

Navigating Global Trade Rules: The Impact of WTO Frameworks on Bangladesh's Shipbuilding Industry

Apurba Zubaer Mahmud¹; Umme Morsalin Akter Neer^{2*}

^{1,2} Nanjing University of Information Science and Technology, Nanjing, China.

Corresponding Author: Umme Morsalin Akter Neer^{2*}

Publication Date: 2025/06/21

Abstract: The shipbuilding industry of Bangladesh has grown as a promising sector for export diversification, employment generation and nation building industry. Currently the export revenues are over \$100 million per year and are expanding the market globally including the European markets. However, areas such as the absence of automation manufacturing technologies like robotics welding and Computer Aided Design (CAD), and low levels of compliance with global environmental standards remain a weakness afflicting the competitiveness of the firm. These becomes even more important when Bangladesh is graduating from LDC, which means it will have to follow more stringent standard in trade. This paper has analyzed the strengths, weaknesses, opportunities of this sector within the WTO regulations. Some of the issues related to outdated technology, and low infrastructural facilities, and lack of conformity to environmental and safety issues such as green shipbuilding. These have locked Bangladesh out from striking such eco-sensitive markets such as the EU and deepened its rivalry with global competitors such as China, South Korea and Japan. But there is potential for creating, for example, small or environmentally friendly boats, as more and more of them are ordered throughout the world. Some of the tactical measures include signing more Free Trade Agreements (FTAs), investing in Technology, Public/ Private Partnership and fostering skill development. The study pointed out that in order to synchronize national strategies with international trade policies, it is needed to carry out the following activities: Efficiency of export formalities, Multilateralism, and International Trade Transparency and TBT, ECO and Intellectual Property Rights. This paper identifies these areas, which addressed through the WTO framework, can help Bangladesh to overcome challenges to its shipbuilding industry and compete effectively in the global market. This paper stresses the implementation of the technology agenda, promotion of environment benchmarks, and building sound policy framework as the ways that will allow the realization of growth potential in the sector.

Keywords: Shipbuilding, Maritime Industry, LDC, WTO, TBT, Blue Economy.

How to Cite: Apurba Zubaer Mahmud; Umme Morsalin Akter Neer: (2025) Navigating Global Trade Rules: The Impact of WTO Frameworks on Bangladesh's Shipbuilding Industry. *International Journal of Innovative Science and Research Technology*, 10(6), 1315-1328. <https://doi.org/10.38124/ijisrt/25jun501>

I. INTRODUCTION

Bangladesh is a riverine country. It has a long history with river, boats, and ships. Due to its riverine geography ships played an import role in its economy and trade since the ancient times. Shipbuilding has deep roots in Bangladesh going back to the 1300s. Ibn Batuta, a traveler from Morocco, noted big fleets of warships at many ports in the area. In the 1400s European traveler Caesar Frederick saw that Chittagong and Sandwip were main spots to build large ships. The field grew even more during the Mughal time in the 1600s. Back then, people knew the shipyards of Chittagong and Sandwip for making warships for the Sultan of Turkey. [1]

➤ The Mughal Period

When the Mughal Empire ruled, Bengal Subah became a big center for shipbuilding. Economic expert Indrajit Ray figured that Bengal made about 223,250 tons of ships each year in the 1500s and 1600s. This was way more than the 23,061 tons made in 19 North American colonies from 1769 to 1771. The shipyards in Bengal were also great at fixing ships. Bengali shipbuilding methods were ahead of their time. One of their big ideas was the "flushed deck" design used in rice ships. While the hull would get an internal reconstruction increasing the strength and ability to keep the ship afloat, it was replaced by the stepped deck design that grew popular in Europe. The British East India Company copied this within a few years in the 1760s, making great as well as very long improvements on how long and in the best possible way, the

ships of Europe could work, especially during the Industrial Revolution. [2]

➤ *Modern Period*

Dockyard and Engineering Works Limited is the first modern shipyard in Bangladesh, which was established during British rule in 1922. After independence in 1971, it was nationalized and attached to the Ministry of Industries. In 2006, the yard was handed over to the Bangladesh Navy for management. The birth of foreign investments in shipbuilding was started in 1979 when a Japanese company Mitsui Engineering and Shipbuilding partnered with High Speed Shipyard in Bangladesh for the establishment of an overseas shipyard in Fatullah, Narayanganj. Later, more private shipyards were set up, and in 2008, Bangladesh became a ship-exporting country. [3] The shipbuilding industry is one of the rapidly growing industries of Bangladesh and has its own role in the country's economy. Over the last successive decade starting from the year 2009 to 2019, the industry expanded on the average of 8% per year. It currently generates annual of around USD 1.4 billion and is projected to reach close to USD 9.5 billion by 2041. Shipbuilding is also one of the main export industries, and is second on the list of industries in terms of export specialization. Some of the ship that are produced in Bangladesh are exported to countries such as Norway, Finland and Germany. The small-scale industry has however the potential to move to a new level and achieve higher revenue targets in the future, with the government of Bangladesh with a vision to raise the export earnings of the industry to reach USD 4 billion within the year 2026. [4]

➤ *Bangladesh's Rising Shipbuilding Industry*

In 1983, the Ananda Shipyard and Shipways Limited (ASSL) was constructed at Meghna River that had the privilege to earn first Bangladeshi exporters of an ocean-going vessel. The locally built vessel named "Stella Maris", was sold to a company in Denmark. Since then, ASSL has continued to secure contracts, mainly with European clients. The other giant name in the industry is the Western Marine Shipyard, in Chittagong. The company has been able to bag several export orders in recent times. The Khan Brothers Shipbuilding Limited at the Meghna River is running the third-biggest shipyard in Bangladesh. Another name synonymous with the industry is FMC Dockyard Limited. [5] It is also distinguishes from the other companies because it contains both forward and backward linkage facilities wherein it became a full-fledged ship building and repair center. The potential of Bangladesh shipbuilding industry is compared with the leading countries of shipbuilding industry such as China, Japan, and South Korea & among. Owing to cheap labor and an increase in demand from foreign buyers, Bangladesh is gradually emerging on the world map of suppliers of small and medium-sized ocean-going shipbuilding. They argue that there is an increasing number of small scale ships to meet the pulled back world economy after the financial crisis, and thus Bangladesh will not run out of work. [6]

Global giants in the shipbuilding industry are unable to capitalize on this need for small ships because the cost of building them are prohibitive. On the other hand, Bangladesh has not felt the likes of order cancellations. However, the new recession that has up to date affected the demand for giant ships, other boats and vessels have been experiencing stable market. Because of this high international demand and the capacity of Bangladesh in building such ships, it has also been regarded as one of the most potential sectors. [7]

➤ *Research Question*

The following paper is going to analyze how the WTO frameworks affect the competitiveness of the shipbuilding industry in Bangladesh. The research question would be,

➤ *In what ways does WTO frameworks impact shipbuilding industry of Bangladesh towards the international market?*

This question is justified by the relevance of the knowledge of the effects that the rules of global trade have on a sector that is in its development phase and within a developing country. The relentless growth in recent years seen by the shipbuilding industry of Bangladesh due to increased demand of the smaller to medium-sized ships in the global market, its further growth is subjected to a series of exogenous variables such as compliance to WTO laws and agreements. In an attempt towards furnishing a response, this paper examines:

- How MFN status allows Bangladeshi exporters easier and equal access to the fair market of the importing country as any other country.
- The importance of quality and safety rules of TBT Agreement on exported ships.
- Global trade regulations as seen through anti-dumping rules and subsidies for the shore's ship builders.
- Challenges that Bangladeshi shipbuilders face when they are competing with giants such as South Korea, China, and Japan.
- WTO principles that can lead to a level industry in the international market for Bangladeshi shipbuilding industry.
- Suggestion on the measures that could be taken to make the shipbuilding sector fit WTO standards.
- Possible measures to increase the competitiveness of the ship building industry and to respond to WTO's challenges.

Understanding the responses to these research questions would give an appreciation of why this study is important and how WTO agreements and systems influence trade policies, market access, and the possible course of the Bangladesh shipbuilding sector.

➤ *Structure of the Paper*

The paper is organized to discuss the WTO frameworks and their effects on the Bangladesh shipbuilding industry. First, an introduction is made to the shipbuilding industry in Bangladesh. It lays down the research question and explains why the research is important. The literature review looks at previous research and finds areas that need more study.

Then, the paper notes down the WTO framework and principle, Most-Favored-Nation (MFN), Technical Barriers to Trade (TBT), and Anti-Dumping Measures- and their impact on the shipbuilding industry in Bangladesh.

A case study is made pertaining to the aspect of telling how the current status of the shipbuilding industry in Bangladesh stands through exporters, rival countries, and WTO rules that affect the growth of the industry in Bangladesh and why Bangladesh failing in this industry.

Challenges and controversies elucidate the technology backwardness that Bangladesh suffers from in contesting at the international arena, along with the subsidy restrictions and trade disputes.

The last two areas consisting of recommendations and policy implications travel down to outline what Bangladeshi authorities should be doing to capitalize on the WTO agreements for optimal performance in this sphere, to be followed by a conclusion summarizing the significant findings from the paper.

II. LITERATURE REVIEW

Bangladesh's shipbuilding industry is also coming to be viewed as a major potential success story. The government of Bangladesh has planned to earn US \$ 4.0 billion annually through ship export by the year 2026 due to its Shipbuilding Industry Development Policy (2020). They got cheap labor, a rich stock of ship breaking to supply resources, and a web of river systems that are perfect for ship building. However, the industry's success will depend on compliance with the main WTO principles regulating global trade, not to mention WTO agreements on specific sectors. [8]

Research has been carried out on the development of ship building industry in Bangladesh and the prospects of the industry to compete on the global market. In their paper, Zakaria, N. M. Golam & Halder, Priti & Mehtaj, Nafisa. (2023). "SWOT Analysis of the Shipbuilding Industry of Bangladesh In The Light Of Ir4.0." explained how the formation of Bangladesh's first joint venture dedicated to shipbuilding facilitates its incorporation into the global shipbuilding network. These joint ventures provide fresh technology, financial investments and management experience, which are useful for Bangladesh to match to international standards, which are crucial to compete in the foreign market, particularly with WTO rules regarding subsidies and trade. [9]

Hoque, Emranul & Akter, Shahnaz. (2024). Financial and Cost Accounting Practices of the Shipbuilding Industry of Bangladesh. 8. 169-187. They investigate the financial management on shipbuilding industry in Bangladesh. They stress on the standards of managing the financial dimensions of organizations for operating globally. To make the industry WTO compliant, it needs to have better financial literacy, control expenses efficiently and have apposite internal check and balance. This would lead to more accurate financial reports which would in turn attract foreign investors there by

meeting the WTO Fowler requirement on transparency and fair trade. [10]

Even though most large scale shipbuilding countries have similar types of Shipyards, there are some evident factors: The last significant factor is the use of Industry 4.0 application in the construction industry. Similarly, analyzing SWOT of these technologies, Zakaria, Halder, and Mehtaj (2023). At the same time, with new technologies utilization, the industry's productivity and quality could be increased; though obstacles, including the absence of infrastructure and skilled employees, high investment demands, still persist. These challenges are associated with the trade agreements, and standards, which regulate for example transfer of technology and exclusive rights. In their paper Parveen, Jannat & Kabir, Adnan. (2021). "Prospects and Challenges of Shipbuilding Industry as a Growing Sector of Bangladesh Economy. 2. 15-27." They discussed about it and showed why it's imperative for Bangladesh to invest in such technologies to better its performance on the international market. [11]

According to Siddique, P. M. K. & Shemon, Wahidul & Islam, Mazharul. (2020). "Shipbuilding: A Gateway for Bangladesh to Achieve Economic Solvency. 4". Bangladesh's shipbuilding sector is developing as a strategic position in Bangladesh's economy as it seeks to diversify export earnings from the RMG sector. They think the shipbuilding industry could hit \$2 billion in exports within one to two years because of the increasing need for smaller vessels. Despite the fact that Bangladesh offers fewer governmental subsidies in comparison with China and Vietnam, Bangladesh's local shipbuilders do retain rather high levels of productivity. This is consistent with Bangladesh's plan to diversify its export industry in accordance to what WTO has in store for the global community to make trade more liberalized or to remove barriers to trade. [12]

The paper by Anjum, Naveed & Rahman, Muhammad & Islam, Md Mynul & Hasan, Md. (2022). "Overview of Popular Raw Materials in Ship Building and a Sustainable approach for this Industry in Bangladesh." Transactions of the Krylov State Research Centre. 4. 161-172. 10.24937/2542-2324-2022-4-402-161-172. The focus is drawn on how the subject raw materials used in shipbuilding have developed with transition from conventional material to the contemporary alloys and synthetics. It provides insight into the effect of COVID19 pandemic on the prospects of the shipbuilding industry, especially in Bangladesh whereby demand for materials and price volatility has proven problematic. The authors claim that embracing sustainability is essential for the industry and Bangladesh to become the leader in shipbuilding provision worldwide. They agree that a system of these strategies of sustainable growth requires more research. [13]

Lastly, this study has shown that the development of Bangladesh's shipbuilding industry is highly dependent on National policies and WTO regulations. However, Bangladesh has to overcome constraints such as

infrastructure, skilled workforce, and technology for a better exploitation of it and it should also be compatible with WTO standards. Lack of appropriate financial management, technology and requisite international linkages are also going to be the critical success factors for the shipbuilding industry of Bangladesh.

➤ *Research Gap*

While there is a growing amount of studies dealing with shipbuilding in Bangladesh, some areas are not covered as yet. First, there is no work about the impact of each rule of the WTO on this industry, in particular regarding MFN, TBT, anti-dumping measure, trade agreements, subsidies, local content, and industry support. The other long shot glimpse is cast into the perception that hardly any literature discusses how international outlooks would take Bangladesh to the necessary technological domains of shipbuilding under the WTO environmental standards so as to keep up with competition. In furtherance, there are also other unknowns about a comparative study under the WTO umbrella between the Bangladeshi and leading country's shipbuilding, since there is still so much yet to be known by investigation.

Overall, still there is a lot of things to discuss about the shipbuilding industry in Bangladesh. More studies are needed to understand how WTO rules can help Bangladesh's shipbuilding industry grow by making better use of global trade opportunities. This will help the shipbuilding sector become better at exporting its products.

➤ *Main Body*

• *WTO Framework and Principles*

✓ *Most Favored Nation (MFN)*

As per the World Trade Organization's (WTO) pacts, state cannot discriminate against any of their business partners. Thus, if one state provided with a special benefit, let's say reduced customs duty rate for a product, the very same gain must be given to the rest as well. [14]

➤ *MFN in Bangladesh's Shipbuilding Industry*

The WTO's principle most favored Nation (MFN) plays a vital role in Bangladesh's shipbuilding Industry. It established a fair trade and removed trade discrimination. And it has a huge impact on Bangladesh shipbuilding industry.

• *Benefits for Bangladesh*

✓ *Global Market Access:*

MFN helps Bangladesh to get the access of global market. Bangladesh can export ships to all the member countries without trade barrier. This equalizes the situation of Bangladeshi shipbuilders on the global stage.

✓ *Stable Tariffs:*

MFN principle is to impose tariffs on ship exports in consistent manner and stable the tariff among all the trading partners. It helps the exporters to plan effectively.

✓ *Export Growth:*

Because of MFN Bangladesh can export ships to countries like Norway, Finland, and Germany without any difficulties that led to the growth of the industry. [15]

➤ *Challenges*

Since MFN accords equity to all the countries on equal level. Bangladesh will have to compete with those advanced ship building countries such as China, South Korea, Japan etc. And they are more technologically and in other aspects more developed. Consequently, it will be really difficult for countries such Bangladesh to cope up with these modern countries.

Basically, MFN is ideal for all the countries in the world. However, to cope up with the modern world Bangladesh need technological advancement as well.

➤ *Technical Barrier to Trade (TBT)*

TBT means Technical Barriers to Trade. These are rules and standards that provide protection to a product against possible risks related to its efficacy, health and to the environment. In ship building, it implies that ships must conform to certain specifications, specific designs, be constructed of recognized materials and contain effector safety and pollution control. [16]

➤ *Benefits for Bangladesh*

- **Better Quality Ships:** Because of the implementation of TBT rules, Bangladeshi shipbuilders can build high quality ships. Because ships that satisfactorily adhere to the international standard on safety and the environment are likely to appeal to international buyers.
- **More Ship Markets:** Thus, by meeting these standards Bangladeshi shipbuilders are free to export their ships to as many countries as possible. For instance, vessels constructed and designed by European construction standards can penetrate the European markets without further inspection.
- **Promotes contemporary technology:** For the realization of TBT requirements, shipyards require improved machines and techniques. This promotes the application of enhanced technology consequently transforming industry to have upgraded techniques.
- **Fair Competition:** TBT rules ensure that everyone plays it level by level to ensure that there are the same standard. This makes a good trade relations to avoid international shipbuilders taking advantage of Bangladesh shipbuilders like the way they have been seen doing it to other countries.
- **Assistance to Rich Countries:** For example, wealthier nations assist those lesser developed in learning how to meet TBT standards. They could do this through training and equipment, technology or financial assistance to improve shipyards in Bangladesh. [17]

➤ *Challenges Facing Bangladesh*

- **High Expenses:** To meet the TBT standards Bangladesh need to upgrade its facilities. Also they need to give training to its workers. And that will cost a lot of money.
- **Lack of Knowledge:** Thus, smaller shipbuilders may not sufficiently understand the nature of TBT requirements so that this may become an issue of concern.
- **Strong Competition:** China and South Korean nations for instance are much advanced in terms of technology and therefore can easily come to the kind of specifications required by TBT standards. [18]

➤ *Anti-Dumping Measures*

Dumping is simply the sale of products at a price that is lower than the cost of production, or lower than the domestic price of the exporting country. For this it can violate fair competition and in extremes harm local industries. To curb such, WTO allows member countries to fight back through organizations such as through anti-dumping measures such as placing further tariffs on such imports. [19]

➤ *Benefits for Bangladesh*

The threat with the world market is most dangerous in the industry of ship building which is one of the most booming industries in Bangladesh. Sometimes the giants like China, South Korea and Japan emerge as the leaders in terms of the technology and size. In this highly competitive context, anti-dumping facilities can therefore provide a form of safeguard to an embryonic Bangladeshi shipbuilding industry.

- **Protecting local shipbuilders:** Anti-dumping taxes protect Bangladeshi ship builders from low priced imports of ships and other essential commodities steel. Such measures are applied in order to maintain a fair market, where manufacturers of domestic products do not suffer from competition with foreign, often significantly cheaper imported products.
- **Maintaining Fair Trade Practices:** As it has been clearly depicted all the aforementioned anti-dumping policies are WTO compliant hence their application to encourage equity on international business. For Bangladesh this is about restraining the imaginable breakdown of 'actual' domestic market defense by being flooded with inexpensive imports a process which compromises the domestic market feasibility.
- **Promoting Growth and Investment:** When local industries are protected from predatory pricing, they are able to put in place better technologies investment in infrastructure and the human resource. In particular for the shipbuilding industry of Bangladesh, this means a bigger production increase and market share worldwide.
- **Keeping of Economic Balance:** Dumping practices are able to upset the local conditions as supply and demand become skewed in certain intervals. On this score, measures against dumping help reduce this risk, due to the acquisition by domestic industries of the essential conditions for a sustainable growth, such as shipbuilding, which is one of the most significant sectors in the context of adding value to the national GDP. [20]

➤ *Example of Impact*

Imagine this situation, some country sells steel which is a material used in the manufacture of ship for less than its actual price. On the same note, Bangladesh can place additional taxes to these imported steel products. This goes to the extent of protecting the local producers of steel and ship builders from any harm.

➤ *Challenges*

- **Difficult to Apply:** In order to provide you have evidence of unfair selling you will need to conduct proper verification and certify the evidence.
- **Risk of Confrontation:** You may start trade disputes or other nations will retaliate when you use unfair selling practices.

➤ *Case Analysis*

• *Current State of Shipbuilding Industry*

Gradually shipbuilding industry of Bangladesh is being specialized in providing small and medium sized ships to the world. Nonetheless, exports have been gradually rising in recent years even though they are mainly dictated by domestic requirements. Currently, there are exporting live-stock ships, ro-ro vessels, tug boats, landing crafts, bulk carriers, multipurpose container ships, catamaran water taxis, ferries, oily waste collection vessels, passenger ships, and patrol boats etc. to Europe, Africa and Asia. [21]

➤ *Key Features of the Industry*

• *Strong Local Demand:*

There are more than 100 shipbuilders and 120 shipyards in Bangladesh and the vast majority are located on rivers. Having 700 rivers and 24 thousand kilometers of the water transport is necessary for moving products and population. About 90% of fuels, 70% of cargoes, and 35% of passengers in the nation use water transportation. The local demand for ships is on the rise due to factors such as; economy, trade and newer infrastructure. Industry volume is about 1 billion USD per year, with growth dynamics of 5.39%. Other shipbuilding specialties are oil tankers, cargo ships, passenger vessels, ferries, and dredgers built and ranging in size from 1000 to 20000 dwt, built locally. [22]

• *Export Opportunities:*

The country now has the capability to construct an average of 20 export standard ships each year. In the construction of ships up to 12000 dwt like the multipurpose vessels and passenger ferries, the country is quite on a par. [23] For the same reasons defined above, Bangladeshi shipbuilders can lower the costs since labor is 20–30% cheaper than in many others countries. [24]

➤ *Growth Drivers*

- **Supportive Government Policies:** To support the growth of domestic production, the government has launched the "Shipbuilding Policy 2020." [25]

- **Strategic Location and Ports:** Bangladesh has a 580km sea board and the main sea borne import and export activities take place through Chittagong and Mongla. The two new deep-sea ports; Matarbari and Payra are under construction and are planned to be completed by 2026. [26]
- **Skilled Workforce:** Industry requires skilled and semi-skilled people. With client concentration it also makes available skilled and semi-skilled people so that they can easily get employed and avail these services. Raising training inducing 6,000 workers annually resulting to the majority of the workers being employed within the sector. [27]
- **Industrial Clusters:** Many of the shipyards, such those in Narayanganj and Chittagong, are located near to ship breaking yards, steel manufacturers and other related industries. This makes production easier and efficient. [28]

➤ Future Potential

According to World Bank, future growth in the industry is expected to be between 10-15% per year for the next 10 years. At a local level, over the next ten years there is a demand for about 300-400 new vessels for operations in inland and coastal water channels. Globally, Bangladesh has every reason to compete favorably in the field of manufactures of small ships mostly for regional cargo/passenger transport service. A local base for business, cheaper price structure, skilled labor and government support makes shipbuilding industry prospectus in Bangladesh to compete in the globe. This it is believed will have a huge impact on the future development of the economy of the country. [29]

However, 15 years ago Bangladesh made his entry to ship export market with Ananda Shipyard and Western Marine Shipyard. The sector had not emerged well; no ocean going ships exported in the past 20 months and only 3 in last 5 years. The global downturn beginning in 2011, COVID-19, and the Russia-Ukraine war greatly affected the business. [30]

Bangladesh has exported 45 vessels out of which 19 are ocean going ships after operation from 2006 and the total export earning was approximated at USD 136 million. Western Marine exported the most with 15 ocean bound ships followed by Ananda Shipyard exporting 4. Out of 10 export oriented companies, these two only have operated effectively and successfully in exports.

New export orders are now opening. Ananda Shipyard has planned and has already initiated building of three ships and is on the lookout for more orders whereas Western Marine has received orders of seven small vessels from UAE. Local players are upbeat as the international market preferred more compact vessels. [31]

III. IMPACT OF WTO PRINCIPLES IN THIS INDUSTRY

Bangladesh has a lot of potential to do well in this sector. Still, this industry is failing to export ships in the global market. According to the UNCTAD report on 2022, shipbuilding industry of Bangladesh has found the 14th place in the world leaving behind 27 countries and it has gone up 13 places. It has emerged as even richer than India, Singapore, Spain, Romania, Malaysia, Norway or Indonesia. The following ranking is based on the improvements in constructing global standard certified vessels in Bangladesh. [32]

As we can see in the graph China was the biggest exporter in this sector last year. China earned \$25.1 billion USD by exporting ships. South Korea, Japan is in 2nd and 3rd place by earning \$16.9 billion and \$9.6 billion USD respectively from this sector. [33]

On the other hand, Norway imported the largest amount of ships by this time. They spend \$1.30 billion dollars to buy ships in 2023. Canada spend \$0.68 billion dollar and Angola a country of central Africa spend 0.63 billion USD in this sector. [34]

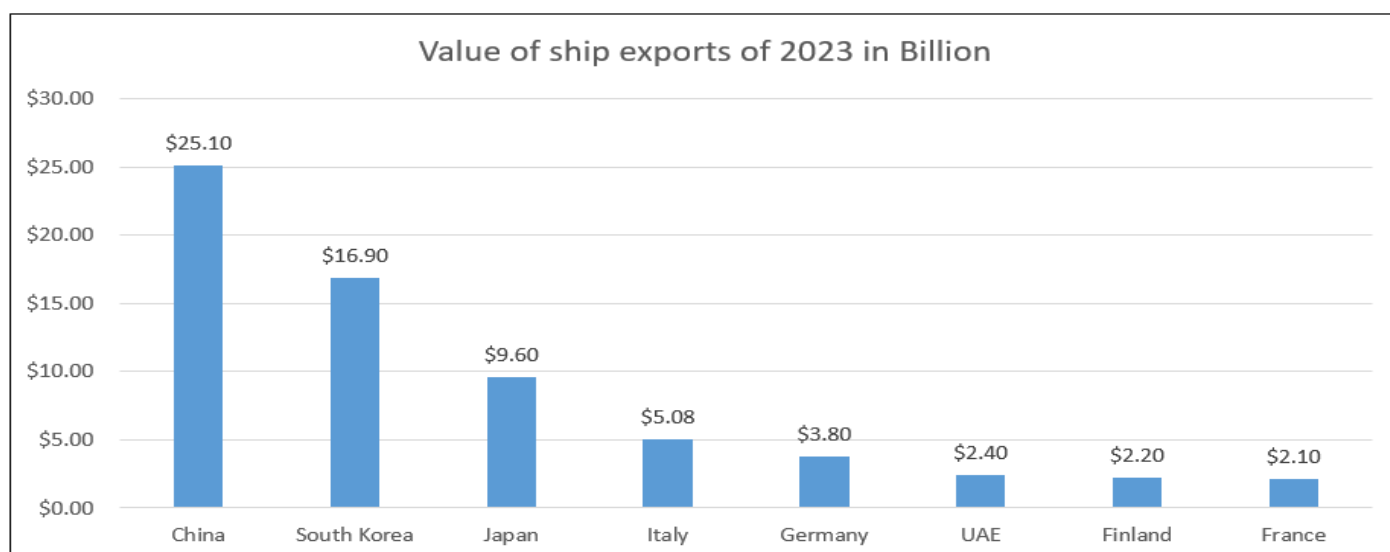


Fig 1 Value of Ship Exports of 2023 in Billion

As we can see from the graph below among the top 10 ship importing countries, 4 countries are the member of European Union and in the 10th position there is European Union itself. Bangladesh is a Least Developed country (LDC). Bangladesh enjoys Generalized Scheme of Preferences (GSP) in European Market. That means Bangladeshi product enjoys duty free in European Market. But still Bangladesh couldn't grab the European Market. Bangladesh have the full potential do well in this sector. Even

Bangladesh have the cost advantage than other top ship exporting countries. Where labor cost is 20-30% less than other developed countries. [35] Less labor cost will definitely decrease the total production cost. In this case Bangladesh lower cost is giving it absolute advantage in this labor intensive industry. It is allowing Bangladesh to produce ships more cheaply than other high labor cost countries like China, Japan and South Korea etc.

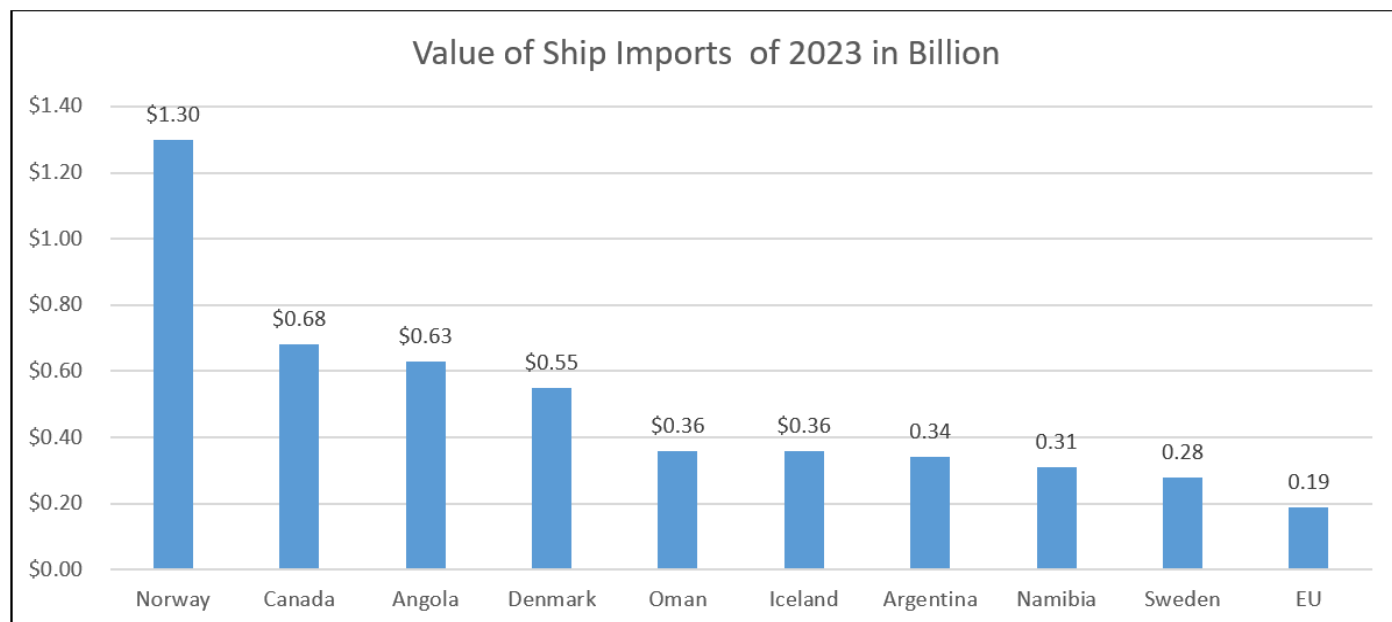


Fig 2 Value of Ship Imports of 2023 in Billion

Let's assume production cost of a product is \$300 USD without labor cost. and in general labor cost is \$100 USD per unit. 20% less labor cost of Bangladesh makes the labor cost,

$$\text{Labor cost} = \$100 \times 0.80 = \$80 \text{ USD}$$

$$\text{Total production cost (with labor)} = \$300 + \$80 = \$380 \text{ USD}$$

Now, let's assume labor cost is 30% less than other high labor cost countries.

$$\text{So total production cost will be} = \$300 + \$70 = \$370 \text{ USD.}$$

From the calculation we can see that Bangladesh have the absolute cost advantage in this industry. Yet other countries are exporting more ships than Bangladesh. Where Bangladesh could have earn more from this sector. And price of ships will be cheaper if other countries import from Bangladesh.

➤ Top 3 ship exporting country

- **Japan:** Goods imported from Japan will face no tariffs under the basis of the EU-Japan Economic Partnership Agreement (EPA). For ships with duties completely eradicated EU-Japan EPA. [36]
- **South Korea:** The EU-South Korea Free Trade Agreement eliminates tariffs on ships and virtually all industrial products, and offers preferential tariff. [37]

- **China:** Until now, there is no special FTA between the EU and China and, therefore, the tariffs apply to them as MFN tariffs determined by WTO. In most cases access through the Most Favored Nation (MFN) tariffs applied to ships and various industrial products are 0%.

They are all getting benefit as a WTO member and for their Bilateral Trade Agreement even after being a developed country. Because of no tariff in EU for this top 3 ship exporting country, other countries want to import ships from them. Because they have the best technology, training, resources to fulfill the requirement of the client.

While other countries are getting benefit from the frameworks of WTO, countries like Bangladesh barely can utilize these principles as an advantage even after having a lot of potential to do well in this sector. The main problem for Bangladesh is to meet the TBT standard. Bangladesh can't meet the requirement of the TBT standards. That's why they are not getting order from the global market.

➤ Some Difficulties of Implementation of WTO's TBT Requirements for Bangladesh

Needless to say, although there are great potentials for shipbuilding industry in Bangladesh, the adverse impact of the TBT rules set by WTO are greatly affecting this sector. These challenges affects its competitiveness and its efficiency in penetrating the global markets.

IV. TBT REQUIREMENTS: AN OVERVIEW

The WTOs TBT Agreement requires member countries to adopt technical regulations, standards, and conformity assessments in order to maintaining the safety, quality and environmentally sound characteristics of products. In the context of shipbuilding, these regulations encompass areas such as:

Adherence to maritime standards internationally (SOLAS, MARPOL etc.). To fulfill the provision of green material and emissions standards. Maintenance of conformity regarding appearance, structure and safety regulation. [38]

➤ *Theoretical Challenges for Ship Building Industry of Bangladesh*

These are some of the most specific challenges that the shipbuilding industry at Bangladesh could face in near future:

- **Lack of Modern Infrastructure:** The country has very little exposure to hi-tech ship building, except that most of them are built with traditional methods. This means that manufacturers cannot be in a position to meet the technical commissions of the importing countries especially those in Europe and North America. [39]
- **Deficiency in Certification and Accreditation:** The fact is that a significant percentage of Bangladeshi shipyards does not have internationally accredited certification of their products like ISO or classification society certifications like Lloyd's Register, BV etc. These certifications are necessary since they help meet the TBT for a product to enter the market. [40]
- **High Compliance Costs:** Updating the shipyard infrastructure and the production line in compliance with international technical standards is capital intensive. For an industry that was mostly occupied by SME's, such costs are usually very expensive.
- **Insufficient Skilled Workforce:** Bangladesh lacks technically skilled manpower that is proficient in the technicalities associated with the industry including the standard and techniques needed for advanced welding systems, quality assurance, and pollution control.
- **Limited Awareness and Technical Knowledge:** Most shipbuilders are not well informed on the technical aspects of the specifications that are demanded in the international markets or do not have the capacity to understand and apply the guidelines set down by TBT appropriately. This leads to rejection of ships or higher costs due to retrofitting most often.
- **Non-Compliance with Environmental Standards:** The importing countries then therefore have to conform to high levels of environmental concessions that include those to do with the use of environmentally friendly products including emission control technologies ballast water management systems. The above mentioned requirements are difficult to incorporate by Bangladeshi shipbuilders primarily because of the lack of technological and financial capacity.
- **Dependence on Traditional Markets:** This restricts Bangladesh's capacity to diversify its export market because of a failure to meet the TBT requirements.

Majority of the Bangladeshi ships are exported to countries which allow fewer standards which means that the market reach is regulated.

➤ *Concerns for the Industry*

Non-observance of TBT badly affects the ship building sector of Bangladesh.

- **Loss of Export Opportunities:** Failure to comply leads to market exclusivity such as the EU and US markets being closed to the company.
- **Reduced Competitiveness:** Lack of the ability to set global benchmarks allows Bangladeshi shipbuilders to lag behind competitors from China, South Korea, and Japan.
- **Higher Costs:** Rejection or change of orders makes the manufacturing rate go high thus making the costs of production high thus, the amount of money to be made is little.

V. CHALLENGES AND CONTROVERSIES

➤ *Technological Competitive Challenges*

A major factor dissuading Bangladesh's shipbuilding industry is its low levels of technology which cut off its world market potential. Small and medium sized shipyards in Bangladesh have not yet shifted from conventional technologies and methodologies. For instance, CAD and robotic welding are used on a regular basis in countries such as South Korea and China, are not common in Bangladeshi contexts. In addition, there is the lack of internationally accredited testing centers to facilitate a means whereby Bangladeshi manufacturers can easily standardize their products meeting various safety and quality requirements & from better construction techniques such as 3D printing, modern robotic control with support of artificial intelligence and or virtual reality to making better ships and all at the same time meeting environmental regulations and global sustainability. At the heart of this change, modern shipbuilding and the maritime industry as a whole is evolving. Nevertheless, the Bangladeshi shipyards have not been so proactive in the case of embracing such advanced technologies, which added a new dimension to the competitive disparity. The inability to fully integrate any of such advancements leads to reduced effectiveness, higher costs of production, and market opportunities not met. [41]

The other difficulty is the general absence of conditions for mass production and output. Most of the shipyards are situated in regions that have access to poorly developed deep water ports which puts them in a disadvantaged position in constructing the larger vessel required by international buyers. These technological drawbacks lead to increased costs of production, low productivity and hence the inability to operate at the international market.

➤ *Global Competition*

The number of shipbuilding giant companies stationed in such countries as South Korea, China, and Japan is high, as these countries offer the necessary shipbuilding technologies, recruitment of qualified personnel, and matters turning the scale at the scales. While China has had a great

deal of governmental support to back the path, South Korea has always sustained the dynasty through high tech approaches. For instance, South Korean Hyundai Heavy Industries leans more towards LNG carriers and offshore platforms construction, while China CSSC offers low priced bulk carriers and container ships. [42]

In WTO, competition is done through the agreements to encourage fair trade among the partners in trading. However, the Bangladeshi shipbuilding industry cannot sustain this because WTO standard technical compliance is expensive. In addition, local shipyards in Bangladesh cannot build the capacity to diversify its product offering, this will decline their competitiveness because the market is now defined by size and differentiation.

➤ *Competitive Landscape:*

Although, WTO regulations do not allow protectionism, Bangladesh is competing against technologically developed countries like South Korea and China, having economy of scale advantage and huge R&D backup. WTO mechanisms such as the Technical Barriers to Trade (TBT) can even impose additional barriers to market entry if facility export by Bangladeshi shipyards are sub-standard regarding safety and quality.

➤ *Subsidy Issues*

Bangladesh still depends on government subsidies as its new shipbuilding industry is in its early stages. Such incentives may involve issues such as tax exemptions, low rates of port charges, and export promotion incentives. But, these policies involving subsidies appear to be highly regulated in the WTO in a bid to discourage competitions. The SCM of WTO categorizes some subsidies into prohibited or actionable which may limit the opportunity of Bangladesh for giving subsidization on direct export. [43]

For instance non subsidies Policy reason, indicate that subsidies are believed to injure the international trade or prejudice the interest of the other WTO member countries, Bangladesh can encounter challenges or disputes. This poses a challenge to policy makers on how they can promote the industry while at the same time trunk to WTO regulations. Unfortunately, the absence of viable approaches to manage these limitations remains a major concern for the development of the industry.

➤ *Trade Disputes*

The shipbuilding industry of Bangladesh has not been directly associated with WTO related trade controversy. However, lacking economy of scale means that while the industry grows, so does the potential for conflict. For example, dumping will attract anti-dumping investigation or countervailing measures by the countries which feel that subsidies place exporters, such as the Bangladeshi exporters, at an unfair competitive advantage. Consequently, failure to meet technical regulations or environmental standards is likely to be followed by restrictions on market access or legal proceedings.

Perhaps, an artificial example could be a trade disagreement with the European Union when Green Deal environmental standards may clash with Bangladesh's manufacturing processes. The conflicts in question could lead to huge monetary sanctions and imitate losses for the breweries, as well as damage their image.

➤ *Emerging Problems*

In addition to the above challenges, several new issues are emerging

• *Environmental Compliance:*

Implementation of low emission vessels in the global markets and the increasing adoption of sustainable resources to building materials are some of the issues that Bangladeshi shipyards are likely to face. Lack of access to the environmentally sustainable technologies and skills limits the country's ability to adhere to international standards on environmental issue.

• *Intellectual Property (IP) Issues:*

This is true because while Bangladesh is aspiring to embrace new technologies it has some few problems hinging on issues that deal with Intellectual Property Rights especially in case of acquirement of technology from more evolved nations. Such could lead to increased cost, disputes and possibly go to court.

• *Worker Safety and Labor Standards:*

Purchasers in the global market are beginning to look into the various conditions that the shipyards involve their workers in. Bangladeshi garment industry, especially shipbuilding sector is also criticized for its unwillingness to adopt acceptable safety standards at workplaces and thus can suffer from trade ban or loss of contracts.

• *Market Diversification:*

Concentration on a few export markets exposes the industry kind of to volatility of such markets/either a change in demand or change in trade policies. The B2B manufacturing organizations need to invest largely into the marketing activities and acquiring necessary certifications to operate in the new regions, as well as the local regulations.

VI. RECOMMENDATIONS AND POLICY IMPLICATION

At present the situation of the Shipbuilding industry of Bangladesh can be described in the following words – critical. It is also seen on the verge of graduating from the LDC status to the developing country status. [44] As with any form of modification, this has given a new form of events which are advantageous and disadvantaging the company, these new events are; access to markets: another new event which the company has to conform to is the international standards. There are compliance, innovative, CB&T and IDWP as priority areas in the industry. Please see below for some plain and straightforward steps on what needs to be done.

➤ *Global Standard and Certification*

- Follow International Standards: Bangladeshi government should take the example of countries round the globe that has benefited from IMO and WTO and help the small scale shipyards in Bangladesh to get the IMO certification. [45]
- Promote Green Shipbuilding: Thus it is imperative for the country to begin the process of new ship building production technology on renewable and low carbon content material. These technologies should be developed, more so these technologies should be made popular and the expenses should be incurred by the government. State support and promotion of development of sustainable ship architectural designs and green technologies.

The government should also obtain financial and technical assistance from the international organizations. They also can include such further and more incentives as tax credits to the manufacturers of the ships who employed different green technologies in course of the manufacture of the ships.

➤ *Expanding Market Access*

- Sign Free Trade Agreements (FTAs): Government of Bangladesh should focus to sign those FTAs which are in strategic markets as per the above analysis, such as European Union, Japan and ASEAN countries. It is agreed that the government should endeavor to continue to qualify for GSP+ facility when there is no longer any LDC on the list.
- Strengthen Regional Trade Relationships: SAARC and BIMSTEC regions combined need to be developed from Bangladesh to build up a single market through the trade treaties that have been drawn.

There should likewise be government formations for some special sensitive matters pertaining complicate trade negotiations and the other aspects of trade should be marketed through financing. Formulate trade negotiation professional with skills that enable him/her to deal with WTO and Free Trade Agreement negotiations. Ensure diplomatic means and trade promotion in target areas. Actively participate in the process of simplification of trade and development of intra-regional trade together with other countries of the region.

➤ *Enhancing Investment and Financial Functions*

- Encourage Public-Private Partnerships (PPPs): Based on these factors there is a logic for the government to increase the involvement of PPPs in the financing of the modernization and expansion of India's shipyards.
- Expand Export Financing Options: Thus, Bangladesh should design funds for the export of ships with the help of financial organizations that are present in the World Bank.

The government needs to approach the last stages of legal regulation of the field of maritime investment regarding the establishment of special funds for the formation of

financial support and credit guarantee for private business. Establish a shipbuilding investment corporation to provided focused financing to shipping projects. In order to manage credit risks for private sector participant's credit guarantee schemes should be created. Make sure that subsidies and incentives given fall under WTO's compliant sector for aid, i.e. environmental and research support.

➤ *Market Specialization*

- Target Specific Markets: More construction of simple types of ships including ferries and fishing ships and set our sights on the eco boat projects.
- Improve Quality and Branding: It is essential that they market their Bangladesh ships into the international market through creating commitment in the quality of ships being manufactured, participation in the global exhibitions and advertisement of ships being manufactured.

This is a clear indication that the government should undertake market intelligence through market research with a view of establishing the trends of the market. It should also provide a financial other for the international marketing and partnership.

➤ *Infrastructure and Logistics*

- Upgrade Shipyard Facilities: Some of the options that need to be developed are purchase of more efficient tools, a large area of establishment, better machinery and so on.
- Improve Port and Logistics Efficiency: Bangladesh should improve and properly develop the so called "soft infrastructures" like port and other logistics centers for better conveying of raw materials and ships which will eventually be cost cutting and benefit yielding.

For the enhancement of FDI in construction segment and to reform customs procedures responding to multinationally acceptable standards. Infrastructure, access to international financing for the development. This involves encouraging PPPs for logistics and port establishment and for the operation of logistics and port facilities'. Advancements in customs and logistics procedures and adopting them according to the TFA set up by WTO.

➤ *Cost and benefit analysis of WTO compliance*

Suppose, Bangladesh is aiming to expand its capability to export more ship since ship exports are the part of export basket of Bangladesh. To understand the net payoff from resulting compliance, we'll first go through WTO rules.

- Cost to upgrade a shipyard to meet international standards: \$20 million USD.
- Revenue per ship after meeting global safety and environmental standards: \$15 million USD.
- These standards will enable Bangladesh export 30 ships per year once production reaches this level.
- Net Benefit= (Total Revenue per Ship * Actual Number of Ships Exported) – Cost of Upgrade
- Net Benefit= (15million USD * 30) – 20million USD

- Net Benefit= 450 million USD – 20 million USD = 430 million USD

If Bangladesh sculpture its vision to export more ships it needs to enhance capacity of ship building. We'll calculate the net benefit from complying with WTO rules. Therefore, ship export maintaining the standard of WTO and upgrading the shipyards of Bangladesh would gain net benefit of 430 million USD for Bangladesh.

➤ *Human Resource Development*

- Establish Training Institutes: Set up more professional technical colleges for maritime engineering and ship building and technology education and exchange with universities and ship building countries.
- Focus on Advanced Skills: Explain employment of modern articles in the ship and structures like, Ship electronic part, automation and ecological design on the ship.

The government should provide a percentage of the nation's education budget toward the maritime courses while at the same time motivating colleges to involve informed personnel in the marketplace for the delivery of education as fits the international standards.

➤ *Advanced and Green Solutions*

- Use Digital Technologies: To match up with the technicality, better infrastructures in shipyards for shipbuilding like CNC machines, automated welding machines, testing and researching labs, **Block chain for tracing the supply chain and improving efficiency**, etc. are needed by investing good amount.
- Invest in Automation: Facilitating Use of robots and automation systems in activities like welding and assembling.
- Funding for Green R&D: Government backed research funds should be provided toward the development of sustainable methods of ship construction particularly in relation to energy particularly renewable energy.
- Technology Upgradation Programs: Provide an interest free loan or grant to shipyards, for the purchase of automation, AI and IoT technology for their ships.
- Public-Private Collaboration: Develop grounds for cooperation in clean and advanced technologies within the framework of joint investments with international shipbuilding industry representatives.

Government should provide technology parks for the investors from other countries to start up ships in order to engage in ship constructing business; there should be subsidy programs for SMEs to install advanced or ecological technology.

➤ *The Impact of Technology in Ship Construction*

Let's assume that Bangladesh decides to upgrade its shipbuilding technologies that enhance output, lower material cost and produce better ships. These innovations could lead to the following: Technology improvement and automation

of processes, access to better material means a decrease of at least 10% in the cost of constructing each ship.

- Old cost to build a ship: \$30 million USD.
- Technology-driven cost reduction: 10% reduction.
- New Shipbuilding Cost = 30million USD × {1– (10/100)}

Bangladesh successfully implements the strategy of investing primordially in technology to greatly slashed \$3 million USD per ship in cost of constructing ships. It increases ship capability requirements lead to increased foreign interest, especially from the superior segments such as EU and US

➤ *Effect on Export Revenue:*

If Bangladesh continues to export 30 ships annually at the new cost (with technology), the savings from technology become significant:

- Savings per ship: \$3 million USD. Total savings from technology (for 30 ships)
- Total Savings = 3 million USD×30 = 90 million USD

The money saved through synergies could be reinvested to enhance the service offerings, increase headroom or even make the ships even more attractive in an increasingly burgeoning global marketplace. Also advanced shipyards will attract foreign investors.

➤ *Navigating WTO Frameworks*

- Seek Support for LDC Transition: The support Bangladesh expects to be kept well beyond graduation that is after graduation from the LDC status of the country is the shipbuilding industry.
- Promote Environmental Incentives: Bangladesh need to insist on subsidies for green technologies in WTO platform.
- Improve Dispute Resolution: Enhance the capability of WTO in providing the Dispute Settlement System for appropriate solving of new developing trade problems.

Bangladesh should join other developing countries and must constitute a particular group for WTO trade policy modifications.

➤ *Building a Strong Reputation for Quality*

- Strengthen Branding Efforts: Bangladesh should use 'Made in Bangladesh' logo advertisement slogans indicating high quality and low cost and advertise the ships in the foreign markets.
- Foster International Collaborations: To improve the knowledge and technology of Bangladesh have to in coordination with the leading world ship builders.

On publicity issue, the government should focus more on branding programs as well as the promotion to participate in international trade fairs.

➤ *More specific rules and Enhanced Regulation*

- **Ensure WTO-Compliant Policies:** The Government should look at the subsidies and incentives it provides, that is, the Governmental export subsidies and TW to ensure that it complies with WTO and if not it will be penalized.
- **Establish a Maritime Policy Framework:** To this end, the country should consider developing a national maritime policy which captures Issues to do with Labor Relations, Environmental Conservation and Subsidization.

National maritime policy unit to ensure the country has implemented policies that have been developed to help facilitate its maritime commitment and policies.

➤ *Targeted Exceptions for Bangladesh*

- Demand more flexibility for export-related subsidies for industries with long lead times of production, and others.
- Call for non-competitive status of government-supported credit aids crucial for infrastructure financing.

➤ *The Effect of Government Subsidies to Shipbuilding*

Let's take the example of government subsidy to shipbuilding so that Bangladeshi exports may become cheaper. Per WTO guidelines subsidies may not be given in a manner that will influence competitive advantage in the global market, though for this purpose let's assume that Bangladesh did offer a 10% subsidy on shipbuilding.

- Subsidy rate: 10%.
- Shipbuilding cost per ship (before subsidy): \$30 million USD.
- Subsidy Calculation: $\text{Subsidy} = (10/100) \times 30 \text{ million USD} = 3 \text{ million USD}$
- Effective Shipbuilding Cost = $30 \text{ million USD} - 3 \text{ million USD} = 27 \text{ million USD}$

This lower cost makes Bangladesh's ships cheaper than those of counterparts in the inter-country waterway system. On the other hand Labor cost in Bangladesh 20-30% cheaper than other top ship exporting countries. It will make the ship cheaper and attract foreign buyers.

➤ *Incentive Policy Adjustments*

- Exempt from taxes or allow lower tariffs for the imports of sophisticated equipment necessary for the shipbuilding industry only with constraints bound to WTO.
- Guarantee WTO-consistency of operational modes for encouraging the PPP initiatives with the public sector.

➤ *Better and cheaper Access to Raw Materials*

- **Tax Breaks on Imports:** However, encourage the duty-free import of critical material such as steel and other complex alloys to bail out the burden of high costs of production.
- **Domestic Production Support:** Promote the use of locally produced shipbuilding grade steel through grant aids, subsidies and tax exoneration to steel producers.

- **Supply Chain Development:** Set up factories for the supply of material and parts used in shipbuilding and prevent the over emphasizing on imported items.

➤ *Export Promotion and Policy*

- **Streamlined Documentation:** Reduce export formalities and thus waiting time for ship exporters.
- **Export Subsidies:** The incentives provided to various businesses for exports should not be in violation of WTO laws. Such as adopted tax credits of exportations of goods and services including machineries and tools among others.
- **Market Diversification:** Increase current and potential maritime exports by creating export strategies especially in new and emerging markets.

VII. CONCLUSION

There is a great prospect of the ship building industry as a means to enhance economic growth, employment and export diversification in Bangladesh in this graduations process of the country from LDC. However, this sector has several problems: lack of access to high-tech equipment, great age of equipment, high competitiveness in the field of shipbuilding within the framework of international cooperation with such dominant world countries as South Korea, China, Japan, which use equipment such as welding robots and environmentally friendly technologies. To bridge these gaps significant investments in technology, infrastructure and people development will be required.

It also makes Bangladesh to focus on quality, brand creation and to look for specific market areas in the global market. All WTO regulation concerning TBT, SPS, environment standards, subsidies are very important for sustainable development. However, matters such as environmental endowment, employment relations and protection of ideas cannot be overlooked. For example, not using green technologies excludes organizations from the eco-friendly market and reduces the chance for exports explaining the need for materials, decreased emissions, and improved working conditions.

Measures that need to be undertaken to strengthen the sector include: actualizing FTAs with the relevant regions, strengthening regional markets, promoting PPP for capital infrastructure. Setting up of training centers, encouraging research and development as well as changing over to environment friendly processes are important in developing skilled commercial workforce as well as innovation. Compensating measures, such as promoting extension of export outlets, providing import tax incentives on necessary materials, and encouraging the development of local source materials, also improve competitiveness. The WTO guidelines must be complied with, global trends have to be predicted, and awareness has to be created to make Bangladesh a reckoning force in the global shipbuilding industry. The sector has the capacity with the right policies and practice to contribute towards the growth of the national economy and its market share in the international market.

REFERENCES

- [1]. Contributors to Wikimedia projects. (2024). Shipbuilding in Bangladesh - Wikipedia. Wikimedia Foundation, Inc. https://en.wikipedia.org/wiki/Shipbuilding_in_Bangladesh
- [2]. Étienne Fortier-Dubois. (2022). The Industrial Revolution That Almost Was. Hopeful Monsters. <https://www.hopefulmons.com/p/the-industrial-revolution-that-almost>
- [3]. Dockyard and Engineering Works Limited Bangladesh. (2024). dewbn.gov.bd. <https://www.dewbn.gov.bd/historical>
- [4]. Contributors to Wikimedia projects. (2024). Dockyard and Engineering Works - Wikipedia. Wikimedia Foundation, Inc. https://en.wikipedia.org/wiki/Dockyard_and_Engineering_Works
- [5]. Harry Boo. (2024). ASSL | Quality is our moto. anandashipyard.com. <https://www.anandashipyard.com/>
- [6]. 31st anniversary issue-I. (2024). Shipbuilding in Bangladesh: opportunities & challenges. The Financial Express. <https://thefinancialexpress.com.bd/views/analysis/shipbuilding-in-bangladesh-opportunities-challenges-1647444297>
- [7]. Ahsan H. Mansur. (2023). Harnessing the Tide: Unlocking the Potential of Bangladesh's Shipbuilding Sector – Policy Insights. policyinsightsonline.com. <https://policyinsightsonline.com/2023/11/harnessing-the-tide-unlocking-the-potential-of-bangladeshs-shipbuilding-sector/>
- [8]. 31st anniversary issue-I. (2024). Bangladesh sets ship export target at \$4.0b by 2025. The Financial Express. <https://thefinancialexpress.com.bd/economy/bangladesh/bangladesh-sets-ship-export-target-at-40b-by-2025-1611754944>
- [9]. Halder, P., Mehtaj, N., & Zakaria, N. M. G. (2023). Swot Analysis of the Shipbuilding Industry of Bangladesh in the Light of IR4.0. SSRN Electronic Journal. <https://doi.org/10.2139/ssrn.4446276>
- [10]. Emranul Hoque. (2024). google.com. <https://scholar.google.com/citations?user=AUCT26sAAAAJ&hl=en>
- [11]. Parveen, Jannat & Kabir, Adnan. (2021). Prospects and Challenges of Shipbuilding Industry as a Growing Sector of Bangladesh Economy. 2. 15-https://www.researchgate.net/publication/325715397_Toward_shipbuilding_40-an_industry_40_changing_the_face_of_the_shipbuilding_industry
- [12]. Siddique, P., Sheikh, W., & Islam, D. (2019). Shipbuilding: A gateway for bangladesh to achieve economic solvency. Bangladesh Maritime Journal. https://bsmrmu.edu.bd/public/files/econtents/5f8060cd7fcb4BMJ_V4_Issue_article_5_pmk.pdf
- [13]. Naveed Anjum. (2024). OVERVIEW OF POPULAR RAW MATERIALS IN SHIP BUILDING AND A SUSTAINABLE APPROACH FOR THIS INDUSTRY IN BANGLADESH. academia.edu. https://www.academia.edu/111768194/OVERVIEW_OF_POPULAR_RAW_MATERIALS_IN_SHIP_BUILDING_AND_A_SUSTAINABLE_APPROACH_FOR_THIS_INDUSTRY_IN_BANGLADESH
- [14]. What is a most favored nation (MFN). (2024). BDC.ca. <https://www.bdc.ca/en/articles-tools/entrepreneur-toolkit/templates-business-guides/glossary/most-favoured-nation>
- [15]. Most favored nation | Access2Markets. (2024). europa.eu. <https://trade.ec.europa.eu/access-to-markets/en/glossary/most-favoured-nation>
- [16]. WTO | Technical Barriers to Trade. (2024). wto.org. https://www.wto.org/english/tratop_e/tbt_e/tbt_e.htm
- [17]. tbt3rd_e.pdf. (2021). wto.org. https://www.wto.org/english/res_e/booksp_e/tbt3rd_e.pdf
- [18]. Shamsuddin Illius. (2024). Bangladesh's shipyards invest Tk2,000cr for a greener industry. The Business Standard. <https://www.tbsnews.net/supplement/bangladeshs-shipyards-invest-tk2000cr-greener-industry-978816>
- [19]. WTO | Anti-dumping - Gateway. (2024). wto.org. https://www.wto.org/english/tratop_e/adp_e/adp_e.htm
- [20]. WTO | Understanding the WTO - Anti-dumping, subsidies, safeguards: contingencies, etc. (2018). wto.org. https://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm8_e.htm
- [21]. Press Xpress. (2024). Bangladesh's Shipbuilding Industry: An Export Powerhouse. Press Xpress. <https://pressxpress.org/2024/03/29/bangladeshs-shipbuilding-industry-an-export-powerhouse/>
- [22]. Ahsan H. Mansur. (2023). Harnessing the Tide: Unlocking the Potential of Bangladesh's Shipbuilding Sector – Policy Insights. policyinsightsonline.com. <https://policyinsightsonline.com/2023/11/harnessing-the-tide-unlocking-the-potential-of-bangladeshs-shipbuilding-sector/>
- [23]. Shipbuilding: a promising industry of Bangladesh – NewVision Solutions Ltd. (2024). newvision-bd.com. <https://newvision-bd.com/shipbuilding-a-promising-industry-of-bangladesh/>
- [24]. BIDA - Shipbuilding. (2024). bida.gov.bd. <https://bida.gov.bd/shipbuilding>
- [25]. 31st anniversary issue-I. (2024). Shipbuilding policy — a welcome move. The Financial Express. <https://thefinancialexpress.com.bd/editorial/shipbuilding-policy-a-welcome-move-1613059372>
- [26]. Foisal Ahmed. (2023). Construction of Matarbari port progressing at full pace. The Business Standard. <https://www.tbsnews.net/bangladesh/infrastructure/construction-matarbari-port-progressing-full-pace-594486>
- [27]. 12.%20Ship%20building%20Industry%20Development%20Policy%202021.pdf. (2022). portal.gov.bd. https://moind.portal.gov.bd/sites/default/files/files/moind.portal.gov.bd/page/66b4934c_1ad2_4ab3_a9f8_329331d9b054/12.%20Ship%20building%20Industry%20Development%20Policy%202021.pdf
- [28]. Home. (2024). Karnafuly Ship Builders Ltd. <https://ksblbd.com/>
- [29]. 6166c36a3ed37649367965.pdf. (2024). bida.gov.bd. <https://bida.gov.bd/storage/app/uploads/public/616/6c3/6a3/6166c36a3ed37649367965.pdf>

- [30]. Harry Boo. (2024). ASSL | Quality is our moto. anandashipyard.com. <https://www.anandashipyard.com/>
- [31]. Masud Alam. (2024). No export of ocean-going vessels in 20 months. Prothom Alo English. <https://en.prothomalo.com/business/local/ars2rs5ukj>
- [32]. "Shipbuilding in Bangladesh can be traced to the medieval era that underwent gradual expansion during the British colonial rule." The Financial Express. Accessed December 17, 2024. <https://thefinancialexpress.com.bd/views/analysis/shipbuilding-in-bangladesh-opportunities-challenges-1647444297>.
- [33]. Contributors to Wikimedia projects. (2024). List of countries by ship exports - Wikipedia. Wikimedia Foundation, Inc. https://en.wikipedia.org/wiki/List_of_countries_by_ship_exports
- [34]. Norway Fishing vessels and factory ships imports by country | 2023 | Data. (2024). worldbank.org. <https://wits.worldbank.org/trade/comtrade/en/country/NOR/year/2023/tradeflow/Imports/partner/ALL/product/890200>
- [35]. 123. (2024). ndc.gov.bd. <https://ndcjournal.ndc.gov.bd/ndcj/index.php/ndcj/article/download/142/123>
- [36]. EU-Japan. (2024). Trade. https://policy.trade.ec.europa.eu/eu-trade-relationships-country-and-region/countries-and-regions/japan/eu-japan-agreement_en
- [37]. EU-South Korea Free Trade Agreement | Access2Markets. (2024). europa.eu. <https://trade.ec.europa.eu/access-to-markets/en/content/eu-south-korea-free-trade-agreement>
- [38]. WTO | Technical barriers to trade - Technical Information. (2017). wto.org. https://www.wto.org/english/tratop_e/tbt_e/tbt_info_e.htm
- [39]. Shipbuilding Industry - Banglapedia. (2023). banglapedia.org. https://en.banglapedia.org/index.php/Shipbuilding_Industry
- [40]. Pacific Certifications. (2024). ISO Certifications in Bangladesh, Popular Standards, Requirements and Benefits. Pacific Cerifications. <https://blog.pacificcert.com/iso-certifications-in-bangladesh/>
- [41]. Modern Marine Technology in Bangladesh. (2024). Tauhid Ahmed. <http://tauhidahmed.weebly.com/ew1.html>
- [42]. Welcome to HD Hyundai Heavy Industries. (2024). hhi.co.kr. https://english.hhi.co.kr/biz/offshore_over
- [43]. 24-scm.pdf. (2002). wto.org. https://www.wto.org/english/docs_e/legal_e/24-scm.pdf
- [44]. Bangladesh graduation status | LDC Portal - International Support Measures for Least Developed Countries. (2024). un.org. <https://www.un.org/ldcportal/content/bangladesh-graduation-status>
- [45]. Introduction to IMO. (2024). imo.org. <https://www.imo.org/en/About/Pages/Default.aspx>