Sustainability, Challenge and Solution in Maritime Industries

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Research project Submitted in Partial Fulfilment of the Requirement

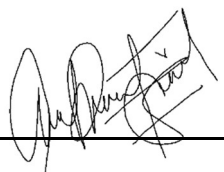
For the Degree of Master of Business Administration

Universiti Tun Abdul Razak

October 2023

DECLARATION

I hereby declare that the case study is based on my original work except for quotations and citations that have been duly acknowledged. I also declare it has not been previously or concurrently submitted for any other degree at Universiti Tun Abdul Razak (UNIRAZAK) or other institution.

Signature : 

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Date : 25th October 2023

ACKNOWLEDGEMENT

I am really happy and blessed to have completed my study with the University and Thank god for the blessing me in completing this Thesis. Secondly, to my family members who are always supporting me in my study after all the hard time I had been through, the sadness, struggle, happiness where they are always by my side. It was not easy to play so many role, I'm a single mother, a worker, a student in the same time. A special thank to my supervisor Asst. Prof. Dr. Farhana Newaz Tahmida who was help me out during the completion on this thesis, without her I might not able to conclude my analysis.

It was my dream to complete this study where I can upgrade myself to another level and give an aspiration to my childrens too. Last but not least, all the knowledge obtained were very valuable and the memories will always remains in my heart.

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By

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October 2023

The shipping industry is currently facing a number of issues, including latest International Maritime Organization (IMO) regulations, security concerns, geographical shifts, technology advancements, and a push for greater efficiency. While these difficulties are highly probable to have a broad variety of financial, environmental, and negative repercussions for the whole maritime industry in the near future, they might also be viewed as having enough rights to drive the maritime industry to a central role in efficiency due to the fact that has been recognised as a worldwide significant issue that has to be addressed. This could be a positive development for the maritime industry. There have been 17 environmental sustainability objectives adopted by UN members since 2015 as a programme of action to combat poverty and safeguard the earth so that human beings can live peaceful and happy lives by the year 2020's. Despite the fact that ships transport 90 percent of all goods carried around the world, worldwide shipping is one of the earliest businesses that provides income and enables nations to support economic growth.They might also be viewed as having enough rights to drive the maritime industry to a central role in efficiency due to the fact that has been recognised as a worldwide significant issue that has to be addressed. This could be a positive development for the maritime industry. Using literature reviews about sustainability in the marine industry as well as globalisation and stakeholder theory to guide its development, a questionnaire was created, and an interview was performed with the major stakeholders in this business. After doing an analysis of the interviews, it was discovered that the industry needs a more comprehensive strategy. On the one hand, comparable collaborations among regions, the third sector, non-governmental organisations, scientific community, and the general public are required; on the other hand, appropriate and innovative technology use. They might also be viewed as having enough rights to drive the maritime industry to a central role in efficiency due to the fact that has been recognised as a worldwide significant issue that has to be addressed. This could be a positive development for the maritime industry.

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

The research proposal attempts to conduct business research that comprises an organised, strategies for engaging and testing the hypotheses for qualitative objectives in pursuit of explanations with replies to the following statement of the problem. Maritime transportation is more economical, safe, secure, environmentally friendly, and sustainable than other modes. The global financial crisis, energy constraints, and ongoing environmental concerns (cutting carbon and sulphur dioxide emissions) have made these advantages more appealing. However, the high level of international, national, organisational linkages and communication networks creates a complex business situation (Celik and Topcu, 2009). So, for the maritime industry to excel as a method of transport Roumboutsos et al (2005). Maritime stockholders should follow not only international and national conventions, codes, regulations, and norms, but also organisational, operational, and proprietary processes.

It is used in research whereby the sustainability and greenhouse gas emissions are major challenges for all industries, it is estimated that the overall shipping generated 1,056 million tons of Carbon dioxide in 2018, accounting for approximately 2.89 percent of all global anthropogenic emissions that year, and that the proportion of international shipping constituted 740 million tons of Carbon dioxide in 2018. According to a variety of possible long-term economic and environmental business-as-usual scenarios, emissions by 2050 might be 90-130 percent of 2008 emissions. In the realm of commercial transportation, shipping via road transportation is characterised by the lowest quantity, potentially resulting in the least significant contribution to greenhouse gas emissions (Speirs et al., 2020). Nevertheless, the marine industry is inevitably impacted by the increasing focus on environmental considerations.

The maritime industry, specifically the shipping industry, emits a variety of pollutants that contribute to environmental pollution and have a direct negative impact on climate change. These pollutants include co2, so2, nitrogen oxide, carbon monoxide, organic compounds, and particulates such as black carbon. Nevertheless, unless suitable mitigation measures are implemented, the worldwide maritime industry is likely to continue to account for around 19% of carbon warming in the future (Gaillo, Morechi, Mazoccoli, Marota & Del Borgi, 2020). Moreover, it is worth noting that the transportation of goods across international borders plays a substantial role in the

exacerbation of climate change. Specifically, in the year 2015, international shipping accounted for a noteworthy 21 per cent of Carbon dioxide equivalents emissions, predominantly attributed to the release of black carbon emissions resulting from the combustion of marine diesel (Comer, Oolmer, Roy & Rutherford, 2017).

The substitute of Paris Agreement through Kyoto Protocol in Nov 2016 is expected to result in all decided-to-commit countries adopting a proactive stance to Reducing ghg emissions, particularly in terms of their financial targets, with the maritime industry playing a significant role in this.

Although the Paris Agreement does not currently include provisions for global shipping, the International Maritime Organisation (IMO), which holds authority over the maritime industry worldwide, is strongly committed to a global framework for implementing the agreement. The IMO has effectively enforced various measures aimed at mitigating carbon emissions within the shipping sector. The primary objective of the committees is to enhance the ship's energy efficiency and implement measures aimed at mitigating greenhouse gas emissions originating from the ship's exhaust. In the year 2020, Fancello and Serra conducted a study (Serra & Fancello) on a certain topic.

1.2 Problem Statement

According to the International Maritime Organisation (IMO, 2020), it is projected that global shipping emissions could experience an increase ranging from 50% to 250% by the year 2050. This anticipated rise is mostly attributed to the expansion of international maritime trade. As a result, The International Maritime Organization's (IMO) Marine Environment Protection Committee (MEPC) has given considerable thought to reducing GHG emissions from vessels and established in 2011 a package of technical standards for new ships and operations and maintenance reduction measures for all ships. This package of measures, included with a new Chapter 4 of MARPOL Annex VI titled "Regulations on ship energy efficiency," is composed of two major components:

1) The Energy Efficiency Design Index (EEDI), which require unique ships to comply with minimum mandatory energy saving overall performance, increasing over time through different phases.

2) Ship Energy Efficiency Plan (SEEMP), which demonstrates a method for shipowners to improving energy efficiency of both fresh and innovative ships using management procedures such as weather routing, trim and draught enhancement, speed optimization, just-in-time entry in ports, etc.

The regulations took effect on 1 January 2013 and implement to all ships with a gross tonnage of 400 or more, regardless of flag or ownership. These are the first-ever globally mandatory GHG reduction measures for an entire business segment.

In 2016, MEPC 70 made it mandatory for ships with a gross tonnage of 5,000 or more to retrieve and finalise fuel oil meter reading to their contracting state for accumulation and then submits to the IMO from January 1, 2019. MEPC will receive an annual report from the Secretary-General. The Committee will use this data to make informed decisions.

Besides the GHG emissions, the maritime industry faces a huge difficulty with ballast water management. Ballast Water Management Convention of a International Maritime Organization comes into force in 2017 to limit the spread of germs that could be damaging to various ecosystems. The pact incorporates the D1 and D2 guidelines. The D1 standard mandates the exchange of ballast water by ships in areas beyond port boundaries and across open seas. Conversely, the D2 standard imposes restrictions on the quantity of organisms that ships are permitted to discharge into the open sea. Additionally, ships adhering to the D2 standard must possess a ballast water management strategy, maintain a comprehensive documentation book, and obtain the Global Ballast Water Management Certificate. By September 2024, all vessels must demonstrate conformity with the D2 standard. (2020, IMO). However, implementation of the convention continues to face obstacles in the form of national regulations and legislation, as well as jurisdictional differences regarding ocean boundaries and limitations, managerial systems and technology, and navigation safety, all of which must be tried to address efficiently (Weintrit & Neumann, 2019).

Digitalization and automation are currently posing new problems for the industry. Nobody is surprised to hear about basic ideas such as intelligent shipping and remotely operated vessels, smart ports, and use of digital transformation for document exchanges in the shipping industry, as it is one of the most forward-thinking industries when it comes to leveraging technological advancements and artificial intelligence. To secure the endorsement of the primary stakeholders in the industry for the implementation of the proposed methods, it is imperative to thoroughly address numerous significant inquiries and apprehensions. The majority of shipments continue to employ paper-based document exchange because to a lack of infrastructure and confidence, mostly for security reasons, whereas the strategy can be adopted could be conducted via the network (Kapnissis, Leligou & Vaggelas, 2020).

Human factors are likewise a matter. Who will able to take responsibility for any problems that may arise during sailing or operation if the vessels and ports are

becoming more automated? " How much responsibility will the ship's cargo carrier have if something goes wrong on board? What about cyber-attacks or system complexity? These are just a few of the many topics that need to be investigated further with a more open mind (Alop, 2019).

Last but not least is the maritime industry's cost and investment. Shipowners face a huge financial burden when they must comply with regulatory changes and maintain sustainability and growth by implementing new technologies and trends that require investment from primary stakeholders, who aren't just shipowners, as the trade must fulfil its sustainable development commitments in environmental and social aspects of shipping (Ouyang, 2020).

1.3 Research Objective

- The study sought to identify the challenges that the maritime industry faces and how mitigation solutions have sustained the Maritime Industry to this day and will deliver better in the future.
- To ensure the long-term viability of the magnificent outcomes that have been achieved both for the scientific community and the maritime industry.
- Comprehensive research and modelling studies are being conducted, with consistent deliverables that meet or exceed the expectations of the maritime industry.
- The objective of this study is to analyse the influence of conventions and deals, which include the International Maritime Organisation (IMO), on the sector by means of enacting new legislation or making adjustments to current legislation.
- Establishing a global maritime industry knowledge center.

1.4 Research Question

Despite the considerable amount of research conducted on the subject of global sustainability in recent years, and the significant progress made in both the scientific community and the maritime industry, there has been a lack of emphasis on various aspects of sustainable development. This has hindered the attainment of effective solutions and the appropriate addressing of these issues. Economic concerns remain the primary issue, and the entire industry continues to face lot of challenges, while social and environmental concerns lag. In addition, the presence of geopolitical disparities and excessive regulation by regulatory bodies such as the International Maritime Organisation (IMO) or the European Union (EU) has posed ongoing threats to industries. These regulatory agencies consistently enforce rigorous rules without adequately considering the limitations of infrastructure and financial resources, thereby

perpetuating risks to the industries involved. For instance, the implementation of global regulations on sulphur emissions commenced in early 2020. These regulations mandate that all vessels must utilise a specific kind of ship fuel with a sulphur content not exceeding 0.5 percent. Failure to comply necessitates investments in infrastructure, facilities, and effective solutions. Consequently, shipowners face significant pressure to adopt one of three primary strategies: employing LSFO (Low sulphur fuel oil), assembling scrubbers on their vessels, or pursuing alternative approaches (Ouyang, 2020). Furthermore, it will ascertain if the existing and forthcoming regulations will lead to a significantly more sustainable ecosystem for the industry. Additionally, what tactics have been implemented to increase impact, and how may the most successful option be defined among them? Finally, the research will examine the consequences of legislation on shipping businesses, the marine industry, and their major stakeholders, determining if they are a threat or an opportunity.

The primary question of this investigation.

"Can the shipping industry build a sustainable strategy that is competitive?"

In addition, there was a sub-question that inquired about the most critical obstacles and how these challenges can be perceived as possibilities?

1.5 Significance of the Study

The aim of this study is to evaluate the existing challenges and strategies in the maritime sector, and to determine the effectiveness of internationally recognised organisations, conventions, and agreements, which include the International Maritime Organisation (IMO), in addressing these issues. Additionally, the study will examine the potential impact of innovative legislation or enhancements to current legislation on the industry.

1.6 The Organisation of the Study

Sections 1 through 3 of this paper are organised as follows:

Following the introduction and overview of the problem statement, as well as the overview of the objective and question of the study;

The subsequent section will assess the available literature and empirical data pertaining to various dimensions of sustainability within the Maritime Industry. This evaluation will encompass an examination of the opportunities, barriers, difficulties,

and potential remedies, with the aim of offering a comprehensive comprehension of the present state of affairs in this sector.

In the forthcoming section, Section Three, our attention will be directed towards the research methodology employed in this study. We will aim to provide a comprehensive understanding of the investigation by employing a qualitative research approach. This will involve the development of a questionnaire and the engagement of key stakeholders within the maritime industry. Additionally, we will conduct semi-structured interviews with a diverse group of 20 experts, including shipowners, vessel members, ports estates control authorities, marine attorneys, Class societies, charterers, and shipyards. The objective of these interviews is to identify and analyse the critical challenges confronting the maritime industry. The fourth section of the paper will provide a detailed account of the discoveries and outcomes derived from the research. Subsequently, the final section will briefly summarise the findings, limits, and suggestions.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The concept of sustainability is widely discussed in various industries, including the shipping sector. Recent studies in this field have mostly examined the usage of alternative fuels, which include Methanol, LNG, or Ammonia, as viable options for reducing greenhouse gas (GHG) and carbon dioxide (CO2) emissions in vessels. Multiple studies have provided evidence that carbon emissions within the marine sector arise from the combustion of diesel in ships, as well as the use of petroleum technology in other vessels and the terrestrial aspects of maritime operations. Additionally, there is a considerable body of research on the investigation of techniques for lowering emissions from various types of ships, including includes studies on options for reducing emission from the port side as well. These investigations also cover the use of Carbon Zero shipping the use of alternative marine fuels such as LNG the implementation of maritime sector strategies and legislation and the penalty charges for non-compliance in the maritime sector. Furthermore, the International Maritime Organisation (IMO) has been actively enacting and implementing a range of legislations and precedents on behalf of the United Nations. These include regulations pertaining to carbon dioxide (CO2) emissions and ballast water management, MARPOL as an international convention over the prevention of ship-borne pollution, SOLAS as the International Convention for the Safety of Life at Sea, and the mandatory Energy Efficiency Design Index (EEDI).

2.2 Theoretical Foundation

Apart from regulatory authorities such as the International Maritime Organization or the European Union, market forces, the danger of resource scarcity, and environmentalist concerns are the key drivers of durability in this industry (Serra & Fancello, 2020). New sulphur emission limitations of 0.5 percent globally and 0.1 percent in IMO-designated emission control zones are one of the new rules that took effect in January 2020. To achieve these standards technologically, three solutions exist: utilising LSFO instead of HFO, employing filtration systems, or using LNG so rather than fossil fuel. Furthermore, there exist supplementary strategies in the maritime industry, including operational measures that prioritise ship speed management through the practise of slow steaming to mitigate fuel consumption, as well as route optimisation. Additionally, market-based measures can be implemented,

such as the imposition of taxes on ships utilising heavy fuel oil (HFO), or the provision of incentives for ships employing fuel substitutes or other technological advancements (Serra & Fancello, 2.

In summary, among the aforementioned technological breakthroughs, the substitution of Heavy Fuel Oil (HFO) with Low Sulphur Fuel Oil (LSFO) stands out as the most straightforward solution. This is primarily due to its little impact on vessel operations, as it necessitates only minor adjustments to the fuel lines while enabling the vessel to maintain its efficiency when sailing. This will not take additional time, and shipping companies and ship management companies can enforce this to meet their sulphur emission control obligations (Ouyang, 2020).

Another alternative is to install Exhaust Gas Cleaning Systems (EGCS), often known as scrubbers, on the vessels. Scrubbers are utilised as pollution mitigation mechanisms, designed to cleanse the emissions produced by engines with internal combustion, auxiliary engines and boilers. These devices employ either clean water in closed-cycle control systems (suitable for short lengths) or seawater in easily accessible configurations to effectively eliminate sulphur dioxide gas from the exhaust. Due to the substantial disparity in cost between Heavy Fuel Oil (HFO) and Low Sulphur Fuel Oil (LSFO), shipowners face the potential burden of significant expenses in the long run. This discrepancy is expected to further escalate in 2020. Consequently, numerous shipowners have endeavoured to set up scrubbers on their vessels, enabling them to persist in procuring HFO. It is worth noting that the value for each unit of scrubber depends on the specific prototype and type, typically ranging from USD 3-5 million. Nevertheless, as the disparity in costs between Heavy Fuel Oil (HFO) and Low Sulphur Fuel Oil (LSFO) or Very Low Sulphur Fuel Oil (VLSFO) increases, the allure of such investments intensifies, perhaps resulting in a shorter payback period. According to the United Nations Convention On Trade (2020), the Straits Steamship Company possesses and manages a substantial collection of vessels fitted with scrubbers, with a total count exceeding 50 vessels.

Finally, the use of alternative fuels such as LNG or methanol is being considered as well. According to several research efforts, by burning LNG instead of HFO or MDO, CO2 emissions can be reduced by approximately 10–30 percent when compared to these fuels. The primary reason for employing LNG is to comply with the International Maritime Organization's sulphur emission control requirement. At the beginning of 2020, there were 172 vessels that were burning LGas, and this figure climbed to 318 vessels by the end of the year.

Challenges in implementing new orders and directions.

Although each organisation may choose one of the previous section options or take a hybrid strategy, there are still important issues to be addressed. For example, when LSFO is in short supply, bunkering businesses and refineries blend HFO with VLSFO to achieve the statutory sulphur level compared with fewer than 0.5 percent. This, however, may violate additional standards governing thresholds, mineral composition, and stability, posing a safety concern. Conversely, the utilisation of a scrubber has the potential to decrease the sulphur content in heavy fuel oil (HFO); yet, it results in the contamination of saltwater due to the consumption and subsequent discharge of either groundwater or seawater during each operational cycle.

If shipping companies opt for the new option and subsequently employ LNG as fuel, extra obstacles may arise. To begin, they must convert the ship, which might cost between USD 25-30 million plus the cost of drydocking the vessel for three to four months ("Converting LNG ready box ship," 2019). ("LNG box ship conversion still," 2020). Moreover, the expense associated with manufacturing the structure is significantly higher when compared to the expenses of fabricating a conventional vessel that operates on fuel oil. For example, CMA CGM estimates that the expense of a 20,000 (Twenty-foot Equivalent Unit) cargo vessel powered by LNG is around USD 160 million, while the rate of a 22000 TEU cargo vessel powered by fuel oil is approximately USD 140 million (Ouyang, 2020). Additionally, because the tanker on such a vessel is larger than a typical fuel tank, there will be less room for cargo storage, as well as port and LNG bunkering facilities. Although numerous terminals worldwide have integrated the infrastructure necessary to refuel ships with LNG, including Hammerfest, Kochi, the Dominican Republic, Montreal, Barcelona, Panama, and Yokohama, and several other docks in Germany, and Europe are planning to do so, only Singapore, Rotterdam, and Zhoushan port currently have the optimal infrastructure for LNG bunkering.

Furthermore, shipping companies will be able to cut emissions in the near term by utilising operational methods like as slow steaming, but they may face certain problems along the way, such as delay at the port discharged or loaded at speed design that is ideal. Moreover, a primary obstacle associated with the implementation of a tax or incentives mechanism is in its potential to stimulate an increase in emissions production, up to the predetermined maximum permissible threshold set by governmental bodies through the establishment of an emissions pricing.

2.3 Empirical Research

Shipowners are currently facing a significant challenge due to the escalating operating costs, despite the existence of certain initiatives like the Poseidon fundamentals. These initiatives offer financial support to shipowners who demonstrate a commitment to sustainability practises. Additionally, the Bunker Adjustment Factor (BAF) is implemented to transfer the increased bunker expenses to the shipowner or charterer. Nevertheless, the issue of rising operating costs remains a pressing concern for shipowners. Moreover, recent study has raised uncertainties over the environmental advantages of liquified natural gas (LNG) in terms of its life-cycle greenhouse gas emissions. However, it is important to note that these findings have not been conclusively confirmed and further investigation is needed to fully understand this matter. This topic presents both benefits and drawbacks, as discussed by Pavlenko et al. (2020). For example, one study indicated that replacing fuel oil with liquefied natural gas (lng natural gas will not satisfy the International Maritime Organization's GHG goal and may even have a negative climate impact. While it may reduce CO2 emissions, it also releases Methane, which is a much worse long-term pollutant than CO2. Additionally, economic expansion in LNG facilities on vessels and at ports will hinder future transitions towards low-carbon even zero-carbon fuel. Simultaneously, there is widespread worry among stakeholders about the new restrictions and their potential detrimental impact on business and profit on a worldwide scale.

Based on these claims, this study aims to investigate whether the maritime industry can adopt a more environmentally friendly approach beyond the substitution of gasoline and diesel with LNG, bio-fuels, or similar alternatives. Additionally, it seeks to examine the potential risks posed to the shipping sector by new regulations, the influence of globalisation on such regulations, and the extent to which key stakeholders can alter their mindset to perceive sustainability as a viable option rather than a mere obligation.

In addition, global concerns such as the drop in oil prices, the Corona epidemic and their effects in the marine sector are important to consider, particularly in terms of long-term viability and sustainability. Global difficulties, like every challenge, have both negative and positive effects for some stakeholders at the same time, as well as opportunities for other stakeholders. When global shipping suffered a major setback during in the economic meltdown in 2008-2009, it resulted in significant losses, including a drastic decrease in fares, empty port facilities, inactive ships without

cargoes, worker and vessel layoffs, economic difficulties, and bankruptcy, all of whom have a cumulative impact throughout the industry and also many countries, whilst also Malaysia ports were able to catch up with their external competitors in terms of developing depots at various ports and trying to implement more infrastructure.

The coronavirus illness 2019, often known as the Covid-19 pandemic, has impacted several enterprises throughout the world. This issue is partly a result of the lockdown measures adopted by the countries that have been affected. Most economic activity were temporarily suspended until the outbreak was contained as a result of the entire or partial lockdown implemented by governments all around the world to manage the pandemic. The decisions taken by the authorities of each impacted countries vary depending on a variety of circumstances, including the financial viability of the country in question. According to this report, the Covid-19 epidemic has had a significant influence on marine industries, particularly shipping. It has also had an impact on fishing, maritime tourism, and the oil and gas industry. There are supplementary obstacles that arise, including crew change complications resulting from travel limitations, as well as the upkeep of inland operations due to border closures. These factors have had an adverse effect on the movement of cargo to and from ports. It is imperative to pragmatically tackle these concerns, emphasising the utmost need of enhancing collaboration and engagement among the primary stakeholders within the global shipping sector in order to attain desired outcomes.

2.4 Proposed Conceptual Framework

Proposed Conceptual framework would be base of three basic pillars: economic, environmental, and social. These pillars have been applied to a wide range of industries, including the marine industry, with varying degrees of success. It is the environmental factor that is most frequently mentioned in the literature, with the vast majority of the debate concentrating on the boats and port infrastructure. The social aspect of the maritime sector has garnered greater attention in recent times, particularly concerning the individuals residing in ports globally, including the workforce and their families. These individuals face significant risks and endure profound consequences due to the emissions emitted by ships and other pollutants stemming from port activities. Such environmental factors may contribute to the spread of infectious diseases. In addition to the aforementioned factors, the presence of bias among crew members, the presence of cultural diversity, challenges pertaining to security and protection on board vessels, and other associated issues are significant

social aspects within the maritime sector. These aspects will be further explored and analysed in subsequent sections.

Likewise, the economic aspect of sustainably in the maritime sector is inextricably linked to the other two dimensions of sustainability. One of the most significant financial challenges faced by the shipping industry is the need to sustain competitiveness by simultaneously reducing transportation costs and investing in new green technology. This challenge arises due to the additional financial constraints imposed by regulators and charterers, who require the industry to meet certain environmental requirements. There have also been numerous initiatives and research projects to intellectually clarify or experimentally find and study how globalisation impacts sustainable in terms of the environment, social, and economic factors. However, despite all of these attempts, there is yet to be a consensus on how to best clarify the potential consequences (Bilgili et al., 2019).

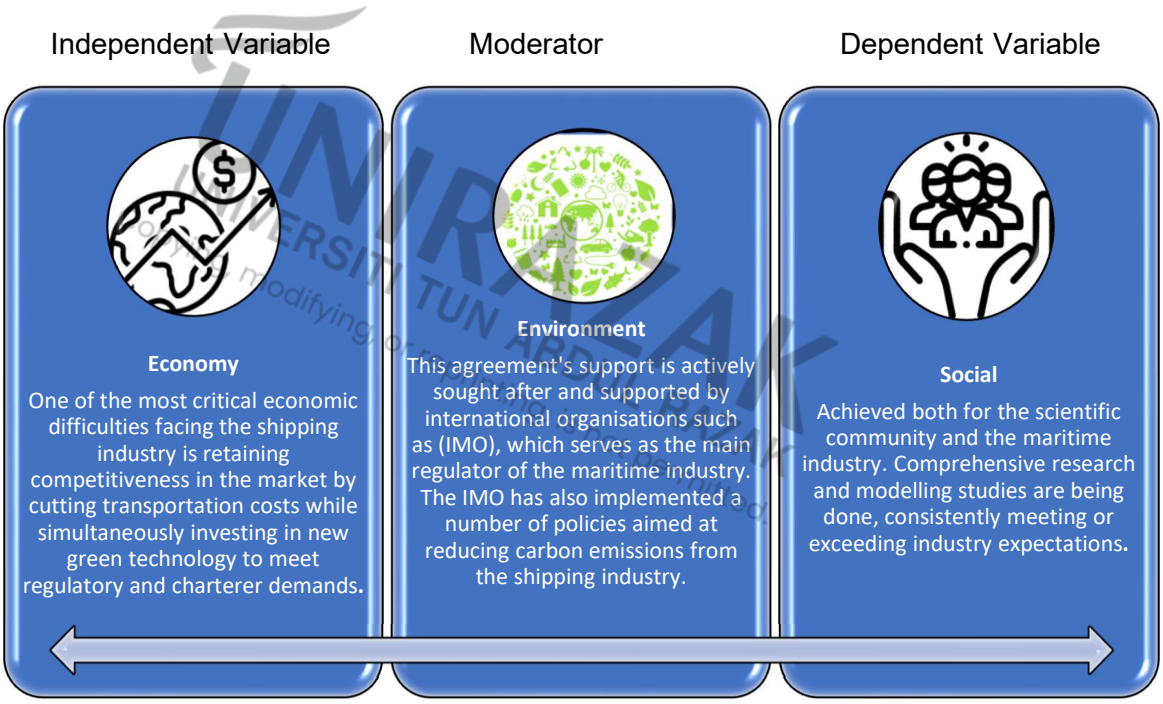

Figure 1: Proposed Conceptual Frameworks

2.5 Hypothesis Development

As a result of technological advancements, collaborative partnerships, and interdependence between countries, globalisation is projected to assist in reducing destruction of the environment, economic disruption, and social difficulties. Alternatively, this firm belief may shift backwards and become inverted, as is the case in the current scenario. In order to determine whether globalisation contributes to long-

term sustainability and whether improvements are required, it is critical to do this research.

In recent decades, there has been widespread concern about the negative impact of maritime logistics on the local ecosystem, prompting theroritical, industry experts, and the major stakeholders inside the maritime sector to consider this a critical topic that necessitated additional resources and time (Koilo, 2019). Despite ongoing attempts and innovative measures to mitigate the adverse effects of maritime traffic, the condition of the maritime ecosystem and its resources continues to deteriorate, despite these endeavours and initiatives. The collaboration between various stakeholders in the maritime industry, including the regulatory bodies, shipowners, port states, flag states, and classification societies, alongside the involvement of the field of science, the both the public and private the business community, and the financial system, is crucial for identifying and implementing practical solutions to enhance work safety in the maritime industry and protect its passengers.

It should be noted, however, that focusing just on emissions does not rule out other ecological consequences in the water. There exist several significant issues pertaining to the ocean, encompassing ship tragedies, oil spills, and water contamination, which necessitate careful consideration by the relevant specialists. Based on available data pertaining to European flagged vessels operating within the territorial seas of the European Union in 2016, it was observed that about 3300 maritime incidents occurred, involving a total of 3669 ships, throughout the specified one-year timeframe (2016). Out of a total of 3669 vessels, 36 were lost, leading to a cumulative count of 115 casualties. According to Monios and Jiang (2020), a significant proportion of these failures, specifically 62 percent, may be attributed to human error. Furthermore, the consequences of these accidents included water contamination, with 278 incidents involving the leakage of the vessel's tanks and residual oils into the surrounding environment.

The primary aims of creating hypotheses are to systematically handle the identified challenges in a practical manner and to efficiently devise solutions for the immediate and intermediate timeframes. This approach will facilitate the overcoming of hurdles. Various stakeholders within the maritime sector are collaboratively striving towards the attainment of these objectives. In addition, the shipping sector, specifically shipbuilding, shipping firms, and port authorities, is striving to integrate sustainability principles into its activities. The International Maritime Organisation (IMO), serving as

the principal governing body for the industry, is exerting pressure on key stakeholders to facilitate the adoption of these progressive measures. The primary stakeholders, in addition, have been attempting to take the appropriate activities in order to achieve these standards while also achieving their financial objectives around the same time.

Although these objectives could be achieved, there'd be a slew of problems and additional expenditures that would need to be addressed in order to achieve them. In addition to this, the stakeholders possess a wide array of purposes and interests, encompassing natural, social, and economic considerations, all of which can be in conflict with one another. To give you an example, a ship that is required to register under the badge of Liberia and whose owners are from Greece and which transports cargo respectively Persian Gulf ports with crew members from Russia and The united states while being managed by a Russian oligarch, has already involved a variety of stakeholders with varying objectives.

Within the maritime sector, there exists an ethical dilemma among the key stakeholders, who play a crucial role in implementing sustainability strategies. These stakeholders include the International Maritime Organisation (IMO), shipbuilding industry, vessel workers, The harbour nations Govern, Flag nations, regulatory bodies, and nation-states. The breach of ethics is observed in five significant domains: the protection of the environment, urban development, labour practises, resident interests, and economic growth and profits (Galvao, Wang, and Mileski, 2016).

Consequently, the task of merging pertinent parties and domains into a unified entity and executing a comprehensive strategy within the maritime business presents challenges. The current governance model is also incapable of meeting the current needs of the maritime sector's environmental, sociocultural, and economic development. Finding a practical and beneficial solution to the problems and conflicts that arise as a result of the complexity of governance subjects and the wide range of main players, all of whom are interdependent on one another, has been one of the major constituents of protection of the marine environment authority in diverse nations (Jiang, Chen, McNeil, Dai, 2019).

Organizations and businesses should be organised in such a way that, in conjunction to maximising shareholder profit, they maximise prosperity and generating profit for all of its stakeholders. This is in accordance with the stakeholder theory. According to Venkataraman (2019), the sustainability model has been discussed from this angle,

integrating the environment and other model constituents like corporate responsibility. The second component of the equation is of utmost importance, despite its frequent neglect and tendency to prioritise financial gains for a select few stakeholders (Schalteger, Hörisch, and Freeman, 2017). In this scenario, several inquiries arise.

> For instance, how can the IMO expect Africa to meet its duties in terms of sulphur emission management when most African ports lack adequate infrastructure and many people insufficient availability of clean water?
>
> In light of varying national or regional priorities that may not align with sustainability objectives, how can the International Maritime Organisation (IMO) effectively pursue its goals of mitigating greenhouse gas (GHG) emissions?

When an engineering executes and sustains a successful strategy that provides economic, social, and environmental benefits all at the same time, it is said to be sustainable (Venkataraman, 2019). Consequently, this research examines strategies for mitigating possible disputes of interest among important players in the maritime sector through the implementation of practical approaches and the negotiation of mutually beneficial agreements aligned with their respective demands and objectives.

2.6 Summary

In conclusion, it is important to note that, according to current scientific understanding, available methodologies, and proposed solutions, the maritime trade is limited in its ability to make a substantial contribution to the sustainability challenge. To effectively address this issue in the long run, further research, enhanced collaboration, and the development of improved options and strategies are necessary. These efforts are crucial in order to fill existing gaps, tackle pressing concerns, and enable the industry to attain sustainable development while maintaining its competitive edge. The current available alternatives lack sufficient feasibility to effectively mitigate environmental issues and simultaneously address the socioeconomic considerations of the relevant stakeholders. To attain success, it is imperative for the primary actors in the sector to engage in innovative thinking and consider diverse methodologies through the utilisation of emerging technology, sharing of information, and adoption of robust tactics. In order to attain success, individuals should establish pragmatic objectives rather than idealistic ones. Additionally, they should contemplate strategies for maintaining their positions after attaining each milestone and addressing any existing

gaps. This pertains not only to economic considerations, but also to environmental and societal considerations.

Prior to completing this chapter, it is crucial to acknowledge that although sustainable development in maritime sectors has already been extensively discussed and advocated in literature from diverse perspectives, and practitioners have endeavoured to determine gaps and tackle issues by proposing various approaches and techniques, the literature review reveals that the sector continues to face a deficiency in comprehensive and cohesive frameworks capable of addressing the diverse challenges it encounters. would like to know more about the effects of climate change on biodiversity. When addressing an issue, it is important to consider that the solutions proposed in existing literature may inadvertently give rise to further challenges within the business. Furthermore, it is worth noting that unrealistic objectives may be established by those who lack the necessary authority or professional expertise in the fields of economics or engineering. This will give rise to the inquiry into how the shipping sector can effectively adopt a competitive strategy for sustainability that is both economically advantageous and environmentally sustainable. This paper aims to enhance understanding of the main concerns of key players in the industry by providing comprehensive knowledge and insights. Additionally, it will analyse the approaches of various stakeholders in addressing challenges and evaluate their responses. The objective is to obtain a more precise understanding of the current state of the maritime industry and ultimately provide a well-informed answer to the research question.

CHAPTER 3

RESEARCH METHODOLGY

3.1 Introduction

The main objective of this assignment is to determine the methodological approach that will be employed to examine the sustainable development of maritime sectors, along with the challenges and opportunities within the maritime industry. Additionally, the rationale for selecting the specific methodology will be provided, followed by the development of a research design based on the analysis. Furthermore, this study will comprehensively outline the sampling methodology employed, elucidate the data acquisition procedure, and present a thorough analysis of the study's findings. In conclusion, this study will examine the accuracy of the data, along with its constraints, while also considering the ethical ramifications of the results. The main aim of this type of research study is to ascertain deficiencies within the maritime sector with regards to environmental, social, and economic aspects. Additionally, it seeks to identify the most notable obstacles and challenges, along with potential solutions to address these concerns.

The primary inquiry of this study.

What strategies may be implemented by the maritime sector to foster competitiveness while also promoting sustainability?

In addition, there was a supplementary query that might be formulated this way: What exactly are the primary issues of utmost importance, and how can these difficulties be perceived as potential opportunities?

Sustainable construction is a popular topic for research projects that examines the positive impact of social and environmental systems on one another and assesses what and to which extent those interactions affect sustainability (Kates, 2011). The qualitative methodology is commonly utilised in the study of the human behaviours and social sciences, as it allows for the exploration of individuals' views and opinions, which may be challenging to capture through quantitative methods such as numeric data analysis or mathematical modelling (Guest, Namey, & Mitchel, 2013). Moreover, this approach is applicable to other categories of research inquiries that aim to investigate the mechanisms, timing, and nature of events in order to gain a deeper understanding, rather than only documenting the frequency of a certain phenomenon. (Basias & Pollalis, 2018). Furthermore, it is widely used to respond to questions from the

participants' views, inner experiences, and to conduct in-depth study on their opinions (Hammerberg, Kirkman & De lacey, 2016). In addition, this methodology has the potential to facilitate a deeper analysis of the people and participants' studies within specific contexts and environments. This, in turn, enables a more nuanced exploration of diverse human objectives and perspectives. The flexibility of this approach is exemplified by the option to employ a semi-structured or unstructured interview format, which affords participants a sense of autonomy and facilitates the expression of their genuine thoughts and ideas (Rahman, 2016). Furthermore, as the researcher is tasked with extracting the genuine significance of the content and reaching conclusions based on their own perspective and background, the resulting findings may possess a greater sense of authenticity. However, it is crucial for researchers to remain watchful in order to mitigate any subjectivity. In addition, qualitative research methods have been consistently employed to investigate and evaluate technological phenomena, commercial concepts, and associated challenges. This approach is deemed essential in order to conduct a thorough and comprehensive survey that facilitates a comprehensive understanding of the subject matter (Baskerville, Cavallari, Hjort-Madsen & Pries-Heje, 2010).

In conclusion, the qualitative methodology offers valuable contributions to the investigation of complicated ideas that are challenging to assess quantitatively. It is particularly useful in uncovering phenomena that require the genuine perspectives and voices of respondents. However, researchers must remain vigilant in avoiding bias and strive to maintain objectivity throughout the research process. In light of temporal limitations, a virtually conducted semi-structured interview was conducted with a representative sample of key players within the shipping industry. The aim was to gather essential insights into the current challenges faced in the maritime sector, as well as potential solutions. In order to conduct a comprehensive analysis of problem solutions from many perspectives, a cohort of 20 industry professionals has been carefully chosen to partake in this project, as outlined below:

1) Officer in Charge in Maritime (Royal Navy Malaysia)
2) Middle rank in Maritime (Malaysia Maritime)
3) Expertise in Shipping industry (ship agents, brokers, marine legal, port states and regulatory agencies as the stakeholder)
4) Shipowner Contractors & Main contractor in Shipping industry (charterer)
5) Oil & Gas practitioner

6) Public

The present study employed a methodology that facilitated the examination and juxtaposition of the firsthand experiences and perspectives of key stakeholders in relation to tangible sustainable development and deficiencies within the global shipping sector. Additionally, it shed light on prevailing legislation and policies, as well as potential obstacles and prospects. Moreover, the insights and proposed remedies put forth by the interviewees may lead to the implementation of novel approaches within the industry.

3.2 Research Design

The phenomenological technique was used in this investigation. It is necessary to mention the following points in order to justify the application of this approach:

The method known as phenomenology is a commonly employed qualitative research methodology that focuses on the exploration and interpretation of lived experiences shared by individuals within a particular group. The research on phenomenology can be characterised as follows: The major objective of this methodology is to establish a clear definition of the phenomena under study by elucidating the interpretations of terms, experiments, and observed circumstances as comprehended by a specific group of individuals (Creswell, 2013). Phenomenology, a branch of interpretivism, is characterised by its rejection of positivism. It posits that direct understanding and immediate experiences in information exchange are more reliable and genuine compared to interpretations or indirect explanations. Phenomenology is alternatively referred to as non-positivism inside certain academic spheres.

In this study, the author employed a methodology involving interviews with a cohort of individuals who possessed prior knowledge and recent information pertaining to a certain incident or experiment. In addition to the aforementioned points, the interview encompassed two overarching inquiries, namely: An experiential engagement with the conceptual understanding and empirical examination of the phenomenon, along with the contextual factors and situational variables that impact the observed occurrences. The structure of individual viewpoint and subjectivity holds significance within the field of epistemology. This encompasses the function of personal vision and a meaning, which form the basis for adopting a phenomenological research strategy in comprehending the surrounding reality. The utilisation of the phenomenological technique in this study is justified by the distinctive nature of sustainability within the

marine industry, which encompasses a diverse range of stakeholders, each possessing their own perspectives, lived experiences, and vested interests. This research incorporates a qualitative technique to explore the multifaceted challenges and issues pertaining to global shipping, encompassing social, environmental, and economic dimensions. By employing this approach, the study aims to foster novel interpretations and enhance understanding of these complex phenomena, which stem from a diverse array of causes. Despite the presence of certain limitations, such as challenges in data assessment and explanation, as well as the complexity of adjusting procedures and conducting research, and the perceived unreliability from the perspective of lawmakers due to potential interpretations and biases, this methodology also possesses its own set of merits and demerits. This approach has several advantages, including the ability to observe the changing flow over time, the simplifying of methods to make it simpler to recognise the participant's objectives, the assistance in framing new problems and impediments, and the generation of new theories.

3.3 Study Population and Sampling Procedures

Sampling technique was used in this research study, and it is a part of the non-sampling strategy that was used to collect the data. This approach is commonly known as selective, subjective, or judgmental sampling within academic circles. In simpler terms, it is a deliberate method that involves carefully choosing participants who possess examples that relate to expertise, knowledge, and a connection to the study they are involved in. In contrast to other sampling procedures, this particular approach, classified as a non-random method of sampling, does not necessitate an established amount of respondents or a certain theoretical framework, as is the case with alternative sampling methods. The primary goal of this approach is to address the research questions by selecting a group of participants who are capable of answering the question because of their experience or knowledge. This method is used to answer research questions in a variety of fields.

It is a popular strategy in qualitative research methodologies since it aids in the collection of the specific indicators through the most relevant sources that are readily available. There are several advantages to using this method, including having a large range of methodologies, being cost-effective, saving time, and being ideal for exploratory study design.

Semi-structured interviews were undertaken with key players in the marine industry to enhance understanding of sustainability within the maritime sector, including potential

challenges and opportunities that may arise. Among the key stakeholders in the sector are shipping companies, vessel owners, charterers, ship agents and brokers, as well as maritime law organizations, flag states, port governments, classification organisations, and regulatory bodies. This necessitated the selection of a sample group from each institution, while the respondent had to have a sufficient amount of prior expertise in the maritime industry. Moreover, the significance of small firms or lesser-known stakeholders in the maritime business has been disregarded by previous literature projects. This oversight is notable considering their crucial contribution to the development of strategies within the maritime sector. As a result, interviews were conducted with both renowned organisations and organisations, as well as lesser-known or tiny businesses, with the aim of obtaining comprehensive insights from diverse perspectives and across various contexts. The researcher has accumulated nine years of experience in the shipping sector, namely in the subject of maritime logistics. As a result, he has successfully cultivated favourable professional connections with all relevant stakeholders. Prominent entities, such as the MISC or MMHE, have been contacted through the professional networking platform LinkedIn. In an effort to get favourable feedback.

Except for one case, all 8 interviews were conducted virtually via video call, and used the Microsoft Teams, or Google Meet, platforms, The choice of communication channel for the participants' sessions varied based on their individual request and choices with the exception of a single instance where the session was conducted via phone using either the Microsoft Teams or Google Meet platform In addition, most of the interview lasted approximately 50-55 minutes on average. Of course, in other instances, such as when conducting interviews with the Royal Malaysian Navy, it took approximately one and half hours. The researcher played an active role in the interviews by asking questions and also having to explain some facts or evolving or creating some questions in response to the participants' responses. However, the researcher attempted to maintain objectivity throughout all of the interview sessions and did not share any personal beliefs or points of view with the participants during the interviews (Refer the question Appendix A)

In conclusion, all respondents were informed about the prospect of transcribing the interviews and consented to their names being included if applicable and to their thoughts being included in the research proposal paper. Separate consent forms have been provided to each respondent in order to collect their documented confirmation as well.

3.4 Data Collection Method

In carrying out extensive the sub interview sessions, all the respondents will be provided with a draught of the questionnaire 2 weeks in advance, allowing them ample think more deeply about them and conduct additional research if necessary. Every one of the interview processes are scheduled to take place between the 1st of August and the 1st of September in 2023.

A research paper's data analysis section is one of the most significant sections, and it is necessary to devote more time and effort to this section since, if the wrong technique is taken, the outcome may not be accurate and valuable. Making the data ready for detailed examination is the first step in qualitative research method, followed by refining the classification of the data into concepts through a inscribing and categorising process, identifying patterns or relationships, and finally demonstrating them through discussion, charts, or tables as the final step in qualitative research method. The primary distinction within qualitative evaluation of data and the analysis of quantitative data lies in their respective foundations. Qualitative analysis of data is rooted in textual sources rather than numerical data, with researchers primarily focusing on the content of words, which may encompass interviews, observations, or visual representations. The most accurate methodologies for data analysis encompass the analysis of documents, analysis of narratives, narrative research, grounded theory, and interpretive phenomenology, which may also be known as frameworks or thematic analysis in some contexts. As an overall view each of, subject analysis is mostly used to examine ideas by studying documents or behaviours, which is either phrases or pictures, in order to determine their validity. Discourse analysis is the process of analysing meanings and languages in the context of their social environments. The narrative analysis assesses the stories that have been gathered by the researcher through order to fully understand the significance of the respondents and to address the research questions posed by the research question posed by the researcher. The grounded theory technique initiates the process of pattern or hypothesis formation by examining one point of data or a small cohort of individuals within various situations in which they are observed.

However, throughout the course of the investigation, the researchers may come across new patterns, which they must investigate further in order to discover a pattern that fits

all. Eventually, the thematic analysis will be used to figure out primarily the experiences of respondents, their perspective on the incident, and their information or understanding on the event from the qualitative data that has been collected, which may be connected to those respondents in order to determine a pattern. The most significant shortcoming of the thematic method, on the other hand, is subjectivity, as well as the researcher must take this into consideration and prevent this as much as possible while interpreting and analysing the data that has been collected. On either hand, it gives important attributes and provides various gates that will be used in the future when performing different types of analysis procedures. It is also a method rather than a methodology, which implies that it's not bound to definite epistemology or else theoretical framework as other methodologies are, which makes this approach incredibly efficient.

Nearby are a number of different approaches for implementing thematic analysis, some of which overlap with the other types of qualitative analysis methodologies. Accordingly, the six-step procedure developed by Braun and Clarke was followed in order to avoid complications or mistakes, since it provides an unambiguous road map for theme analysis method implementation and a skeleton for thematic analysis method implementation. Taking another crucial activity before introducing these six phases is essential; this involves choosing between utilising either the inductive or deductive approach; and also deciding whether a semantic or latent approach is to be employed as a topic.

Thematic analysis used to find ideas; an empirical technique would be used for experimental investigations, which employ data to construct a thesis and framework; and each deductive methodology should be used only when the researcher is certain of the outcome. It is possible that the researchers will become imprisoned if they continue to use the questions in interviews as a theme, according to Clarke and Braun. Rather than being examined, the results were tabulated in that scenario rather than being evaluated. Moreover, a clear distinction exists between semantic and latent techniques, where the latent method operates at a different level compared to the semantic approach. If the researcher takes a conceptual approach, she will study only the data's substance and will disregard everything else save the respondent's remarks and explanations. The researcher uses a latent approach, she will attempt to uncover hidden meanings in the respondent's statements or the hypothesis, wish, or desire that may be concealed within the words.

Because of the aforementioned factors, and when the transcribing of the interviews had been completed, a theme analysis was carried out on the data. Additionally, and to exclude any possibility of subjective or prejudice, a conceptual method was used to assess simply the raw data, rather than generating any judgments or assumptions, in contrast to other methodologies. Additionally, the utilisation of a deductive approach was employed to scrutinise the data, as the theoretical framework and existing literature provided a solid foundation for anticipating the major themes that were anticipated to emerge throughout the data analysis phase.

3.5 Operationalisation and Measurement

Previously, we discussed how this research article conducted theme analysis using the Braun and Clarke 6-step method, which was developed by Braun and Clarke.

The first stage involved familiarising oneself with the dataset. Prior to engaging in any further actions, the researcher initially constructed a transcript of the recorded vocalisations by utilising suitable computer software. Subsequently, the researcher refined the transcripts in a suitable manner to render them prepared for subsequent analysis. Furthermore, certain aspects have been duly acknowledged and carefully deliberated upon in order to formulate an appropriate strategy for the forthcoming stages.

The coding phase constituted the second step inside the procedural framework. In this part, the researcher effectively organised the respondent's insights (data) in a systematic manner, demonstrating successful coding and selection of relevant and favourable information for the research purpose. Extraneous and irrelevant information was excluded, enabling the researcher to substantiate the content. The principal tool utilised for this purpose were the questionnaire approach and its sub-questions. These sub-questions provided guidance to the researcher in categorising specific areas of the information that were deemed significant in addressing the research objectives. Upon completion of this part, the researcher managed to gather and organise a comprehensive assortment of pertinent points and concepts.

The search for ideas and the creation of themes were the third steps. The concept of a theme has been discussed previously, and it is a model that assists researchers in identifying the noteworthy and fascinating aspects of data that might be derived from the research issue under matter. Following the acquisition of a set of data and the

identification of intriguing correlations, the researcher started to develop themes by incorporating the relevant codes into his or her analysis. The researcher, however, realised after completing this portion of the study that most of the codes just weren't close enough from the subject matter or were obstruse, and as a result, those codes have indeed remained indifferent, and the remaining codes can contribute to the generation of expressive topics and the sharing of an informative idea for the next phase.

The fourth phase involved a comprehensive examination of the underlying principles. During this phase, the researcher commenced the process of assessing the validity and precision of the generated themes in order to determine their effectiveness in explaining the observed phenomena. In order to achieve this objective, a comprehensive evaluation of all generated concepts was conducted by juxtaposing them with the acquired data from interviews. This evaluation aimed to ascertain the absence of any omissions and to identify potential areas for improvement within the concepts. Additionally, the consistency between the data and the concepts was examined, leading to iterative iterations of the process. Consequently, certain themes were subject to modification and editing as a direct outcome of this evaluative procedure.

The naming of the themes was the fifth phase. Once the researcher was able to obtain the finished version of the concepts, he began to identify each of them individually, stating clearly what the true meaning of each concept is, as well as demonstrating how they will aid in the analysis of the data, before moving on to the next step.

The final step will become the discovery phase, which will be explored and detailed in greater detail in the discovering phase sections of this research article, which will be published separately from this paper.

3.6 Data Analysis Techniques

Assessing the credibility and validity of the data collected through a qualitative research method, the most important question to consider is how knowledge is formed. There was a disparity between both the Doxa and the Episteme, according to Plato's point of view (Sousa, 2014). Doxa refers to information that is unjustified and devoid of scientific support, whereas Episteme refers to knowledge that is credible, stable, and clearly established, as well as knowledge that is accompanied by empirical fragments of evidence. The approach used for qualitative studies often faces criticism

due to perceived limitations in scientific rigour, inadequate explication of the chosen method, and insufficient transparency in the data analysis process, leading to the potential development of subjective and biassed viewpoints (Noble & Smith, 2015).

Nevertheless, the significance of these concepts may differ in the context of qualitative research projects. The assessment of research paper quality in quantitative research projects often involves the use of three frameworks: relevance, consistency, and generality. It is important to note, however, that the interpretation of these ideas may vary when considering qualitative studies (Leung, 2015).

Genuine qualitative research is characterised by the alignment of instruments, procedures, and data, ensuring their coherence with one another as well as with the study issue. The term "reliability" refers to the consistency of operations and results. As for generalizability, there are different opinions as to whether a qualitative inquiry outcome can be generalised or not, because qualitative research projects are primarily concerned with studying topics or subjects between a narrow set of people, and the outcomes may not be relevant to all (Leung, 2015).

In general, other criteria have been proposed for evaluating the qualitative research approach, which are referred to as external and internal principles, respectively (Sousa, 2014). External describes the standards and techniques that have been introduced from a quantitative method of research, whereas internal refers to the concepts and procedures that have been introduced into the framework of qualitative research methodology. It is preferable to use the second principle since it increases the reliability of qualitative research by demonstrating its validity (Morrow, 2005). The structure of directness of the technique, consistency of results, generalizability of the findings, and application of results (Lincoln and Guba, 1985) is one approach to this goal, which has been proposed by Sousa (2014). The proposal suggests the adoption of a series of methodologies aimed at achieving the desired outcome. It employs alternative terminology, such as utilising the term "integrity" instead of "internal validation," "generalizability of the findings" instead of "external endorsement," "consistency" being replaced by "confirmability," and "reliability" being substituted with "confirmability" (Creswell, 2013).

Considering the study employed a qualitative technique, the primary question is concerning the principles that must be taken into consideration in order to ensure the accuracy of data collected. Despite the fact that there are a variety of approaches available for this situation, one appears to be the most suited. If the data is well enough grounded and relies on adequate proof, it would be acceptable under this technique. It would also be acceptable if the models generated are derived only from the obtained

data, regardless of whether they adhere to established standards and frameworks. To ascertain the response, the researcher needs initially pose five inquiries to oneself:

- Is it possible that I had any impact on the substance of the provided respondents, which may have resulted in a complex perspective than the one intended??

- Have the written explanations been accurately composed and effectively convey the identical meaning as the oral explanations?

- Have there been any potential alternative interpretations for findings data collection and analysis?

-Can I generalise the results of the analysis, or do they only apply to the specific content that I'm analysing?

- Have I been reflective during the research process? Creswell (2013) defines formalised formalised (Creswell, 2013).

In addition to creating trust, the researcher will maintain a deep connection with the sample group. The sample technique shows that the researcher worked in the shipping industry for many years and also that, as just a result, there seems to be a connect data process between the researcher and several of the respondents. Additionally, as a result of the researcher's point of view and study area, the other respondents felt compelled to interact more about their difficulties and interactions, and as a result, the majority of interview sessions lasted somewhere around fifty and fifty-five minutes, despite the develop and advance that they would last 35-40 minutes. In addition, some of the respondents provided the researcher with articles that were relevant to the questionnaire during the interview was finished. However, there had been a sense that some participants would withhold specific information about their businesses, particularly about the adoption of sustainability efforts, and responses were occasionally more diplomatic than practical.

As an additional consideration, the researcher's reflexivity, which may be described as self-awareness and self-appraisal, is a significant factor in establishing credibility (Berger, 2013). In order to mitigate potential biases and ensure the integrity of the research procedure, the researcher adopted a passive role during the interviews, refraining from actively participating or influencing the responses. The researcher's silence was maintained throughout the interviews, with the exception of instances

where clarification of certain abbreviations or concepts, such as SDG (sustainable development goals), was deemed necessary.

Due to the specificity of the findings, it was impossible to generalise them to the entire maritime sector, which reduced their generalisability. In the first place, the study had a small sample size of only 20 participants, and the information was gathered through a semi-structured interview technique. Another disadvantage of this study is that the majority of participants came from all over the world, from east to west, from coast to coast, and from international maritime organisations; there were respondents from all over the world, from Perak to Terengganu, for example, which could be cited as one of the study's weaknesses. As a result, some critical concerns and roadblocks were neglected, which could have had a negative impact on the conclusion. Nonetheless, by describing the logic and findings in depth, the transferability of the findings may be used to other research endeavours in the future. Consider the potential of conducting more interviews with more complex including in questions and reaching out to a larger number of respondents with this information to increase the number of respondents.

3.7 Summary Of Chapter 3

In this chapter, we will describe the methodology that the researcher utilised in order to evaluate both the dependent and the independent variables. In addition, the methodology of the sample selection, demographics, and study design were all discussed in great depth in Chapter 3. When it comes to information collection, the approach that is used the most frequently is to conduct polls and questionnaires.

To generate more practical and thorough by and activities to solve the key difficulties that the maritime sector has, such as improprieties, renewable energy sources, digitisation and automation, and transparency, however, additional research is required. This is the case in order to provide more concrete results. Future research should take into account the possibility of conducting extra research and having conversations with a wider variety of stakeholders, such as members of the International Maritime Organisation (IMO), personnel, and researchers at universities. This will allow for a better comprehension of alternative points of view and the elicitation of more in-depth insights.

I'd want to emphasise the fact that this research not only inspired me to continue working in the field that interests me but also drove me to discover more about it, especially in relation to the industry that I work in but also in regard to a variety of other topics and theories. Additionally, it assisted in the growth of some of my actual

concerned capacities, my drive for self-discovery, including my capacity to make use of internet research tools in an effective manner. In addition, adopting a scientific worldview might cause one's way of life to undergo a fundamental transformation. In this lesson, rather of blindly trusting every detail and acting quickly, you are going to discover investigate and question your own preconceptions, as well as to make an effort to determine whether or not they are accurate or incorrect.

CHAPTER 4

RESULTS AND DISCUSSUON

4.1 Findings

This study relied on primary data obtained using semi structured interviews. The iterviews were recorded and the data transcribed for analysis purposes. From this data, Themes were identified through an analysis process refered to as thematic analysis.

4.2 Themes

4.2.1 Sustainability in the maritime sector

The central issue in all comments is marine industry sustainability. The emphasis is on finding ways to make the industry more environmentally friendly, to reduce its ecological footprint, and to achieve a balance between commercial and environmental objectives. The responses consistently underline the importance of shifting the sector toward more environmentally friendly practices. This includes cutting emissions, switching to greener fuels, and increasing vessel efficiency. The overarching purpose is to ensure that the industry's operations cause the least amount of environmental impact.

For instance, RA emphasizes that organizations in the maritime industry need to focus their future plans towards sustainable measures.
"I believe that the maritime industry should prioritize sustainability by enforcing strong environmental rules and adopting cleaner and more efficient technologies." RA

According to RC, the maritime sector is a major contributor to the dangers facing today's environment due to the amount of deposits and gas emissions that it discharges to the atmosphere.
"The compass of the maritime business should always point towards sustainability. This necessitates a paradigm shift involving the adoption of cleaner propulsion technology and utilizing renewable energy sources." RC

RB highlights the serious issues facing the maritime sector especially with regards to sustainability concerns.
"…Presently it must deal with significant sustainability issues such as emissions, pollution, and resource depletion." RB

4.2.2 Challenges of sustainability in the maritime sector

The responses recognize the maritime industry's numerous difficulties and complexity. These challenges include environmental degradation, resistance to change, and the intricacies of global regulations and stakeholder interests. This theme emphasizes the need for a sophisticated approach to sustainability efforts in the maritime sector, which are not simple. Regarding the issues of sustainability especiallyin the maritime industry, RA mentioned that they were caused by a variety of factors that inckuded economic restrixtions, lack of knowledge regarding sustainability concerns, and insufficient infrastructure.

"These issues are the result of a number of causes, including aging infrastructure, a lack of environmental awareness, and economic constraints. Society can help by encouraging sustainable shipping methods, campaigning for tougher laws, and requiring openness from industry participants." RA

Regulatory requirements have also been identified as causes of the sstainability challenges faced by the maritime sector as RB indicatges;

"The marine industry's issues are worsened by poor regulatory requirements, economic constraints, and the immensity of the operations in this industry." RB

According to RC, the decentralized nature of the sector is also a concerning issue.

"The issues are the result of a complicated interaction of forces. The breadth and decentralization of the maritime industry face logistical obstacles in implementing sustainable measures. Society may spark change by developing an accountability culture." RC

4.2.3 Innovations and Technological Advancements

Innovations and technological advancements is another theme that has been identified from the interview data obtained in the data collection process. Technology and innovation frequently come up in the responses. Both a challenge and an answer are associated with new innovations.

"In the long run, new developments in the maritime industry have the potential to simplify the path to sustainability. Alternative fuels, autonomous ships, and eco-friendly technologies can all help to lessen the industry's environmental impact." RA

Even with a variety of innovations identified as necessary for the maritime industry, their implementation is faced with challenges as indicated by RH.

"While immediate implementation may involve logistical challenges and increased financial outlays, these advances foreshadow the long-term simplification of sustainability goals. Such advancements, which include alternate propulsion technologies and eco-friendly operational approaches, are positioned to reduce environmental burdens while increasing operational efficiency." RH

Although they might present difficulties at first, such as high expenses and regulatory changes, they have the potential to make the road to sustainability simpler in the long run. This theme emphasizes how innovation drives industry-wide sustainable practices as expressed by RF.

"Initial difficulties with their adoption can include expensive prices and regulatory changes. It's crucial to strike a balance between immediate challenges and long-term advantages." RF

4.2.4 Environmental Stewardship

Environmental stewardship emerges as a recurring issue in the responses. The maritime sector is asked to take a more responsible and earth-friendly stance. This includes safeguarding marine habitats, cutting down on pollution, and balancing business practices with environmental sustainability. This subject emphasizes how important it is to protect the environment ethically. The respondents indicate the need for change in the maritime sector towards a more environmentally friendly strategy in its operations.

"Change is necessary. This entails designing ships that consume less energy and so emit less pollution." RE

Such change has been indicated by RD as the adoption of cleaner sources of energy to power the ships.

"Marine industry needs to start using cleaner ways to power ships, like cleaner fuels. We also need to be more careful with how we use resources." RD

Further, respondents call for environmental awareness in the sector as indicated by RH;

"My opinion is that the marine sector should fervently start a path marked by increased sustainability awareness." RH

RA recognizes the need for strong rules in the prioritization of sustainable measures to safeguard the environment from the harm brought about by industry operations.
"I believe that the maritime industry should prioritize sustainability by enforcing strong environmental rules and adopting cleaner and more efficient technologies." RA

4.2.5 Collaboration and Stakeholder Engagement

In the framework of sustainability, collaboration and stakeholder involvement emerge as crucial issues. The responses highlight the importance of collaboration among diverse stakeholders, such as governments, industry entities, and environmental organizations. They emphasize that accomplishing sustainability goals necessitates teamwork and a shared commitment to environmental care.
"My readiness to make investments toward improving the existing maritime environment is conditional on industry stakeholders, including corporate entities and governmental authorities, making a coordinated and clear commitment." RH
The respondents express their concern over the inability of the regulations and policies directed towards maritime sustainability concerns to meet the concerns of all the stakeholders due to the diversity of their needs and expectations.
"New regulations and policies are a positive step forward, but they may not meet all major stakeholder concerns. The interests and priorities of various parties differ." RA
"New regulations and procedures may not fully address all major stakeholder concerns because of the Divergent interests among stakeholders." RB
"Stakeholders' interests range from environmentalists to industry players, each with their own set of goals. Hence new regulations and procedures may not fully address all stakeholder concerns." RC

Moreover, the respondents indicated that they would be interested in investing in the sustainability of the maritime sector as long as they see the commitment of other stakeholders and players in the sector.
"… I can invest in the sector when I witness a collective commitment from industry players." RC
"I'm willing to invest in improving the maritime environment if I perceive that everyone is sincerely concerned about the environment." RE

CHAPTER 5

CONCLUSION, LIMITATIONS, AND RECOMMENDATIONS

5.1 Discussions of Findings

The results of this study are consistent with prior research regarding the importance of sustainability within the maritime industry. Because of the substantial ramifications for the environment, economies, cultures, and global trade, sustainability in the maritime sector is extremely important. Sustainability in this sector is fundamentally based on ethical and ecologically sensitive activities that strive to lessen the industry's ecological imprint. Its involvement in environmental preservation is one of the key reasons for its importance. Oceans and coastal areas are vital ecosystems, teeming with diverse marine life and playing an important role in climate regulation on Earth. To protect these crucial ecosystems, sustainability measures are required to minimize pollution, habitat destruction, and biodiversity deterioration (Buonomano et al., 2023).

Furthermore, the demand for regulatory compliance drives sustainability in the maritime sector. Environmental standards are mandated by international marine legislation implemented by organizations such as the International marine Organization (IMO). Noncompliance not only results in legal consequences, but it also tarnishes the industry's reputation. As a result, sustainability is no longer a choice but a legislative requirement, making it essential for the industry's legal functioning. The maritime industry benefits economically from sustainability as well. Practices that improve operating efficiency, reduce fuel usage, and minimize costs are not only environmentally benign, but also economically beneficial (Parviainen et al., 2018). Investments in sustainable technologies and practices help the industry's long-term viability by lowering the risk of stranded assets and increasing competitiveness. In an ever-changing global landscape, economic resilience is critical.

According to study, the maritime sector faces a variety of issues arising from the inherent complexities of reconciling economic interests with environmental and social responsibility. Among these concerns, probably the most critical is reducing greenhouse gas emissions from ships. Meeting the International Maritime Organization's (IMO) and regional authorities' increasingly rigorous emission limits necessitates major technology developments and operational modifications. Similarly, the management of ballast water, which is critical for preventing the spread of invasive species, necessitates the development and broad implementation of appropriate treatment technology (Hasanspahić et al., 2021).

The current study and previous studies agree that the adoption of renewable fuels and technology is a significant task. Transitioning from traditional, high-sulfur fuels to cleaner alternatives such as LNG (Liquefied Natural Gas) or hydrogen needs not just a financial commitment but also the development of a solid infrastructure to support these fuels. Furthermore, the development and integration of green technology such as wind-assist propulsion and energy-efficient ship designs provide financial as well as operational obstacles (Koilo, 2019).

Studies have also found that economic viability is a recurrent challenge for maritime sustainability. Many sustainable practices and green technologies have significant upfront costs, which can be a disincentive for ship-owners and operators, particularly those with limited resources. Demonstrating the long-term economic benefits of sustainability programs can be difficult as well, because these benefits may take time to fully materialize. Compliance with regulations adds another layer of complication. The maritime business must manage a complex network of international, regional, and municipal rules, many of which have variable requirements. The intricacy of these requirements can be onerous, especially for smaller operations, and achieving uniform enforcement across multiple areas and countries can be difficult (Mallouppas & Yfantis, 2021).

Moreover, the maritime industry's global nature is a big impediment to achieving sustainability. There are numerous competing interests and agendas among the diverse stakeholders, which include ship-owners, operators, governments, and environmental organizations. Finding common ground and reaching consensus on sustainability efforts may be a difficult and time-consuming task that frequently necessitates international collaboration (Ashrafi et al., 2020).

Innovations and technological breakthroughs are at the forefront of attempts to improve the maritime sector's sustainability. They provide a path to transform industry processes, drastically reduce environmental impacts, increase safety, and boost overall operational efficiency. These developments are especially important in an industry that has previously relied on traditional fuels and techniques. Alternative propulsion technologies are one of the most noteworthy fields of invention. Ships are increasingly using LNG and hydrogen propulsion systems, which generate fewer pollutants and carbon gases than traditional marine fuels. Wind-assist technologies, including as sails and rotor sails, are also being used to harvest wind energy, lowering fuel usage and emissions while on the go (Saether et al., 2021).

In the maritime industry, fuel efficiency and emissions reduction are top priorities. Ship design innovations are resulting in more energy-efficient boats with streamlined hulls

and improved engine layouts. Another technological advancement that allows ships to comply with rigorous pollution standards is the installation of exhaust gas cleaning devices, or scrubbers. Integration of clean energy is also gaining traction. Solar panels and wind turbines are being integrated into ship designs to provide backup power and reduce dependency on traditional fuels. Advanced battery technology enables hybrid and electric propulsion, which is especially useful for lowering emissions during port operations and in environmentally sensitive areas (Hasanspahić et al., 2021). .

Technological developments make regulatory compliance easier, helping the industry's move to more environmentally friendly practices. Emission monitoring systems assist ships in meeting emissions laws and monitoring environmental performance. Digital documentation and reporting solutions reduce administrative overhead by streamlining compliance procedures. Collaborative research projects and greater investment in green technology are propelling maritime innovation forward. These programs stimulate collaboration among stakeholders in the industry, research institutions, and governments, ultimately assisting in the creation and implementation of sustainable solutions (Acciaro & Sys, 2020).

Collaboration and stakeholder involvement are critical to the marine sector's sustainability, as it is a globally interconnected enterprise confronting complex environmental concerns. The role of government and regulatory authorities in establishing the framework for sustainable practices is critical. Collaboration with these organizations is critical for developing and enforcing effective sustainability policies and standards. Compliance with international agreements, such as those created by the International Maritime Organization (IMO), is critical in order to achieve a united and globally uniform approach to maritime sustainability (Fasoulis & Kurt, 2019).

Collaboration is visible among different stakeholders within the business, including shipping corporations, port authorities, shipbuilders, and industry groups. These organizations frequently form alliances and working groups to share best practices, create sustainable norms, and push industry-wide efforts. Collaboration extends to technological developments, where stakeholders collaborate on R&D efforts to propel sustainable technologies such as clean propulsion systems and emissions reduction solutions.

Environmental organizations and non-governmental organizations (NGOs) also play an important role in marine sustainability. They work as watchdogs and advocates, keeping the marine industry accountable for its environmental implications. Collaboration with these organizations yields useful insights, raises awareness, and aids in the monitoring of industry practices. Partnerships with environmental non-

governmental organizations (NGOs) are critical for funding and implementing conservation and cleanup operations such as marine habitat restoration and ocean cleanup programs. Collaboration among nations and international organizations is critical at the international level in solving global concerns such as climate change and environmental protection. Organizations such as the United Nations enable dialogue and agreements that enhance international marine cooperation (Saether et al., 2021).

Finally, effective collaboration and stakeholder involvement are critical to the entire approach required for marine sustainability. These collaborations foster the interchange of ideas, resources, and experience, thereby accelerating the development and implementation of new solutions that combine commercial goals with environmental and social responsibility. These collaborative initiatives are critical in crafting a more sustainable and ethical future in a globally integrated business like maritime.

5.2 Conclusion

In conclusion, maintaining the sustainability of the marine industry is a difficult task with many facets and great importance for the environment, economies, society, and international trade. This industry's possibilities and difficulties call for a comprehensive strategy that is fueled by innovation, control, and cooperation among various players. The maritime industry, in particular, has substantial environmental difficulties, such as greenhouse gas emissions, marine pollution, and the maintenance of delicate ecosystems. To address these issues and lessen the industry's ecological imprint, a commitment to cleaner technology, alternative fuels, and strong regulatory frameworks is necessary. Technological development and innovation have become potent drivers of sustainability in the maritime industry. These technologies are changing business practices, minimizing negative environmental effects, and improving operational efficiency. They range from alternative propulsion systems to digitalization and renewable energy integration.

Stakeholder participation and collaboration are essential elements of the sustainability journey. Important roles must be played by government agencies, business entities, environmental organizations, research institutions, local communities, financial institutions, and international organizations. Their combined efforts fuel the creation and adoption of sustainable business models, legal frameworks, and technology innovations.The marine industry's road to sustainability indicates a commitment to reducing environmental risks and is in line with international environmental

commitments. The growing significance of sustainability in luring investment and satisfying consumer and investor preferences is also acknowledged.

5.3 Limitations of the Study

While this study on marine sustainability provides useful insights, it is not without limits. Given the dynamic nature of sustainability efforts and the rapid pace of technology improvements, the study's capacity to provide a full picture of the sector's current situation is limited. Furthermore, the report takes a comprehensive view of marine sustainability, providing a high-level overview of significant themes and concerns. This broad approach, however, may not sufficiently reflect the complexities and unique sustainability challenges that differ among industry segments. Different maritime sectors, such as container shipping, cruise lines, or fishing fleets, may confront distinct issues that necessitate specific solutions, which this study does not cover in full.

Another constraint is geographical variation. Because of variances in legal frameworks, environmental circumstances, and economic considerations, sustainability challenges and solutions can range dramatically from one place to the next. While noting these differences, the study does not go thoroughly into region-specific dynamics, potentially restricting its application to specific locations. Further, another constraint is the changing regulatory landscape. The maritime sector's sustainability is susceptible to shifting international and national rules. As a result, as new regulations are implemented or current ones are amended, the regulatory insights presented in this study may become out of date.

Subsequently the study does not take into consideration anticipated future uncertainties or emergent sustainability trends beyond the date of knowledge. Because of the fast-paced nature of sustainability advances, this constraint implies that the study may fail to identify or examine new difficulties and solutions that may impact the marine sector in the next years.

5.4 Recommendations of the Research

Based on the study on maritime sustainability, several major recommendations emerge to assist stakeholders, policymakers, and organizations in their quest of a more sustainable business. To begin with, there is an urgent need to stimulate technological innovation in the maritime sector. It is critical to encourage and support continuous research and development efforts in sustainable technologies. Investing in alternative propulsion systems, energy-efficient vessel designs, and new pollution reduction solutions is part of this. To accelerate the development and use of these green

technologies, collaboration between industrial actors, research institutes, and governments should be encouraged.

To support sustainability efforts, regulatory structures controlling the maritime industry must be strengthened. Stringent international and national rules must be developed and enforced in order to minimize greenhouse gas emissions, avoid marine pollution, and encourage sustainable practices. It is also critical to provide transparency and uniformity in the implementation of these policies across different areas and nations in order to create a level playing field for all stakeholders. Further, Collaboration and stakeholder participation should be aggressively promoted. Partnerships should be encouraged among various industry players, such as shipping firms, port authorities, shipbuilders, and environmental organizations, to support the sharing of best practices and the establishment of industry-wide sustainability norms. Furthermore, communicating with local people and soliciting their feedback is critical for effectively addressing issues about port operations, noise pollution, air quality, and environmental impacts.

The maritime industry should prioritize the use of alternative fuels and the integration of sustainable energy. Accelerating the transition from old maritime fuels to cleaner alternatives like LNG and hydrogen is critical, as is developing the infrastructure needed to handle these fuels. Furthermore, the incorporation of renewable energy sources, such as solar panels and wind turbines, into ship designs should be encouraged in order to lessen dependency on traditional fuels. Besides, the importance of sustainability data research and collaboration should be emphasized. It is vital to encourage coordinated efforts among industry players, academic institutions, and governments to collect, evaluate, and disseminate data on sustainability. Standardized sustainability reporting methodology can help with industry-wide benchmarking and assessment.

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APPENDICES

APPENDIX A

INTERVIEW QUESTIONNAIRE

Please introduce yourself and describe your present position and duties.

1) How many years have you worked in this field?
2) Could you explain the situation of the shipping industry in your opinion?
3) In your perspective, what should be the marine industry's future actions or path forward?
4) How and why that, in your opinion, are the elements that contribute to these difficulties, and how can society do something concerning?
5) Do you believe that the new regulations and imposed measures address all main stakeholder concerns? If yes, or if no, why? (This question was posed in the absence of any discussion of legislation by the participants.)
6) Did you believe the new regulations and mandated measures address overall main stakeholder doubts? If affirmative, or if negative, why? (This statement was made in the absence of any discussion of legislation by the participants.)
7) How are the primary impediments to consolidating a coherent approach for achieving the ISDGs? (In order to achieve the aims of integrated sustainable development)
8) How do you view the effects of new innovations in between, and do you believe they will simplify or complicate the path to these goals in the long and short term?
9) How significant is the influence of global crises such as the economic crisis or COVID-19 in this industry?
10) As a final point, under what circumstances, as a..... (stakeholder), are you eager to give to any investing required to improve the existing maritime environment, or the finest alternatives for bringing shipping industry's main actors together?

Respondent A

1) How many years have you worked in this field?

For the past eight years, I have been working in the maritime industry.

2) Could you explain the situation of the shipping industry in your opinion?

The shipping sector is at a crossroads. While it is critical to global trade, it faces serious sustainability challenges. The industry is dealing with concerns such as greenhouse gas emissions, marine pollution, and resource overexploitation.

3) In your perspective, what should be the marine industry's future actions or path forward?

I believe that the maritime industry should prioritize sustainability by enforcing strong environmental rules and adopting cleaner and more efficient technologies.

4) How and why that, in your opinion, are the elements that contribute to these difficulties, and how can society do something concerning?

These issues are the result of a number of causes, including aging infrastructure, a lack of environmental awareness, and economic constraints. Society can help by encouraging sustainable shipping methods, campaigning for tougher laws, and requiring openness from industry participants.

5) Do you believe that the new regulations and imposed measures address all main stakeholder concerns? If yes, or if no, why?

New regulations and policies are a positive step forward, but they may not meet all major stakeholder concerns. The interests and priorities of various parties differ.

6) How are the primary impediments to consolidating a coherent approach for achieving the integrated sustainable development goals ISDGs?

The key hurdles to accomplishing the ISDGs in the maritime industry include a lack of international cooperation, some industry actors' reluctance to change, and economic limits. A coherent approach necessitates global cooperation, policy alignment, and incentives for sustainable activities.

7) How do you view the effects of new innovations in between, and do you believe they will simplify or complicate the path to these goals in the long and short term?

In the long run, new developments in the maritime industry have the potential to simplify the path to sustainability. Alternative fuels, autonomous ships, and eco-friendly technologies can all help to lessen the industry's environmental impact.

8) How significant is the influence of global crises such as the economic crisis or COVID-19 in this industry?

Global crises such as the COVID-19 pandemic and economic downturns have had a significant impact on the nautical industry. These crises have disrupted supply chains, lowered demand for shipping services, and strained many enterprises' financial stability.

9) As a final point, under what circumstances are you eager to give to any investment to improve the existing maritime environment?

I am enthusiastic to invest in enhancing the existing maritime environment when there is a clear commitment to prioritize sustainability from industry stakeholders, governments, and society as a whole.

Respondent B

1) How many years have you worked in this field?

I have dedicated 12 years to the maritime industry

2) Could you explain the situation of the shipping industry in your opinion?

The maritime industry is an important engine of global trade and economic progress. Presently it must deal with significant sustainability issues such as emissions, pollution, and resource depletion

3) In your perspective, what should be the marine industry's future actions or path forward?

Most notably, adopting cleaner fuels, enforcing severe emissions limits, and collaboration among industry actors, governments, and environmental organizations are critical to meeting these targets.

4) How and why that, in your opinion, are the elements that contribute to these difficulties, and how can society do something concerning?

The marine industry's issues are worsened by poor regulatory requirements, economic constraints, and the immensity of the operations in this industry.

5) Do you believe that the new regulations and imposed measures address all main stakeholder concerns? If yes, or if no, why?

New regulations and procedures may not fully address all major stakeholder concerns because of the Divergent interests among stakeholders.

6) How are the primary impediments to consolidating a coherent approach for achieving the integrated sustainable development goals ISDGs?

Conflicting national interests, opposition to change, and restricted access to funding for sustainable initiatives are the key obstacles to accomplishing the ISDGs in the maritime industry.

7) How do you view the effects of new innovations in between, and do you believe they will simplify or complicate the path to these goals in the long and short term?

Alternative fuels, digitalization, and efficient vessel designs are examples of new technologies in the marine industry that can reduce environmental impacts while improving overall efficiency.

8) How significant is the influence of global crises such as the economic crisis or COVID-19 in this industry?

Global crises have a significant impact on the maritime industry.
They lower transportation demand and expose flaws.

9) As a final point, under what circumstances are you eager to give to any investment to improve the existing maritime environment?

I can invest in improving the maritime environment when I see a clear commitment from industry stakeholders

Respondent C

1) How many years have you worked in this field?

I have worked in the sector for ten years

2) Could you explain the situation of the shipping industry in your opinion?

In simple terms, maritime sector is simultaneously the lifeblood of global trade and a major contributor to environmental challenges.

3) In your perspective, what should be the marine industry's future actions or path forward?

The compass of the maritime business should always point towards sustainability. This necessitates a paradigm shift involving the adoption of cleaner propulsion technology and utilizing renewable energy sources.

4) How and why that, in your opinion, are the elements that contribute to these difficulties, and how can society do something concerning?

The issues are the result of a complicated interaction of forces. The breadth and decentralization of the maritime industry face logistical obstacles in implementing sustainable measures. Society may spark change by developing an accountability culture.

5) Do you believe that the new regulations and imposed measures address all main stakeholder concerns? If yes, or if no, why?

Stakeholders' interests range from environmentalists to industry players, each with their own set of goals. Hence new regulations and procedures may not fully address all stakeholder concerns.

6) How are the primary impediments to consolidating a coherent approach for achieving the integrated sustainable development goals ISDGs?

The challenges include resistance to change embedded in traditional practices, and financing gaps for sustainable initiatives.

7) How do you view the effects of new innovations in between, and do you believe they will simplify or complicate the path to these goals in the long and short term?

New developments in the maritime business are a double-edged sword. In the short term, their adoption may be complicated by large start-up costs and regulatory changes while they can cause positive change in the long term.

8) How significant is the influence of global crises such as the economic crisis or COVID-19 in this industry?

Such events can be change agents, causing the sector to rethink and strengthen its defenses. Sustainable behaviors have become not just ethical, but also necessary for navigating these choppy waters.

9) As a final point, under what circumstances are you eager to give to any investment to improve the existing maritime environment?

Yes, I can invest in the sector when I witness a collective commitment from industry players.

Respondent D

1) How many years have you worked in this field?

I have been working in this sector for 14 years now

2) Could you explain the situation of the shipping industry in your opinion?

Maritime sector helps the world trade, but also harms the environment in a big way. We need to change the way we do things to protect the Earth.

3) In your perspective, what should be the marine industry's future actions or path forward?

Marine industry needs to start using cleaner ways to power ships, like cleaner fuels. We also need to be more careful with how we use resources.

4) How and why that, in your opinion, are the elements that contribute to these difficulties, and how can society do something concerning?

People in the past used to be more concerned with generating money than with safeguarding the environment. Society can help by encouraging companies to do more for the environment and urging the government to enact environmental regulations.

5) Do you believe that the new regulations and imposed measures address all main stakeholder concerns? If yes, or if no, why?

New rules are a good start, but they may not satisfy everyone basically because People have many interests.

6) How are the primary impediments to consolidating a coherent approach for achieving the integrated sustainable development goals ISDGs?

The major obstacles to working together for a healthier environment are that certain countries refuse to cooperate and that some people refuse to change their ways.

7) How do you view the effects of new innovations in between, and do you believe they will simplify or complicate the path to these goals in the long and short term?

New ideas can make things easier in the long run, but they can be difficult to implement at first. To aid the environment, we must be patient and continue to try new things.

8) How significant is the influence of global crises such as the economic crisis or COVID-19 in this industry?

Like Covid made it hard for the entire transport sector. But it also also showed us that we need to be ready for unexpected things and that it's important to protect the environment even during tough times.

9) As a final point, under what circumstances are you eager to give to any investment to improve the existing maritime environment?

First, companies and governments need to show they're serious about being green.

Respondent E

1) How many years have you worked in this field?

I have worked for 7 years in the maritime sector.

2) Could you explain the situation of the shipping industry in your opinion?

The industry is essential for global trade but faces one of the greatest challenges today which is pollution.

3) In your perspective, what should be the marine industry's future actions or path forward?

Change is necessary. This entails designing ships that consume less energy and so emit less pollution.

4) How and why that, in your opinion, are the elements that contribute to these difficulties, and how can society do something concerning?

People did not previously pay close attention to the environment hence causing its deterioration. Society may assist by supporting businesses who are attempting to do better for the environment.

5) Do you believe that the new regulations and imposed measures address all main stakeholder concerns? If yes, or if no, why?

New rules are a step in the right direction but they are not merely eough because of the existing differences.

6) How are the primary impediments to consolidating a coherent approach for achieving the integrated sustainable development goals ISDGs?

The major obstacles to working together for a healthier environment are failure to cooperate and refusal by people with regards to changing their ways.

7) How do you view the effects of new innovations in between, and do you believe they will simplify or complicate the path to these goals in the long and short term?

New ideas make things easier but they can be difficult to implement at first. We must be patient and continue to explore new solutions to improve the

environment. These improvements can help to smooth the route to sustainability over time.

8) How significant is the influence of global crises such as the economic crisis or COVID-19 in this industry?

The shipping business is greatly impacted by crises. They interfere with normal operational routines. However, disasters like Covid demonstrated the importance of being prepared for unanticipated situations.

9) As a final point, under what circumstances are you eager to give to any investment to improve the existing maritime environment?
I'm willing to invest in improving the maritime environment if I perceive that everyone is sincerely concerned about the environment.

Respondent F

1) How many years have you worked in this field?

I have worked in the industry for 12 years.

2) Could you explain the situation of the shipping industry in your opinion?

The maritime sector faces considerable challenges like pollution and harming marine life

3) In your perspective, what should be the marine industry's future actions or path forward?

The maritime sector needs to turn toward more promising futures. This calls for the use of cleaner fuels, the use of emission-reduction technology, and the preservation of marine habitats.

4) How and why that, in your opinion, are the elements that contribute to these difficulties, and how can society do something concerning?

These issues arise from the fact that in the past, profit was frequently prioritized over the environment.

5) Do you believe that the new regulations and imposed measures address all main stakeholder concerns? If yes, or if no, why?

New regulations are a good step, but they might not allay everyone's worries. Finding a single, universally applicable solution is tough since stakeholders have diverse interests. To meet everyone's demands, open communication and flexible rules are essential.

6) How are the primary impediments to consolidating a coherent approach for achieving the integrated sustainable development goals ISDGs?

In the maritime sector, national interests, reluctance to change, and a lack of money for sustainability projects are the main obstacles to fulfilling the ISDGs. Global collaboration, diplomacy, and creative financing channels are essential to securing a cogent strategy.

7) How do you view the effects of new innovations in between, and do you believe they will simplify or complicate the path to these goals in the long and short term?

Initial difficulties with their adoption can include expensive prices and regulatory changes. It's crucial to strike a balance between immediate challenges and long-term advantages.

8) How significant is the influence of global crises such as the economic crisis or COVID-19 in this industry?

Global crises like the COVID-19 pandemic have resulted in economic downturns with significant impacts on the maritime sector. They hampered supply networks, decreased shipping demand, and highlighted weaknesses.

9) As a final point, under what circumstances are you eager to give to any investment to improve the existing maritime environment?

Yes, I am eager to invest in improving the maritime environment.

Respondent G

1) How many years have you worked in this field?

For like four years.

2) Could you explain the situation of the shipping industry in your opinion?

It has both positive and negative bits. We need to find ways to keep the good parts and fix the bad parts.

3) In your perspective, what should be the marine industry's future actions or path forward?

The way the marine sector operates needs to alter. Cleaner fuels should be used in the ships.

4) How and why that, in your opinion, are the elements that contribute to these difficulties, and how can society do something concerning?

The issues arise because individuals usually cared more about money than the environment.

5) Do you believe that the new regulations and imposed measures address all main stakeholder concerns? If yes, or if no, why?

Yes, I think they are okay as companies have started taking initiative in the implementation of sustainable measures.

6) How are the primary impediments to consolidating a coherent approach for achieving the integrated sustainable development goals ISDGs?

The largest obstacles to collaborating for a better environment are the unwillingness of some nations and individuals to change their habits.

7) How do you view the effects of new innovations in between, and do you believe they will simplify or complicate the path to these goals in the long and short term?

We need to be patient and keep trying new things to help the environment. In time, these new ideas can make the path to a better environment smoother.

8) How significant is the influence of global crises such as the economic crisis or COVID-19 in this industry?

They made it challenging for ships to do their duties. But they also demonstrated the necessity of being prepared for unforeseen events and the value of environmental preservation in the face of adversity.

9) As a final point, under what circumstances are you eager to give to any investment to improve the existing maritime environment?
I'm ready to invest in making the maritime environment better wit5h collaborations.

Respondent H

1) How many years have you worked in this field?

For about nine years.

2) Could you explain the situation of the shipping industry in your opinion?

According to me, it is essential to balance environmental care with the economy

3) In your perspective, what should be the marine industry's future actions or path forward?

My opinion is that the marine sector should fervently start a path marked by increased sustainability awareness.

4) How and why that, in your opinion, are the elements that contribute to these difficulties, and how can society do something concerning?

These issues are embedded within a matrix of causal variables, resulting in part from a long period of industry-driven economic precedence over ecological considerations.

5) Do you believe that the new regulations and imposed measures address all main stakeholder concerns? If yes, or if no, why?

While new legislation and procedures are definitely a significant step toward environmental improvement in the maritime domain, they may not be comprehensive in their ability to entirely alleviate the numerous concerns of varied stakeholders. Because stakeholder interests are intrinsically diverse, calibrating rules to meet all parts of this spectrum necessitates ongoing dialogic dialogue and adaptive legislative refinement.

6) How are the primary impediments to consolidating a coherent approach for achieving the integrated sustainable development goals ISDGs?

The maritime sector faces major challenges in establishing a coordinated approach to achieving the Integrated Sustainable Development Goals (ISDGs). Geopolitical difficulties, opposition to change among existing industrial actors, and a lack of funding for long-term initiatives are among them.

7) How do you view the effects of new innovations in between, and do you believe they will simplify or complicate the path to these goals in the long and short term?

While immediate implementation may involve logistical challenges and increased financial outlays, these advances foreshadow the long-term simplification of sustainability goals. Such advancements, which include alternate propulsion technologies and eco-friendly operational approaches, are positioned to reduce environmental burdens while increasing operational efficiency.

8) How significant is the influence of global crises such as the economic crisis or COVID-19 in this industry?

Global calamities, most notably the economic crisis and the paradigm-shifting COVID-19 pandemic, have had a significant impact on the maritime realm. These crises caused interruptions in supply networks, which reduced demand for shipping services.

9) As a final point, under what circumstances are you eager to give to any investment to improve the existing maritime environment?

My readiness to make investments toward improving the existing maritime environment is conditional on industry stakeholders, including corporate entities and governmental authorities, making a coordinated and clear commitment.

APPROVAL PAGE

TITLE OF PROJECT PAPER: SUSTAINABILITY, CHALLENGE AND SOLUTION IN MARITIME INDUSTRIES

NAME OF AUTHOR : NOORDIANA FAZWANIE BINTI MOHD NASHIR

The undersigned certify that the above candidate has fulfilled the condition of the project paper prepared in partial fulfilment for the degree of Master of Business Administration.

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