

SWOT Analysis of Shipbuilding Industry of Bangladesh

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Abstract: Bangladesh, a proud maritime nation, boasts a rich heritage in shipping and shipbuilding. However, it has struggled to keep up with the global shipbuilding race for several reasons. To address this, the utilization of SWOT analysis becomes an invaluable tool for strategy formulation, providing guidance in making viable decisions rather than serving as a strict prescription. In order for Bangladesh's shipbuilding industry to flourish, it is crucial to identify its strengths, rectify internal weaknesses, and implement protective measures against external threats. Harnessing the nation's potential and capitalizing on available opportunities are vital for ensuring the sustainable development of the shipbuilding industry. This paper aims to analyze Bangladesh's shipbuilding industry using the SWOT framework. By conducting this analysis, the paper will shed light on the strengths, weaknesses, opportunities, and challenges faced by the local shipbuilding sector. Additionally, it will offer recommendations on suitable markets, as well as insights into the industry's potentials and hurdles. By undertaking a comprehensive examination of these factors, Bangladesh can strive to regain its position in the global shipbuilding arena. Through strategic planning and effective decision-making, the country can forge a path towards a prosperous future for its shipbuilding industry.

Keywords: Shipbuilding, Tow-Tech, Strength, Weakness, Opportunity, Threat

1. Introduction

Shipbuilding is a primitive and labor intensive industry. Conventional shipbuilding was a low-tech industry [1]. After invention of arc welding technology, normal steel with insufficient fracture toughness was used in shipbuilding and that resulted in some ships suffering catastrophic brittle fracture and structural failure. Since 1950s, specialized high tensile strength and tough steel with good physical and chemical properties are using in shipbuilding industry. Modern steel has eliminated brittle fracture in ships [2]. Distinct beautification and work excellence found in modern shipbuilding. Today's shipbuilding needs lot of automation and uses line production manufacturing process, where skilled workforce is essential. Ship design work, usually known as naval architecture, finalized ships drawing after ship model testing either in towing tank/basin or CFD analysis.

Modern shipbuilding makes considerable use of prefabricated blocks or modules, where entire multi-deck segments of the hull build elsewhere in the yard, transported

to the building dock/slipway, and then lift into place and fabrication process has done as per the guideline of naval architects. This is known as block or module construction. So, modern shipyards pre-install machinery, equipment, pipes, electrical cables, and all other components within the blocks, to minimize the effort needed to assemble components within the hull, once it is welded together [3]. Again, incoming 4IR or Industry 4.0 will definitely influence the whole maritime sector and new transformation will be taken place in the shipbuilding industry and that will be very decisive in nature [4]. The main goal of shipbuilding 4.0 is intelligent shipyard which is characterized not only by adaptability, resource efficiency and ergonomic but also close integration among ship owner, shipbuilder, suppliers, and other stake-holder both in industry and in value processes.

This is a specific study of shipbuilding industry of Bangladesh by SWOT analysis with the aim of depict suitable market along-with potentials and challenges for local shipbuilding. The study has been conducted with combination of primary and secondary data including useful inputs from related stake-holders of the industry from home and abroad.

The primary and secondary information about the global and local shipbuilding have been collected from available sources like, visits, interviews, books, publications, web sites, journals, reports, financial reviews, etc. Effort has been made to collect the few special data to evaluate the local and global shipbuilding industry for sustainable development.

2. Assessment of Global Shipbuilding

There are ups and down observed in shipbuilding growth. United Kingdom (UK) was the market leader of global shipbuilding before WWII. After that, Japan become the dominant ship building nation in 1960s and slowly lost its competitive advantage to the promising industrial nation South Korea, as they had the advantages of much cheaper wages, suitable shipbuilding strategy, strong government support and cheaper currency. South Korean shipbuilding overtook Japan's in 2003 [5, 17]. Again, from 2009, during and after global financial crisis China become global shipbuilding leader leaving behind South Korea and Japan by using the same strategy and technique of those two shipbuilding giant [6]. China utilize global financial crisis to develop their shipbuilding and they initially target the medium and small global market of containers, tankers and cargo ships.

High labor cost countries always have lost its global shipbuilding market share, during removal of state subsidies, even strong domestic policies failed to provide enough support. The British, USA, and European Countries shipbuilding is the prime example of this [2, 20]. The market share of USA and European ship builders began to decline in the 1960s and their production is now primarily on military, and few special ships like, cruise liners or pleasure Yacht. Today China is global shipbuilding leader with around 45% of global share. Their shipbuilding quality and technology has improved significantly and they earn the confident of global customers. South Korea and Japan is following china securing second and third position in global market with 25% and 20% share respectively [7, 8, 18].

3. Assessment of Bangladesh Shipbuilding Industry

Indigenous shipbuilding industry of Bangladesh has a glorious history. Shipbuilding consider as an early industry developed in Bengal based on its traditional boats building [9]. Ibne Batuta came to Bengal in 14th century and went back with a wooden ship that built in a shipyard located at Sonargoan, Dhaka. Interestingly, Ibne Batuta's ships has conserved in European Museums. European Traveler Mr. Caesar Frederick viewed that, Chottogram was the centre of building ocean-going ships during middle of the 15th century [10]. In 17th century, "a fleet of ships was built for Sultan of Turkey at Chottogram. In Mughal period, Chottogram has manufactured a large number of warships for their Naval Force. The British Navy used wooden hull warships, built at

Chottogram and was successfully deployed in Battle of Trafalgar in 1805.

The wooden hull frigate Deutschland (1000 DWT) was built in Chottogram for German Navy in 1818" [1].

Local shipbuilding industry has adequate strength and potential. But, Bangladesh has failed to keep pace with the continuous technological advancement with global shipbuilding due not to depict the weakness and threat of local shipbuilding industry. Moreover, few typical problems and challenges have created obstacle for development of this sector [10, 3]. It has been anticipated that, if local shipbuilding can choose appropriate and optimum type and size of ships and can capture tiny global market share and handle meticulously the weakness and threat, nation can develop a sustainable shipbuilding industry. Again, to become a sustainable ship exporting nation after fulfilling local demand, we need to develop our shipbuilding with global standard.

There is hundred of indigenous private shipyards are located all over Bangladesh. Those local shipyards are capable to construct and repair almost all types of inland and coastal ships and crafts. Few local shipyards are well reputed and possess good shipbuilding history. As an example, Highspeed Shipyard has 70 years of shipbuilding history. Again, few private shipyards have achieved international standard and are getting international new-building order, and constructing small and medium ships for foreign buyers. Recently few local shipyards have attained the capacity to construct 10000 dwt merchant ships.

Presently local private shipyards (ASSL, WMSL, KSY Ltd, and KSSL) have received orders from the foreign ship owners like Germany, Japan, Denmark, Netherlands, EC, Mozambique, India, and Nigeria [6]. Various types of merchant ships have built successfully and handed to foreign owners by local Shipyards. There are three public shipyards (DEW Ltd, KSY Ltd and CDDL) in Bangladesh with magnificent shipbuilding history. However, after independence all those shipyards have declared as sick industry and laid-off due to poor management and same inherent problems like other public industries. Finally those are handed over to BN and presently those are running successfully by BN management with same civil workforce.

Bangladesh has hundred indigenous dockyards/shipyards around different location. "These shipyards are operating principally under individual management, except three public shipyards are running by BN. Most of the local private shipyards use materials, plate, fittings, engine, component and machinery of old merchant ship; which collect from Bhatary ship recycling industry in Chottogram" [11, 12]. There are versatile types and size of ships built in local shipyards/dockyards. There are four local shipyards are capable to build ships around 10000 dwt. We need to find out suitable market for local shipbuilding. Local shipbuilding also needs to face the challenges with suitable strategy to become a sustainable industry.

With this backdrop the aim of the study is to evaluate the global shipbuilding trend and to depict viable suggestions for

local shipbuilding.

4. Suitable Shipbuilding Market for Bangladesh

Productivity of local shipbuilding labour is very poor, but average hourly labour wage is the cheapest in the globe. As a result, relative labour wage is the lowest in the world. Present government has taken some step and drafts a shipbuilding policy to improve the shipping and shipbuilding sector as a whole. Before implement the policy, it needs to consider proper evaluation and uniform priority, so that both public and private shipyards get benefit equally from the policy. Previously shipbuilding cost in China was cheaper. But at present, due to their improved living standard, labour wages have increased. It has been predicted that, at future, China will leave a portion of their small and medium shipbuilding market share and that is the niche market for our local shipbuilding.

World middle class society of Asia and Africa is flourishing in 21st century. At the same time, shipbuilding labor price of China has increased manifold in recent years. As a result, china is going to reduce their small and medium container, cargo, tanker, and multi-purpose ships market share very soon [13]. Here the opportunity has created for small commercial shipbuilding nations like Vietnam, Philippines, India, Bangladesh, Myanmar, Australia, Turkey, etc. Tentative size of global shipbuilding market is USD 200 billion, where small ship building market size is USD 20 billion [14]. There is a serious demand of container ships in all size. UNCTAD, WB, WTO, and OECD have detected the high demand of container ships in future.

Small niche shipbuilding market is suitable for local shipbuilders. In near future, the world will need few thousand of merchant ships, where mostly are small to medium. Moreover, existing single hall oil tanker fleet is going to be replaced soon as per IMO requirement. The niche market of small size container, tanker, cargo, multipurpose and special types of ships with 3000-10000 dwt is suitable for local shipyards. Global renowned and bigger shipyards have less interest on this niche market. Bangladesh has all potential and capacity to capture this market with competitive price. Again, we need to develop our own merchant fleet to maintain export and import of cargo, oil, energy and passenger. So, it is another niche market for us. [31, 40]

The sea area of Bangladesh has enormous importance, because it is the only way of direct connectivity to the rest of the world during crisis with any of our neighbors. Constant presence of BN and BCG are imperative for keeping the sea lanes of communication secured, and maintaining the sovereign rights over 118813 sq-km sea areas and economic benefit of the country. In order to avert any threat to national security by 'traditional' and 'non-traditional' means both the organizations remain vigilant by deploying naval ships and craft at sea. So, a good number of military ships are required for operational tasks both in peace and wartime. This is

another suitable niche market for BN operated three public shipyards.

5. SWOT Analysis of Local Shipbuilding

A consistent study of the environment in which the business firm operates helps in forecasting or predicting the changing trends and also helps to including them in the decision-making process of the organization. SWOT analysis is a strategic planning and management technique used to help an individual or organization or business to identify Strengths, Weaknesses, Opportunities, and Threats and useful to decision making process. It is the most renowned tool for analysis of the overall strategic position of the organization or business and its environment. In SWOT internal factors are viewed as strengths or weaknesses depending upon their effect on the organization's objectives and over which we have some measure of control. Internal factors may include personnel, finance, manufacturing capabilities, and all of the marketing mix. However, external factors are macroeconomics, technological change, legislation, and socio-cultural changes, as well as changes in the marketplace and over which we have usually no control. [24, 31]

SWOT analysis is a strategic planning technique used to help an individual or business to recognize Strengths, Weaknesses, Opportunities, and Threats and use as decision making tools to analyse strategic position of the business and overall environment. In SWOT, internal factors like personnel, finance, manufacturing, and marketing mix; are viewed as strengths or weaknesses; where organization has some control. External factors like, technological, legislation, and socio-cultural changes are viewed as opportunity and threats; where organization has usually no control [7]. SWOT analysis is instrumental in strategy formulation and is always very useful as guide, but not as prescription. Local shipbuilding must know its strengths, correct its internal weakness and apply protection measure against external threats. It should keep sharp eyes on its overall business environment and exploit new opportunities. It needs to identify core competencies and to set objectives for business strategic planning by using past trend and current data. Let's do the SWOT analyses and evaluate potentials and challenges of local shipbuilding.

5.1. Strengths Analysis of Local Shipbuilding

Bangladesh has all necessary facilities to become an emerging shipbuilding nation in the globe by exploiting her glorious shipbuilding tradition and cheap labour in maritime industry. The presence of indigenous shipyards, long shipbuilding practice with large pool of young workforce is the main strength of local shipbuilding. The areas of strengths and their analysis have been described below:

- a. Cheap shipbuilding labour is the major strength of local shipbuilding. Bangladesh possesses the cheapest workforce in the world. Manual welding quality and local welder are better than those of China, Vietnam and Philippine.

- b. Local shipyards enjoyed sufficient supports from backup industries or backward linkage with competitive prices.
- c. Local re-rolling factories produce various accessories for shipbuilders by using scraped, which come from Bhatiary break-yards.
- d. Bangladesh being a maritime nation has magnificent shipbuilding history and that encourages local and foreign entrepreneurs to invest in this sector.
- e. Coastal area and river side of Bangladesh are geographically convenient for shipbuilding and other maritime activities.
- f. Availability of white color semi skilled manpower like naval architect, marine engineer, electronics and IT engineer, management professional, in maritime field. A little training and skill development programme will convert them human resource. [23]
- g. Bangladeshi maritime workforces have proved themselves as disciplined, diligent, hard working, obedient and quick learner in international arena (in Japan, Korea, Middle East, Malaysia, etc).
- h. Now huge number of technical institutes and vocational training centers are producing skilled manpower for heavy industries. Presently KSY, BN Dockyard, WMSL, KSSL, and ASSL are producing few thousand of skilled labours per year in different trade courses like, welders, cutters, painters, carpenter, blacksmith, foremen, mechanics, electrician, etc.
- i. There are huge numbers of SMEs are functioning and contributing distinctly to heavy industries like shipbuilding as backward and Forward Linkage Industries.
- j. The classification society is extending their support to guiding to develop quality of class certified shipbuilding and also certifying the material lists for export oriented shipbuilding. Germanischer Lloyd (GL), BV, and NKK are contributing and supporting to develop export shipbuilding.
- k. Present shipbuilding cost in China has increased further due to their improved standard of living. It has been predicted that, China will leave a portion of their small and medium shipbuilding market share in near future.
- l. Tax free activities for export oriented shipyards, ease of rules for shipbuilding, imposed tax on import ship, declare some development strategy for the local industry, dredging of rivers, and negotiating with related other sectors will definitely improve the local shipbuilding.
- m. Presence of various supporting industries, which may contribute as backward, and Forward Linkage Industries.
- n. Availability of cost effective human resources of whom a good number of skilled manpower are now working overseas.
- o. The classification society is extending their support to guiding to develop quality of class certified shipbuilding and also certifying the material lists for export oriented shipbuilding. Germanischer Lloyd (GL), BV, and NKK have been playing a very vital role in the growth and development of export shipbuilding in Bangladesh.
- p. Careful comparison of prices of China and Bangladesh have been made and the price of Bangladesh have been found to be better and competitive. And this need continuous improvement, otherwise many cancellation of order may occur in recent recession. [21, 22]
- q. The emerging shipbuilding industry will strengthen the export diversification strategy.
- r. Present government has taken some step and drafts a shipbuilding policy to improve the shipping and shipbuilding sector as a whole.
- s. Tax free activities for export oriented shipyards, ease of rules for shipbuilding, imposed tax on import ship, declare some development strategy for the industry, dredging of rivers, and negotiating with related other sectors to improve the local shipbuilding. [31]

5.2. Weaknesses Analysis of Local Shipbuilding

Local shipbuilding has enormous potential to expand and capture tiny global share, with few distinct weaknesses, and those need to be considered and convert into strength to flourish this sector. Existing weaknesses and their analysis have been described below:

- a. Even with inheritance, Bangladesh shipbuilding found sluggish to keep pace and consistency with technological development. Due to abundance of cheap labour, shipyards owner are reluctant to accept advance technology.
- b. There is distinct gap between industrial needs and curriculum or syllabus of mass education system. Nation should concentrate more on technical education. [27, 31]
- c. Policy planners, bureaucrats, bankers, and other stakeholders are generally less aware of local shipbuilding potential. To progress the shipbuilding, we need to nurture this sector same as RGM.
- d. Most of the local shipyards are located in and around Dhaka, which is far away from coastal area and that restrict size of ships production.
- e. Bangladesh is not producing class approved MS plate, frame, girder, stiffener, longitudinal, etc; which are essential for export oriented shipbuilding.
- f. Image crisis and obstacle in EODB discourage FDI in shipbuilding. There are lack of information, motivation and business promotion for prospective foreign buyers. Our ambassadors in foreign mission should act appropriately in this matter.
- g. Local shipbuilding is lacks of technical expertise on modern technology and government financial support to meet incoming 4IR and that will be the main hindrance for sustainable development.
- h. The key weakness of the local industry is the dishonesty and fraud character of our people. We are usually tried to cheat and earn illegal profit by unethical way.
- i. Private shipyards have lack of corporate culture as those

are managed by family members. They capture all the key and top appointments and create a unhealthy business environment. Local shipyards are operated by their desire and aspiration. As a result, employees don't feel belong to the organization.

- j. Local bank interest and service charges are still high. It is one of the major obstacles to develop shipbuilding. Again, shipbuilding requires bank guarantees as per the choice of foreign buyers. So, local commercial banks need counter guarantees from foreign banks. This incurs additional cost in local shipbuilding.
- k. The technology used in local shipbuilding is still rudimentary. There is distinct lacks in efficiency, technological, managerial and labour skill. Most of the local shipyards lack of modern shipbuilding tools and machineries. Moreover, there is a shortage of expert machine and digital/AI operators. Still, Bangladesh has lack of ship design expertise and we are depending on foreign support.
- l. Commission for opening import LC, counter bank guarantee and other mark up in local shipbuilding incur additional cost and fail to make export oriented shipbuilding more competitive with its competitors like China, Korea, Japan, Vietnam, Philippines, India, Australia, etc.
- m. Poor management practice observed in most of the local Shipyard. Family member are running local shipyards as per their desire and aspiration. They hold all the key and top appointments and consider employee as their servant. As a result, there are distinct gap between shipyards owner and employee, which create unfriendly business environment in local shipyards.
- n. We have wrong attitude and have integrity problem. Again, we have bureaucracy problem as well as unfriendly and negative attitude to expansion on heavy industry like shipbuilding. [28, 31]
- o. Shipbuilding industry is not well understood by local investor and policymaker; as a result the usual responses to such investment proposal are lukewarm and not treated as booming sector. Thus banking support that the shipbuilding sector enjoys in the current policy is poor. Again, there is a risks of shipbuilding business both for the entrepreneurs and for bankers. Moreover, local commercial banks are shy to deal with big investment individually; but that is essential for shipbuilding. [29, 40]
- p. Local bank interest and service charges are still high. It is one of the major obstacles to develop local shipbuilding. Again, shipbuilding requires guarantees to be issued by banks acceptable to foreign buyers. But local commercial banks have to obtain counter guarantees from foreign banks. This incurs additional cost in local shipbuilding.
- q. The technology used in local shipbuilding is still rudimentary. There is distinct lacks in efficiency, technological, managerial and labor skill. Most of the local shipyards lack of modern shipbuilding tools and

machineries. At the same time, there is a shortage of expert machine and digital/AI operators. Moreover, at present Bangladesh is not working in the field of ship design and that create dependency to foreign support. [30, 40]

- r. Productivity expansion and export promotion are being impeded due to lack of required capital and sound investment. Existing rate of interest in working capital loans is still in double digit; whereas 5-7% rate of interest on export credit is prevailing for other export sectors, like RGM and pharmaceutical industry.
- s. We have wrong attitude and have integrity problem. Again, we have bureaucracy problem as well as unfriendly and negative attitude to expansion on heavy industry like shipbuilding.
- t. Poor training facilities of the technical personnel observed in almost all local shipyards. Most of the local shipyards' owner considers that, every human resource development programmed as money drain not gains. [31, 32]

5.3. Opportunities Analysis of Local Shipbuilding

Bangladesh with her vast and young population has immense opportunity to develop any labor intensive heavy industry like shipbuilding. However the provable opportunities and their analysis have been described below:

- a. Local shipbuilding has got enough potential to capture a portion of global market share and can earn mentionable foreign currency by building and exporting quality ships.
- b. There are opportunities to have more employment in this sector. Country has abundance of easily trainable work-force. A little training can elevate the quality and competency of workforce into international standard. There is huge number of white color semi-skilled manpower is also available for any industry.
- c. Present geopolitical situation and financial crisis may increase demand for low cost ships. This is an opportunity and is favourable for local shipbuilding.
- d. Existing local shipyards of Bangladesh can manufacture quality ships with competitive price. Moreover, there is a golden opportunity to flourish backup industries to support local shipbuilding. There is also a chance to grow backup and foreword linkage industries with foreign collaboration. [31, 34]
- e. Shipbuilding may be a dominant foreign currency-earning sector within next few years and that is suitable for Bangladesh.
- f. Bangladesh has export-import imbalance and export deficiency. We need to explore potential sectors to balance deficiency. Shipbuilding may be the new opportunity. Because, there is an opportunity for access duty free market of ships, into developed countries.
- g. There is an opportunity of FDI in shipbuilding sector. Country like China, Turkey, Netherlands are showing their keen interest in this sector.
- h. The foreign buyers especially in Western Countries

(Europe and North America) have exhausted to China due to present geopolitical situation. They are searching new market and are imposing few mandatory requirements to using their own equipment in the ordered ships. It creates hope for LDC and developing countries like Bangladesh.

- i. The government, investors shipbuilders, ship owners and related stakeholders are somehow understand that, shipbuilding is a promising sector and that could be one of the alternative sector in replace of RGM in near future.
- j. During the discussion with focus group, few experts have stated that, Bangladesh is the suitable for small and medium size shipbuilding. They viewed that Bangladesh have the opportunity to capture a handsome share of 3000-20000 dwt multipurpose, container, tanker and cargo ships market. Those small and medium niche markets will be alive in coming years. [31, 33]
- k. Present geopolitical situation and financial crisis may increase demand for low cost ships. This is an opportunity and is favorable for local shipbuilding.

5.4. Threats Analysis of Local Shipbuilding

Shipbuilding industry of Bangladesh failed to keep pace and consistency due to lack of proper government, stakeholder, and private initiatives. This has ultimately caused of slow progress and fails to penetrate international shipbuilding market. However the suspected threats and their analysis have been described below:

- a. Many countries like Vietnam, Philippine, Indonesia, India, Brazil, etc are also trying to capture the surplus and niche shipbuilding market and that is a viable threat for local shipbuilding.
- b. There is a drain of skilled manpower, naval architect and engineer from Bangladesh shipbuilding industry to foreign industry.
- c. Prime raw materials like, class plate, machinery, equipment and accessory of local shipbuilding industry are import-based. So, local shipbuilding is highly dependent on foreign countries and that incur additional cost. [31, 35]
- d. As per market analysis, new ship demand or Compound Annual Growth Rate (CAGR) is increasing at a rate of around 4%. Theoretically there is formidable threat and risk for the newcomers and investors.
- e. Image crisis, integrity problem, bureaucratic problem and attitude of local investor consider another threat for the overall existence of local shipbuilding. Again there are risks to maintain good well and build confident to foreign buyers.
- f. Poor management culture found in local shipyards and employees have poor job satisfaction and not motivated to organization. As a result, lack of discipline, huge absenteeism and poor turn-over of skilled manpower are common phenomenon in local shipyards. [31, 37]
- g. Weak infrastructure, deficiency in energy supply, insufficient land, poor EODB, and other facilities are

the major hindrances for rapid development of local shipbuilding. [36, 40]

- h. The world is passing through economic recession due to post COVID-19 situation and severe geopolitical crisis (Russian war on Ukraine). Shipping and shipbuilding of the world are affected from this recession and that result cancellation of orders and slow down the global business.
- i. The draught restricted in rivers (maximum 4m) limit the size of ship built in local shipyards. It is very difficult to maintain navigable draft in the river/channel for navigability of ships due to huge siltation. Again bridges and overhead cables also induce additional restriction to the ship size built in shipyards. A minimum 22 meters air draft over high water (monsoon) needs to be maintained for major rivers.
- j. There is an absent of pleasant government policies and strategy for local shipbuilding. It's not playing supporting role to sustainable development of this sector. Again, there is a lack of mechanism for proper formulation, implementation, monitoring and updating export oriented local shipbuilding policy and strategy.
- k. There is poor management culture found in local shipyards as well as shipyards owner attitude in the local shipyards is not employment friendly. As a result, employees have poor job satisfaction as well as they does not feel belong to the organization. That's why, lack of discipline, huge absenteeism and poor turn-over of skilled manpower has usual phenomenon in local shipyards. [31, 38]
- l. Shipbuilding industry needs a lot of machinery, equipment, components, spare-parts, and accessories and that lead to emergency import during the construction period. Present existing roles and facilities are not so adequate for emergency import requirements. Under the present import policy and foreign currency regulation, create unwanted complicacy and delay the delivery of import of ships items. Finally whole process delays the production and that demoralize foreign buyers.

5.5. Present Challenges of Local Shipbuilding

Local private shipyards are very reluctant to introduce corporate management culture. Family members occupy the important managerial appointment. Such family management culture is one of the hindrances for development of shipbuilding. For example ASSL, has failed to continue their success in ship export business due to family management culture. Local shipyards have negative attitude and are very reluctant to improve quality, health, safety, and environmental (QHSE) aspects. Government pressure, foreign buyers' demand, together with awareness and training program on QHSE aspects may develop local shipyards to international standard. People need to change the attitude as 'get rich quickest way possible'. We need focus on sustainable development and happiness. [39, 40] For example WMSL has failed to continue their success in ship export due

to their investment in other business aside shipbuilding, where they don't have enough expertise.

Additional financial cost of local Shipbuilding is about 10 to 20% and that is higher than the other competing nations (China, Korea, Japan, India, and Vietnam). High price and uneven electricity and gas supply with other poor infrastructure are major obstruction for smooth development of shipbuilding industry. [26] Relatively poor state diplomacy, country image and insufficient activities to promote local shipbuilding are creating obstacle to growth export shipbuilding. Local shipbuilding is still at a vulnerable stage; need so many things to do, to sustainable development and achieve international standard. If this sector get same facilities as given to RMG, the net benefit will be better than that of RMG.

5.6. Future Challenges of Local Shipbuilding

Ocean and shipping is the livelihood of global trade, where technology has placed at core of the strategy since inception of ship and shipping, which observed previous three industrial revolutions. Likewise, there will be huge impact on maritime industry during incoming 4th IR (4IR) or Industry 4.0 and future ships will be controlled by Artificial Intelligence (AI), IoT, or automated systems. Modern technology will steadily reduce seafarers in shipping due to unmanned ship and AI. "The 4IR is anticipated to reach at the peak around the middle of the 21st century and bring disruptive changes by exploring and implementing new technology in all spheres of trade and shipping to create safer, efficient, greener, and viable solution. The technologies like Robotics, AI, Machine Learning, IoT, Blockchain, [19] Drones, and Augmented Reality (AR) are going to change the equation of the job sectors and give a new dimension of maritime industry" [15].

To overcome the present situation and future complexity few measures need may be adopted by government, maritime administration, shipyards, ship-owners, MET and technical institutes. We need to take necessary preparation to fulfill the demands of 4IR. The policy, strategy, context and learning process in the mass and technical/MET education need to be formulated accordingly to develop the skills and knowledge for new generation. There may be skill development program for seafarers and shipbuilding workforce to meet the future challenges. Such program are: communication and coordination, QHSE, adaptability and cognitive flexibility, automation and AI, digital proficiency, innovation and creativity, critical thinking, emotional intelligence, technical skills, self learning (on-line), data-based decision, people management and negotiation, complex problem solving skill, service orientation, etc. [20, 31] we have strategic vision to adopt with disruptive changes in 4IR but the main obstacle in this transformation is poor motivation of employees due to fear of losing job, unawareness and rigidity in old style of work.

In the recent time, the impact of 4IR or Industry 4.0 has been discussed everywhere. The first industrial revolution introduced water and steam-powered mechanical manufacturing. "The second industrial revolution brought

electrically powered mass production system and the third industrial revolution introduced electronic and information technology (IT) for achieving automation in manufacturing process" [15].

On the other hand, "the incoming 4IR leads to the complex use of digitization, combining the cyber world with the physical world by including AI, IoT, big data analytics, cloud computing, virtual and augmented reality, simulation, human-machine interaction, 3D printing, advanced materials technology, etc" [31, 39]. The main goal of 4IR is intelligent shipyard which is characterized not only by adaptability, resource efficiency and ergonomic but also close integration among all stakeholders [16].

6. Conclusion

Cheap labor alone cannot be the only factor for sustainable development of shipbuilding. Nowadays advance technology can save cost and there is a chance to lose our competitiveness, if we rely only on labor cost. Actually, Bangladesh can make a huge economic progress by properly nourishing and utilizing our export oriented shipbuilding industry. Entrepreneurs have also confident on good prospect of local shipbuilding industry. Bangladesh is taking the advantages of its long history of maritime activity, favorable geographical location and availability of cheap workforces. 'Export oriented shipbuilding is truly a global industry. Bangladeshi-made ships of international standard are roughly 10%-30% less costly than ships made in Japan, Korea, China even Vietnam or India'. Recently the opportunity of FDI has created in shipbuilding sector. Country like China, Turkey, Netherlands are showing their keen interest in this sector. So creation of an exports shipyard zone or air-marking a special zone for export shipbuilding can positively help to develop healthy growth of shipbuilding industry in Bangladesh.

Small and medium size container, tanker, cargo, multipurpose ships with around 3000-10000 DWT is suitable for Bangladesh. There is a serious demand of container ships in all size. Old single hall tanker fleet will be replaced immediately as per IMO requirement. Bangladesh has all potential and capacity to capture this niche market with competitive price. Previously shipbuilding cost in China was cheaper. But at present, due to their standard of living has improved and their labor wages have also been increased. So, Bangladesh remains in advantageous position in this aspect. It has been predicted that, at future, China will leave a portion of their small and medium shipbuilding market share. Bangladesh has all potential and capacity to get 1% of global market share within 2030 and the worth value will be USD 2 billion.

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