

# **INDIGENOUS CAPITAL WARSHIP BUILDING IN BANGLADESH: CHALLENGES AND WAYS FORWARD**

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“If you want to build a ship, don’t drum up people to collect wood and don’t assign them tasks and work, but rather teach them to long for the endless immensity of the sea.” Antoine de Saint-Exupery

## **Introduction**

Bangladesh Navy (BN) started her journey as a force with few assets after the independence. Today she has become a considerable force with more than 70 ships and crafts (DNP, NHQ). Ships were acquired from various countries including UK, USA, China, South Korea etc. Such acquisition gave BN the required sea going capability to look after the country’s maritime interest. But BN is still striving to achieve desirable combat capability. The causes of BN’s limitation in combat capability may be attributed to reasons like, foreign dependency, non availability of desired platform, spares, rapid changing technology etc. These limitations may be multiplied if those countries denied to provide capital warship or our sea lines of communication are disrupted during the crisis. As such BN needs to maintain credible force and BN should approach for an indigenous solution. In particular indigenous war shipbuilding will enhance her capability to perform her core duties.

In the field of construction of war shipbuilding, Bangladesh has achieved considerable success. In the 70’s Bangladesh first built its indigenous Town Class naval patrol craft([www.dewbn.com](http://www.dewbn.com)). Khulna Shipyard (KSY) built five vessels of Padma Class in 2013. These 350 tonnes modern vessels were built with the assistance of China Ship Building Industry Corporation. KSY is building two large patrol craft for BN at this moment. However, Bangladesh is yet to build capital warship whereas capital warship is the most capable platform at sea. To enhance her capability BN needs a continuous inflow of modern ships in its flotilla. But, procurement of ship from abroad is too lengthy and exhaustive process and at the same time it is a costly affair. Moreover, it may be difficult to acquire desired capital platforms from other countries in times of national crisis. Therefore, time has come to build capital war ship indigenously to be a credible Navy.

Dependence of foreign procurement has serious implications on national security and economy. BN may face tremendous problem if some countries especially China denies to supply platform, critical equipment and spares during the period of crisis. Thus it is imperative for us to evaluate the prospect of indigenous capital warship building. Presently BN is operating three shipyards among those Narayangonj Dockyard and Khulna Shipyard do not have the capability to build capital ships like frigate. However Chittagong Dry Dock Limited has the capability to launch ship larger than frigate for repair and maintenance only but does not have the shipbuilding capability right now. Indigenous construction of warship in major local shipyard/dockyard will give BN teeth in terms of combat capability. As such Bangladesh needs to develop capital war shipbuilding capability immediately.

## Foreign Procurement vs Indigenous Production and Warship Building by Regional Countries

### Foreign Procurement

- **Difficulties in Foreign Procurement:** Some of the challenges of foreign procurement in Bangladesh are appended bellow.
  - **Lengthy Procedure:** Procurement system itself is a lengthy system. Total process takes about 9 months for Foreign Currency (FC) and 6 months for Local Currency (LC) contract.
  - **Monopoly in Standardized Items:** Certain items have been standardized but the numbers of enlisted firms for supplying those items are very few. As a result those few firms are doing monopoly business very often by quoting higher prices.
  - **High Cost:** Except very few small arms, most conventional weapons and platforms are very costly. Furthermore, weapon, sensors and platform suppliers often increase the price many times more than normal price during war.
  - **Uncertain Strategic Environment:** In this uncertain world, nations, which have cordial bilateral relations today, may not enjoy the same tomorrow, resulting discontinuation of arms deal. Analysts suggest that present trend of imposition of arms embargoes might drive even more countries to produce indigenous weaponry.

- **Risk of Import Dependency:** An import-dependent country virtually subjects her defence and foreign policies to the mercy of the suppliers. Another serious consequence is dependency on our Sea Line of Communications (SLOC) which is vulnerable during the war.

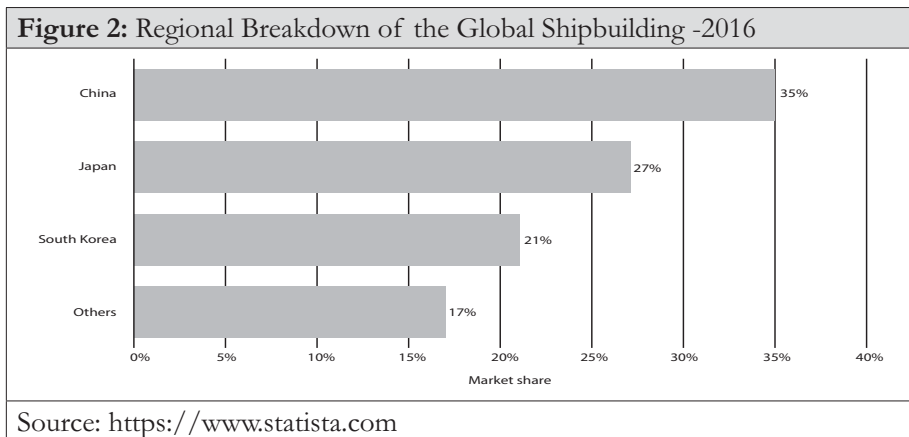
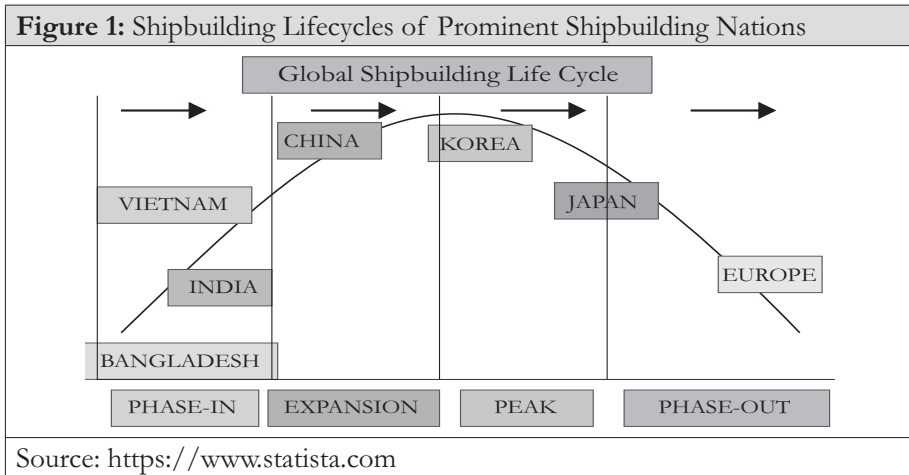
## Indigenous Production

- **Significance and Rationale for Indigenous Approach:** Contrary to the foreign procurement, there are a lot of significances and rationale for indigenous approach. Some of the other merits of indigenous production are highlighted below (Haglund, 1989):
  - **Self-Dependence in Warship Supply:** Establishment of Capital warship building industries will help Armed Forces to be self-dependent in warship supply in time of crisis.
  - **Foreign Currency Savings and Earning:** Besides conserving foreign exchange, indigenous capital warship production can even generate foreign exchange by exporting abroad. This income can be utilized for both nation building and complementing defence budget.
  - **Employment Opportunity:** The establishment of capital warship building industries will benefit in the fields of employment of men and women, enhancement of foreign trade and establishment of huge export oriented industries.
  - **Infrastructure Development:** Setting up capital warship building industries will certainly develop country's infrastructure. In addition, industries allied construction will also take place and as a result country's overall infrastructure will be developed.
  - **Learning Technical Know-how by Doing:** Work experience in the capital warship building industries will help people to gradually learn the technical know-how, which in long run will be an asset for the nation.
  - **Export:** Warship building related items, ship design, propulsion system, engineering equipment, sensors etc. could be exported in the long run. This will also save lots of foreign currency.

- **Strategic and diplomatic domination:** A formidable indigenous capital warship building industry also helps in achieving strategic and diplomatic domination.

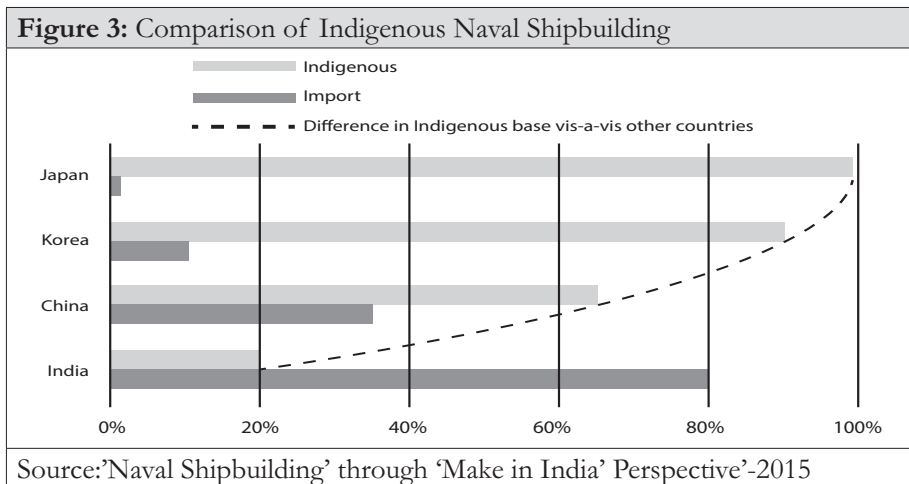
### Regional Shipbuilding Trends

After World War II shipbuilding becomes a European Industry in which Britain took the lead. This is followed by Japan (1960s to 1980s). Then South Korea took the lead. Thus the world shipbuilding market is moving east and presently Japan and South Korea have nearly equal shares of 70 percent of that market. Now, the most rapid growth in market share observed and planned is in China. But, the countries where labor costs are going up are shifting their role from small to medium and large ships.



## Indigenous Warship Building Trends around the Globe

It is estimated that over the next two to three decades, the global naval shipbuilding industry could see an investment of over US \$835 billion in new warship and submarine construction. A forecast of construction of naval ships suggests that globally over the next 25–30 years about 522 new construction programmes totalling more than 3800 new ships, submarines and craft, is expected to cost US\$ 838 billion. This forecast indicates a steady rise in spending on new naval acquisitions worldwide, despite declines in US and European shipbuilding sectors. As such regional countries have concentrated on indigenous warship building.



**Indigenous Warship Building by India:** India emerged as one of the leading players in indigenous war shipbuilding which has made India an unparalleled naval power in the region. Indian started her indigenous warship building by the NILGIRI-Class frigates in 1972. NILGIRI-Class frigates were updated versions of the Leander class, designed and built for the Indian Navy by Mazagon Dock Limited in Mumbai. Six ships were built between 1972–81. Vessels of this class formed the 14th Frigate Squadron. The lead ship INS NILGIRI was the first major warship to be built in India in collaboration with Yarrow Shipbuilders of the United Kingdom. Indian Navy's Directorate of Naval Design has designed over 80 ships since 1970s and 48 state-of-the-art ships and submarines are under construction in Indian shipyards, both public and private, as on date.

<b>Table 1: List of India's Indigenous Capital Warships</b>					
<b>Ships</b>	<b>Types</b>	<b>Tonnage</b>	<b>No</b>	<b>Year</b>	<b>Shipyards</b>
NILGIRI Class	Frigate	2682 Ton	06	1972-78	Mazagon Dock, Mumbai
GODAVARI-Class	Frigate	3600 Ton	03	1983	Mazagon Dock, Mumbai
KHUKRI-Class	Corvette	1350 Ton	04	1989-91	Mazagon Dock, Mumbai
B.PUTRA-Class	Frigate	3600 Ton	03	1993-96	Garden Reach, Kolkata
DELHI-Class	Destroyer	6200 Ton	03	1997-01	Mazagon Dock, Mumbai
SHIVALIK-Class	Frigate	4900 Ton	03	2010-12	Mazagon Dock/GRSE
KOLKATA-Class	Destroyer	7400 Ton	03	2014-16	Mazagon Dock, Mumbai
V.PATNAM-Class	Destroyer	7400 Ton	04	2018-24	Mazagon Dock, Mumbai
VIKRANT-Class	A/Carrier	40000 Ton	01	2020	Cochin Shipyard, Kochi
ARIHANT-Class	SSN	6000 Ton	02	2016	NSC, Visakhapatnam
KALVARI-Class	SSK	1575 Ton	02	2017	Mazagon Dock, Mumbai

Source: Prepared by Author

**Indigenous Warship Building by Myanmar:** Myanmar has now made certain progress in ship building in the past decade with the encouragement of the government. The Naval Dockyard in Yangon as well as other local shipbuilding companies had by 2013 produced two Aung Zeya class frigates, two Anawratha class corvette, the five series class FAC, the 412 class coastal patrol craft, Yan Naing and PCE class river patrol craft, LCU, LCM as well as coastal craft. In recent days, Myanmar Shipyards has been capable of constructing and repairing the various types war ships ranging from small landing craft to frigate. Building of indigenous stealth UMS KYANSITTAH and UMS TABINSHWEHTI is the testimony of her shipbuilding capability.

<b>Table 2: List of Myanmar's Indigenous Capital Warships</b>					
<b>Ships</b>	<b>Types</b>	<b>Tonnage</b>	<b>No</b>	<b>Year</b>	<b>Shipyards</b>
Anawrahta Class	Corvette	1105 Ton	02	2001-03	Sinmalaik Shipyard, Rangoon
Tabinshwehti Class	Corvette	1105 Ton	01	2016	Sinmalaik Shipyard, Rangoon
Aung Zeya-Class	Frigate	2500 Ton	01	2010	Myanmar Shipyard, Myanmar
Kyansitthar -Class	Frigate	2500 Ton	02	2014	Myanmar Naval Dock yard
Source: Prepared by Author					

**Indigenous Warship Building by Pakistan:** Shipbuilding Industries in Pakistan are not very rich. However, the Karachi Shipyard & Engineering Works Limited (KS&EW), is a major defence contractor and military corporation situated in West Wharf in Karachi, Pakistan. Pakistan Navy's Directorate of Naval Design has designed and produced under mentioned ships as on date.

<b>Table 3: List of Pakistan's Indigenous Capital Warships</b>					
<b>Ships</b>	<b>Types</b>	<b>Tonnage</b>	<b>No</b>	<b>Year</b>	<b>Shipyards</b>
ASLAT Class	Frigate	2500 Ton	01	2010	Karachi Shipyard, Karachi
KHALID-Class	Submarine	1500 Ton	03	1999-2006	Karachi Shipyard, Karachi
Fleet Tanker	-	17000 Ton	01	2016	Karachi Shipyard, Karachi
Source: Prepared by Author					

### **Challenges Faced by Regional Countries while Indigenous Warship Building**

There are challenges in warship building which are common to all types of warship building be it small or capital. Some of the challenges are enumerated below:

- **Shipyard Infrastructure and Facilities:** Shipyard infrastructure and facilities is great challenge to construct capital warship in local shipyards.

- **Requirement of Large Financial Resources/Support:** Warship building is a very high capital intensive project and it requires large financial resources.
- **Long Gestation Periods Between Design and Construction:** Long gestation periods between design and construction leads to design and equipment changes during construction. As such it is a problem for indigenous warship building.
- **Restricted Technologies:** The lack of access to critical technologies like stealth, smart materials, weapon system design, etc continue to elude the warship building effort.
- **Limited Research and Development (R&D):** Limited R&D on warship building has been low with most shipyards. Most of shipyards of the region does not have R&D for development of cutting edge technologies.
- **Supply of Modern Weapon Systems by the Industry:** Naval weapons are complex in design due to the corrosive sea environment in which they have to operate. Most of the shipyards of this subcontinent have suffered to provide viable weapon system or even subsystem solution within the required time frames and the budgeted costs.
- **Lack of Design Capability in Shipyards:** The private shipyards resort to buying the designs from foreign collaborators and depend upon the concerned Navy for providing design of warships on order. This is a great challenge for the local shipbuilders.
- **Lack of a Strong Commercial Shipbuilding Industry:** Despite noticeable differences, a strong and competitive commercial shipbuilding industry has a positive impact on warshipbuilding. Except India, there is lack of a strong commercial shipbuilding industry.
- **Absence of a Strong Ancillary Industry/Backward Linkages:** Like in any other sector ancillary industry plays a vital role in shipbuilding in general and warship building in particular. In this region the general ancillary industry for shipbuilding is vastly underdeveloped.
- **Lack of Synergy Between Public And Private Yards:** A key weakness in naval shipbuilding is lack of synergy between public and private shipyards. Initially, India and other regional countries faced this problem.



## Capability Analysis of Major Shipyard/Dockyards

### Analysis of Major Shipyard/Dockyard of Bangladesh

There is more than fifty shipyards in Bangladesh and a hundred of shipbuilders or contractors and marine workshops are actively involved in shipbuilding activities (Banglapedia, 2016). Capabilities Analysis of Major Shipyard/Dockyard of Bangladesh is as under:

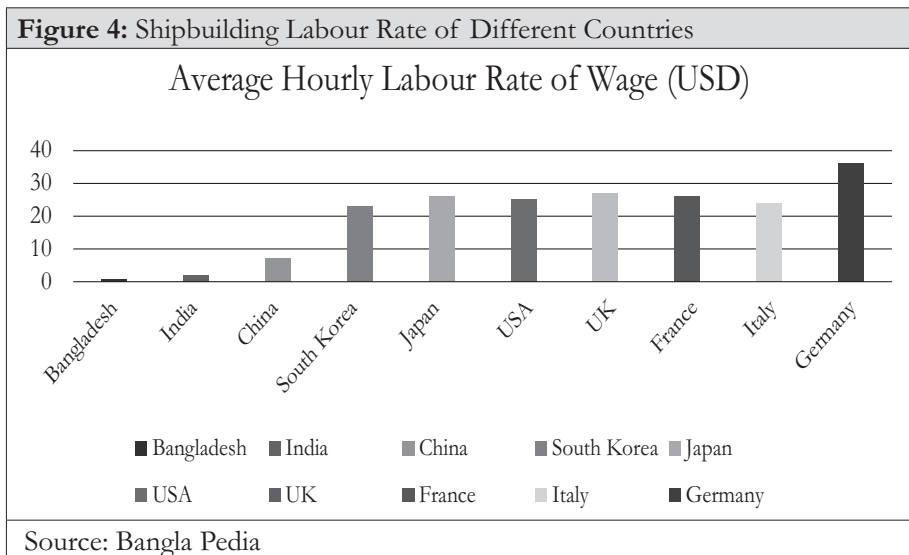
- **ASSL:** The likely indigenous capital warship will of maximum 120m and 3000 ton. It has experience of building Logistics ships of Bangladesh Navy BNS K J ALI of 4000 ton. As such, ASSL has good potentiality of capital warship building.
- **KSY:** It has the capability of building ship up to 700 DWT and 4 m draft. KSY has limited capability of building a ship with more than 4m draught and 20m height which is an impediment to build capital warship. It has fully equipped Shipbuilding shops. It has experience of building LPC of Bangladesh Navy of 650 ton. Once new infrastructure is developed in newly acquired land near Harbaria, it will be possible (Razib, 2017).
- **Western Marine Shipyard Ltd:** WMSL has capability of lifting 5000 tonnes in its track. It has fully equipped Shipbuilding shops. In terms of steel consumption, the production capability is about 25,000 per year. This shipyard has already delivered a 5200 DWT Container vessel. It has also experience of building OPV for Tanzanian Navy. As such, WMSL has good potentiality of capital warship building.
- **DEW, Narayangonj:** DEW Ltd is one of the oldest dockyards in the subcontinent and possesses the greatest history of ship building and repair work. First River Class Patrol Ship was built in this shipyard. It has capability of lifting 2500 tonnes in its track. It has fully equipped shipbuilding shops. As such, its potentiality of capital warship building is yet to be tested (Mahmud, 2017).
- **CDDL:** CDDL has only one dock capable of docking and repairing all types of vessels up to 22000 DWT. Allowable length and breadth is 175m X 24m. CDDL has the potentiality to do both repair and new ship building works once shipbuilding infrastructure is developed. As such, its potentiality of capital warship building is huge. (Kislu, 2017).

## Prospects and Challenges of Indigenous Capital Warship Building in Bangladesh

### Prospect of Capital Warship Building in Bangladesh

Many of the shipyards in neighboring countries like India and Vietnam are fully occupied with medium and large ship orders. Bangladesh has still got rooms for building small and medium categories ships for international market. The survey responder and interviewed personnel echoed that there are genuine reasons for the prospect of capital warship building in Bangladesh which are discussed below:

- Global Demand:** At present the global shipbuilding industry has been dominated by Asian countries (China, Korea and Japan). As the global demand of commercial shipbuilding is growing, the capability of local shipyard will certainly be enhanced and as result these shipyards will be able to build capital warship.
- Lower Labour Cost:** The single most driving force behind this phenomenon is lower labor cost and overhead. Cost of labour is about 20-30 percent of the cost of shipbuilding (Shenoi, 2007). Workers in US shipyards receive about US\$ 18 per hour, whereas the hourly wage in Bangladesh is less than US\$ 1.



- **Shipbuilding Heritage:** Being a maritime nation, Bangladesh has good name in shipbuilding since long. In 1884 Bangladesh build wooden warship for German Navy which bears the testimony of Bangladesh’s shipbuilding heritage. As such, all stackholders are optimistic that the local shipyards will be able to build capital warship.
- **Demand by Bangladesh Navy:** According to Forces Goal 2030, the requirement of Frigate and Corvette for BN is given below:

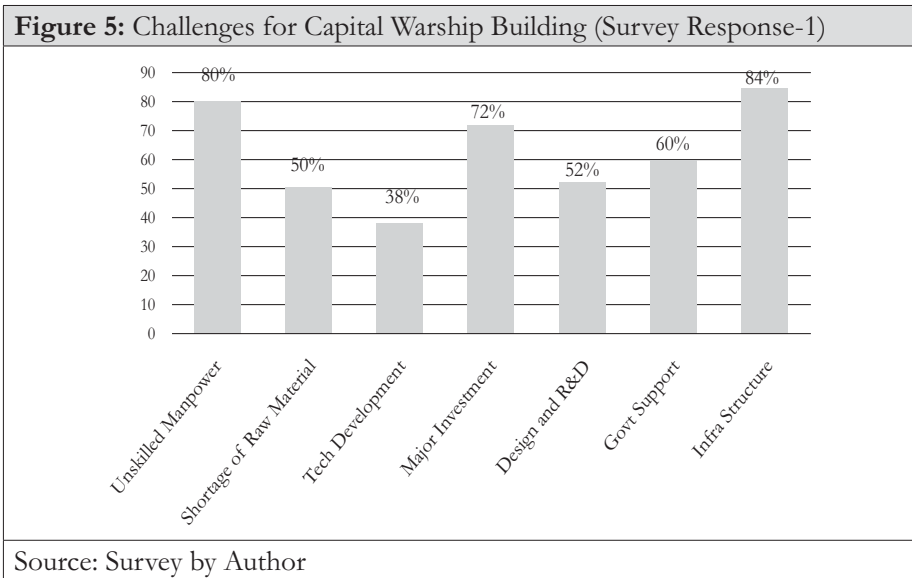
**Table 4: Requirement of Frigates and Corvettes**

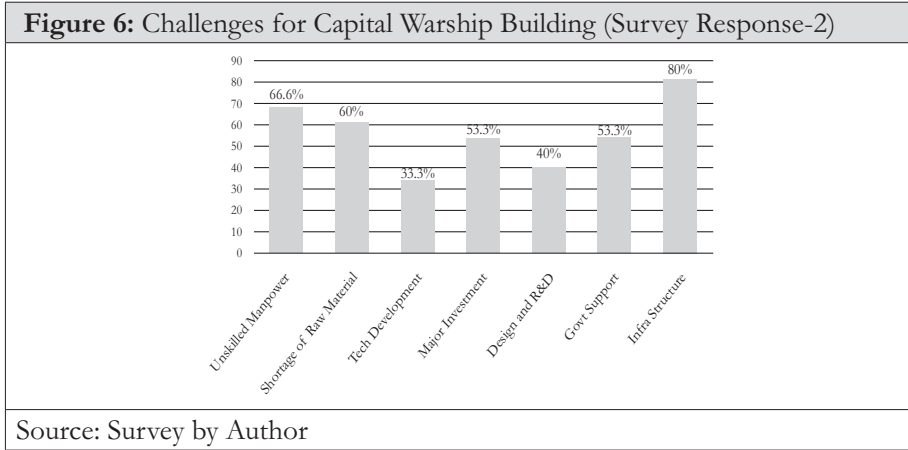
Ser	Ships/Crafts	Requirement (2030)	Present Stock	Additional Requirement
1.	Frigate	8	6	2
2.	Corvette	12	4	8

Source: DNP Directorate, NHQ

### Challenges in Capital Warship Building in Bangladesh

There are many challenges which are hindering the development of our shipbuilding industries. After analyzing the above survey data along with the interviews of some experts and reviewing various articles and case study, papers and journals followings challenges in capital warship building are summarized:





- **Unskilled Manpower:** Warship building is a highly specialized job. Starting from the Naval Architecture to a welder, everybody must be skilled. There is a shortage of skilled manpower in major shipyards which is a hindrance for capital warship building.
- **Shortage of Raw Material:** More than 80% of raw materials and ship's components are in import-based for export oriented Bangladeshi shipbuilding. There is no adequate backup industry to produce required standard of MS plate need for capital warship construction.
- **Lack of Linkage Industries:** Like in any other sector ancillary industry plays a vital role in shipbuilding in general and warship building in particular. Absence of adequate backward linkage industries will cause extra cost of warships.
- **Access to Critical Technology:** Lack of access to critical technologies like stealth, smart materials, weapon system design, etc continue to elude the warship building effort.
- **Standardization of Shipyards:** Overall management practice and planning process for most of the shipyards is not up to the international standard.
- **Energy Crisis:** The lack of electricity and gas supply is a major impediment which hinders the setting up of shipbuilding industries in Bangladesh.
- **Infrastructure Development:** Most of the major shipyards are not fully equipped to undertake the capital warship building. Shipyard

infrastructure and facilities is great challenge to construct capital warship in local shipyards.

- **Government Support:** Government support or patronization is a key point for the success in our country.
- **Financial Problem:** Financial matter like lack of adequate working capital, high rate of interest on industrial and working capital loan, high bank guarantee margin and high import LC margin are threat to capital warship building.
- **Productivity in Shipyards:** The productivity of Bangladeshi Shipbuilding labour is 11.43 which is very high as compared with other countries.
- **Limited Research and Development (R&D):** Limited R&D on warship building has been low with most shipyards.
- **Supply of Modern Weapon Systems by the local Industry:** Most of the shipyards of this subcontinent have suffered to provide viable weapon system or even subsystem solution within the required time frames and the budgeted costs.
- **Lack of Design Capability in Shipyards:** The private shipyards resort to buying the designs from foreign collaborators and depend upon the concerned Navy for providing design of warships on order.
- **Lack of Synergy Between Public And Private Yards:** A key weakness in naval shipbuilding is lack of synergy between public and private shipyards.

## **Cost-Benefit-Risk Analysis and Ways Forward of Capital Warship Building**

### **Cost-Benefit-Risk Analysis of Capital Warship Building**

- **Cost:** The cost of capital warship building is analyzed below:
  - **Cost of Materials:** If materials are cheaper than anticipated, price drops and the navy may benefit with additional ships from the contract. If materials are more expensive costs rise increasing the price of ships.

- **Labour Cost:** Same hold true for labour cost too. If labour wages are cheaper than anticipated, price of warships drops. If labour wages are more expensive, then the total costs rise.
- **Cost of Expertise:** A shortage of trained personnel could have the same increasing effect, as shipyards pay more for experts.
- **Cost of Weapon and Sensors:** Non availability of weapon and sensors increases the overall cost of a warship.
- **Risk:** The risk of capital warship building is analyzed below:
  - **Limited Demand:** If ships for the BN and BCG are the only goal, there exists risk. As the requirement of BN and BCG is limited, so an export oriented capital warship building shipyard must be thought of.
  - **Economic Recession:** Economic recession has profound impact on capital warship building project.
  - **Delay in Supply:** The navy could also suffer if delay or disruption in a shipbuilding project because of different reasons.
  - **Contract Performance:** Contract performance could also cause similar problems if one or both parties lose confidence and trust in the other.
  - **Future Change in Mission:** There is always possibility of future change in naval mission and threat perception which may cause cancellation of warship building project.
- **Benefit:** The benefit of capital warship building is analyzed below:
  - **Strategic Benefit:** Indigenous capital warship building has huge strategic benefit. It can reduce the strategic vulnerability in unreliable imports. It will help Armed Forces to be self-dependent in warship supply.
  - **Economic Benefit:** Indigenous capital warship building has tangible economic benefit. It can conserve foreign exchange and can

even generate foreign exchange by exporting abroad.

- **Operational Benefit:** Indigenous capital warship building will enhance combat capability of BN by supplying mission oriented ships.
- **HR and Infrastructure Development:** Capital warship building industries will benefit in the fields of employment of men and women and will certainly develop country's infrastructure.

### **Ways Forward of Indigenous Capital Warship Building in Bangladesh**

As an outcome of the data analysis, following ways forward to overcome the challenges have been identified:

- **Skilled Manpower Development:** Warship building is a special job, hence skilled manpower is prime requirement for constructing a quality warship. Both Government and private sector should undertake skilled manpower development program to produce skilled and technical people for the warship building.
- **Joint Ventures and ToT:** Participation of global players with Bangladeshi partners, would greatly facilitate timely completion of projects, enhancement of shipyards capacity, cost competitiveness of shipyards, bench marking with world class players in terms of quality and ensuring more orders to Bangladeshi Shipyards while meeting Defence force preparedness requirement. As such the shipbuilders may go for joint venture and ToT while implementing the capital warship project. Building LPC in KSY is a good example of Joint Venture and ToT.
- **Government Policy and Patronization:** Government should develop a favorable policy to help the international standard shipbuilding industry to build capital warships for Bangladesh or even for export. To promote naval shipbuilding, the Government should take steps to provide financial assistance to shipyards which ultimately will save lots of money.
- **Tax Reduction:** Government may grant shipbuilding industries those who will build warship a tax holiday of 5-10 years. Government may order the Bangladesh Bank to resume working capital loan to the shipbuilding company via commercial banks at a lower interest rate.

- **Development of Backward Linkage Industries:** Development of the backward linkage industry, e.g. the steel, cable, weapon and sensors to obtain the necessary class or standard will allow supplying the warship building industry with raw materials and components.
- **Influencing the Major Investors:** Capital warship building is a costly project and collaboration with major investor will ensure timely delivery and meet navy's requirement would greatly increase.
- **R&D and Development of Design Expertise:** R&D in capital warship building is essential for development of cutting edge technologies. The Government should support R&D activity. To synergize the R&D talent available in private and public sectors as well as in the academia, a Centre of Excellence for warship building should be created on a PPP model aimed at generation of warship design.
- **Industry - Academia Co-operation:** Industry - Academia co-operation must be promoted to facilitate innovation and product development. In such case capital warship building will be easier. The academia may help the industry in significant way by surveying, inspecting and controlling quality while constructing capital warship. In Bangladesh, academia from BUET and MIST may perform this role.
- **Infrastructural Development:** The major shipyards must develop their existing infrastructure to undertake capital warship building project.
- **Developing Awareness:** The importance of capital warship building is to be understood by all. Its economic and strategic benefit must be known to all stakeholders, for which developing awareness is required.

### **Strategy for Indigenous Capital Warship Building in Bangladesh and Suggested Timeframe**

Indigenous capital warship building is a complex, expensive and time consuming proposition. A strategy may be formulated for developing indigenous capital warship building capability. Considering the ground realities implementation of the suggested strategies can be time-framed as Short term (within next 5 years), Mid-term (within next 10 years) and Long term (by next 20 to 25 years). Strategy for Indigenous Capital Warship Building in Bangladesh at a glance is as under:



<b>Term</b>	<b>Time Frame</b>	<b>Strategy</b>
Short Term	Within next 5 years	<ul style="list-style-type: none"> <li>• Develop a favorable government policy to develop the infrastructure of shipbuilding industry.</li> </ul>
		<ul style="list-style-type: none"> <li>• Establish 'Indigenous Capital Warship Building Cell' under supervision of DSB at NHQ.</li> </ul>
		<ul style="list-style-type: none"> <li>• Undertake a pilot project in CDDL to build frigate/corvette indigenously with joint venture.</li> </ul>
		<ul style="list-style-type: none"> <li>• Explore global market for potential buyers to export indigenous corvette/frigate.</li> </ul>
		<ul style="list-style-type: none"> <li>• Influence major investors to ensure timely completion of the project.</li> </ul>
Mid Term	Within next 10 years	<ul style="list-style-type: none"> <li>• Explore and exploit Transfer of Technology (ToT).</li> </ul>
		<ul style="list-style-type: none"> <li>• Develop own warship design capability by the cooperation of Academia.</li> </ul>
		<ul style="list-style-type: none"> <li>• Establish some backward linkage industries to support indigenous capital warship building.</li> </ul>
		<ul style="list-style-type: none"> <li>• Undertake skilled manpower development program to produce skilled and technical people.</li> </ul>
Long Term	By next 20-25 years	<ul style="list-style-type: none"> <li>• Reduction of foreign dependency.</li> </ul>
		<ul style="list-style-type: none"> <li>• Establish all required backward linkage industries.</li> </ul>
		<ul style="list-style-type: none"> <li>• Build indigenous capital warship without joint venture or ToT.</li> </ul>
		<ul style="list-style-type: none"> <li>• Export capital warship in global market.</li> </ul>

## Conclusion

To enhance her capability BN needs a continuous inflow of modern ships in its flotilla. But, procurement of ship from abroad is too lengthy and exhaustive process and at the same time it is a costly affair. Moreover, it may be difficult to acquire desired capital platforms from other countries in times of national crisis. Therefore, time has come to build capital war ship indigenously to be a credible Navy. Quest for self-reliance and indigenization of BN will ensure inflow of more platforms at the time of crisis which ultimately will reduce the foreign dependency drastically. Indigenous approach will benefit Bangladesh as a whole as indigenous defence production is likely to ensure self reliance, promote human resource development and employment to workers. Moreover by gaining the capability of warship building, the strategic impact Bangladesh will gain is not possible to measure in terms of money.

Because of long heritage of shipbuilding, Bangladesh has abundance semi-skilled and easily trainable manpower for supporting shipbuilding industry and labor cost is the cheapest among others shipbuilding nations which will ultimately help to build capital warship. [From the SWOT analysis it is evident that two leading local shipyards, Ananda and Western Marine have great potential to construct capital warship. On the other hand, KSY, CDL and DEW Narayangonj have the experience of ship building but these shipyards have limitations of size and draft for building new ships. This problem can be solved if CDDL undertakes ship building projects. If shipbuilding infrastructure is developed in CDDL, it has potentiality to undertake capital warship building.

It is evident that there are number of challenges in the warship building. The main challenges are unskilled manpower, shortage of raw material, government support, infrastructure, shortage of linkage industries, productivity in shipyards, standardization of shipyards etc. If we can overcome these challenges then capital warship building can be a potential sector. Despite numerous challenges, the development of capital warship building in particular and shipbuilding sector as a whole, has the potential to impact the economy. Owing to infrastructure development and standardization local major shipyards may undertake capital warship building project of those ships. However, this investment and consequent benefits can be materialized only if supportive measures are continued by the Government to address the systemic disadvantages.

It is apparent that with proper government policy and patronization the capital

warship building is possible without much difficulties. Investment in infrastructure, building design capability through R&D, developing skilled manpower, joint venture and ToT will be effective tools to overcome the aforesaid challenges. However, It may be extremely difficult for Bangladesh to equip all its warships with exclusively indigenously developed weapon systems because, technology in weapon systems is rapidly changing. Hence Bangladesh may still have to depend on certain imported systems. The shipbuilders can integrate these imported systems successfully into the indigenously designed and built warships. With the above initiatives the Bangladesh can truly be on its way to be achieve the dream of capital warships.

## **Recommendations**

Basing on the research followings are recommended:

- Government may formulate policy regarding naval shipbuilding and allocate adequate budget to facilitate the expansion and development of major shipyards of Bangladesh.
- Major shipyards like CDDL, KSY (after developing infrastructure in Harbaria), ASSL and WMSL may undertake projects for the production of capital warship indigenously by Joint Venture and ToT or with public private partnership in long term.
- Major shipyards of Bangladesh may explore opportunities of technology transfer and joint venture deal with friendly countries through extensive engagement for capital warship building.

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