



Shipbuilding

A Larger National Perspective

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Shipbuilding – A Larger National Perspective

Abstract

The shipbuilding industry has witnessed a period of unprecedented growth riding on the stimulus of global demand from 2003 onwards. Many Indian shipyards buoyed by possible business opportunities made significant capital investments to scale up their infrastructure. The market share of Indian yards in terms of global orders grew from 0.2 per cent in 2002 to 1.2 per cent in 2007, which was projected to go up to 7.5 per cent by 2017. However, these projections went awry due to the global recession in 2008 and fall in oil prices. The consequent low demands for ships, led to large scale cancellation of export orders. This accompanied with withdrawal of government subsidy in 2007 and relatively low competitiveness of our shipyards, compounded the challenges of the fledgling industry. These market dynamics resulted in poor cash flows and created serious capital debt servicing challenges for the yards, plunging the market share of Indian shipyards to 0.01 per cent by 2013.

Several policy measures have since been taken by the government of India to revive shipbuilding industry. However, the majority of shipbuilding orders to the shipyards in current times, are primarily from Indian Navy and Coast Guard. The shipbuilding industry can be a major employment creator with relatively large spin-offs for ancillary industries unlike the automobile and other manufacturing industry. However, the shipbuilding industry has not received the required attention and focused view of competing priorities, uncertainties and lack of assurance on short term returns on government policy measures. Considering the relatively large young population in the country, it is essential to galvanize the shipbuilding industry as a strategic infrastructure industry with the required policy, legislative and institutional measures, as seen in Japan, Korea and China.

Higher volumes are critical for the growth and competitiveness of the shipbuilding and ancillary industry. This requires disruptive changes at the macro level to collectively overcome the 'Combined Critical Mass' of the Merchant Marine, Naval / Coast Guard and export orders.

Long term transformational changes may need the central and state government's support to ensure the required upswing in the manufacturing sector's contribution to GDP, besides scaling up the creation of critical job opportunities for the large number of unemployed youth in the country. This paper intends to analyse the problems plaguing the industry and make recommendations to catalyse the current vision to build sustained focus for infusion of required dynamism in the Indian shipbuilding industry.

Introduction

Peninsular India provides optimum conditions for the development of a maritime nation. Both literature and archaeological findings in the region give ample evidence of the shipbuilding capabilities of India. The significance of Indian shipbuilding can be traced back to the role it played in the composing of the US national anthem ‘The Star-Spangled Banner’. The lyrics came from ‘Defence of Fort McHenry’, a poem written in 1814 by Francis Scott Key, when aboard the *Minden*, a vessel built in India. The *Minden* was built with teak wood by Jamshedji Bomanji Wadia *and* launched in 1810 from the Duncan Docks in Mumbai.¹ The Royal Navy came to admire the skills of Indian shipbuilding and dry dock infrastructure, thus giving Bombay a distinguished place among naval arsenals.

HMS Trincomalee, a 1447 tons frigate, was built in Bombay for the British navy and is the oldest floating British frigate and the second oldest floating ship in the world. Throughout recorded history, India’s shipbuilding panache was acknowledged and recognised the world over and various naval powers sourced their requirements of ships from the various shipyards in India. At the time of industrial revolution in Europe, Indian shipyards were at the peak of their shipbuilding activities. However, British rule led to a dark period in shipbuilding. The arrival of Indian-built ships in the Port of London created a sensation among the monopolists. The shipbuilders of the Port of London took the lead in raising alarm. An obliging government saw to it that the Indian industry perished.

Shipping Industry

Global seaborne trade, supported by the 2017 upswing in the world economy registered a growth of 4 per cent, the fastest growth in five years. Global maritime trade gathered momentum with total volumes reaching 10.7 billion tons. The seaborne trade volume represents the health of global economy and the world fleet of ships provides the necessary vessels which form the backbone of economy. After five years of decelerating growth, 2017 saw an improvement in world fleet expansion. During the year, a total of 42 million gross tons were added to global tonnage and as on January 1, 2018, the world commercial fleet consisted of 94,171 vessels, with a combined tonnage of 1.92 billion dwt. The top five ship owners in terms of cargo carrying capacity are Greece, Japan, China, Germany and Singapore with a total market share of 49.5 per cent of dwt. Just three countries – the Republic of Korea, China and Japan – have built 91.8 per cent of world gross tonnage in 2016.²

In contrast, India has been lagging behind and ranks 16 in terms of dwt and with an ownership of 1011 vessels carried a total of 24,852 thousand tons amounting to 1.3 per cent of the total cargo carried as indicated in Table 1 below. Indian seaborne trade has been growing rapidly, but the Indian shipping and shipbuilding sector has been lagging behind despite its development potential. Indian registered ships carry just about 0.9 per cent of the global shipping stock while ships constructed in India carry even less.

	Country or territory	Number of vessels			Dead-weight tonnage (thousands of tons)			
		National flag	Foreign or international flag	Total	National flag	Foreign or international flag	Total	National flag as percentage of total (dead-weight tonnage)
1	Greece	774	3 597	4 371	64 977	265 199	330 176	19.7
2	Japan	988	2 853	3 841	38 053	185 562	223 615	17.0
3	China	3 556	1 956	5 512	83 639	99 455	183 094	45.7
4	Germany	319	2 550	2 869	11 730	95 389	107 119	11.0
5	Singapore	240	2 389	2 629	2 255	101 327	103 583	2.2
6	Hong Kong (China)	95	1 497	1 592	2 411	95 396	97 806	2.5
7	Republic of Korea	801	825	1 626	14 019	63 258	77 277	18.1
8	United States	943	1 128	2 071	13 319	55 611	68 930	19.3
9	Norway	549	1 433	1 982	4 944	54 437	59 380	8.3
10	Bermuda	21	473	494	1 215	53 036	54 252	2.2
11	Taiwan Province of China	164	823	987	6 732	43 690	50 422	13.4
12	United Kingdom	398	956	1 354	9 496	40 494	49 989	19.0
13	Monaco	16	405	421	3 856	35 467	39 323	9.8
14	Denmark	139	805	944	1 521	37 691	39 212	3.9
15	Turkey	633	889	1 522	8 034	19 207	27 241	29.5
16	India	885	126	1 011	17 974	6 878	24 852	72.3
17	Switzerland	43	368	411	1 565	23 240	24 805	6.3
18	Belgium	120	152	272	12 405	11 225	23 630	52.5
19	Russian Federation	1 384	323	1 707	7 589	14 630	22 219	34.2
20	Indonesia	1 886	62	1 948	19 414	885	20 299	95.6

Table 1 – Ownership of World Fleet³

India's foreign trade is being increasingly serviced by foreign flagged vessels. With the present differential taxation norms, this share is bound to go up further. Even the ships registered under the Indian flag are constructed by the foreign shipyards. An analysis of the major shipping companies of India reveals that the majority of the ships owned and operated by Indian Companies under Indian flag, are constructed in foreign shipyards due to time and cost overruns and unfavourable fiscal policies. The breakdown of the vessels with the country of construction for major shipping companies of India is given below.

Ser	Shipping Company	Fleet Strength	India	Japan	China	South Korea	Rest of the World	% of Ships Constructed in India
(a)	SCI	63	10	1	6	44	2	15.87
(b)	ESSAR Shipping	9	8	0	0	0	1	88.89
(c)	The Great Eastern Shipping Co. Ltd	44	0	12	7	23	2	0.00
(d)	Mercator Ltd	13	1	1	7	2	2	7.69
(e)	Varun Shipping	5	1	0	0	1	3	20.00
(f)	Shreyas Shipping	16	0	6	2	5	3	0.00

Table 2 – Breakdown of Fleet of Major Indian Shipping Companies⁴

A strong domestic shipping industry domestic flag not only accrues commercial gains for any nation, but also provides greater leverage for national security, contingency response, the enforcement of safety norms, monitoring of environment compliance, control over immigrant and refugee movement and labour issues. This aspect has been recognised by nations which have emerged as major shipping and shipbuilding hubs and is reflected in the Merchant Shipping Acts. However, India has traditionally neglected the importance of a strong merchant marine and the same is evident in the share of cargo movement by Indian flag vessels.

Significance of Shipbuilding Industry

The manufacturing sector has a large impact on the economic growth of a country. History indicates that the nations which evolved as major manufacturing hubs also evolved as major shipbuilding nations. The English during 19th century, the Americans post World-War II, the Japanese during 1960-90, the Koreans post 1990 and more recently the Chinese have emerged as major shipbuilding nations, accounting for over 40 per cent of annual world ship production in terms of tonnage.⁵ The economic growth of these nations had direct correlation with the growth in output of shipbuilding industry. The growth of the shipbuilding industry is also critical for development of associated industries such as steel and ancillary equipment.

The shipbuilding industry is of both economic as well as strategic significance for the nation. It is characterised by a high growth potential, employment generation and contribution to GDP. Shipbuilding capacity and capability in the commercial and defence sectors has the potential to significantly scale up the employment prospects for the burgeoning young population along with having a massive multiplier effect on economy.⁶ Security concerns at the strategic level dictate maritime defence cooperation in the Persian Gulf, Gulf of Aden and the entire Indian Ocean Region. Further, a shipbuilding industrial base, catering to naval vessel acquisition and freight carriage through domestically owned merchant ships is strategically significant for national security.

For a country that is predominantly peninsular with an extensive coastline and about 1200 islands, India's shipbuilding capabilities have not kept pace with its economic development, market demand and human resource potential. This offers huge scope for the development of the shipbuilding sector considering that country's potential in the sector have not been exploited fully. India as the epicentre of low cost solutions for the design, construction and retrofitting of naval vessels can be a vision for constructive engagement, which can favourably shape the maritime environment in the IOR. A vibrant and robust policy of giving impetus to exports from/through DPSUs would complement the above perspectives.

Peculiarities of Shipbuilding

The shipbuilding industry has its own distinctive features as compared to other industries. It is unique in that:

- (a) It has to sell first and construct later, unlike the other industries, wherein the seller manufactures first and sells later.
- (b) The shipyards get orders only if they have credibility (deliver ships on time) and they can become credible only after executing consistently, in spite of international competition.

- (c) The shipyard has to be globally competitive against the best yards in the world.
- (d) The deliverables of the industry involve long gestation periods and require high cost finance over a long period.⁷

Commercial Shipbuilding in India

The shipbuilding industry is a cyclic industry and had witnessed a period of unprecedented growth from 2003 onwards. Riding on the stimulus of global demand and favourable government policies such as a subsidy of the order of 30 per cent, the Indian shipbuilding industry embarked upon an ambitious growth plan, with significant investments in infrastructure during this period. In terms of global orders, the market share grew from 0.2 per cent to 1.3 per cent, which was projected to go up to achieving 7.5 per cent by 2017. However, by the time the wheels of this plan were about to be set in motion, the global recession in 2008, coupled with the relatively less competitive presence of the Indian industry, led to the large scale cancellation of export orders. The withdrawal of government subsidy in 2007 also compounded the adverse effect on the industry. This left the industry badly crippled by the burden of overleveraged capital and poor cash flow, and its market share dropped to 0.01 per cent by 2013. The plunge in oil prices and consequent downturn in freight costs, has led to a sharp slowdown in the shipping industry, further reducing global commercial shipbuilding demand.

A slew of measures were adopted by major shipbuilding nations to revive the shipbuilding industry post the global recession in 2008. Industry showed signs of rebound with order books indicating growth from 2013, but the commercial shipbuilding industry in India failed to recover as reflected in the global shipbuilding order book of emerging shipbuilding nation shown in Figure 1. The two largest commercial shipbuilding yards went under Corporate Insolvency Resolution Process (CIRP) under the Insolvency and Bankruptcy Code (IBC). It is pertinent to mention that these two yards were market leaders during the shipbuilding boom from 2002-08.

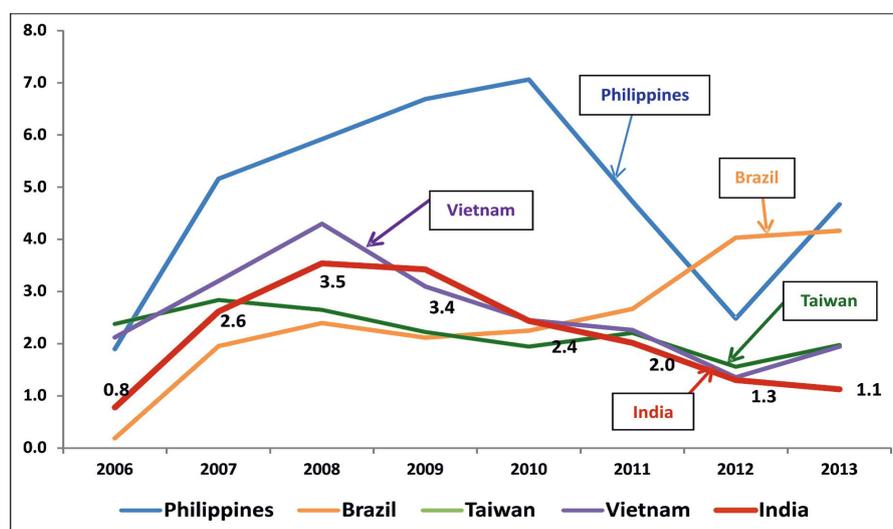


Figure 1 - Global Shipbuilding - Orderbook at Year-End, 2006-2013⁸

(mn gross tonnage) (Select Countries)

The tonnage on order for all main vessel types further decreased between 2017 and 2018 (Figure 2). Compared with the peaks in 2008 and 2009, the current tonnage on order has decreased by 62 per cent for container ships, 66 per cent for oil tankers, 76 per cent for dry bulk carriers and 85 per cent for general cargo ships. With regard to shipbuilding countries, China accounts for 41.6 per cent of the dwt on order, followed by the Republic of Korea at 24.3 per cent and Japan at 23.6 per cent. Nearly all the building of cargo-carrying vessels takes place in Asia. The other shipbuilding countries including Italy, Germany, France and Finland focus on passenger ships and specialised ships that are custom made to specific orders.

The global reduction in the order book of shipbuilders as shown in Figure 2 below indicates the demand supply mismatch with the existing fleet of ships having enough platforms to meet the sea borne trade requirement. The revival of the Indian shipbuilding industry through global export orders appears unlikely in the near future. However, the shipping industry in India is an untapped market with huge potential which can give windfall gains with minimal effort. However, it would require serious action at all levels with realistic targets in terms of numbers and timelines to generate tangible outcomes.

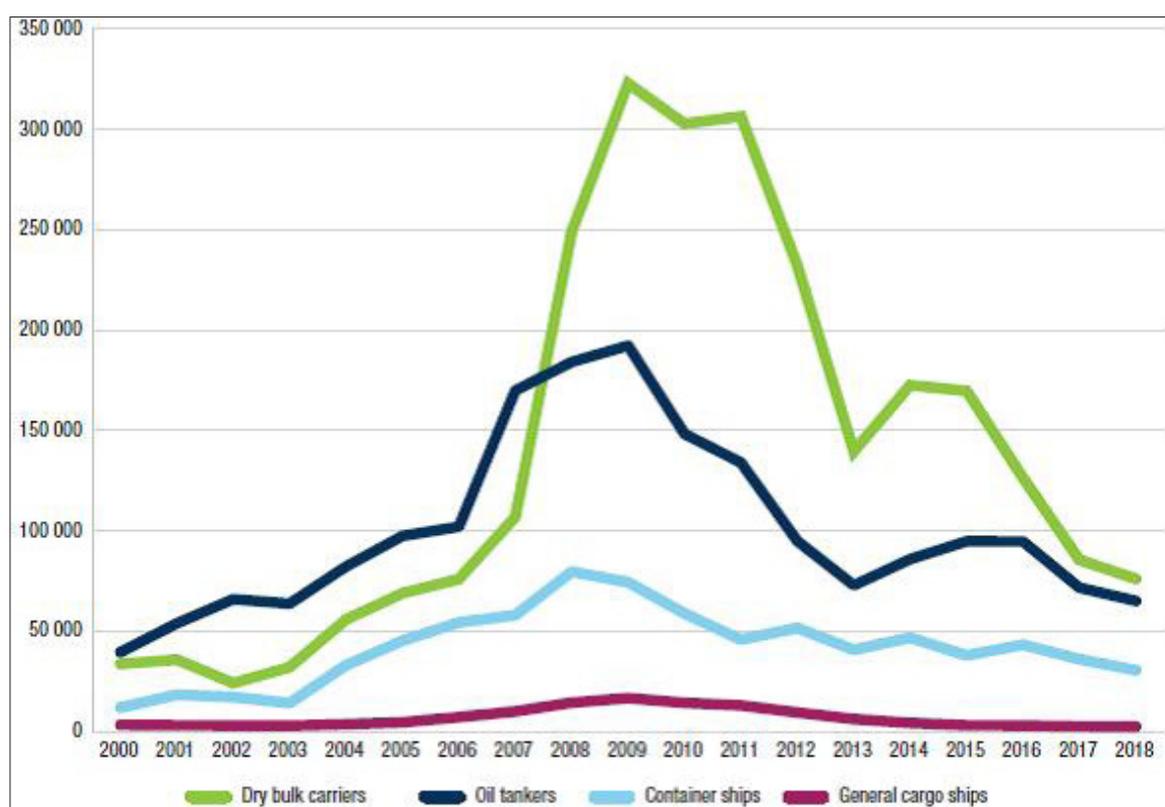


Figure 2 - Global Shipbuilding Order Book Year-wise⁹ (Thousands of Dwt tons)

Defence Shipbuilding in India

The Indian Navy has been the leading patron of the indigenisation of defence production capabilities, with a vision of a 200-strong combat fleet by 2027. In wake of the naval vision, warship construction has witnessed an unprecedented growth. However, the Navy's expansion plan have largely been restricted

to DPSU / PSU shipyards. The government for its part, tried to stimulate the commercial industry by engaging many shipbuilding yards on a competitive basis, for naval shipbuilding projects from 2011 onwards.

However, the inherently monopsonic nature of naval shipbuilding led to aggressive undervalued bidding for naval projects from an industry desperate for orders. This, coupled with the burden of high debt, high working capital costs, poor cash flows, poor productivity/ efficiency and poor project management has resulted in poor performance of shipyards on existing naval orders, resulting in a virtual standstill, in some cases. The various projects of Indian Navy, at different stages of execution in shipyards are tabulated below.

Ser	Project	Type	No of Ships	Shipyards
(a)	P28	Corvettes	01	M/s Garden Reach Shipbuilders Ltd
(b)	IAC	Aircraft Carrier	01	M/s Cochin Shipyard Ltd
(c)	P15B	Destroyers	04	M/s Mazagon Shipbuilders Ltd
(d)	P17A	Frigates	07	M/s Mazagon Shipbuilders Ltd & M/s Garden Reach Shipbuilders Ltd
(e)	Follow on 1135.6	Frigates	02	M/s Goa Shipyard Ltd
(f)	LCU	Landing Ship	02	M/s Garden Reach Shipbuilders Ltd
(g)	Survey Vessel	Survey Vessel	04	M/s Garden Reach Shipbuilders Ltd
(h)	ASW Shallow Water Craft		16	M/s Cochin Shipyard Ltd M/s Garden Reach Shipbuilders Ltd
(j)	NOPV	Patrol Vessels	05	M/s RNEL
(k)	DSV	Diving Support Vessel	02	M/s Hindustan Shipyard Ltd
(l)	FSS	Tanker	05	M/s Hindustan Shipyard Ltd
	Total		49	

Table 3: Various Shipbuilding Projects of Indian Navy in progress in Indian Shipyards
(Smaller ships like FACs & auxiliary crafts not included)

Ser	Project	No of Ships
(a)	LPD	04
(b)	NGMV	06
(c)	Survey Training Vessel	01
(d)	MCMV	12
(e)	MPV	04
(f)	NGC	07
(g)	NGF	07
(h)	CTS	03
(j)	NGD	05
(k)	IAC 2	01
	Total	50

Table 4 : Shipbuilding Projects of Indian Navy in on the Anvil / Planning Phase
(Smaller ships like FACs & auxiliary crafts not included)

In addition to the Indian Navy, the Indian Coast Guard is also engaged in a massive expansion plan and is in the process of acquiring various craft to strengthen the maritime boundaries of the country. However, the performance of private shipbuilding industry has been much better in terms of project completion mainly attributable to less complex weapons and sensors, leading to timely completion of the project. The various shipbuilding projects of Indian Coast Guard in progress / planning phase are tabulated below.

Ser	Project	Quantity	Shipyard
(a)	Fast patrol Vessel	05	M/s Garden Reach Shipbuilders Ltd
(b)	Offshore Patrol Vessel	05	GSL Goa
(c)	Offshore Patrol Vessel	07	L&T Mumbai
(d)	Fast patrol Vessel	14	RDEL Mumbai
(e)	Training Ship	01	RDEL Mumbai
(f)	Interceptor Boats	18	L&T Mumbai
(g)	Interceptor Boats	15	BDIL
(h)	FSB	05	BDIL
	Total	70	

Table 5: Various Shipbuilding Projects of Coast Guard in progress at Shipyard¹⁰

Ser	Project	No of Ships
(a)	Pollution Control Vessel	02
(b)	Air Cushion Vessel	06
(c)	Fast patrol Vessel	08
	Total	16

Table 6 : Shipbuilding Projects of Coast Guard in Planning Phase ¹¹

The details given above show that more than 140 ships are on order from Indian Navy and Coast Guard and about 50 ships are in the planning stage for which orders will be given shortly to public/private sector shipyards. However, India's defence industrial base remains limited, infrastructure is inadequate as are the inhouse R&D facilities. The main reason for the limited development of industrial base, is the wide variety and mission specific ships constructed in lesser numbers for Indian Navy which limits the standardization in view of lack of volumes. In order to develop the industry base, the shipyards have to attain 'Critical Mass' so that the globally renowned ancillary companies set up manufacturing bases in the country. In the absence of a domestic ancillary industry, shipyards have to rely on foreign manufacturers for supply of equipment with longer lead time and higher cost.

Need for Shipbuilding Industry

The shipbuilding industry is of great strategic and economic significance as elucidated in Figure 3 below. Shipbuilding as a sector can contribute significantly to the country's manufacturing sector and be a key enabler for achieving the target of a \$5 trillion economy by 2024-25. The shipbuilding

industry contributes to growth, both directly and indirectly, by way of retention of derivative income (e.g. freight value spent on import and export) and employment generation which is an important government KRA (Key Result Area) for strategic perspective on self-reliance in war, trade during hostilities and enabling competitive edge are other outcomes.



Figure 3 – Economic & Strategic Significance of Shipbuilding Industry

A successful shipbuilding sector has been pivotal for the rapid and robust economic development of most countries with long coastal boundaries. Shipbuilding has the potential to increase the contribution of the industry and the services sector to national GDP. The sector has an immense direct and indirect positive impact on most other leading industries such as steel, aluminium, electrical machinery and equipment etc., besides its huge dependence on infrastructure and services sectors in an economy.¹² Most countries have laid immense emphasis on development of their shipbuilding sectors which has, in a way, also contributed to national economic development. Notwithstanding its seemingly discouraging state at present, the shipbuilding industry, especially the huge infrastructure that has been created, is definitely an asset that needs to be nurtured and gainfully exploited.

As the world's fastest growing economy, India stands to benefit from a robust shipbuilding industry, considering its significant influence for a growing nation in respect of:-

- a. **Self-Reliance during Hostile Conditions.** Dependence on the foreign flag vessels for shipping of own cargo has severe implications at times of distress. This could dry up the supply lines during economic blockades and have an adverse impact on the war fighting capability of the nation.
- b. **Trade and Economy.** The 'Make in India' initiative has given a boost to the manufacturing sector, to complement India's existing strength in the service sector. This manufacturing boost, besides ensuring self-sufficiency, also taps into the demand for manufactured goods in the export market, which would consequently influence the nation's current account deficit / trade deficit in a positive way. When this initiative bears the intended fruit in the near future, the demand for sea trade and freight will also

undoubtedly grow again. In this scenario, it is imperative that India is also self-reliant with regard to its shipping and shipbuilding capabilities, and exercises direct control over its trade routes and means of shipping. An indigenous shipping and shipbuilding industry, would also reduce freight bills and forex outgo, thereby reducing the current account deficit and strengthening the currency.

- c. **Jal Marg Vikas Project.** The government has taken initiatives to develop the inland waterways to tap into the low operating cost of water transport. The Inland Waterway Authority of India is mandated to develop and maintain infrastructure for fairway navigation aids and terminals and create an enabling environment for private investment in cargo vessels and operational services. The ministry is also augmenting the capacity to enable movement of larger vessels of 1500-2000 tonnes on inland waterways. A strong indigenous commercial shipbuilding industry can help in promoting inland waterways as cost effective mode of transport.

- d. **Boost to Ancillary Industry.** The shipbuilding industry has an immense direct and indirect positive impact on almost all other leading industries such as steel, aluminium, electrical machinery and equipment etc., besides its huge dependence on the infrastructure and service sectors in an economy. It is also known as a mother industry because of its multiplier effect on most manufacturing ancillary industries and on account of its large scale employment generation capability.¹³ About 65 per cent of the value addition in a ship under construction comes from manufacturers of shipboard material, equipment and systems. The shipyard, by itself only adds 35 per cent of value, by putting together these material and integrating equipment/ systems. Therefore, as seen in the automotive industry, a significant section of the indigenous manufacturers would stand to gain substantially from a strong shipbuilding industry.

- e. **Employment Generation.** A most important USP of shipbuilding is its high potential to generate employment vis-à-vis other manufacturing industries. Since employment generation is a key result area for the government of India, the promotion and growth of shipbuilding as a strategic industry in our country may be the need of the hour. The results of the impetus to shipbuilding and its consequent benefits are clearly seen in Korea and now in China. Employment generation and GDP growth in India have not been synchronous as depicted in Figure 4 below. An analysis of the age based distribution of unemployment in India at Figure 5 reveals that a large segment of unemployed youth are in the 15-25 age bracket. An analysis of qualification based unemployment data at Figure 6, reveals that a large number of unemployed youth are graduates or have passed their 10+2/examination. Society has still not evolved enough to acknowledge the dignity of labour and given the preference for white collar jobs and engineering etc. shipbuilding can offer opportunities in this respect. The shipbuilding industry employs a variety of engineers and skilled tradesmen covering the entire spectrum of various engineering jobs. The government's 'Skill India' initiative is set to produce a growing number of skilled young people seeking job opportunities. It has been established fact that for the same turnover, the shipbuilding industry generates at least three times the employment generated by heavy engineering industry. For a country struggling with large scale unemployment, the shipbuilding industry offers avenues for large scale employment

generation for both skilled and unskilled manpower. The comparison of employment generation by different industries is shown in Figure 7. In addition, a healthy shipbuilding industry is also likely to give rise to the ship repair business which is even more labour intensive than the shipbuilding industry. India with its labour advantage and ideal location with regard to international trade routes, is well placed to wrest this business from competitors. This would create additional employment opportunities and additional revenue entailing only marginal increase in investment.

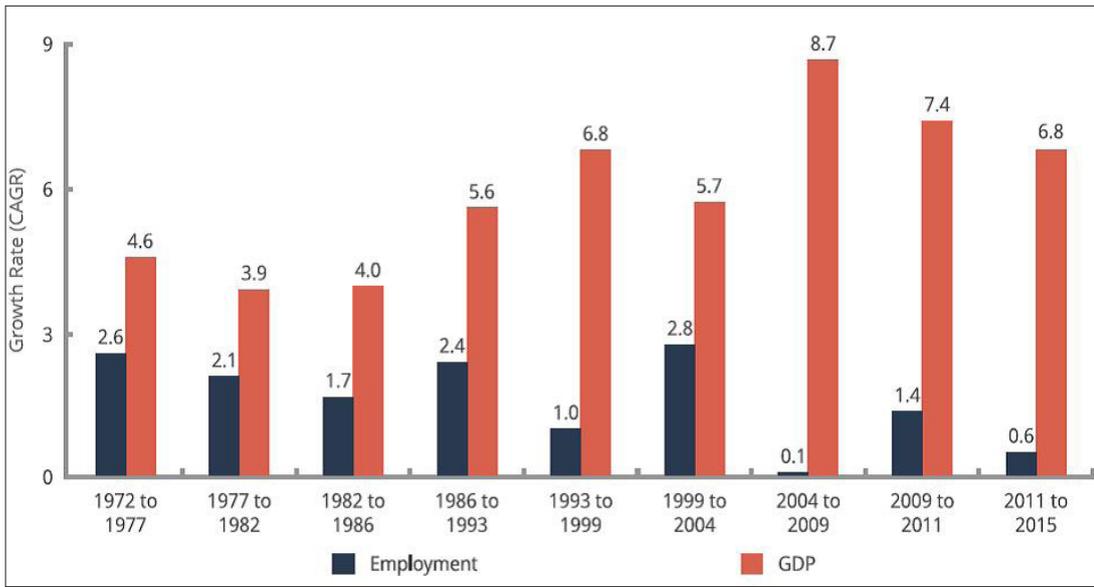


Figure 4 – Employment Growth Vs GDP Growth ¹⁴

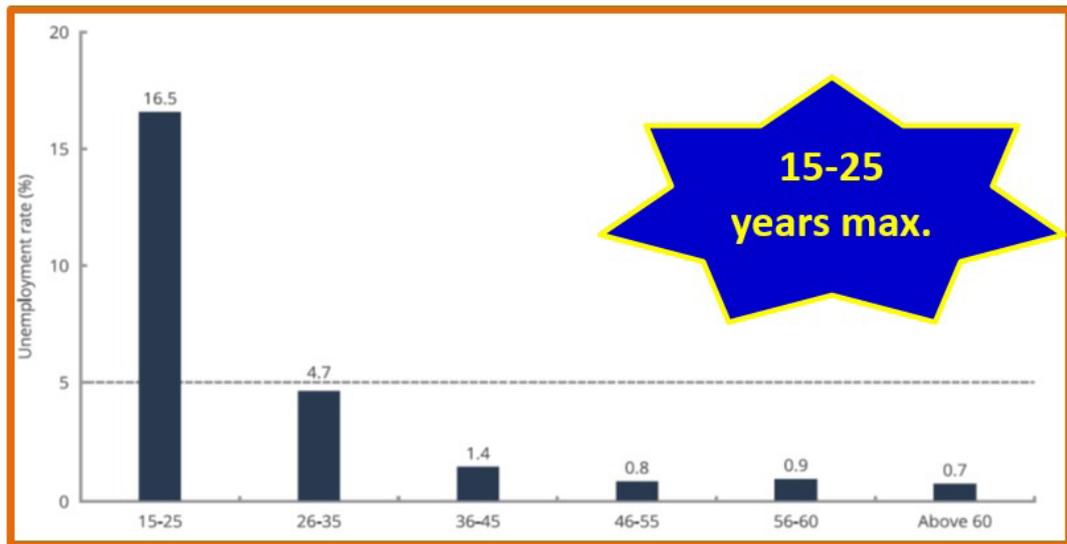


Figure 5– Age based Unemployment Rate Distribution¹⁵

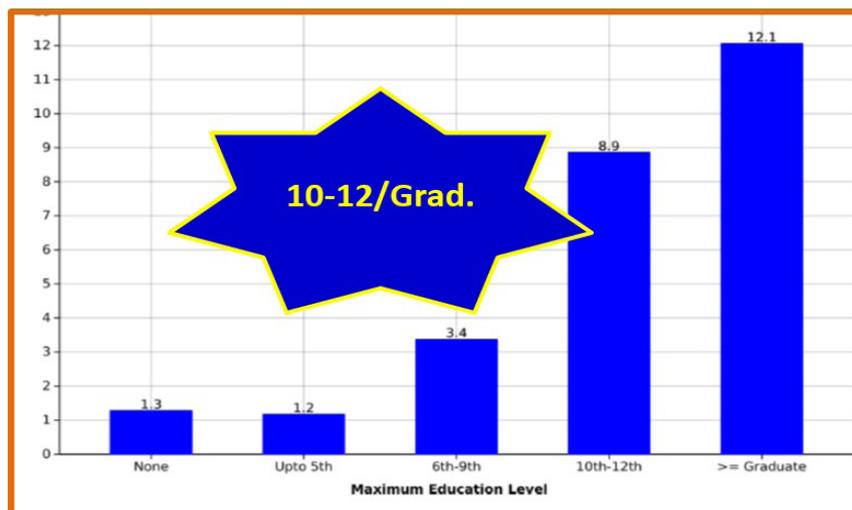


Figure 6 – Qualification based Unemployment Rate Distribution ¹⁵

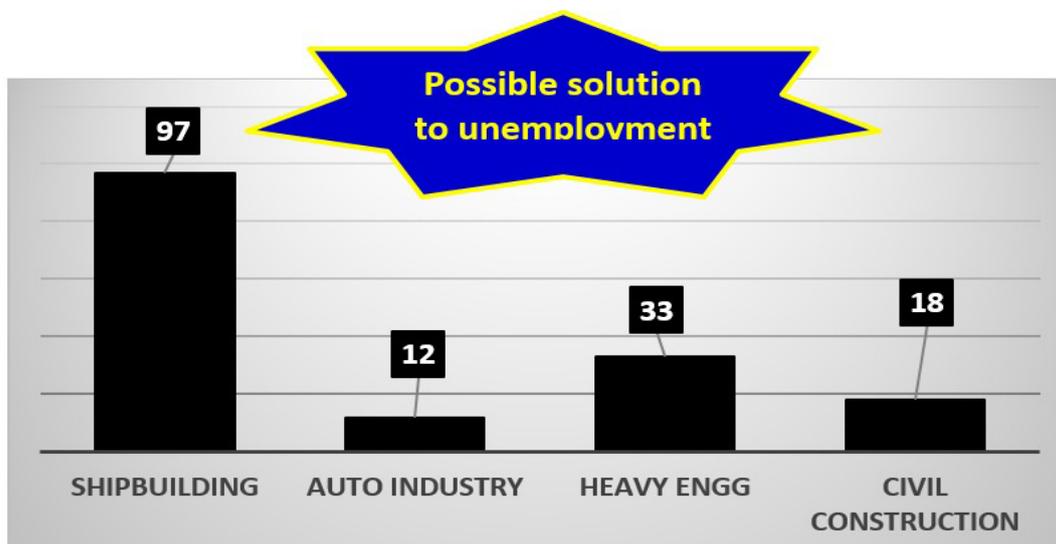


Figure 7- Labour employed /Turnover (INR 1 mn) for various Industries¹⁶

Economic and Other Benefits Derived from Naval Shipbuilding

Warship building being capital intensive entails high infrastructure and equipment costs, and is thus considered to be a drain on the economy. The reality however is otherwise. Money spent on Navy is ploughed back into the economic growth of the nation. The Navy's vision is outlined in its long term planning under the Maritime Capability Perspective Plan (MCP) and Technology Perspective and Capability Roadmap (TPCR) and the Indian Naval Indigenisation Plan as depicted in Figure 8 below. It is clear that this long term plan has also been the bedrock for realisation of the 'Make in India' dream of the naval visionaries. Apart from meeting the principal objective of providing security to the nation, these projects have generated returns in terms of revenue in the form of taxes, duties and employment directly in shipyards, Original equipment Manufacturers (OEM), yard subcontractors and other ancillary industry and for Micro, Small and Medium Enterprises (MSMEs).

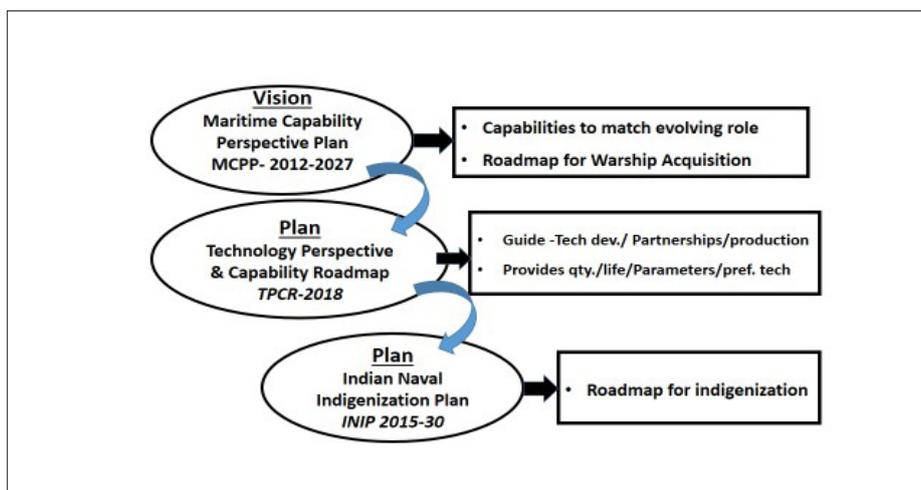


Figure 8 – Indian Navy’s Growth Plan

Visionaries in the Indian Navy have been working towards ‘Make in India’ since the 1960s in the Indian Navy’s Directorate of Naval Design/Surface Ship Group along with Indian shipyards and OEMs. The Directorate of Naval Design, a premier design organisation of Indian Navy celebrated its Golden Jubilee in 2014. The design organisation has developed 19 designs as per which more than 90 vessels have been built. The naval ships built almost fully indigenously ‘Plough back’ large amounts into the Indian economy as outlined in Figure 11 below. Nearly 60 per cent of the naval budget is dedicated to capital expenditure and nearly 70 per cent of the capital budget is spent on indigenous sourcing.¹⁷ Each shipbuilding project creates its own logistics, spares, project support eco systems. Besides shipbuilding, the spin-offs result in the setting up of ancillary industries in the ship repair business. Naval shipbuilding also results in capacity and capability buildup of industry. The shipbuilding industry has a higher multiplier effect on investment and turnover (11.6 and 4.2) and has high employment potential due to the multiplier effect of 6.4.¹⁸ Further, since warships are more complicated and technologically more demanding, the potential for employment generation is much higher in warship building than commercial shipbuilding as depicted in illustrative data in Figure 12 below.

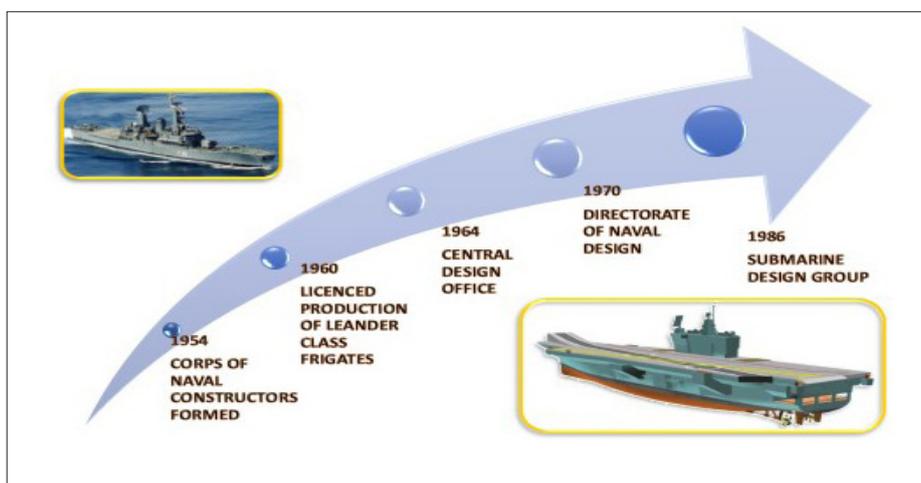


Figure 9- Unique Naval Vision of ‘Make in India’ was the Genesis of Naval Design Organization



Figure 10 - 'Make in India'- Thus Far by Indian Navy



Figure 11 – Spin Offs – Indigenous Naval Shipbuilding

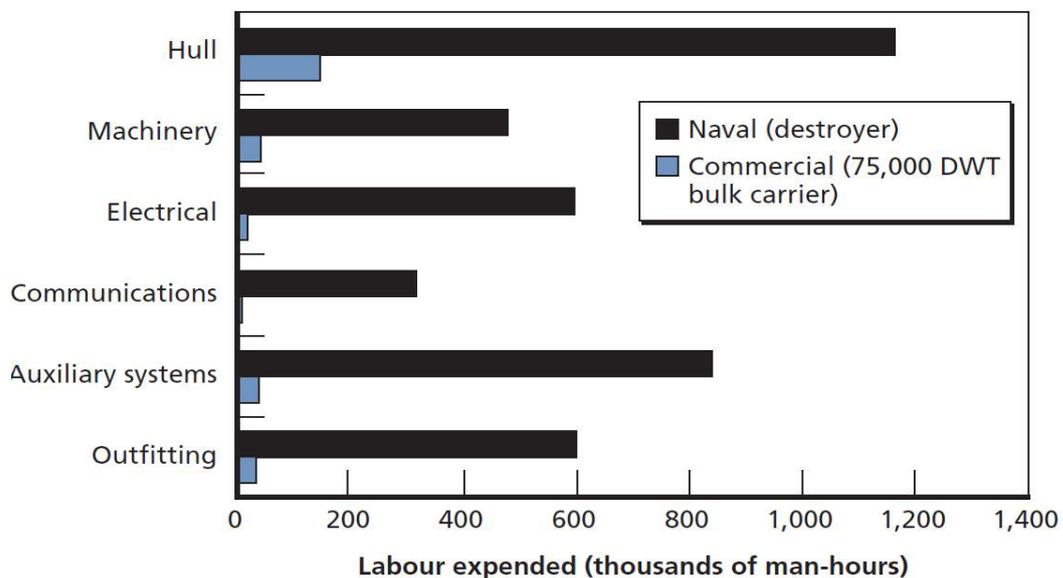


Figure 12 – Employment Generation Potential - Warships compared to Merchant Ships¹⁹

Infrastructure, Capacity, Integration Capabilities & Skill Upgradation

Naval Shipbuilding Projects have led to significant infrastructure augmentation (crane Capacity, modular warships, slipways, dry docks) in shipyards besides equipping the yards with capabilities in detail design. Soft skills upgradation through know-how providers for integrated construction to improve delivery timelines and the welding of indigenous steels, propulsion system and weapon integration etc. The capabilities developed in the designing of auxiliary systems for equipment and the design of large number of automation systems by Indian Industry, i.e. Integrated Platform Management System, Integrated Bridge System, Automatic Power Management System, Advanced Composite Communication Suites etc. have led to the consequent enrichment and maturity of the indigenous shipbuilding ecosystem.

With the Navy's plans for expansion in the emerging maritime security scenario, the impending shipbuilding loads are set to reach unprecedented levels. This load would need to be met by the indigenous shipbuilding industry, both public and private, given the national goal of self-reliance. Public sector shipyards, while possessing the capability to build complex naval platforms, are already overflowing with orders and may not have the capacity to meet the entire naval shipbuilding load, that is impending. Therefore, a significant portion of this load would have to be shared by the private shipbuilding industry. In such a scenario, the need for a strong private industry cannot be over emphasised.

Measures Instituted by the Ministry of Defence (MoD) to Promote Indian Shipbuilding Industry

The ministry of defence in association with Indian Navy has taken several initiatives to boost the shipbuilding industry in India. The main measures include the following:-

- (a) **Defence Procurement Procedure (DPP).** The DPP over time has evolved a policy framework to facilitate 'Make in India' in defence manufacturing including shipbuilding. Chapter IV of DPP lays down the procedure to be followed for warship building. Section A enumerates the procedure for warships being constructed on nomination basis at DPSUs whereas, Section B enumerates the methodology to be followed for acquisition of ships / submarines through competitive bidding on multi-vendor basis under the categories 'Buy (Indian-IDDMM)', 'Buy (Indian)', 'Buy and Make (Indian)', 'Buy and Make', 'Buy (Global)'. The Procedures have undergone periodic revision to streamline the procedures for warship building with detailed stage payment linked with milestones for ensuring the availability of working capital for the shipyards.
- (b) **Indian Naval Indigenisation Plan (INIP).** In order to enable indigenous development of equipment and systems over the next 15 years, the Indian Navy (IN) has made efforts to formulate the requirements of equipment which can be taken up for indigenisation in the coming years through INIP. The aim of INIP is to synergise Indian Navy's relationship with the industry and encourage all sectors of industry to come forward and participate in the indigenous development of weapons, sensors and equipment for the Indian Navy and improve the vendor base.

- (c) **Strategic Partnership.** The policy on strategic partnership in defence sector was approved by the Defence Acquisition Council (DAC) in May 2017. The policy is intended to institutionalise a transparent, objective and functional mechanism to encourage broader participation of private sector, for the manufacture of defence platforms for aircraft, submarines and armoured vehicles.

The measures instituted by the MoD and Indian Navy have brought about incremental changes and reduced the cost overruns in warship construction, considerably. This has ensured the sustainability of the warship building capability in the country and self-reliance to meet the force levels envisaged for Indian Navy. However, these changes have brought only incremental benefits whereas disruptive changes are required to revitalise the shipbuilding industry.

Case Study- Korean Ship Building Ecosystem²⁰

Korea did not have any systematised shipping / shipbuilding policy until the first Five Year Economic Development plan that was launched in 1962. However, the government had taken various policy initiatives to develop the shipping and shipbuilding industry, since its liberation from Japan in 1945. In 1962 when the First Five Year Plan was launched, Korea had in principle, two alternative approaches to economic development. One was inward looking based on import substitution and the other was an outward looking development strategy emphasising trade. The country’s policy shift to an outward-looking strategy was fuelled by powerful economic reasons including poor availability of natural resources, small domestic market and an abundant and well educated labour force with relatively low wages.

The essence of the outward-looking strategy adopted in the early 1960s was to promote the labour intensive manufacturing of goods for export. In order to implement this strategy, the Korean government mobilised both external and internal resources by making use of market mechanism. The policy evolved with time and ensured the development of a shipbuilding ecosystem with specific focus on institution building for sustained growth. The Korean government enacted laws under the Shipbuilding Promotion Act 1967, built internal capacity in both shipbuilding and ancillary industries through sustained focus across governments over the period from 1960 to 2000 to reach the pinnacle in world of shipbuilding. These measures are outlined in Figure 13 below.



Figure 13 – Korean Shipbuilding Policy

In addition to the robust policy framework, the Korean government focused on building institutions as indicated in Figure 14 below and also instituted a support mechanism for facilitating the growth of shipbuilding industry as depicted in Figure 15. The Korean government developed shipbuilding clusters to encourage effective cooperation between the shipbuilders, and the ancillary industry which were located close by. The government also funded research in cooperation with the shipbuilders association and provided credit facility to ship owners and loans to shipyard to ensure working capital requirements. The Korean government also plays a role in developing Human Resource (HR) policies for the shipbuilding and ancillary industry. Measures instituted by the Korean government fuelled the growth in the shipbuilding industry making it leading global ship exporter. The key institutions in this field are as listed at Figures 14 and 15.

- **MOTIE – Korean Ministry of Trade, Industry & Energy**
- **KOSHIPA – Korean Offshore & Shipbuilding Association**
- **KIOST – Korean Institute of Ocean Science & Technology**
- **KOMERI – Korean Marine Equipment Research Institute**
- **KOMEA – Korean Marine Equipment Association**
- **RIMS – Research Institute of Medium & Small shipbuilders**

Figure 14 – Institution building was Key for Growth in Korean Shipbuilding Industry

- **Shipbuilding Clusters – Effective cooperation due Proximity**
 - ✓ SME's important part of these shipbuilding clusters
- **R&D – Shipbuilding Core Technology Development Plan**
 - ✓ Govt share 25.9 MUSD – 2013-9% of KOSHIPA funding
- **Credit Facility – State Owned Export Credit Agency**
 - ✓ Direct loans to ship owners
 - ✓ Financial & Bond Guarantees
 - ✓ Pre shipment loans – Working Capital
- **Human Resources**
 - ✓ Setting up of specialized universities
 - ✓ Special Training Programmes – Industry / academia

Figure 15 – Korean Government Support Mechanism for Shipbuilding Industry

Recommendations for Growth of Shipbuilding Industry

Growth in the shipbuilding industry requires a national mindset and disruptive changes at the macro level to collectively overcome the ‘Combined Critical Mass’ of the Merchant Marine, Naval / Coast Guard and export orders. The tried and tested methodology of the Indian Navy to sustain the warship building programme can be adopted as the model. The proposed growth plan for the merchant marine is outlined in Figure 16 below.



Figure 16 – Proposed Growth Plan for Indian Shipbuilding Industry

Measures for ensuring the growth of shipbuilding would therefore require a focused approach, encompassing financial and policy measures applicable to the shipbuilding industry as a whole. These would also need to be analysed and implemented at the highest levels of Government of India involving the ministries of finance, shipping and industry and surface transport. The recommended measures follow.

Policy Framework to Promote Shipbuilding

Strategic Status to Shipbuilding Industry The shipbuilding industry offers large scale opportunities for direct and indirect employment generation. It is therefore in the interest of the nation to accord strategic status to the shipbuilding industry. Similar moves by the following countries have led to the significant development of the domestic shipping and shipbuilding industry:-

- i. China, has extended credit lines to foreign shipping companies with a view to support the local shipbuilding industry and generate orders for local shipyards.²¹
- ii. Philippines, introduced the Domestic Shipping Development Act in 2004 propelling the country into becoming the world’s 4th largest shipbuilding nation. The various benefits accorded to

shipbuilding industry (including shipbuilding industry with 100 per cent FDI) included various incentives such as: tax exemption on imports of shipyard equipment and other capital equipment and spares required for the construction, expansion, upgrading, modernisation of shipyards and facilities.²²

- iii. Vietnam, has accorded priority status to the shipbuilding industry. Accordingly, a large number of incentives have been extended to the industry including: retention of corporate income tax and capital-use tax for re-investment; preferential corporate income tax; special incentives in industrial zones; protection for domestic shipbuilding industry; import tax exemption; and promoting joint ventures to facilitate technology transfer. The Master Plan has stressed the imperatives of developing the country's shipbuilding industry, and the need to access modern technologies to enhance the efficiency of shipyards and supporting industries.²²

Address Financial Woes. The ship building industry is a capital intensive industry with long gestation period. Shipyards involved in construction of merchant vessels get most of the payment at time of the scheduled delivery. The major problem experienced by the shipyards is the shortage of working capital and servicing of debts. Working capital typically accounts for about 25-35 per cent of the ship cost during the entire construction period. In India, the interest rates on working capital are about 10-11 per cent, against 4-8 per cent in most other countries. As a result, the Indian shipyards have been unable to compete with other countries in the global market. Immediate support in terms of availability of working capital at special interest rates is, therefore essential to boost Indian shipbuilding industry. An analysis of the countries which have emerged as major shipbuilding hubs indicates that this issue has been addressed by the respective administration as follows:-

- i. Brazil has set up a dedicated Merchant Marine Fund(FMM) and provides loans with a duration of 20-years with fixed interest rates between 4 and 6 per cent per annum and loans of up to 90 per cent of the total cost of the project to the shipping companies constructing / repairing vessels in Brazilian shipyards.²²
- ii. Malaysia extends financial support to the shipping and shipbuilding industry through the Bank Pembangunan Malaysia Berhad (BPMB) with interest rates that vary between 4 to 6 per cent with a duration of up to 10 years excluding a grace period of 2 years.²³

Payments in Government Contracts. The bank guarantee clause for clearing stage payments should be removed; instead stage payments should be made through escrow accounts for government orders. Auditors can play the role of facilitators to ensure a healthy eco-system.

Human Resource Initiatives. The board should be given adequate autonomy to decide the remuneration of specialist personnel. It should also be given the powers to 'hire' and 'fire' manpower. Further, retirees with specialised skill sets should be retained as 'mentors'.

Export Promotion. In order to boost the export of Indian built ships, focus should be on developing environment friendly and efficient designs. A major boost to the domestic shipbuilding industry can be given by exploring the demand for ships in emerging economies engaged in trade with India. The export requirements of the emerging countries can be met by exports from India and ships can be offered to them by putting in place credit lines, which would enable such countries to increase imports from India. Similar methodology is also adopted by the Export Import bank of China which provides shipbuilders with Export Sellers credit at a nominal rate of 2.7 per cent. They also provide the overseas buyers with export buyer's credit at 2.7 per cent.²⁴

Benchmarking of Shipyards. Benchmarking is the process of comparing business processes and the performance metrics of the company with the best-in-class practices of other companies. The benchmarking of Indian shipyards would enhance the competitiveness of the industry and facilitate adoption of best practices. Indian benchmarking standards for shipyards should be developed and the incentives payable to shipyards should be directly linked to benchmarking. The objective is to find examples of superior performance and to understand the processes and practices driving that performance.

Modular construction developed by Japan evolved as the process of benchmarking the shipbuilding industry with that of the aircraft industry.²⁵ The shipbuilding industry therefore needs to benchmark its processes with that of the industry leaders from Korea and China and identify the scope for improvement in productivity and cost effectiveness.

Ser	Attribute	China	India
(a)	Shipbuilding & Repair Yards	492	28
(b)	Equipment Manufacturer	148	Nominal
(c)	No of Employees (total industry)	2,87,702	60,000
(d)	Order Book	40 m DWT	1.3 m DWT
(e)	Global Share	19-20 %	1%
(f)	Steel availability	High	Low
(g)	Minimal Labour Cost (US \$/ Hour)	1.19	0.28

Table 7 – Comparison between Chinese and Indian Shipbuilding Industry²⁶

Maturity of Ancillary Industry. The ancillary industry supporting the shipbuilding industry has not developed due to the low volumes in the Indian shipbuilding industry. This has adversely affected the cost structure and rendered the domestic ancillary industry uncompetitive in the international market. Development of the ancillary industry is critical for growth of shipbuilding industry. Special incentives for OEMs who are willing to offer complete Transfer of technology (ToT) as against licence production.

Further, it is recommended that in case a vessel is being procured from a foreign yard, the yard would have to source certain quantity of marine equipment from India. This would result in a steady supply

of orders for domestic ancillary industry and ensure that the industry remains competitive and cost effective, owing to large volumes. This would help in reducing the dependence of Indian shipbuilding industry on foreign suppliers, for critical ancillaries.

Taxes and Duties. The shipping and shipbuilding industry competes for orders globally but the high local taxes make the industry inherently expensive. Therefore, the taxes on the Indian shipping and shipbuilding industry have to be rationalised to be at par with global taxes in order to make them globally competitive. Post the implementation of the Goods and Services Tax, the shipping industry is taxed at 5 per cent that carry cargo from or to India. Five per cent tax is also levied on companies that buy or sell vessels whereas a foreign flag operator can carry out the same activities in India without any taxation. Further, there is no import duty on the vessels being constructed at foreign shipyards for Indian operators. While the heavy taxation on the domestic shipbuilding industry makes the Indian shipyards uncompetitive, the differential taxation policy puts the domestic shipping and shipbuilding industry at a severe disadvantage compared to its foreign counterparts. Thus customers prefer to ferry cargo through foreign ships because of their lower freight rates. Further, the shipping companies have to pay wages to crew of Indian flag vessel post tax, whereas no such restrictions apply to foreign flag vessel operating in India. In order to provide a level playing field to Indian shipping companies and shipbuilders, the taxation rates should be uniform for both Indian and foreign flag vessels. Similar policies have been adopted by the countries to protect their shipping and shipbuilding industry:-

- i. Philippines offers a six year income tax holiday for new shipbuilding/ ship repair yard projects. The existing shipyards, are exempted from taxes and duties on: imported spare parts; wharfage dues; export tax duty; import and fees. There are also reduced rates of duty on imports of machinery, equipment, spare parts, lifesaving, navigational equipment, steel plates and other metal plates and accessories for ships to be operated in domestic trade.²⁶
- ii. Vietnam allows retention of corporate income tax and capital use tax to shipbuilding industry for re-investment. Further, there are lower rates for corporate income tax and import tax exemption for equipment and transportation facilities. Shipbuilding establishments are exempted from export tax on exported seagoing vessels. There is no import tax on: machinery and equipment imported to create fixed assets; means of transport included in technological lines imported to create fixed assets; and raw materials, supplies and semi-finished products, that cannot be produced at home.²⁷

Statutory Regulations. The countries that have emerged as major shipbuilding hubs have designated the shipbuilding industry as a strategic industry and have developed an eco-system for promoting the same that includes the regulatory framework. A supportive regulatory framework, will facilitate the growth of shipbuilding industry and safeguard national interests. These could be:-

- (i) **Commercial Shipbuilding Laws.** Commercial shipbuilding laws similar to the Jones Act in the USA, should be enacted. These would mandate that the ships used for carriage of cargo/passenger within the Indian port should be built in an Indian yard or the right of first refusal should be accorded to an Indian shipyard.
- (ii) **Prompt Payment Act.** The Prompt Payment Act, which will ensure timely payment of dues of shipyards engaged in shipbuilding activity and for sub-contractors engaged by shipyards for shipbuilding.
- iii. **Sub-Contractors / OEM Development Act.** Shipbuilders should develop infrastructure for a cluster based model for the shipbuilding industry, with special focus on the development of MSME to develop vendors for the industry. Authority lies with Boards to execute long term supply contract for ship borne equipment.
- iv. **Specialised R & D Initiatives Act.** Special funding for R&D to develop cutting edge technology and equipment for dual use.

Shipbuilding Plans. Formulation of shipbuilding plans will be the start point for shipbuilding reforms. The plan should commence after the collation of the requirements of all stakeholders including the ministries of shipping, fisheries, home affairs, defence, earth sciences and trade & commerce. This would facilitate in consolidating the requirement of vessels.

Based on these requirements, a three pronged action plan for the short medium and long term would have to be drawn up covering the aspects summarised in Figure 17 below:-

- i. **Short Term.** Starting with simpler ship types in short duration with limited capital infusion with focus on developing design capability, competitiveness and skilled manpower etc.
- ii. **Medium Term.** The medium term focus should be on capital infusion for infrastructure augmentation and graduating to slightly complex ship types and to meet domestic demand.
- iii. **Long Term.** In the long term the shipyards would have to be globally competitive to compete for export orders as well as for the development of the ancillary industry.



Figure 17 - Proposed Phased Shipbuilding Promotion Plan

Reforms in Shipping Ministry / Industry. The shipbuilding industry is an intermediate industry for the shipping sector. Growth in shipbuilding cannot be achieved in isolation, without an associated growth in the shipping industry and the revival of strong mercantile marine of the nation. The logistics sector in India was valued at \$160 billion in 2015-16 and is expected to be worth \$215 billion by 2019-20. About 80 per cent of India's total freight cargo of about 4700 MMTPA (Million Metric Tonnes per annum) is transported by rail / road. Almost 18 per cent is ocean going cargo primarily serviced by foreign flag ships and only about two per cent of the total logistics is coastal cargo carried by Indian flag ships. Indian-built ships carry even less cargo. The governments in all major shipbuilding nations have focussed on the development of the sector through supportive policies and measures such as subsidies, financial aid, easy finance, tax benefits, preferential orders etc. Japanese and South Korean shipbuilding industries received substantial government support during 1970s and 80s, which helped them to emerge as top players in the world. Over the past decade, Chinese government has also taken several measures to foster the growth of its industry, including direct aid, loss reimbursements, tax subsidies etc. Therefore there is need to bring about transformational changes to make shipping industry more lucrative which in turn should generate volumes for the shipbuilding industry. The following steps are therefore recommended:-

- (i) **Shift Land Based Cargo to Water Based Cargo** A comparison of the operating costs of transporting cargo via road, rail and sea are shown in Figure 18. It is clear that transportation through waterways is the cheapest mode of transport. Shifting land based transport through the coast to water based transport would significantly reduce the costs incurred by the government for maintenance of road and railways infrastructure and increase the coastal/ waterways trade significantly. A strong push by GoI is required to increase the utilisation of water based transport

as prime mode for cargo transportation. Steps for development of inland waterways and the thrust on projects such as Sagarmala and Jal Marg Vikas will contribute significantly to facilitate the shift. Special measures to be implemented to promote shift of land based cargo movement to water based cargo movement include special incentives in line with the Marco Polo scheme promoted by EU.

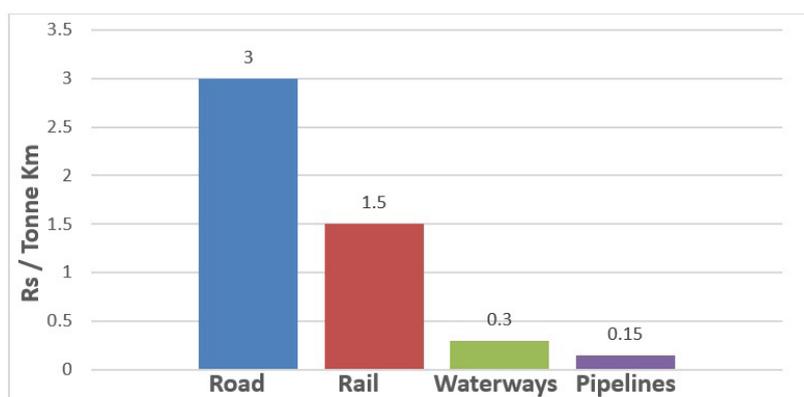


Figure 18 – Operating Cost Comparison in Transporting Cargo through Various Modes²⁸

- (ii) **Appointment of Secretary (Shipbuilding).** Presently, the shipbuilding industry comes under the purview of shipping industry. The government policies for shipping and shipbuilding industry are generally in conflict with each other. Since, the policy impact on the shipping industry is visible in the short term, therefore the policies are geared towards the commercial benefit of shipping industry. This has a severe impact on the shipbuilding industry. It is therefore recommended that a dedicated secretary for shipbuilding be appointed to focus on legislation for shipbuilding industry, policy framework to enhance competitiveness, institute building and skill development to suit the shipbuilding industry.

Measures to Enhance Competitiveness of Shipbuilding Industry In order to enhance competitiveness of the shipbuilding industry, the following measures are proposed:-

- i. Standardise vessels for coastal/ inland waterways. This would facilitate in realizing the benefit of learning curve by building ships of similar type in large number.
- ii. Standardisation of design will require large volumes of the equipment being installed on the ships. This would incentivise the ancillary industry to locally manufacture these items to meet the domestic shipbuilding requirements and reduce the dependency on imported equipment. Large volumes would eliminate the disadvantages accruing from the small scale of operations.
- iii. The standardised design can be owned by government and can be developed on competitive basis by renowned design houses in view of the inadequate ship design capabilities, of the Indian shipbuilding industry. A modest beginning in this regard has already been made by the IWAI, with the standardisation of 13 hull forms of 8 different categories, suitable for large barge haulage on

River Ganga (National Waterway-1). This would eliminate ambiguity with regard to navigation challenges stemming from complex river morphology and facilitate the shipbuilding industry.²⁹

State Maritime Policies. In order to boost the Indian shipbuilding industry, support from the maritime state is considered essential. In this context, the development of a state maritime board and policies is vital. The National Maritime Development policy has mandated all maritime states to form maritime boards, in order to be eligible for financial assistance for developing port infrastructure. These boards should take a cue from the proactive steps taken by Gujarat maritime board to promote the shipbuilding industry in the state by creating a favourable environment for the industry.

Shipbuilding Institutions. Institutions are key to sustained focus with dynamic evolution of measures through constant debate based on sensitivity to market developments. These bodies can provide research data and guidance to the government in framing and constantly tweaking policies for the development of Industry. The institutions proposed for promoting shipbuilding in the country are outlined in Figure 19 below. These institutes should focus to provide trained manpower and resources in specialised fields along with requisite consultancy services. The initial funding for the same can come from the GoI, however, follow-up can be through R & D initiatives by the industry. The institutes proposed are:-

- i. **Indian Shipbuilding Institute (ISHI).** The Indian Shipbuilding institute will focus on: Shipbuilding demand development plan; time and cost estimation; and development of shipbuilding indices, standard designs, benchmarking and grading of shipyards and formulate shipbuilding standards.



Figure 19 - Institutes to Support Shipbuilding Industry

- ii. Indian Marine Equipment Research Institute. It should identify merchant marine equipment for indigenisation, fund R & D project for equipment development in collaboration with private industry, develop special teams for negotiations/ finalisation of ToT agreements and hold global exhibitions for trade promotions.

iii. Other Government and Private Institutes.

- a. Government export credit agency.
- b. Indian offshore and shipbuilding association.
- c. Indian Marine equipment association.
- d. Government global equipment testing and service centre.

Conclusion

It can therefore be concluded that it is critical to support the Indian shipbuilding industry to overcome its current crisis, which is in the long term national interest. Though certain measures have been instituted by the government, a turnaround in the fortune of shipbuilding industry demands disruptive changes at policy level with short term focus on employment generation and long term focus on economic growth. The identification of shipbuilding industry as a ‘strategic infrastructure industry’ is therefore the prime need of the hour. A robust legislative framework supported by dedicated institutional framework would form the backbone of the growth envisaged and propel the reforms desperately required in the fledgling industry. In order to generate the ‘Combined Critical Mass’ for shipbuilding and ancillary industry, a calibrated approach for development of coastal corridors and inland waterways will play a key role, apart from IN and CG orders. Concerted efforts are required from all stakeholders in a phased manner, to ensure that orders for construction of all ships are placed only on Indian shipyards in line with the “Make in India” policy of the government. For long term viability, the merchant marine will have to be built locally. In order to be globally competitive, there is a need to encourage R & D for development of technologically advanced designs with suitable collaborations to cater for the market demand for environmentally friendly ships, unmanned surface vessels, unmanned underwater vehicles, hybrid propulsion and incorporation of digital twin concepts for manufacturing and improved life cycle maintenance with improved prediction for breakdown maintenance. These measures, if instituted, are likely, to not only make the commercial shipbuilding industry more competitive, but also create strategically beneficial options for meeting India’s defence requirements. The need of the hour is summarised in the Figure below.



Figure 20 – Need of the Hour

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