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Maritime Education and Sustainable Development: Prospects of Bangladesh

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Abstract

The traditional landscape of Bangladesh and recent maritime boundary delimitation with its neighbouring countries (India and Myanmar) have opened a new horizon of potentials for its sustainable economic growth. But it demands diverse professional people in the maritime sector. Specialised maritime education and training (MET) is needed to avail the skilled human resources for this sector. Bangladesh has a range of institutes which include a specialised university, academies, technical institutes and an autonomous research centre etc. They offer a range of MET courses and degrees. This paper provides a broad overview of MET opportunities in Bangladesh, and career and other economic prospects of professionals in the maritime sector and its impact on sustainable development of the country. Required data and information has been collected from several databases like ResearchGate, Google Scholar, ScienceDirect, ERIC, journals, newspapers, and relevant organisations' websites to delineate the overview fostering Bangladeshi perspectives. The paper bears significant implications for the policy makers, teacher, trainers, and other stakeholders involved in the Bangladeshi maritime sector.

Keywords: Maritime education, human resources, sustainable development Bangladesh, IMO

1. Background

Many countries around the world have established maritime education and training (MET) institutions, both public and private, to ensure efficient human

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resource development in the maritime sector. Since it is not included in the conventional education system, a clear idea about maritime education was not made in general. As a result, many countries including Bangladesh, are facing a crisis of well-trained human resources due to the lack of adequate interest of common people in maritime education. But as the economic growth around the world is accelerating, the demand for human resources in the maritime sector is also increasing at a significant rate (Cahoon et al., 2014). This encouraged the Philippines, Vietnam, India, Sri Lanka and China to produce substantial number of manpower in the maritime sector and hence, they are well ahead in the export of human resources. Bangladesh, the world's largest delta, also has immense potential to grow as a maritime rich country (Islam et al., 2018; Hossain et al., 2017). Over the past decade, investment in infrastructure has also increased with economic growth, especially in maritime-related sectors including ports. As a result, the need for skilled human resources in all these sectors in Bangladesh has increased significantly (Barsan et al., 2012). Therefore, by producing and supplying efficient manpower in this sector through ensuring real-time education in maritime discipline, sustainable national economic development can be ensured. However, to attract young people into maritime education, it is necessary to raise awareness about the new perspectives, policies and incentives on the one hand, and on the other hand, about the detailed information about MET and overall maritime sectors.

2. Objective and Methodology

The objective of this paper is to provide a broad overview of MET opportunities in Bangladesh, and career and other economic prospects of professionals in the maritime sector and its impact on sustainable development of the country. Required data and information has been collected from several databases like ResearchGate, Google Scholar, ScienceDirect, ERIC, peer-reviewed journals, newspapers, and relevant organisations' websites to delineate the picture. Thus, this paper is a review-based article resulting from secondary data. Relevant literature on MET and maritime sector in Bangladesh have been reviewed. Data retrieved from various secondary sources are duly acknowledged.

3. History of MET

The first formal school of maritime education was established in 1419. Henry Infante founded this school for sailors (Dong, 2014). From then on various occasions, sometimes government-financed, church-funded the sailors' training programs were going separately. The reason for the churches' teaching of maritime was to provide the sailors with religious education among the sailors as well as to provide proficient sailors in the missionary campaign in the colonies. However, from the mid-nineteenth century, the need for trained human resources in maritime education in the international shipping industry began to be seriously considered, and from the sixties of the twentieth-century maritime education was established as a distinct education in many countries of the world. Since then, this education has become integral to the shipping industry. Both theoretical and practical education is important for the maritime industry in the face of growing demand. The topic of maritime education is no longer limited to logistics, transportation and management. Maritime economics, maritime brokerage, insurance, salvage, law, policy, etc. are now included in maritime education.

As far as the history of MET in Bangladesh is concerned, the people of this region had special skills in maritime affairs such as maritime trade, fishing, shipbuilding from around 2300 BC, at the beginning of world navigation. In 1818, a frigate for the German Navy was installed in Chittagong. During the colonial period, the reputation of the Bengalis as honest and diligent sailors spread on British, Portuguese, French flagships. During the partition of India in 1947, at least 5 Bengali sailors were employed on various sea-going commercial vessels in the port of Colombo, Kolkata, Mumbai, Rangoon, and Singapore. Undoubtedly, these skilled professionals were not educated in any institutional education, rather education and training on maritime issues spread from generation to generation. For the first time in 1952, the establishment of STC (presently National Maritime Institute) created maritime education opportunities at the institutional level. Later on, Bangladesh Institute of Marine Technology (BIMT) and Bangladesh Marine Academy (BMA) started their journey in 1958 and 1962 respectively. Bangladesh Marine Fisheries Academy (BMFA) was established in 1973, just after the independence to build skilled human resources to collect fishery resources in the coastal waters. Motivated by the success of

these professionals, the number of marine academies gradually increased at the government and private level. After the establishment of the BN Hydrographic and Oceanic Center (BNHOC) under the Bangladesh Navy (BN) in 1983, Bangladesh went ahead with the process of creating mariners and ratings for commercial ships only (Saha, 2016; Alamgir, 2014).

Through this institution, the study of the actual status of the water bodies, the port channels, the sea and the construction of charts began in the country. At present, some public universities in the country have different maritime courses. The latest addition to this section is Bangabandhu Sheikh Mujibur Rahman Maritime University (BSMRMU), the first maritime university in the country established in 2013, where initiatives are under process to bring all sectors related to the marine profession under one roof. Several more marine academies are being built on government initiatives, and sailors training centres are being set up in every division of the country. Various maritime education institutes are also being established in private enterprises. It is believed that maritime is going to rebuild the golden history of Bangladesh, this time holding the hand of maritime education (Saha, 2016; Alamgir, 2014).

4. Conceptualizing MET

Traditionally, MET was considered to be an education system which was there to produce officers and sailors solely for commercial ships. But the modern context is different when the shipping industry is making a leading contribution to the global economy (UNCTAD, 2018), it is time to look at the education system and illustrate its definition from a broader context. Several maritime scholars like Cross (2013) and Cox (2012) recommended that the MET institutes should equip their graduates with pedagogic and didactic knowledge, skills and attitudes to ensure proper maritime teaching and learning. The prevalence of maritime education in the current context is very broad - these include areas such as port management, freight forwarding, shipbuilding, maritime security, tourism, oceanography, maritime finance and maritime archaeology.

Undoubtedly, maritime education makes an important contribution to create and develop mariners. In the era of globalisation of the logistics system, a mariner now has to become more professional and business-friendly. The mariners also have different roles to play. When embarking on a commercial ship, the marine

engineers take care of its various technical aspects. They operate and maintain the ship's highly sophisticated engines and thousands of other equipment. On the other hand, navigation officers make arrangements for the management, security, distribution of the duties of the sailors, from the movement of cargo, containers and passengers (MaritimeNZ, 2016). Besides, they have to keep the ship's course in the open sea and to reach a specific port. Radio and wireless communications personnel operate the ship's telephone and satellite communications with other ships, ports or their authorities. For the first time in 1978, the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) established a minimum training standard for personnels embarking on board (Win, 2018). In 1995, the emphasis was on competency and practical education, rather than previous knowledge-based learning. Since the implementation of this system in 2002, and subsequent amendment in 2010 (implemented in 2012), most countries now conduct maritime training in this manner. In 2004, EC project METNET mentions four 'E's' essential for maritime education - Essentials (Extensions), Extensions (Enrichment) and Elevation (Development) (Barnett et al., 2006).

Education - institutional or informal, whatever be the case, is an important component of creating efficient human resources. Awareness is being raised all over the world about institutional education to create adequate infrastructure, facilities and human resources. At sea, sailing, safer and more efficient, the sailors' prowess and decision-making ability come to the fore. Therefore, by providing institutional and science-based functional education and training, the provision of well-trained human resources in the maritime industry can be ensured, which eventually results in greater efficiency and safety of shipping (Campara et al., 2017).

MET, however, has a unique teaching system, both theoretical and practical (Manuel, 2017). This education system can be broadly divided into offshore and onshore contexts. Offshore education is for those who want to work on a sailing ship. On the other hand, onshore education represents those who work on the coast and on the land. Maritime fields such as port management, administration, management, engineering, etc. include onshore education. Both types of education are equally important for the sustainable maritime sector (Manuel, 2017).

4.1 Offshore Education

The offshore education and training avail technical and theoretical education which make students proficient in managing ships by understanding and following the IMO Declaration of the Sea - Training, Certification and Watchkeeping for Seafarer (STCW) Convention. MET institutes around the world have gradually improved a lot (Win, 2018). The traditional lecture halls at the maritime universities have now turned into a modern multimedia auditorium. Apart from the educational facilities, various specialised laboratory facilities such as Bridge Simulator, Satellite Navigation System (GPS / GNSS) etc have been added. Besides, new training programs such as Electronic Chart Display and Information System (ECDIS), Bridge Resource Management (BRM), Multifunctional VTS have been lauched. Improvements have also been made to ensure infrastructure, efficiency and other benefits to the maritime sector. International Rules-12 (Colleges), Radio Communication System (GMDSS), Ship Power Plant Simulator, (ER-SIM), Radar Simulator (ARPA), Fire Prevention Training Ground, Equipment Analysis Workshop for the prevention of sea collisions are in place. In offshore education, a learner becomes knowledgeable in these areas and is skilled at managing ships and can show discretion in adverse conditions (Manuel, Nakazawa, & Kreta, 2013).

Having been trained in marine engineering or nautical science, a trainee can join the ship as an engineer or deck officer. These cadets get the status of Chief Engineer and Captain through competitive examination (step by step). It is only through proper practical practice that the knowledge of nautical or engineering matters and systems can be gained. For example, a learner can learn from the practical use of simulators, such as sailing or special practical knowledge. His practical training supplements the exact kind of action that an officer will take in a particular situation. As well as a mariner has to have the basic concepts of management, economy, logistics, marine environment protection, marine law, maritime administration and security. After obtaining written tests and onshore-onboard training as proof of their knowledge of all these matters, he gets the license to join the ship as a marine officer. A watchkeeping officer or engineer learns to operate the ship safely at sea using the knowledge and skills acquired through maritime education and training courses. Not only does a graduate who has an education in navigation and engineering have the ability to operate ships,

but also the ability to communicate effectively with the surrounding ships, and when entering a country's territorial waters, with the pilots, customs, vessel traffic management centres, shipping agents and shipping agents and shipping agents. One should also be aware of this (Bandar Barta, 2018).

Again, exploration and extraction of mineral oil and gas, the construction of aircraft as a source of renewable energy, exploration of suitable new ports, channels and waterways are also part of offshore drilling. This work requires detailed study and expertise on topics such as oceanography and hydrography. Hydrography is done to keep the sea or river surfaces and adjacent coastal areas suitable for navigation. It is one of the most important pillars of marine science, the applied branch that maps the sea, oceans, and rivers, depths, and areas suitable for navigation. The task of this faculty is to make changes and forecast the watershed over time (Trujillo & Thurman, 2011). Oceanography, on the other hand, is a very wide subject where both the physical and the organic matter of the sea are given equal importance. It studies ecosystem dynamics, ocean currents, wave dynamics, geophysical fluid dynamics, formation and movement of tectonic plates, geographical position of the seabed, chemical and physical changes in water (Trujillo & Thurman, 2011).

4.2 Onshore Education

In addition to offshore education, onshore education plays an equally important role in the maritime industry. Onshore education has important issues in the maritime sector such as port management and administration, engineering, operations, insurance, law, logistics and economics etc. Shipbuilding is taught under a variety of functional and varied designs. Marine environment study works to reduce the ocean's carbon footprint to prevent global warming whereas the department of marine biology works on the biodiversity of the seagrass etc. (Bandar Barta, 2018).

In many universities, subjects related to onshore education are taught. In Bangladesh, onshore maritime education courses such as marine technology and engineering, maritime business and management, maritime law, maritime logistics etc. have been included in various educational institutes. There are a wide range of maritime sectors where graduates of these courses can build

careers, such as port manager, marine insurer, naval architect, marine engineer, shipbuilding engineer, maritime teachers, freight forwarder, shipping manager, cargo surveyor, marine surveyor, operations manager, maritime lawyer, shipbroker, maritime security and safety practitioner, maritime administrator, maritime business manager, crew manager, marine incident and accident investigator, transport and logistics manager, maritime economist, maritime journalist, ship superintendent, harbormaster, marine environmental manager etc. (SSM, 2019; ECSA, 2005).

5. MET Opportunities in Bangladesh

Bangladesh, the world's 8th most populous country with nearly 163 million people, and is the 92nd largest country in land area, spanning 147,570 square kilometres (UN, 2019), has limited land resources but wealth is abundant in the sea area of almost equal size (approximately 700 km long coast with nearly 1,18,813 sq. km. of maritime area) (Alamgir & Chowdhury, 2019). The maritime sector can undoubtedly play an important role in building a prosperous Bangladesh. Therefore, the importance of promoting maritime education is also very important for Bangladesh. For this purpose, several educational institutions have already been developed in the country. Some (universities and research institute) are preparing graduates for shore-based industries while others (academies and institutes) are for ocean-going merchant ships. An overview of these educational institutes is as follows.

5.1 BSMRMU

Intending to produce quality human resources for the local and global maritime sector, Bangabandhu Sheikh Mujibur Rahman Maritime University (BSMRMU) is the first-ever maritime university of Bangladesh by an Act of the Parliament on 26 October 2013 for upholding maritime excellence in the field of education. The university has already signed MoUs with a number of reputed maritime universities of the world for required supports to retain a high standard in the education system in this university. In addition to constructing a modern marine aquarium, the university is also intending to incorporate oceanographic research vessel for the training of students and research works by the scientists to

discover the sea area of the country. As the resources on land are depleting, it has become important for the nation to look towards the sea for its survival. Efficient adventure and development of maritime resources are, therefore, overriding towards economic liberation of the country. Besides, the onus of retaining 'good order at sea' is becoming heavier with time. For accomplishing the goals, the nation desperately needs the right kind of human resources. BSMRMU with its motto '*We Strive for Maritime Excellence*' is preparing its graduates as necessary human resources for the nation, through the innovation of effective well qualified and knowledgeable human resources in the forthcoming days. The university is offering both graduate and postgraduate degree programmes in several maritime disciplines. It is building a permanent campus on 106.66 acres of land on the Karnaphuli river in Chittagong, where other specialized disciplines of study will be opened (Alamgir, 2014; BSMRMU, n.d.).

The university comprises seven faculties and four institutes to create skilled human resources to exploit the enormous potential of blue economy. Currently, BSc (Honors) programs in Oceanography, Marine Fisheries, Naval Architecture and Offshore Engineering, BBA in Port Management and Logistics, and LLB in Maritime Law are being taught at BSMRMU. Apart from these, currently postgraduate degrees in seven subjects are being offered at this 37th public university of the country. These are: Masters in Maritime Development and Strategic Studies, Masters in Port and Shipping Management, LLM in Maritime Law, MBA in Marine Tourism and Hospitality Management, MBA in Maritime Business, Masters in Marine Biotechnology, Masters in Marine Science, Masters in Harbour and River Engineering. Besides long-term courses/degrees, certificate courses are being offered on supply chain management, freight forwarding, marine insurance and claims and dangerous goods handling and transportation, project management, international humanitarian law etc. Thus, it endeavours to arise as a base of quality in maritime higher education (Alamgir, 2014; BSMRMU, n.d.).

5.2 Other universities

Apart from this, other universities of the country take the opportunity to teach maritime subjects. Among these are the Naval Architecture and Marine

Engineering Departments at Bangladesh University of Engineering and Technology (BUET) and Military Institute of Science and Technology (MIST) under the Bangladesh University of Professionals (BUP). After receiving a four-year BSc (Honors) degree, there is an opportunity to earn a master's degree in the same subject. These departments teach Mathematics, Ship Drawing, Design, Ship Structures, Thermodynamics, Fluid Mechanics, Shipbuilding Materials, Marine Engine and Fuel, Shipbuilding Technology, Marine Hydrodynamics, Shipyard Management, Resistance Ship Management, Resistance ship etc. The University of Dhaka (DU) has the departments of Fisheries and Oceanography, where under the Faculty of Science, students are admitted at the undergraduate level. They can study four-year BSc (Honors) degrees in Fisheries and Oceanography. Chittagong University (CU) has the Institute of Marine Science and Fisheries. At this university students can study bachelor and masters in two disciplines (i.e. marine science and oceanography). The department of Fisheries and Marine Resources Technology is located in the southern port city of Khulna University (KU). Fisheries and Ocean Science are also taught at Noakhali Science and Technology University (NSTU). On the other hand, the Faculty of Fisheries at Patuakhali Science and Technology University has five departments: Aquaculture, Fisheries Biology and Genetics, Fisheries Management, Marine Fisheries and Oceanography and Fisheries Technology. Bachelor and masters in fisheries are also offered at Bangladesh Agricultural University, Sylhet Agricultural University, Sher-e-Bangla Agricultural University, Bangabandhu Sheikh Mujibur Rahman Maritime University, KU, DU, Rajshahi University, CU, Jessore University of Science and Technology, Hajee Danesh Science and Technology University, *Chittagong Veterinary and Animal Sciences University and Sheikh Fazilatunnesa Mujib Fisheries College* (Hossain, Chowdhury & Sharifuzzanam, 2017).

5.3 BORI

Bangladesh Oceanographic Research Institute (BORI) was established in Cox's Bazar in the wake of Bangladesh's victory in the seaside settlement case with Myanmar in 2012 and India in 2014. The country's first and only deep-sea and maritime affairs research organisation is going to play an important role in creating skilled human resources for deep seaport management, coastal development, mineral resources, the fair use of sea resources and development

of potential tourism industry. Its organogram includes five research departments, three oceanographic data centres, four administrative departments and one medical centre. The institute coordinates and conducts joint research activities with local and international universities and other research institutes researching maritime affairs. Besides, public awareness activities and training will be conducted to create skilled human resources on maritime affairs (Alamgir, 2014; BORI, n.d.).

5.4 BMA

Bangladesh Marine Academy (BMA) is located on the banks of the Karnaphuli river in Jaldia, Chittagong. The institute is the pioneer in marine engineering and nautical education in the country. Previously it was Mercantile Marine Academy (established in 1962). The United Nations' specialized agency 'International Maritime Organization' (IMO) had recognized BMA as a qualified institute. It has been declared as one of the branches of the World Maritime University in Malmo, Sweden because of its institutional excellence and advanced training systems and the need for skilled human resources in the marine sector (BMA, 2016; UNESCAP, 2004). BMA received this status through a formal assessment which found it found duly qualified and so has been upgraded to have a 'Partner Relation' since 2019. It has received international recognition from the European Union in 2011, the Australian Maritime College in 2012, the Port Authority of Singapore (Training Division) in 2014 and of UK Merchant Navy Training Board in 2019 as indicators of continuous development. Previously, cadets had to go abroad for earning sea-going Certificates of Competency. This international recognition indicates that the equivalent quality training and study prospects are obtainable in the country (Bandar Barta, 2018).

At BMA, students have the opportunity to study in two departments - Nautical Science and Marine Engineering. In the first two years theoretical knowledge on principals of navigation, ocean and offshore, aids on coastal, aids, meteorology, cargo operations and stability, generalship knowledge, marine engineering, nuclear knowledge, pre-sea marine engineering and pre-sea nautical science, engineering drawing, mathematics, physics, English, Bangladesh studies is imparted to the cadets. In the third year, the cadets are then trained for one year in hands-on seamanship, signalling, watch-keeping, maritime law and convention. The following year again the theoretical studies on marine engineering practice (part 1 and part 2), workshop process and materials, electrotechnology, naval architecture and ship construction, applied mechanics,

engineering drawing etc. are done (BMA, 2016; UNESCAP, 2004). In line with the current technology-based shipping world, BMA is teaching the curriculum of IMO since its inception. After four years of rigorous training, the cadets receive BSMRMU accredited BMS (Bachelor of Marine Science in nautical/engineering) degree, which is an indicator of their ability to operate a ship (Bandar Barta, 2018).

5.5 NMI

The Seamen's Training Center, which is known as the National Maritime Institute (NMI), started its humble journey with very limited resources in a rented building in Pahartali, Chittagong. To make it more efficient, the institute was brought under the Ministry of Shipping in the Ministry of Labor and Manpower in 1989. It is currently providing training in two disciplines - Nautical and Engineering. This institute is also conducting pre-sea training in ship's ratings (decks, engines, salons). Supported by the financial and technical assistance of the Government of Japan and Bangladesh, this modern equipment and rich institute was white-listed at the IMO Compendium held in 2000. From 1994 to 2012, 18,62 pre-sea rating and 8379 post-sea rating cadets were trained (Bandar Barta, 2018; NMI, n.d.).

5.6 MFA

Bangladesh Marine Fisheries Academy (MFA), located in Chittagong, is creating human resources for the exploration of marine fisheries in a scientific way. A training centre was established on the banks of the Karnaphuli river opposite the Sadarghat of Chittagong in 1973 to create skilled and educated human resources for the maritime fisheries industry of Bangladesh. From that year, progress was made in the exploration and collection of fishery resources through joint ventures. The high-tech fishing vessel, which is deployed in the deepest sea, has come to explore and collect science-based fisheries. Skilled navigators, engineers and fish processing technicians are needed to manage the vessels. This institute is producing such human resources. With time, the training centre has started as Marine Fisheries Academy. BSMRMU accredited graduate degrees in Marine Engineering, Nautical Science and Marine Fisheries can be obtained from this institute (UNESCAP, 2004; MFA, n.d.).

5.7 DEPTC

There are numerous river ports in riverine Bangladesh. In particular, Chittagong-Chandpur-Narayanganj, Narayanganj-Barisal and Narayanganj-Khulna routes are used for transporting goods on numerous inland vessels or inland cargo vessels, known as lighter vessels. Both the decks and engines of these vessels require skilled human resources. Out of this need, the Deck and Engine Personal Training Centers (DEPTC) were set up in Narayanganj first and Barisal later on a government initiative. Deck Personnel Training Centre (DPTC) started its journey in 1970 near the locality named “Char House” situated on the west bank of Shitalakhaya River. Later on, in June 2003 along with Deck crews, the institute started training program for Engine crews as well and therefore the name of the institute was changed to Deck and Engine Personnel Training Centre (Alamgir, 2014; DEPTC, n.d.).

5.8 Other institutes

Apart from the government institutions, as mentioned above, several private marine academies have been established in Bangladesh. Notable among them are United Marine Academy, Western Maritime Academy, Cambridge Maritime Academy, International Maritime Academy. However, they have not yet introduced a self-sufficient and quality education system. Besides, a four-year diploma course on Marine Engineering Technology and Shipbuilding Technology is conducted at Bangladesh Institute of Marine Technology in Narayanganj. Besides, Mangrove Institute of Technology, located in Khalishpur, Khulna, offers the opportunity to study Diploma in Shipbuilding and Marine Technology. There are also opportunities for working in the maritime sector with technical education in electrical, mechanical, civil, power, etc., from 49 government and 221 private polytechnical institutes registered under the technical education board (Bandar Barta, 2018).

5.9 BNA

Bangladesh Naval Academy (BNA) is a defence academy, where the naval force of the country is being trained through rigorous exercises at the special military training centre (located in Patenga in Chittagong under the Ministry of Defense, i.e. Bangladesh Navy) for the production of Bangladesh Navy officers. After completing HSC (Higher Secondary Certificate) or A level, interested

candidates can participate in a rigorous selection process of Bangladesh Navy to get selected and employed. After two years of long-term training, they are commissioned into the Navy's Sub-Lieutenant position. In addition to prestigious and attractive careers in the military, they have the privilege of holding high positions in various government-autonomous organisations and at various post-retirement maritime establishments (Bandar Barta, 2018).

6. Prospects of Bangladesh in Maritime Sectors

The demand for offshore drilling, marine education and consultancy worldwide is currently on the rise. According to Drewry report, by the end of 2019, the world shipping sector will need 42,500 more seafaring officers (cited in Porathe, 2016). Meanwhile, the BIMCO ICS human resources report (2016) says there will be a shortage of 1,50,000 officers (seafarers) in the sector by 2025 (cited in UNCTAD, 2019). There is also a wide range of work areas onshore. In the context of rich maritime history, the government of Bangladesh is also very keen to exploit the immense potential of the sector. At the heart of Bangladesh's maritime possibilities are seaports and port-centric activities. Ports and rivers play a major role in domestic and international trade. Japan, Singapore, China, India and other coastal countries have recently achieved unprecedented success, especially in harnessing the potential of the port and maritime sectors. Although slow, Bangladesh is now following that path. The present government has already adopted a new policy in this regard and has undertaken several mega projects for port-centric development (Chowdhury, 2010).

Being a country of small size compared to the population, human resources is its biggest asset. However, most of the educated people of the country are not educated in technical education (Dewan & Sarkar, 2017). Unemployment rates are rising due to mainstream certificate-based studies. However, by receiving maritime training and education a young person can not only get a guaranteed job, it can also be a source of remittance for the country and the family. Besides shipping or onboard jobs, they have the opportunity to work in the world's leading shipping companies (Hossain, Chowdhury, Sharifuzzaman, 2017). Currently, there are at least eleven thousand Bangladeshi officers/engineers and five thousand ratings (crews) working in various international waters of the world, who collectively add more than US \$400 million to the country's treasury. Thousands of Bangladeshi workers are working in various shipbuilding factories in Singapore, South Korea, Poland, Malaysia, UAE (Bandar Barta, 2018). There are numerous shipyards and workshops in the country, most of

which are privately owned. About 100 per cent of the various types of ships operating within the country are manufactured in the shipyards of Bangladesh. The ships built in a few hitech shipyards of Bangladesh are being exported overseas since 2008. At this moment, the growing sector needs skilled shipbuilding human resources and the right direction (Islam & Islam, 2019; Rahman, 2017).

Eight thousand staff are working in the country's ports at the officer-employee level to keep the country's exports and imports functioning. Not only that, about one hundred thousand people are directly and indirectly involved in operational and various other tasks at the port. Bangladesh is now a leading country in the world in the ship breaking industry (Ahammad, & Sujauddin, 2017). About forty-three thousand fishing boats and one hundred fifty-four commercial fishing trawlers are deployed in the exclusive economic zone (EEZ) of the Bay of Bengal to collect fishery resources. Fisheries resources beget about 3.57% of the country's total GDP (DoF, 2018). Moreover, the Ministry of Shipping has made it compulsory that each fishing vessel must have at least one fishery skipper and personnel which has created more employment opportunity. Besides, at least two million fishermen are directly involved here (Karim, Saadi, & Tamanna, 2015).

Tourism is one of the major attractions of the sea. Day by day the beaches of Cox's Bazar, Shah Pari Island, St Martin's Island, Kuakata, Mongla, Patenga, Parkee are having increasing number travellers. Around 2 percent of GDP now comes from tourism and day by day; the graph is moving upward (Bandar Barta, 2018). Soon, Bangladesh will have the opportunity to establish passenger liner services and specialised cruise terminals.

On the other hand, naturally, there are huge quantities of natural gas in the seabed and biofuels such as mineral oil. It also requires trained and skilled human resources to build, maintain and provide offshore infrastructure for the exploration, acquisition and disposal of these assets. The earth is slowly turning to renewable energy to reduce greenhouse gas emissions. Along with solar power, windmills along the coast may be the next source of renewable energy for us. To properly utilise these resources given by nature, Bangladesh needs to develop experts on oceanography, naval architecture and offshore, ocean engineering, maritime security and strategy, marine engineering and nautical science, biotechnology, biodiversity, maritime management, maritime law, and marine survey etc. From ship to port machinery and management are now technology-dependent. Therefore, the need for skilled human resources is most important in the maritime sector than ever before. This has brought Bangladesh

the potential for success in the maritime sector. Providing timely maritime education can become the key to the development of Bangladesh in the maritime sector (Kabir, 2014). The country's prospect has further increased since it received the status of the white list of the IMO in 1999. That is, Bangladesh is getting full support from IMO in maritime education. As a result, other countries of the world are also recognising and valuing the certificates received from this country.

7. Maritime Education for Sustainable Development

The blue economy encompasses a direct and extensive impact on sustainable development. For example, maritime transport enables world commerce by transporting eighty per cent of international trade through quantity and seventy per cent by value in the most commercially effective and energy-efficient manner (UNCTAD, 2018). Moreover, it is essential from the social standpoint as it creates huge job prospect for hundreds of seafarers and even extra shore-based personal. Hence, in this age of commerce-based global economy, trained, skilled and educated human resources in maritime education are the driving force of economic development of any country. A country with more population like Bangladesh is better suited for developing efficient human resources in any sector. Blue economy has created thousands of employment opportunities in this sector, besides natural resources collection from marine sources. And it is challenging to provide dynamic and sustainable economic development without the development of skilled human resources in modern marine education to influence all these prospects (Patil, et al., 2018).

8. Conclusion

Considering its significance, the theme of World Maritime Day (2015) was "Maritime education and training", which brought before us the questions related to MET quality and adequacy (Prylipko, 2016). Bangladesh has some maritime institutes, but to keep pace with the demands of the modern world, these institutes need to update and deliver creative and pragmatic methods and approaches to marine education and training, a shift from theory-based to skill and competency-based training and cater to the need for continuous skill change and recertification. Otherwise, Bangladesh will face challenges to reap the benefits of the blue economy to the fullest. The institutes preparing graduates for offshore jobs should ensure effective and efficient implementation of the

program contents following the contents of the IMO model courses and the STCW's demands. On the other hand, the institutes producing graduates for shore-based jobs should develop and continuously update the curricula keeping pace with the rest of the world. Both these two types of institutes have to develop further and ensure standards of their teaching staff, organisational facilities and instrumentality.

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