988, the country's entire road length was 21,943 kilometers. However, after 1988, the government has attempted to develop road transportation infrastructure by enacting the following road-network policies (Zin, 2013):

- Making a master plan to construct and upgrade 36 highways from north to south and 49 roads from east to west across the country's seven regions and seven states.
- Prioritizing the development within every region in order to develop standards cooperation and build reconsolidation of the national races
- Facilitating and encouraging economic activity between Myanmar and other nations, particularly commerce and tourism

As of 2018, the total road length increased to 39,084 km in Myanmar under the Public Works Department, MOC. The surface types of the road lengths are as shown in the following table. Among them, more than half of the roads are still unpaved condition.

Table 1: Road Transport Information

<table>
<thead>
<tr>
<th>Road Classification</th>
<th>Concrete</th>
<th>Bituminous</th>
<th>Gravel</th>
<th>Matalled</th>
<th>Earth Road</th>
<th>Donkey</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highway</td>
<td>612</td>
<td>11,733</td>
<td>2,441</td>
<td>2,700</td>
<td>1,974</td>
<td>44</td>
<td><strong>19,504</strong></td>
</tr>
<tr>
<td>Region and State Roads</td>
<td>50</td>
<td>5,452</td>
<td>3,300</td>
<td>2,941</td>
<td>6,497</td>
<td>1,340</td>
<td><strong>19,580</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>662</strong></td>
<td><strong>17,185</strong></td>
<td><strong>5,741</strong></td>
<td><strong>5,641</strong></td>
<td><strong>8,471</strong></td>
<td><strong>1,384</strong></td>
<td><strong>39,084</strong></td>
</tr>
</tbody>
</table>

Source: Public Works, MOC

2.4.2 **Air Transport**

In the air transport sector, the Department of Civil Aviation (DCA), under the Ministry of Transport and Communications (MOTC), is responsible for air transport operation as a regulatory department in Myanmar. As of 2020, Air transport services
can be provided by 35, with three international airports and 32 domestic airports. The three International airports are as follows:

1. Yangon International (passenger handling capacity of 6 million)
2. Mandalay International Airport (passenger handling capacity of 3 million)
3. Naypyitaw International Airport (passenger handling capacity of 3.5 million)

Currently, six domestic airlines are operating, of which Myanmar National Airline (MNA) and Myanma Airways International (MAI) operate international flights. There are 39 foreign airlines involve in the Myanmar air transport sector. The statistics of the performance of the DCA from the year 2010 to 2020 can be seen in the following table:

Table 2 : Air Transport Information

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Air transport infrastructure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Total number of airports</td>
<td>Count</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>33</td>
<td>33</td>
<td>34</td>
<td>34</td>
<td>34</td>
<td>34</td>
<td>34</td>
<td>35</td>
</tr>
<tr>
<td>2</td>
<td>Number of international airports</td>
<td>Count</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Number of domestic airports</td>
<td>Count</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>31</td>
<td>31</td>
<td>31</td>
<td>31</td>
<td>31</td>
<td>32</td>
</tr>
<tr>
<td>B.</td>
<td>Air transport Domestic &amp; International traffic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Domestic air passenger traffic</td>
<td>Thousand person</td>
<td>862</td>
<td>1,381</td>
<td>1,602</td>
<td>1,775</td>
<td>1,966</td>
<td>2,097</td>
<td>2,352</td>
<td>2,893</td>
<td>2,823</td>
<td>2,981</td>
<td>1,323</td>
</tr>
<tr>
<td>2</td>
<td>Domestic air cargo traffic</td>
<td>Thousand ton</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>International air passenger traffic</td>
<td>Thousand person</td>
<td>1,212</td>
<td>1,456</td>
<td>2,035</td>
<td>2,652</td>
<td>3,187</td>
<td>3,428</td>
<td>4,027</td>
<td>4,378</td>
<td>4,466</td>
<td>5,539</td>
<td>1,151</td>
</tr>
<tr>
<td>4</td>
<td>International air cargo loaded</td>
<td>Thousand ton</td>
<td>9</td>
<td>10</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>8</td>
<td>13</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>26</td>
</tr>
<tr>
<td>5</td>
<td>International air cargo unloaded</td>
<td>Thousand ton</td>
<td>6.4</td>
<td>6.3</td>
<td>8.0</td>
<td>11</td>
<td>14.98</td>
<td>17.93</td>
<td>21.411</td>
<td>29.74</td>
<td>29.61</td>
<td>30.09</td>
<td>1.48</td>
</tr>
<tr>
<td>C.</td>
<td>Others (enterprises, logistics and economic performance)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Total domestic freight volume by air</td>
<td>Thousand tons</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1.2</td>
</tr>
<tr>
<td>2</td>
<td>Total domestic freight movement by air</td>
<td>Million tons-km</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>14</td>
<td>12</td>
<td>17</td>
<td>13</td>
<td>8</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Total import cargo by air</td>
<td>Thousand tons</td>
<td>6</td>
<td>6</td>
<td>8</td>
<td>11</td>
<td>15</td>
<td>18</td>
<td>21</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>1.48</td>
</tr>
<tr>
<td>4</td>
<td>Total export cargo by air</td>
<td>Thousand tons</td>
<td>9</td>
<td>10</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>8</td>
<td>13</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>26</td>
</tr>
</tbody>
</table>

Source: Department of Civil Aviation
2.4.3 Maritime Transport

In the maritime transport sector of Myanmar, Inland Water Transport (IWT), Myanmar Port Authority (MPA), and Myanma Shipyards (MS), under the MOTC play a significant role in facilitating both the country’s river and sea transportation. Myanmar’s coastal line stretches for nearly 2000 kilometers along the Bay of Bengal and the Andaman Sea, accounting for one-third of the country's overall perimeter. (Uranza et al., 2017). There are nine ports along the coast in Myanmar, mainly supporting its coastal and seaborne trade. Among them, Yangon, Pathein, Sittwe and Moulmein ports can handle international transport.

According to the OECD report (2018), Myanmar’s port and inland water transport infrastructures are likewise significantly limited. Yangon river port is the most significant international gateway and can handle the large majority of seaborne trade, about over 80 per cent of Myanmar, which includes both Yangon’s main port and the Thilawa port, situated next to the Thilawa Special Economic Zone. The most important international gateway, handling the large majority of Myanmar’s seaborne trade (above 80%), is the Yangon river port complex, which comprises both Yangon’s main port and Thilawa port, located next to the Thilawa Special Economic Zone (SEZ). Yangon main port and the Thilawa port are container handling ports in Myanmar, destined mainly to industrial zones, near Hlaing industrial area, on the Yangon river’s west bank (JICA et al., 2014). The Yangon ports have inadequate accessibility since they can only handle vessels up to 15,000–20,000 deadweight and 167–200 meters in length, respectively, prohibiting larger vessels from calling at the ports. However, dredging work is underway to improve vessel capacity up to 35,000 deadweights. Dredging is required regularly to ensure access to the port, particularly during the dry season (Nederland Maritiem Land, 2016).

The list of the wharves and terminals of the Yangon port area and Thilawa port area can be seen in the following table:
Table 3: Facilities of International Wharves in Myanmar

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Type of Terminals</th>
<th>Quay Length (meter)</th>
<th>Apron Width (meter)</th>
<th>Vessel DWT</th>
<th>Back Up Area (acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sule Terminal (1)</td>
<td>GC and Container</td>
<td>137</td>
<td>12.2</td>
<td>9</td>
<td>15000</td>
</tr>
<tr>
<td>2</td>
<td>Sule Terminal (2)</td>
<td>GC and Container</td>
<td>137</td>
<td>12.2</td>
<td>9</td>
<td>15000</td>
</tr>
<tr>
<td>3</td>
<td>Sule Terminal (3)</td>
<td>GC and Container</td>
<td>137</td>
<td>12.2</td>
<td>9</td>
<td>15000</td>
</tr>
<tr>
<td>4</td>
<td>Sule Terminal (4)</td>
<td>GC and Container</td>
<td>137</td>
<td>12.2</td>
<td>9</td>
<td>15000</td>
</tr>
<tr>
<td>5</td>
<td>Sule Terminal (5)</td>
<td>GC and Container</td>
<td>126</td>
<td>15.2</td>
<td>9</td>
<td>15000</td>
</tr>
<tr>
<td>6</td>
<td>Sule Terminal (6)</td>
<td>GC and Container</td>
<td>126</td>
<td>15.2</td>
<td>9</td>
<td>15000</td>
</tr>
<tr>
<td>7</td>
<td>Bo Aung Kyaw(1)</td>
<td>GC and Container</td>
<td>137</td>
<td>15.2</td>
<td>9</td>
<td>15000</td>
</tr>
<tr>
<td>8</td>
<td>Bo Aung Kyaw(2)</td>
<td>GC and Container</td>
<td>137</td>
<td>15.2</td>
<td>9</td>
<td>15000</td>
</tr>
<tr>
<td>9</td>
<td>Bo Aung Kyaw(3)</td>
<td>GC and Container</td>
<td>183</td>
<td>30</td>
<td>9</td>
<td>15000</td>
</tr>
<tr>
<td>10</td>
<td>Asia World Port Terminal (1)</td>
<td>GC and Container</td>
<td>198</td>
<td>30.5</td>
<td>9</td>
<td>15000</td>
</tr>
<tr>
<td>11</td>
<td>Asia World Port Terminal (2)</td>
<td>GC and Container</td>
<td>156</td>
<td>19.5</td>
<td>9</td>
<td>15000</td>
</tr>
<tr>
<td>12</td>
<td>Asia World Port Terminal (3)</td>
<td>GC and Container</td>
<td>260</td>
<td>30.5</td>
<td>9</td>
<td>15000</td>
</tr>
<tr>
<td>13</td>
<td>Myanmar Industrial Port(1)</td>
<td>GC and Container</td>
<td>155</td>
<td>18</td>
<td>9</td>
<td>15000</td>
</tr>
<tr>
<td>14</td>
<td>Myanmar Industrial Port(2)</td>
<td>GC and Container</td>
<td>155</td>
<td>18</td>
<td>9</td>
<td>15000</td>
</tr>
<tr>
<td>15</td>
<td>Myanmar Industrial Port(3)</td>
<td>GC and Container</td>
<td>160</td>
<td>30</td>
<td>9</td>
<td>15000</td>
</tr>
<tr>
<td>16</td>
<td>Myanmar Industrial Port(4)</td>
<td>GC and Container</td>
<td>180</td>
<td>30</td>
<td>9</td>
<td>15000</td>
</tr>
<tr>
<td>17</td>
<td>Htee Tan Oil Terminal</td>
<td>Oil</td>
<td>120</td>
<td>15</td>
<td>9</td>
<td>15000</td>
</tr>
<tr>
<td>18</td>
<td>Htee Tan Oil Terminal (2)</td>
<td>GC and Container</td>
<td>213</td>
<td>30</td>
<td>9</td>
<td>15000</td>
</tr>
<tr>
<td>19</td>
<td>Htee Tan Oil Terminal (3)</td>
<td>GC and Container</td>
<td>213</td>
<td>30</td>
<td>9</td>
<td>15000</td>
</tr>
<tr>
<td>20</td>
<td>Alone Int’l Terminal(1)</td>
<td>GC and Container</td>
<td>200</td>
<td>30</td>
<td>9</td>
<td>20000</td>
</tr>
<tr>
<td>21</td>
<td>Alone Int’l Terminal(2)</td>
<td>GC and Container</td>
<td>200</td>
<td>30</td>
<td>9</td>
<td>20000</td>
</tr>
<tr>
<td>22</td>
<td>Alone Int’l Terminal(3)</td>
<td>GC and Container</td>
<td>200</td>
<td>30</td>
<td>9</td>
<td>20000</td>
</tr>
<tr>
<td>23</td>
<td>Myanmar Naing Group Terminal</td>
<td>Oil</td>
<td>134.1</td>
<td>56.7</td>
<td>6.38</td>
<td>5000</td>
</tr>
<tr>
<td>24</td>
<td>Htoo Trading Terminal</td>
<td>CG and Oil</td>
<td>123</td>
<td>10</td>
<td>7</td>
<td>600</td>
</tr>
<tr>
<td>25</td>
<td>Yu Za Na Terminal</td>
<td>Oil</td>
<td>113.4</td>
<td>22</td>
<td>5</td>
<td>15000</td>
</tr>
<tr>
<td>26</td>
<td>Myanmar International Terminal Thilawa (MITT)</td>
<td>GC and Container</td>
<td>200</td>
<td>30</td>
<td>9</td>
<td>20000</td>
</tr>
<tr>
<td>27</td>
<td>Myanmar International Terminal Thilawa (MITT)</td>
<td>GC and Container</td>
<td>200</td>
<td>30</td>
<td>9</td>
<td>20000</td>
</tr>
<tr>
<td>28</td>
<td>Myanmar International Terminal Thilawa (MITT)</td>
<td>GC and Container</td>
<td>200</td>
<td>30</td>
<td>9</td>
<td>20000</td>
</tr>
<tr>
<td>29</td>
<td>Myanmar International Terminal Thilawa (MITT)</td>
<td>GC and Container</td>
<td>200</td>
<td>30</td>
<td>9</td>
<td>20000</td>
</tr>
<tr>
<td>30</td>
<td>Myanmar International Terminal Thilawa (MITT)</td>
<td>GC and Container</td>
<td>200</td>
<td>30</td>
<td>9</td>
<td>20000</td>
</tr>
<tr>
<td>31</td>
<td>Myanmar International Terminal Thilawa (MITT)</td>
<td>GC and Container</td>
<td>200</td>
<td>30</td>
<td>9</td>
<td>20000</td>
</tr>
<tr>
<td>32</td>
<td>Myanmar Integrated Port Limited (MIPL)</td>
<td>GC and Container</td>
<td>200</td>
<td>17</td>
<td>9</td>
<td>20000</td>
</tr>
<tr>
<td>33</td>
<td>Myat Myiter Mon Services Oil Terminal</td>
<td>Oil</td>
<td>133</td>
<td>13.0</td>
<td>9</td>
<td>15000</td>
</tr>
<tr>
<td>34</td>
<td>Apex Gas and Oil Public Co.,Ltd.</td>
<td>Oil</td>
<td>133</td>
<td>15.0</td>
<td>9</td>
<td>15000</td>
</tr>
<tr>
<td>35</td>
<td>Puma Energy Asia Sun Co.,Ltd</td>
<td>Oil and Coal</td>
<td>190</td>
<td>25.0</td>
<td>9</td>
<td>20000</td>
</tr>
<tr>
<td>36</td>
<td>Green Asia Services Co.,Ltd</td>
<td>Oil</td>
<td>133</td>
<td>19.0</td>
<td>9</td>
<td>15000</td>
</tr>
</tbody>
</table>

Source: Myanmar Port Authority
2.4.4 Rail Transport

In Myanmar, Myanmar Railways (MR), under the Ministry of Transport and Communications, is a state-owned enterprise responsible for the rail transport operator of the entire country. Since 1988, the MR has been expanding its rail transportation network in order to promote socio-economic development in rural areas (Zin, 2013). Myanmar has the longest railway network in ASEAN, with a total length of about 6,000 kilometers, but missing interconnections with neighboring countries, an absence of multimodal infrastructure, and the inadequate condition of existing tracks and rolling equipment preclude it from being used for domestic and international freight transportation almost entirely (OECD, 2020a). As of 2020, the total length of the rail network is 6,112.31 km, including the double-track railway route length, 705.99 km in Myanmar. Furthermore, the MR’s objective is to strengthen the rail services for container transportation as a well-developed logistics activity that improves multimodal transportation systems in international and national trade activities. According to the OECD report (2020), the fleets of locomotives, passenger coaches, railbuses, and freight wagons now engaged in rail transport operations throughout the country are insufficient to meet the increased demand. The Railway transport infrastructure and equipment from 2010 to 2020 can be seen in the following table.

In addition, MR aims to strengthen rail services as a cost-effective and cost-effective logistics service that supports the development of similar transport in regional and international trade.
2.5 Quality of the logistics industry in Myanmar

The logistics services industry and freight transport sector in Myanmar need to be more upgraded to catch up with the growing trade demand. To promote capacity expansion and assist the development of auxiliary logistics services, the government may consider expanding its promotion of investments in the industry (OECD, 2020a). According to the ADB (2016) report, there has been a major expansion and renewal of the trucking fleet in road freight transport since the government lifted restrictions on truck imports in 2011. Moreover, the lower operating expenses of the newer and larger truck fleets have aided in reducing freight rates in the major corridors. However, other transport mode operators cannot replace the fleet. The rolling stock of the Myanma Railways (MR) is still dominated by relatively outdated locomotives, requiring almost double as much fuel as more advanced engines. Correspondingly, Myanmar's existing vessel fleet is aging and small, with an average age of 28 years and a gross tonnage of 3,716 gross tons (Nederland Maritiem Land, 2016).

According to the OECD report(2020), modern logistics and management procedures are generally constrained in most areas, resulting in inefficient assets utilization and

---

Table 4: Railway transport infrastructure and equipment

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Railway transport infrastructure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Total railway route length</td>
<td>Kilometer</td>
<td>5,672</td>
<td>5,844</td>
<td>5,844</td>
<td>5,959</td>
<td>6,110.48</td>
<td>6,110.48</td>
<td>6,076.67</td>
<td>6,112.31</td>
<td>6,112.31</td>
<td>6,112.31</td>
<td>6,112.31</td>
</tr>
<tr>
<td>2</td>
<td>Double-track railway route length</td>
<td>Kilometer</td>
<td>700.80</td>
<td>700.80</td>
<td>700.80</td>
<td>701.00</td>
<td>705.19</td>
<td>705.19</td>
<td>705.99</td>
<td>705.99</td>
<td>705.99</td>
<td>705.99</td>
<td>705.99</td>
</tr>
<tr>
<td>3</td>
<td>Urban railway route length</td>
<td>Kilometer</td>
<td>83.00</td>
<td>83.00</td>
<td>83.00</td>
<td>83.00</td>
<td>83.00</td>
<td>83.00</td>
<td>84.00</td>
<td>94.00</td>
<td>94.00</td>
<td>94.00</td>
<td>94.00</td>
</tr>
<tr>
<td>B.</td>
<td>Railway transport equipment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Number of railway locomotives ready for operation</td>
<td>Count</td>
<td>248</td>
<td>250</td>
<td>250</td>
<td>246</td>
<td>231</td>
<td>220</td>
<td>232</td>
<td>235</td>
<td>236</td>
<td>245</td>
<td>248</td>
</tr>
<tr>
<td>2</td>
<td>Number of passenger coaches</td>
<td>Count</td>
<td>1,257</td>
<td>1,257</td>
<td>1,281</td>
<td>1,307</td>
<td>1,349</td>
<td>1,385</td>
<td>1,405</td>
<td>1,405</td>
<td>1,472</td>
<td>1,482</td>
<td>1,522</td>
</tr>
<tr>
<td>3</td>
<td>Number of freight wagons</td>
<td>Count</td>
<td>3,355</td>
<td>2,36</td>
<td>3,188</td>
<td>3,416</td>
<td>3,377</td>
<td>3,395</td>
<td>3,449</td>
<td>3,449</td>
<td>3,100</td>
<td>3,100</td>
<td>3,155</td>
</tr>
</tbody>
</table>

Source: MOTC
poor profitability. For instance, ordinary cargo load factors are inadequate across all means of transportation, and even on some vital routes, such as the road links with Thailand, where numbers of trucks operating empty for return cargo extent 25 to 50 per cent. Return cargo engagements are not secured in advance, even on routes with relatively high average load capacity (e.g. Yangon-Mandalay), with about ten per cent of return cargo are arranged by agencies. The majority of cargo owners organize for return cargos on their own after departure (JICA et al., 2018). The limited handling of cargo at the port exacerbates this problem. As a result, truck terminal dwell durations are often long, averaging around 37 hours in Yangon-Mandalay, roughly half the truck turnaround time, which are both excessively long for a 650-kilometer route. The expansion of the further market for logistics service providers, freight agents, and cargo-truck matching systems should assist in increasing the situation (JICA et al., 2018).
Chapter 3
Overview of the Logistics Performance Index

3.1 Description of the Logistics Performance Index

One of the most critical aspects of the trade is logistics, and logistics performance significantly impacts bilateral trade volume. In addition, it improves the productivity of companies and nations, which are increasingly realizing the role of logistics in global trade. It needs to establish a unique measurement framework for logistics performance and strategies for improving country performance (Göçer et al., 2021).

The Logistics Performance Index (LPI) can be defined as one of the benchmarking tools researched and published by the World Bank that measures the performance of the country's logistics sector, based on the all-inclusive survey of global express carriers and freight forwarders. The LPI is a World Bank ranking system that can assist the challenges and opportunities of developing and implementing a country's logistics capability. The World Bank publishes the survey result every two years. It was started in 2007, and 160 countries were included in the survey in 2018 (World Bank, 2018). In addition, LPI offers an overview of performance models to better understand global assessments of logistics performance and trends over time (ITF, 2015).

The significant role of Logistics in the worldwide economy is recognised nowadays than it was ten years ago. Better logistics facilities can lessen the trade cost. Furthermore, Logistics performance is determined by how well supply chains integrate companies to international and domestic opportunities. The LPI attempts to quantify a country's logistical accessibility or how well it is linked to the physical internet of global logistics. Moreover, LPI results were also applied in documents and policy reports arranged by multilateral organizations or advisers. The findings of the LPI offer a global standard for the logistics sector and users of logistics.
Furthermore, the results of the LPI were applied for academic purposes, as cited by the extensive use of textbooks, journal articles and research papers. (Arvis et al., 2018)

Companies use the LPI information to evaluate difficulties and advantages relating to the country's transportation infrastructure, logistics competency, and accessibility of competent supply chains. Moreover, the LPI is one of the valuable measures of the trade logistics performance of the country, as well as a benchmark for considering locations for various sorts of operations. One of the key reasons for this is that countries typically focus on their ranking instead of advancements in the LPI's actual indicator values. (ITF, 2015)

The LPI is an important component of international efforts to understand better logistics performance in the context of exponentially complicated supply chains. By the best performance in the logistics sector of a country, the highest score is defined as 5 points. The index score ranges are from 1 to 5 points, with a maximum score undertake the best performance. The LPI scores are divided into four groups, which correspond to the scoring quintiles as follows (World Bank, 2018):

1. logistics unfriendly (Bottome quintile)
   Countries with severe logistical restrictions, including the Least Developed Countries (LDCs)
2. partial performers (Third and Fourth quintile)
   Countries with a level of logistics constraints, such as those often seen in low- and middle-income countries
3. consistent performers (Second quintile)
   Countries regarded enhanced on logistics performance than most others within the same income group
4. logistics friendly (Top quintile)
   Countries with the best-performing countries, the majority of which are high-income countries.
The following figure shows the cumulative distribution of LPI scores in different quintiles:

Figure 8: Quintile of LPI scores

Source: Arvis et al., (2018, p.13)

According to the World Bank's biennial LPI ranking results, the highest-income countries that are mostly from Europe are in the top 10 places. These countries have traditionally been key players in the supply chain industry. The bottom ten countries are mainly low-income and lower-middle-income from African countries or isolated areas. These countries are either unstable economies impacted by armed conflict, political instability, natural disasters, or landlocked countries naturally hampered in connecting to global supply chains by geography or economies of scale.
According to the World Bank’s data, the gap LPI average scores between the top ten countries and the bottom ten countries from 2007 to 2018 are described in Table 7. In 2018, the LPI score gap between the top ten countries and the bottom ten countries
was narrower than in 2016. Moreover, the top 10 countries average score fell up to 4.03, and the bottom countries scores reached the highest, about 2.08 in 2018.

Table 7: The average LPI scores of the top 10 and the bottom 10 countries, 2007 to 2018

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2010</th>
<th>2012</th>
<th>2014</th>
<th>2016</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top 10 Average</td>
<td>4.06</td>
<td>4.01</td>
<td>4.01</td>
<td>3.99</td>
<td>4.13</td>
<td>4.03</td>
</tr>
<tr>
<td>Bottom 10 Average</td>
<td>1.84</td>
<td>1.97</td>
<td>2.00</td>
<td>2.06</td>
<td>1.91</td>
<td>2.08</td>
</tr>
<tr>
<td>Gap LPI Score</td>
<td>2.22</td>
<td>2.04</td>
<td>2.01</td>
<td>1.93</td>
<td>2.22</td>
<td>1.95</td>
</tr>
</tbody>
</table>

Source: World Bank

3.2 The components of the Logistics Performance Index

The World Bank’s Logistics Performance Index (LPI) is investigated by the followings six key components across countries’ performance (Arvis et al., 2018):

1. Customs
   (the proficiency of customs and border management clearance procedures)
2. Infrastructure
   (the quality of trade and transportation infrastructure)
3. International Shipments
   (the comfort of organizing competitively priced international shipments)
4. Service Quality
   (the capability and quality of logistics services)
5. Tracking and Tracing System
   (the capability to track and trace system for consignments)
6. Timeliness
   (the shipments reach consignees within the scheduled or estimated delivery time)
The components were selected based on empirical and theoretical studies as well as the practical experience of international freight forwarding logistics professionals. The six indicators for LPI can be defined as regulatory policies and Supply chain performance outcomes. The regulatory policies area includes three components as Customs, Infrastructure and Logistic quality and competence. Supply chain performance outcomes correspond to time, cost, and reliability, such as timeliness, international shipments, and tracking and tracing systems (Arvis et al., 2018). In this connection, the regulatory policies part is concerned with the distribution chain, while the Supply chain performance outcome part is concerned with the service's quality. (Marti et al., 2017)

Figure 9: Input and Outcome of LPI Indicators

Source: Arvis et al., (2018, p 8)
3.2.1 **Customs**

According to the ITF report (2015), the customs, one of the performance indicators for LPI ranking, defines the efficiency and effectiveness of the country's customs processes with simplicity, predictability, and speed. Many studies have identified customs as a significant factor in logistics and transportation performance, and small changes in customs can improve the overall efficiency of the logistics system, especially in less developed countries (Roekel et al., 2018). In the transport and trade sector, customs can be an essential aspect of trade facilitation (Hausman et al., 2013). Border clearance procedures must be efficient in order to prevent unnecessary delays and improve supply chain predictability. Border management changes aim to enhance customs processing and integration of controls by other entities, such as risk management, physical inspection reduction, automation, and the introduction of single windows to make information exchange and transaction transparency easier for traders. Trade corridors and transportation facilitation programs are essential for fulfilling transit and border connectivity (one-stop border facilities), transit procedures, and transit control reduction needs (JICA et al., 2018).

3.2.2 **Infrastructure**

Infrastructure is a critical component of trade. Development of infrastructure can make significant progress in terms of ensuring basic connectivity and gateway access. Moreover, The consistency of information and communication technology (ICT) infrastructure is a key factor in achieving better infrastructure growth results. Moreover, as transportation policymakers, the volume of commodity consumers is the primary cause of infrastructure construction and maintenance costs and has a significant benefit. The development Infrastructure Components of Logistical Systems of a country depends on the “hard infrastructure” such as highways, railroads, ports, airports and “soft infrastructure” such as transparency, institutional reforms, customs efficiency. (Portugal-Perez, A., & Wilson, 2012)
3.2.3 International Shipments

This component calculation depends on how simple it is to carry out import and export procedures according to international requirements and reasonable prices. Shipments must arrive at consignees within the anticipated or scheduled delivery periods. Cargo shipment is not only limited to seaports but also gateways such as seaports, airports, and cross-border facilities. Frequent transports will ensure consistent delivery of goods to the destination by the carrier. According to the calculation of Hausman et al., (2013), one per cent cheaper shipping can increases trade by 1.4 per cent and one per cent reduction for overall costs can rises trade by 0.4 per cent.

3.2.4 Service Quality

The effects of logistics service innovations have substantial benefits for supply chains, for instance, increased productivity and customer satisfaction. The high efficiency of logistics performances has an indirect impact on economic measures. Transport policy can impact logistics services’ effectiveness through the transportation sector's regulatory measures or direct support to services such as traffic management. Additionally, transport policy can impact logistics services' effectiveness through the transportation sector's regulatory measures or direct support to services such as traffic management. (Roekel et al., 2018). Moreover, Transhipment of goods, storage, and cargo handling are all labour-intensive activities. As a result, the availability of skilled and competent logistics personnel is an essential determinant of supply chain performance (NLMP, 201). Good service quality can measure the service quality supplied by logistics companies and their fulfilment in accordance with the international supply chain procedures such as freight forwarders and customs clearance processes.
3.2.5 Tracking and Tracing System

Tracking and tracing processes are critical for logistics providers and shipping companies to determine where their containers are and when they will return to the port or designated location. GPS can be used for tracking and tracing procedures these days (JICA et al., 2018). Tracking and tracing becomes a key area for investment, as all stakeholders in the supply chain can get advantages of improving their product search capabilities (Korinek & Sourdin, 2011)

3.2.6 Timeliness

The term "timeliness" denotes the shipments that can be delivered to the right location at the right time. According to Hummels & Schaur (2013), a one per cent less container processing time at the seller will result in 0.4 per cent more bilateral trade, while a one per cent reduction in shipping time variability will result in a 0.2 per cent increase in trade and investment. It can be said that improved timeliness and anticipation of when shipments will arrive can improve trade. Reducing time in transportation is one kind of essential purpose for the transportation policy.

3.3 Logistics Performance Index of Myanmar

According to the World Bank’s 2007 LPI survey of 150 countries, Myanmar ranks 147th. In 2010, Myanmar progressed the position about 133 out of 155 countries and in 2012, it still progressed up to 129th. The survey conducted by the World Bank of 2014 found that 160 countries participated, and Myanmar's ranking dropped to 145. According to the 2016 report, Myanmar’s LPI rank has improved about 113 out of 160 countries, with an LPI score of 2.46. In 2018, Myanmar dropped 24 places than the year 2016, ranked 137th with a LPI score of 2.3. Myanmar's LPI scores from 2007 to 2018 were between 1.86 and 2.46, so Myanmar was only in the bottom quintile (logistics unfriendly). The LPI ranks and scores of Myanmar from 2007 to 2018 are shown in the following table.
Table 8: LPI ranks and scores of Myanmar from 2007 to 2018

<table>
<thead>
<tr>
<th>Year</th>
<th>LPI rank</th>
<th>LPI score</th>
<th>Customs</th>
<th>Infrastructure</th>
<th>International shipments</th>
<th>Logistics competence</th>
<th>Tracking &amp; tracing</th>
<th>Timeliness</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>147</td>
<td>1.86</td>
<td>2.07</td>
<td>1.69</td>
<td>1.73</td>
<td>2.00</td>
<td>1.57</td>
<td>2.08</td>
</tr>
<tr>
<td>2010</td>
<td>133</td>
<td>2.33</td>
<td>1.94</td>
<td>1.92</td>
<td>2.37</td>
<td>2.01</td>
<td>2.36</td>
<td>3.29</td>
</tr>
<tr>
<td>2012</td>
<td>129</td>
<td>2.37</td>
<td>2.24</td>
<td>2.10</td>
<td>2.47</td>
<td>2.42</td>
<td>2.34</td>
<td>2.59</td>
</tr>
<tr>
<td>2014</td>
<td>145</td>
<td>2.25</td>
<td>1.97</td>
<td>2.14</td>
<td>2.14</td>
<td>2.07</td>
<td>2.36</td>
<td>2.83</td>
</tr>
<tr>
<td>2016</td>
<td>113</td>
<td>2.46</td>
<td>2.43</td>
<td>2.33</td>
<td>2.23</td>
<td>2.36</td>
<td>2.57</td>
<td>2.85</td>
</tr>
<tr>
<td>2018</td>
<td>137</td>
<td>2.30</td>
<td>2.17</td>
<td>1.99</td>
<td>2.20</td>
<td>2.28</td>
<td>2.20</td>
<td>2.91</td>
</tr>
</tbody>
</table>

Source: World Bank

Figure 10: LPI ranks and scores of Myanmar from 2007 to 2018

Source: World Bank

According to the World Bank LPI ranking in 2018, China was ranked 26th and highest in Myanmar’s neighbouring countries. Thailand was ranked 32nd globally, but Myanmar was in the lowest position with 137 among the neighbouring countries. It can be said that Myanmar has poor performance in the logistics sector than the region and same income group countries. The following table shows the LPI rank of some selected countries of the region and Myanmar neighbouring countries.
Table 9: LPI for Myanmar and Neighbouring Countries, 2018

<table>
<thead>
<tr>
<th>Country</th>
<th>LPI rank</th>
<th>LPI score</th>
<th>Customs</th>
<th>Infrastructure</th>
<th>International shipments</th>
<th>Logistics competence</th>
<th>Tracking &amp; tracing</th>
<th>Timeliness</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>26</td>
<td>3.61</td>
<td>3.29</td>
<td>3.75</td>
<td>3.54</td>
<td>3.59</td>
<td>3.65</td>
<td>3.84</td>
</tr>
<tr>
<td>Thailand</td>
<td>32</td>
<td>3.41</td>
<td>3.14</td>
<td>3.14</td>
<td>3.46</td>
<td>3.41</td>
<td>3.47</td>
<td>3.81</td>
</tr>
<tr>
<td>Vietnam</td>
<td>39</td>
<td>3.27</td>
<td>2.95</td>
<td>3.01</td>
<td>3.16</td>
<td>3.40</td>
<td>3.45</td>
<td>3.67</td>
</tr>
<tr>
<td>India</td>
<td>44</td>
<td>3.18</td>
<td>2.96</td>
<td>2.91</td>
<td>3.21</td>
<td>3.13</td>
<td>3.32</td>
<td>3.50</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>82</td>
<td>2.70</td>
<td>2.61</td>
<td>2.44</td>
<td>2.72</td>
<td>2.65</td>
<td>2.91</td>
<td>2.84</td>
</tr>
<tr>
<td>Cambodia</td>
<td>98</td>
<td>2.58</td>
<td>2.37</td>
<td>2.14</td>
<td>2.79</td>
<td>2.41</td>
<td>2.52</td>
<td>3.16</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>100</td>
<td>2.58</td>
<td>2.30</td>
<td>2.39</td>
<td>2.56</td>
<td>2.48</td>
<td>2.79</td>
<td>2.92</td>
</tr>
<tr>
<td>Myanmar</td>
<td>137</td>
<td>2.30</td>
<td>2.17</td>
<td>1.99</td>
<td>2.20</td>
<td>2.28</td>
<td>2.20</td>
<td>2.91</td>
</tr>
</tbody>
</table>

Source: World Bank

The following Figure illustrates the sectoral results of Myanmar from 2007 to 2018 in the six components surveyed by the World Bank to calculate LPI scores.

Figure 11: sectoral results of Myanmar from 2007 to 2018 in the six components
Source: World Bank
The following figure displays the comparison among the Myanmar, East Asia & Pacific region and lower-middle-income countries results of six components of LPI in 2018.

Figure 12: comparison among Myanmar, East Asia & Pacific region and lower-middle-income countries

Source: World Bank
Chapter 4  
Research Methodology

4.1 **Introduction**

This chapter discusses the methodology used to attain the objectives of this study. A research methodology can be said to be tools and techniques for examining and performing research or study (Walliman, 2017). In addition, the research methodology can be described as the logic of the strategy formulation procedure that uses research methods to create theories and a framework for research procedures (Remenyi et al., 1998). According to Rajasekar et al., (2013), research methodology is one of the systematic approaches to solving a problem and is also defined as “the procedures by which researchers go about their work of describing, explaining and predicting phenomena”.

4.2 **Types of Methodology**

The qualitative methodology is one kind of multidimensional research method that encompasses all common qualitative data such as interview transcripts, observation notes, meeting minutes, literary texts, memos, recollections and historical records (Denzin & Lincoln, 2011). The qualitative method focuses on human clarification and comprehensive interviews to generate a holistic image of the phenomenon in question, allowing the researchers to construct a holistic picture of the issue (Gentles et al., 2015). Consequently, the qualitative method is a type of social action that emphasises words instead of figures to make sense of people's everyday experiences (Walia, 2015).

According to Crowther & Lancaster (2008), the quantitative method supports a positivist approach. It typically adopts a deductive approach, with the scholar's role limited to data collection and presentation using an objective methodology and the study findings being quantifiable and observable. Furthermore, Rovai et al., (2014)
also defined the quantitative method as a deductive approach in which investigators perceive the world to be outside of themselves and that "there is a purposeful reality that is irrelevant to any observations." As a result of the quantitative method based on obtained statistical and theoretical data, research approaches must be more structured, inflexible, rigid, and preset in terms of how reliable the data is and which data may be generalized through a creative and practical application.

On the other hand, the case study is the most effective method for in-depth and comprehensive analysis. Several researchers have used this method, particularly in the study of sociology, and to expand its usage in instructions. According to the classification of Yin (1993), the case study can be defined as three types: Exploratory type, Explanatory type, and Descriptive type. In this connection, Exploratory types are occasionally used as a prelude to more formal social research. Explanatory type is used for the casual research investigation. Descriptive types need a descriptive theory to develop before the project begins. Moreover, Stake (1995) comprised three other types: intrinsic, instrumental, and collective. At this point, the Intrinsic type is used if the researchers have an interest in the cases. The instrumental type is utilized to comprehend better what is entirely evident to the researcher. The collective case study style can be used when performing a study as a group of cases.

Additionally, a case study is a multi-perspective evaluates in which the researcher can take into account significant actor groups and their interactions and the voice and perspective of the actors. On the other hand, case study research enables examining and comprehending complicated issues using previous research reports (Zainal, 2007).

It is essential that the resources used are reliable and well established. In this research, the data and sources are documents. The documents could include letters, memoranda, study reports, agendas and any other items added to the database, according to Tellis (1997); accuracy is crucial. Even though quantitative and
qualitative approaches to case studies are widely recognized, quality standards vary and concern accessibility, accuracy, impartiality, and consistency; they are difficult to describe in this approach.

4.3 Research Design

The research design means the research methods and methodological framework chosen by a researcher. Thus, it can select the proper research method for the research problem and shape the whole study to succeed and achieve the research objectives. According to Quinlan et al., 2019, qualitative and quantitative research are different types of research designs, which can be further divided into experimental, diagnostic, descriptive and correlational research. In this research, descriptive design has been chosen because of the qualitative nature of the research problem. The following steps include in this research:

1. Defining the research objectives
2. Defining the research questions to achieve the objective of the study
3. Reviewing on the concept of the study and industry overview
4. Selecting the case to learn and recommend for the improvement of Myanmar LPI
5. Analysing the selected country’s performance
6. Presentation recommendations and conclusion

In this research, the researchers used a qualitative approach, as previously stated, the nature of the research problem. In this connection, a case study methodology can be used as one of the best ways to analyse how to increase LPI in Thailand and reach to top performer group because it allows for in-depth research by providing sufficient information in the field of study. Case studies can be used to describe, compare, evaluate, and comprehend various aspects of a research problem. Furthermore, in this study, as a case, the researcher selected Thailand’s performance in LPI. The
researcher chose Thailand as a case study because it is one of Myanmar's neighbouring countries and progressed to the top performer group of the World Bank's LPI rankings in 2018.

Moreover, secondary sources will apply in this study, such as annual reports, journals, articles, press releases, preceding case studies, transcripts of key personnel interviews, industry and government websites and public sources (OECD, ITF, World Bank, Statistical). Furthermore, cases have been selected purposely of Thailand that have raised the LPI performance rank to balance and study the implementation differences of performance in LPI. Finally, the research recommends the best practice for further developing LPI in Myanmar by reviewing the selected country’s performance.

Furthermore, the idea behind the study is, in part, to study and learn from the best practice from the selected country and to apply for own country. For that reason, the study starts with an overview of the logistics sector in Myanmar, then brief literature on LPI and LPI of Myanmar. Consequently, case studies on Thailand’s LPI’s performance and how Thailand achieves the countries’ LPI rank and then analyzed and compared to make a recommended practice for Myanmar’s LPI improvement. As a final point, the lessons learned from the comparative analysis conclude with suggestions and recommendations for the application of Myanmar LPI development.
Chapter 5
Examination of Logistics Performance Index in Thailand

5.1 Introduction

This chapter provides an overview of Thailand's logistics performance and a brief overview of the Thailand economy and GDP. Thailand's logistics performance increased dramatically in 2018 due to significant investment in transportation infrastructure and relevant legislation reform. According to World Bank's biennial LPI ranking results for 2018, Thailand's LPI position was improved from 45th place in 2016 to 32nd place in 2018. Thailand was ranked as the second only to Singapore in ASEAN, surpassing Malaysia, and seventh overall in Asia (Bangkok Post, 2018). The government is already investing extensively in infrastructure development and legal reform, and the LPI is expected to improve significantly.

5.2 A brief overview of Thailand

Thailand is one of Myanmar’s neighboring countries. Thailand is comprised of 76 provinces and is situated in the heart of Southeast Asia's Indochina peninsula. Thailand is bordered on the west by Myanmar and the Andaman Sea, on the northeast by Laos, on the southeast by Cambodia, and on the south by the Gulf of Thailand and Malaysia. The total land boundary of Thailand is 4,863 kilometers in length, which includes borders with Malaysia (506 kilometers), Cambodia (803 kilometers), Laos (1754 kilometers) and, Myanmar (1800 kilometers), respectively.

Thailand is an industrialized, developing country with an upper-middle-income. Because of its geographic location, it has excellent access to significant economic centers in the region. Therefore, Thailand is attempting to establish itself as the region's logistics hub for this reason (OECD, 2020 b). Moreover, Thailand's government has been promoting the country as a logistics hub in Southeast Asia since 2010 to improve the logistics sector. As a result, Thailand has permitted private
sector investment in logistics sectors development projects totaling over 233 USD million in the year 2015 only, including commercial ports, multimodal facilities, maritime services (Limcharoen et al., 2017).

According to the Thailand investment review 2019, Thailand's transportation and logistics growth is speeding up rapidly, enabling the country to become ASEAN's transportation hub. As Thailand develops, urban growth is driving demand for transportation growth, and the supply chain of every industry depends on transport and logistics infrastructure. As a result, Thailand's transportation and logistics sector have much opportunity to promote more travel, trading, and investment, given the country's strong growth as one of Asia's transit and trading hubs (TIR, 2019).
Figure 13: Map of Thailand

Source: www.un.org
5.3 **GDP and economic growth**

Thailand has been the second-largest economy after Indonesia in Southeast Asia’s (OECD, 2020 b). According to the ease of doing business report of the World Bank, Thailand’s position was 21st among the 190 countries in 2020 (Doing business, 2020). Moreover, Thailand has had a significant economic growth trend over the past 60 years, with foreign direct investment (FDI) playing a key role in this achievement. Thailand was a pioneer in developing its development strategy around FDI and involvement in the global value chains. Thailand is currently a net outward investor, with a rapidly rising position in neighboring countries (OECD, 2021).

According to the World Bank's assessment, Thailand's economy has grown rapidly since the 1980s, moving from a low-income to an upper-middle-income country. In 2020, the GDP of Thailand was at 501.79 USD billion, and GDP per capita is at 6094.43 USD. The highest GDP was 544.26 and GDP per capita was about 6505.72 in 2019. (Word Bank, 2021).

![Figure 14: GDP of Thailand](https://tradingeconomics.com/thailand/gdp)

Source: https://tradingeconomics.com/thailand/gdp
5.4 Logistics Performance Index of Thailand

According to the World Bank’s identification, the overall score of the LPI reflects the insights of the logistics performance of a country. It depends on the efficiency of a customs clearance procedure, adequacy of transport infrastructure and trade, the convenience of placing reasonably priced shipments, the quality of logistics facilities, the capability of tracking and tracing consignments, and the rate with which shipments arrive the consignee on time. The assessment is based on theories, empirical studies, and the practical experience of logistics professionals from international freight forwarding (World Bank, 2020).

According to the World Bank’s LPI result of 2018, Thailand was in a moderately good position, 32 out of 160 countries, with an overall score of 3.41. The results from 2007 to 2018 show that in 2016 alone, it dropped to 45th place. However, the results for the remaining years were between 31 and 38, and the ranks were relatively consistent. The LPI scores for six components were between 3.18 and 3.41. According to the World Bank’s identification, Thailand was included in the logistics-

Figure 15 : GDP per capita of Thailand
Source: https://tradingeconomics.com/thailand/gdp
friendly (top quintile). It can be said that Thailand is regarded enhanced logistics performance than most others within the same income group.

The LPI ranks and scores of Thailand from 2007 to 2018 are shown in the following table and figure.

Table 10 : LPI ranks and scores of Thailand from 2007 to 2018

<table>
<thead>
<tr>
<th>Year</th>
<th>LPI Rank</th>
<th>LPI Score</th>
<th>Customs</th>
<th>Infrastructure</th>
<th>International shipments</th>
<th>Logistics competence</th>
<th>Tracking &amp; tracing</th>
<th>Timeliness</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>31</td>
<td>3.31</td>
<td>3.03</td>
<td>3.16</td>
<td>3.24</td>
<td>3.31</td>
<td>3.25</td>
<td>3.91</td>
</tr>
<tr>
<td>2010</td>
<td>35</td>
<td>3.29</td>
<td>3.02</td>
<td>3.16</td>
<td>3.27</td>
<td>3.16</td>
<td>3.41</td>
<td>3.73</td>
</tr>
<tr>
<td>2012</td>
<td>38</td>
<td>3.18</td>
<td>2.96</td>
<td>3.08</td>
<td>3.21</td>
<td>2.98</td>
<td>3.18</td>
<td>3.63</td>
</tr>
<tr>
<td>2014</td>
<td>35</td>
<td>3.43</td>
<td>3.21</td>
<td>3.4</td>
<td>3.3</td>
<td>3.29</td>
<td>3.45</td>
<td>3.96</td>
</tr>
<tr>
<td>2016</td>
<td>45</td>
<td>3.26</td>
<td>3.11</td>
<td>3.12</td>
<td>3.37</td>
<td>3.14</td>
<td>3.2</td>
<td>3.56</td>
</tr>
<tr>
<td>2018</td>
<td>32</td>
<td>3.41</td>
<td>3.14</td>
<td>3.14</td>
<td>3.46</td>
<td>3.41</td>
<td>3.47</td>
<td>3.81</td>
</tr>
</tbody>
</table>

Source: World Bank

Figure 16 : LPI ranks and scores of Thailand from 2007 to 2018

Source: World Bank
In addition, among the upper-middle-income countries, Thailand was second place after China in the year 2018. The following table shows the LPI ranking of top-performing upper-middle-income group.

Table 11: Top-performing upper-middle-income group

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>26</td>
<td>3.61</td>
<td>27</td>
<td>3.66</td>
<td>28</td>
<td>3.53</td>
<td>26</td>
<td>3.52</td>
</tr>
<tr>
<td>Thailand</td>
<td>32</td>
<td>3.41</td>
<td>45</td>
<td>3.26</td>
<td>35</td>
<td>3.43</td>
<td>38</td>
<td>3.18</td>
</tr>
<tr>
<td>South Africa</td>
<td>33</td>
<td>3.38</td>
<td>20</td>
<td>3.78</td>
<td>34</td>
<td>3.43</td>
<td>23</td>
<td>3.67</td>
</tr>
<tr>
<td>Panama</td>
<td>38</td>
<td>3.28</td>
<td>40</td>
<td>3.34</td>
<td>45</td>
<td>3.19</td>
<td>61</td>
<td>2.93</td>
</tr>
<tr>
<td>Malaysia</td>
<td>41</td>
<td>3.22</td>
<td>32</td>
<td>3.43</td>
<td>25</td>
<td>3.59</td>
<td>29</td>
<td>3.49</td>
</tr>
<tr>
<td>Turkey</td>
<td>47</td>
<td>3.15</td>
<td>34</td>
<td>3.42</td>
<td>30</td>
<td>3.50</td>
<td>27</td>
<td>3.51</td>
</tr>
<tr>
<td>Romania</td>
<td>48</td>
<td>3.12</td>
<td>60</td>
<td>2.99</td>
<td>40</td>
<td>3.26</td>
<td>54</td>
<td>3.00</td>
</tr>
<tr>
<td>Croatia</td>
<td>49</td>
<td>3.10</td>
<td>51</td>
<td>3.16</td>
<td>55</td>
<td>3.05</td>
<td>42</td>
<td>3.16</td>
</tr>
<tr>
<td>Mexico</td>
<td>51</td>
<td>3.05</td>
<td>54</td>
<td>3.11</td>
<td>50</td>
<td>3.13</td>
<td>47</td>
<td>3.06</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>52</td>
<td>3.03</td>
<td>72</td>
<td>2.81</td>
<td>47</td>
<td>3.16</td>
<td>36</td>
<td>3.21</td>
</tr>
</tbody>
</table>

Source: Arvis et al., (2018, p.12)
The figure below shows the 2018 LPI six segment rankings between Thailand, East Asia & Pacific region and the upper-middle-income group.

Figure 17: LPI ranks and scores of Thailand, East Asia & Pacific and Upper-middle-income group for the year 2018

Source: World Bank

5.5 The components of the Logistics Performance Index

In 2018, Thailand's LPI ranked 32nd out of 160 countries in the world, up from 45th in 2016, the best LPI total score in a decade, with a score of 3.41. The first group (Logistics Friendly) from the second group (Consistent Performers) reflects the awareness and satisfaction in the efficiency of the country's logistics system have improved in the past two years. The most developed indicator in terms of ranking is the accuracy of service (Timeliness) has improved 24 places to 28th place from 52nd place in 2016, followed by the service provider's performance. Logistics in both government and business (Logistics Quality and Competence) improved 17 places to 32nd place from 49th place in 2016 and the Tracking & Tracing system improved 17
places, 33rd out of 50th in 2016. The following figure shows Thailand’s LPI overall score for the six components of LPI in 2018.

![Figure 18: Thailand’s sub-indicators LPI scores of 2018](image)

Source: World Bank

Table 12: Thailand’s sub-indicators LPI scores, 2007 to 2018

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2010</th>
<th>2012</th>
<th>2014</th>
<th>2016</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customs</td>
<td>3.03</td>
<td>3.02</td>
<td>2.96</td>
<td>3.21</td>
<td>3.11</td>
<td>3.14</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>3.16</td>
<td>3.16</td>
<td>3.08</td>
<td>3.40</td>
<td>3.12</td>
<td>3.14</td>
</tr>
<tr>
<td>International shipments</td>
<td>3.24</td>
<td>3.27</td>
<td>3.21</td>
<td>3.30</td>
<td>3.37</td>
<td>3.46</td>
</tr>
<tr>
<td>Logistics competence</td>
<td>3.31</td>
<td>3.16</td>
<td>2.98</td>
<td>3.29</td>
<td>3.14</td>
<td>3.41</td>
</tr>
<tr>
<td>Tracking &amp; tracing</td>
<td>3.25</td>
<td>3.41</td>
<td>3.18</td>
<td>3.45</td>
<td>3.20</td>
<td>3.47</td>
</tr>
<tr>
<td>Timeliness</td>
<td>3.91</td>
<td>3.73</td>
<td>3.63</td>
<td>3.96</td>
<td>3.56</td>
<td>3.81</td>
</tr>
</tbody>
</table>

Source: World Bank
5.5.1 **Customs**

One of the essential aspects in improving the score is the computerization of customs offices and the automation of customs procedures (ITF, 2015). Thailand’s Customs service is increasingly relying on computer technology to handle a wide range of customs functions. On 1 January 2007, “e-Customs” was implemented in Thailand. In the e-Customs service, e-Export, e-Import, e-Payment, e-Manifest, and e-Warehouse services were included. It offers a paperless environment and a one-stop service to business operators such as importers, exporters, shipping businesses and Customs brokers (Thailand Customs Department, n.d). Moreover, it can significantly improve the ease of import/export and trade servicing of the country.

According to the World Bank’s Doing Business Report (2020), Thailand and other 189 countries were investigated from many business perspectives, containing “Trading Across Border”. This sector indicates the cost and time of exporting and importing in the perspective of border and documentation processes of the country performance. In this regard, compared to its neighbours in East Asia and the Pacific, Thailand’s performance is considerably well. Consequently, from a Trading Across Borders perspective, Thailand was ranked 62nd out of 190 countries with an average score of 84.65 (Thailand Doing Business, 2020).
5.5.2 Infrastructure

Infrastructure improvement is necessary to ensure basic connectivity and gateway access. Thailand has a significant strategic advantage in road connectivity, with connections to Myanmar to the north and west, Cambodia to the east, Lao People's Democratic Republic to the northeast, and Malaysia to the south. It is also possible to transport and logistics from Thailand to southern China through these bordering nations, principally Lao PDR and Myanmar (Pomlaktong & Ongkittikul 2008).

Thailand's robust road linkage is a crucial driver of the development of the logistics sector, accounting for more than half of all freight movements (57.5%) by road transport. Thailand has a total of 390,000 km of highways, many of which are part of the regional network. There are 23 highways in the ASEAN Highway Network, nine in the Asian Highway Network and three highways in the Greater Mekong Subregion (GMS) Highway Network and two highways linking Malaysia and

---

Table 13: Trading across Borders in Thailand and East Asia Pacific – Score

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Thailand</th>
<th>East Asia &amp; Pacific</th>
<th>Thailand's Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to export: Border compliance (hours)</td>
<td>44</td>
<td>57.5</td>
<td>73.0</td>
</tr>
<tr>
<td>Cost to export: Border compliance (USD)</td>
<td>223</td>
<td>381.1</td>
<td>79.0</td>
</tr>
<tr>
<td>Time to export Documentary compliance (hours)</td>
<td>11</td>
<td>55.6</td>
<td>93.9</td>
</tr>
<tr>
<td>Cost to export Documentary compliance (USD)</td>
<td>97</td>
<td>109.4</td>
<td>75.8</td>
</tr>
<tr>
<td>Time to import: Border compliance (hours)</td>
<td>50</td>
<td>68.4</td>
<td>82.4</td>
</tr>
<tr>
<td>Cost to import: Border compliance (USD)</td>
<td>233</td>
<td>422.8</td>
<td>80.6</td>
</tr>
<tr>
<td>Time to import Documentary compliance (hours)</td>
<td>4</td>
<td>53.7</td>
<td>98.7</td>
</tr>
<tr>
<td>Cost to import Documentary compliance (USD)</td>
<td>43</td>
<td>108.4</td>
<td>93.8</td>
</tr>
</tbody>
</table>

Average Score: $84.65$

Source: Economy profile of Thailand, World Bank’s Doing business 2020, (p. 46)
Thailand. Thailand has the most roadways connecting it to neighbouring nations among ASEAN members, with thirteen (OECD, 2020 b).

Thailand has a coastline of 3,219 kilometres with over 4,000 kilometres of waterways. There are eight international deep-sea ports in Thailand, including Bangkok, Laem Chabang, Sattahip, Songkhla, Ranong, Map Ta Phut, Phuket, and Si Racha. It also has four private ports permitted to handle container cargo. Among them, Bangkok Port is the largest and busiest one, with 1.5 million TEU handled annually. The growth of the logistics industry is aided by such extensive infrastructure (Marketresearch, 2018).

The railway infrastructure of Thailand consists of 4431 kilometers of metre-gauge railway tracks, as of 2017. The Thai government is now attempting to expand the quantity of freight delivered by the railway sector, and the State Railway of Thailand (SRT) is implementing several projects to boost the railway infrastructure of Thailand (OECD, 2020 b).

According to the World Bank’s survey on the quality of trade and transport infrastructure, such as railways, roads, ports and information technology of 160 countries for 2018, Thailand’s result was relatively consistent than in the same income group and the region. The following figure shows the average score for quality of trade and transport-related infrastructure in East Asia and Pacific was 3.05, the upper-middle-income group was 2.60, and Thailand was 3.14 in the year 2018.
5.5.3 **International Shipment**

The measurement of the index of the international shipment depends mainly on the ease of arranging low-cost shipments. In Thailand, both Government and private sectors attempt to reduce logistics costs and to facilitate logistics activities. Thailand continued expansion to logistics service providers globally as the country's and region's economies continue to grow. Moreover, the government is attempting to increase regional connections by focusing not just on administrative reforms but also on expanding logistical infrastructure and warehouses investments. Not only would this reduce logistics costs, but it will also improve Thailand's trade competitiveness (Limcharoen et al., 2017). The logistics cost of Thailand is declining since 2010. The National Economic and Social Development Council (NESDC) has reported, the cost for 2019 was 13.5% per GDP. The following figure shows the logistics cost to the GDP of Thailand from the year 2010 to 2019 (NESDC, 2020).
Figure 20: Thailand’s logistics cost to GDP

5.5.4 **Competence and quality of logistics services**

One component sector of LPI, the competence and quality of logistics services, measures the accessibility of the overall level of logistics services and the excellent operation of transport services in a country.

Thailand's logistics sector is fragmented, with a combination of international and domestic operators. DHL maintains a main position in the Thailand logistics service provider sector, with a foothold in sea freight and air and experience in third-party logistics services (Mordor Intelligence, n.d a). According to the Federations of Thailand Industry's report, there are 215 logistics service providers in Thailand (Limcharoen et al., 2017). Additionally, The continued growth of the e-commerce sector has created an opportunity for logistics space, leading to significant changes in Thailand's supply chain and logistics activities. As a result, many courier companies have developed their high-quality and cost-effective logistics services in the country, bringing domestic end-to-end delivery systems to the market. Moreover, agreements
with Thailand and ASEAN have resulted in a rise in cross-border freight movement through roads and ports without any restrictions (Mordor Intelligence, n.d a).

According to a 2018 World Bank’s LPI survey, Thailand's performance on competence and quality of logistics services sector rank was 32nd with a score of 3.41. The result for 2018 is the highest score in the entire period since the survey began in 2007. In addition, compared to regional and the same income groups, the results for Thailand are higher.

![Graph showing Competence and quality of logistics services indicator for Thailand, East Asia & Pacific region and upper-middle-income group](image)

Figure 21: Competence and quality of logistics services indicator for Thailand, East Asia & Pacific region and upper-middle-income group

Source: World Bank

5.5.5 Tracking and Tracing

Performance evaluation for the tracking and tracing system is measured by the ability of tracking and tracing the consignments. Therefore, it is critical to determine each shipment's exact location and route when it is delivered to the end customer.
Thailand is one of the top countries in the Asia-Pacific region regarding e-commerce development, with a prominent increase in recent years. During 2017, Thailand's e-commerce logistics market grew at a steady pace. Thailand, ASEAN's second-largest economy, has one of the region's most significant internet user populations. There are an estimated 57 million internet users in Thailand who are proficient in using digital technologies, mobile devices, and e-commerce. As a result, Thailand has become an attractive growth environment for e-commerce businesses due to its growing internet user base (Mordor Intelligence, n.d a).

The wide-ranging usage of information and communication technologies (ICT) in Logistics Services has significantly profited. Moreover, ICT can make it easier to improve tracking and tracing performance by allowing the organization, gathering, and distribution of information about products, services, and trade regulations (ITF, 2015).

Moreover, information technology system has been applied more in transportation and logistics services for the Tracking and Tracing, such as vehicle tracking system (GPS Tracking) and product tracking system with Radio Frequency Identification (RFID) (NESDB, n.d).

5.5.6 Timeliness

The timeliness of the shipment to reach the destination is measured by how reliable the shipment coincides with the promised delivery time. In this regard, shipment time depends on the type of the product and its nature, management and planning, logistics services, the distance between the buyer and the seller, and external reasons such as supply chain interferences due to political risk or weather conditions and regulations (ITF, 2015).
In Thailand, the express delivery market is driven by the e-commerce industry's growth. In addition, with the rapid growth of international trade services, express services are becoming more critical as Thailand's economy. Improvement of e-commerce in Thailand benefits from the reduced time for goods distribution and inventory costs and the increasing the quality of logistics services.

In 2018, Thailand’s performance on the timeliness of shipments had the highest score among the six components of the LPI index. According to the World Bank LPI result for 2018, Thailand’s timeliness sector rank was 28 with a score of 3.81.

Figure 22: the results of the six components of LPI in 2018
Source: World Bank
5.6 Overview on Thailand’s LPI Performance

This study focuses on how Thailand has improved its LPI rank from the second group (Consistent performers or Second Quintile) to the first group (Logistics friendly or Best Performer). It also highlights the idea of a relatively quick review of Thailand's logistics capabilities based on six components of the LPI.

An overview of increasing the LPI ranking from 45th to 32nd place between 2016 and 2018, the Thailand government has made efforts to increase Thailand's competitiveness by investing comprehensively in the infrastructure sector and reforming and modifying business and customs procedures to strengthen the country's logistics sector. Thailand's well-developed road network is a crucial component in the growth of the logistics sector and the critical factor why road transport accounts for just over half of all freight movements.

In addition, in terms of transport infrastructure and information technology, raising the standard of roads to facilitate the transportation of goods and the development of the road network connecting the main trade gates, such as Laem Chabang Port, Suvarnabhumi Airport, as well as important border trade gates. Furthermore, the government has prioritized and allocated budgets for investment in the development of double-track railways throughout the country, the development of freight stations and coastal port transformation centres at Bangkok Port and Laem Chabang Port to support the modification of transportation modes. Additionally, regarding information technology, an Internet network has been developed that covers a greater area in terms of logistics service provider performance (NESDB, n.d).

Thailand's logistics sector is booming due to the Government’s substantial investment in country’s infrastructure, its ability to implement legal reforms that support economic growth, and the support of a strong government.
Chapter 6
Recommending to Myanmar’s logistics sector after Learning Thailand’s LPI practices

6.1 Introduction

Myanmar was designated as a Least Developed Country (LDC) in 2018 by the United Nations. Moreover, the Logistics and transportation performance of Myanmar is poor and lagging behind the other countries in the region. Accordingly, there are many things that Myanmar needs to undertake to minimize the gap with other more economically developed countries, and enhancing logistics performance is one of them.

6.2 Challenges encountering Myanmar Logistics Sector

Despite Myanmar's geographic location, its inadequate port facilities, lack of railroad, low-quality roads, and falling air traffic are significant shortcomings in its overall logistics environment. As a result of these factors, businesses seeking to import or export into Myanmar will face higher costs and longer lead times.

The Asian Development Bank (ADB) projected that Myanmar required about 60 billion (US$) to invest in the transport sector between 2016 and 2030. In addition, the ADB highlighted the shortages by stating that approximately twenty million people lacked basic road access, while 60% of highways and the majority of railways conditions are still poor in Myanmar (ADB, 2016).

According to the National Logistics Master Plan (NLMP, 2018), several shortcomings were identified regarding the country's logistics infrastructure. The current challenges facing the development of Myanmar's logistics sector are as follows:
(1) The current transport infrastructure is underdeveloped and needs to be upgraded;

(2) The cost of transporting goods is twice as high as in neighboring countries;

(3) The waiting time for customs clearance process at Cross Border Points CBPs and ports is longer than other countries;

(4) The underperformances of logistics facilities include dry ports, off-dock facilities, truck terminals, warehouses;

(5) Inland Water Transport (IWT) provided the cheapest transportation costs for long-distance and bulky cargoes, but was not available due to lack of necessary infrastructure;

(6) The railway is one of the competitive transport modes for the long haulage of bulky cargoes and containers with lower transport costs and higher speed. As a strong point, the railway network is available in a wide range of the country in Myanmar. However, the railway has not been utilized due to a lack of powerful locomotives and substandard railway tracks;

(7) There is no multimodal freight transport due to the lack of logistics facilities and an absence of logistics providers; and

(8) Lack of appropriate freight transportation laws and regulations in line with international and regional requirements.

In addition, Cross border e-commerce is at a stage where it needs to be developed in Myanmar. Due to these circumstances, other developed countries take only one to two days to process customs clearance, while Myanmar takes about five to seven days. This factor is also an obstacle to developing the country's logistics sector (Banomyong & Fernandez, 2021). According to the United Nations Conference On Trade and Development (UNCTAD) Business-to-Consumer (B2C) E-commerce Index for 2020, Myanmar’s rank was 130th out of 152 countries. It measures the
readiness of countries to engage in online commerce based on the following four indicators: (UNCTAD, 2021)

(1) internet use penetration
(2) secure servers per one million inhabitants
(3) credit card penetration
(4) a postal reliability score

The development of an E-commerce system is also essential as a good e-commerce system plays a vital role in the development of the country's logistics sector. The development of a country's e-commerce system is critical to implement logistics performance indicators such as customs clearance, trucking and tracing systems and timeliness.

In Myanmar, road transportation is the most common mode of local trade and transportation, allowing rural areas to be connected and regional and global trade. However, Myanmar's road system is particularly poor and underdeveloped, with more than half of the country's roads being unpaved. The lack of transportation infrastructure, combined with Southeast Asia's lowest motor vehicle penetration, has led to high transportation costs and lengthy travel times. As a result, the country's trucking expenses are higher than other countries in the region (Mordor Intelligence, n.d b).

6.3 A study on Thailand’s LPI practices for the improvement of Myanmar’s LPI

The country’s Logistics performance will generally improve when the logistics development system is implemented as planned in the roadmap outlined in the program. Accordingly, a country's LPI can only be improved through the collaboration of policymakers, government agencies and the private transport industries aiming at developing the transport and logistics system. The following
section will discuss how to enhance Myanmar's LPI ranking by applying lessons learned from Thailand's efforts.

6.3.1 **Customs (LPI score of 2.17)**

The customs clearance procedures at airports, ports, and border crossing gates must be streamlined and simplified. In addition, as a member country of ASEAN, Myanmar's customs procedure needs to be standardized, in line with the customs procedures set out in the logistics protocol agreed by the ASEAN Economic Community (AEC). Moreover, the Customs Department of Myanmar is carrying out reforms, amending the structure of the department and drafting rules related to the revised customs laws. In addition, with the efforts of the Customs Department, Myanmar Automated Cargo Clearance System (MACCS) was introduced in Yangon in 2016, CBPs of Myawady in 2018 and CBPs of Muse in 2021 (The Global New Light of Myanmar, 2020). In order to develop Cross-border trade, the MACCS system should be implemented and operated through all the country’s CBPs. It is also recommended that customs clearance be carried out not only at international ports and CBPs, but also in areas close to special economic zones (JICA et al., 2018).

In Thailand, “e-Customs” services, including e-Export, e-Import, e-Payment, e-Manifest, and e-Warehouse services were widely used since 2007. Such improvement can significantly speed up the country's customs clearance process. Therefore, Myanmar's Information Technology system needs to be further developed than the current status.

6.3.2 **Infrastructure (LPI score of 1.99)**

To develop the country's infrastructure sector, it is necessary for a balanced improvement of soft infrastructure such as laws, regulations and procedures and hard infrastructure such as roads, bridges, ports, airport facilities of the country. In Myanmar, many projects will be implemented under regional development programs in the
context of logistics-related road infrastructure development. These projects primarily consist of Asian highways, ASEAN highways, GMS Economic Corridors, and road connectivity with bordering countries.

The railway sector must be improved to allow heavy cargo and container block trains for long haulage routes between Yangon and Mandalay. Improved railway freight stations and inland container depots can minimize barriers that hinder smooth railway freight transportation.

Moreover, it is also needed the improvement and maintenance of domestic ports. Improvements to domestic ports' infrastructure and operations result in a higher utilization ratio of coastal cargo ships, reducing freight transport costs and enhancing coastal shipping’s competitiveness. In addition, domestic ports could play a key role in the fundamental facilities of multimodal freight logistics hubs by connecting to road and rail networks.

A study of Thailand's infrastructure sector found that the Thailand government had made significant investments in the country's infrastructure development. Both Myanmar and Thailand have geographical advantages for transportation hubs, but Myanmar's infrastructure sector is still underdeveloped. Therefore, the Myanmar government needs to work harder to develop the country's infrastructure sector.

6.3.3 **International Shipments (LPI score of 2.20)**

In exporting and importing internationally, it is essential to create a business-friendly environment for shippers. In addition, export and import processes must be cheaper and more convenient than in other countries. With the expansion of border crossings, transportation costs could be significantly reduced. In addition, to shortening customs clearance times, the road between CBPs and Yangon has improved
smoother transport. Therefore, it is essential to bring competitiveness to logistics services (JICA et al., 2018).

According to Thailand’s practice, there are many attempts to reduce logistics costs and facilitate logistics activities by the government and private sectors. As a result, Thailand’s government can perform in logistics cost to decline. In Myanmar, to achieve a high rank in the international shipment sector, it is crucial to reduce logistics costs and facilitate the logistics activities of the country. The government should focus more on administrative reform to enhance regional connectivity while simultaneously increasing logistics infrastructure and warehousing investment. By doing so, the country’s logistics costs can be reduced, and trade competitiveness will be increased.

6.3.4 Logistics competence (LPI score of 2.28)

Myanmar's logistics service industry is still at its beginning stage. However, owing to a quick increase in the volume of trade cargo, this situation will change relatively in a short period. Currently, logistics associations are being formed according to the type of logistics services provided in Myanmar. These associations need to work with the government to provide training for human resources development, cooperation to strengthen the logistics sector, and quality control to improve operations. Moreover, many international logistics service providers have already joined the market and begun providing logistics services. Therefore, the quality of domestic freight forwarders and transporters needs to be upgraded as international logistics service providers stimulate those domestic companies. Furthermore, developing the potential of logistics service providers to be efficient and service standards comparable to international service providers.

In Thailand, the continued growth of the e-commerce sector has inevitably created an opportunity for the country's quality of logistics activities. Many logistics services
provider companies can develop their high-quality and cost-effective logistics services in the country, bringing domestic end-to-end delivery systems to the market.

In Myanmar, to enhance the quality of logistics service in the country, the government and concerned organizations need to develop the potential of logistics service providers to be efficient and service standards comparable to international service providers by establishing freight standards, developing freight management systems, warehousing systems and inventory tracking systems.

6.3.5 Tracking and Tracing (LPI score of 2.20)

A good tracking and tracing system is needed to determine a country's logistics capabilities. Because it can help prevent cargo loss and damage and ensure cargo safety and security. In this regard, advanced technologies are needed to implement a good tracking and tracing system. Therefore, the government needs to support the implementation of basic needs and infrastructures.

Thailand is one of the top countries in the Asia-Pacific region regarding e-commerce development, and the country's e-commerce logistics market grew steadily. Moreover, an estimated 57 million internet users in Thailand are proficient in using digital technologies and e-commerce. The growing internet user in a country can lead to an attractive growth environment for e-commerce. Therefore, Thailand can use advanced information technology in transport and logistics services such as vehicle tracking system (GPS Tracking) and product tracking system with Radio Frequency Identification (RFID).

The tracking and tracing system of cargoes can be done electronically and through the utilization of the internet. Therefore, if the government focuses on improving the country's technology and facilitating the use of the Internet, the tracking and tracing system will be improved.
6.3.6 **Timeliness (LPI score of 2.91)**

The timeliness of cargo delivery depends on the country’s capability of transport infrastructure and quality of services. Furthermore, the durability of the equipment used in the transportation sector and the operative staff are critical facts for this sector. Consequently, it is essential to collaborate between relevant government agencies and private transportation and logistics service industries to enhance the timeliness of the logistics sector. The efficiency of cargo transportation and the profitability of the transport industry are closely connected.

A study of the timeliness of Thailand, the improvement of e-commerce in Thailand benefits the reduced delivery time of goods. Moreover, the government has prioritized investment in the development of transportation infrastructure. Therefore, improving transport infrastructure and other related quality of services can support the right time on a cargo delivery.

6.4 **Recommendations for Myanmar’s logistics sector**

To improve the country’s logistics sector needs the integration of significant components organizing the logistics system, including infrastructure, institutional framework and logistics service providers. The following points should be considered for the sustainable development of Myanmar's logistics sector (JICA et al., 2018):

- To reduce and rationalize the transportation costs, logistics costs and the lead time for the cargo transportation.
- Costs for all types of international trade and cross-border transactions should be reduced and rationalized.
- Enhancing competitiveness by leveraging cross-border and value-added economic services based on value-added activities;
- Providing appropriate advanced feeder road networks and truck terminals throughout Myanmar to strengthen the hub and spoke freight transport functions;
- To improve urban-rural cohesiveness by connecting urban-industrial regions with rural regions using efficient freight transportation and rural road linkages;
- Supporting rural development to reduce poverty (including in border areas)
- Increase incomes and job possibilities by creating high-quality jobs in a variety of industries, including the logistics sector.

Inter-ministerial coordination and inter-transport modal coordination need to be more recognized in implementing the country's logistics sector development since the coordination mechanism between ministries and agencies involved in developing and enhancing the administration's logistics system is still lacking. The infrastructure development plans of each transport sector, roads, railways, airports, ports, truck terminals, cross-border facilities are currently organized and formulated by the separate and independent ministries and agencies. Improved connectivity between diverse modes of transportation is critical in the plan to reduce transportation costs and lead times, which is a critical component of logistics development planning. Therefore, an effective mechanism for inter-ministerial coordination is vital in the development of the country's logistics sector.

Furthermore, cooperation in learning and research and development (R&D) between industry and academics should be strongly encouraged concerning human resource difficulties and other constraints to develop the country's logistics sector. It is needed to ensure the development of professional standards and logistics personnel to meet international quality standards and plan to manage the logistics manpower in accordance with the needs of the logistics sector by emphasizing specialized
vocational training and supporting cooperation with the private sector in operational level training.

If transportation networks can be used effectively, the manufacturing sector of the country will profit substantially. Thus, transportation infrastructure can boost a country's productivity while also reducing commercial transportation costs. For instance, modernizing ports and upgrading the roads and railways system can reduce the cost of delivering raw materials and make distributing commodities between markets and ports easier. Additionally, efficient transportation is an important component for the development of the country’s logistics sector.

Myanmar is currently undergoing comprehensive reforms in all sectors, and the government, professionals from logistics sectors and the concerned agencies need to cooperate to improve the logistics sector. In this way, the transport and logistics sectors adapt to international requirements, and Myanmar's LPI ranking will grow in the coming years.
Chapter 7
Conclusion

7.1 Summary

The main purpose of this study is to recommend the best practice for further developing LPI in Myanmar by reviewing and analyzing Thailand's capacity to increase the rank of LPI and implement the logistics sector.

Firstly, the study was an overview of the logistics sector in Myanmar by reviewing the background information of Myanmar, Administration of Logistics sector, current situation of key players in the logistics sector, domestics transport infrastructure and the quality of logistics sector. Then, it was made an overview of the LPI by examining the description of LPI, the definition of the six performance indicators for the LPI and an overview of the logistics performance of Myanmar.

After that, the examination of Thailand's performance in LPI was analyzed. In that chapter, the study was made on a brief overview of Thailand's geography and economic background, how to perform the six components of LPI to acquire the progress ranking in LPI and the overall review on the country's logistics sector.

Finally, the article suggested the lessons learnt from Thailand's practices of implementing LPI and how to raise the rank of LPI in Myanmar. Moreover, it also outlines the current challenges facing Myanmar's logistics sector and recommendations to improve Myanmar’s Logistics sector.

7.2 Contributions

This article provides an overview of the LPI activities of Thailand, which has been selected as a model for how to improve Myanmar's LPI rank. It was conducted by examining and analyzing the development and implementation of Thailand's logistics
sector, the progress to the first group performer in the World Bank's LPI ranking, and its challenges in the implementation and development process by reviewing the literature. Furthermore, the recommendations for the best practice for further developing LPI in Myanmar are intended to contribute to the policymakers and concerned stakeholders to develop the country's infrastructure and logistics sector.

7.3 Limitations

This study found insufficient well-researched studies on LPI in Myanmar, and that information was hard to find. Since the Myanmar logistics service industry is still in the beginning, sufficient information is not available. Moreover, this study was limited due to the lack of sufficient information and time constraints. Furthermore, as previously stated, there may be other factors to consider when proposing in reality, as recommendations are based on evaluating countries with different backgrounds. In terms of future research suggestions, if precise operational data becomes accessible in the future, qualitative and quantitative analyses might be advised to examine and identify the realistic perspectives of various stakeholders through questionnaires or interviews. Using the more accurate data to determine the logistics sector will enable future studies to be more accurate and provide more effective recommendations to improve Myanmar's LPI level.
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