



STUDY ON SOME COMPETITIVE PARAMETERS FOR SHIPBUILDING INDUSTRY IN BANGLADESH

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ABSTRACT

Despite Bangladesh has glorious history & heritage as a shipbuilding nation since ancient time, shipbuilding has been in focus only from the last couple of years. The optimism about this industry arose from the success attained by a number of local entrepreneurs who brought the name and fame to Bangladesh as a country with great potentials in shipbuilding by building and handing over some ocean-going vessels to overseas buyers. Since then, the shipbuilding in Bangladesh did not have to look back and now new opportunities are knocking at the door to flourish this industry further. However, due to global nature of this industry, an assessment of suitability to modern shipbuilding in terms of global standard is of prime importance. This paper focuses on studying some crucial competitive factors like labour skill, labour availability, labour man-hour, labour cost & productivity for local shipbuilding which are the inherent part for expansion of this industry. The analysis also focuses on the existing access to the resources like materials, knowledge and capital for shipbuilding. Comparison of these parameters with other nations have been made qualitatively and quantitatively to find the level of our shipbuilding. On the basis of existing condition and future vision, some recommendations have been made which might be useful for accelerating the development of this sector.

Keywords: Shipbuilding, Competitive factor, Productivity, R &D, Labour cost.

1. INTRODUCTION

Due to congenial geographical location, the history of indigenous shipbuilding in Bangladesh dates back to a long ago. Chittagong port was the best centre of building ocean going vessels in the middle of the 15th century and even in the 17th century, the entire fleet of ships of the Sultan of Turkey was built at Chittagong. Also in 1805, British Navy built ships at Chittagong for the famous battle of Trafalgar. However, with the passage of time, glory of shipbuilding in this region began to fade. Recently fame of shipbuilding revives again when local shipbuilders exported some ocean going vessel to foreign countries. The country now foresees a huge economic progress into the arena of shipbuilding industry by utilizing the economic globalization, free international trade & shipping boom of the recent time. Entrepreneurs also confident in the good prospect of flourishing shipbuilding industry because of its long history of maritime activity, favorable geographical location and availability of cheap work forces.

Shipbuilding is truly a global industry. It is also technological intensive, labor intensive and capital intensive industry. So, for the development and expansion of this industry, numerous parameters are to be considered. Because ultimate goal is to become competitive relative to other neighboring countries considering of all the related parameters.

As a labor intensive industry, labor input, labor availability, labor cost, labor hour etc. are very crucial to assess the present status and future development of shipbuilding industry. Although cheap labor is big advantage for Bangladeshi shipbuilding, however international competitiveness and market shares shall not depend on cheaper labour alone as lower productivity and efficiency may nullify this advantage. As a technology-driven sector, constant improvement of engineering skill & adaptation of new technology will keep one ahead of others in the competition. Furthermore, the requirement of raw materials, components as well as appliances for ships by the industry also play important role for the sustainability of this sector. On the other hand, the development of the industry needs large investment on facilities and infrastructures, which will absolutely benefit other sectors. Political support is one of main influencing factors in shipbuilding which is certainly

an international business. The downfall of the British and Swedish shipbuilding industries and the successes of Japanese and Korean shipbuilding were the direct outcome of lose or gain political support.

In this paper, an effort has been made to assess competitive parameters as mentioned above for local shipbuilding in terms of global standard. For qualitative and quantitative measurement of the parameters, methodology described in the next section has been applied. Based on the analysis of the above parameters, some recommendations have been made.

2. METHODOLOGY

The present study provides an aggregate overview and qualification profile of the shipbuilding sector in Bangladesh. The following general methodology has been adopted for data collection:

- i) Data were collected through extensive review of literature, field visits, survey, consultations and meetings with Government authorities, shipbuilding associations, existing and upcoming shipyards and its related stakeholders.
- ii) Private and public shipyards around the country were visited to collect primary data [1] and information about the local shipbuilding practice through interacting with structured, unstructured and open ended questionnaires.
- iii) Data about shipbuilding process, organizational set up, working environment, management practices and future vision of local shipyards had been collected to get an insight in context of work standards and the requirements of shipyard compared to other shipbuilding nations.
- iv) Qualitative and quantitative data about labor, labor hour and labor cost were collected to assess the labor productivity of local shipbuilding industries.
- v) Professional participations were conducted through information, questionnaire and interviews. Information on different aspects related to shipbuilding industries from the stakeholders, different government supporting organizations, educational institutions including various published sources as needed were collected.

3. INDUSTRY STRUCTURE

There are more than one hundred shipyards and workshops in Bangladesh, most of them are privately owned shipyards. Out of these shipyards, approximately 70% are located in and around Dhaka and Narayangong along the side of the river bank of

Buriganga, Shitalakha and Meghna. About 20% shipyards of Chittagong division are located along the side of Karnapuli river and 6% are located along the bank of Poshur river in Khulna division and the remaining 4% are located in Barishal division.

Field data shows that most of these yards have indigenous method of construction and are not equipped with the man, machineries and equipment required to build standard ships. These yards are mainly engaged in building and repairing of inland and coastal vessels, up to 3,500 DWT. Recently few of these yards specially Ananda Shipyard and Slipways Limited [2], Dhaka and Western Marine Shipyards Limited [3], Chittagong have attained the capability to manufacture ships of 10,000 DWT and they are expanding their facilities to upgrade them up to 25,000 DWT.

About 7% shipyards have the capability to entertain quality shipbuilding right now. Another 19% shipyards will be ready for construction of ships (small & medium category) of international standard with some renovation & expansion program. Some new shipyards are also surfacing to build export oriented ship.

A number of diversified types of vessels such as: multipurpose vessel, fast patrol boat, container vessel, cargo vessel, tanker, dredging barge, ro-ro ferry, passenger vessel, landing craft, tourist ship, tug, supply barge, deck loading barge, pleasure craft/yatch, crane boat, speed boat, deep sea trawler, self propelled barge, inspection vessel, cargo coaster, troops carrying vessel, double decker passenger vessel, hydrographic survey boat, pilot boat, hospital ship, water taxi, pontoon, etc. are built in various shipyards in Bangladesh.

The order [4] so far received from overseas countries includes multipurpose cargo ship 80%, container ship 7% and other types such as ferry, landing craft, water taxi, floating reception vessel etc 13%.

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Analysing the competitiveness of shipbuilding from the viewpoint of access to main resources or production factors are crucial and in this paper, the following resources are primarily highlighted:

- Manpower input, skill & employment
- Wage costs
- Raw materials -steel & Components
- Knowledge
- Capital

4.1 Manpower input, skill & employment

The availability of (skilled) manpower is an important factor in determining the competitiveness of the shipbuilding industry [5]. Fortunately, the

presence of shipyards in particular for long time with large pool of workforce is the main strength of Bangladesh shipbuilding industry. Bangladeshi workforce is acclaimed to be disciplined, diligent, hard working, obedient and quick learner and comparatively cheaper than any other country in the world [6]. Also availability of white color skilled manpower in maritime field is an added advantage. Management professionals, electronic, electrical, information technology and communication engineers of the country are capable of performing the assignment in relation with shipbuilding. Also, presence of technical institutes with 35,512 intake capacity of producing skilled manpower with regard to shipbuilding industry is very useful to support this industry [4]. In addition to this capacity, presently Khulna Shipyard Limited is producing 100 skilled persons per year and Western Marine Shipyard Ltd. is conducting training course in order to produce international standard welders, painters, foremen, etc. every year for quality ship production.

When taking a look at the skill levels in different shipyards, similar patterns exist although there are clear differences among different countries. The total workforce in Bangladeshi shipbuilding can be broken down in management & administration (7-10%), graduate engineers (3-6%), technical & skilled workers including diploma engineers, foreman, certified welders (13-18%) and remaining portion belongs to semi-skilled, unskilled workers at different categories.

Although Bangladesh has a strong base for the production of workforce, but the alarming picture is that skilled workforce drain out every year and the rate is very high as shown in Table 1. For the case of naval architects, the situation is even worse. As a result, shipyards are facing difficulties to carry out job of ship production taking the engineers from other backgrounds. The only positive side of drain out is that every year about 10, 000 skilled shipbuilding workers are contributing to country's economy by sending remittance. Shipbuilding related remittance is about 2-4% of total remittance sending from abroad to Bangladesh [4].

The ageing of population, demographic change and negative growth of population is an issue [5] for the shipbuilding countries like Europe, Japan, Korea, Singapore etc. and there is a high demand of high skill labours in coming years. Bangladesh with young and energetic population has a huge opportunity to fill the gap of those countries in coming years. Thus, to capture market share of the growing manpower industry particularly shipbuilding, Bangladesh needs to invest more in human capital through education and training. Training has become a necessity with the structural shift towards activities demanding higher skilled and emergence of automation.

The scenario of age distribution as well as education

qualification and experiences based on the data collection among promising shipyards in the country has been shown in Table 1.

4.2 Wage costs

Wages have a major impact on the competitiveness of a shipyard: labor accounts for a large part of the costs of a ship [7]. The labor share in total production cost strongly depends on the wage levels and the labor intensity of the production process. Figures on this vary between 40-50%, while other sources state a percentage between 21-23% in Europe and Japan and 19% in Korea. Indian shipbuilding labor costs are estimated at 8-10% of the total shipbuilding costs [7]. As a result of labor cost competition, shipyards in high labor cost countries are trying to reduce the man-hours required to build the ship. This can be done by improving facilities, systems and labor productivity. Automation is important, but improved organization, systems and product development may all play a part. The competitive price advantage gained from plentiful cheap labor played a significant role in the lifecycle development of shipbuilding industry (as shown in Fig. 1) and it will likely to continue to do so for the foreseeable future. Figure 2 shows the hourly labour charge for local shipbuilding in Bangladesh and Figure 3 & 4 show the comparison of labour cost and productivity with other competing nations around the world.

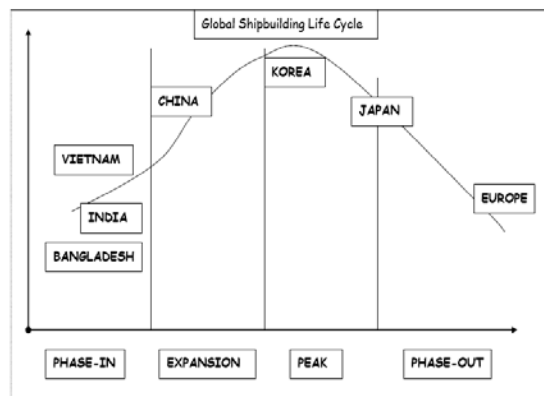


Figure 1: Shipbuilding lifecycle around the world

4.3 Access to raw materials: steel & components

For the shipbuilding sector, access to cheap raw materials is very important in order to keep down input costs of vessels. The main raw material – one that determines the price of a vessel to a large extent – is steel. Unfortunately, entire amount of steel for class building has to purchase from outside country although few local companies are producing limited class steel plates in the recent time.

On the other hand, despite Bangladesh has a long experience in shipbuilding, the component and

service suppliers/manufacturers for shipbuilding have not grown in an organized manner and not up to the quality required for class vessels except for few cases. For export oriented ships, the proportion for components/services required for classed vessel is very insignificant [8] and at present it is only 5-10%. The concerned shipyards, some local steel companies together with some local marine component manufacturers are now entertaining the small orders that have been placed in Bangladesh. Because of non availability of organized component and service supply manufacturer for export oriented ship, they have either procured from abroad (as shown in Figure 5) or have been engaged themselves for manufacturing of the same. On the other hand, almost entire amount of the components /services as well as steel plates, structural items required for construction of inland/coastal vessels are manufactured & supplied by various SME & ship breaking yards.

In the recent year, Govt. is showing special interest for export oriented shipbuilding, by waving custom duties on import of raw materials and components used in shipbuilding, green channel status etc.

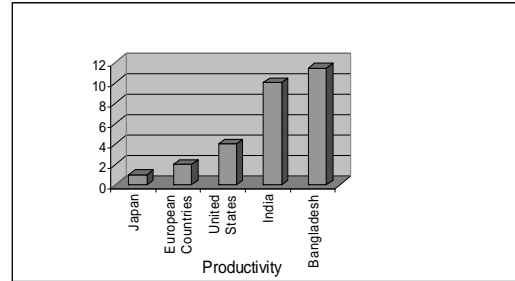


Figure 4: Shipbuilding productivity of different countries around the world

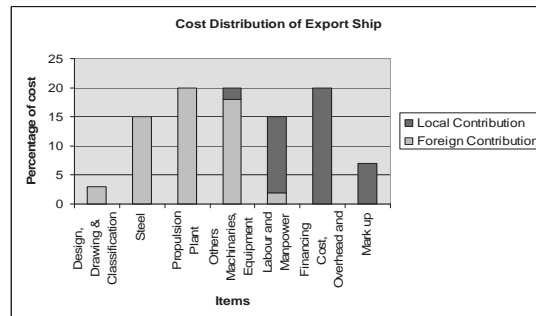


Figure 5: Percentage of Local and foreign Contribution of Cost of a Sample Export Quality Combine Cargo Ship Manufactured by Bangladeshi Shipyard

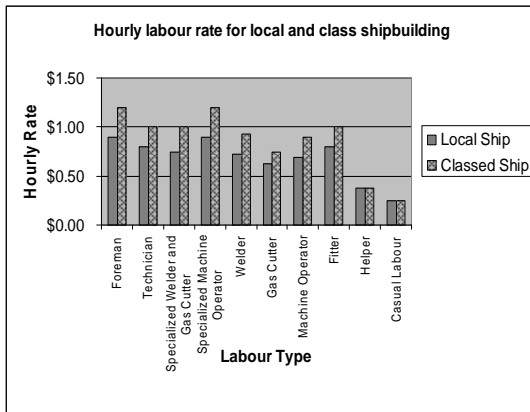


Figure 2: Hourly Labour Charge (in USD) for shipbuilding industry in Bangladesh

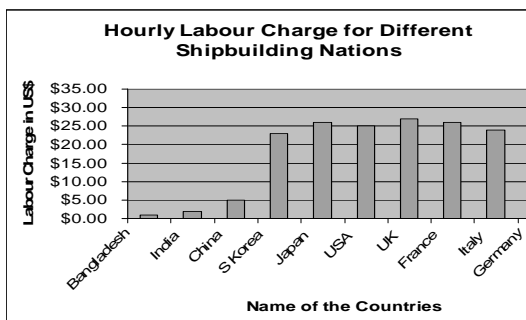


Figure 3: Average Hourly Labour Charges (in USD) for Different Shipbuilding Nations around the World

4.4 Knowledge: R&D and Innovation

Knowledge, R&D and innovation are of strategic importance for the competitive position of shipbuilding sector in the long run. Bangladesh shipbuilding industry is one of few industrial sectors that have gained international reputation and the industry experienced a process from domestic oriented industry to international-based industry in last few years. Today's shipbuilding industry has been gradually transformed into technology driven industry from labor intensive one due to the growing needs to meet environmental regulations on ship operators, increased technological requirements of the clients and extremely enlarged sized of the vessel. The global market becomes severely competitive to late comers armed with cheap labor cost and expanded facilities. Under these circumstances, shipbuilding companies are seeking effective ways to strengthen competitiveness in quality, cost and delivery thus ultimately benefiting the customers. In this context, not only resources on high value-added ships, but also much R & D efforts on production automation and optimization of logistics are being conducted in order to derive high level functionality, improve performance, reduced cost and easy maintenance in ship operation.

Bangladesh has received sizeable amount of foreign orders in the recent time. To fortify the position in the global market, shipbuilding yards have

to make hard effort to improve productivity and quality through technological research and development. Because of the unique nature of shipbuilding like short series production, sales of ship on the basis of concept design, R & D is an inherent characteristic of the individual end product.

Absolute R&D expenditures of most of the largest shipbuilding countries have increased between 2000 and 2006 [5]. In absolute terms, South Korea has been the country with the highest R&D expenditures (240 million euro in 2006) which is almost 1% of production value and China takes the second place in the absolute ranking (140 million euro) while Japan is placed in the third (92 million euro in 2006).

But unfortunately, shipbuilding industry in Bangladesh is still in its rudimentary stage because of the negligence of R& D. Still Bangladesh is lacking very basic facilities like Towing Tank, Cavitation Tunnel, Structural laboratory etc. As a result, despite having full potential of making basic design, we still did not able to attain in-house design capability. And also there is no in-house competence of doing testing and checking.

4.5 Access to capital – ship financing & Govt. support

The demand for ships is also depending on the availability of ship financing. If financial means are difficult to obtain, the demand for ships will be low. The financing of ships differs from other asset based industries as ships are not just seen as a means of transport, but also as a speculation and hence ship finance is generally regarded as a specialist business [5].

Shipbuilding financing cost in Bangladesh is very high. Lack of adequate working capital loan, high rate of interest on industrial and working capital loan shipbuilding, high bank guarantees and bank commissions, all lead to a very harsh environment for the future nourishment of this industry. That is why Govt. is presently taking a plan to formulate the following policy regarding shipbuilding;

- a) Provide shipbuilding with loans on advantages terms
- b) Exemption of export taxes and land rent
- c) Covers up to 50% of working capital

- d) Incorporate shipbuilding expansion plan as strategic development program of the country

5. CONCLUSION

Bangladesh can turn itself into a hub of shipbuilding in the global context for small and medium-sized vessels [4]. Bangladeshi shipbuilding is competitive in terms of low labor cost. Also easily trainable workers can provide this country with a decisive edge over other prospective countries. However, in terms of design, R & D and supportive industry, present condition is quite poor. Furthermore, Bangladeshi shipbuilding productivity is rather low due to inefficient management, which somehow diminishes the benefits of low labor cost. However, the major difficulty at the moment is the lack of working capital.

To become more competitive than other neighboring countries like India, China and Vietnam and to attract and motivate new entrepreneurs to try out their hands in this growingly lucrative sector, the following recommendations should be met immediately:

- 1) Apart from opening up a major new source of export earnings, the growth of backward linkages of this industry, opportunities for employment expansion, higher revenue earnings, etc., deserve appropriate government support.
- 2) Bangladeshi shipbuilding needs a favorable regulatory framework to support shipbuilding and maritime industry.
- 3) For sustainable development of this industry immediate steps must be incorporated to upgrade the level of R & D and to promote the technological advancement. Basic infrastructure like towing tank facility, cavitation tunnel, modern laboratories should be set up as a priority basis for supporting this industry.
- 4) Low-productivity persists because of low technology in shipbuilding sector in Bangladesh. Imparting training to the workers, technological enhancement through automation and modern management practice make a huge improvement in terms of productivity.



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Table 1: Workforce Statistics in quality shipbuilding yards of Bangladesh

Item No.	Category of worker	Age limit in years	Academic Education	Trade Course	Experience (Yrs)	% of workers leaving Bangladesh
1.	Unskilled	15-22	Class V	NA	NA	2
2.	Semi-skilled	18-25	Class V-VIII	Yes	2-3	10
3.	Skilled	22-30	Class V- SSC	Yes	5-10	15
4.	Specialist	28-40	SSC	Yes	About 10	20
5.	Machine Operator	28-40	Class VIII- SSC	Yes	5-10	10
6.	Electrician	25-35	SSC	Yes	3-8	20
7.	Fitter	30-45	Class VIII- SSC	Yes	10+	15
8.	Welder	18-32	Class VI- SSC	Yes	5+	10
9.	Cutter	18-35	Class VI- SSC	Yes	5+	10
10.	Helper	15-25	Class V	NA	NA	2
11.	Painter	20-40	Class V-VIII	NA	3+	5
12.	Carpenter	20-35	Class V-VIII	Yes	3+	5
13.	TIG & MIG Welder	32-45	Class VI- SSC	Yes	8+	20
14.	Crane Driver	28-40	Class VI- SSC	Yes	5+	10
15.	Drawing & Draft man	28-45	SSC & Diploma	Yes	3+	10
16.	Diploma Engineer	25-45	Diploma	NA	5+	20
17.	Mechanical Engr	25-46	B Sc Engr		3+	25
18.	Electrical Engr	25-45	B Sc Engr		3+	20
19.	Naval Architect	25-40	B Sc Engr		2+	50
20.	Admin Offr	30-50	M Sc		8+	5
21.	Marine Engr	35-55	Class II or I		10+	50