SWOT Analysis of Bangladesh Maritime Region for the Strategic Approach of Bangladesh Delta Plan-2100

M. R. Ashikur[1*] and R. S. Rupom[2]

Abstract

Bangladesh is called a Maritime Nation and Maritime Region (MR) has been subjugated geomorphologically and hydrologically by the Ganges-Brahmaputra-Meghna (GBM) basin and the Bay of Bengal (BoB). Bangladesh Delta Plan 2100 (BDP-2100) has been taken for sustainable delta management and an intrinsical relationship appears among the parameters of MR and BDP-2100. Strength (S), Weakness (W), Opportunity (O), and Threat (T) (SWOT) analyses are revealed an object's current situation and make it possible to augment future short-term as well as a long-term plan like BDP-2100. The objective of the study is to analyze the parameters of MR through the SWOT matrix to find out the strategic approaches for the implementation of BDP-2100. The study is based on reviewing different published research papers, articles, and reports, etc., and about 32 parameters of MR are identified through the literature review for the SWOT technique. The SWOT technique demonstrates that the MR of Bangladesh has enormous strength and extensive opportunity, but the strength is not exploited, and the opportunity is not utilized owing to their high internal weakness and moderate external threat. The study reveals four strategies i.e. SO, WO, ST, and WT strategy, and based on these it suggests some strategic approaches for the implementation of BDP-2100 contemplating the MR. Besides, the study recommends that marine resources should be utilized properly for a balanced ecosystem, new laws and regulations should be introduced to restrict the unsanctioned interruption of foreign entities and a maritime court should be established to ensure the peace and protection of the maritime border, modern technology can be used for exploration, exploitation, conservation, and management of maritime resources, all islands and ports should be used as the tourism sector, Individual or group should be supported to collaborate for maximizing the development in the maritime territory.

Keyword: Maritime region; Marine resource; SWOT; BDP-2100; Strategic approach.

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Introduction

Maritime region (MR) consists of the ocean and coastal areas (Vicente-Cera et al. 2020, 102731) and it is estimated that over 70% of the world's land area is enclosed by oceans and 90% of global trade is conducted over sea-routes (Aksenov et al. 2017, 300-17; Islam & Shamsuddoha 2018, 45-54; Zis et al. 2020, 107697). The basin countries of MR have consisted of Maldives, India, Sri Lanka, Bangladesh, Myanmar, Thailand, Indonesia, and Malaysia (Murty et al. 2020, 102048). The MR of Bangladesh has consisted of 19 districts and the Bay of Bengal (BoB) (Figure 1). In the BoB, the exclusive economic zone (EEZ) area spans 164,000 km^2 and the shelf area covers roughly 66,440 km^2 (Sattar & Cheung 2019, 101283). The resources include 200 nautical miles of EEZ and 354 nautical miles of the Continental shelf. Recently, Bangladesh has achieved the exclusive right to explore, exploit, conserve and manage maritime resources over a vast area of 118,813 km^2 of the BoB (H. U. Ahmed 2018; Report 2020). The new maritime boundaries give Bangladesh a potential source of natural resources (F. Alam et al. 2019, 18-25; Bissinger 2010, 103-42; Gomes 2013). Besides, several potential new ocean industries have been identified in the MR (S. Alam & Ahammad 2017, 122-33) and it is estimated that the resources extracted from the BoB constitute 81% of the resources available in its land area (H. u. Rashid 2018).

Bangladesh Delta Plan-2100 (BDP-2100) considers some parameters which are existing in the MR and there is a mutual relationship between them. The General Economic Division (GED) of the Bangladesh Planning Commission (BPC) has formulated BDP-2100 with the cooperation of the Government of Netherlands (GoN) for coping with the challenges of climate change and natural hazards. The aims of the BDP-2100 are removing extreme poverty and attaining upper-middle-income countries by 2030 and upper-income county by 2041. Besides, BDP-2100 has encircled some specific goals like ameliorating water security and proficiency of water usage, confirming safety from floods and climate change-related disasters, maintaining and preserving wetlands and ecosystems, ensuring sustainable and integrated river systems and estuaries management in the MR and other parts of the country. BDP-2100 takes the middle-term delta agenda until 2050 but keeps in consideration its longer-term implications to 2100 (BDP-2100 2018).

Strength, weakness, opportunity, and threat (SWOT) are the parameters to make the competitive strength for determining any object position and strategy (Gürel & Tat 2017; Haque et al. 2020, 111118). A strength is an ability or resource that can be used efficiently to achieve its goals (Bull et al. 2016, 99-111; Büyüközkan et al. 2020, 100929; Li et al. 2020, 60-75; Thomas et al. 2014, 112-59). The MR of Bangladesh is rich in vast natural resources and its proper utilization contributes to the national economy. Weakness is fault, limitation, or defect that will be prevented to achieve the goals (Bull et al. 2016, 99-111; Büyüközkan et al. 2020, 100929; Li et al. 2020, 60-75; Thomas et al. 2014, 112-59). The lack of proper utilization of natural resources is the major weakness in the MR. Moreover, some shortcomings of the authorities have hindered the development of the MR. An opportunity is any favorable circumstances within the context of any institution (Bull et al. 2016, 99-111; Büyüközkan et al. 2020,

100929; Li et al. 2020, 60-75; Thomas et al. 2014, 112-59). Nationally and internationally, the MR has several tremendous opportunities, including positive relations with neighboring countries and acquaintances with international organizations that enrich the economic expansion. On the other hand, a threat is any unfavorable circumstances within the context of the institution that potentially damages its strategy (Bull et al. 2016, 99-111; Büyüközkan et al. 2020, 100929; Li et al. 2020, 60-75; Thomas et al. 2014, 112-59). The MR of Bangladesh faces threats by its various acts of violence that hinder the proper adoption of the strengths and opportunities of the MR.

The researchers use SWOT analysis in different sectors to recognize future potentiality. Ofosu-Boateng, 2017 has used the SWOT analysis to investigate the oil piracy situation and the relationship between maritime transport and security in the Gulf of Guinea (Ofosu-Boateng 2017, 14-34). Hossin et al., 2018 have discussed the scopes, challenges, and threats of e-commerce as well as its growth dimensions in Bangladesh using SWOT analysis. In the study, the authors recommend that the government need to take a proactive step to better enforce ICT policy for the smooth operation of e-commerce businesses in Bangladesh and the achievement of digital Bangladesh ambitions (Hussain et al. 2018, 88-99). Mondal, 2017 has mentioned a way in which the tourism industry in Bangladesh can develop sustainably using the SWOT model and a derived matrix. The author has found that Bangladesh's existing tourism activities are unsustainable. This research also reveals several weaknesses-threats strategies that can be established for a sustainable tourism industry (Mondal & Haque 2017, 159-67). From the previous studies, it is realized that the SWOT technique in MR of Bangladesh is a new context and there are limited works in BDP-2100 considering the aftermath of SWOT of MR.

The present study is conducted through secondary resources like published papers, research articles, and reports, etc. The objectives of the study are to analyze 32 parameters of MR through the SWOT technique and to investigate a mutual relationship between the parameters of MR and BDP-2100. The study also intends some strategic approaches for the implementation of BDP-2100 contemplating the MR. Table 1 shows the SWOT analysis matrix diagram where a 2x2 SWOT matrix has been developed and discussed 4 strategies i.e. SO, WO, ST, and WT strategy by utilizing internal strengths and external opportunities along with lessening internal weakness and external threats.

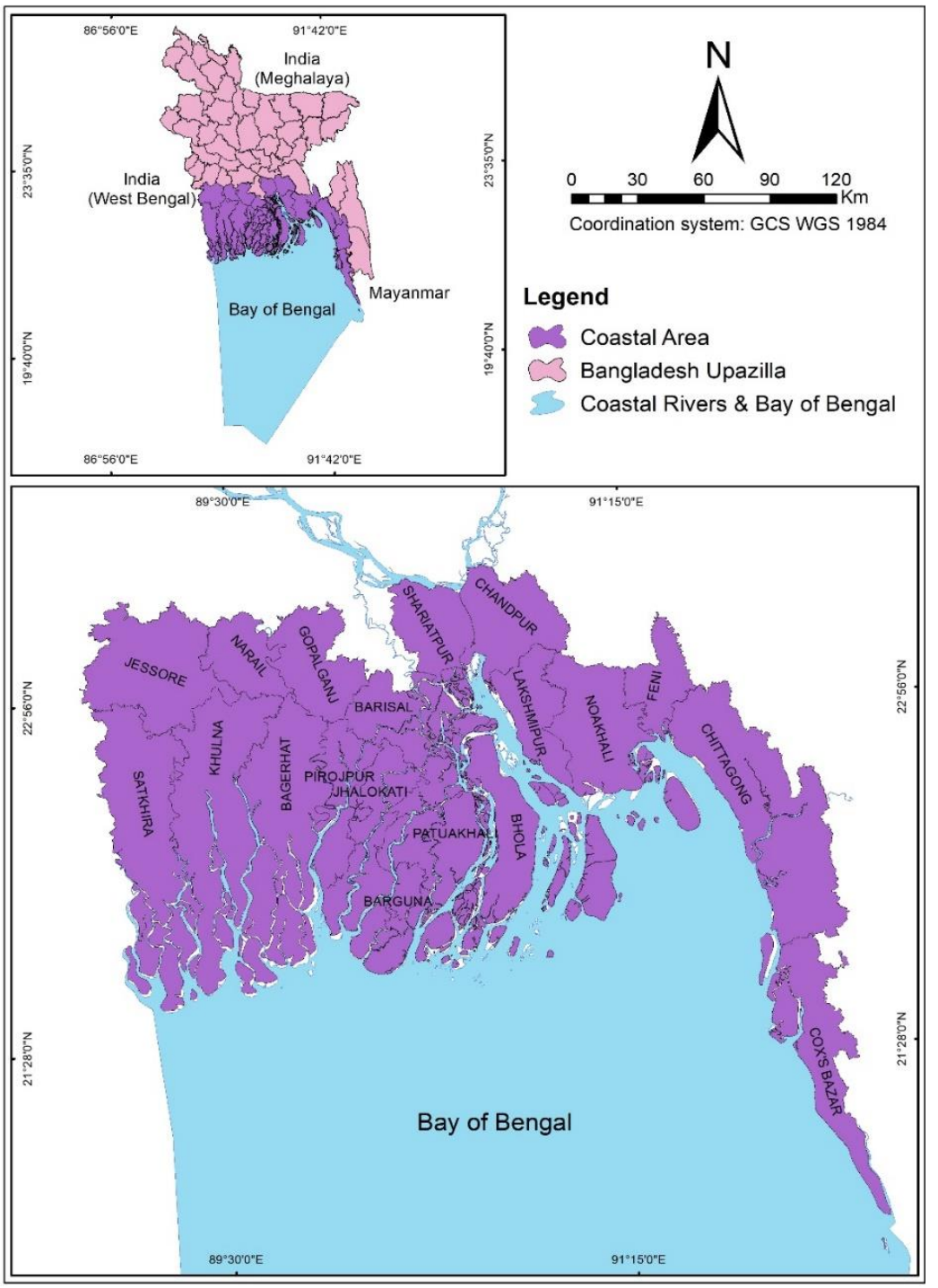

Figure 1: Maritime region of Bangladesh (Developed by authors, 2020)

Table 1: SWOT analysis matrix diagram (Developed by authors, 2020)

	Strength (S)	Weakness (W)
Opportunity (O)	**1. SO strategy** How does an object use its strength to take advantage of its opportunity?	**2. WO strategy** How does an object overcome its weakness and get the advantage from its opportunity?
Threat (T)	**3. ST strategy** How does an object use its strength to reduce its threat?	**4. WT strategy** How does an object get the strategic approach to reduce its weakness and threat?

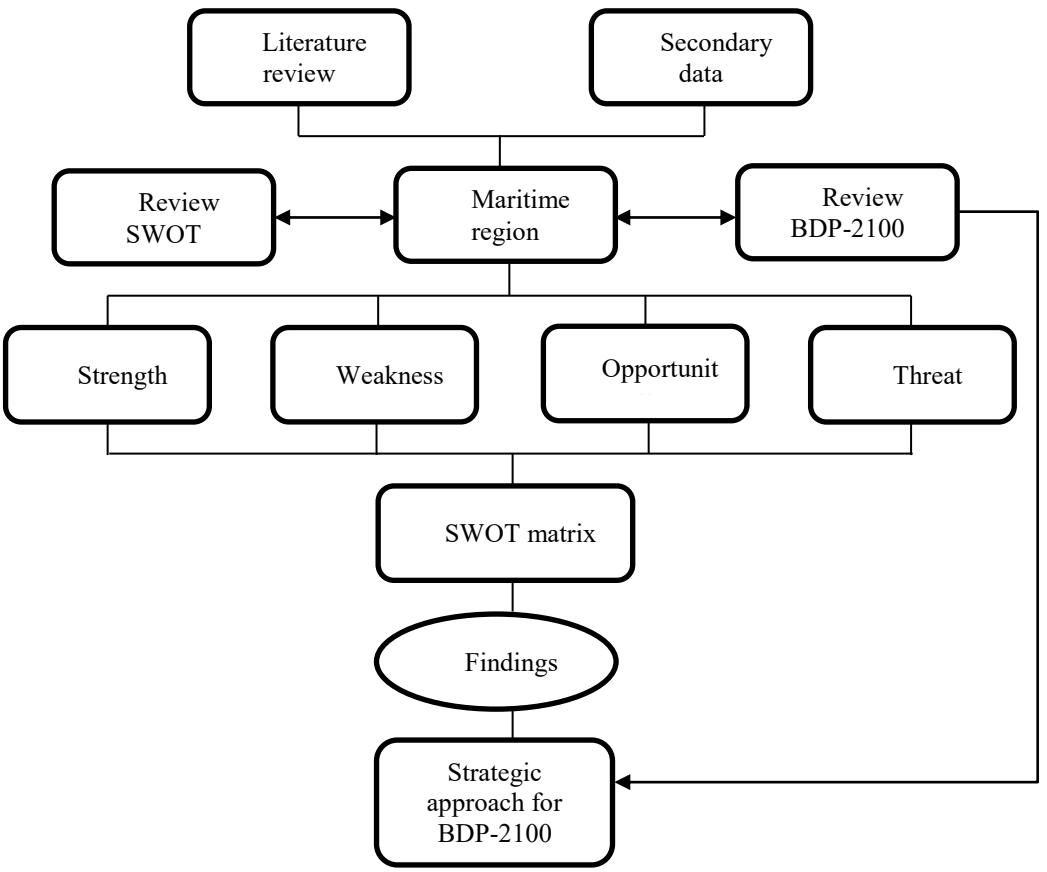

Figure 2: Schematic procedure of the study (Developed by authors, 2020)

Figure 2 shows the work diagram of the study where secondary information and resources are gathered for the SWOT of MR as well as for the BDP-2100. After getting the SWOT matrix, it has been delivered some strategic approaches for the implementation of the BDP-2100 considering the parameters of MR.

SWOT of Maritime Region

Strength of the Maritime Region:

S1-Abundance of fisheries: The government of Bangladesh (GoB) has declared a marine reserve area covering 698 km^2 and a marine protected area (MPA) covering 1738 km^2 in the BoB. The extraction of shrimp and Hilsa from MR is about 7.46% and 43.46% respectively and the marine water resources contribute about 16 % of national total fish production in Bangladesh (Figure 3) (Bangladesh Fisheries Report 2018).

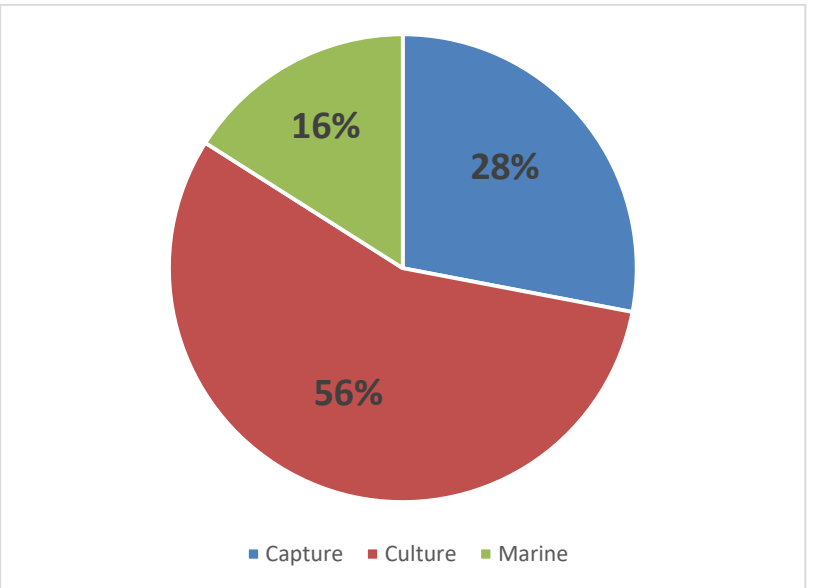

Figure 3:Fish production category (Bangladesh Fisheries Report 2018)

S2-Natural gas: Natural gas is one of the main petroleum and there are 27 gas fields in Bangladesh. The whole country was divided into 23 blocks for the sound search of gas in 1988 where 16-21 no blocks were fallen in the MR. The calculated retrievable gas reserve was 12.43 TCF (trillion cubic feet) but the amount became 27.12 TCF at the end of 2017 (Shetol et al. 2019, 347-54). Figure 4 shows that in the economic year of 2018-19 the condensate production is above 5000 Ltr (Liter) and gas production is above 40000 mmcf (millimeter cubic feet) (BAPEX 2019).

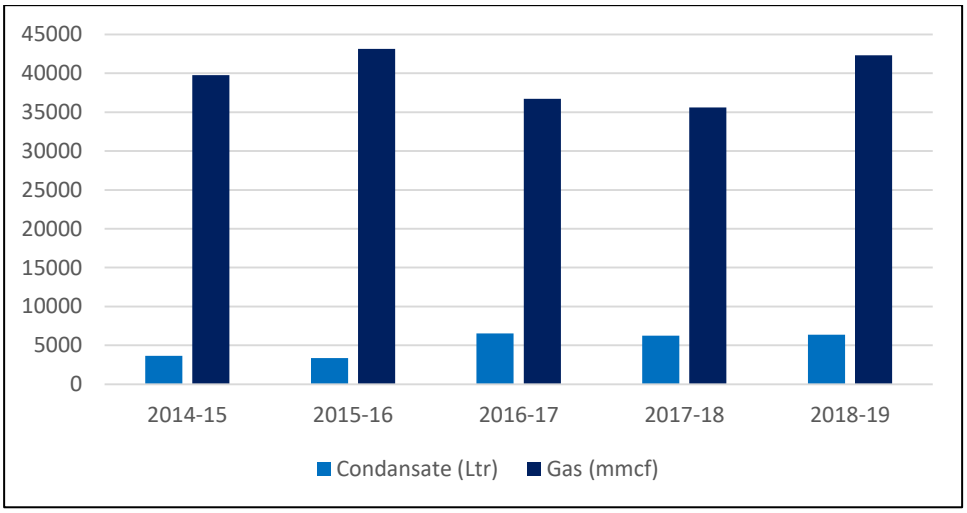

Figure 4: Gas production in Bangladesh (BAPEX 2019)

S3-Sea salt production: The salt is traditionally produced on the Cox's Bazar and Chittagong coast. Recently salt cultivation has been started in the Khulna and Satkhira coastal belt. In the year 2009-2010, the production of sea salt was 17.07 MT (metric tons). In Bangladesh, the salt production per acre is 17.25 MT following the traditional method and 21 MT following the modern method (Banglapedia 2020).

S4-Ship and boat building: Shipbuilding is a highly competitive subject in the global market where tanker and container shipbuilding is expected to arise from the bulk carrier market. In the next decade, shipbuilding shows the potential to grow mod-erately (Hasan et al. 2017, 218-23; M. M. Rahman 2017, 224-31). The seaborne cargo is increasing 6-8% per year and the market of new shipbuilding is increasing at the rate of 3-4% per year (Saki et al. 2019, 98-102).

S5-Tourism: Bangladesh contains the longest sea beach in the world called Cox's Bazar and other tourism places are located at Teknaf, St. Martin's Island, Kuakata, etc. (S. M. A. Rahman et al. 2020, 111587). Besides, Sundarbans-based tourism flourishes in the western part of Bangladesh for the last few decades (Khanom & Buckley 2015, 178-80). In the national tourism sector, gross domestic product (GDP) and employment contribution are 4.3% of GDP and 3.8% of total employment (Chakraborty et al. 2020, 100279; Travel & Council 2018). Tourism in Bangladesh is categorized into business, pleasure, and officials which contributed to 42%, 23%, and 17% respectfully (FAO 2020), and investment in the tourism sector is expected to grow more than 9% annually (M. L. Rahman et al. 2010, 9363; Rani et al. 2020, 105024; Roy & Roy 2015, 53-61)

S6-Port and maritime logistic: The Chittagong port is an important contributor to the national economy of the country with growth in container traffic. It is ranked 76th among the 100 busiest container-handling maritime ports in the world. The port primarily handled containerized, manufactured products including garments, leather products, seafood, raw materials, fertilizers, etc (Monir 2017; Saha 2018). There are

also two other ports in Bangladesh namely Mongla port in Bagerhat district (F. Hossain et al. 2016, 7) and Payra port on the western bank of the Rabnadbad channel (port Authority 2019).

S7-Marine renewable energy: The available renewable energy sources in Bangladesh are wind, solar, biomass, hydropower, and geothermal energy to overcome the energy crisis (Action 2016). The renewable energy consumption scenario in Bangladesh is hydro, solar and wind for 60%, 39.5%, and 0.5% respectively which are in total share of 3% to the national energy consumption (Uddin et al. 2019, 655-61). Solar energy is the fastest-growing renewable energy sector in Bangladesh (F. Ahmed et al. 2013, 698-707).

S8-Marine manufacturing and ship recycling: Bangladesh, the world's leading ship recycling country, was recognized as the world's largest ship recycling country in 2015. Over the past decade to 2015, the marine manufacturing and ship recycling industries in Bangladesh recycled over 175 ships approximately 1.8 million light displacement tons (LDTs) in a year (Ahammad & Sujauddin 2017). On average annually, 20,00,000 MT of different sorts of outdated ships are recycled and an average of 1,833,461 MT of reusable materials is produced in Bangladesh's ship recycling industries (K. Hossain 2017, 6). These industries also provide employment opportunities to thousands of skilled and semiskilled workers from all over the country.

Weakness of the Maritime Region:

W1-Illegal, unreported, and unregulated (IUU) fishing: Bangladesh has ranked 47th on a recent global index that positions the countries considering vulnerable, prevalent, and responsible for IUU fishing. 152 countries worldwide have a maritime coastline that is ranked based on indexing score and the indexing score of Bangladesh is 2.41 (1 was best and 5 was worst) (UNB 2020). Among the illegal fishing operations, the most dangerous is the illegal trade in baby Hilsha (locally 'Jatka'). Out of a gross annual yield of 389,000 MT, only 118,000 MT of fish and shrimp is legally harvested. The foreign boats and trawlers are responsible for harvesting the rest of the 271,000 MT of fish and shrimps (IPAG 2019).

W2-Oil and gas extraction deficiency: Though oil and gas are large natural resources in MR but due to lack of modern technology Bangladesh is not able to extract oil and gas as per demand. In FY 2014-2015, Bangladesh Petroleum Corporation (BPC) imported 1.297 MMT (million metric tons) of crude oil and 4.095 MMT of refined oil of which 63% was diesel (Uddin et al., 2019). A recent survey reports that there is no oil and gas exploration in the deep offshore block in Bangladesh (M. A. RAHMAN 2020).

W3-Coastal water pollution: Though Bangladesh is an agriculture-based country, about one-tenth of its GDP is received from industrial sectors and these are situated along the riverbank. Since wastewater treatment does not happen when it is discharged, it pollutes the whole waterbodies. Besides, chemical fertilizers used on land and oil leaking from vessels contaminates the water in the coastal area. The International Maritime

Organization (IMO) has predicted that carbon emissions from ship industries can increase by 50-250% between 2010 and 2050 (M. W. Alam & Xiangmin 2019, 17-27).

W4-Lack of regulation: After 48 years of independence, due to the concern of two neighboring states and lack of legal and economic management, the MR is still unable to protect vast sea territory like land boundaries. From the sign of the negotiation to the present, the GoB is unable to formulate a code for maritime problems and is unable to comply with UNCLOS (UN Convention on the Law of the Sea) maritime rules and regulations. Although the sea area is larger than its land territory, MR is not developed as an exclusive maritime court. UNCLOS also addressed the way forward for the advancement and transition of marine technology for the revelation, exploitation, conservation and management of marine resources, as well as international regulation and national legislation for the prevention, reduction and control of marine pollution, but Bangladesh has still not been able to pursue this strategy of marine environmental pollution control and marine resource management. There is insufficient regulation to stop the unauthorized entry of the fishing ships, fishermen, and cargoes of the neighboring states and to control the environmental degradation of the maritime zone (Hosen 2019, 1331).

W5-Lack of monitoring port: The most difficult challenges of port monitoring in Bangladesh are operations and maintenance inefficiency, weak security system, infrastructural barriers, reverse transit system, insufficient ICT knowledge, the entire financial system, etc. The most important issues regarding operations and maintenance inefficiency in the Chittagong port are the lack of customs clearance, human resources scarcity, institutionally informal practices within the port, weak digitization, etc. The main monitoring problems for Mongla port are poor transport infrastructure and extremely continuous siltation due to the Farakka barrage in India (M. J. A. Sarker & Rahman 2015, 25).

W6-Illegal trade in containers: In Bangladesh, 96-98% of lorries are made with shipping containers and cost 2-2.5 lakh to construct the body of a lorry (Mokbul Ahmed, Chief of Bangladesh covered van truck goods transport owners' association). The cost of constructing the body of a lorry is cheap because it is performed by evading government tax and illegal fees. Because of negligence on the part of the customs authority and no monitoring, the shipping containers which are brought from foreign countries and are legally allowed to return with export or empty goods are sold with tax evasion in the local market and then uses to make lorries and temporary housing. At least 57 empty containers with tracking numbers have been found in various container selling shops and workshops in Chattogram (Suman 2020).

W7-Lack of technology for marine renewable energy: In Bangladesh, there are no adequate modern technologies for exploring and using the marine mineral resources and renewable energy (Hosen 2019, 1331), and only 3% of electricity is produced from renewable energy sources (Uddin et al. 2019, 655-61). The inadequate technological progress is confirmed the creation of negative intensity in the renewable energy sector. The shortage of sufficient qualified workers and skilled labor, engineering, or

operational skills also hinder the innovation and development of the renewable energy sector in Bangladesh MR (Karim et al. 2019, 5774).

W8-Lack of ecosystem protection: The marine ecosystem steadily declines the quality of life of a significant section of the coastal people. Due to both natural disasters and man-made hazards, many of the coastal residents face climate change and sea-level rise, caused by global warming, often are threaten the coastal zone's ecological stability (Islam & Shamsuddoha 2018, 45-54).

Opportunity of the Maritime Region:

O1-International maritime boundary: The new maritime sea-boundary with India and Myanmar gives a new opportunity to achieve sustainable economic development by exploiting the blue ocean to its south. This maritime boundary forms a good relationship between Bangladesh and its neighbors. In 2011, India, Maldives, and Sri Lanka formed a working group to exploit the sea resources. It encouraged cooperation and partnership with India, Myanmar, and other countries in extracting resources from the BoB (B. H. u. Rashid 2015).

O2-Interaction with an international organization: The BoB initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) is a regional bloc built upon the promise of cooperation that comprises Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka, and Thailand. This organization focuses on the regional economy, development, trade, and investment. In 2005, Bangladesh signed the Asia Pacific Trade Agreement (APTA), which enabled a reduction of trade gaps with other nations such as China, South Korea, and India. Bangladesh is an active member of the world trade organization (WTO) for tackling matters related to the multilateral scheme of trade (B. H. u. Rashid 2015).

O3-Relation with neighboring countries: Bangladesh had good relations with Bhutan, Maldives, Nepal, Sri Lanka, and India. Although there are border disputes in MR, Bangladesh-India relations are getting closer by solving that. Bangladesh and Nepal have reached an agreement to promote the land transportation system between the two countries (Shamsuddoha & Islam 2017, 50).

O4-Connected with Indian ocean: The BoB, an extended northern portion of the Indian ocean is defined by a broad U-shaped basin with a southern opening to the Indian ocean at its topography. A geological formation in the Gulf is equivalent to the Indus River Basin and the western edge of the Indian Peninsula. The connection of the BoB with the Indian ocean strengthens its connectivity with neighboring countries, including India, which develops the Bangladesh economy (Chaudhury & Chatterji 2019).

O5-Connected with foreign seaport: India has 13 major ports, among these seven are situated on the eastern coast of the country including the Andaman Islands and the Nicobar Islands. For India's maritime trade with Bangladesh ports such as Kolkata-Haldia, Paradip, Visakhapatnam, and Chennai are important. Bangladeshi shipping lines begin transporting containerized cargo from Kolkata to Pangaon's inland waterway

port. India and other states explore exporting cargoes such as food grains, raw materials for clothing through sea routes to make bilateral trade more competitive (Choudhury 2020).

O6-Tidal halophytic mangrove forest: The Sundarbans is the world's largest single block of halophytic mangrove forest in the southwest of Bangladesh. It is rich in natural resources at the Ganga-Brahmaputra delta point where the delta is merged with the BoB. It is also a center of economic activities such as timber, fishing extraction, and honey collection consisting of about 200 islands separated by around 400 interconnected creeks, tidal rivers, and canals. In 1875, the Sundarbans was declared as a reserve forest and later designated as three sanctuaries for wildlife, as well as a UNESCO World Heritage Site in 1997 (Das & Aminuzzaman 2017, 1-15).

O7-Ganga Brahmaputra delta: The Ganga-Brahmaputra delta is in Asia where the Ganga and Brahmaputra rivers are discharged into the BoB. This delta is the world's largest delta, and about two-thirds of the total delta is found in Bangladesh. With a delta width of approximately 350 km, the Ganges Delta is one of the most productive regions in the world (van Driel et al. 2015, -).

O8-Submarine fan: The Bengal fan is the largest submarine fan in the world which is affected by the availability of adherent rivers Ganges and Brahmaputra sediment load and smaller sediment contributions from other river systems in Bangladesh and India. The Bengal fan is completely covered by the floor of BoB (Curray et al. 2002, 1191-223; Schwenk & Spieß 2009, 107-31).

Threat of the Maritime Region:

T1-Armed robbery, theft, and piracy: Armed robbery, theft, and maritime piracy threaten maritime security in the MR that negatively affect global trade flows and Bangladesh's economic growth. The ICC's International Maritime Bureau (IMB) states that territorial waters in Bangladesh are at high risk of armed robbery targeting ships (RECAAP 2017). Cox's Bazar District Fishing Trawler Owners Association (CBDFTOA) has reported that pirates seize more than 1000 fishing boats and collect more than $1.28 million on ransoms from MR (RECAAP 2017).

T2-Arms and Drugs smuggling: Drug smugglers and international terrorist groups sometimes work hand to hand in BoB, which is a laborious task for Bangladesh's long-standing national security agencies. The MR of BoB is bordered by 'Golden Crescent' from Pakistan which shares the sea with the 'Golden Triangle' of Myanmar. These areas are considered a hotbed of illegal arms and drug smuggling which pose a significant threat to security. Traffickers from India and Myanmar send Yabba and other illicit drugs and narcotics to Bangladeshis through BoB (IPAG 2019). From 2012-2019, several fishing crafts loaded with weapons and narcotics were also confiscated by the Bangladesh Coast Guard (BCG) and the navy police in Cox's Bazar coastal town (IPAG 2019).

T3-Human trafficking: Men working abroad with fake job offers are a major part of the victims of trafficking in Bangladesh who are later abused on condition of forced

labor or debt bondage. Some children are sold to slavery by their parents while others are coerced by deceit and physical abuse through labor or sexual prostitution. Bangladeshi women and children are also trafficked for commercial sexual abuse in India (Afp 2018).

T4-Sabotage and terrorism: Maritime terrorism and sabotage are becoming a growing international security concern among the major common maritime threats. The Suritec Piracy Report, 2014 revealed that the impending seaborne threats would occur in South China, the Gulf of Guinea, and Bangladesh. The pirates plunder fish and mineral resources and assist in the smuggling of small and heavy weapons. They also patronize local gangs and crook officials as well as police officers (IPAG 2019).

T5-Transboundary problem and issue: The eight countries of the BoB identify three major transboundary problems and the BoB large marine ecosystem (BOBLME) identifies three major issues such as degradation of coral reefs, seagrasses, and mangroves, overexploitation of living marine resources, pollution and water quality. The availability and distribution of transboundary waters leave its stakeholders unhappy, disbelieved, and contested. The transboundary has numerous ecological consequences due to water diversion and its importance between Bangladesh and India at the national and regional levels (Baten & Titumir 2016, 13-27).

T6-Geopolitical issue: Myanmar's opening draws far-reaching implications on the geopolitics of the BoB in the MR. India also takes steps to exploit great opportunities and to deal with potential challenges. Although the BoB is experiencing drastic changes, it remains a natural sphere of influence for India, and New Delhi's concerns and interests in the BoB (Chattoraj 2018; M. N. I. Sarker & Rahman 2019).

T7-Climate change: The MR in Bangladesh is the most vulnerable areas in the country. Mangroves, tidal deltas, and low-pressure coastal plains, sandy beaches, coastal wetlands, estuaries, and coral reefs are particularly at risk in the coastal environment. The most significant ecosystem in the world the Sundarbans are ruined with a one-meter rise in sea level. At least 70 major cyclones threatened Bangladesh's coastal belt over the past 200 years and approximately 900,000 people died in past 35 years. Almost 53% of the coastal areas were affected by salinity and due to an increase in temperature of 32^0 C, the coastal aquaculture was declined. In the coastal area, about 140,000-160,000 households are dependent on fisheries that are devastated by rough climate events (Ahmad 2019, 1-7; Minar et al. 2013, 114-20).

T8-Marine habitats degradation: The BoB is a high bio diversified area with many vulnerable and unprotected species. The main reason for marine habitat degradation is transboundary issues. The root causes of the problems are the coastal poor's food protection needs, lack of coastal development planning, increased trade in coastal habitat products, coastal growth and industrial development, inadequate marine protected areas and lack of enforcement, upstream growth affecting the flow of water, concentrated upstream agricultural practices, and increasing tourism (Ahmad 2019, 1-7).

SWOT Strategy for The Maritime Region

Table 2 shows the SWOT matrix in the MR where the first raw contains internal factors like strength and weakness and the first column contains external factors like opportunity and threat. The strength-opportunity (SO) strategy defines the way to get the opportunity of the MR by utilizing its existing strength. The weakness-opportunity (WO) strategy defines the way to conquer the weakness of the MR by getting advantages of its opportunity. The strength-threat (ST) strategy defines the way to utilize its strength to fight with the external threat. At the last, the weakness-threat (WT) strategy defines the way to reduce the internal weakness and external threat by taking necessary approaches. Considering the 32 parameters of the MR, an output of the SWOT matrix strategy is given below:

SO strategy: The MR of Bangladesh has tremendous natural resources and great opportunities to utilize these resources. Proper exploitation of the vast natural resources in the MR helps to develop the relationship between Bangladesh and the other countries and assist in the economic development of Bangladesh. Moreover, the manufacturing and recycling industry and the port and tourism sector grow through mutual collaboration that will increase the GDP of Bangladesh.

WO strategy: Bangladesh has many renewable energy sources, but these are not inquired into due to the lack of modern technology. Moreover, the lack of imposing appropriate laws and regulations hinders the growth of the port sector and the tourism industry that lead to a decline in national income. Through improving modern technology and applying law and regulation, natural resources and renewable energy will be properly exploited and utilized, and the maritime commerce and trade sectors will be developed. Besides, water and forest resources can be conserved through international collaboration.

***ST strategy*:** There are several threats in the MR that can be reduced by proper utilization of wealth and resources. The natural resources of the MR can be protected from various offenses by eliminating international conflicts among the trans-boundary countries, and the manufacturing and recycling industries can be developed through public-private partnerships (PPP). Climate change is a significant threat to the MR that has considerable effects on the maritime commerce and trade sector in the past year. The growth of these sectors can be accelerated by taking the required measures and technology to minimize natural calamity.

WT strategy: There are some major weaknesses and threats in the MR that impede the development of this region. Through using modern technology and imposing laws, and regulations, the natural resources and renewable energy sources of the MR can be properly utilized, and the development of the maritime commerce and trade sector will be accelerated by closing down the illegal allies. This region faces too many national and foreign threats. Although the foreign threats may not resist very easily, by taking the required measures the national threats can be resisted. Multiple offenses in this area can be prevented by taking required measures and effective punishment of the

authority. Besides, climate change and marine habitat loss are regulated with increased public awareness and government and non-governmental acts.

Table 2: SWOT matrix of the Maritime region (Developed by authors, 2020)

Internal **External**	**Strength** 1. Abundance of fisheries. 2. Natural gas. 3. Sea salt production. 4. Ship and boat building. 5. Tourism sector. 6. Port and maritime logistics. 7. Marine renewable energy. 8. Marine manufacturing and ship recycling.	**Weakness** 1. IUU fishing. 2. Oil and gas extraction deficiency. 3. Coastal water pollution. 4. Lack of regulation. 5. Lack of monitoring in port. 6. Illegal trade in containers. 7. Lack of technology for marine renewable energy. 8. Lack of ecosystem protection.
Opportunity 1. International maritime boundary. 2. Interaction with the international organization 3. Relation with neighboring countries. 4. Connected with the Indian ocean. 5. Connected with a foreign seaport. 6. Tidal halophytic mangrove forest. 7. Ganga Brahmaputra delta. 8. Submarine fan.	**SO Strategy**	**WO Strategy**

Threat 1. Robbery, theft, and piracy. 2. Arms and drugs smuggling. 3. Human trafficking. 4. Sabotage and terrorism. 5. Geopolitical issue. 6. Climate change. 7. Trans boundary problem and issue. 8. Marine habitats degradation.	**ST Strategy**	**WT Strategy**

The Relationship Among The Parameters of The MR And BDP-2100

The BDP-2100 is a tactical techno-economic, long-term, comprehensive, and water-centric program for achieving a 'safe, climate-resilient, and prosperous Delta by 2100. In BDP-2100, eight hydrological regions of Bangladesh are defined in six hotspots areas based on vulnerability to natural disasters and climate change including the Chittagong hill tracts, coastal zone, and river systems, and estuaries that are considered in the MR of Bangladesh. Figure 5 indicates the mutual relationship between the parameters of MR and BDP-2100.

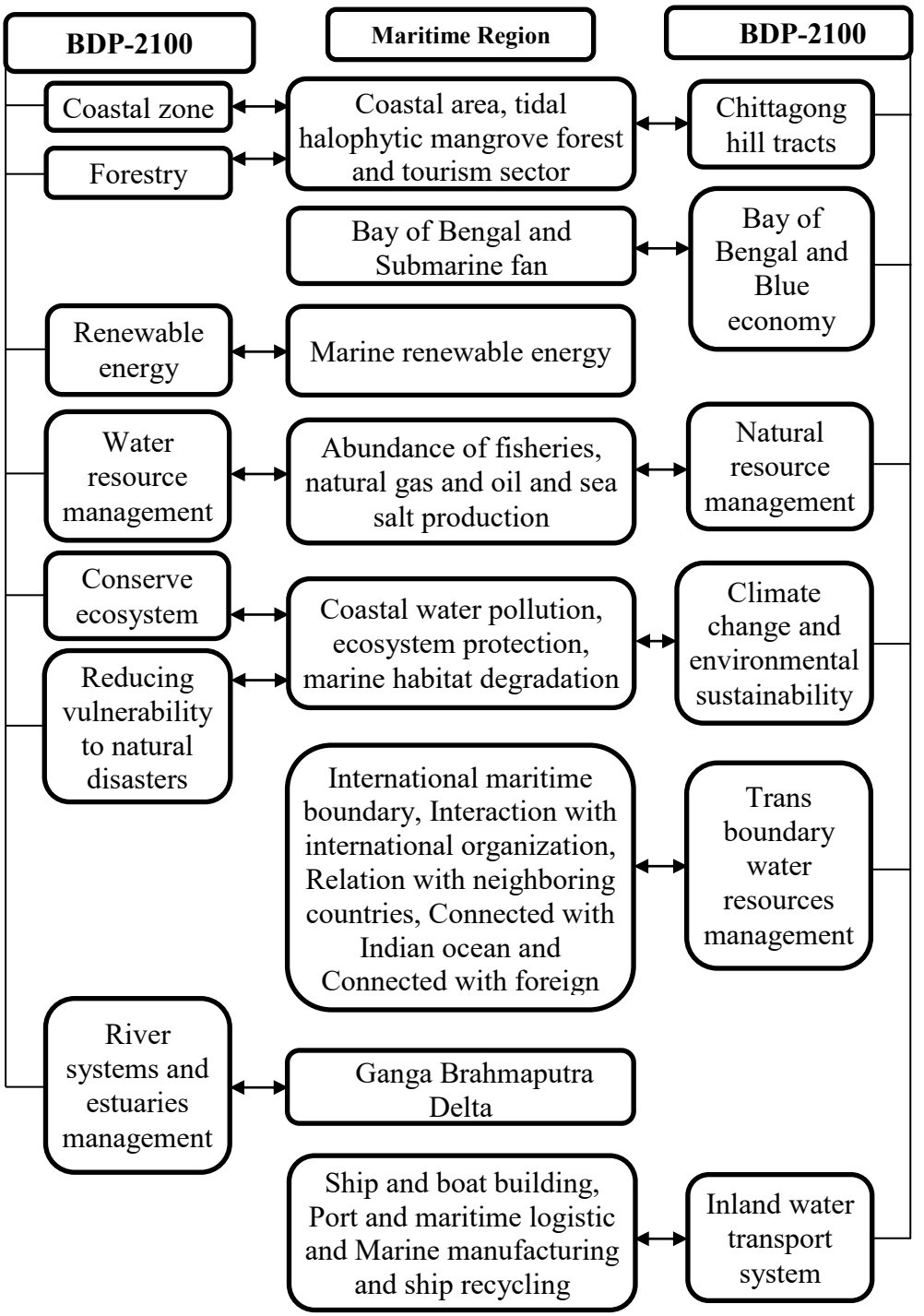

Figure 5: Mutual relationship between the parameters of the maritime region and BDP-2100 (Authors generated, 2020)

Strategic Approaches for Implementation of BDP-2100

GBM Delta, the largest delta of Asia and contains a major part of Bangladesh especially a large part of MR and it is the most populated Delta on the earth. As BDP-2100 focuses on the GBM Delta and it has an inevitable relationship with the inhabitants of the land and coastal people, relation to the economy and national culture, it requires some strategic approaches for proper action and development of the Delta area. Here is given some approaches for the implementation of the BDP-2100 considering the parameters of MR:

Climate change and Flood risk management: Climate change and flood risk can be managed by developing economic conditions without degrading the environment, mitigating the risk of climate change through optimal use of the natural resource, developing climate-resilient through a participatory process, and reducing flood risk through infrastructure development.

Freshwater management: Freshwater can be ensured by managing basin and embankment in the MR, excavating local water reservoir, constructing rubber dam, using modern technology for irrigation, restoring the natural reservoir and water bodies, and preserving the groundwater level.

Coastal zone management: Coastal zone can be sustained by existing products for storm surge and salinity intrusion, increasing drainage facilities, balancing water supply from river to ocean, and vice versa, reclaiming new land for coastal management and reducing the water level.

Conservation of Sundarbans: Sundarbans can be conserved by planting all layers of a forest at the same time, using existing plants to build soil, introducing only hardy plants initially, and raising the levels of organic matter in the soil artificially.

Chittagong hill tracts: Strategic approach for Chittagong hill tracts is by protecting the economic zone, ensuring water security and sanitation, maintaining ecological balance, and developing multi-purpose resource management.

River systems, estuaries, and water resource management: River systems, estuaries, and water resource can be managed by providing river space, improving both vehicle capability and stunning rivers, preserving ecosystems and resources of the rivers, allowing safe and reliable waterway transport, developing a strategy for sediment management, strengthening management of river and estuaries in newly recognized lands, dredging maintenance and capital arrangements for important rivers.

Fisheries management: The fisheries can be preserved by conserving the ecosystem, improving the wetland management in MR, maintaining biodiversity to ensure long term fish availability, and managing sustainable marine fisheries resources.

Inland water transport management: The management of inland water transport can be performed by maintaining flow and transport in rivers and other channels in the Sundarbans through regular dredging activities, developing, maintaining, and operating the inland river ports, maritime ports, landing ferry ghats, and terminal facilities in ports or ghats through cooperation and coordination among BIWTC, BIWTA, and BWDB.

Management of coastal urban area: The coastal urban area can be superintended by improving sewerage system, drainage and sanitation, controlling waterlogging, developing road network, regulating and monitoring industrial pollution, preserving urban wetland and ecosystem, and managing the solid waste.

Coastal land management: Strategic approaches for coastal land management are by preserving agricultural land from flood or erosion to sustain gain production, managing the newly recognized land in the Meghna estuaries, enhancing agriculture and non-agricultural land through sustainable coastal land and resource management, spatial land use planning for urbanization, increasing climate change adaptation capacity, optimization of land use, formulating spatial planning and land resource management acts, formulating necessary laws and acts to form land zoning, enhancing afforestation and plantation in the coastal zone for stabilizing land, restoring and protecting soil health, erosion and land loss, protecting land through the management of coastal water infrastructures, substituting the plants of the forest succession stages with useful species.

Salinity control: The salinity of MR can be restrained through an appropriate and effective measure i.e. measuring salinity concentration during the dry season, preventing salinity intrusion and desertification, extracting groundwater from deeper aquifers, revitalization, rehabilitation of polder water infrastructure, salt-resistant crop farming, adapting shrimp or crab farming.

Figure 6 shows the Delta framework for monitoring the project and implementation of the BDP-2100.

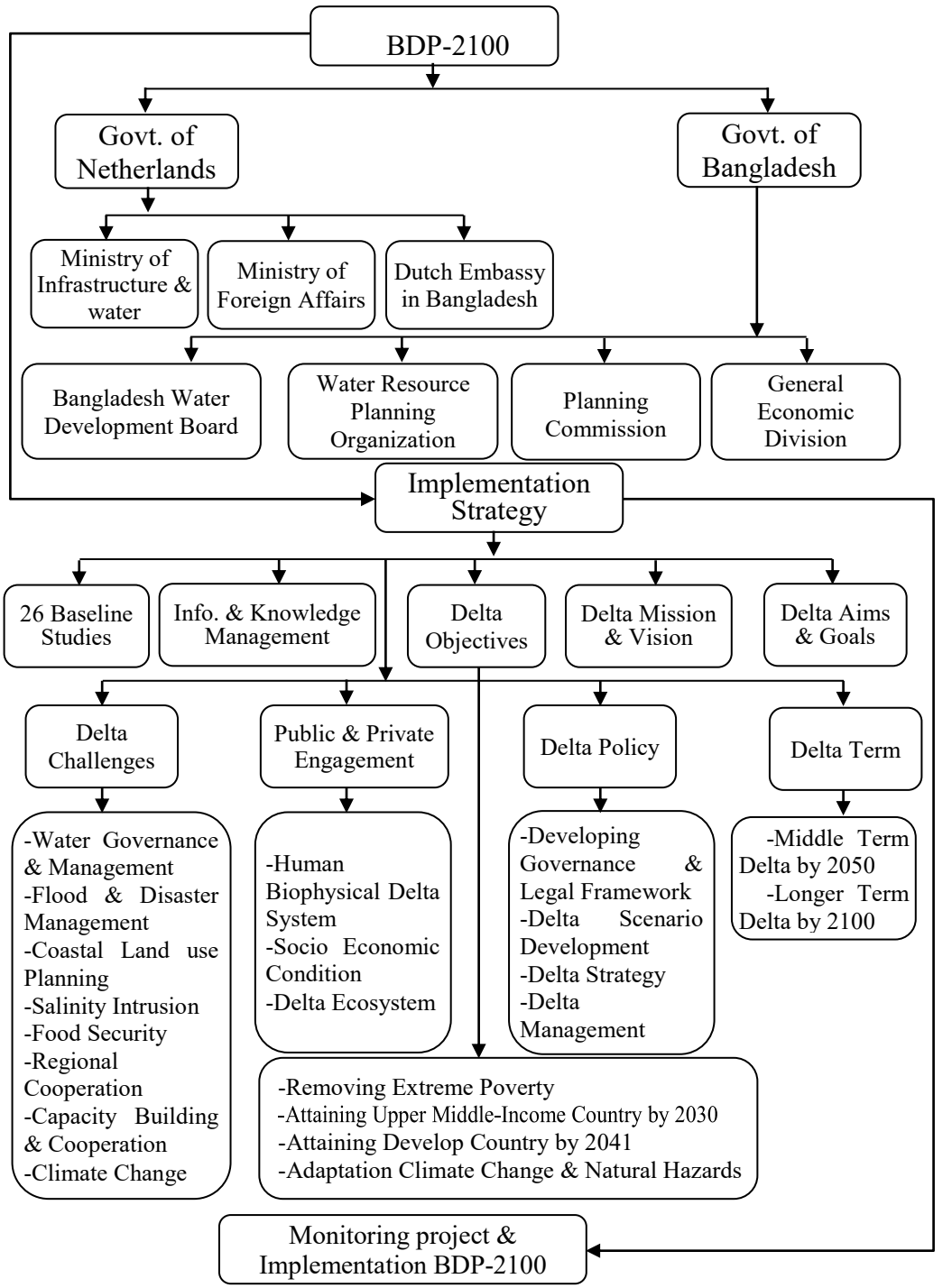

Figure 6: BDP-2100 framework for monitoring and implementation of the Delta plan (Authors generated, 2020)

Conclusion and Recommendation

This study intends to evaluate the SWOT of MR in Bangladesh where 8 parameters are individually apprehended for strength, weakness, opportunity, and threat. The strength-opportunity strategy of the MR concentrates the proper utilization of natural resources, recapturing the natural reservoir and water bodies, excavating local water reservoirs, strengthening management of rivers and estuaries in newly recognized lands of the strategic approaches of BDP-2100. The strength-threat strategy of the MR focuses on alleviating the risk of climate change, diminishing flood risk through infrastructure development, balancing water supply from the river to ocean and vice-versa, maintaining biodiversity to ensure long term fish availability, developing multi-purpose resource management, etc. of the strategic approaches of BDP-2100. The weakness-opportunity strategy of the MR demonstrates using modern technology for irrigation, conservation of Sundarbans by planting all layers of a forest, developing a strategy for sediment management, etc. of the strategic approaches of BDP-2100. The weakness-threat strategy of the MR manifests the developing climate-resilient through a participatory process, managing basin, and embankment, increasing drainage facilities, maintaining ecological balance, conducting regular dredging activities, preserving urban wetland and ecosystem, etc. of the strategic approaches of BDP-2100.

The present study recommends that though the MR of Bangladesh has boundless marine resources but the lack of strategy and planning, the marine resources are not properly utilized that abbreviates the national economy. New laws and regulations should be introduced by the GoB to restrict the unsanctioned interruption of foreign entities. Besides, the GoB should take the requisite steps to establish a maritime court to ensure the peace and protection of the maritime border and to monitor unauthorized trafficking of human beings, smuggling, and contamination of the environment through its MR. Moreover, The GoB should use modern technology for exploration, exploitation, conservation, and management of maritime resources in this region. Nevertheless, all islands including Saint Martin Island, Nizum Island, Andar Manik Island, and ports in Bangladesh should be used as the tourism sector. Furthermore, the GoB should support the individuals or groups who are willing to collaborate for maximizing the development in the maritime territory. In fine it is realized that the results of this study will be helpful for planners, engineers, geographers, oceanographers, environmentalists, and policymakers by perceiving the SWOT of MR, its strategies, and potentialities for the development of MR and implementation of BDP-2100.

References

Action, Practical. 2016. *Poor People's Energy Outlook 2016: National Energy Access Planning from the Bottom Up*. Practical Action Publishing.

Afp, Cox's Bazar. 2018. "Malaysia-Bound Rohingyas: 33 Rescued from Trawler in Bay." *The Daily Star*, November 09. https://www.thedailystar.net/rohingya-

crisis/human-trafficking-33-malaysia-bound-refugees-rescued-bay-bengal-1657756#:~:text=Six%20alleged%20traffickers%20held&text=Bangladesh's%20coast%20guard%20rescued%2033,Bengal%2C%20an%20official%20said%20Wednesday.

Ahammad, Helal, & Mohammad Sujauddin. 2017. "Contributions of Ship Recycling in Bangladesh: An Economic Assessment." *IMO-NORAD, London, UK*.

Ahmad, H. 2019. "Bangladesh Coastal Zone Management Status and Future Trends." *Journal of Coastal Zone Management*, 22, 1: 1-7.

Ahmed, Ferdous, Abul Quasem Al Amin, M Hasanuzzaman, & R Saidur. 2013. "Alternative Energy Resources in Bangladesh and Future Prospect." *Renewable sustainable energy reviews*, 25: 698-707.

Ahmed, Helal Uddin. 2018. "Making the Most of 'Blue Economy'." Last modified July 14. https://thefinancialexpress.com.bd/views/making-the-most-of-blue-economy-1531498218.

Aksenov, Yevgeny, Ekaterina E Popova, Andrew Yool, AJ George Nurser, Timothy D Williams, Laurent Bertino, & Jon Bergh. 2017. "On the Future Navigability of Arctic Sea Routes: High-Resolution Projections of the Arctic Ocean and Sea Ice." *Marine Policy*, 75: 300-17.

Alam, Firoz, Khondkar Saleque, Quamrul Alam, Israt Mustary, & Harun Chowdhury. 2019. "Indigenous and Imported Natural Gas and the Economic Growth of Bangladesh: The Challenges Ahead." *Energy Procedia*, 160: 18-25.

Alam, Md Wahidul, & Xu Xiangmin. 2019. "Marine Pollution Prevention in Bangladesh: A Way Forward for Implement Comprehensive National Legal Framework." *Thalassas: An International Journal of Marine Sciences*, 35, 1: 17-27.

Alam, Shawkat, & Saif Uddin Ahammad. 2017. "Shrimp Aquaculture in Bangladesh: Domestic Regulatory Responses and Compliance with Meas." *Marine Policy*, 82: 122-33.

Bangladesh Fisheries Report, BFR. 2018. "Yearbook of Fisheries Statistics of Bangladesh 2017-18."

Banglapedia. 2020. "Bangladesh Salt Industry." Last modified http://en.banglapedia.org/index.php?title=Salt_Industry#:~:text=Salt%20Industry%20an%20industry%20for,belts%20of%20Khulna%20and%20Satkhira.

BAPEX. 2019. "Bapex Anual Report."

Baten, Mohammed Abdul, & Rashed Al Mahmud Titumir. 2016. "Environmental Challenges of Trans-Boundary Water Resources Management: The Case of Bangladesh." *Sustainable Water Resources Management*, 2, 1: 13-27.

BDP-2100. 2018. "Bangladesh Delta Plan." Ministry of Planning, Government of the People's Republic of Bangladesh.

Bissinger, Jared. 2010. "The Maritime Boundary Dispute between Bangladesh and Myanmar: Motivations, Potential Solutions, and Implications." *Asia Policy*, 10: 103-42.

Bull, Joseph William, Niels Jobstvogt, Anne Böhnke-Henrichs, André Mascarenhas, Nadia Sitas, Corinne Baulcomb, Cosmas Kombat Lambini, *et al.* 2016. "Strengths, Weaknesses, Opportunities and Threats: A Swot Analysis of the Ecosystem Services Framework." *Ecosystem services*, 17: 99-111.

Büyüközkan, Gülçin, Esin Mukul, & Elif Kongar. 2020. "Health Tourism Strategy Selection Via Swot Analysis and Integrated Hesitant Fuzzy Linguistic Ahp-Mabac Approach." *Socio-Economic Planning Sciences*: 100929.

Chakraborty, Shamik, Shantanu Kumar Saha, & Samiya Ahmed Selim. 2020. "Recreational Services in Tourism Dominated Coastal Ecosystems: Bringing the Non-Economic Values into Focus." *Journal of Outdoor Recreation Tourism*, 30: 100279.

Chattoraj, Kuntal Kanti. 2018. "Rohingya Issue: Changing Nature of Geopolitical Situation and Diplomatic Relationship among South-East Asian Countries." *Research Journal of Social Sciences*, 9, 1.

Chaudhury, Anasua Basu Ray, & Rakhahari Chatterji. 2019. "Maritime Order and Connectivity in the Indian Ocean: The Renewed Significance of the Bay of Bengal." Taylor & Francis.

Choudhury, Anasua Basu Ray. 2020. "Enhancing India-Bangladesh Maritime Connectivity in the Bay of Bengal Possibilities and Challenges."

Curray, Joseph R, Frans J Emmel, & David G Moore. 2002. "The Bengal Fan: Morphology, Geometry, Stratigraphy, History and Processes." *Marine Petroleum Geology*, 19, 10: 1191-223.

Das, K, & FM Aminuzzaman. 2017. "Morphological and Ecological Characterization of Xylotrophic Fungi in Mangrove Forest Regions of Bangladesh." *Journal of Advances in Biology Biotechnology*: 1-15.

FAO. 2020. "The State of World Fisheries and Aquaculture 2020. Sustainability in Action." FAO Rome, Italy.

Gomes, Ieda. 2013. *Natural Gas in Pakistan and Bangladesh–Current Issues and Trends*. Oxford Institute for Energy Studies.

Gürel, Emet, & Merba Tat. 2017. "Swot Analysis: A Theoretical Review." *Journal of International Social Research*, 10, 51.

Haque, HM Enamul, Shobhakar Dhakal, & SMG Mostafa. 2020. "An Assessment of Opportunities and Challenges for Cross-Border Electricity Trade for Bangladesh Using Swot-Ahp Approach." *Energy Policy*, 137: 111118.

Hasan, Khandaker Rasel, Md Mashiur Rahaman, M Ziauddin Alamgir, & Hiromichi Akimoto. 2017. "Foreign Direct Investment and the Shipbuilding Industry: A Bangladesh Perspective." *Procedia Engineering*, 194: 218-23.

Hosen, Muhammad Farhad. 2019. "An Overview of the Statutory Laws and Regulations Relating to the Maritime Issues of Bangladesh: Loopholes and Recommendations." *Beijing L. Rev.*, 10: 1331.

Hossain, F, MA Islam, A Al-Mamun, K Naher, R Khan, S Das, U Tamim, *et al.* 2016. "Assessment of Trace Contaminants in Sediments of the Poshur River Nearby Mongla Port of Bangladesh." *Nucl. Sci. Appl,* 25, 1-2: 7.

Hossain, KA. 2017. "Ship Recycling Practice and Annual Reusable Material Output from Bangladesh Ship Recycling Industry." *Journal of Fundamentals of Renewable Energy Applications,* 7, 5: 6.

Hussain, M Gulam, Pierre Failler, A Al Karim, & M Khurshed Alam. 2018. "Major Opportunities of Blue Economy Development in Bangladesh." *Journal of the Indian Ocean Region,* 14, 1: 88-99.

IPAG. 2019. "Maritime Security in Bay of Bengal: Potential Challenges and Opportunities." 5 September 2020.

Islam, Mohammad Mahmudul, & Md Shamsuddoha. 2018. "Coastal and Marine Conservation Strategy for Bangladesh in the Context of Achieving Blue Growth and Sustainable Development Goals (Sdgs)." *Environmental Science Policy,* 87: 45-54.

Karim, Mohammad Ershadul, Ridoan Karim, Md Islam, Firdaus Muhammad-Sukki, Nurul Aini Bani, & Mohd Nabil Muhtazaruddin. 2019. "Renewable Energy for Sustainable Growth and Development: An Evaluation of Law and Policy of Bangladesh." *Sustainability,* 11, 20: 5774.

Khanom, Shahida, & RC Buckley. 2015. "Tiger Tourism in the Bangladesh Sundarbans." *Ann Tour Res,* 55, C: 178-80.

Li, Chengjiang, Michael Negnevitsky, & Xiaolin Wang. 2020. "Prospective Assessment of Methanol Vehicles in China Using Fanp-Swot Analysis." *Transport Policy,* 96: 60-75.

Minar, M Hm, M Belal Hossain, & MD Shamsuddin. 2013. "Climate Change and Coastal Zone of Bangladesh: Vulnerability, Resilience and Adaptability." *Middle-East Journal of Scientific Research,* 13, 1: 114-20.

Mondal, Md, & Sanaul Haque. 2017. "Swot Analysis and Strategies to Develop Sustainable Tourism in Bangladesh." *UTMS Journal of Economics,* 8, 2: 159-67.

Monir, Mohammad Monirul Islam. 2017. "The Role of Port of Chittagong on the Economy of Bangladesh." *Erasmus University Rotterdam*.

Murty, PLN, K Siva Srinivas, E Pattabhi Rama Rao, Prasad K Bhaskaran, SSC Shenoi, & J Padmanabham. 2020. "Improved Cyclonic Wind Fields over the Bay of Bengal and Their Application in Storm Surge and Wave Computations." *Applied Ocean Research,* 95: 102048.

Ofosu-Boateng, Nana Raymond Lawrence. 2017. "A Swot Analysis of Maritime Transportation and Security in the Gulf of Guinea." *Open Journal of Social Sciences,* 5, 8: 14-34.

port Authority, PPA Payra. 2019. "Environmental Impact Assessment of Payra Port."

RAHMAN, M AZIZUR. 2020. "Exploration of Deep-Sea Block: Petrobangla Seeks to Scrap Deal with Korean Firm." *The Financial Express*, June 21. https://thefinancialexpress.com.bd/trade/exploration-of-deep-sea-block-petrobangla-seeks-to-scrap-deal-with-korean-firm-1592711383

Rahman, M Muzibur. 2017. "An Appraisal of Shipbuilding Prospects in Bangladesh." *Procedia Engineering,* 194: 224-31.

Rahman, Md Lutfur, SM Nawshad Hossain, Sania Sifat Miti, & AKM Abul Kalam. 2010. "An Overview of Present Status and Future Prospects of the Tourism Sector in Bangladesh." *Journal of Bangladesh Institute of Planners ISSN,* 2075: 9363.

Rahman, Shahriar Md Arifur, Gulam Saruar Robin, Mahila Momotaj, Jamir Uddin, & Mohammad Abdul Momin Siddique. 2020. "Occurrence and Spatial Distribution of Microplastics in Beach Sediments of Cox's Bazar, Bangladesh." *Marine Pollution Bulletin,* 160: 111587.

Rani, Seema, Md Kawser Ahmed, Xue Xiongzhi, Jiang Yuhuan, Chen Keliang, & Md Mynul Islam. 2020. "Economic Valuation and Conservation, Restoration & Management Strategies of Saint Martin's Coral Island, Bangladesh." *Ocean Coastal Management,* 183: 105024.

Rashid, Barrister Harun ur. 2015. "A New Opportunity for Bangladesh in the Bay." *The Daily Star*, January 01. https://www.thedailystar.net/a-new-opportunity-for-bangladesh-in-the-bay-57995

Rashid, Harun ur. 2018. "Blue Economy - Are We Ready for It?" *The Daily Star*, May 14. https://www.thedailystar.net/opinion/economics/blue-economy-are-we-ready-it-1575823

RECAAP. 2017. "Annual Piracy and Armed Robbery against Ships in Asia." Last modified https://www.recaap.org/resources/ck/files/reports/2018/01/ReCAAP%20ISC%20Annual%20Report%202017.pdf.

Report, Star Business. 2020. "Blue Economy Worth $6.2bn." *The Daily Star*, February 20. https://www.thedailystar.net/business/news/blue-economy-worth-62bn-1704688

Roy, Sanjay Chandra, & Mallika Roy. 2015. "Tourism in Bangladesh: Present Status and Future Prospects." *International Journal of Management Science Business Administration,* 1, 8: 53-61.

Saha, Razon Chandra. 2018. "The Role of Chittagong Port Authority to Develop Other National Ports in Bangladesh to Provide Maritime Logistics Support in South Asia."

Saki, Mohammad Takiuddin, Md Naser Ali, & Mohammad Ali Martuza. 2019. "A Study on Present Scenario of Bangladesh Ship Building Industries, Underlying Problems and Probable Solution." *European Journal of Engineering Research Science,* 4, 10: 98-102.

Sarker, Md Juwel Ahmed, & Mohammad Mizanur Rahman. 2015. "Analysis of Port Management in Bangladesh: Challenges and Potentials." 1811, 120293: 25.

Sarker, Md Nazirul Islam, & Md Ziaur Rahman. 2019. "Geopolitical Influence and Trade between Bangladesh and India." *Bangladesh Journal of Public Administration,* 27, 2.

Sattar, Md Abdus, & Kevin KW Cheung. 2019. "Tropical Cyclone Risk Perception and Risk Reduction Analysis for Coastal Bangladesh: Household and Expert Perspectives." *International Journal of Disaster Risk Reduction,* 41: 101283.

Schwenk, Tilmann, & Volkhard Spieß. 2009. "Architecture and Stratigraphy of the Bengal Fan as Response to Tectonic and Climate Revealed from High-Resolution Seismic Data." *External Controls on Deep-Water Depositional Systems. Special Publication-SEPM,* 92: 107-31.

Shamsuddoha, Md, & MM %J Department Forest Islam. 2017. "Bangladesh National Conservation Strategy: Coastal and Marine Resources." *Department Forest International Union for Conservation of Nature*: 50.

Shetol, M Hassan, M Moklesur Rahman, Ratneshwar Sarder, M Ismail Hossain, & F Kabir Riday. 2019. "Present Status of Bangladesh Gas Fields and Future Development: A Review." *Journal of Natural Gas Geoscience,* 4, 6: 347-54.

Suman, Mohammad. 2020. "Illegal Trade in Containers." *The Daily Star*, 16 january. https://www.thedailystar.net/frontpage/shipping-containers-illegal-trade-in-bangladesh-1854664

Thomas, Susan, Qiu Ting Chie, Mathew Abraham, Sony Jalarajan Raj, & Loo-See Beh. 2014. "A Qualitative Review of Literature on Peer Review of Teaching in Higher Education: An Application of the Swot Framework." *Review of Educational Research,* 84, 1: 112-59.

Travel, World, & Tourism Council. 2018. "Travel & Tourism-Economic Impact 2018-World." WTTC United Kingdom.

Uddin, MN, MA Rahman, M Mofijur, J Taweekun, K Techato, & MG Rasul. 2019. "Renewable Energy in Bangladesh: Status and Prospects." *Energy Procedia,* 160: 655-61.

UNB. 2020. "Bangladesh 47th in World's Illegal Fishing Index." *The Daily Star,* September 15. https://www.thedailystar.net/country/bangladesh-47th-in-world-illegal-fishing-index-1711405

van Driel, WF, T Bucx, A Makaske, C Van de Guchte, T Van der Sluis, H Biemans, & B Adriaanse. 2015. "Vulnerability Assessment of Deltas in Transboundary River

Basins." In *Delta Alliance Contribution to the Transboundary Water Assessment Program*, 9: Delta Alliance.

Vicente-Cera, Isaías, Asunción Acevedo-Merino, Enrique Nebot, & Juan Antonio López-Ramírez. 2020. "Analyzing Cruise Ship Itineraries Patterns and Vessels Diversity in Ports of the European Maritime Region: A Hierarchical Clustering Approach." *Journal of Transport Geography*, 85: 102731.

Zis, Thalis PV, Harilaos N Psaraftis, & Li Ding. 2020. "Ship Weather Routing: A Taxonomy and Survey." *Ocean Engineering*, 213: 107697.