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WORLD MARITIME UNIVERSITY

Malmö, Sweden

**Analysis of the Impact of Establishing Public Shipping
Company in Timor - Leste**

By

JÚLIO DOS SANTOS

TIMOR - LESTE

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

**MASTER OF SCIENCE
in
MARITIME AFFAIRS**

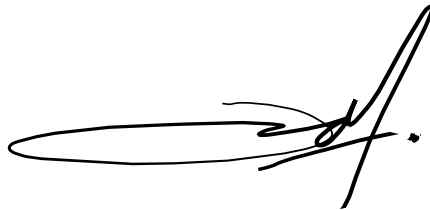
(SHIPPING MANAGEMENT AND LOGISTICS)

2022

Declaration

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

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

A handwritten signature in black ink, consisting of a large, stylized loop followed by a vertical stroke and a small dot.

(Signature):

Date: 20 / 09 / 2022

Supervised by : **Professor SHUO MA**

Supervisor's affiliation : **Vice-President (International) and
Professor of World Maritime University**

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Abstract

Title of Dissertation: **Analysis of the Impact of Establishing a Public Shipping Company in Timor-Leste**
Degree : **Master of Science**

As a new development country in the maritime industry, establishing public shipping companies in Timor-Leste appears to be an essential component of sustainable transportation development. As well as contributing to the growth and stability of the economy and the country. It should be noted that the shipping management matter has several shortcomings that need to be adjusted. Due to this, Timor-Leste's Government is responsible for implementing policies and strategies designed to enhance economic development, maintain maritime connectivity, and provide a competitive advantage for its citizens by creating a new public shipping company.

This research aims to identify and analyse the role played by a public shipping company In Timor-Leste, especially in shipping management, into one independent entity, focusing on specialization, in order to split up several former functions within the same institution. Thus, creating a new organization dedicated to domestic shipping operations is necessary. Moreover, the purpose of the research is to identify and understand the critical factors involved in the socioeconomic and political impacts of establishing public shipping companies in Timor-Leste; analyzing costs associated means the total average budget allocation from the central government to ship operation. However, the benefits are the impacts of public investment on society. Consequently, the Cost and Benefit Analysis (CBA) methodology provides funding options, management and operational issues, and recommendations and conclusions from that methodology.

The study also emphasizes the importance of ship investment in national cabotage to facilitate business and prevent maritime transportation interruptions. During this process, the objective is to identify and evaluate the factors that must be considered when making rational economic decisions. Using a cost-benefit analysis method to assess outcomes, it becomes possible to assign a monetary value to all outcomes so that policies can be more confidently determined. Ultimately, establishing a shipping company also maximizes the efficiency with which resources are allocated within the organization; for example, a public investment project must benefit the community more than alternatives.

KEYWORDS: Investment, CBA, Policy, Impacts, Growth, Decision, Efficiency and Establishing Shipping Company, Timor-Leste.

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List of Abbreviations

CBA – Cost and Benefit Analysis

COSCO – China Ocean Shipping Company

GDP – Gross Domestic Product

GIZ – Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH

IRR – Internal Rate of Return

ISM Code – International Safety Management Code

Km² – Square Kilometers

NPV – Net Present Value

PV – Present Value

RDTL – Republica Democratica de Timor-Leste

Ro-ro Ferry – Roll-on/Roll-off Ferry

SOLAS – International Convention for the Safety of Life at Sea

TL – TIMOR-LESTE

USD – United States Dolla

WMU – World Maritime University

CHAPTER I – INTRODUCTION

1.1 Introduction

A brief introduction to the establishment of public shipping companies and their role in the socioeconomic and political development of Timor-Leste¹ (TL) is presented here. A significant component of maritime transportation and logistics is shipping (Song & Panayides, 2015). It is one of the riskiest industries in the world (Deliantoni & Tsakalidou, 2015; Drobetz et al., 2012 & IMO). For this reason, financial and business risks have always been a concern in the industry, such as volatile freight rates, bunker prices, and vessel prices are all sources of risk (Kavussanos & Visvikis, 2006). Therefore, shipping companies profoundly impact business viability and profitability because these factors affect their cash flows (Alizadeh & Nomikos, 2010, p121). As time progresses, the number of ships operating in domestic fleets in TL, both private and public, has increased over the last few years. As a result, a concept of ship supply comprises the capacity of ships to carry cargo and passengers, which is determined by four factors: number, size, port time, and speed (Stopford, 2008). Therefore, this research will concentrate on shipping management in the public sector. In light of this, it is necessary to provide a detailed explanation of the complete analysis prior to giving the findings, discussion, recommendation and conclusion of this dissertation and the substances presented therein. Additionally, this section provides a perspective of the general structure of the study and the motivation for the chosen research objectives and questions.

1.2 Background

The development of the maritime sector has been a part of the national development programme since TL gained independence in 2002 (Democratic

¹ Timor-Leste (TL) or East Timor is a nation in Southeast Asia that occupies half of the island of Timor. The nation became the first sovereign state of the twenty-first century on 20 May 2002. Dili is the capital of the country, with a total area of 15,007 Km².

Republic of Timor-Leste, 2011). Furthermore, analysis of the impact of establishing a public shipping company on the TL socioeconomic and political development is something new for the maritime industry in the country. As a result, current ro-ro ferries owned by the Government of TL prove to ensure sustainable maritime transport connectivity. The Government of TL needs vital dedication and consistency to achieve satisfactory results from the economic development perspective. Thus, the Government of TL has been committed to developing the maritime industry, particularly domestic shipping and connectivity, port operation and infrastructure, and strengthening maritime administration², education, and training. Moreover, one of the potential strategies in maritime sectors to enhance the country's socioeconomic growth is the domestic shipping supply that the Government has been investing in for the last twenty years. Therefore, most importantly, identifying gaps and challenges in the development for the establishment of the public shipping company is part of a contribution to the country's socioeconomic and political growth.

After TL gained independence in 2002, The "Deutsche Gesellschaft für Internationale Zusammenarbeit" (GIZ³) GmbH, as a German government representative, implemented technical and financial cooperation in the maritime industry in TL. Additionally, the project finished at the end of 2021; therefore, the Timorese Government takes overall responsibility in the maritime sector. Moreover, political accountability and economic efficiency have become increasingly contentious in recent years. Due to the long-standing cooperation between the two countries, the German Government offered the Timorese Government two ro-ro pax ferries (GIZ, 2021). Considering that the two vessels are essential assets for supporting maritime transport connectivity in TL. Although there are still many shortcomings that need to be met in the shipping management sector, one of which is to create a public shipping company that is economically and strategically crucial for the sustainable

² Maritime Administration is a Directorate of the Ministry of Transport and Communications of Timor-Leste.

³ GIZ carried out the projects in Timor-Leste, representative of the German Federal Ministry for Economic Cooperation and Development. GIZ project was promoting development of maritime transport, and safeguarding passenger and freight transport between the capital Dili, Atauro Island and Oecusse Enclave.

development of TL. Therefore, the research interest is to analyze the key factors that negatively (Costs) and positively (Benefits) affect the country's socioeconomic and political matters.

Timor-Leste (TL) is a half-island country in Southeast Asia located between Indonesia and the North of Australia. The total area is 15.007 Km², about 80% covered by the sea. TL has an enclave of Oecusse⁴, Atauro Island and the regional ports on the Northern and Southern Coast (Government of Timor-Leste, 2022).

Figure 1 – Map of Timor-Leste, Dili, Oecusse Enclave and Atauro Island



Source: Google Map, fixed by Author

In addition, economically, the Oecusse Enclave and Atauro Island still depend more on maritime transport as a priority (Sea Power, 2021). Moreover, to provide the formal link between Oecusse, Atauro⁵ Island and other regional ports, the efficiency of domestic maritime transport substantially impacts domestic economic development

⁴Oecusse Exclave is the Special Administrative Region of Timor-Leste. Located on the north coast of the western portion of Timor and is separated from the rest of TL by West Timor, Indonesia, with a total area of 813.6 km².

⁵ Atauro Island is a tiny oceanic island and a separate municipality north of Dili with a total area of 140.1 Km².

(World Bank Documents, 2005). As a new country, TL has the potential to become visible in the maritime industry as one of the solutions for its economic growth. The majority of domestic cargo and passengers to those regions are transported by sea. In addition, national cabotage⁶ has grown by supplying the capacity of the ships. Thus, more maritime transportation will be available due to the economic growth in these special autonomous regions. Therefore, the role of the Government is to create standard conditions, improve services, and promote and provide connectivity through the public shipping company. Moreover, an extensive description of the process of establishing a public shipping company, including an analysis of how it can contribute to the economic development of TL if it is to become an essential source of future growth.

The ship's operation at the national cabotage in the country must have a detailed economic development plan to resolve the challenges of sustainable transport development. Creating a shipping company strengthens and promotes national cohesion because shipping can link, integrate, and secure remote areas in the country (GIZ, 2013). As a potential solution in the maritime transport sector, the establishment of a public shipping company and the operation of the ships will impact the national economic development of the TL. Furthermore, this will be a public institution or company which is owned by the Government to provide and improve the services and connectivity from the capital city to the regional ports. Therefore, influencing decisions towards investing or creating conditions in shipping necessitate a public shipping company.

Ferry Berlin Nakroma⁷ services between Dili⁸ - Oecusse - Atauro under a government contract. This service has a 300-passenger capacity and can accommodate approximately ten vehicles. The German Government previously funded the subsidy

⁶Cabotage is the right to operate and transport goods by sea within a national territory fo Timor-Leste.

⁷Ferry Berlin Nakroma is a ro-ro vessel owned and operated by the Government of Timor-Leste., which links to or from the Dili-Oecusse enclave - Atauro Island. See Appendix 7.

⁸Dili is the capital and largest city of East Timor.

for the service, which amounts to about USD 0.6 million annually, and the purchase of a new vessel, which was later operated by the Port Administration. In light of a more efficient ship and increasing coastal traffic, it is anticipated that the subsidy required for the service will decline in the future (TIMOR-LESTE TRANSPORT SECTOR, 2005).

Finally, understanding the maritime industry through establishing a shipping company is critical for future sustainable maritime transport connectivity and economic development (Wang et al., 2020). Shipping activity is required because of the nature of connectivity and demand. Therefore, at least one company specialises in responding to shipping activities in TL and, for example, managing the loading and unloading of cargo and passengers. In addition, introducing the public shipping company to the TL national economic development is a change in the industry that advises new policies and decisions within the maritime sectors that continuously contribute to economic growth.

1.3 Problem and Motivation Statement

The motivation for choosing the topic is the vision for TL maritime sector's future development and growth. As a citizen of an island state, the maritime world has played a significant role in our lives and the country's development, providing it with ports, ships, and ocean resources⁹. Maritime transportation is crucial to the economic development of TL. There are even more opportunities in TL, where maritime transport contributes significantly to regional and global market demands. Additionally, the reasons for choosing the topic are as follows;

- No research has ever been done related to the research topic in the maritime transportation and shipping industry in TL.
- To create a new milestone in TL's public shipping company by providing an economic advantage of public maritime transport and connectivity to create

⁹*Ocean resources contain petroleum, gas, sand and gravel, phosphorite, corals and other biogenic carbonates (Energy sources & raw materials).*

better conditions for sustainable national economic growth.

- Strengthen achieving economic sustainability according to the national strategic development plan 2011-2030 of TL by enhancing shipping activities in domestic freight.

Furthermore, it promotes national cohesion because shipping can link, integrate, and secure remote areas such as the enclave of Oecusse, Atauro Island and the regional ports (Northern and Southern Coast) of TL. In addition, economically, those regions still rely more on maritime transport. Establishing a public shipping company as part of the TL national economic development goal will help the government reduce unemployment by creating opportunities for maritime experts and seafarers to work in the local maritime industry.

However, because of uncertainty regarding employment opportunities for seafarers, fewer individuals have applied for positions aboard current ships. To maintain and ensure the sustainability of maritime transport connectivity, the company or firm also needs to identify future markets that are compatible with the situation and reality. Moreover, the current management of these vessels is still under the Port Administration, which may cause long-term risks to the sustainability of maritime transport connectivity and activities, as it does not concentrate on one single focus, but rather combines two different specialities, both of which are managed under the same management; however, they are slightly linked. Consequently, the researcher is motivated to find the approaches by researching related issues and identifying the need to separate them to make management more efficient and effective.

1.4 Aim and Objectives

In this study, the goal is to analyze the socioeconomic and political impacts of establishing public shipping companies to reduce costs and increase benefits that could contribute to the development of TL. This research proposes the following objectives:

1. Identify the key factors of the socioeconomic and political impacts of establishing public shipping companies in TL;
 - a. Utilizing cost and benefit analysis (CBA)
2. Analyze the role played by the public shipping company in TL's socioeconomic and political development through the maritime sector;
 - a. Funding options
 - b. Management and operational issues
3. Recommend the result of the analysis of a public shipping company based on economically viable to the relevant institutions.

1.5 Research Questions

This research finds out how establishing a public shipping company affects the TL national economic development. The following are the questions that will be explored in this research:

1. What are the key factors and roles played in the socioeconomic and political impacts of establishing public shipping companies in TL?
2. How can optimising domestic maritime connectivity be economically viable for TL by establishing a public shipping company?

1.6 Limitations

Throughout this study, it is assumed that there are still many shortcomings to be addressed in terms of shipping management, including the establishment of a public shipping company that is economically critical for the sustainable development of TL. Therefore, the researcher is interested in analyzing positively the key factors affecting the country's economic growth. As a result, the researcher is interested in how establishing a public shipping company could be economically viable in TL. The scope of this research is limited to private companies and their vessels operating in National cabotage. However, it only covers vessels owned by the Government of TL that are

managed under the Port Administration, being operated for commercial purposes in national cabotage.

1.7 Expected Result

The researcher wishes to present the findings and analysis of the research as well as the recommendations to the relevant institutions, including the Maritime Administration, Port Authorities¹⁰, Maritime Training, Private Shipping Management, and the Ministry of Transport and Communications of TL. Ultimately, the researcher aims to determine whether establishing a public shipping company would positively contribute to sustainable economic development in TL. It also contributes to academic science and provides knowledge to those seeking information about the maritime industry.

¹⁰Port Authority (APORTIL) administers all the ports in Timor- Leste, an autonomous Public Institution responsible for managing the Sea Port.

CHAPTER 2 - LITERATURE REVIEW

2.1 Overview of Maritime Transport in Timor-Leste

TL is an island nation that depends on maritime commerce to function efficiently. Transporting goods and passengers by ship from one port to another is the central purpose of all maritime activities, and all other activities support this purpose (Ma, 2020). Generally, 95% of all imports and exports are transported by sea (ADB, 2016). However, TL's maritime transport is still at a development stage, enabling it to serve the country's international trade and transport needs efficiently (GIZ, 2013). Based on the TL Strategic Development Plan¹¹ 2011-2030, Since 2002, economic development in TL has been mainly supported by state budget revenue or the Petroleum Fund¹², which accounts for 90% of government revenues and is primarily derived from oil and gas (Timor-Leste, 2010, p.136).

Additionally, more than 70% of the population is subsistence farmers and fishers (Mills et al., 2017). TL's maritime transportation is vital to further economic, social and political development and the Integration of the country's remote areas. The Sustainable Development Plan for TL includes a priority for transport as a government goal. Therefore, it is crucial for continued economic growth and the creation jobs in the tourism, fishing, shipping and logistics industries to expand the transportation infrastructure as part of the Integration of the maritime transportation system.

Consequently, this country's maritime sector has not yet demonstrated the ability to take action to meet the market demand. However, a slow-growing proportion of the maritime industry of TL is aligned with internationally recognized standards in terms of law, institutions, and human resources (GIZ, 2013). As a result, the maritime business will become gradually more organized, and public servants will be held more accountable. They will perform at a higher level, more employment opportunities will

¹¹The Timor-Leste Strategic Development Plan (TSDP) is a twenty-year vision reflecting Timorese's aspirations for prosperity and national strength.

¹²Petroleum Fund is a sovereign wealth fund based in Dilli, Timor-Leste. Established in 2005, the petroleum fund contributes to the wise management of petroleum resources and benefits the future and the current generation.

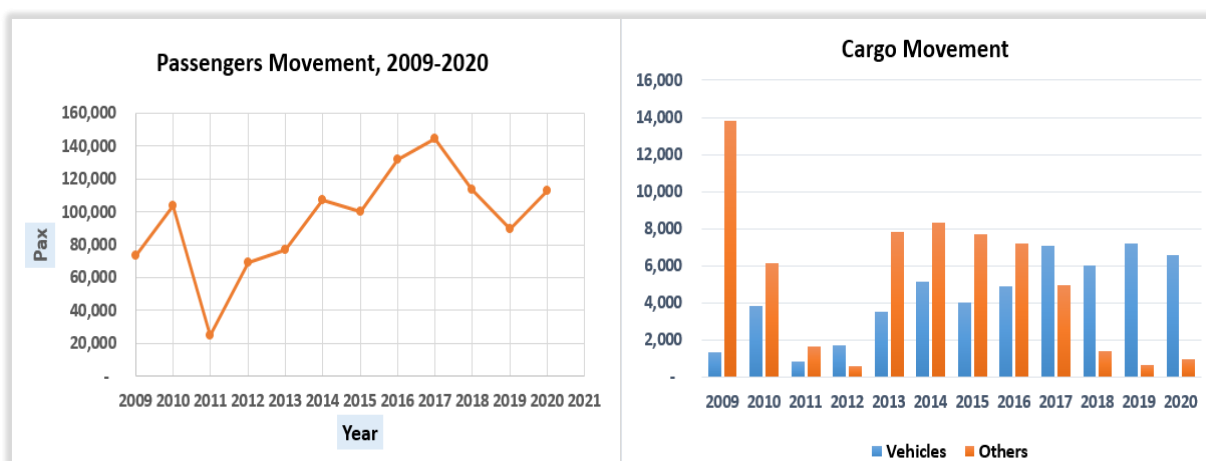
be available for Timorese citizens, and maritime transportation services will become more efficient. Together, this will considerably improve the living conditions for Timorese residing in remote areas. According to the Port Administration statistical data, the domestic passengers and cargo movement from Dili-Oecusse-Atauro by the Ferry Berlin Nakroma from 2009 to 2020 is shown below.

Table 1 – *Domestic Passengers and Cargo movement from Dili, Oecusse and Atauro Port, 2009-2020.*

Year	Passengers	Vehicles	Others
2009	73,212	1,311	13,800
2010	103,401	3,839	6,114
2011	24,929	848	1,640
2012	69,074	1,710	582
2013	76,784	3,509	7,823
2014	107,336	5,157	8,336
2015	100,316	4,027	7,714
2016	131,931	4,873	7,177
2017	144,250	7,088	4,924
2018	113,525	5,998	1,391
2019	89,699	7,210	646
2020	112,640	6,569	947
Total (12Y)	1,147,097	52,139	61,094
Passengers (Pax)			
Vehicles (Unit): Trucks, Cars & Motorbikes			
Others (M^3): Construction Materials, Fuel oil, Agriculture products, Livestock...			

Source – Port Administration of Timor-Leste, fixed by Author

Figure 2 – *Domestic Passengers and Cargo movement from Dili, Oecusse and Atauro Port, 2009-2020*



Source: Port Administration of Timor-Leste fix by Author

Table 1 shows that maritime transport has the potential to generate significant benefits for both socioeconomic developments. Despite this, the maritime infrastructure in TL is still lacking (Bateman et al., 2011). Bateman et al. (2011) concluded that despite the lack of attention paid to the maritime sector generally, over the past few years, TL has benefited from many overseas offers of assistance and advice in the maritime industry. Nevertheless, there is some scepticism concerning the motivation and utility of such assistance. Additionally, the Timorese lack a maritime culture; despite living on an island - there are fewer seafarers and less investment in the maritime industry; however, seeing the sea as a potential source of economic growth.

On the other hand, there is great potential in the maritime sector to provide employment and support the efforts of the Government to address the current youth unemployment crisis in TL. In addition to fisheries, aquaculture, shipping, marine tourism, and offshore support, there are numerous opportunities for career advancement (Bateman et al., 2011). Therefore, TL requires a national maritime strategy framework for shipping activities by creating a shipping company to achieve sustainable economic growth and support national development using cost and benefit analysis. TL, being an island nation in the maritime sector, must consolidate shipping connectivity in an integrated manner. As a result, by implementing this, TL also ensures its continued maritime presence.

2.2 The Role of Government Policy Perspective

Maritime transport is also a key element of state responsibility. More effective maritime transport services boost the economy of the state (Nguyen et al., 2022). This power naturally depends on government commitment and responsibility to invest in maritime transport through public shipping companies (Theotokas, 2018). Thus, it transforms the responsibility to the operation and service through the shipping company for its citizens. Therefore, several factors may justify the need for research in this area, such as increasing the provision of services to optimize transport flows in

the national water, including the Oecusse Enclave, Atauro Island, and the north and south coasts of TL.

Figure 3 – Current and Future ro-ro ship connectivities



Source: By Google Maps fixed by Author

Moreover, ships promote trade, which is the concept behind government policies concerning shipping. On the other hand, the alternative view that ships follow the trade implies that shipping connectivity only adheres to a policy if sufficient cargo volumes can be guaranteed (Purwaka, 1989). However, ships that travel between islands have inevitably followed trade rather than policies and regulations due to the need of its nature. Purwaka (1989) stated that national shipping connectivity would be able to achieve government policy objectives through the provision of subsidies to shipping activities, the encouragement of domestic shipping interest, and the extension of economic decentralization to the strategic destination Islands. It is also clear from these shipping activities in TL that maritime connectivities can facilitate exchange processes toward establishing vertical and horizontal homogeneity in sociopolitical and cultural conditions (Purwaka, 1989). As a result, the nation has become more united.

In the 1960s, a growing number of developing countries, including Korea, Singapore, India, and Hong Kong, began to implement national policies to promote the development of the shipping industry. To maintain stable transport means for international and national trade, domestic shipping was a central aspect of their national policies (Jung & Kim, 2012). As a result, due to the increased movement of capital across borders, developing countries have begun mobilizing the capital required to build their own fleets. As part of this process, they began to acquire the skills and technology needed for the operation and management of ships by establishing domestic maritime education institutions and training programs. Moreover, for example, establishing the ZIM¹³ national shipping company has become much more than just a means of transport. For a young country in the process of becoming a nation, it marked the emergence of new sovereignty. Thus, its establishment represents more than just technical achievement; it represents one step toward achieving a vision of national significance (Cohen-Hattab, 2015).

2.3 Overview of the Shipping Company

2.3.1 Company

A company is composed of a number of interconnected and interdependent components that work together to achieve several goals (Theotokas, 2018). Alkhafaji & Nelson (2013); Theotokas (2018) affirmed the set of functionalities that there is a dynamic environment in which the organization functions, seeks opportunities for profitable activation, takes on business risks, it adapts its methodologies to ensure products and services meet the needs of diverse groups related to or affected by its operations. It tries to meet the conflicting expectations of those groups.

General distinctions can be made between the shipping markets according to the type of vessels and cargo they can carry. These characteristics allow us to

¹³ZIM national shipping company is a fleet of ships which a publicly held Israeli international cargo shipping company.

differentiate the passenger shipping markets and sectors. Therefore, passenger shipping differs from cargo shipping in its organization. However, as with cargo shipping, passenger shipping has a nonuniform market because its customers do not share common characteristics (Theotokas, 2018). Each sector has different features in terms of demand or purpose. It is important to note that passenger shipping involves derived as well as direct demand. In this case, it depends on the type of vessel used. For example, a ferry boat is a vessel that transports passengers and meets the demand derived from them. Additionally, a ferry boat sails according to a regular schedule, linking ports. It can also transport both vehicles and passengers simultaneously, which is why they are often referred to as Ro-Ro ferries.

2.3.2 Shipping Company

SOLAS Chapter IX and ISM Code defined a company means "the owner of the ship or any other organization or person such as the manager, or the bareboat charterer, who has assumed the responsibility for the operation of the ship from the ship owner and who, on assuming such responsibility, has agreed to take over all duty and responsibility." The aim is for the safe operation of ships and pollution prevention, whether in commercial activities or environmental protection and safety.

A shipping company is an economic unit that produces and provides maritime transportation services utilizing factors of production (Theotokas, 2018). As stated by Svendsen (1978); Gumbus & Lussier (2006), cited by Theotokas (2007), "a shipping company is a company, an individual, or a small group of individuals" that are responsible for the employment of the factors of production within the maritime industry. Those who take decisions are tasked with choosing a market or sector in which they will engage, the type of vessel required to accomplish this, and the timing at which they will realize their investment. Additionally, the type of financing to be chosen, the amount of capital to be invested, the extent of the vessel's insurance coverage, and the nature of the management and operations will also need to be considered (Downard, 1984).

A shipping company is responsible for managing ships to provide maritime transport services and is also composed of two essential components, such as the units of production, namely the vessels; in addition, there is a parcel of infrastructure on land, the shipping office, which is responsible for managing the vessels (Theotokas, 2018). In the case of ro-ro ships in TL, for example, The Government provides dedicated infrastructure such as a proper jetty to operate those ships.

In addition to the ships being autonomous units with their own personnel and organization, they are constantly moving away from the shipping company's headquarters. On the other hand, it is necessary to have permanent administrative or technical support from the land to operate effectively. To accomplish the company's goals and objectives, the organization on land is responsible for providing employment for the vessels and supporting the day-to-day operations of the vessels (SandhAaland et al., 2015). Moreover, the shipping company's function is to keep its productive units in constant motion, even though they may be thousands of miles away from their base of operations, where the company operates and manages its fleet.

2.3.3 The Categorization of Shipping Companies

The Ro-ro ferries are the most common sea transportation mode in TL's coastal region. The owner of the ships is the Government of TL, whose main office is in Dili, and the representative office is in Oecusse, Atauro and extends to the north and south coast of TL. In addition, the management of the ships will be under the Timorese public institution/company, the classification of the vessels from external classification societies, and the ships are registered in TL and insured for hull and machinery to the insurance company. Dry docking¹⁴ maintenance is performed outsourced by the dockyard in Indonesia. The crew are mixed with Timorese and might come from other countries in the region. This is, therefore, a list of many entities involved. In this regard, shipping companies are not limited by geographical

¹⁴ The dry docking is a place where ships are repaired or taken to be serviced.

constraints, either when it comes to acquiring their resources or in offering their services to customers. However, as has already been mentioned, the shipping industry is not a single entity but rather consists of multiple markets or sectors (Heaver, 2022).

First, shipping companies can be distinguished by the differences between their markets; for example, their fleets can be classified according to their specialized operations. Accordingly, their maritime transportation services can be analyzed according to their types of services. The following categories of companies should be distinguished: those that specialize in bulk shipping¹⁵, those that specialize in liner¹⁶ shipping, those that specialize in passenger shipping¹⁷, and those that have differentiated fleets. Therefore, shipping companies can be distinguished first by the markets in which they operate and their services (Theotokas, 2018). While each company has its own unique characteristics, they all have one primary objective in common: to provide maritime transport services by managing ships. In addition to the extent and degree of Integration of a company's activities, it is possible to distinguish shipping companies based on other criteria (Frémont, 2009). Furthermore, some shipping companies only operate in one sector. There are three types of shipping companies based on the nature of their ownership status: horizontally integrated, vertically integrated, and diversified (Tseng & Liao, 2015; Evangelista & Morvillo, 1999).

It is necessary to examine the supporting activities and systems as shipping companies operate and manage their core activities (Ma, 2020). Depending on the actions of a company and its relationship with one another, its degree of Integration will vary. There may be a horizontal connection between the activities (Thai & Jie, 2018). The production stages may be similar, but they may not be directly related; for

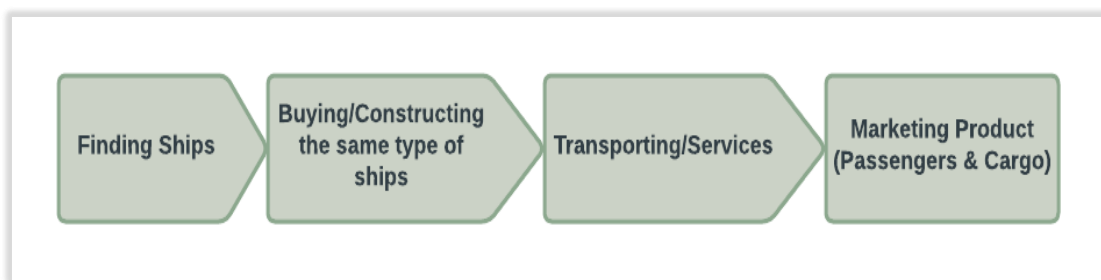
¹⁵Bulk shipping consists of vessels transporting bulk liquid and dry cargoes

¹⁶Liner shipping is vessels that regularly sail on a fixed route following a schedule that includes vessels which carry general or unitised cargoes.

¹⁷Passenger shipping differs from cargo shipping in that uses its services do not share common characteristics due to the nature of demand or purpose of the voyage.

example, they may be at different stages of production of other branches, or they may not be directly related. A company's development strategy determines the degree of Integration of its activities. Horizontal Integration, for instance, focuses on a specific level of production. By managing vessels for maritime transport services, the shipping company develops either by adding to its current fleet of ships or buying out a competitor (Theotokas, 2018).

Figure 4 – A business model of a horizontally integrated ro-ro ferry.



Source: Adapted from Theotokas (2018, p15)

On the other hand, shipping companies can be classified according to their ownership status and the level of Integration of their activities (Svendsen, 1978). An example of a pure transportation company is a company that is exclusively engaged in shipping and provides services related to maritime transport.

In terms of both the number of ships of every type and the carrying capacity, for example, China Cosco Shipping Corporation (COSCO¹⁸) ranks among the largest shipping companies in the world (Cosco Shipping, 2022). The merger was motivated by policy and was concerned with slowing down the world economy and its effects on China (Cosco Shipping, 2022). In an effort to develop world-class enterprises with international competitiveness and specialization, the Chinese Government has taken several initiatives to promote and reorganize some large state-owned enterprises (Garnaut et al., 2006). As a strategic industry, shipping contributes to the national

¹⁸COSCO Group, or China Ocean Shipping Company, is a Chinese government-owned company that provides shipping and logistics services.

economy. As early as 2006, the Chinese Government identified the shipping industry as one of seven industries whose policies must be maintained over the state-owned economy (Liao & Yu, 2019).

2.3.4 Promoting Domestic Fleet by Country

A country in the early stages of economic development may be forced to establish its own fleet to meet the growing demands for shipping services. A country with its own fleet may be more concerned about maintaining it (Jung & Kim, 2012). As a result, an organisation's governance structure effectively manages and controls the entire management, including the internal and external contractual relationships, and balances the operations as part of the administrative process. The organization itself is responsible for arrangements designed to maximize benefits and ensure operators do not deviate from their private interests. As a result, the management has a chance to define and configure the rights and responsibilities of the internal structures reasonably. In most countries, there is a keen interest in promoting the development of their domestic shipping industry. In spite of this, the objective and national shipping industry policies should be differentiated according to the characteristics of the actual conditions of the development of the industry in each country (Jung & Kim, 2012).

Establishing a national fleet may be the top priority for developing countries lacking a developed domestic shipping industry to meet the ever-increasing demands for shipping (Jung & Kim, 2012). Two major functions of the shipping industry are essential to the nation's economy. This sector provides logistic services for domestic and international trade and contributes to the creation of value-added production and employment in the country's economy (Nam & Song, 2011). Jung & Kim (2012) stated that establishing a national fleet is often considered a symbol of national pride. Therefore, the objective of consolidation in the maritime industry of TL, particularly in a shipping company, is to separate several previous functions at the same stakeholders into one independent entity that will lead specializing activities and

promote the competitiveness of the nation's maritime industry. The organization will concentrate on domestic shipping operations.

2.4 Analysis of the Cost and Benefits

2.4.1 Introduction

The shipping investment is inherently capital intensive¹⁹ and requires significant amounts of capital to be invested every year in new buildings and second-hand vessels (Giannakoulis, 2016). Due to this, increasing a company's shipping supply is essential; therefore, creating a shipping company to manage the ships appropriately is necessary. In the 19th century, shipowners continuously worked to reduce the cost of transport due to the rapid growth of seaborne trade (Ma, 2020). Consequently, ships and shipping companies underwent numerous changes and innovations. Ma (2020) affirmed that Multiple aspects of the industry have changed from the business model to shipping operations, from the type of ships to the type of ports. A major source of funding capital requirements has been debt financing²⁰ in the shipping industry due to its capital-intensive nature and the fact that shipping assets are relatively homogeneous assets of considerable value. Shipping is a global industry heavily correlated with the level of global economic activity (Christopher & Holweg, 2017). A higher level of industrial production leads to higher demand for raw materials and, eventually, increased seaborne imports/exports.

There is no doubt that urgent and adequate investment in the shipping industry is required to allow this vital asset to reach its full economic potential and mitigate the mentioned adverse effects on the national economy (Papadimitriou et al., 2019). This study examines whether alternative restructuring investments may be used to address the issue and investigate their financial feasibility by applying the Cost-Benefit Analysis (Del Giudice et al., 2014). The choice of sustainable operating practices for

¹⁹Capital intensive refers to business processes or industries requiring a substantial amount of fixed assets to produce a good or service. Examples are the shipping and the construction industry.

²⁰Debt financing involves borrowing money to be repaid later with interest.

shipping management enables the optimal use of limited resources for maximum profitability in the long term. It highlights the importance of ship investment to avoid interruption of the maritime transport link. Consequently, this conceptual framework would be applied to this study for TL maritime transportation, specifically to the establishment of the public shipping company.

An assessment of the relative merits of alternative public investment projects is done through a benefit-cost analysis. This process aims to identify, depict, and assess the factors that must be taken into account when making rational economic decisions. There is nothing new about this technique. Essentially, it involves adjusting profit-and-loss calculations to incorporate social goals, criteria, and constraints rather than private ones (Boettke & Rathbone, 2002). A Cost-Benefit Analysis aims to determine the value of a particular project, including its benefits and costs, to determine whether it is worth pursuing. For example, it may be a dam, a highway, or maritime transport. It is also a method for assessing policy consequences that provide a monetary value for all policy outcomes to society as a whole, thus improving the quality of public policy decisions (Carolus et al., 2018). To measure the value of a policy, one must consider the net social benefits. Net social benefits are equal to social benefits minus social costs:

2.4.2 Cost-Benefit Analysis (CBA) as a Concept

The cost-benefit analysis is one of the most widely used methods of analyzing public policy and service delivery, such as in the study of projects and policies, especially for major capital projects. An analysis of the cost and benefit of a project or policy is performed by comparing the different costs and benefits of various solutions in the same monetary units as the project or policy (Saarikoski et al., 2016). As the name suggests, CBA assists a decision-maker in selecting the best decision (Damart & Roy, 2009). Analyzing the costs and benefits of public investment projects is essential to making sound economic decisions. Assessing a project's impact on the broader society involves many factors, regardless of who is affected or whether the

result can be accounted for in financial statements (Wilson et al., 1994 & Transport Canada, 1994). CBA was initially developed to evaluate a project's public utility by analyzing its costs and benefits (Boadway, 2016). As well as comparing the net benefits of different projects (Ekelund et al., 1999) to justify their priority among other projects (Fuguit et al., 1999). Several governments and international organizations have used it to reduce uncertainty about assessing the potential benefits of public investment (Nas, 2016; Litman, 2009); Mishan & Quah, 2017).

According to Nas (2006), CBA is, specifically, it is a method designed for evaluating public projects. On the other hand, it ensures efficient resource allocation and maximizes social welfare. As a result, the CBA estimates the costs and benefits of the specific project, which are primarily public, taking into account the society's advantages and disadvantages related to the development of such projects. Mendez (1992) also highlighted that in order to determine whether the proposed public investments are in the public interest, the CBA estimates and aggregates the monetary equivalents of current and future social costs and benefits. Consequently, CBA enables public authorities to allocate resources to projects likely to provide a marginal social benefit that exceeds the marginal cost during their lifecycle (Mosteanu & Semenescu, 2009). Government investments may promote social, cultural, and political benefits, but that does not mean they cannot achieve the same results as those generated by the private sector. In this manner, it is possible to calculate precisely the monetary value of profit and public prosperity at the time.

Public investment is emphasized in this case for the establishment of a shipping company in TL that is operated by a public entity. The Government must defend an investment's selection criteria. There are high risks, uncertainties, and resources limited in this world. When a minimum amount of resources is allocated, CBA can clarify choosing alternative courses with the best financial and social benefits in the short, medium, and long term. In summary, cost-benefit analysis involves listing all the costs on the one side and the benefits on the other side, evaluating the future net

benefit of similar projects and ranking them accordingly to determine which one will achieve the highest return on investment (Brent, 2006).

2.4.3 Cost Benefit Analysis as a Decision-Making Tool

CBAs aim to identify, quantify, and value the consequences (benefits and costs) associated with alternative resource utilization (Mishan & Quah, 2007). In the end, the objective is to maximize the efficiency with which resources are allocated within society – in other words, to show how a particular public investment project, as an example, will benefit society more than alternatives, including the status quo²¹ (Vining, & Weimer, 2014). An investment project's aggregate value is determined by its net social benefits, which are determined by the difference between social benefits and social costs. It is important to note that projects often have impacts that take place over time; therefore, the future benefits and costs of the project are discounted relative to the present benefits and costs to determine the net present value (NPV) (Manning, 2016). As a result, procedures emerged for minimizing the monetary costs of activities -- a method in which the benefit is measured in some physical unit, and the costs are expressed in monetary terms. Since then, CBA has played a critical role in government decision-making (Fuguitt & Wilcox 1999). The CBA assists in planning and decision-making since it provides a common framework that can be used to identify and quantify the effects of investment choices. Value for money is achieved with it (Transport Canada, 1994).

2.4.4 Previous Application of CBA

CBA was first applied to the London - Birmingham highway in the 1960s in the United Kingdom. An official document issued by the British Government in 1967 recognized the existence of cost-benefit analysis and assigned it a limited role in the nationalization of industries (Munby, 1968). CBA was extended to less developed

²¹*Status quo refers to the current state of shipping management under the Port Administration of Timor-Leste, which is not a specialist shipping organization.*

countries with the publication of a Manual of Industrial Project Analysis in the late 1960s (Little and Mirrlees, 1969). Organization for Economic Co-operation and Development (OECD) prepared this manual for its members. Little and Mirrlees' work was heavily cited in the World Bank guidelines issued in 1975 (Squire and Van der Tak, 1975). During this period, the CBA became a valuable tool for executive decision-making in many fields, and with the advent of the environmental movement, CBA gained additional relevance.

2.4.5 Explanation of the CBA methods selected for establishing a shipping company

The study focuses on maintaining connectivity and supporting policy, cultural, and socioeconomic effects. As a result, the government can reduce budget allocation expenditures. Thus, reducing its dependence on the central government and this way, contributing to the sustainable economic development of the country. However, according to Varian, "there is still the problem of determining the most cost-effective way to achieve the targeted reduction" (Varian 2003). Therefore, establishing public shipping companies in TL would also be in government interest in the long run, benefiting the society in which it is implemented. There are quantitative and qualitative benefits for the members of a society that are expected to improve.

CBA is the method chosen in this study to assess and estimate how the country and its citizens benefit from the activities associated with public shipping in TL. It proposes a methodology for conducting a CBA, including analyzing primary and secondary data, to reach conclusions and recommendations and precisely determine objectives. Furthermore, it should demonstrate how its chosen methods complement and integrate each other to achieve the research objectives and solve the problem. Further, the researcher will analyze and explore the CBA method relating, which will be based on the results of the analysis of budget allocations from the Central Government to the port administration during the period between 2016 and 2020, in which the Port Administration does not specialize in shipping management or

operations. Hence, it offers a quantitative and qualitative view of the issues, which allows decisions to be made based on evidence instead of opinion or bias. As a result, it has the opportunity to decide whether or not to proceed with the project.

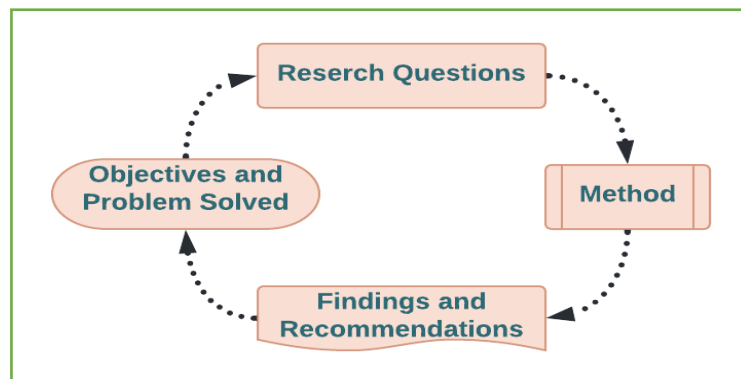
Furthermore, the research will be conducted to determine whether the establishment of new public shipping companies in TL will be beneficial from an economic, financial, social, and political viewpoint. To determine also whether the CBA measures are indeed improving efficiency and care, the collected data must be compared, confirmed, and analyzed. For these reasons, concrete steps should be followed as part of the CBA process so that the data analysis can be compared and confirmed. There are six CBA stages in this research: Identify all relevant costs and benefits to the current situation, Estimate the monetary value of each cost and benefits component, Forecast future costs and benefits, Compile data, and interpret and decide, Limitations and Recommendations.

CHAPTER 3 – DATA AND METHODOLOGY

3.1 Introduction

This paper proposes a research design focusing on cost and benefits analysis methods, such as using quantitative primary and secondary data to reach findings and recommendations and also conclude with the precise answers to objectives. In addition, to accomplish the research objectives and solve the problem, It should illustrate how its chosen methods are integrated and complemented by one another. Hence, the data was collected from budget allocations from the central government of TL to the Port Administration, a public institution that manages of current shipping operation between 2016 and 2020. To achieve research objectives and solve problems, selected methods complement one another in *Figure5*.

Figure 5 – Diagram of the chosen method



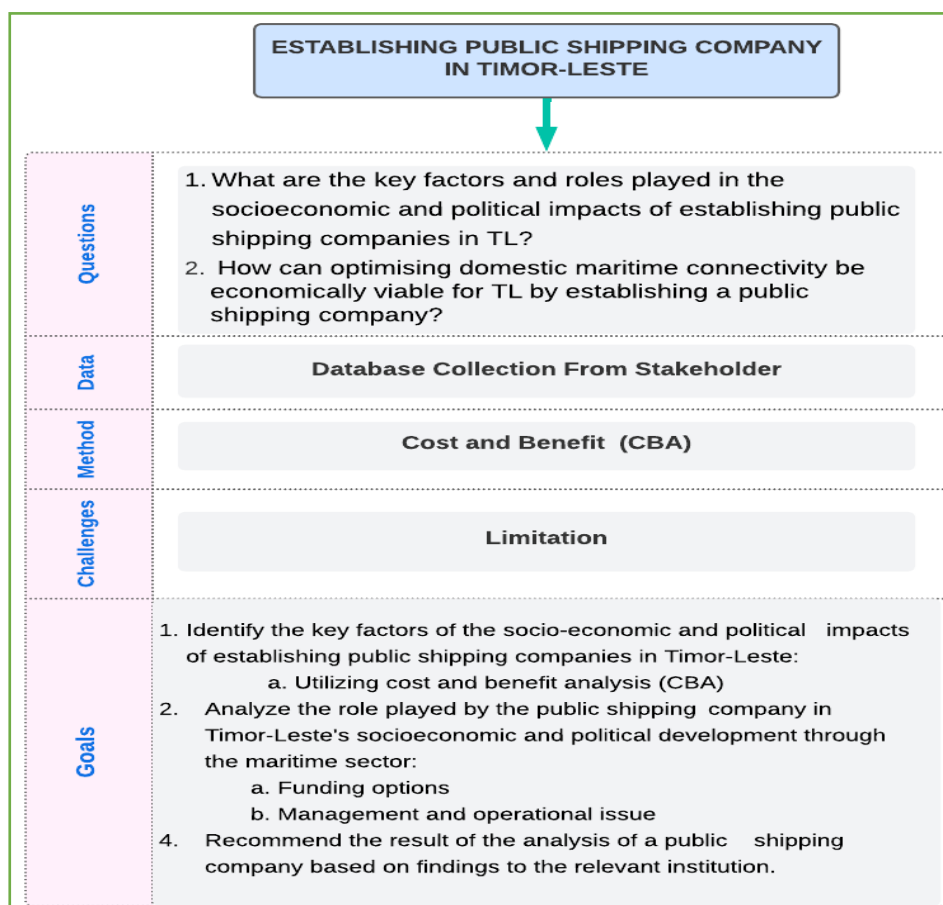
Source: By Author

Furthermore, the researcher will analyze and explore the cost and benefits analysis (CBA) related to the budget spending under Port Management Authority which is not specialized in shipping management and operation, in order to establish a new shipping company in TL to determine whether this is feasible and ensure that the gaps and challenges involved are understood. Moreover, obtain data sources from database collection from Port Administration, especially budget allocation, to the National Cabotage Department, compiled and analyzed further detail. Therefore, It allows taking decisions based on evidence rather than opinion or bias by providing a

quantitative and qualitative view of the issues. Thus, it can decide whether to pursue the project or not.

Firstly, understanding the research questions in order to solve the problem and achieve research objectives. In addition, to understand the intangible benefits of the economic, social and political impact of sustainable development through the maritime sector, particularly establishing public shipping companies. The analysis begun in the CBA reveals current and future investments in shipping companies, such as funding options and operational management matters. And finally, the research will be conducted to determine whether establishing new public shipping companies in TL will be economically, financially, socially and politically advantageous.

Figure 6 – Raise questions utilizing CBA as a tool on how to achieve research objectives and solve the problem



Source: By Author

Therefore, to assist in selecting the best approach in terms of return on investment and other vital benefits, estimate the socioeconomic and political impact of the existence of a shipping company. Since several distributional, regional, or merit priorities are expressed by Dasgupta et al. (1972), details of specific prices, such as the social discount rate, are also determined per the prevailing political agenda. As a result, such proposals may be described as the use of what can be described as political commitment, whose purpose is to reflect the government's planning goals or political objectives and then unavoidably promote them. However, merit goods or benefits, such as national pride, enhanced civic participation, better community relations, or reduction of poverty, are not necessarily measured with money and therefore are not translated into monetary valuations in the same way. Likewise, after collecting the data need to be compared, confirmed and analyzed in order to determine how well CBA measures are improving efficiency and care to be trusted. Therefore, CBA concrete steps should be followed to compare and confirm the data analysis.

3.2 Data

The purpose of this chapter is to provide a detailed demonstration of how a CBA appraisal is conducted and how the CBA approach is used to conduct the financial and economic analysis of the establishment of a shipping company. Note that the primary and secondary data were collected electronically from the National Cabotage Department²² of the Port Administration of TL, which the central government funds from 2016 to 2020. (*see Appendix 1 and 2*)

3.2.1 Financial Data

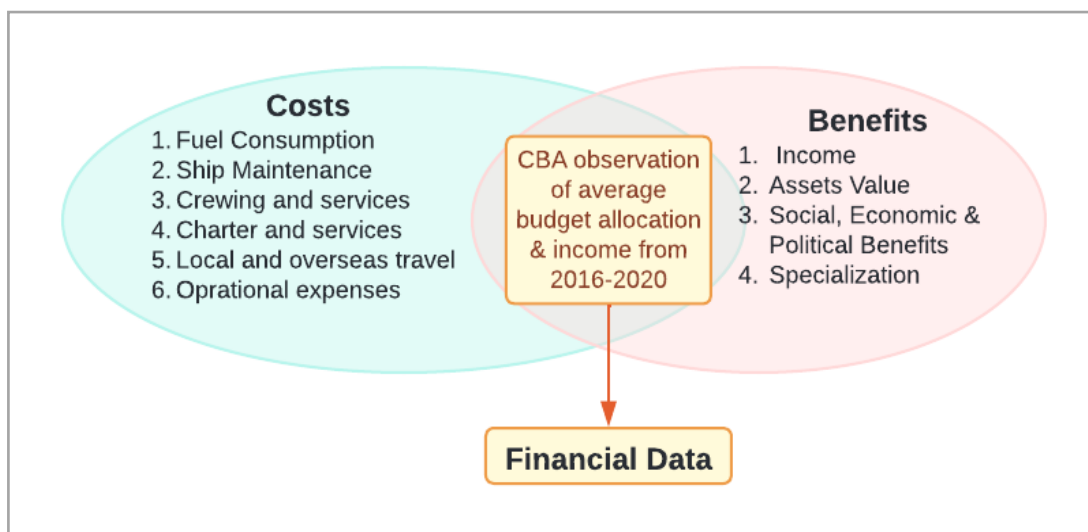
Pike & Neale (2006) affirmed that various financial incentives are provided by governments and the European Union to the business community. In the context of TL domestic shipping activity and connectivity, the government offers both longer-term

²²National Cabotage Department is a department under the Ports Administration of the Timor-Leste that manages the operation of the ships Berlin Nakroma and Berlin Ramelau.

sources of cash and more regular cash flows from business operations in order to maintain maritime connectivity. The cash flows from operations are the balance between the money collected from customers and the money paid out for goods and services received, the wages and benefits of employees, and certain other operating expenses. As for the financial data and operational measures, the methods consider the CBA utilizing the quantitative and qualitative data to understand the research problem where information is available from primary and secondary database collections. As a result, financial data was collected from the database for the development, operation, management, and maintenance of passenger ships for compilation into these three categories (see *Figure 7*):

1. **Cost:** Total budget allocation from the central government to the Port Administration as manager of ships from 2016 to 2020 and categorized into six items.
2. **Benefits:** Total Income collection from 2016-2020, the value of current assets depreciation and intangible benefits of socioeconomic and political interests.
3. **Financial Data:** The average budget allocation, income from 2016 to 2020, and other benefits derived from observation and analysis.

Figure 7 – Cost and benefits composition and financial data observation



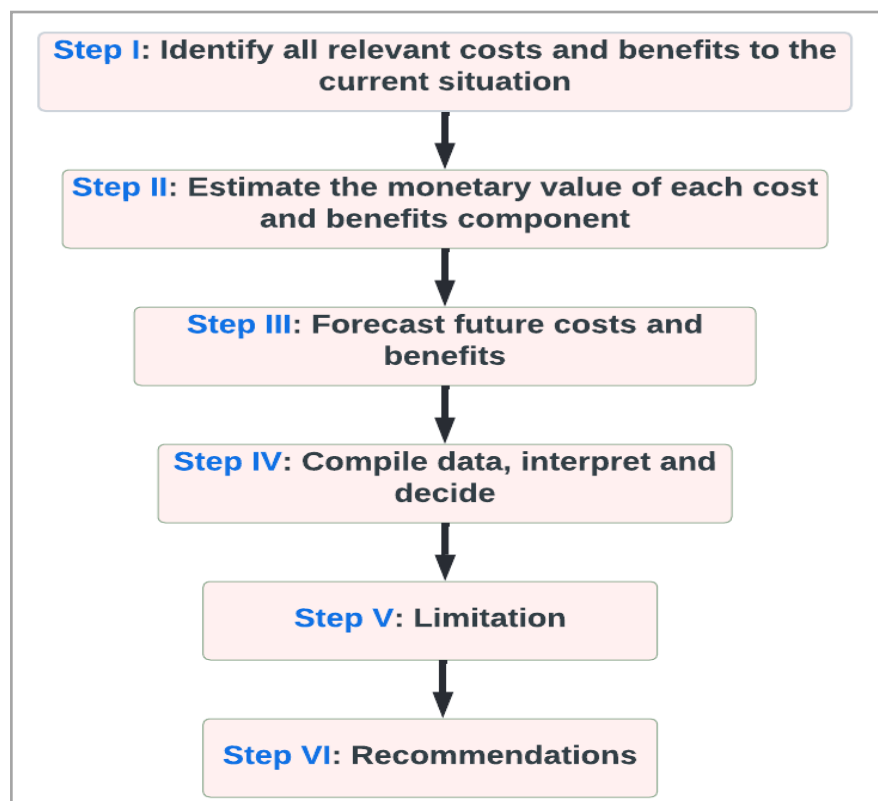
Source: By Author

A detailed description of the proposed project, as well as detailed information concerning data sources and assumptions, can be found in *Appendix 1, 2, 3 and 4*).

3.3 Methodology

In light of the definition provided earlier, the CBA is a process used to determine whether or not a decision will be economically and socially beneficial; therefore, it can be used to determine whether or not the decision will be worthwhile. It is a valuable tool for avoiding bias in decision-making processes, particularly when a significant decision will affect the team or project in the long run. There are almost no differences between the stages involved in conducting a CBA. Following is a development of a conceptual framework for CBA of establishing a shipping company (see *Figure 8*).

Figure 8 – Six CBA stages in this research



Source: By Author

The above figure 8, steps can be customized to suit the specific requirements of the CBA of the project after running them. Additionally, it establishes a systematic framework for identifying, quantifying, valuing, forecasting, and interpreting and finally recommends comparing the current costs and benefits to the new situation of the company. Newcomer et al., (2015) cite the following concrete steps for the CBA proceeding.

3.3.1 Identify All Relevant Costs and Benefits to the Current Situation

It is essential to recognize the specific components of costs and benefits that are affected by the establishment of the shipping company. In this case, the new shipping company will be based on the current average costs of the overall shipping operation. On the other hand, benefits components are generally related to the income derived from passengers and cargo tariffs. Additionally, the benefits will be reflected in the value of current assets, maintain maritime transport connectivity and the country's socioeconomic and political interests.

3.3.1.1 Current Cost Composition

Expenses represent the total costs incurred by a business when producing goods or providing services. Several factors contribute to the production of a product or service, such as the cost per unit and the price of individual units (Cooper & Kaplan, 1992). Albertijn et al., (2011) identified that a shipping company's cash flow and profitability are also affected by the volatility of operating costs. As a more narrowly defined concept, operating costs are the costs associated with manning, repairs, maintenance, stores, lube, and insurance. Costs of the current type of ship are generally considered relatively constant and to increase with inflation. Similarly, if the vessel is operated in the spot market (voyage), the owner is liable for all voyage expenses. In addition, fuel oil (bunker cost) typically accounts for 20-25% of the total voyage expenses; due to its correlation with world oil prices, bunker fuel's cost is highly volatile and, as a result, a significant source of risk for voyage planners.

Table 2 – Cost component items

Develop, operate, manage and maintain passenger ships		2016	2017	2018	2019	2020	Total 5Y Budgets	Average Budget Allocation
C	Costs							
C1	Fuel Consumption	\$ 420,000.00	\$ 550,000.00	\$ 291,388.00	\$ 480,210.00	\$ 364,094.00	\$ 2,105,692.00	\$ 421,138.40
C2	Ship Maintenance	\$ 480,000.00	\$ 600,000.00	\$ 427,500.00	\$ 739,608.00	\$ 549,082.00	\$ 2,796,190.00	\$ 559,238.00
C3	Crewing and services	\$ 620,000.00	\$ 628,000.00	\$ 609,876.00	\$ 624,380.00	\$ 615,420.00	\$ 3,097,676.00	\$ 619,535.20
C4	Charter and services	\$ 400,000.00	\$ 502,500.00	\$ 240,000.00	\$ 200,000.00	\$ -	\$ 1,342,500.00	\$ 268,500.00
C5	Local and Overseas travel	\$ 38,000.00	\$ 52,000.00	\$ 28,121.00	\$ 58,434.00	\$ 7,960.00	\$ 184,515.00	\$ 36,903.00
C6	Operartional expenses	\$ 39,000.00	\$ 26,000.00	\$ 11,600.00	\$ 22,810.00	\$ 5,500.00	\$ 104,910.00	\$ 20,982.00
	Total	\$ 1,997,000.00	\$ 2,358,500.00	\$ 1,608,485.00	\$ 2,125,442.00	\$ 1,542,056.00	\$ 9,631,483.00	\$ 1,926,296.60

Source: By Author

- **Fuel Consumption**, the bunker fuel of the ship will be consumed in the course of the year.
- **Ship Maintenance**, maintenance is the process of repairing and maintaining the ship's equipment, such as dry dock, spare parts, consumables, inventory and certification renewal.
- **Crewing and services**, Crews are outsourced to shipping management companies. There are a total of 22 crew members on board, of which 16 are Indonesians and six are Timorese, including other provisions. Moreover, including also labour or staff under Port Administration that provides services to the ship in different places.
- **Charter and services**, In the absence of the Ferry Berlin Nakroma when it is undergoing annual maintenance, the TL government will charter a similar vessel to maintain connectivity.
- **Local and overseas travel** is a budget item that the management of port administration utilizes for local and overseas travel while ships are in operation and for overseas travel when the vessels are undergoing maintenance in Indonesia.
- **The operational expenses** are the goods and services required for the office and ship operation.

3.3.1.2 Current Benefits Composition and Approaches

Hanley et al. (2009) described CBA as addressing "*the fundamental economic problem: how to allocate scarce resources in the face of unlimited wants*". In addition to providing a means of comparing the benefits and costs of a particular action, a CBA can also provide a means of including the preferences of ordinary people in government decision-making. Several methods and approaches are studied in the following section to measure the benefits, for example, associated cost reduction and increasing income and related benefits factors. Therefore, based on assumptions applicable, the shadow price appropriate measures the net benefits of increasing the supply of goods by the public sector, which means that projects that make a profit at shadow prices should be approved (Drèze & Stern, 1987).

Table 3 – Domestic Passengers and Cargo movement from Dili, Oecusse and Atauro Port, 2016-2020

Year	Passengers (Pax)	Vehicles (Units)	Others (m ³)	Year	Income (Passengers & Cargo)
2016	131,931	4,873	7,177	2016	\$ 580,118.00
2017	144,250	7,088	4,924	2017	\$ 631,971.00
2018	113,525	5,998	1,391	2018	\$ 528,274.00
2019	89,699	7,210	646	2019	\$ 378,906.00
2020	112,640	6,569	947	2020	\$ 516,415.00
Total (5 Years)	592,045	31,738	15,085	Total (5Y)	\$ 2,635,684
Average/y (\bar{x})	118,409	6,348	3,017	Average/y (\bar{x})	\$ 527,137

Source: By Author

- **Income** (Market, Passenger & Cargo Tariff), As a country's Gross Domestic Product (GDP), gross national income, consumer price index, investment, and inflation change over time, the development of these indicators increases (Statista & Statistic Timor-Leste). The World Bank estimated that the total population of TL is 1.35 million in 2021, of which 70 thousand residents are in the Oecusse Region and about 8 thousand on the Atauro Island. As a result, the people of TL generally benefit from maritime transportation, especially those who live in those regions benefit directly from shipping services. Nevertheless, the direct income

measure is determined by the capacity of the vessel to transport passengers and cargo movement during that period. Aside from this, the central government subsidizes the operation of the ship; Therefore, the price of tickets is not reflected in the market demand.

Table 4 – Income calculation

B1	Income		\$ 527,137.00
B1.1		Passengers and Cargo	\$ 527,137.00

Source: By Author

- **Social Benefits**, Generally, creating a new shipping company contributes to the social benefits in quantitative analysis; it is expressed in assumed monetary value. The direct beneficiaries of the country are people who live in the region of the Oecusse enclave, Atauro Island, and also, in the future, people from the North and South Coast of TL. There is controversy surrounding monetising intangible values (Klijn, 2009). As a result of the wide range of benefits associated with social matters, some aspects are difficult to quantify but assumed value in order to obtain value based on the following methods in Table 5.
 - **Maintain connectivities**, passengers and cargo movement from/to Dili-Oecusse-Atauro from 2016 to 2020. The ship operates twice from/to Dili-Oecusse and once Dili-Atauro per week. Thus, the value is calculated by multiplying the total number of passengers and cargo moved in one year by the price per passenger and cargo volume.
 - **Health care access**, It is estimated that about 100 people per year, about 5000 USD, prevent death due to health care in the central hospital in Dili.
 - **Access to education**, an estimated 50 people graduate from university every year, and if they obtain a job, they will receive a salary of 204 USD per month. Furthermore, 50 people who graduate from high school will be employed at 115 USD per month.
 - **Crime prevention rate**, in case there is no maritime transport connectivity people will make the demonstration demand connectivity. As a result, 30

police officers are estimated to be dispatched to prevent crime. The government will incur costs as a result of the per diem system.

- **Employees**, the current management is responsible for about 21 employees who are paid about 300 USD a month.

Table 5 – Social benefits calculation

B2	Social Benefits		\$	1,562,393
B2.1	Connectivities	Dili-Oecusse-Atauro	\$	789,393
		Dili - Oecusse (2x)		78,939
		8\$/Pax	\$	631,515
		Dili.-Atauro (1x)		39,469.67
		4\$/pax	\$	157,879
B2.2	Health Care Access	Dili-Oecusse-Atauro	\$	500,000.00
		100 pax/y prevent life	\$	500,000.00
B2.3	Access to Education	Dili-Oecusse-Atauro	\$	191,400.00
		50 P/Y graduate at University	\$	122,400.00
		50 P/Y finish High School	\$	69,000.00
B2.4	Crime Prevent Rate		\$	6,000.00
		30 Police for prevent demonstration	\$	6,000.00
B2.5	Employees		\$	75,600.00
		x Salary for 21 staffs = 300\$	\$	75,600.00

Source: By Author

- **Economic Benefits**, In this study, there have been slightly difficulties in monetising or estimating economic benefits. The Government provides operational services to the shipping activities in TL at a cost that impacts the estimate economic activities. It is considering that the economic growth of Oecusse and Atauro is essentially dependent on the central government. The standard of living conditions in these two regions will decline if there is no shipping service because all construction materials, agriculture products, livestock, fuel oil and others are transported by ships. All types of commodities have been transported by truck lines via ships; approximately 1500 trucks and other units have been transported per year multiplied by their value per freight. Consequently, the family's living conditions will deteriorate if shipping services are unavailable. The

impact will be felt by approximately 2000 families who spend 115 minimum salaries per month to meet their daily needs.

Table 6 – Economic benefits calculation

B3	Economic Benefits		\$ 1,770,000.00
B3.1	Merchandise	Cargo Movement	\$ 390,000.00
		Truck Line (Dili Oecusse =1000)	\$ 250,000.00
		Truck Line (Dili Atauro =500)	\$ 75,000.00
		Others =2000 (m^3) Dili Oecusse	\$ 50,000.00
		Others =1000 (m^3) Dili -Atauro	\$ 15,000.00
B3.2	Family Living Condition		\$ 1,380,000.00
		2000 family spend 115 salary/month	\$ 1,380,000.00

Source: By Author

- **Political Benefits**, since it is a nation responsible for economic growth, it provides essential services to its citizens through social guarantees by maintaining connectivity to maritime transport. More importantly, by giving political aspects that strengthen the state's sovereignty through providing subsidized ferry services to the people of Timor-Leste at a low cost. To illustrate this point, there is no exact estimation value to maintain the independence and integration of territory, and it is to defend national sovereignty across nations. However, it is challenging to calculate other benefits quantitatively; therefore, qualitative descriptions can be made in those aspects.
- **Assets Value**, the Berlin-Nakroma and Berlin Ramelau²³ ro-ro ferries are Maritime transportation owned by the TL Government, which operates from Dili-Oecusse- Atauro Port. With the support of the German Cooperation, the German Government offered both vessels to its partners in the maritime industry as solutions. A total of more than 20 Million Euros has been invested.

²³Ferry Berlin Ramelau is a ro-ro passenger and cargo ferry operated and owned by the Government of Timor-Leste, which links to or from the Dili-Oecusse enclave - Atauro Island. See Appendix 7.

- **Specialization Benefits** , current shipping management is not a shipping specialist, considering the current situation of having two ships under port management and creating a new shipping company is the core of the study. Despite this, it is managed by the port authority, which does not specialize in the shipping management company involved in the vessel's operation. Consequently, they are less competitive, productive, inefficient, and lack services. Moreover, most services such as crewing and technical assistance can be outsourced to an outside company from another country. In contrast, the cost and benefits of establishing a new shipping company will be specializing in shipping management and operation will reduce costs, increase benefits, reduce reliance on external sources, and definitely assume many responsibilities. It will be more economical and efficient to operate ships directly.

3.3.2 Estimate the Monetary Value of Cost and Benefits Component

Several approaches have been developed to value non-marketed outputs, including socioeconomic and political valuation. This aims to demonstrate the applicability of some of these valuation methods. The summation of the benefits is the summation of all monetary values assigned to the benefits. The summation of the costs is the summation of all monetary values assigned to the costs. Therefore, it is recommended to proceed with the decision if the numerical benefits outweigh the costs. Additionally, calculating the benefits involves many controversial assumptions and hypotheses, thus leading to significant differences in the results, which are overestimated in the majority of cases.

3.3.3 Forecast Future Costs and Benefits

A primary objective of the newly formed shipping company would be to generate as much wealth as possible through efficiently utilizing existing and future resources (Pike & Neale, 2006). A company must have a cash inflow greater than its cash outflow to create wealth—the company's wealth increases due to an investment

with a positive net present value. Costs and benefits are both involved in most decisions.

As a result, establishing a shipping company as a project is essential for identifying the value of costs and benefits associated. Considering that ships are one of the most critical assets. As mentioned in *Appendix 1*, the initial analysis and financial calculations were based on budget allocation to the shipping activity according to the type and characteristics of the ship in *Appendix 7*. Additionally, new deliveries of the vessel will be available as part of the expansion option. Since the current ship operation receives government assistance, the weight average cost of capital (WACC) will not be considered when calculating the initial weight average cost of capital. Any cost component affecting cash flow is included in operating expenses.

3.3.4 Compile Data, Interpret and Decide

The value of the investment is determined by comparing the current and future benefits with the costs associated with the investment. Whenever possible, it is best to define these benefits in terms of cash flows. It is not always easy to quantify benefits in such a convenient way. An investment opportunity is evaluated based on its net present value (NPV), and benefits are subtracted from costs in order to arrive at the present value. As part of CBA, the NPV is the essential calculation for proceeding decisions.

Figure 9 – The optimal decision flow based on NPV and IRR

Goal	Optimize existing and future resources to maximize wealth
Input	Identify Benefits (Xt) & Costs (k)
Financial Analysis	$NPV = \text{Benefits (Xt)} - \text{Costs (k)}$
Decision Outcome	Positive --> Accept Negative --> Reject

Source: By Author

A cash flow analysis is necessary to estimate the NPV and the successive internal rate of return (IRR), assuming components of costs and benefits are deemed to be included in the cash flow. The NPV is calculated as follows:

$$\text{NPV} = \text{PVBenefits} - \text{PVCosts}$$

Calculating the return on investment requires finding the rate equalizing the present value of future benefits with the initial cash outlay. This is known as the internal rate of return. When applied to project cash flows, the IRR is the discount rate, r , that produces a net present value of zero. A project is considered feasible and profitable when its net present value exceeds zero. When it is not, it would be better not to invest in it but also to consider its other benefits. The selection criteria for a project with a significant NPV in an alternative where many projects are proposed based on the project with the greatest NPV. The following formula may be used to supplement the calculation of NPV²⁴ and IRR²⁵ in order to aid the decision maker in choosing between proposals.

Figure 10 – NPV and IRR Calculation

NPV: Enter k , solve for NPV	
$NPV = \sum_{t=0}^n \frac{CF_t}{(1 + K)^t}$	<p>If $NPV > 0 \rightarrow$ NPV is Positive (+), Accept)</p> <p>If $NPV < 0 \rightarrow$ NPV is Negative (-), Reject)</p>
IRR: Enter $NPV = 0$, solve for IRR	
$\sum_{t=0}^n \frac{CF_t}{(1 + IRR)^t} = 0$	<p>If $IRR >$ Discount rate, accept the project</p> <p>If $IRR <$ Discount rate, reject the project</p>

Source: Pike, R., & Neale, B. (2006).

²⁴NPV (Net Present Value) is calculated by considering all future cash flows generated by a project, including the original investment.

²⁵IRR (Internal Rate of Return) is in a discounted cash flow analysis, the IRR makes the NPV of all cash flows equal to zero.

The IRR represents the return on investment as a percentage. The NPV, however, depends on the discount rate. As a result, increasing or decreasing the discount rate until NPV becomes zero is, in fact, the IRR. Relationship between IRR, discount rate and NPV:

If $IRR > \text{Discount rate}$, accept the project, then the NPV is always Positive

If $IRR < \text{Discount rate}$, reject the project, then the NPV is always Negative

Table 7 – Cost and Benefits calculation based on Figure 8

	Identify Costs and Benefits	Monetary Value (Av 5Y Budget Allocation)	Future Forecast		Compile data, Interpret and Analyse
	Develop, operate, manage and maintain passenger ships				
C	Costs	\$ 1,926,297			Optimal Decision, Accept. Therefore, Establishing Public Shipping Company in TL
C1	Fuel Consumption	\$ 421,138.40	NPV > 0		
C2	Ship Maintenance	\$ 559,238.00			
C3	Crewing and services	\$ 619,535.20			
C4	Charter and services	\$ 268,500.00			
C5	Local and Overseas travel	\$ 36,903.00	IRR > Discounted rate		
C6	Opearational expenses	\$ 20,982.00			
B	Benefits	\$ 3,859,530			
B1	Income (passengers & cargo)	\$ 527,137.00			
B2	Social benefits	\$ 1,562,393.00			
B3	Economic benefits	\$ 1,770,000.00			
B4	Political benefits	\$ -			
B5	Assets value	\$ -			
Net benefits	undiscounted		NPV	\$ 1,933,233.40	
Net benefits	Discounted 5%		NPV	\$ 1,749,446.26	
			IRR	100%	

Source: By Author

According to the Office of Management and Budget of the United States, federal agencies should conduct policy analyses using two discount rates²⁶: 7% and 3% (Li & Pizer, 2021). In the case of government policies with costs today but benefits in the future, the two rates can yield strikingly different results. As a result, net benefits discounted by 5% are assumed based on previous similar government policies. Li & Pizer (2021) added that future impacts must be discounted or reduced in value to

²⁶The discounted rates refer to the interest rate used in discounted cash flow calculations in order to estimate the present value of future cash flows.

compare costs and benefits occurring at different times since future costs and benefits will be less significant than those today. The greater the discount rate, the less significant future effects are considered; the lower the discount rate, the closer to the equal significance of future effects is considered.

3.3.5 Limitation

The disadvantage of CBA here is that it may not be possible to determine all the benefits valuation. Moreover, valuing unique assets, such as shares of unquoted companies with no identifiable market, is difficult. For example, the benefits are generated directly by the shipping freight activities. Most importantly, the socioeconomic and political benefits for the country of TL are challenging to give value measurement. Furthermore, asset price depreciation is also complicated to know the exact value; therefore, the valuation of an asset such as a ship more than ten years old is based on the market condition approach. As a result of the analysis above, it appears that cost-benefit analysis' limitations may also be affected by uncertainty or that uncertainty is primarily responsible for other limitations of the method. Uncertain factors also include non-market value; therefore, monetizing non-market value is one kind of uncertainty.

3.3.6 Recommendations

The final stage in developing a CBA is to recommend the decision maker regarding the project with the highest NPV and IRR to guide them in deciding between viable alternatives. Ultimately, CBA emphasizes efficient resource allocation to maximize internal and external benefits. Another option would be to make the weighting system dependent on recent political decisions. According to Weisbrod (1968), one way to approach this problem is by considering that all public projects adopted, despite their failure to meet cost-benefit criteria, are adopted because an implicit utility weighting has been applied to the earnings of different groups.

On the other hand, measuring opportunity cost²⁷ can determine how much must be sacrificed to take advantage of input to implement a policy. It is almost always necessary to use inputs that could be used to produce something else of value when implementing policies. For instance, the budget allocated for implementing a policy to operate a company with ships may be used to generate other social, economic or political benefits in TL. The value of the input in its best alternative use is the opportunity cost of using it to implement a policy. Finally, the optimal recommendation would be to continue with the project by analyzing the findings and discussion in the next chapter.

²⁷The opportunity costs measure how much value or benefit an activity gives up compared to alternatives.

CHAPTER 4 - FINDINGS, DISCUSSION AND RECOMMENDATION

4.1 Introduction

Based on the CBA method in the previous chapter, the researcher analyzed the findings and discussed them to ensure that research objectives could be met. As part of the first research objective, it was determined that the establishment of a public shipping company in TL would have significant socio-economic and political implications. After reviewing the fact-finding aspect analysis, components of costs, benefits, and financial data of budget allocations and revenues from 2016-2020 were determined. The next step was developing a conceptual framework for analyzing the costs and benefits of establishing a shipping company according to the six steps of the framework. Therefore, it is essential to identify the most influential factors in costs and benefits components. Further, a discussion of implementation and recommendations are also included in the following summary.

4.2 Findings and Analysis

4.2.1 High Cost Associated with the Operation of the Ship

It was determined that the costs associated in Table 8 are high costs in light of the types of characteristics of the ship described in *Appendix 7*. Whenever costs become excessive, they may negatively impact the financial situation and result in inefficient resource utilization because resources are being misused in analysing costs related to the development, operation, management, and maintenance of passenger ships, one of the significant efficiencies that led to a long spending period. As a result, it causes a shortage in investing in a similar project in the future as well. Consequently, the development of the industry will not increase, nor will it change, since one vessel is insufficient to meet domestic needs. Furthermore, based on the availability of ships, the shipping manager decided to operate the current service twice a week to Oecusse Enclave and once to Atauro Island to ensure service continuity. This makes it difficult to achieve full operational efficiency and productivity. Therefore, there was a shortage

of ship supplies, which resulted in many passengers and cargo being congested and overloaded.

A CBA and the analysis performed in Chapter 3 help determine whether to invest in such a project based on discounted future incomes due to high costs. Moreover, the CBA provides additional options for choosing the ship to maximize revenue by utilizing an available ship with similar productivity and expected return. Therefore, the decision to separate existing shipping management and create a new shipping company was based on the assumption that socioeconomic and political benefits will exceed cost components; however, such a ship still has higher costs in terms of its funding.

As a result of implementing the current management system under the Port Authority, there are expected to be high costs, inadequate overall expenditures, and inefficient voyage operations. Therefore, creating a new shipping company would provide a specialized approach for achieving several results, including reducing costs, increasing the frequency of ship operations, and increasing ship supply to address passenger and cargo congestion issues. Thus, improving maritime transport connectivity will assist increase domestic income as well. In this way, the investment in a new shipping company will mitigate existing short and long-term deficiencies, and the company will have to consider improving its services to its customers. Following the Costs represent six items to be analysed based on the CBA findings:

- **Fuel Consumption.** Fuel Consumption, a significant quantity of fuel will be consumed by the ship for one year. In this case, the bunker risks will remain the same price because the current management and the new shipping company will not control it because it is outside the coverage. There is still a direct correlation between the price of oil on the market and the total amount of fuel consumption by ships.
- **Ship Maintenance.** Generally, maintenance involves the repair of ship equipment, including dry docking, spare parts, consumables, inventory, and certification renewals. As of now, about 30% of the overall budget is allocated for maintenance

each year. Several factors can contribute to an increase in maintenance costs; for example, TL does not have any maintenance facilities; therefore, every year, the ship must undergo dry docking in Indonesia, which results in high operating costs, including labour, fees, tax, foreign exchange, fuel consumption, provisions, crewing, and long waits during the process of repairing the ship. However, In the short term, the new shipping company will focus on maintenance management and how to reduce maintenance costs by carefully negotiating prices. In addition, the ship's maintenance should be conducted per existing regulations. Alternatively, the shipping company could reduce and save many costs in the medium term if it had a dockyard since most of the maintenance components would be available within the country.

- **Crewing and services.** About 70% of crew members are outsourced to shipping management companies in Indonesia since the ship is delivered to TL from the shipyard. Moreover, including other provisions, there are 22 crew members on board, of whom 16 are Indonesians and six are Timorese. For example, the high costs associated with the foreign crew include repatriation, high wages, tax and other fees. In addition, the staff and labour provided by the Port Administration, which provides services to the ship at various locations, may also be included. However, the new company will focus on restructuring the crew member by insourcing most of the crew to be Timorese in order to reduce overall costs. Moreover, it will provide jobs to the Timorese seafarers and maritime-related expertise to perform the jobs, implying that many seafarers' families will get benefits.
- **Charter and services.** During the annual maintenance cycle of the Ferry Berlin Nakroma, the TL government carries out a charter of a similar vessel to maintain connectivity. As a result of the addition of another ship to the fleet, Ferry Berlin Ramelau, the new company will not charter the ship from outside because it has been capable of supporting maintaining maritime connectivity. Although the operational cost will be increased by adding a new ship, the benefit will also

multiply, but the new calculation method will differ. It is estimated that 15% of the total budget will be reduced by the ship's charter from outside.

- **Local and overseas travel** is a budget item utilized by the management of port administration for local and overseas travel while ships are in operation and for overseas travel while vessels are undergoing maintenance in Indonesia. The new company's strategy will review the associated costs in detail and how to allocate resources effectively.
- **The operational expenses** consist of the goods and services required to operate the office and ship. In this case, it may increase as more ships are added to the fleet; therefore, the cost will differ on the needs of each ship.

4.2.2 Significant Benefits Composition

In recent years, shipping activities in TL have become an increasingly important economic, social, and political factor for the country's growth. Despite this, the development of the economy is not feasible without proper development of the transportation sector, particularly the connectivity of maritime transport. Accordingly, a public shipping company should be established to handle and specialise in all overall activities within the country. Although this measure is intended to create opportunities and conditions for its citizens through the efficient operation of a state-owned company or public institution, it also intends to find benefits associated with this measure.

Based on the CBA calculation, there is a more significant benefit than cost in the future management of the project. Nevertheless, current administration-provided services are not maximally effective and efficient due to a lack of specialization in shipping.

- **Income.** The average annual income of the present management is about 527.137,00 USD, which is lower than the expenses incurred. This is one of the benefits that a new company will pay more attention to. The discussion is on how to find an adequate solution in the new company management to increase income.

For example, Re-evaluate the ticket price, which has been the same since 2007 until now but does not correspond to the market.

- **Social benefits**, Generally, creating a new shipping company contributes to the social benefits in quantitative analysis; it is expressed in assumed monetary value. The benefit of these essential services provided by the Government to the people of TL is to facilitate the mobilization of the people and cargo from these locations. Given the possible positive consequences for safe and smooth cabotage operation in TL. The direct beneficiaries of the country are people who live in the region of the Oecusse Enclave, Atauro Island, and also, in the future, people from the North and South Coast of TL. There is controversy surrounding monetising intangible values (Klijn, 2009). As a result of the wide range of benefits associated with social matters, some aspects are difficult to quantify but assumed value in order to obtain value based on the following analysis.
- **Maintain connectivities**, passengers and cargo movement from/to Dili-Oecusse-Atauro from 2016 to 2020. The ship operates twice from/to Dili-Oecusse and Once Dili-Atauro per week. About 120.000 people per year are transported by ship. Thus, the value is calculated by multiplying the total number of passengers moved in one year by the price per passenger. As a result of people moving from the main island to the regional or vice versa, a sense of social stability and harmony between families was created, as well as several other related effects.
- **Health care access**, It is estimated that about 100 people per year, about 5000 USD, prevent death due to health care in the central hospital in Dili. Maritime transportation, in this case, is vital because this means the solution of transport how to reach the capital city to obtain health care.
- **Access to education**, an estimated 50 people graduate from university every year, and if they obtain a job, they will receive a salary of 204 USD per month for that level. Furthermore, 50 people who graduate from high school will be employed at 115 USD per month. People will get more knowledge and educated implies the positive effects on society from the reduction of violent crime, the securing of jobs, and the reduction of school dropouts.

- **Crime prevention rate**, in case there is no maritime transport connectivity people will make the demonstration demand connectivity. As a result, 30 police officers are estimated to be dispatched to prevent crime. The government will incur costs as a result of the per diem system. To maintain peace and harmony between the regions, maritime links should remain intact in order to prevent disturbances in public demonstrations related to maritime transportation.
- **Employees**, the current management is responsible for about 21 employees who are paid about 300 USD a month. It is important to note that employment is a major issue in TL and that employees under shipping companies will significantly affect multiple social and economic benefits. For example, families will receive direct salaries to crease poverty and increase incomes.
- **Economic Benefits**. There have been slightly difficulties in monetising or estimating economic benefits in the context of the TL economy. The Government provides operational services to the shipping activities in TL at an estimated cost that impacts regional economic activities. It is considering that the economy of Oecusse and Atauro is essentially dependent on the central government since transportation costs to local markets are low which facilitate local trade within the national territory. The standard of living conditions in these two regions will decline if there is no shipping service because all construction materials, agriculture products, livestock, fuel oil and others are transported by ship. All types of commodities have been transported by truck lines; approximately 1500 trucks and other units have been transported per year multiplied by their value per freight. Consequently, the family's living conditions will deteriorate if shipping services are unavailable. The impact will be felt by approximately 2000 families who spend 115 minimum salaries per month to meet their daily needs.
- **Political Benefit** has no value to measure because it is the nation's responsibility to maintain its sovereignty and integrity of the nation. TL has experienced development over the past 20 years as one of the world's newest nations. The maritime public transport and ferries played an essential and pivotal role in securing the integration of the nation of TL; it is also opening the isolated Oecusse

Enclave surrounded by Indonesian territory. Therefore, maritime transportation facilitates economic and social development.

- **Asset Value.** TL owns Berlin-Nakroma and Berlin Ramelau ro-ro ferries, which operate from Dili – Oecusse - Atauro. Both vessels were offered by the German government to its maritime industry partners as solutions. The total investment is more than 20 Million Euros. The fleet consists of two ro-ro passenger ships. The vessels will be operated at their costs in order to prevent further losses and maximize benefits. For the new company, the risk will be the depreciation of assets over time. Consequently, to maintain the assets, the company should adopt a new strategy to purchase or order a new ship due to the benefits of long-term business.
- **Specialization Benefit.** The study considers the current situation of having two ships under port management and creating a new shipping company. The port authority, however, does not specialize in the company managing the vessel. Due to this, they are less competitive, productive, inefficient, and services. In addition, most services, such as crewing and technical assistance, can be outsourced to a foreign company. In contrast, establishing a new shipping company will be a cost and benefit advantage since the company will specialize in shipping management and operation, reducing costs, increasing benefits, diminishing reliance on external sources, and assuming various responsibilities. Therefore, managing ships directly will prove to be more economical and efficient.

4.2.3 Decision-Making

Decision-making considers opportunity cost when adjusting the value of what may be sacrificed to enable the policy to be implemented. To policies, some inputs that could otherwise be used to produce other valuable products must be used. For example, the budget allocated for charter ships is supposed to be used to achieve different objectives by the working group in Figure 16 to implement the policy for creating a company. Inputs must be viewed in terms of their best alternative uses to determine their opportunity costs. In calculating a policy's costs, analysts must consider the opportunity cost. Moreover, Governance decision refers to the process through which decisions are made and the implementation process through which

these decisions are carried out or not (Rasmussen & Hall, 2016). For the sustainability of shipping in TL's maritime industry, there are several essential characteristics, including implementing different strategies for achieving several objectives, such as enhancing shipping activities imply to social stability, increasing economic activity, and strengthening national sovereignty by developing facilities and infrastructure, human elements, and legal frameworks in maritime affairs and also maintaining maritime connectivities.

4.2.4 Efficiency in Management and Planning

The project's benefit should be the reduction in turnaround time and cost expenses and the transfer from the old to the new system or from the current management to a specialist organization. Thus, the annual benefit will be the difference between spending time and cost in the old system and the summation in the new system per period of time. In other words, the benefit will result from ship time and cost savings to expand new planning strategies²⁸. Adding value to their transport service is a significant challenge for new shipping management. Its integration with transport services to improve processes and adapt to changes are urgent measures that must be implemented. It is necessary to separate from the current administration, which does not seem to show any signs of change in the near future.

4.2.5 Comparative Analysis

The annual government budget allocation for this type of ship (*appendix 7*) corresponding to the current total operating costs is much higher than the total income value per year. Therefore, setting up a shipping company can potentially reduce costs. However, it is recommended that the commercial aspects be carefully considered, for example, eliminating unnecessary cost items, such as terminating ship charters, that will imply an increase in revenue. The company may become financially and commercially self-sufficient in the future due to establishing a new shipping company oriented to the new management and business environment. When establishing a new

²⁸New planning strategies refer to expanding more shipping activities, such as constructing or buying new ships, opening new connectivities, capacity building of human resources and other commercial activities related to the shipping industry.

company, several unnecessary items should be focused on and need to be avoided, reduced or increased. The following are some strategies to consider.

- Increasing the frequency of ship service between Dili, Oecusse and Atauro Island. Currently, the ship operates two times each week between Dili and Oecusse and once from Dili to Atauro. By adding 50% voyages with the same ship to Oecusse and Atauro Port, it is technically and operationally feasible to increase the frequency of trips. Despite this, two ships are in service, so their sails will be split. Christmas and New Year's day also cause the peak passenger and cargo traffic in December and January. Thus, by that period, additional ships would be supplied, or the frequency of voyages would be increased. However, spend some operational costs, and more income will be generated.
- Re-evaluate the ticket price; from Dili to Oecusse, about 115 NM, it has been 8 USD per person since 2007; from Dili to Atauro Island, about 30 NM, it is 4 USD per person. Additionally, all cargo items should be evaluated in accordance with market demands. Ticket prices are calculated per the distance travelled per nautical mile. There is a proposal to increase the ticket price by 20% (see Table 8) due to the increase in fuel price and consumption, the high maintenance cost, and the high costs associated with ship operation. However, the market will suffer from inflation, affecting not only the transportation sector but also other sectors. Therefore, the new shipping company will gradually improve its business orientation in order to maximize its benefits.
- Discontinue the substitute ferry (Charter) contract. In this case, since the Ferry Berlin Ramelau has been added to the fleet, it will not require another ferry to be chartered when one of the ferries is required to undergo annual maintenance for the dry dock. It is shown in Table 8 that the total cost of chartering a ship for four years was 1.342.500 USD, which represents approximately 17% of the total cost expenditure per year. Due to this, it was proposed to remove this item by adding a supply of ships to the fleet since the fleet no longer requires a ship. Even though it used to be necessary to charter ships from outside because the government was solely responsible for ensuring maritime connectivity.

- Open new maritime connectivity on south and north coast of TL means adding a new mode of transportation as an alternative to land transportation. Ships may access a total of six regional ports simultaneously, which will increase market demand since the majority of the population resides in the region. The land transportation of passengers is more convenient and faster than the transportation of passengers by ship. However, due to poor road conditions and the relatively small amount of cargo transported by land, it is more costly to transport cargo by land. Therefore, sea transport has the advantage of being able to transport large quantities of materials more efficiently than laneways. The price of goods will be influenced by the effect of sea transportation, particularly in remote areas. Moreover, by establishing more maritime connections, the benefits will multiply in all aspects. Therefore, every municipality can transport goods and passengers to the capital city. However, there is still a lack of port facilities and infrastructure, particularly on the north and south coasts of TL.
- TL does not have the capacity to perform ship maintenance. The cost of ship maintenance accounts for about one-third of the total cost of operating a ship. To perform annual maintenance or dry docking of the ship, the ship must travel to Indonesia (Surabaya) to find a shipyard or dockyard due to TL not having a yard facility. As a result, the voyage and repair periods waste time and are costly. Additionally, operation costs are associated with fuel consumption, crewing, provisioning and maintenance expenses, and the cost of spare parts and services will affect the cash flow. Due to this, It is vital to have a dockyard to respond to vessel needs in TL, thus, reducing maintenance and operation costs.
- Implementing ISM Code to the new shipping company to ensure the safe management, operation, and prevention of pollution of ships.

Table 8 – Current and future cost and benefit analysis

	Develop, operate, manage and maintain passenger ships	Current Cost and Benefits	Future Cost and Benefits	Observations
C	Costs	\$ 1,926,297	\$ 1,360,088.44	30% Cost reduction
C1	Fuel Consumption	\$ 421,138.40	\$ 421,138.40	Same
C2	Ship Maintenance	\$ 559,238.00	\$ 447,390.40	Reduce 20%/Y
C3	Crewing and services	\$ 619,535.20	\$ 433,674.64	Reduce 30%
C4	Charter and services	\$ 268,500.00	\$ -	Eliminated
C5	Local and Overseas travel	\$ 36,903.00	\$ 36,903.00	Same
C6	Opearational expenses	\$ 20,982.00	\$ 20,982.00	Same
B	Benefits	\$ 3,859,530	\$ 3,964,957.40	Increase 3% Benefit
B1	Income (passengers & cargo)	\$ 527,137.00	\$ 632,564.40	Increase 20%
B2	Social benefits	\$ 1,562,393.00	\$ 1,562,393.00	Same
B3	Economic benefits	\$ 1,770,000.00	\$ 1,770,000.00	Same
B4	Political benefits	\$ -	\$ -	Same
B5	Assets value	\$ -	\$ -	Same

Source: By Author

Based on the analysis of the costs and benefits in table 8, the value assumption associated with the current and new management companies results in a significant reduction in costs of approximately 30% and an increase in benefits of approximately 3%. The price of tickets may increase by 20% based on market conditions. However, the value of socioeconomic and political benefits assumed remains the same. To illustrate the point, it can be said that establishing a new shipping company was the main objective which led to improvements in each area.

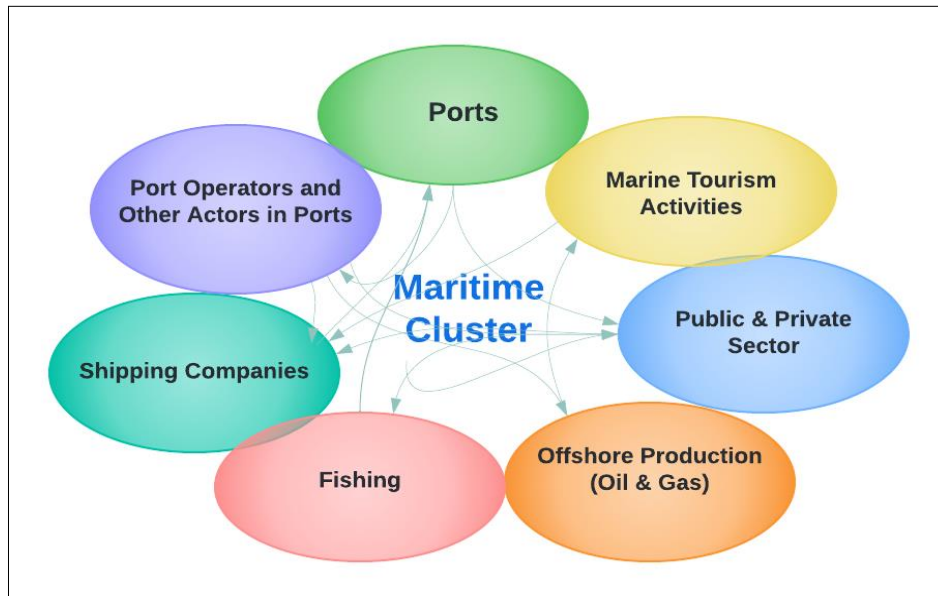
4.3 Discussion of Implementation

4.3.1 Country's Interest and Shipping Policy

Since TL became an independent country in 2002, in the period since then, maritime issues, including shipping, have become an increasingly pressing concern for the country. Therefore, TL has scrambled to develop its maritime industry. The combination of maritime industries is known as the maritime cluster. As part of the maritime cluster, there are several components, such as the maritime administration and maritime authority, which are responsible for developing the country's maritime industry. The country provides development trajectories such as maritime

infrastructure, human resources and maritime institutions development, and also provides services and operations through the shipping activities to its citizens.

Figure 11 – The maritime industry and its cluster of Timor-Leste



Source: By Author based on Timor-Leste Maritime Profiles

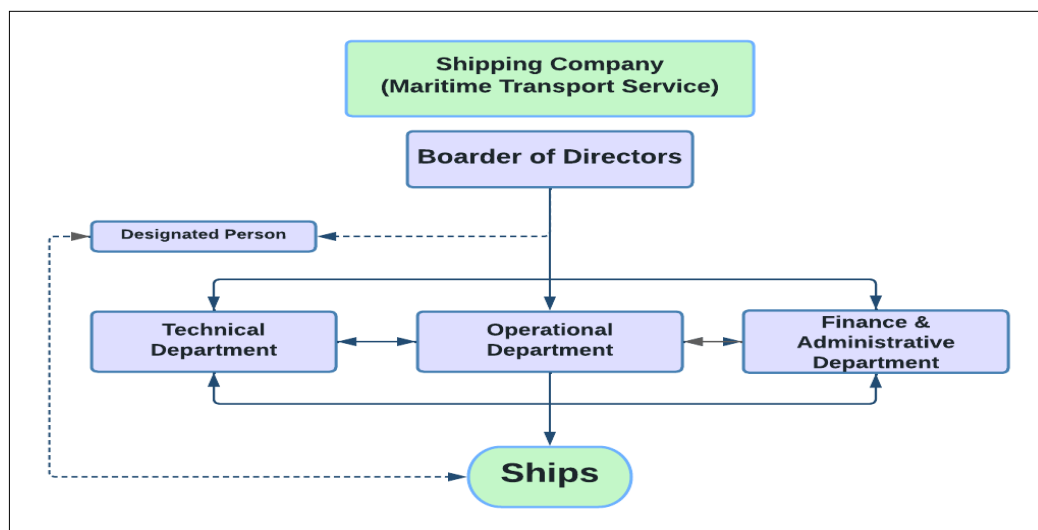
The country's interest implied that national shipping policies existed and played a role, which implies that shipping policies impact the development of the TL maritime industry. In TL, shipping continues to play an essential role in society, economy, and politics strategically; however, there are still many challenges associated with the maritime industry's development. As a result, the discussion before that the current shipping management under Port Authority is not specialized in shipping. Due to this, it is commonly attributed to the need to establish a separate public shipping company from the current administration that is responsible for all aspects of shipping. In order for this institution to be considered a solution to maritime connectivity problems, efforts are initiated in accordance with the policy interest of establishing it. A model concept for establishing a new shipping company in TL is presented in the following discussion. It can be adopted as the country's shipping policy at the national level.

4.3.2 Action to Take to be the Future Model

It is evident that the current management does not possess particular expertise in the field of shipping, causing an overall lack of operational issues regarding crewing, maintenance, passengers, and cargo operations, as well as ship availability. Moreover, the implementation and execution of the budget are also lengthy processes, and due to the complicated management process, it took quite a long time to complete. Ultimately, this resulted in ships having difficulty operating in the field, often getting stuck and hindered in their operations.

However, the more a company's shipping activities are specialized and the larger it becomes, the more processes it performs are differentiated (Theotokas, 2018). Therefore, the action to take is the proposed alternative solution for the Government to decide in the short-term time considering a strategic and prioritised investment in the maritime industry is establishing a new shipping company that is based on the objectives of the research mentioned above. The maritime transportation service action plan structure is initially designed to serve the company's strategy as it provides a framework for making decisions, undertaking actions, and adjusting the company's strategy as necessary. (see Figure 12).

Figure 12 – Recommended the organizational structure of the new shipping company



Source: By Author

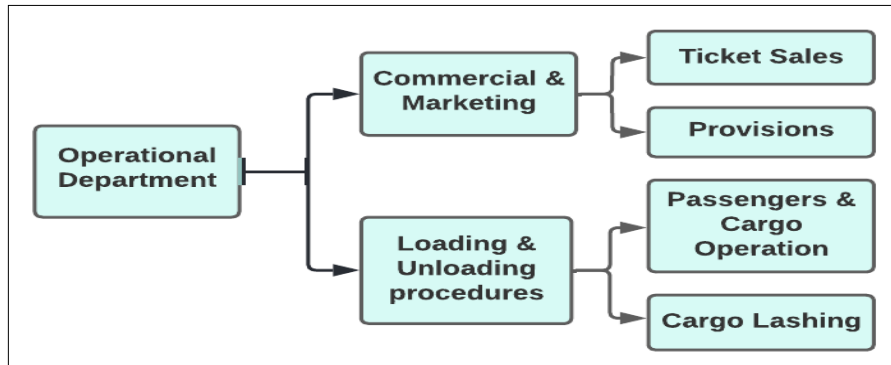
There are several tasks that need to be coordinated; therefore, they are grouped and enrolled into departments due to their coordination needs. To discuss in more detail the *figure 12*, It is important to discuss the meaning of departmentalization in a shipping company. Ahmed, M.A. (2017) & Price, J. L. (1968) defined the concept of departmentalization refers to the division of all work into specific jobs and their organization into separate departments. The objectives include effective management, coordination, achieving synergy, maximizing efficiency, using resources efficiently, and ensuring employee satisfaction. In this case, according to Theotokas (2018, p174), The departmentalization of a company is based on three basics criteria:

1. **Independent of Jobs.** The carrying out of the task of a job depends upon carrying out the task of another. Some processes or activities are highly separate and need to be grouped in the same department in to coordinated
2. **Specialization of jobs.** For synergy to be created and effective management to be achieved, jobs with the same or related specializations are grouped into one department. A shared culture within the department is also developed through this process.
3. **Best use of resources.** Grouping is organized in a manner that creates synergies and avoids overlapping between departments to prevent wasting resources.

In response to the departmentalization of a shipping company proposed, three essential departments under the board of directors are listed below.

- I. Operational or the passenger and cargo department is responsible for the commercial, marketing and operational management of cargo and passengers on the public maritime transport line between national ports on the coast of TL. Moreover, the department is responsible for ensuring and organizing the loading and unloading of passengers and cargo, as well as other duties assigned by the department.

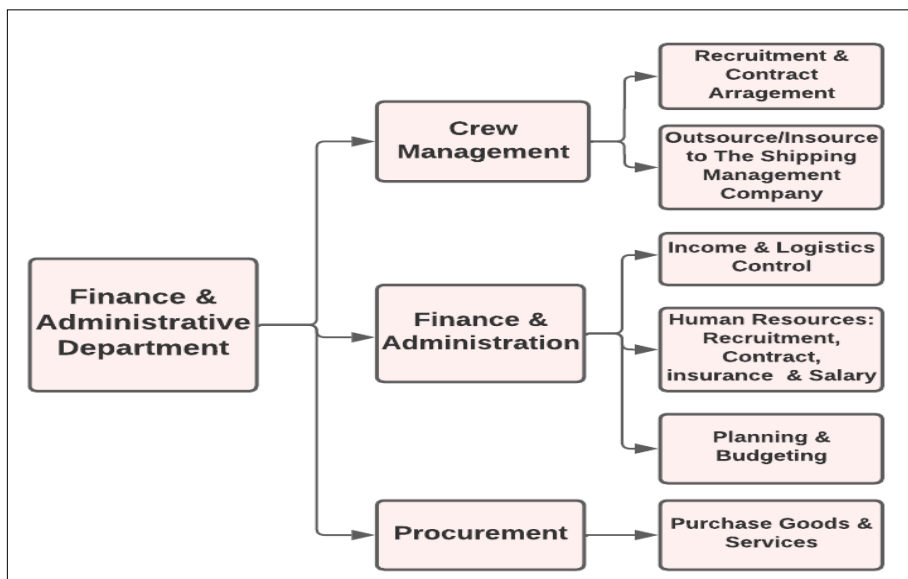
Figure 13 – Structure of the operational department



Source: By Author

- II. Finance and administration department is a functional unit responsible for managing the financial procedures and operations of the company. As part of its responsibilities, it is also responsible for providing technical and administrative assistance in management, training, crew, and human resource development. In addition, procurement is an integral part of the company, entrusted with the responsibility of managing the procurement process.

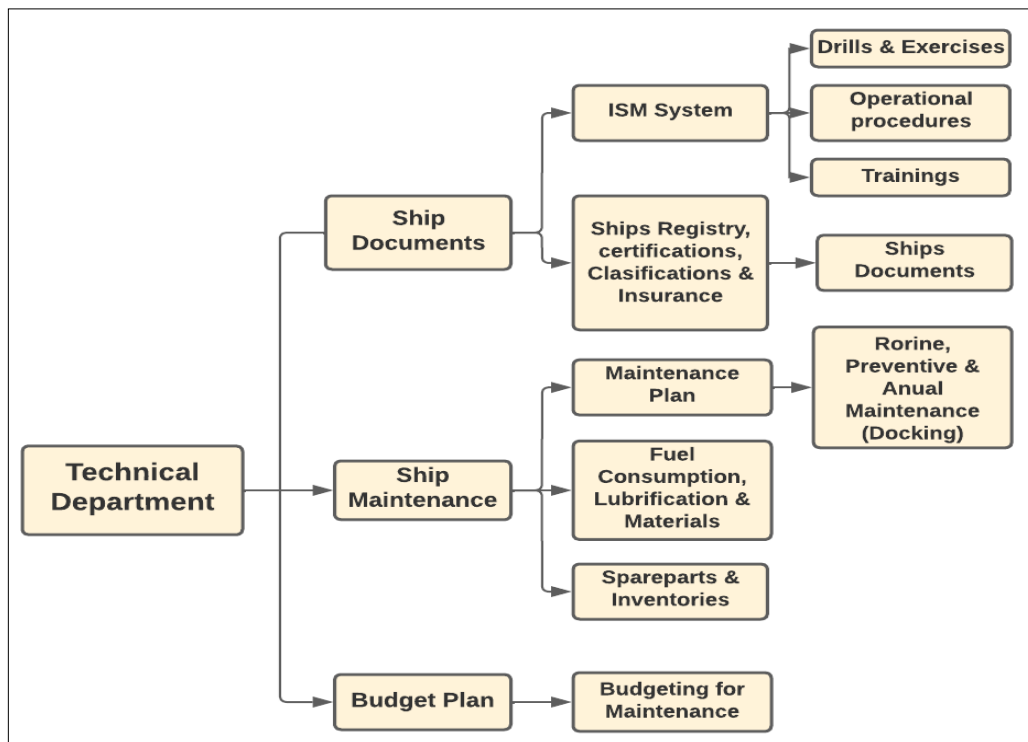
Figure 14 – Structure of the Technical department.



Source: By Author

III. The Technical Department is responsible for the maintenance, documentation and management of all the vessel parts. Additionally, following applicable law and international standards, it is essential to ensure the means are maintained and appropriately performed and maintain the highest standards of safety, efficiency, and sustainability. Also, ensure all documentation, including licenses and certifications required by law or international certification bodies, as well as other duties assigned by the department.

Figure 15 – Structure of the technical department



Source: By Author

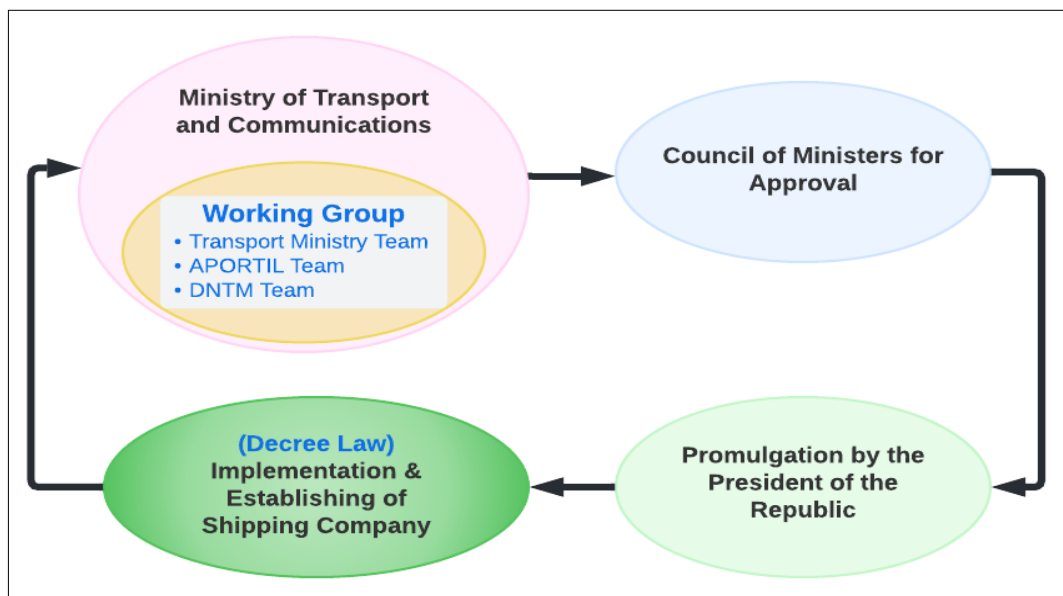
4.3.3 Plan for Implementation

The implementation process is aligned with the country's policy concerning maritime industry demand. In addition, the shipping company shall be directly

responsible for running ship operations in domestic water for the purpose of maintaining maritime connections for the citizens of TL and also for growth in socioeconomic and political impacts. The increased ship supply in TL in recent years will enable the company to provide a better service in order to ensure the continuation of maritime links. Therefore, defining the legal public shipping company's responsibilities as an independent institution with financial and administrative autonomy should be clearly stated in national policy and strategy.

Legalizing public shipping companies in TL should follow the process of drafting a decree law. TL's government is responsible for performing the legislative function under the constitution. The initial phase is characterized by submitting a proposed decree law to the Council of Ministers by the Ministry of Transportation for the Constitutive stage of drafting a decree law and the approval by the Council of Ministers. Presidential promulgation and publication are the phases of control and integration of effectiveness in the governmental legislative process. (see Figure 16).

Figure 16 – Legislation process in Timor-Leste's governance system



Source: By Author

4.4 Recommendation

After analyzing the cost and benefits of establishing a public shipping company in TL, supported by the literature review, the findings showed that maximizing the efficiency with which resources are allocated for public investment projects benefits society. Encourage investment in the development of the maritime industry specifically in shipping and ensure that the company and its ships are managed, operated, and developed appropriately. Therefore, to implement a policy, it is necessary to recommend that the government take the initiative to separate the current management of ships under the Port Authority. To achieve this, to establish legislation, such as a decree law specialising in shipping management. As a result of the analysis associated with support decision-making, TL will potentially benefit from its shipping business and financial, socioeconomic and political advantages in managing the ships effectively by establishing a new shipping company.

CHAPTER 5 – CONCLUSION

5.1 Conclusion

Establishing a new shipping company in TL facilitates better maritime connectivity, supports policy, cultural, and social effects, and stimulates economic growth. Therefore, maximizing resource efficiency for public investment projects benefits society. Thus, the company does not burden the Government with expenses on costs, and it is less dependent on the Government as a whole. To achieve this, it may be necessary to establish legislation first, such as a law explicitly addressing shipping management. Due to this, TL can leverage its shipping business, financial, socioeconomic, and political advantages and manage the ships effectively.

Moreover, the analysis of the costs and benefits in the findings and the discussion of the value assumptions associated with the current and new management companies produces significant savings and increases in benefits. The income of the shipping business should be evaluated using market demand to determine its value. In addition, the value of socioeconomic and political benefits remains the same, but they could contribute significantly to the development of society. To illustrate this point, utilizing the CBA methodology to study whether allocating resources maximize internal and external benefits. This led to cost reductions and enhanced benefits in each area reviewed by setting up a new shipping company. Towards this objective, a proposed alternative solution for the Government to consider a strategic investment in the maritime industry that is prioritized in the short term is to establish a new shipping company based on the objectives of the above research.

Finally, investing in maritime transportation through public shipping companies requires the commitment and responsibility of the Government of TL. For a country at the start of its economic development, the need to build its own fleet may become inevitable, and having a fleet of its own may make a country more concerned with maintaining it. Therefore, The shipping company is responsible for efficiently managing ships to provide maritime transport services to its citizens.

5.2 Research Restrictions and Future Work

In this study, the political benefit and asset value risks were revealed to have an untold value. This research should also consider quantifying asset, political and specialisation benefits value. The benefits will increase with development, and a more efficient maritime transport system will be able to meet market demands. Moreover, maintenance costs for ships in TL are enormous, with almost all vessel items being expensive. In order to find a new solution to a maintenance issue, a new study of maintenance costs is being conducted in the future to assess technical progress for reducing maintenance costs. This study also restricted private companies and their vessels engaged in national cabotage. However, it only applies to vessels owned by the Government of TL and operated for commercial purposes in national cabotage.

In order to make the development of a shipping company successful, policymakers need to focus not only on public shipping companies but also on private shipping companies by adopting the appropriate business models. Currently, the Government of TL is responsible for and provides operational services related to shipping management. However, in the future, such services will be provided by a private company to promote competition. Domestic shipping companies should be supported and encouraged by the government as well. As a result, the country will be exposed to more competition. Due to the complexity of the shipping industry, it requires considerable capital to establish a business. To maximize efficiency and excellence in the shipping sector, the Government should support the participation of local companies in the industry to create competitive pressure. There are several reasons why TL needs to develop its shipping industry, including economic and strategic considerations. To enhance the country's competitiveness in the shipping industry, developing long-term maritime connectivity plans, particularly those that enhance the country's maritime connectivity, is essential. TL shipping industry will use this as a reference to assess policies from a holistic perspective.

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Appendices

Appendix 1 – Costs Calculation

Develop, operate, manage and maintain passenger ships		2016	2017	2018	2019	2020	Total 5Y Budgets	Average Budget Allocation
C	Costs							
C1	Fuel Consumption	\$ 420,000.00	\$ 550,000.00	\$ 291,388.00	\$ 480,210.00	\$ 364,094.00	\$ 2,105,692.00	\$ 421,138.40
C2	Ship Maintenance	\$ 480,000.00	\$ 600,000.00	\$ 427,500.00	\$ 739,608.00	\$ 549,082.00	\$ 2,796,190.00	\$ 559,238.00
C3	Crewing and services	\$ 620,000.00	\$ 628,000.00	\$ 609,876.00	\$ 624,380.00	\$ 615,420.00	\$ 3,097,676.00	\$ 619,535.20
C4	Charter and services	\$ 400,000.00	\$ 502,500.00	\$ 240,000.00	\$ 200,000.00	\$ -	\$ 1,342,500.00	\$ 268,500.00
C5	Local and Overseas travel	\$ 38,000.00	\$ 52,000.00	\$ 28,121.00	\$ 58,434.00	\$ 7,960.00	\$ 184,515.00	\$ 36,903.00
C6	Operartional expenses	\$ 39,000.00	\$ 26,000.00	\$ 11,600.00	\$ 22,810.00	\$ 5,500.00	\$ 104,910.00	\$ 20,982.00
	Total	\$ 1,997,000.00	\$ 2,358,500.00	\$ 1,608,485.00	\$ 2,125,442.00	\$ 1,542,056.00	\$ 9,631,483.00	\$ 1,926,296.60

Appendix 2 – Income Calculation

Year	Income (Passengers & Cargo)
2016	\$ 580,118.00
2017	\$ 631,971.00
2018	\$ 528,274.00
2019	\$ 378,906.00
2020	\$ 516,415.00
Total (5Y)	\$ 2,635,684
Average/y (\bar{x})	\$ 527,137

Appendix 3 – Passengers & Cargo Movement

Year	Passengers (Pax)	Vehicles (Units)	Others (m^3)
2016	131,931	4,873	7,177
2017	144,250	7,088	4,924
2018	113,525	5,998	1,391
2019	89,699	7,210	646
2020	112,640	6,569	947
Total (5 Years)	592,045	31,738	15,085
Average/y (\bar{x})	118,409	6,348	3,017

Appendix 4 – Benefits Calculation

B1	Income		\$ 527,137.00
B1.1		Passengers and Cargo	\$ 527,137.00
B2	Social Benefits		\$ 1,562,393
B2.1	Connectivities	Dili-Oecusse-Atauro	\$ 789,393
		Dili - Oecusse (2x)	78,939
		8\$/Pax	\$ 631,515
		Dili.-Atauro (1x)	39,469.67
		4\$/pax	\$ 157,879
B2.2	Health Care Access	Dili-Oecusse-Atauro	\$ 500,000.00
		100 pax/y prevent life	\$ 500,000.00
B2.3	Access to Education	Dili-Oecusse-Atauro	\$ 191,400.00
		50 P/Y graduate at University	\$ 122,400.00
		50 P/Y finish High School	\$ 69,000.00
B2.4	Crime Prevent Rate		\$ 6,000.00
		30 Police for prevent demonstration	\$ 6,000.00
B2.5	Employees		\$ 75,600.00
		x Salary for 21 staffs = 300\$	\$ 75,600.00

B3	Economic Benefits		\$ 1,770,000.00
B3.1	Merchandise	Cargo Movement	\$ 390,000.00
		Truck Line (Dili Oecusse =1000)	\$ 250,000.00
		Truck Line (Dili Atauro =500)	\$ 75,000.00
		Others =2000 (m^3) Dili Oecusse	\$ 50,000.00
		Others =1000 (m^3) Dili -Atauro	\$ 15,000.00
B3.2	Family Living Condition		\$ 1,380,000.00
		2000 family spend 115 salary/month	\$ 1,380,000.00

Appendix 5 – Costs and Benefits Calculation

	Identify Costs and Benefits	Monetary Value (Av 5Y Budget Allocation)	Future Forecast		Compile data, Interpret and Analyse
	Develop, operate, manage and maintain passenger ships				
C	Costs	\$ 1,926,297			Optimal Decision, Accept. Therefore, Establishing Public Shipping Company in TL
C1	Fuel Consumption	\$ 421,138.40	NPV > 0		
C2	Ship Maintenance	\$ 559,238.00			
C3	Crewing and services	\$ 619,535.20			
C4	Charter and services	\$ 268,500.00			
C5	Local and Overseas travel	\$ 36,903.00	IRR > Discounted rate		
C6	Opearational expenses	\$ 20,982.00			
B	Benefits	\$ 3,859,530			
B1	Income (passengers & car	\$ 527,137.00			
B2	Social benefits	\$ 1,562,393.00			
B3	Economic benefits	\$ 1,770,000.00			
B4	Political benefits	\$ -			
B5	Assets value	\$ -			
Net benefits	undiscounted		NPV	\$1,933,233.40	
Net benefits	Discounted 5%		NPV	\$1,749,446.26	
			IRR	100%	

Appendix 6 – Current and Future of the Costs and Benefits

	Develop, operate, manage and maintain passenger ships	Current Cost and Benefits	Future Cost and Benefits	Observations
C	Costs	\$ 1,926,297	\$ 1,360,088.44	30% Cost reduction
C1	Fuel Consumption	\$ 421,138.40	\$ 421,138.40	Same
C2	Ship Maintenance	\$ 559,238.00	\$ 447,390.40	Reduce 20%/Y
C3	Crewing and services	\$ 619,535.20	\$ 433,674.64	Reduce 30%
C4	Charter and services	\$ 268,500.00	\$ -	Eliminated
C5	Local and Overseas travel	\$ 36,903.00	\$ 36,903.00	Same
C6	Opearational expenses	\$ 20,982.00	\$ 20,982.00	Same
B	Benefits	\$ 3,859,530	\$ 3,964,957.40	Increase 3% Benefit
B1	Income (passengers & car	\$ 527,137.00	\$ 632,564.40	Increase 20%
B2	Social benefits	\$ 1,562,393.00	\$ 1,562,393.00	Same
B3	Economic benefits	\$ 1,770,000.00	\$ 1,770,000.00	Same
B4	Political benefits	\$ -	\$ -	Same
B5	Assets value	\$ -	\$ -	Same

Appendix 7 – Vessels Specification

SHIP NAME	MV BERLIN NAKROMA	MV BERLIN RAMELAU
Owner	Government of Timor-Leste	
Flag	Timor-Leste	
Type of Ship	Ro -Ro Pax	
Port of Registry	Dili Port	
Year Built	2005	2019
Delivery	2007	2021
IMO No.	9335472	9911393
Call Sign	4WBN2	J8B6185
Class	BKI	DNV-GL
LOA	47.25 Meters	67.30 Meters
Beam	12 Meters	16 Meters
Draft	2.40 Meters	3.30 Meters
Total Crew	22 Persons	16 Persons
GRT	1134 GT	3400 GT
DWT	164 T	750 T
Max Spead	12 Knots	10 Knots
Passengers	300 Pax	380 Pax
Cargo	6 trucks/ 8 Cars	25 Truck / 36 Cars
Fuel oil	55 m ³	82 m ³
Potable Water	42 m ³	38 m ³
Lubricant Oil	3.5 m ³	4.3 ton