

**YANGON UNIVERSITY OF ECONOMICS  
MASTER OF PUBLIC ADMINISTRATIONPROGRAMME**

**A STUDY ON THE PERCEPTION OF PORT USERS ON  
PORT FACILITIES AND PERFORMANCE OF  
YANGON PORT**

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**AUGUST, 2019**

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**MASTER OF PUBLIC ADMINISTRATION PROGRAMME**

**A STUDY ON THE PERCEPTION OF PORT USERS ON PORT  
FACILITIES AND PERFORMANCE OF YANGON PORT**

A thesis submitted as a partial fulfillment of the requirements for the degree of  
Master of Public Administration (MPA)

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**MASTER OF PUBLIC ADMINISTRATION PROGRAMME**

This is to certify that this thesis entitled “**A STUDY ON THE PERCEPTION OF PORT USERS ON PORT FACILITIES AND PERFORMANCE OF YANGON PORT**” submitted as a partial fulfillment in the requirements for the degree of Master of Public Administration (MPA) has been accepted by the Board of Examiners.

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## **ABSTRACT**

Yangon Port is an international port and it handles about 90% of the country's export and virtually all imports. As Yangon Port is a major port of Myanmar, it is required to develop in line with the external trade of Myanmar. The main objective of this study is to analyze the perception of port users on port facilities and port performance of Yangon Port. Quantitative approach and descriptive method are used for this study. The descriptive method is used from 150 randomly selected port users at Yangon Port. It was found that the respondents were more satisfied with the port facilities and port performance. Ports and port operation staffs followed for port safety was weak and the main functions of port services loading and unloading were quickly as possible to get quick turn round of the ship. It also found that document dispatching system such as delivery order issue were faster as possible and all manual works were replaced with computerized system such as Port Electronic Data Interchange (EDI) and Myanmar Cargo Clearance System (MACCS) to reach goal life with paperless.

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## LIST OF ABBREVIATIONS

AIPT	Ahlon International Port Terminal
APEO	Asia Pacific Edible Oil Limited
AWPT	Asia World Port Terminal
BKP	Bangkok Port
BOT	Build Operate Transfer
CFS	Container Freight Station
D/O	Delivery Order
DWT	Death Weight Tonnage
EDI	Electronic Data Interchange
GRT	Gross Tonnage
GT	Gross Tons
ICT	Information and Communication Technology
KCT	Kingston Container Terminal
LCP	Laem Chabang Port
LOA	Length Over All
MACCS	Myanmar Cargo Clearance System
MIP	Myanmar Industrial Port
MIPL	Myanmar Integrated Port Limited
MITT	Myanmar International Terminals Thilawa
MPA	Myanma Port Authority
PAT	Port Authority Thailand
PFSO	Port Facility and Security Officer
PPP	Public Private Partnership
SPW	Sule Pagoda Wharf
TEU	Total Equivalent Unit
TMT	The Myanmar Terminal
UNCTAD	United Nations Conference on Trade and Development

# **CHAPTER I**

## **INTRODUCTION**

### **1.1 Rationale of the Study**

The Union of Myanmar is located in Southeast Asia and has a total coastline of 3832 km (1760 miles) fringing the North-East portion of the Bay of Bengal. According to geographical structure, strategic location of Myanmar and its endeavor in the development of ports are of great importance of national level as well as regional.

Myanmar is rich in resources and culture. By the end of 2003, foreign investors have invested into diverse development projects, while increased export of agricultural products and timber combined with strong demand for construction materials, plant equipment and consumer goods have contributed to the phenomenal growth in international trade.

Economic development depends on the amplitude and spread of trade. Trade is increasingly subject to efficient, reliable and competitive port services to flourish. Ports play a major role in promoting international trade by generating commercial and industrial activities which are linked to the economic development of a country.

In trading, human being use three modes of transport in carrying commodities from one place to another, by road, by sea and by air. In expansion of international trade, transport by sea is very important because huge amount of goods can be delivered at lowest cost in comparison with other modes of transport. Safe, reliable and competitive maritime transport services benefit the economy as a whole, and are key factors of efficiency for the production of both goods and services. It is estimated that 80% of world trade in terms of volume is carried by vessels. Maritime transport is thus an important facilitator of world trade, and this role becomes even apparent crucial in an expanded and diversified world trade system.

Maritime Transportation has played an important role in the history development of the region's economy and remains an important source of jobs today. Today, more than 90% of international cargo moves through seaports and 80% of seaborne cargo moves in containers through major seaports. Management of terminal operations has thus become crucial in order to meet the demand for cargo traffic effectively and efficiently.

The marine transportation system provides an efficient means of moving quantities of cargo with the low cost. Ports exist as an important and fundamental in the port terminal, berth allocation, loading and discharging of cargo, storage of cargo and delivery of cargo.

The nature of marine transportation and port development is too much link and interdependent with each other. If the port becomes grate facilities and services, the marine transport sector is more developed and smoother. If the marine transport becomes better, the trade will become improve and that promote economic growth and social development of nations. It is a sub system within a total transport system, thus typically ports around the world have been the centers of commerce from which cities, national capital and thriving hinterlands have sprung up. In modern world, ports have become the nuclei of flourishing industrial and manufacturing zones. Therefore, ports from a vital part of the economy of every nation and serve many purposes.

In maritime transport, ports are vital and a port is an interface between the water-link and the land-link of the transportation of commodities. The continuing global expansion of trade will mean a sustained increase in transport and ports are an essential part of the transport chain, especially with international trade.

Port is gateway for the export and import of the state and played vital role as main sector for the Economic Development of the State. Particular emphasis is placed on the need to strive for complete professionalism in all areas of port operation and management by providing a viable high quality service to sustain and expand international trade passing through the port.

Ports are increasingly challenged by the requirements of balancing accountability and responsibility against the necessities of competing in their service providing. Ports should be well developed to enable to provide better services for ports users. There are nine ports in Myanmar. Among them, I want to study Development of Yangon port because Yangon port is an international port and it

handles about 90% of the country's export and virtually all imports. Yangon also has road link, rail link and water link with other parts of the country and it reflects easy access to distribution of import cargo and export cargo. Development of Yangon Port is very important for sustainable economic development of Myanmar and Yangon Port development should also have the conformity with the economic development of Myanmar.

## **1.2 Objective of the study**

The objectives of this study are to study the background history of ports in Myanmar and to analyze the perception of port users on port facilities and port performance of Yangon Port in Myanmar.

## **1.3 Method of Study**

The descriptive method is mainly used with both primary and secondary data. Primary data are collected from the port users (shipping lines, agents and port operation staffs) by using the semi-structured questionnaire. The sample in this study is 150 port users and they are randomly selected. Secondary data are collected from Myanmar Port Authority.

## **1.4 Scope and Limitations of the Study**

This study focuses mainly on the perception of port users on port facilities, port performance, port safety, port services, and port management at Yangon Port. The scope of the study covers only on port facilities, port performance, port safety, port services, and port management at Yangon Port in Myanmar from 2013-2014 to 2017-2018.

## **1.5 Organization of the Study**

This paper consists of five chapters. First chapter is introduction about the study included rationale of the study, objectives of the study, method of study, scope and limitation of the study and organization of the study. The second chapter mentions literature review on port and port development. The third chapter describes the background history of Ports in Myanmar. The fourth chapter includes the data analysis and finally findings, suggestions recommendations and need for further research are mentioned in fifth chapter.

## **CHAPTER II**

### **LITERATURE REVIEW**

#### **2.1 Port Definition and Its Functions**

Ports are man-made places where are facilities for berthing or anchoring ship, and where there is handling equipment to handle cargo transfer from the ships to shore, shore to ship, or ships to ships. The book "The role of Port" written by Robison (2002) listed as following:

- (1) Ports as places: They are places that handle ships and cargoes.
- (2) Ports as operating systems: They are places that handle ship and cargoes with operational efficiency.
- (3) Ports as economic units: They are places that handle ships and cargoes within an economic efficiency framework.
- (4) Ports as administrative units: They are places that handle ships and cargoes within an efficiency administrative and policy framework.

Ports are a vital part of the transport infrastructure. The important functions of ports include:

- (1) Their acting as nodes for linking with other inland transport modes such as highways, railways, and inland waterway system;
- (2) Their acting not only acts as gateways for trade, but also attracting agents of commercial infrastructure such as banks and insurance agents, as well as industrial activities.

#### **2.1.1 Port Generation**

United Nations Conference on Trade and Development (1999) defined ports in terms of generations. In general, three generations can be classified:

**First-generation ports:** Until 1960, ports played a simple role as the link between sea and inland transport systems. The main activities in the port region were cargo handling and cargo storage. Thus, the only focus of port development was

investment in port facilities for ship and cargo handling, whereas adoption of technology was largely neglected.

**Second-generation ports:** The second-generation ports were those built between 1960 and 1980. The activities in ports were expanded to value added services ranging from packaging and labeling to physical distribution. Players in the port communities, including ocean carriers and freight forwarders, had begun to realize the importance of customer services and of keeping a long-term relationship with customers.

**Third-generation ports:** From 1980, container transport developed quickly and the growth of an intermodal transport system emerged. The container transport chain had linkages to form an international network, which was enlarged to include logistics and distribution services. In third-generation ports, customs service requirements were analyzed in detail and ports were actively engaged in marketing-related activities.

### **2.1.2 Types of Ports**

Port can be divided into two types, by the organization, and the system of packing and type of ship.

The main factor of a port needs basically to have supported instruments and to give services provided by its organization. Most of the ports are controlled under state governments. The system of the port management can be varied based on states' background history, constitution, finance and policy. Therefore, different management of the ports appeared in the world that is classified into five categories.

- (a) Private Ports
- (b) Railway Ports
- (c) State or National Ports
- (d) Self-Governing or Autonomous Ports

#### **(a) Private Ports**

These, owned by private or company, aim to get profits like other ports. The Manchester Port in United States and the most ports in the Hong Kong are examples. The advantages of these ports have not any restrictions like the systems of red tape and bureaucracy. And the port organization can choice rights and qualified person to assign employees and can carry out commercially by its own policy to give service without any other interference.

**(b) Railway Ports**

Although railway port can generally be put into private ports, it has also different characteristics. The most of the ports in Europe and United States had established as the railway ports and some of these are still used as an origin. Railway Ports provide the secondary role for railway transportation. Port of Baltimore and Felixstowe Dock and Railway Company are like this port. To be reduced the tax of the port, railway ports can be supported it according to the creating assessments needs.

One of the advantages is that containerization make easy between the transportation of sea and land. On the other hand, the disadvantage is that the development of port totally depends on promoting railway transportation and has to shape its origin.

**(c) State ports**

These ports are very important in development of the state economy, especially in developing countries. The state ports Egypt, Sudden, California (port of Rich-mond), Manila, England (port of Southampton) are examples.

The advantage of the state ports generally have a sufficient budget to draw projects freely, proficiency of the nationalities and stat can be avoid financial rein even it faces financial crises because of the state subsidization.

The disadvantages of the port are no services targeting profits economically, no special attention to develop, have not incentives and using bureaucratic functions.

**(d) Municipal Ports**

These ports are managed by municipal organization of its city councils. The best example of municipal ports are Antwerp Port in Belgium, Kobe Port in Japan, Los Angeles Port in United State, Amsterdam Port in the Netherlands, Hamburg port Bremen Port in Germany.

Advantages and disadvantages of these ports are likely in general to state ports. Municipal ports can be more flexible situations than state ports.

**(e) Self-Governing or Autonomous Ports**

These kinds of ports are called as "Quasi Government Ports" because these are free from political oppression. The main purpose of the ports is to keep and protect for public prosperity. For example, Port of London Authority, Port of Singapore

Authority, Port of New York Authority and Klang Port Authority are likely in this kind.

Shipping lines and state representatives are normal concerning with these port authorities. Body of the board and numbers, and types of board members are set up by Acts providing from parliament.

The advantage of this type is to be flexible and adaptable. The board manages so economically that it can bypass delaying to decide and to implement projects according to the lack of political interventions. However, some ports in this type like bureaucratic ports have political violence pressure as a disadvantage.

### **2.1.3 Evolution of Port**

Ports are defined as "placed where is the interchange of cargo and passenger traffic among vessels, and between vessels and overland carriers or sites along shore". Ports can span more than one harbor, and some harbors are the loci of more than one port. The term port is also used to designate a unit of organization or operation of a set of facilities associated with the transfer or interchange of waterborne commerce, or of other maritime activities such as naval installations, or the servicing of fishing fleets or pleasure craft.

The evolution of Port can be divided into three stages as follows;

**Setting:** The initial setting of a port is strongly dependent on geographical considerations. Evolution of a port started from the original port, mainly a port equipped with cargo handling facilities to handle trading and related activities. Port - related activities were mainly confined to warehousing and wholesaling, located at sites directly adjacent to the port.

**Expansion:** The industrial revolution and growth in seaborne trade volume created impact is on port activities. Quays were expanded and docks were required to handle growing amounts of freight and increasing numbers of larger ships. Furthermore, the development of intermodal transport enhanced the integration of rail operations with port terminals to increase accessibility to hinterlands. Port-related activities also expanded to include value-added activities such as cargo consolidation.

**Specialization:** This phase of development involved the construction of specialized terminals to handle specialized freight such as containers. Larger ships often required deeper channels, longer berths, more yard spaces, and comprehensive intermodal transport facilities. As a result, original port sites, located adjacent to



downtown areas, became absolute and were abandoned. This created opportunities for port operators to build larger and new ports to cope with the increasing demand from port users.(Lun, 2010)

## **2.2 Some Selected Well - known Ports in the World**

### **2.2.1 Laem Chabang Port**

Laem Chabang Port (LCP) is the main international deep sea port of Thailand. It is located in eastern part of Thailand .The port area covers 2,572 acres. The port offers various services such as Ro-Ro terminal, cruise terminal, general cargo terminal, and multipurpose terminal but the majority of its total throughput is containers. Therefore it can be considered as a container port. According to the Port Reform Toolkit (2007), the characteristic of a landlord port is the port combination between public and private. In the landlord port model, the port authority acts as a regulatory body, whereas private companies are in charge of its operations. LCP is regulated by the Port Authority of Thailand (PAT). LCP consists of two phases. The first phase and second phase are composed of 14 container ports. The maximum capacities of first and second phases are 11 million TEU per year. The water depth in Phase 1 is -14 meters and in phase two is -16 meters. From 2007 to 2014, container throughput at the port increased approximately by 4 per cent. In 2009, the container throughput at the port dropped sharply by 13 per cent as a consequence of global financial crisis which not only impacted on world economic growth but also the shipping industry. After a year, the growth container throughput recovered by soaring to 18 per cent.

LCP is a transit port (import-export port). Regarding the geographical location of the port, it is not located on a main shipping route. Most ship calls are feeder ships from Singapore. Therefore, the majority of containers in LCP are transit containers. The majorities of cargos are consumed within the country and are used in the hinterland. During this period, the average number of transshipment containers was less than 1 per cent of transit container.

### **2.2.2 Bangkok Port**

Bangkok Port (BKP) was established in 1954 as the first international port of Thailand, but nowadays BKP changes its role to be the biggest river port in Chao Phraya River and the second largest port in Thailand after LCP (PAT, 2011a). However, BKP still has the important role in Thailand waterway transport as the

consolidation and distribution port for cargo in Bangkok and industrial zone in the central part of the country. At present, BKP is operated by Bangkok Port Division under the supervision of PAT; this means that BKP can be identified as a state-owned enterprise port operator (BKP, 2006a).

**(a) Location and Area**

BKP is located on the left side bank of the Chao Phraya River between km.+26.5 and km.+28.5, at Klongtoey District, Bangkok. The total inland area is 960.65 acres but when considering particular operation area inside customs fence is around 400.12 acres. Moreover, Cargo operational area can be divided into 2 main areas firstly, ‘The west quay’; for accommodating 7 Conventional Berths, 2 Domestic Coastal Berths, 1 Tourist Boat Berth. Secondly, ‘The east quay’ for accommodating container Terminal Division 1 (4 Berths), Container Terminal Division 2 (3 Berths) and 1 Domestic Coastal Berth (PAT, 2016).

**(b) Facilities and Infrastructure**

It is well connected with road and rail systems, which help transport of cargoes between the port and its hinterland fast and economical. (BKP, 2018) The depth of the river within the port area varies from 8.5 meters to 11 meters below. However, Facilities and infrastructure of BKP can be divided into 2 group based on the quay sides (BKP, 2006b).

**The West Quay**

The West Quay has total area at 226.81 acres is the area used for general container cargo and international/domestic berths.

**The East Quay**

The East Quay has total area of 132.4 acres. This quay focuses on containerized cargo and container vessels service. The container operation is divided into 2 section which are Container Terminal Division 1 and 2.

(c) **Main Services**

Main services of BKP can be identified into Vessel Services and Warehouse Services.

- **Vessel Services** for different type of vessels which can categorizes by the type of ship which are (PAT, 2017b):

- Container vessels; because BKP is a river port, so it can accommodate up to 8.2 meters deep. Therefore, the type of container vessel cannot be bigger than feeder vessels and barges.
- General Cargo vessels
- Passenger Vessels
- Naval vessels
- Other vessels

- **Warehouse Services** of BKP can be identified into 6 types of warehouses which are (PAT, 2017b):

- In-transit Warehouse
- Bonded Warehouse
- Warehouse (Overtime Cargo)
- Vehicle Warehouse
- Dangerous Cargo Warehouse
- Jute, Cotton, Kapok Cargo Unit

### **2.2.3 Da Nang Port**

(a) **The Role and Geographic Position**

Da Nang Port lies on Da Nang bay, covering 12 km<sup>2</sup>, surrounded by Hai Van Mountain and Son Tra peninsula and well shielded by the 450 m long breakwater. Da Nang Port is having the ability to operate and accommodate ships all year round.

Da Nang Port is located in Da Nang city, a dynamic city playing a key role of the Central Vietnam. With a history of over 100 years of development, Da Nang Port is currently the largest container port in the Central Vietnam.

With over 1.700m of berths, Da Nang Port has the ability to accommodate cargo vessels up to 70.000 DWT, container ships up to 4.000 TEUs Cruises ships up to 150.000 GRT, guarantee port's throughput up to 12 million tons/year

The traffic system connecting with Da Nang International Airport, the national railway station, the industrial zones in the region and the national highway creates favorable conditions for cargoes transportation.

**(b) Main Services**

- Main services of Da Nang Port can be identified into the follows;
- Container and General Cargo handling services
- Cruises services
- Logistics services
- Wharves services
- Storage and Warehouses services
- Towage services
- Road and waterway transport
- Repairing services
- Other marine services

**(c) Future Development**

Da Nang Port is aiming to become an important port in the center of Vietnam as well as a whole country and also in the region.

In the 2016 - 2020 periods, Da Nang Port also prepares the plan to invest and upgrade the Port to be a green and modern port, fulfilling the region's needs, tending to become the Central Region's most modern port.

The Port plans to invest more than 2.200 billion dong from 2016 - 2020 for constructing, upgrading and modernizing port's infrastructure.

**2.2.4 Port of Singapore**

The Port of Singapore refers to the collective facilities and terminals that conduct maritime trade, and which handle Singapore's harbors and shipping. It is ranked as the top maritime capital of the world, since 2015. Currently the world's second-busiest port in terms of total shipping tonnage, it also trans-ships a fifth<sup>3</sup> of the world's shipping containers, half of the world's annual supply of crude oil, and if the world's busiest transshipment port, It was also the busiest port in terms of total cargo tonnage handled until 2005, when it was surpassed by the Port of Shanghai. Thousands of ships drop anchor in the harbor, connecting the port to over 600 other ports in 123 countries and spread over six continents.

### **Facility information**

Location	Singapore
Coordinates	1.264° N 103.840°
Constructed	1819
Annual TEU	32.2 million (2013)

### **Shipping information**

No. of berths	67
---------------	----

The Port of Singapore is not a mere economic boon, but an economic necessity because Singapore is lacking in land and natural resources. The Port is critical for importing natural resources, and then later re-exporting products after they have been refined and shaped in some manner, for example wafer fabrication or oil refining to generate revenue. The service industries such as hospitality services typical of a port of call restock the food and water supplies on ships. Ships pass between the Indian Ocean and the Pacific Ocean through the Singapore Strait. The Straits of Johor on the country's north are impassable for ships due to the Johor-Singapore Causeway, built in 1923, which links the town of Woodlands, Singapore to the city of Johor Bahru in Malaysia.

### **Operations**

The port is the world's busiest port in terms of shipping tonnage handled, with 1.15 billion gross tons (GT) handled in 2005. In terms of cargo tonnage, Singapore is being Shanghai with 423 million freight tons handled. The port retains its position as the world's busiest hub for transshipment traffic in 2005, also the world's biggest bunkering hub, with 25 million tonnes sold in the same year.

Singapore is ranked first globally in 2005 in terms of containerized traffic, with 23.2 million Twenty-foot equivalent units (TEUs) handled. High growth in containerized traffic has seen the port overtaking Hong Kong since the first quarter of 2005, and has led the race ever since, with an estimated 19,335 kTEUs handled in the year up to October, compared to 18,640 kTEUs handled in Hong Kong in the same period. A rise in regional traffic consolidating the port's position in Southeast Asia, and increase in transshipment traffic using the strategic East Asia-Europe route via

Singapore helped the port to emerge tops at the end of the year, a title it had not held since overtaking Hong Kong once in 1998.

### **2.2.5 Port of Kingston**

The Port of Kingston is situated in the Kingston Harbour, it is currently ranked as the world's seventh natural harbor and comprises of a nearly landlocked area of water ranging over ten miles in length and two miles in width, it is illustrated in Figure 1.3. The primary terminal in the Port of Kingston is the Kingston Container Terminal (KCT), which is owned by the Port Authority of Jamaica. The Port of Kingston has a geostrategic location, within the major maritime trading routes of the Caribbean region. The location is further strengthened by its close proximity to the Panama Canal which provides Jamaica with the opportunity to fit directly into the global value chain.

Conversely, The KCT is one of the Caribbean region's premier transshipment hubs, consisting of three terminals with a berth face draft of 13 meters, and a capacity of 2.8 million TEU's. The terminal is expected to undergo expansion to increase its present capacity to meet an improved standard goal of 3.2 million TEU. The major driving force behind this expansion is the port's current operator which is the container shipping line, CMA CGM. The shipping line has entered into a thirty-year port concession arrangement with the Government of Jamaica and has invested over US\$600 million in THE upgrade and expansion program (Authority, 2015).

### **2.2.6 Port of Durban**

Durban is the busiest port in Africa and has the best container terminal in Sub-Saharan Africa and many commercial ships call at the port per annum. The port has 59 berths and a single buoy mooring point. Durban accounts for 64% of the containers handled in South Africa. According to TIPS (2014) the port is served with excellent rail and road links to Gauteng province. Containers, vehicles, grains, forestry, liquid bulk, coal, agricultural products, steel and passengers are the main commodities handled at Durban. Plans to further expand the port are underway with the dig out at the site of the old airport.

### **2.2.7 Port of Kobe**

Among Japan's big five ports (Tokyo, Yokohama, Nagoya, Osaka and Kobe), Kobe is the westernmost port. In Japan, therefore, Kobe is the last port for exports and the first port for imports and more often than not for intra-Asian sea routes. As such, it features shorter lead time and greater service frequency in shipments to and from ports elsewhere in Asia than is case with the four other Japanese ports. Moreover, the Port of Kobe is linked with China, which has markedly increased both exports and Imports in recent years, by numerous container liner services. At present, with China having become the No.1 trading partner for the Port of Kobe, a total of 62 container liner routes connect the Port Kobe and China with 62 sailings per week.

The Port of Kobe is efficiently linked with ports in the Chugoku, Shikoku and Kyushu regions by coastal feeder and ferry service networks. The coastal feeder network features 94 sailings per week and tramper service to 32 ports in Japan, while the coastal ferry network provides shuttle services between Kobe and 11 other Japanese ports with a frequency of 55-56 sailings per week. The Port of Kobe thus forms port of an environmentally friendly maritime transport network.

### **2.3 Port Development**

Within the broad national strategy, the development of each individual port must be comprehensively planned. The development of a port consists of a combination of medium-term and long-term planning of new facilities plus-in the case of an existing port a programme of short-term action to improve the management, the present facilities and their use.

For each investment there must be, first. a planning phase, which ends in a recommendation on which course of action the port should follow, giving only abroad treatment of each technical aspect; secondly, a decision phase, which can be substantial and includes the securing of funds: thirdly, a design phase, which turns the chosen plan into detailed engineering designs, and lastly, the construction or implementation phase. This handbook is concerned mainly with the planning phase and goes only into sufficient technical detail to supply the information necessary to produce preliminary cost estimates. Final cost estimates are predominantly dependent on the engineering difficulty and magnitude of the project. These estimates must be made, and the subsequent engineering design and construction work carried out. After the conduct of more detailed investigations by qualified civil and mechanical

engineers in consultation with the port authority. This handbook makes no attempt to provide a substitute for the use of such professional staff.

The long-term plan-the master plan as it is often called-consists of a view of the future situation as it will be after a series of individual developments have been carried out. However, it does not try to say whether and exactly when each of them will occur, since this will depend on traffic development. The master plan will be set within the framework of the national ports plan and in turn will provide a framework within which the medium-term up and specific projects defined. This principle of going from a broad long-term plan to a detailed medium-term proposal should be a standard procedure.

The programmed of immediate practical improvements for the use of existing facilities can, however, go ahead independently of the medium- and long-term plans. There will always be an urgent need form operate technical and operational improvements, such as the extension of available storage space, the introduction of additional cargo-handling equipment or the purchase of pilot boats or lighters. Improvements of this kind are independent of future capital investments and should not be delayed until the main investment plan is finalized.

For example, the identification and removal of bottle-necks which impede the productive flow of goods may be studied by the methods indicated in there port of the UNCTAD secretariat on berth throughput. This approach can be undertaken at any time independently of the planning project, but it would be advisable for sufficient analysis of throughput to be made by the middle of the planning phase to give reasonable practical estimates of future productivities.

The establishment of these estimates is one of the most important and difficult tasks of the port planner.

### **2.3.1 Drivers of Port Development**

Developed ports have adapted to globalization, where by these ports are retrofitted to accommodate the ever increasing growth in cargo traffic volumes. Moreover, with the privatization of the managing ports, this has resulted in international groups taking control in the handling of the complete operations and management of the port. Simultaneously shipping lines contend with ports to adjusting to their evolving operation strategies. Thus in order to remain efficient and



profitable, these shipping lines try to extend their networks by integrating larger ships into their fleets.

Importantly this causes increased pressure on existing port infrastructure; ports now have to increase their average capacity to cope with the changing dynamics of the shipping lines. Collectively both the maritime and the port industry are fundamentally important to the globalized economy.

Furthermore, the maritime industry has grown progressively over the years meeting the expectations of the demand of port capacity which is projected to increase proportionally in the future. These forecasts are based on current existing port infrastructures not adequately meeting the existing demand for port throughput. Therefore, to avoid excessive congestion at the port additional investment in port infrastructure is both practical and justifiable in the near future (Paralo, 2016).

Additionally international companies have applied the business practices of off shoring aspects of their productions either through utilizing subsidiaries or external outsourcing or alliance partners. The operating strategies of many of these firms incorporate their supply chain which has become largely, fragmented and geographically dispersed. This trend had presented lucrative economic opportunities for developing countries because they are targeted by international companies for the outsourcing of their processing and manufacturing activities which reduce cost and access to resources. The return benefit gained for the developing country is being better integration into the global value-chains by becoming exporters of commodities or of machinery (Leung, 2015).

Moreover, port infrastructure is critical in the integrating and coordinating globalized production, whereby ports have to provide the service of enabling goods to be transported from other countries to be brought to market. The gains which are achieved from adequate physical infrastructure are enhanced supply chain networks, improved integration and coordination of global production process. Moreover, adequate development of transport infrastructure is integral justifying the location of economic activities. International companies tend to be positioned around logistics hubs to ensure fast and reliable delivery of their products to the end user. Additionally, a country's stage of development is proportionally tied to the capacity and the performance of its port (Bong - ming, 2012).

The lack of sufficient and modern port facilities and inadequate trade policies contribute to severe bottlenecks in the transport and logistics chains which obstruct

trade, this has to be rectified in light of the future increase in demand for cargo. Additionally, efficient inland intermodal transport including road, rail and connection to the port hinterland is conditioned and dependent on efficient demand forecast which enhances trade from the hinterland (Economic and Social Commission for Asia and the Pacific, 2014).

International trade is mainly reliant on the efficiency and effectiveness of the port operation. Therefore, ports have to innovate continuously their operations to improve port functions, by coordinating transport and communications along with the development of innovative business models that enhance both shipping and port operations. Ports mainly serve as the interface between maritime shipping activities and economic systems.

The Latin American and Caribbean region can be considered to be an emerging region for global container trade although it accounts for a relatively small portion of the world container trade reaching numbers of 7.2% in 2013. However, in recent years' growth of container traffic in the region has resulted in significant challenges to the ports in terms of infrastructure development, trade policy framework. Over time ports have developed from being mainly a bridge between ocean carriers and logistics networks. Innovation has led to changes in the role of main players in the maritime sector having to adapt by becoming facilitators of development responding to demands of trade led by shipping lines. This is more apparent in the case of the port authorities. Ports now have to be able to readily respond to the changes in market developments while having to contend with increasing size of vessels.

Therefore, the full factors which attract shipping lines and subsequently lead to the port development are adequate port systems. These systems comprise of sufficient hinterland which encourages infrastructure and carrier's strategies, along with an economic system which is conducive to enabling logistics strategies and economic development (Ehlers, 2014). There are specific factors which form the catalyst for port development as displayed, they include; demography and social changes which can be seen particularly in the form of population growth and urbanization which impact on the transport demand that eventually leads to more international trade and movement of freight. The demand generated from this can be seen in increased vessel arrivals which then contribute to a reduction in shipping which is further supported by the emergence of bigger ships which function increased vessel arrival frequency.

Hence energy and environmental factors are also key factors which influence port development whereby fuel cost which fundamentally impacts on transport cost lead to higher incentives for cost savings and consolidation. Additionally, climate change policies result in concerted efforts for more environmentally friendly transport models, whereby the impact of these results in higher incentives for cost savings and consolidations which position the maritime sector to become the preferred means of transportation as opposed to other modes of transport.

Technology innovation is a very integral component which drives port development. Whereby it is the means by which applications are implemented to improve the transportation operation, this results in a considerable reduction of administrative procedures through information and communication technology (ICT). This ultimately improves the processing of documentation and data flexibility. The economy is also a major driver for port expansion through the impact of economic growth globalization of production and consumption. This result is the subsequent impact on leading to profound increase transportation demand, causing a measurable reduction in shipping costs creating the ideal environment for economies of scale. These conditions shape the increasing demand for transportation demand over long distances.

Financial instruments also influence on port development whereby once there are numerous available financing possibilities to port administrators the greater the incentive to engage in port development. Policy direction is very critical to enable port development whereby regulations which relate to safety, environmental protection and security conditions and market condition causes an increase in competition in the shipping market and encourages consolidation and efficiency. Additionally, geostrategic interest serves as major criteria for port development. It is on this basis that the investment in the location is made and the trade agreements to new shipping clients in the shipping and port sector are made(Rodrigue, 2010).

## **2.4 Port Development of Some Selected Countries**

### **2.4.1 Port Development in Asia**

**In Asia**, port development projects are largely spurred by the importation of raw materials and increased industrial output. China continues to lead the world in terms of port throughput and efficiency and increasingly as a provider of expertise in port construction and management. As Chinese labour costs increase, some of the

production processes are moving to neighboring countries and Chinese companies are able to take advantage of this movement of trade through the provision of other higher value services such as expertise in port construction.

**In Cambodia** a new cargo terminal officially opened in the capital in 2013, in response to a sharp increase in shipments moving through the country's existing ports. The new terminal is located in the Kien Svay district of Kandal province, about 30 kilometers from the existing port in Phnom Penh, and cost over \$28 million. It was financed by the Chinese government and will be capable of handling 300,000 TEUs when the second phase is complete (PortCalls, 2013).

**In India** plans to enable trust ports to lease land to private companies are being considered for the purpose of establishing industrial or special economic zones to generate more trade. This proposal will affect 12 major ports (Chennai, Kochi, Ennore, Jawaharlal Nehru, Kolkata (including Haldia), Kandla, Mormugao, Mumbai, New Mangalore, Paradip, Tuticorin and Visakhapatnam), which have a capacity to handle over 740 million tons of cargo each year and account for about 58 per cent of India's external trade shipped by sea. The proposed Portland policy will allow land to be leased up to a maximum period of 30 years by a port with the approval of its board of trustees. Leases of above 30 years and for a maximum of up to 99 years will have to be recommended by the port trust board to the shipping ministry for committee approval (*Livemint*, 2013b). Elsewhere in India two New port development projects are being considered by the Cabinet Committee on Economic Affairs. One port called Dugarajapatnam is located 45 kilometres from Gudurand about 140 kilometers north of Chennai port. The proposed port, which will occupy 5,000 acres and have an expected throughput of 50 million tons per annum, will be the second major port in Andhra Pradesh controlled by the central government after Visakhapatnam. The other slightly larger port project with an anticipated throughput of 54 million tons per annum is located at Sagar in West Bengal. The ports are part of the government's "look east policy" which aims to triple the country's cargo-loading ability to 3.13 billion tons by 2020 through PPPs (*The Hindu*, 2013). Just over one fifth of Indian cargo is containerized, which is about half the world average (*The Economist*, 2013a). The Government is set to increase this with the development of container facilities along its east coast at the ports of Ennore, Kakinada, Karaikal, Kattupalli and Krishnapatnam (Drewry Container, 2013).

**In Myanmar**, the existing port of Yangon has outdated facilities and there is a need to build new port facilities to help the country better integrate into the world trade arena. However, there is still much uncertainty as to where such new port facilities will be located. Two possible sites have been identified, one at Kyaukphyu to the north of Yangon, where oil and gas pipelines running across Myanmar to China's Yunnan province are being completed, and the other is Dawei to the south, which is only 250 kilometers from Bangkok and could be a valuable source of transit cargo. Further assessment on demand, revenue, investment, timeframes and technical aspects need to be undertaken (*The Vancouver Sun*, 2013). To directly service Yangon a new \$200-million riverine port called Thilawa will be constructed just to the south of the city (*The Economist*, 2013 b).

**In Sri Lanka**, the first stage of the Port of Colombo's third container-terminal expansion plans came online in 2013, with the final stage expected to be completed by 2016. The port has a draft of 18 meters and a gantry crane out reach of 24 containers wide, which enables it to cater for the largest container ships, including the Maersk Triple E class container vessels. The new terminal will be in a better position to serve cargo from and to Indian ports, although competition between ports in the region will grow (*Drewry Container*, 2013).

**In Thailand**, a new PPP act is set to quicken the pace to bring projects to fruition. The act will set a limit of 180 days to the period between the winning of a government tender and the signing of the contract, as well as establish a committee for five-year strategic development plans. This examining committee will consist of 17 members led by the prime minister. The new act also states that a member of the committee cannot become a board director of the company winning the bid for three years after his or her resignation from the committee. The previous 1992 PPP act dealt with only 40 projects in its lifetime, 33 between the private sector and national state agencies and seven with provincial authorities (*The Nation*, 2013).

#### **2.4.2 Port Development in Europe**

**In Europe**, port developments relate mainly to building new terminals within existing ports rather than developing new Greenfield sites. As such, much of the reform process is more to do with the organization and operational aspects of ports.

**In Belgium**, organizational practices designed to spur improvements in performance had to be reviewed. DP World and its partners that operate the Antwerp Gateway, as well as PSA's Deurganck Terminal, owed the Port of Antwerp Authority some €70 million (\$93 million) in underperformance penalties, principally because of a decrease in cargo volumes as a result of the global downturn(DyanmarB.V, 2012).

**In the Netherlands**, the Port of Rotterdam Maasvlakte 2 port expansion area has opened to shipping, making the site accessible by road, rail and water. By the end of 2013,ship-to-ship transfer will commence. Construction of the two container terminals at Maasvlakte 2, one operated by DP World-led Rotterdam World Gateway and the other by Netherlands-based APMT, is on schedule to be operational at the end of 2014(Lloyd'sList, 2013a).

## **2.5 Reviews of Previous Studies**

Wynn Mynn Than (2011) mentioned in his thesis "A study on Development of Ports in Myanmar" that to promote trading activities with other countries more functional port facilities and services need to developed .The port should be participate private and public partnership to implement the goal development projects and long term development plan with sustainable ways.

Zaw Min Tun (2012) analyzed in port situations and problems in the thesis title of "A study on Port and Terminal Management of Yangon Ports". This thesis reveals a port faces with various kinds of problems, difficulties and impediment in daily operations, because of port congestion, lack of equipment, inefficient cargo handling and complicated document systems which make ports less productive in port operations. All problems occurring in ports as well as in inland container depots and container freight stations and the study suggests the best possible means for future port improvement.

Moreover, other studies of candidate by Aye Lwin (2013) who studied in "A study on the Role of Ports in Maritime Transportation in Myanmar". This thesis emphasized present situation of port operations in Myanmar is suitable for national level but it is needed to build new ports, and upgrade the existing ports to meet future demand and to achieve long term sustainable development of maritime transportation.

## **CHAPTER III**

### **BACKGROUND HISTORY OF PORTS IN MYANMAR**

There are nine ports in Myanmar. They are Yangon Port in Yangon Area & Thilawa Area, Sittwe Port, KyaukPyu Port, and Thandwe Port in Rakhine State, Patheingyi Port in Ayeyarwady Region, Mawlamyine Port in Mon State and Dawei Port, Myeik Port and Kawthaung Port in Thanintharyi Region.

#### **3.1 The Role of Yangon Port in Myanmar**

Yangon Port has been managed in the form of an organization since the first of January in 1880 till the Second World War. Yangon Port is situated at Latitude 16' 40' N and Longitude 96' 15' E on the Yangon River. Navigation from Pilot Station which is further 32 km seaward from Elephant Point and the sea access channel has a length of about 16 km for Thilawa Port and 32 km for Yangon Inner harbor between river mouths near Elephant Point on the Gulf of Martaban. Yangon Port is the principal trading Centre of Myanmar. The waterborne activities through the port include international, coastal and inland river traffic. The Yangon Port is placed at the terminus of road, railways and inland waterways system of the country. The draft of the vessels entering the Yangon River is controlled by the depth available at the Outer Bar and entry into the Inner Harbor is restricted by the Inner Bar off Monkey Point. All vessels calling to Yangon Port, Pilotage is compulsory if they are over 200 GRT. The Yangon Port is accessible to vessels of 167 m LOA, 9m draft, 15000 DWT.

##### **3.1.1 Initial Stage of Yangon Port**

When Alaung Phaya found Yangon in 1755, Thanlyin (Syriam) was separately situated and it was the chief resort of foreign merchants trading with Myanmar. Alaung Phaya desired Yangon to be a new port under control of Myanmar as Thanlyin had been one of the European interests in the country. Then the Bago River was also silting up off Thanlyin and sea going vessels were finding it difficult to navigate to reach the opposite of the town. So for this, Yangon became the major

port and it is outside the stockade on the riverbank and there were 3 wooden wharves leading down to the river. The Principal wharf, the king's wharf, was graced by a tiled roof. There was only one jetty and that was built of timber, it was part of the king's wharf and unlike the remaining two wharves it was fitted with a crane to enable ships to load and unload. Near the main wharf, there were two large wooden sheds which were used as an exchange point by the merchants.

### **3.1.2 Yangon Port in the Colonial Period**

In 1824, First Myanmar-Anglo war broke out and Yangon was occupied by British until 9 December, 1826. Yangon had been deteriorated; the king's wharf was not repaired and could not be maintained. There were no wharf or jetty, but in four or five places there were wooden stairs at which small boats landed passengers. Vessels anchored at midstream and discharged onto small boats and goods were lugged on men's shoulders to the custom House.

In 1852, the second Myanmar-Anglo war broke out and Yangon fell into the British administration. A military administration was established and regulation of Yangon Port was exercised by the appointment of a Master Attendant and Collector of Custom, who took steps to facilitate navigation and to build a new wharf, as well as arranging for the provision of pilots. A pilot service was organized and though they were not part of the government services, the pilots were required to hold licenses issued under the commissioner's authority which were controlled by the Master Attendant, who prescribed the rates of pilotage.

During the British Occupation, Yangon developed rapidly in commerce. One effect of the growth of Yangon's commerce was it became the principal Port of Myanmar. In 1869, the Suez Canal was opened and communication with Europe was also improved. The volume of exports increased rapidly and thus, vessels calling to Yangon Port and cargo volume also increased.



**Table (3.1) Vessels Calling and Cargo Handling at Yangon Port from 1855-56 to 1870-71**

<b>Year</b>	<b>Vessel calling</b>	<b>Cargo handling</b>
1855-56	165 vessels	67,313 Tons
1861-62	438 vessels	157,472 Tons
1867-68	519 vessels	246,854 Tons
1870-71	689 vessels	313,988 Tons

Source: A Study of the Port of Rangoon, 1969

Although the Master Attendant was responsible for the harbour and to control the shipping, the Town Magistrate was responsible for the shores administration. All revenues from the Yangon Port were appropriated for the town's land fund. Thus, there was lack of money for port development and little progress was made in port development. In 1876, a Strand Bank Committee, consisting of the Master Attendant, the Collector of Custom and the Executive Engineer, was established for the administration of the port and became responsible of regulation the anchoring of ships and the leasing of wharves. A wooden wharf was built in 1859 and an iron wharf, in 1867. In 1871, a wharf was built at Lather Street and the Sule Pagoda wharf was completed in 1874. As new wharves were built and put into service, trade value also increased. In 1873-74 value of exports was 345 lakhs of Rupees and in 1877-78 441 lakhs. The value of rice exports was 226 lakhs in 1873-74 and 302 lakhs in 1877-78.

As jetties and wharves were increased, the port limit needed to be extended. Thus, the Board of Commissioners was incorporated by the special Act of January 1, 1880 and the limit of the port was then placed under the control of the Commissioners.

The following wharves and jetties were already in existence in 1880.

- (i) Keighley street jetty
- (ii) Crisp street jetty
- (iii) Lather street wharf, ware house
- (iv) China Street ware house
- (v) Sule Pagoda Street wharf, ware house
- (vi) Barr Street Landing Stage
- (vii) A Jetty opposite the custom House
- (viii) Phayre street wharf, ware house

- (ix) Lewis street jetty and pontoon
- (x) Master Attendant's wharf
- (xi) Monkey Point jetty

In the above mentioned jetties and wharves there were only three fixed and one pontoon jetty for sea going vessels. Three fixed jetties for boat traffic and two small jetties for passengers. After that, the number of jetties for sea going vessels had increased to ten; the Brooking street Jetty had been lengthened to 360 feet and two pontoon jetties of Spark and Lewis streets were acceptable berthing the largest vessel alongside. 800 feet length of the Sule pagoda street Jetty was capable for at least two vessels. God owns and open sheds had been constructed along the river bank of Yangon Port and thus, vessels entering and volume of cargo handling also increased.

Though Yangon was not in the area of combat of the First World War, it affected the trade of Yangon and in 1915-16, vessels calling Yangon port was decreased and export also declined.

On 1<sup>st</sup> January 1946, after World War II only the following wharves were already put into use for sea going vessels and but they were not in good condition.

<u>Wharves</u>	<u>No. of Berth</u>
Ahlong wharf	1
Sule Pagoda Street wharf	4
Brooking Street wharf	2
Barr Street wharf	2

Thus, the immediate programme for wharves drawn up by the port commissioners after assessing the damages were

- (a) To reconstruct the Sule and Brooking wharves to provide 6 cargo berths, three were equipped with double storied transits heds, one passenger (pontoon) berth and one lighterage berth.
- (b) To retain Ahlong wharf as a cargo berth during there construction period and later turn it into a coal berth.
- (c) To retain No 8 and 9 Sule (as pontoon cargo berths) for a minimum period and then turn them into a passenger berth.
- (d) To use No 7 Sule as a temporary lighterage berth during there construction period.
- (e) To use No 6 and 7 berths out of commission as soon as possible.

In 1946, extensive repairs had been carried out to the main road at the Sule Pagoda Street wharves simultaneously with repairing wharf No 3 and 4 and extension and repairs of wharf No 1.

### 3.1.3 Yangon Port after Independence

The construction of new boundary walls, main gate, gate office and shelters, railway sidings, trolley lines, new roads, were also completed by 1949. In 1951, a programme of reconstruction extending over a period of six years was again planned and resumed. Priority was accorded to work at Ahlone wharf which had been utilized as a rice loading berth, where three storage sheds totaling 90,000 square feet of covered space were constructed. A new steel framed transit shed 51,000 square feet was also constructed at No 0 - Bo Aung Kyaw Street wharf.

Thus, volume of cargo handling was increased gradually as shown in Table (3.2).

**Table (3.2) Volume of Cargo Handling at Yangon Port after Independence**

Year	Total Volume of Cargo in Tons
1946-47	1750 610
1947-48	2042 009
1948-49	1486 283
1949-50	1395 241
1950-51	1916 145
1951-52	1910 856
1952-53	2122 221
1953-54	2378 891
1954-55	2593 973
1955-56	2833 417

Source: a study of the port of Rangoon, 1969

### 3.1.4 Yangon Port in 1962-88

Yangon Port development projects were carried out with the loan of World Bank. The second port development project was signed in 13, January 1977 for US\$ 10 million loan from World Bank and the Third port development project also signed

in 18, July 1983 for US\$ 50 million loan from World Bank. Loans were used for training of port personnel and construction and maintenance of port facilities. Yearly cargo handling volume are shown in Table (3.3)

**Table (3.3) Volume of Cargo Handling at Yangon Port from 1962-88**

<b>Year</b>	<b>Total Volume of Cargo in Tons</b>
1962-63	3291624
1964-66	2613961
1968-69	1753043
1971-72	2232629
1974-75	1874390
1977-78	1859511
1980-81	2460256
1983-84	2572851
1986-87	2250882
1987-88	1871485

Source: Myanmar Port Authority

The volume of cargo handling was decreased due to all business were nationalized and private business was not allowed to do external trade. Planned and centralize economic system was introduced. Thus, total volume of cargo handling was decreased.

In 1988-89, the port of Yangon had 13 wharves, catering to international traffic for sea going vessels. These were located along the 6 kilo metres of quay front Kyimiyndine to Pazundaung creek along the strand road.

### **3.1.5 Yangon Port in 1989 - 2018 (Ports in Yangon Area)**

#### **3.1.5.1 The Myanmar Terminal (TMT)**

TMT is located strategically in the very heart of downtown Yangon City. Formerly it is known as Bo Aung Kyaw Street Wharves (BSW) and the first container terminal in Yangon Port owned by Myanmar Port Authority. Now TMT is under the management of Kt services & Logistic Co., Ltd and used for container and general cargoes. These are three Berths in TMT capable to serve container and general cargoes vessels ranging from 137 meters to 183 meters. Multi-purposes

facilities at the main terminal enable the loading and discharging of container and general cargoes (including heavy-lift project cargo). Their length, apron width and equipments are shown as below; (Appendix - A)

**(a) Length and Apron Width**

TMT-1	Length	137 metres (GC)
	Apron Width	15.2 metres
TMT-2	Length	137 metres (GC & Container)
	Apron Width	15.2 metres
TMT-3	Length	183 metres (Container)
	Apron Width	30 metres

**(b) Container Freight Station (CFS)**

- Length	243 feet
- Width	197 feet
- Total Area	47871 square-feet
- Storage Area	22400 square-feet
- Storage Capacity	2867 tons

**(c) Container Yard (CY)**

- Area	284675 square-feet
- Laden Container Storage Area	104328 square-feet
- Empty Container Storage Area	78720 square-feet
- Total Storage Container Capacity	4352 TEUs

**(d) Equipments**

- Container Quay (Crane 130 tons & 35 tons)	2 units
- Portal Crane	2 units
- RT Gs	3 units
- Reach stacker	2 units
- Empty Handler	1 unit
- Prime Movers	14 units
- Forklift (36 tons)	1 unit
- Forklift (3 tons)	2 units

### **3.1.5.2 Sule Pagoda Wharf (SPW)**

Sule Pagoda Wharf (SPW) is one of the ports of Myanma Port Authority and there have seven berths working for seven ships (in 15000 tons each) at the same time. The port is built for only general cargoes and vehicles. There are total length over all (LOA) is 1026 meters, total wide is 94.4 meters, total yard area is 42200 square meters and total warehouse area is 66300 square meters respectively. The ships of dead weight 15000 tons and draft 9 meters can berth and work at each wharf. The ships berthing at SPW mainly used as moving cranes, forklifts, light trucks and transporters and gang's services can be given for ships and ship representatives by Myanma Port Authority. Not only imported but also vehicles are kept in yard areas and warehouses after security cameras for ships and commodities kept in yards.

### **3.1.5.3 Myanmar Industrial Port (MIP)**

Myanma Industrial Port (MIP) is situated downstream of Asia World Port in Yangon River. It is managed and operated by Myanma Annawa Swaner-shin Group(s) Co., Ltd (MAS) and was formally opened on 4<sup>th</sup> January 2003. MIP constructed container terminals and Inland Container Depot for storage of Container. In their first operation, MIP facilitated as container depot and after that MIP undertaker handling Container ship as well as general cargo ships.(Appendix-B)

#### **Terminal and Wharves**

Phase 1: Currently the port has a wharf length of 1000m which can accommodate 5 berths. The daily processing capacity is 5000 containers.

Phase 2: There will be an additional wharf length of 1000 m which can accommodate up to 5 berths. The backup area will be 135 acres large.

#### **Gates and LED Wall**

MIP has 2 terminal gates. Each gate has 8 Lanes, 4 in and 4 out. They are fitted with auto-weighing machines and operated using the Navis System Control. There is also a LED wall outside the gates.

#### **Inland Container Depots**

Inland Container Depot 1: Storage capacity of 10,000 TEU

Inland Container Depot 2: Storage capacity of 15,000 TEU

## **Container Freight Stations**

CFS Warehouse 1: It is 55,000Sq.ft large, and can handle up to 52 container inspections simultaneously. It has 52 bays, 26 for export and 26 for import.

CFS Warehouse 2: It is 570,000Sq.ft large, and can handle up to 100 container bonded warehouse and office building inside it is 600 by 400 ft large.

## **Container Yard Storage:**

Laden Container	: 28,000 TEU (5 heights)
Refer Container	: 3000 TEU (3heights)
Empty Container	: 12,000 TEU (7 heights)

## **Equipments**

Panamax size-Sumitomo Container Ship-to-Shore Quay-Cranes - 5 Units

Panamax size-Gottwald Container Mobile Harbour-Crane- HMK 4406,120 tons  
30-35 move/hr- 10 Units

Liebherr Heavy Life Latic Boom Cranes SWL 200tons, 150tons, 100tons - 4 Units

Rubber Tyre Gantry (RTG) 48tons (Current - 24 units, Final - 64 units)

Container Reach Stacker 45 tons 5 tires - 35 Units

Empty Container Handlers 5-8 tiers - 35 Units

Forklift - 1.5 tons to 16 tons - 35 Units

Refer Container PTI/Pre-cooling connection points - 100 Units

100 tons Weights-Bridge with Computerized Control - 26 Units

Backing up own generator sets 350-500 KVA - 30 Units

### **3.1.5.4 Asia World Port Terminal(AWPT)**

The Asia World Port Terminal (AWPT) is located upstream of the Yangon River, situated at about 40 miles of inland from Elephant Point on the Gulf of Mottama.

The AWPT is developed, managed and operated with B.O.T system by Asia World Port Management Co., Ltd, a subsidiary company of Asia World Co., Ltd which a well-diversified conglomerate is owned by Myanmar Citizens.

The development of AWPT was planned in phase by phase. The construction of the first wharf commenced in April, 1996 and it became operational in December,

1997. The construction of the second wharf, equipped with container handling facilities, was started in November 1998. The second wharf was opened for conventional cargo handling operations in March, 2000 and it became fully operational for container handling in May, 2001. As a consecutive construction project, the structure of a third wharf was started at the upstream side of present facilities in August, 2002 and officially opened in November, 2005. The fourth wharf project site has been allocated in the downstream of present facilities. AWPT offers a wide variety of facilities to cater to virtually all cargo handling modes, including break build, containers, dry and liquid build operation. (Appendix - C)

## **Terminal Facilities**

### **Berthing**

No.1 Wharf:	Length 198 meters:	Apron width 30.5 meters
No.2 Wharf:	Length 156 meters:	Apron width 19.5 meters
No.3 Wharf:	Length 260 meters:	Apron width 55.5 meters
No.4 Wharf:	Length 238 meters:	Apron width 55.5 meters

(Under expansion project)

The water depth alongside the wharf-head of all wharves is designed at 9.5 meters below datum in order that the largest available vessel entering the Yangon River can be accommodated at AWPT.

### **Turning Area**

A turning area with a minimum width of 330 meters is provided downstream side of No.2 Wharf in the Yangon River in order to facilitate safe and speedy movements of the vessels incoming or outgoing from AWPT wharves.

### **Container Storage Capacity**

Total Area of Stacking Yard	44.7 acres
Total Ground Slot	5050 TGS
Total Reefer Points	338 points
CFS Storage Capacity	5039 m <sup>2</sup>



## **Equipments**

Mobile Harbour Cranes(LIEBHEER) Model LHM 320 (lifting capacity 104 tons)	(2 units)
Mobile Harbour Crane (LIEBHEER) Model LHM 400 (lifting capacity 104 tons)	(1 unit)
Mobile Harbour Crane (GOTTWALD) Model G HMK 4406 (lifting capacity100 tons)	(1 unit)
Ship to Shore Gantry Cranes (ZPMC)	(2 units)
Rubber Tyred Gantry Cranes (ZPMC)1 over 4	(4 units)
Rubber Tyred Gantry Cranes (SANY)1 over 6	(9 units)
Reach Stacker (KALMAR) Model DRD 420-60 S5 with stacking capacity of 5 tiers	(13 units)
Reach Stacker (SANY) Model RSC45C with stacking capacity of 5 tiers	(10 units)
Empty Handler (KALMAR) Model DCE 70-45 E8 with stacking capacity of 8 tiers	(1 unit)
Empty Handler (SANY) Model SDCY 90K8C with stacking capacity of 8 tiers	(3 units)
Terminal Tractors	(56 units)
Terminal trailers for 20-foot Containers	(56 units)
Terminal trailers for 40-foot Containers	(56 units)
(3-ton to 6-ton) Diesel Forklift Trucks for CFS Operations	(9 units)
(60-ton) Weight Bridge with computerized control	(4 units)

### **3.1.5.5 Ahlone International Port Terminal (AIPT)**

Ahlone International Port Terminal is situated near to downtown of Yangon City, on the east bank of Yangon River. Modernized and dedicated facilities designed to handle container and general cargo with a new first class wharf facility supported by a total terminal operation area of 190,000 sq.m. AIPT (1) wharf is (600 m x 30 m) allows (3) vessels up to DWT (20,000) as a berthing area to utilize conveniently alongside A sea going Tugboat is ready for your requirement. AIPT is to undertake port operations providing container and general cargo handling. AIPT 1 is operated by Integrated Port Management system and thus customers can save the time & money. Containers storage capacity is 13210 TEU in container yard and general

cargo storage in the port is supported by warehouse of total area 2400 sq.m and storage capacity of 8500 metric tons. (Appendix - D)

### **Equipments**

Quay Gantry Crane (KOCK, Germany)	3-Nos
R.T.G (Terex Noell, U.S.A / China)	4-Nos
Harbour Mobile Crane (Italgru, Italy)	1- No
Reach Stacker (KALMAR, Poland)	4- Nos
Mobile Crane, 65 Ton (Locatelli, Italy)	1- No
15 Ton Forklift (KONE, Germany)	1- No
10 Ton Forklift (Maximal / Chian)	1- No
2.5 Ton Battery Forklift (Sinkobe, Japan)	4- Nos
Empty Container Handler (Kalmar, Poland)	3- Nos
Yard Tractor (Kalmar Ottawa, U.S.A)	8- Nos
20'/40' Trailer (CIMC, China)	8- Nos
Seagoing Tugboat (70' x 20' x 10'), (1100 x 2) Hp	1- No

### **3.1.6 Yangon Port in 1989 - 2018 (Ports in Thilawa Area)**

#### **3.1.6.1 Myanmar International Terminals Thilawa (MITT)**

MITT is located in Thanlyin region and which is just 40 kilometres or 40 minutes' drive from downtown Yangon. It is the closest port to the mouth of Yangon river and situated at downstream of MIPL. MITT is multipurpose international terminal and it has been developed by the Hutchison Port Holding Ltd, Hong Kong. MITT also got approval from Myanma Investment Commission under BOT system for the period of 25 years and soft opening was inaugurated on 5<sup>th</sup> January, 1997, Grand opening was on 9<sup>th</sup> November, 1997 and commercial operation has commenced on 1<sup>st</sup> March, 1998.

In terms of navigation, MITT is located at LAT 16' 40'N and LONG 96' 15' E on the Yangon River 32 nautical miles from the Pilot Station at the mouth of Yangon River on the Gulf of Martaban. Sailing time from the Pilot Station to MITT is about 3~4 hours. In terms of road transport, MITT is just 25 kilometer from downtown of the nation's commercial capital Yangon.

MITT was constructed in 2 phases and now the total length is 1000 metres with apron width 30 metres and alongside draft is approximately 10 metres. Out of

1000 metres, length 550 metres is for general cargo vessels and remaining 450 metres is for container vessels, Storage shed for general cargo is 20,000 square metres and total area is 750,000 square metres (185 acres). Although cargo handling equipments are used for loading and unloading of general cargo ships most of them are used especially for container vessels.(Appendix - E)

### **Main Features**

Total Berth Length	1000 m
No of Berth	5 Berths
Depth alongside	10 m
Capacity(Phase-1)	500000 TEU/Year
Total Area	75 Hectares
Refer Points	108 Points
CFS Warehouse	2 x10000 Sq.m

### **Equipments**

No of Quay Cranes	4	Units
No of MHC Cranes	2	Units
No of RTGC	12	Units
No of Reach Stackers	4	Units
No of Empty Handlers	3	Units
Tractors/ Trailers	110	Sets
No of Forklift	17	Units

### **3.1.6.2 Myanmar Integrated Port limited (MIPL)**

MIPL is situated in Thanlyin area and it is about 20 kilometre miles away from the mouth of Yangon River. It is situated on the right-side bank of Yangon River and about 40 kilo metres far from centre of Yangon. It was established through two investment permissions granted by "Myanmar Integrated Port Services Private Limited (MIPS) for construction of a port and its supportive activities and by Asia Pacific Edible Oil Limited (APEO) for construction of oil storage tanks and edible oil production activities.

It is especially for general cargoes and oil tankers. Being Myanmar Integrated Port Limited is a private port managed by BOT system giving the port services for

exports and imports are speedy, easy and accurate. Furthermore, the most advantage for berthing ships is easier to reach port and to go through the river because there have an enough water level and only an outer bar to pass by. (Appendix - F)

### **Area and Facilities**

The nature of MIPS's activities are basic port management which involves handling of import and export general cargo from the foreign going conventional vessels, allocation of oil tanker carriers and discharging their bulk cargoes, storing liquid oil cargo at ground-level erected oil tanks, and distributing some to all border the country in 50 gallons drums produced by drum making factory of its own. Singapore based company of Myanmar Integrated Port Services Private limited has affiliated the local companies of Myanmar Integrated Port limited (MIPL) and Asia Pacific Edible Oil limited (APEO). Both of which commenced their operation under BOT system for the period of 25 years and the soft opening MIPL/APEO was inaugurated on 5<sup>th</sup> January, 1998 and the Grand opening was subsequently held on 25<sup>th</sup> March 1998.

Length of MIPL wharf is 200 metres, apron width 17 metres and permissible draft at the alongside jetty is 10 metres. Total working area is 150,000 square metres (38 acres) out of which 110,000 square metres is meant for wharf operation. As MIPL is especially designed for bulk cargo, it has following equipments for handling dry bulk cargo.

- 2 Nos Grab with 2.5 tons lifting capacity each
- 2 Sets Auto sewing machine
- 9 Sets Manual sewing machine

MIPL can also provide facilities for liquid bulk cargo mostly edible palm oil as follows-

- 6 Nos Tanks (oil storage capacity 6000 tons)
  - (2000 tons x 2 tanks)
  - (500 tons x 4 tanks)
- Oil steel pipes connected to storage tanks on shore
- Size of factory is with 5200 square metres basement
- Drum production capacity is 1500 drums per day
- Drum filling ability is 1000 drums per day.

### 3.1.7 Performance of Yangon Port

Ports in Yangon area can handle all types of sea borne trade cargoes such as containerized cargo, general cargo and liquid cargo. Yangon port is an international port which is gateway for the export and import of the state and played vital role as main sector for the economic development of the state. The main export commodities are timber, pulses, rice, and rice products, yellow maize, fishery products while the main import commodities are construction materials, machinery and equipment, fertilizer, oil & lubricant, palm oil, wheat grain, sugar and cement. There are vessel calling, container Handling, General Cargo Handling and Liquid Cargo Handling at Yangon port under Myanmar Port Authority are as shown in below:

**Table (3.4) Yearly Number of Vessel Calling at Yangon Port**

<b>Fiscal Year</b>	<b>Number of Container Vessels</b>	<b>Number of General Cargo Vessels</b>	<b>Total Number of Vessels</b>
2009-2010	396	1462	1858
2010-2011	405	1417	1822
2011-2012	456	1658	2114
2012-2013	510	1802	2312
2013-2014	596	1770	2366
2014-2015	605	1672	2277
2015-2016	869	1567	2436
2016-2017	881	1447	2328
2017-2018	895	1218	2110
2018-2019	812	1111	1923

Source: Myanmar Port Authority

Table (3.4) shows that the number of vessels calling at Yangon Port during ten years. The number of vessels calling was fluctuation between 2009-2010 and 2016-2017. From 2017-2018 to 2018-2019 the number of vessels calling was steadily decreased due to external trade was decreased.

**Table (3.5) Yearly Containers Handling at Yangon Port**

<b>Fiscal Year</b>	<b>Import (TEU)</b>	<b>Export (TEU)</b>	<b>Total (TEU)</b>
2009-2010	150041	147938	297979
2010-2011	175315	171327	346642
2011-2012	209932	203445	413377
2012-2013	239347	238993	478341
2013-2014	309767	303804	613571
2014-2015	377557	367232	744789
2015-2016	459037	434164	893201
2016-2017	519728	538160	1057888
2017-2018	515323	518937	1034260
2018-2019	560229	558784	1119013

Source: Myanmar Port Authority

Table (3.5) shows that the Containers Handling at Yangon Port during ten years. Between 2009-2010 and 2016-2017 Containers Handling was sharply increased and in 2017-2018 Containers Handling was steadily decreased due to external trade.

**Table (3.6) Yearly General Cargoes Handling at Yangon Port**

<b>Fiscal Year</b>	<b>Import (Metric Ton)</b>	<b>Export (Metric Ton)</b>	<b>Total (Metric Ton)</b>
2009-2010	2594606	1332885	3927491
2010-2011	3102530	1409954	4512484
2011-2012	5637890	4569365	10207255
2012-2013	6289316	3871211	10160527
2013-2014	7202162	5047790	12249952
2014-2015	8700216	2437193	11137409
2015-2016	11525748	777031	12302779
2016-2017	9990772	376356	10367128
2017-2018	8312776	761782	9074558
2018-2019	9137638	597959	9735597

Source: Myanmar Port Authority

Table (3.6) shows that the General Cargoes Handling at Yangon Port during ten years. Between 2009-2010 and 2016-2017 General Cargoes Handling was sharply increased. From 2017-2018 to 2018-2019 General Cargoes Handling was sharply decreased due to Export of Rice & Rice products and pulses were decreased.

**Table (3.7) Yearly Oil Tanker Vessels Calling and Handling at Yangon Port**

<b>Fiscal Year</b>	<b>Number of Vessels</b>	<b>Petroleum Product Oil (Metric Ton)</b>
2009-2010	176	930671
2010-2011	262	1337386
2011-2012	273	1706312
2012-2013	277	1845426
2013-2014	356	2181904
2014-2015	424	3101705
2015-2016	632	3262033
2016-2017	470	4806333
2017-2018	424	5707597
2018-2019	347	5505716

Source: Myanmar Port Authority

Table (3.7) shows that the Oil Tanker Vessels Calling and Handling at Yangon Port during ten years. Import of Petroleum Product Oil was sharply increased from 2010-2011 due to import of Motor Car was increased and Import of Petroleum Product Oil to China passed through Muse was increased.

**Table (3.8) Yearly Palm Oil Tanker Vessels Calling and Handling at Yangon Port**

<b>Year</b>	<b>Number of Vessels</b>	<b>Palm Oil (Metric Ton)</b>
2009-2010	78	254116
2010-2011	86	280686
2011-2012	96	332616
2012-2013	100	413522
2013-2014	102	460843
2014-2015	111	502536
2015-2016	127	563293
2016-2017	128	607346
2017-2018	141	648661
2018-2019	145	685082

Source: Myanma Port Authority

Table (3.8) shows that the Palm Oil Tanker Vessels Calling and Handling at Yangon Port during ten years. Import of Palm Oil was sharply increased from 2010-2011 due to most of the consumers substitute palm oil instead of peanut oil.

### **3.2 Ports in Rakhine State**

Rakhine State is located in western part of Myanmar and connected to the Bay of Bengal. The port of Sittwe, Kyaukpyu, and Thandwe are under the Port office Rakhine state. Rakhine State Port office had totally 287 staffs.

#### **3.2.1 Sittwe Port**

Myanmar Port Authority in Rakhine State Launched Sittwe Port in 1880. Sittwe Port is demarcated by the connecting line from the lead top of the mouth of the creek of Sabahta Village in the inner part of Min Gan Creek; the connecting line from there across Kaladan River up to the northern tip of Kywegu River mouth; then, the connecting line up to the cape of the western Phayonkar Island; then up to the Layshintaung lighthouse; from Layshintaung lighthouse; along Kaladan Bank, up to the eastern end the downtown bridge; from there across the creek, along the northern



bank, up to the southern tip of Satyoekya Creek; from there, along the southern bank of that creek up to the town Development Area boundary beyond Sayaygyi ward; from there across tire creek up to the other bank; from there, along the northern bank of the creek up to the southern tip of Satyoekya Creek mouth; from there, along that bank up to the right tip of Min Gan Creek mouth on the bank; and from that creek bank up to the right tip of Sabahta Creek mouth; including the water surface along the connecting line. What is included in the port area are not only all the tributaries flowing into the port area but also all the land area from the highest point of flood tides, stretching 50 yards inland. The purpose of Sittwe Port is both domestic traffic and international exporting.

**Table (3.9) Wharves in Sittwe Port**

No	Name of Wharf	Year of Construction	Particular	Measurement(ft)		Remark
1	PhaungTaw Gyi	20007	RC	240	48	GC (in't/domestic)
2	Min Gan	1987	RC	240	36	GC (in't/domestic)
3	Sat YoeKya	1957	Timber	140	12	GC (in't/domestic)

Source: Myanma Port Authority

Table (3.9) shows that Sittwe port has three jetties namely Phaung Taw Gyi, Min Gan and Sat YoeKya and can handle non containerized cargo. Phaung Taw Gyi known as main jetty was reconstructed as RC jetty in 2007. The two jetties, Phaung Taw Gyi and Min Gan are for the purpose of both international and domestic. Vessel with DWT 6000, draft 9 feet can berth and handle in those two jetties. Sittwe port is western gateway of Myanmar. Main export cargoes are rice, fishery products, and Salt while imports are fertilizer and construction materials.

### 3.2.2 KyaukPhyu Port

KyaukPhyu Port area starts from Nagamawgun in the east to the Paungnetgyi Island Light-house; from there up to the southern tip of TankharoIsland:in the north, from the southerntip of Tankharo Island, along the island's southern coast, up to the

Cathering Bluff; in the west, from the northern trip of Tankharo Island up to the northern trip of Sinbaikkhang Island; from there up to Ngakyahmaw (Georginna Port); in the south, from this point, along the coast up to Nagamawgun (Careening Port), Not only all the tributaries flowing into the port area but also the land surface from the highest point of flood-tides, stretching 50 yards inland, fall with the port boundary.

**Table (3.10) Wharves in KyaukPyu Port**

No.	Name of Wharf	Year of Construction	Particular	Measurement (ft)		Remark
				Length	Width	
1	No 1. Jetty	2010	RC	264	66	GC (international)
2	No 1. Ngalapway	1975	Pontoon	120	20	GC (domestic)
3	No 2. Ngalapway	1980	Pontoon	120	20	GC (domestic)

Source: Myanmar Port Authority

Table (3.10) shows the numbers of wharf in KyaukPyu. No 1 jetty is for the purpose of international and others are domestic line. No 1 jetty was restructured as a RC jetty in 2010 and it will serve water supply service to international crude oil vessels besides general cargo handling. Main export cargoes are fishery products and import cargo is materials for deep sea port project.

### 3.2.3 Thandwe Port

Thandwe port area is located Thabyuchaung, 25 miles from the town of Thandwe. The connecting line in the south of Thandwe Bay (Andrew Bay) starts froth the stone column at Kyauksonegyimaw (the end of Herd Street) (North Latitude 18°19'03" and East longitude 94°20'48")from South Magyimaw (Manny Bluff) in a240 straight bearing up to North latitude 18°18'34" and East longitude 94°19'48". Theport boundary line in the west starts from South Magyimaw (Manny Bluff) in 09straight bearing up to Lontha village lighthouse (Lat 18°21'48" and 94°20'20") at a location nearly 3.75 miles away.

The boundary lines include lines from the point of flood-tides between these boundary lines or the lines extended from these boundary lines stretching 50 yards along Thandwe bay (Andrew Bay). In addition, it is according to the boundary lines that bind an area of 43.68 acres designated by Myanma Port Authority at Thabyuchaing.

Thandwe Porrt has one jetty with 120 feet of length and 20 feet of width which is pontoon type and constructed in 2004. The initial purpose of Thandwe is for domestic. But, when fishery industry developed, it also handled international export of fishing.

### 3.3 Port in Ayeyarwady Region (Pathein Port)

Myanma Port Authority in Ayeyarwady region launched Pathein Port in August, 1910. The Position of Pathein Port is latitude 16°47' and longitude 94°43' E.

As the Wddaunt Concrete Wharf was launched in March in 1996, it is necessary for rice and rice products to be exported. There is thus, no import from Pathein but from Yangon. Consequently, there is no cargo ship that stops at the Wedaunt Concrete Wharf. The purpose of Pathein Port is for both domestic and international exporting.

**Table (3.11) Wharves in Pathein Port**

No.	Name of Wharf	Year of Construction	Particular	Measurement(ft)		Remark
				Length	Width	
1	No 1 Jetty	1992	Pontoon	120	20	GC
2	U Lu Jetty	1962	Pontoon	63	16	GC
3	MyittaOo	1962	Pontoon	120	20	GC
4	Pan Gan	1962	Pontoon	63	16	GC
5	SeikKan	1962	Pontoon	120	20	GC
6	ZayChaung	1962	Pontoon	120	16	GC
7	Mye Nu	1962	Pontoon	63	20	GC
8	Ohn Mar Danti	1962	Pontoon	63	16	GC
9	Poland	1962	Pontoon	30	20	GC
10	Wedaung	1996	RC	360	36	GC(Rice)

Source: Myanmar Port Authority

Table (3.11) shows the numbers of wharf in Patheingyi Port. There are ten wharves in Patheingyi Port. Special purpose of wedaung wharf is for export of rice and products but cannot berth sea going vessel due to insufficient draft and can handle domestic line only. Thus international cargoes are handled in anchorage area. Main export cargoes are rice and rice products, salt, and timber. Import cargo is a few of construction material.

### 3.4 Port in Mon State ( Mawlamyine Port)

Maymya Port Authority of Mon State launched Mawlamyine Port on 22 February, 1915. Mawlamyine Port is situated at Latitude 16°19' and East Longitude 97°37' and on the Than Lwin River. To the north is the Moattama Phayagyi from where the area is demarcated by the connection line to the border stone where the Thanlwin and Attaran River are meeting. To the south is green Island Lithhouse from where the area is demarcated by the connecting line to the Bilu Kyun Western bank at Latitude 16°19.5' North the areas consist of the Moattama function along the eastern bank of the Thanlwin border stone at the north-easten corner of Bilu Kyun. And the areas within the connecting line between the eastern bank of the Thanlwin River and the western bank at the founts of the highest-tide in the days of rising tide. The purpose of Mawlamyine port is for international exporting.

**Table (3.12) Wharves in Mawlamyine Port**

No.	Name of Wharf	Year of Construction	Particular	Measurement(ft)		Remark
				Length	Width	
1	Zegy	1992	Pontoon	120	20	GC
2	KyeikPhane	1962	Pontoon	120	20	GC
3	Myeik	1968	Pontoon	120	20	GC
4	ShwaMyine	1962	Pontoon	120	20	GC
5	Myo Ma	1962	Pontoon	120	20	GC
6	SeikKanTha	1994	Pontoon	120	20	GC
7	Ya Ma Nya	1983	Pontoon	52	28	GC
8	Dawei	1962	Pontoon	240	40	GC
9	Than Lwin	1994	RC	120	20	GC
10	Coal	2005	RC	50	24	GC

Source: Myanmar Port Authority

Table (3.12) mentions the numbers of wharf in Mawlamyine Port. Coal jetty was transferred from Ministry of Railway in 2005. Although, there are ten wharves in Mawlamyine, cannot berth sea going vessel and can load in the area of anchorage. All wharves in Mawlamyine appropriate for domestic line. The international export commodities of Mawlamyine Port are rubber, rubber wood, salt, and rice. Main import is construction materials.

### 3.5 Ports in Thanintharyi Region

Under the port office of Thanintharyi, there are three ports such as Myeik, Dawei and Kawthaung. Thanintharyi Region Port Authority had totally 106 staff and there are both of staffs and head of the office.

#### 3.5.1 Myeik Port

Myanma Port Authority of Thanintharyi Region launched Myeik Wharf on 22 October 1918. To the north is the Kyaukphyar River. If a straight line is drawn from the Kalakyun. The one is from the south-eastern Kalakyun to the northernmost of Ganakyun. From there the area will be untruly the south-westernmost of Myeik Archipelago to the north, along the western coast until the southern KyaukPhyar River from where till the north westernmost place and from there to northern riverbank of the mouth of KyaukPhyar in the north. To the west is Kalarkyun. The area is from the southernmost of Kalarkyun to the northernmost and along the eastern riverbank of Kalarkyun. The purpose of Myeik port is for international exporting.

**Table (3.13) Wharves in Myeik Port**

No.	Name of Wharf	Year of Construction	Particular	Measurement(ft)		Remark
				Length	Width	
1	SeikNgae	1965	Pontoon	240	20	GC
2	Nauk Le No 1	1965	Pontoon	240	20	GC
3	Nauk Le No 2	1969	RC	103	32	GC
4	Yaw GyiWa	1984	Pontoon	240	20	GC

Source: Myanmar Port Authority

Table (3.13) shows the numbers of wharf in Myeik Port. All wharves of Myeik can berth domestic line only and can handle international trade cargo in the area of anchorage. Main international export cargoes are fishery products and timber. After 2007, the exporting of river send to Singapore is emerged.

### 3.5.2 Dawei Port

Myanma Port Authority launched Dawei Port on 22 October, 1918. The position of Dawei Port is Latitude 12°26' N and Longitude 98° 36' E. The initial purpose of Dawei port was domestic coastal traffic.

**Table (3.14) Wharves in Dawei Port**

No.	Name of Wharf	Year of Construction	Particular	Measurement(ft)		Remark
				Length	Width	
1	Mawlamyine	1981	timber	40	20	GC
2	SeikKanThar	1993	Pontoon	120	20	GC
3	No 1 YaeWun	1904	timber	60	24	GC
4	No 2 YaeWun	1973	RC	56	24	GC
5	Sin ByuPyin	1965	Pontoon	240	20	GC

Source: Myanmar Port Authority

Table (3.14) shows the numbers of wharves in Dawei port. All wharves can handle general cargo of domestic line only and international cargoes are handled in anchorage area. Dawei port handled international cargoes related with Ya Da Nar and Deep Sea Port Project.

### 3.5.3 KawthaungPort

Myanma Port Authority launched Kawthaung Port on 6 April, 1965. The location of Kawthaung Port is Latitude 19°20' N and Longitude 93°33' E. Kawthaung Port, a domestic coastal port has used for domestic coastal traffic as well as exporting port mainly destined to Thailand.

**Table (3.15) Wharves in Kawthaung Port**

No.	Name of Wharf	Year of Construction	Particular	Measurement(ft)		Remark
				Length	Width	
1	Taw Win	2004	RC	360	20	GC
2	Myo Ma	1965	Pontoon	120	20	GC
3	Ba YintNaung	1996	Pontoon	120	24	GC
4	KyaukHtaNaung	2001	RC	240	30	GC

Source: Myanmar Port Authority

## **CHAPTER IV**

### **SURVEY ANALYSIS**

#### **4.1 Survey Profile**

There are nine ports which are Yangon Port, Sittwe Port, KyaukPyu Port, Thandwe Port, Pathein Port, MawlamyinePort, Dawei Port, Myeik Port and Kawthaung Port.

Yangon Port is International Port and Sittwe Port, Pathein Port, Mawlamyine Port, Myeik Port are International exporting ports. KyaukPyu Port, Thandwe Port and Dawei Port are mainly for domestic costal traffic. Kawthaung Port, a domestic coastal port has been used for domestic coastal traffic as well as exporting port mainly destined to Thailand.

In 1755, the last Myanmar dynasty “King Alaung Phaya” seized to its territories along the Ayeyarwaddy River and reached to Dagon and changed its name to Yangon. Since then Chief Port of Yangon was established by the king for his new kingdom.

Yangon Port is accessible to international and coastal navigation by twenty nautical miles along Yangon River access channel, with an outer bar at Elephant Point at the estuary and an inner bar at the confluence with the Pazuandaung creek and Bago River.

The port of Yangon is the river port and premier port of Myanmar; which lies along the Yangon River Bank at the Yangon city side. The Yangon Port plays a vital role for economic development of the country by handling about 90% of import and export maritime cargoes.

Nowadays, the maritime cargo traffic of the Yangon Port has climbed more than 24 million tons. The efficiency in cargo handling at 29 wharves of Yangon Port has reached up to almost 70% which will be optimum capacity of the port. Yangon Port is new one of the main gate way for sea transportation in Myanmar. Exporting from Yangon Port has remarkable changed after practicing open economies market system.

A semi-structured questionnaire was used for data collection. The sample in this study is used from 150 randomly port users (shipping lines, agents and port operation staffs) at Yangon Port. The questionnaire divided into seven parts. The first part was about the profile of respondents include gender, age, education, occupation, working experience, work type and frequency. The second to sixth parts comprised questions about port users' satisfaction with the port facilities, performance, safety, services and management. The last part comprised a general question and blank space provided for opinions and suggestions of port users.

#### **4.2 Survey Design**

All the collected primary data of the questionnaire survey was analyzed. There were 150 respondents that answered in questionnaire and all the 150 completed questionnaires were obtained as planned. A simple random sampling method was used to select three types of port users who are Agent, Shipping Line and Port Operation Staffs. After that the collected data from port users by survey with simple random sampling method and descriptive analysis has been used to analyze data.

The questionnaire includes the questions regarding socio - demographic features of Gender, Age, Education, Marital Status, Occupation, Work Experience and questions concerning to get many ways for the development of Yangon port by responding port users. The five points Likert Scales were used and the last part comprised a question and a blank space provided for opinions and suggestions for the development of Yangon Port. The questionnaire is attached in Appendix.

#### **4.3 Survey Findings**

The questions on the perception and satisfaction of port users were answered to get many ways of Yangon Port Development. In order to study, survey analysis is presented in six sections;

- (1) Demographic factors of port users
- (2) Port users' perception on port facilities
- (3) Port users' perception on port performance
- (4) Port users' perception on port safety
- (5) Port users' perception on port services
- (6) Port users' perception on port management

##### **4.3.1 Demographic Characteristics of the Respondents**

In this study, total of 150 port user respondents are answered questions in order to get many ways for the development of Yangon port. The specific characteristics of these respondents are presented in the presentations and discussions as follow.



**Table (4.1) Profile of Respondents**

No.	Variable	Characteristics	No. of Respondents	Percent
1	Gender	Male	120	80
		Female	30	20
		<b>Total</b>	<b>150</b>	<b>100</b>
2	Age	20& Under	15	10
		21-30	90	60
		31-40	30	20
		41-50	15	10
		50&above	-	-
		<b>Total</b>	<b>150</b>	<b>100</b>
3	Education	High School	15	10
		Bachelor Degree	120	80
		Diploma	15	10
		Master Degree & Above	-	-
		<b>Total</b>	<b>150</b>	<b>100</b>
4	Occupation	Agent	90	60
		Shipping Line	30	20
		Port Operation Staff	30	20
		Others	-	-
		<b>Total</b>	<b>150</b>	<b>100</b>
5	Working Experience	Under 5 years	30	20
		5-10 years	45	30
		11-20 years	60	40
		21 years & above	15	10
		<b>Total</b>	<b>150</b>	<b>100</b>
6	Work type	Export & Import	90	60
		Loading & Discharging	15	10
		General Cargo Delivery	15	10
		Container Delivery	30	20
		<b>Total</b>	<b>150</b>	<b>100</b>
7	Frequency	1-2 times	60	40
		3-4 times	45	30
		4-5 times	30	20
		More than 5 times	15	10
		<b>Total</b>	<b>150</b>	<b>100</b>

Source: Survey Data, 2019

In Table (4.1) total 150 port users responded to the questions during the survey. Exploring the gender diffusion among Yangon Port, the number of male port user is higher than the number of female port user. In accurate, 80% are male and 20% are females among 150 sample port users. The age distribution shows that the dominant group is between the age of 21 years and 30 years old which is composed of 60% of the respondents and the smallest age groups 10% are between 41 years and 50 years and 20 years & under. Port users are varied from 20 years and under to 50 years and above. In this study, it was found that 80 % of the port users are Bachelor Degree, 10% of the port users are High School and Diploma respectively. The majority of the respondents 60% are agents and the rest respondents 40% are shipping line 20% and port operation staffs 20%. From the study, the highest working experience 40% of port users are between 11 years and 20 years and the smallest working experience 10% of port users are 21 years and above. The work type of port users at Yangon port, the export and import is 60%, Container Delivery is 20% and the rest 20% are Loading and discharging 10% and General cargo Delivery 10% respectively. The last socio-demographic data derive from the frequency in working at Yangon port. 40% of the port users indicated that they work 1 to 2 times, 30% of the port users work 3 to 4 times, 20% of the port users' work 4 to 5 times and 10% of the port users work more than 5 times.

#### **4.3.2 Port Users' Perception on Port Facilities**

Port Facilities of the respondents is classified by five characteristics and organized in Table (4.2).

**Table (4.2) Satisfaction on Port Facilities**

Characteristics		Very Good	Good	Neutral	Poor	Very Poor	Total
Infrastructure	Number	30	60	30	30	-	<b>150</b>
	%	20	40	20	20	-	<b>100</b>
Electricity Supply	Number	30	30	60	15	15	<b>150</b>
	%	20	20	40	10	10	<b>100</b>
Transportation	Number	45	60	30	15	-	<b>150</b>
	%	30	40	20	10	-	<b>100</b>
Land and Location	Number	30	45	45	15	15	<b>150</b>
	%	20	30	30	10	10	<b>100</b>
Situation by Commercial Area	Number	30	60	40	15	15	<b>150</b>
	%	20	40	26.67	10	3.33	<b>100</b>

Source: Survey Data, 2019

In this study, total 60% of the respondents believed that the infrastructure of Yangon Port within five years is developed. The total 70% of the respondents accepted that the transportation of Yangon Port within five years is more convenience than the past and total 60% of the respondents agreed that Yangon Port is situated at the commercial area of Myanmar and it has the highest the cargo handling capacity within five years. From the survey, it indicates that Port Facilities of Yangon Port within five years have been developed.

### 4.3.3 Port Users' Perception on Port Performance

Port Performance of the respondents is classified by nine characteristics and organized in Table (4.3).

**Table (4.3) Satisfaction on Port Performance**

Characteristics		Very Good	Good	Neutral	Poor	Very Poor	Total
Vessel In and Vessel Out	Number	30	60	50	5	5	<b>150</b>
	%	20	40	33.33	3.33	3.33	<b>100</b>
Equipments	Number	30	30	45	30	15	<b>150</b>
	%	20	20	30	20	10	<b>100</b>
Container Yard	Number	30	60	50	10	-	<b>150</b>
	%	20	40	33.33	6.67	-	<b>100</b>
Inland Container Depot	Number	45	30	45	15	15	<b>150</b>
	%	30	20	30	10	10	<b>100</b>
Container Handling	Number	30	90	30	-	-	<b>150</b>
	%	20	60	20	-	-	<b>100</b>
General Cargo Handling	Number	30	30	60	30	-	<b>150</b>
	%	20	20	40	20	-	<b>100</b>
Petroleum Product Oil & Palm Oil Handling	Number	45	60	45	-	-	<b>150</b>
	%	30	40	30	-	-	<b>100</b>
Vessel Calling	Number	30	30	60	30	-	<b>150</b>
	%	20	20	40	20	-	<b>100</b>
Tanker Calling	Number	50	70	30	-	-	<b>150</b>
	%	33.33	46.67	20	-	-	<b>100</b>

Source: Survey Data, 2019

In this study, total 80% of the respondents accepted that the Container Handling of Yangon Port within five years is sharply increased. The total 70% of the respondents believed that the Petroleum Product Oil & Palm Oil Handling of Yangon Port within five years is sharply increased and total 80% of the respondents agreed

that the rate Tanker Calling at Yangon Port within five years has been improved. From this survey, it indicates that Port Performance of Yangon Port within five years has been developed.

#### 4.3.4 Post users' Perception on Port Safety

Port Safety of the respondents is classified by four characteristics and organized in Table (4.4).

**Table (4.4) Satisfaction on Port Safety**

Characteristics		Very Good	Good	Neutral	Poor	Very Poor	Total
Rules & Regulations followed by Ports	Number	-	30	60	45	15	<b>150</b>
	%	-	20	40	30	10	<b>100</b>
Training Course	Number	10	30	60	30	20	<b>150</b>
	%	6.67	20	40	20	13.33	<b>100</b>
Rules & Regulations followed by Port Operation Staffs	Number	-	15	90	40	5	<b>150</b>
	%	-	10	60	26.67	3.33	<b>100</b>
Checked in by Port Officers	Number	15	30	80	15	10	<b>150</b>
	%	10	20	53.33	10	6.67	<b>100</b>

Source: Survey Data, 2019

In this study, total 40% of the respondents accepted that Rules & Regulations followed by Ports within five years is remaining the same (neutral). The total 60% of the respondents present neither agree nor disagree about the statement, there is any improvement Rules& Regulations on the safety factors followed by Port Operation Staffs of Yangon Port within five years. From this survey, it indicates that Port Safety of Yangon Port within five years is no change. Safety is very important for port and port operation staffs. So, it is necessary to search any ways for follow with safety.

#### 4.3.5 Post Users' Perception on Port Services

Port Services of the respondents is classified by five characteristics and organized in Table (4.5).

**Table(4.5) Satisfaction on Port Services**

<b>Characteristics</b>		<b>Very Good</b>	<b>Good</b>	<b>Neutral</b>	<b>Poor</b>	<b>Very Poor</b>	<b>Total</b>
Delivery Order Issue	Number	18	30	60	40	5	<b>150</b>
	%	10	20	40	26.67	3.33	<b>100</b>
Cargo Delivery	Number	20	60	40	20	10	<b>150</b>
	%	13.33	40	26.67	13.33	6.67	<b>100</b>
Loading and Discharging	Number	30	45	60	15	-	<b>150</b>
	%	20	30	40	10	-	<b>100</b>
Turn-Round of the Ship	Number	30	60	45	15	-	<b>150</b>
	%	20	40	30	10	-	<b>100</b>
Port EDI & MACCS System	Number	-	30	90	15	15	<b>150</b>
	%	-	20	60	10	10	<b>100</b>

Source: Survey Data, 2019

In this study, the majority of the respondents (40%) accepted that Delivery Order Issue (D/O) within five years is no change (neutral) and the total 60% of the respondents believed that Port EDI & MACCS System is no change (neutral). From the survey, it indicates that Port Services of Yangon Port within five years is no change. Services are very important for Port Development. So, it is necessary to issue Delivery Order (D/O) quickly in time and Port EDI & MACCS System is necessary to run with paperless to Goal Life. The majority of the respondents didn't answer exactly about the above statement.

#### 4.3.6 Post Users' Perception on Port Management

Port Management of the respondents is classified by three characteristics and organized in Table (4.6).

**Table (4.6) Satisfaction on Port Management**

<b>Characteristics</b>		<b>Very Good</b>	<b>Good</b>	<b>Neutral</b>	<b>Poor</b>	<b>Very Poor</b>	<b>Total</b>
Effective and Efficient	Number	15	45	60	15	15	<b>150</b>
	%	10	30	40	10	10	<b>100</b>
Trained staffs by senior management	Number	15	50	45	30	10	<b>150</b>
	%	10	33.33	30	20	6.67	<b>100</b>
Appointment of Port Facility and Security Officer	Number	30	40	60	15	5	<b>150</b>
	%	20	26.67	40	10	3.33	<b>100</b>

Source: Survey Data, 2019

In this study, total 43.33% of the respondents accepted that the trained staffs by senior management of Yangon Port within five years are improved. The total 46.67% of the respondents believed that the appointment of Port Facility and Security Officer (PFSO) of Yangon Port is good. From the survey, it indicates that Port Management of Yangon Port within five years is improved.

## **CHAPTER V**

### **CONCLUSION**

This chapter summarizes the findings of this study and recommendations on the development of Yangon Port by analyzing the performance and capacity. Besides, this chapter evaluates the link between the literature reviewed and the research findings to come up with sound recommendations. Furthermore, this study identified and proposed the area of future research.

#### **5.1 Findings**

In light of the anticipated growth of the global economy, it is only logical that expectations will be great on the demand for port capacity to keep pace with the projected growth of the world economy. Therefore, additional investment in port infrastructure has become inevitable for ports in order for them to maintain their viability and success in the future.

A pillar of the national economy is the port, not only as a gateway for entry of cheaper prices compared with other transportation modes but also as a source of revenue to the government and a means for other country activities which will be delayed if the port has inadequate functions to receive the cargo. The wind of globalization and digitalization lead the logistics and supply chain industry into a new era all over the world. ‘Ports’ as an important node in cargo transportation is facing a huge challenge to survive in this intense competitive market. In that sense, it is understood that the role of ports need to be adapted to meet the increasing requirements of customers.

In this study, the respondents presented that the Port Facilities of Yangon Port within five years have been developed. The international standard port facilities of Yangon Port should be maintained in sustainable ways. In recent year’s port competitions intensify and a large port try to favor shipping activities concerned. Smaller ports take part in competition by enabling the integrated company. It is necessary to upgrade the port facilities to take part in port competitions.



The majority of the respondents accepted that the Port Performance of Yangon Port within five years has been developed. Exporting from Yangon Port has remarkable changed after practicing open economies market system. The amounts of total cargo handled were increased and the number of vessels arriving and departing is increase regularly. The volume of trade with neighboring countries will be doubled in coming years if the trade increases gradually. Therefore, the ports of Yangon should be well improved with modern machinery, skilled human resource and expanded and extended area with full cargo handling facilities.

The most of the respondents presented that the ports and port operation staffs followed is weak. To promote port safety, ports should be sent its staffs to attend safety training course programs. By attending the safety training course, the staffs could achieve advanced knowledge and they serve their work safety and effectively. The main function of port services is to place ships at berths for loading and unloading as quickly as possible and to get quick turn-round of the ship. In raising the cargo handling power of Yangon Port, document dispatching system such as delivery order issue should be faster and all manual works can be replaced with computerized system such as Port Electronic Data Interchange (EDI) and Myanmar Cargo Clearance System (MACCS) should be implemented to goal life with paperless.

To improve port management, the port authorities should be trained the staffs for their skills development with effectively and efficient and many of the port facility and security officer (PFSO) should be appointment.

With the help of the respondents there are some important things that could be suggested that the development of Yangon Port. The existing of berths and buildings should be extended. New wharves, new warehouses, new container terminals and new general cargo terminals are necessary to build. It is necessary to upgrade the existing ports, expand the Inland Container Depot (ICD), implement Port Electronic Data Interchange (EDI) and Myanmar Cargo clearance System (MACCS) with successful and follow for safety by ports and port operation staffs.

## **5.2 Recommendations**

In order for the port to retain its leading position in Myanmar, Yangon Port can become more autonomous in order to be more competitive. It will result in a reduction of employees at the port and the mistakes prone to human error will be at a minimum. The congestion at the port will be reduced because an autonomous system

functions faster than a manual system. The implementation of autonomous system will improve the performance of the port.

Yangon Port should upgrade and expand its facilities. By doing so the port will be able to accommodate large vessels and expand its container capacity. Discussions of deepening and increasing the length of the berths have taken place. Transnet has plans to build a dig out port in Yangon. The developments will be sufficient to meet customers' future demands.

Continuous training is imperative for staff and management. A skillful labour workforce is important due to the change in the technology in shipping, for example, ship size, type and cargo packing. There is a need to place emphasis on training in order to produce suitable skills for specific jobs and to meet the customers' demands. This will enable the employees to be assigned with the tasks related to their skills. By doing so, Yangon Port should establish good communication channel between the various shippers, port users and to understand the customers' needs.

Ports should be developed in line with the development of the economy of a country so as to provide sufficient for port services. As Yangon Port is premier port of Myanmar, it has developed in line with the growth of external trade of Myanmar. Although government has adopted border trade system with neighboring countries, maritime trade still plays a vital role in international trade. Thus, Yangon Port has developed in berthing facilities, container handling facilities, cargo handling facilities and cargo handling volume.

In international trade, 90 % of cargoes are carried by sea bone transport through many ports worldwide. Ports are necessity for a nation's economy and play a major role in the world trade and they are the links of international chain of trade. Therefore, every nation has to prioritize the improvement of ports to catch up with ever advancing technology. Efficient ports can support the development of a nation's economy and government shall set objectives and prioritized plans for port development.

Port operations should always go along with the nature of ever advancing technology of sea bone trade so that the ports are always efficient in cargo handling and can lead to profit making services. To be able to achieve sustainable development of Myanmar ports, immediate actions shall be taken such as revising port regulations, attracting local and foreign investment in ports, creating a condition that information technology is timely used for port operations, encouraging free competitions for better

performances. Moreover, in maintaining sustainable development of ports should be well tracked and traced to catch up with the improvement of neighboring ASEAN countries.

In summary, the cargo handling capacity of the existing deepwater berths should be raised by increasing the proportion of cargo in container, modification of certain cargo handling procedures to be most efficient and cost effective, reduction of delays in the movement of export cargoes from shipper's depot to port and to ship, improvements in general working conditions on the wharves and open storage areas. Sufficient storage capacity must be available for export cargoes before shipment and for imports before removal by consignees. Future development plans for port facilities and service require proper and systematic feasibility study before implementation the plans and hence further necessitate technical and financial assistance from local and international counterparts. Port facilities development projects should be implemented by sustainable ways and systematically concerns with environmental impacts. The private sector can successfully implement marketing systems, policies and strategies by using port maximizing ways. At the same time public sectors are also trying to get maximize profit by using port effectively. So, the government should be managed to utilize the facilities and services of the port with government's economic policies.

## REFERENCES

- Ahlon International Port Terminal Information Pamphlet. Retrieved from <https://www.aipt1.com>
- Alhameedi Mohamed, S&M (2018). *Performance Evaluation and Solutions for Port Congestion Focused on the Container Terminal: A case study of Khalifa Bin Salman Port (KBSP)*. Published Master Thesis, World Maritime University, Malmo, Sweden.
- Amakali Hileni. M (2017). *The History of Port Governance and Performance in Namibia: A case study of Port of Walvis Bay*. Published Master Thesis, World Maritime University, Malmo, Sweden.
- Asia World Port Terminal Information Pamphlet. Retrieved from <https://www.asiaworldcompany.com>
- Aye Lwin (2013). A Study on the Role of Ports in Maritime Transportation in Myanmar. Unpublished MPA Thesis, Yangon University of Economics.
- BKP (2006) (a). Bangkok Port's General Information. Retrieved from <https://www.bkp.co.th/bkp2007/datathai/generalinfo.html#point1>
- BKP (2006) (b). Bangkok Port's Services. Retrieved from <https://www.bkp.co.th/bkp2007/datathai/service1.html>.
- Bong - ming, J (2012). Economic Contribution of Ports to the Local Economies in Korea. Retrieved from <https://www.sciencedirect.com/science/article/pii/S2092521211800015>.
- Da Nang Port Information Pamphlet. Retrieved from <https://www.danangport.com>
- Deerod Kanchisa (2018). *Developing Port Marketing Strategies: A case study for Bangkok Port, Thailand*. Published Master Thesis, World Maritime University, Malmo, Sweden.
- Drewry Container Inseight (2013). *Competition heating up on India's East Coast*. Retrieved from Review of Maritime Transport 2013 Report.
- Dyanmar B.V (2012). *DynaLiners Weekly*. Retrieved from Review of Maritime Transport 2013 Report.
- Economic and Social Commission for Asia and the Pacific (2014). Retrieved from <https://www.unescap.org/our-work/transport/dry-ports-and-intermodal-transport-linkages/about>.

- Ehler, S (2014). *Maritime - Port Technology and Development*. Retrieved from [https://www.crcpress.com/Maritime-Port-Technology and Development](https://www.crcpress.com/Maritime-Port-Technology-and-Development).
- HlaMyint (1969). *A Study of the port of Rangoon*. Published Myanmar Port Authority, Rangoon, Myanmar.
- Hussein Salem.J (2013). *An Analysis of the Efficiency and Competitiveness of UMM QASR port In Iraq*. Published Master Thesis, World Maritime University, Malmo, Sweden.
- Kobe Port Information Pamphlet. Retrieved from [https://www.kobe-meriken.or.jp/html>info.....](https://www.kobe-meriken.or.jp/html/info.....)
- KotcharatPitinoot (2016). *A forecasting Model for Container Throughput: Empirical Research for LaemChabang Port, Thailand*. Published Master Thesis, World Maritime University, Malmo, Sweden.
- Kyaw Than (2005). *A Study on the Role of Port in Yangon for Myanmar's External Trade*. Unpublished MPA Thesis, Yangon University of Economics.
- Leung.S (2015). *Manufacturing Trends: Offshoring vs. Reshoring*. Retrieved from [https://www.handshake.com/blog/nearshoring-offshoring-re-shoring-manufacturing trends/](https://www.handshake.com/blog/nearshoring-offshoring-re-shoring-manufacturing-trends/).
- Livemint (2013) (b). *Policy aims to attract port infrastructure investment*. Retrieved from Review of Maritime Transport 2013 Report.
- Lloyd's List (2013) (a). *Power ports, Lloyd's List - Ship Operations*. Retrieved from Review of Maritime Transport 2013 Report.
- Lun, Y-H-V (2010). *Shipping and Logistics Management*. Published Master Thesis, Polytechnic University, Hong Kong.
- MallickPratichi. R (2017). *The Potential of Vizhinjam port As a Regional Hub: A Network Analysis; A feasibility analysis from a Network perspective*. Published Master Thesis, World Maritime University, Malmo, Sweden.
- MokoneTshepiso (2016). *The Impact of Governance Structure on Port Performance: A case study of Durban Port*. Published Master Thesis, World Maritime University, Malmo, Sweden.
- Myanmar Industrial Port Information Pamphlet. Retrieved from <https://www.myanmarindustrialport.com>
- Myanmar Integrated Port Limited Information Pamphlet. Retrieved from <https://www.miplmyanmar.com>

- Myanmar International Terminals Thilawa Information Pamphlet. Retrieved from [https:// www.mitt.com.mm](https://www.mitt.com.mm)
- Myanmar Port Authority (1994). *Yangon Port*. Published Myanmar Port Authority.
- Myanmar Port Authority (2015). *Myanmar Port Authority Annual Report*. Published Shipping Agency Department, Myanmar Port Authority.
- Ndlozi Malibongwe. T (2016). *Port Investment Risk: Qualitative Review of South African Port Investment Valuation Framework*. Published Master Thesis, World Maritime University, Malmo, Sweden.
- Paralo, F (2016). Drivers of port competitiveness. Retrieved from [https://www. port economics.eu/2016/09/26/the-drivers-of-port-competitiveness-a-critical-review/](https://www.porteconomics.eu/2016/09/26/the-drivers-of-port-competitiveness-a-critical-review/).
- PAT (2016). *Port Authority of Thailand Annual report*. Published Port Authority of Thailand.
- PAT (2017) (a). *Port Authority of Thailand Performance analysis report*. Published Research and Development Division, Port Authority of Thailand.
- PAT (2017) (b). *Port Authority of Thailand Strategic Plan (2018-2021)*. Published Port Authority of Thailand.
- Port Authority (2015). *Port Authority Thailand Annual Report*. Published Port Authority of Thailand.
- Port Calls Asia (2013). *Cambodia opens new container terminal*. Review of Maritime Transport 2013 Report.
- Rashid Adil (2009). *Transarctic Routes: Impact and Opportunities for ports*. Published Master Thesis, World Maritime University, Malmo, Sweden.
- Rodrigue, J (2010). Maritime Transport: Drivers for shipping and port industries. Retrieved from Review of Drivers of Port Development.
- Spence Nicolos (2017). *A Critical Evaluation of How Free Trade Zones And Maritime Activities Impact on Port Development: A case Study of the Port of Kingston*. Published Master Thesis, World Maritime University, Malmo, Sweden.
- The Economist (2013) (a). *China's foreign ports: the new masters and commanders - China's growing empire of ports abroad is mainly about trade, not aggression*. Retrieved from Review of Maritime Transport 2013 Report.
- The Economist (2013) (b). *New bay dawning*. Retrieved from Review of Maritime Transport 2013 Report.

The Hindu (2013). *Cabinet nod for two new major ports in West Bengal, Andhra Pradesh*. Retrieved from Review of Maritime Transport 2013 Report.

The Myanmar Terminal Information Pamphlet .Retrieved from <https://www.tmtport.com>

The Nation (2013). *New act tipped to speed up projects*. Retrieved from Review of Maritime Transport 2013 Report.

The Vancouver Sure (2013). *Thai - Burma Port Project Stalled*. Retrieved from Review of Maritime Transport 2013 Report.

UNCTAD secretariat (1985). *A Handbook for Planners in Developing Countries* ( 2<sup>nd</sup> ed.). United Nations Conference on Trade and Development, Geneva.

UNCTAD secretariat (2013). *Review of Maritime Transport Report*, United Nations, New York and Geneva.

Wynn MynnThan (2011). *A Study on Development of Ports in Myanmar*. Unpublished MPA Thesis, Yangon University of Economics.

Zaw Min Tun (2012). *A study on Port and Terminal Management of Yangon Ports*. Unpublished MPA Thesis, Yangon University of Economics.

## **WEBSITES**

<https://en.m.wikipedia.org>>wiki

<https://rru.worldbank.org>

<https://seaport.homestead>

<https://www.mecwebsite.com>>ahlo.....

<https://www.mpa.gov.mm>

<https://www.vir.com.vn>>da-nang-1.....

The Myanmar Terminal (TMT)



Source: Myanma Port Authority



Myanmar Industrial Port (MIP)



Source: Myanma Port Authority

Asia World Port Terminal (AWPT)



Source: Myanma Port Authority

**Ahlon International Port Terminal (AIPT)**



Source: Myanma Port Authority

**Myanmar International Terminals Thilawa (MITT)**



Source: Myanma Port Authority

Myanmar Integrated Port Limited (MIPL)



Source: Myanma Port Authority

### Survey Questionnaire

My name is May Zin Win. I am EMPA 16<sup>th</sup> Batch student from Yangon Economic University of Applied Economics. I am writing a thesis about "The Development of Yangon Port". I request you please answer all questions on this survey questionnaire for my thesis.

This survey questionnaire takes approximately 20 minutes to complete. All participants' feedback will be treated as anonymous and strictly confidential. I would be very thankful if you could answer interesting my questions to get many ways for the development of Yangon Port.

#### Part (A) Profile Information

1. Gender

Male	Female
<input type="checkbox"/>	<input type="checkbox"/>

2. Age

20 & under	21 to 30	31 to 40	41 to 50	51 & above
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Education

High School	Bachelor Degree	Diploma	Master Degree& above
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Marital Status

Single	Married	Divorce	Widower/Widow
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Occupation

Agent	Shipping Line	Port Operation	Staff Others
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Working Experience

Under 5 years	5 years to 10 years	10 years to 20 years	21 years &above
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. Among the following works at Yangon port, what do you work?
- |                      |                       |                      |                      |
|----------------------|-----------------------|----------------------|----------------------|
| Export & Import      | Loading & Discharging | Cargo Delivery       | Container Delivery   |
| <input type="text"/> | <input type="text"/>  | <input type="text"/> | <input type="text"/> |
8. How many times in a week do you work at Yangon port?
- |                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|
| 1 to 2 times         | 3 to 4 times         | 4 to 5 times         | more than 5 times    |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

**Part (B) Port Facilities**

9. The Condition of Infrastructure in Yangon port within 5 years is
- |                      |                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| very good            | good                 | Neutral              | poor                 | very poor            |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
10. The Electricity Supply of Yangon port within 5 years is
- |                      |                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| very good            | good                 | Neutral              | poor                 | very poor            |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
11. The Transportation to Yangon port within 5 years is
- |                      |                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| very good            | good                 | Neutral              | poor                 | very poor            |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
12. The Land and Location of Yangon port within 5 years is
- |                      |                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| very good            | good                 | Neutral              | poor                 | very poor            |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
13. Yangon port is situated at Commercial Area within 5 years is
- |                      |                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| very good            | good                 | Neutral              | poor                 | very poor            |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

**Part (C) Port Performance**

14. Vessel In and Vessel Out at Yangon port within 5 years is
- |                      |                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| very good            | good                 | Neutral              | poor                 | very poor            |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
15. The Equipments of Yangon port within 5 years is
- |                      |                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| very good            | good                 | Neutral              | poor                 | very poor            |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

16. The Container Yard of Yangon port within 5 years is  
 very good      good      Neutral      poor      very poor
17. Inland Container Depot (ICD) for Empty Container at Yangon port within 5 years is  
 very good      good      Neutral      poor      very poor
18. Container Handling (TEU) at Yangon port within 5 years is  
 very good      good      Neutral      poor      very poor
19. General Cargo (G/C) Handling at Yangon port within 5 years is  
 very good      good      Neutral      poor      very poor
20. Petroleum Product oil & Palm Oil Handling at Yangon port within 5 years is  
 very good      good      Neutral      poor      very poor
21. Vessel Calling at Yangon port within 5 years is  
 very good      good      Neutral      poor      very poor
22. Petroleum Product Oil & Palm Oil Tanker Ship Calling at Yangon port within 5 years is  
 very good      good      Neutral      poor      very poor

**Part (D) Port Safety**

23. Ports follow rules and regulations for safety within 5 years is  
 very good      good      Neutral      poor      very poor
24. The training course for safety to port operation staffs within 5 years is  
 very good      good      Neutral      poor      very poor



25. Port operation staffs follow rules and regulations for safety within 5 years is
- |                      |                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| very good            | good                 | Neutral              | poor                 | very poor            |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
26. Port officers check in Port operation staffs whether they follow rules and regulations for safety within 5 years is
- |                      |                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| very good            | good                 | Neutral              | poor                 | very poor            |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

**Part (E) Port Services**

27. Issuing Delivery Order (D/O) for Cargo within 5 years is
- |                      |                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| very good            | good                 | Neutral              | poor                 | very poor            |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
28. Cargo Delivery of Yangon Port within 5 years is
- |                      |                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| very good            | good                 | Neutral              | poor                 | very poor            |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
29. Loading and Discharging of Yangon Port within 5 years is
- |                      |                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| very good            | good                 | Neutral              | poor                 | very poor            |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
30. After Loading and Discharging, Turn - Round of the ship at Yangon port within 5 years is
- |                      |                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| very good            | good                 | Neutral              | poor                 | very poor            |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
31. According to Port EDI & MACCS System running now, Cargo Delivery of Yangon Port within 5 years is
- |                      |                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| very good            | good                 | Neutral              | poor                 | very poor            |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

**Part (F) Port Management**

32. The effective and efficient of port management in Yangon Port within 5 years is

very good	good	Neutral	poor	very poor
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

33. The senior management trained staffs and operators for skill development within 5 years is

very good	good	Neutral	poor	very poor
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

34. The appointment of Port Facility and Security Officer (PFSO) of Yangon Port within 5 years is

very good	good	Neutral	poor	very poor
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

**Part (G) General**

35. What problems do you face up to Yangon Port?

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36. Please give me any opinion and suggestions for the development of Yangon Port.

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