



## Mini Review

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# Comparison of Demographic Changes in Shipbuilding Industry in India & China

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## Abstract

Shipbuilding is known as one of the oldest, most open and highly competitive markets in the world. In time wood was replaced by iron and steel, leadership in the global shipbuilding went from hand to hand; from Great Britain to Japan, then to South Korea, and finally to China. Taking into account the possibility of strong economic growth in India, is presented. This is performed by comparing the expected impact on global ship building sector due to India. Conditions of expected global ship building growth rates and Indian growth rates which may yield another boom are presented. This paper studies the ship building and ship repair industry in India, specifically using China as a basis for comparison. An overview of the current shipping profile of India is presented followed by a comparative discussion to understand the reasons for India to lag behind China in this sector.

**Keywords:** Dry dock; Shipping; Shipbuilding; Shipyard

## Introduction

Shipbuilding is an economic sector that has high scientific, technological and production potential and is capable of generating a significant impact on the development of technology in related industries. As a result, key maritime states around the world pay particular attention to the creation and development of innovative technologies in the shipbuilding industry. Foresight has confirmed its effectiveness as a long-term forecasting instrument for scientific, technological and economic development in the industry as it allows analysts to take into account a complex array of factors influencing market supply and demand alongside current technological trends [Georghiou et al, 2008; Gokhberg, Sokolov, 2013; Saritas et al, 2013; Haegeman et al, 2013]. This article seeks to outline the future of the shipbuilding industry in the period up to 2030 based on an assessment of the current state of the global and domestic shipbuilding and ship repair markets and a forecast of changes with account of contextual factors. The prospects for scientific and technological development in the domestic civil shipbuilding and ship repair industries have been viewed in the context of global, national and inter-industry challenges, trends, driving forces and constraints. This study of inter-industry interaction has enabled us to highlight the synergetic effects brought about by the application of technological innovations from other economic industries.

Increasing competition and globalization bring about challenges in shipbuilding. The current recession and the consequent dearth of new ship orders continue, while the focus of shipbuilding has been gradually moving to Asia [1-5]. The Arctic know-how, offshore operations and wind power represent new business areas on which the European maritime operators most pin their hopes and expectations. There is also a growing interest in environmental technology within the maritime industry.

## Economics of Shipping & Shipbuilding

The story of the shipping industry since the first steamships were built more than a century ago has been one of ingenuity, professionalism, fabulous profits and some disastrous miscalculations. It includes the drama of the super tanker, the meteoric rise of shipping superstars like Niarchos and Onassis, and some equally dramatic scandals such as that involving Tidal Marine, which built up at 700,000 dwt (deadweight tonnage) shipping fleet in the early 1970s and was subsequently indicted, with a number of bankers in New York, on charges of fraudulently obtaining more than \$60 million in loans.

Shipping is a complex industry and the conditions which govern its operations in one sector do not necessarily apply to another; it

might even, for some purposes, be better regarded as a group of related industries. Its main assets, the ships themselves, vary widely in size and type; they provide the whole range of services for a variety of goods, whether over shorter or longer distances. Although one can, for analytical purposes, usefully isolate sectors of the industry providing particular types of service, there is usually some interchange at the margin which cannot be ignored. This suggests that there are several important ground rules for approaching shipping economics [6,7]. First, it emphasizes the importance of the commercial divisions within the shipping market-the liner business carries different cargoes, provides different services and has a different economic structure from bulk shipping. Second, it acts as a reminder that shipping is in another sense a single market. Some shipping companies are active in both the bulk and liner markets and many ships are designed to operate in several different markets. Consequently, we cannot afford to treat the market as a series of isolated compartments. We must recognize that, particularly in a depressed market, owners can move their investment from one market sector to another in order to avoid problems. As a result, supply/demand imbalances in one part of the market can ripple across to other sectors.

### Shipbuilding in India

India has a recorded history of shipbuilding that stretches back to approximately 2500 BC. The "modern era" began with the building of a dry dock at Bombay about 1750; a second was erected in Calcutta about 1780. During the 19<sup>th</sup> century, the industry was in a period of expansion and prosperity. However, for the last 100 years, the yards have been in a general decline, especially with regard to new construction. At present, the Indian yards build very few vessels for export, and, as noted earlier, supply only about 10% of the Indian shipping industry's needs. The perception is that the shipbuilding industry has suffered from an extensive public ownership, and the government would like to change its position by reducing that ownership. Privatization of two shipyards, although approved several years ago, have not moved beyond the planning stage. However, it recognized the importance of first securing economic stability, and therefore implemented the subsidy program, described in the preceding paragraph. The subsidy program has been complemented with a financing guarantee program for 80% of a ship's cost. Import duties are being reduced on equipment and spare parts; however, the system still favors Indian manufacturers. The regulations also make it difficult to freely move spare parts into (and out of) the country. The literature suggests that labor legislation has created significant barriers for making the shipyards more efficient. It is almost impossible to shed jobs and to rationalize work standards and processes. The result is a bloated employee count that continues to grow in spite of low output. The private shipyards are reportedly dealing with the problem by heavy use of subcontractors. The use of the tender's system is dominant in India, and all purchases by the government are by this process. This fact is of importance when discussing India's shipbuilding industry because a majority of the major yards are under government

control. The results are market distortions within the industry. First, the government has built-in preferences for working with Indian suppliers. Second, low-bid selection dominates the process, and little consideration is given for previous performance or experience. Finally, personal contact and political muscle are great advantages, and corruption is reportedly widespread.

In a globalized shipbuilding industry, Indian shipyards have several disadvantages which negate their natural competitiveness and adversely impact their chances of survival in the current scenario. With empty order books and limited future commercial ships on order, the survival option for the private shipyards is to diversify into building of small specialized vessels, naval vessels and repairs. Warship construction extended to private shipyards through competitive bidding since 2011, has also been adversely affected by the financial distress and competitiveness issues. However, considering the strategic significance, economic potential and spinoffs, there is a need to shore up the private shipbuilding industry and prevent erosion of a strategic industrial capability painstakingly acquired through considerable investments. Shipbuilding industry in India needs holistic attention to weather the current crisis and build the desired capability and capacity, so that the prowess in commercial shipbuilding benefits warship construction in realizing quality warships in minimal timeframes. The Indian shipbuilding industry has since long been dogged by low capacity, poor productivity and lack of modernization. Indian government has tried various promotional and subsidy measures since the 1970's. Such measures have managed to keep the industry alive at a time when the global industry was passing through a deep recession after the boom of the 1970's which, the country missed due to lack of industrial growth. Indian shipbuilding industry witnessed healthy growth in the recent past, driven primarily by the boom in global shipbuilding and Govt. subsidies. The annual turnover of the industry increased by more than 250% from 2002-07 as shown in Figure 3. Spurred by this recent growth several companies set up shipbuilding capacity and existing shipyards aggressively expanded their capacity.

Indian shipbuilding today comprises of about 30 shipyards of various sizes, which includes 8 public sector rest private sector shipyards. The shipyards have about 20 dry docks and 40 shipways between them, with an estimated total capacity of over 280,000 DWT. Four shipyards operating under Ministry of Defense cater primarily to the needs of the Indian Navy. The other PSU shipyards are under Ministry of Shipping. Most notable among them being Cochin Shipyard Limited (CSL) with a capacity of 110000 DWT which is currently involved in the construction of the first indigenous Aircraft Carrier. The DPSU shipyards are primarily engaged in building high value, weapon intensive warships and submarines of highly complex design. In terms of number of ships built or even Dead Weight Tonnage (DWT), the Indian private sector shipyards remain ahead of public sector shipyards. However, most private sector shipyards are engaged in building of medium to small vessels such as Offshore Supply Vessels (OSV) and Anchor

Handling Tugs (AHT). While the government has a major role to play, shipbuilding industry needs to rise up to the occasion and grab all avenues open to them to improve their competitiveness, productivity and profitability. It is incumbent on all stake holders during this lean period to focus on enhancing competitiveness of indigenous shipbuilding through resolution of gaps and issues afflicting the industry on all fronts viz. regulatory/ fiscal policy, modern technology, design prowess, build strategy, human resource skills, productivity and research. Simplification of bankruptcy norms and hastening of procedures towards competent ownership of shipyards would be strongly desirable, towards improved competitiveness, debt reduction and de-leveraging of the industry.

### Ship Building in China & its Comparison

When vessels were built of wood, the easy availability of this material made the United States the first major player in shipbuilding in the early part of the 19th century. However, as wood was replaced by iron and steel in the 1850's, Britain took over the leadership, and it remained the leading shipbuilder until 1956, when it lost its leading position after being overtaken by Japan. During the recession of the 1980s, all shipbuilding regions worldwide experienced significant falls in orders, a trend that was exacerbated by the subsequent oil crises. About half of the shipyards worldwide disappeared from the map during this period, and employment in the industry was effectively halved. While there was a strong recovery in the 1990's, the European yards were not able to fully benefit, and yards in the Far East achieved the dominance that they still enjoy today. The present development of the Chinese shipbuilding industry follows a similar pattern to what had happened earlier in Japan and Korea. Japan used its shipbuilding industry in the 1950s and 1960s to rebuild its industrial capability, while Korea saw shipbuilding as a strategic core for its economic development in the 1970s [8]. China is now also taking that development path by taking full advantage of the demand shift towards centers of low-cost production, and making full use of its low-cost advantage and large domestic demand to build a solid industrial foundation.

The development of the Chinese shipbuilding industry is often compared to the development of the industry in South Korea, but the conditions for the process of development differed considerably. While, the South Korean shipbuilding industry was aimed from the outset at producing vessels for export, in contrast the economic strategy in China has initially been to develop shipyard capacity to sustain domestic economic development. In other words, the substantial construction of shipbuilding capacity in China has primarily been aimed at enabling China to be self-sufficient in sea transport. Above all, from the Chinese perspective, the supply of raw materials for domestic manufacturing, meeting the food needs of its populations and the transport of exports should to the extent possible be undertaken by Chinese built ships. However, China has for some decades actively explored the international market, and the trend in the mix of vessels being constructed indicates that the share of that market captured by Chinese shipbuilders is

continuously increasing. The shipbuilding industry is technology, labor and capital intensive. In China, it is also a strategic industry, intended to upgrade its national defense capability, drive economic development and serve as a catalyst for the development of the iron and steel, electronic, and machinery manufacturing industries. In 2006 the Chinese government unveiled an official shipbuilding blueprint to guide the medium and long-term development the shipbuilding industry [9,10]. This National Medium-and Long-term Plan focus on systematic planning to identify and remove barriers to industrial development. The Plan urges the Chinese industry to increase its efforts over the next five to ten years in order to challenge existing mainstream shipbuilders.

### Conclusion

Foresight studies of future markets and technologies enable various scenarios for the shipbuilding industry to be identified. As a technology-driven sector, constant improvement of engineering skills and adaptation of new technologies will keep one ahead of others in the competition. The matter of obtaining and retaining competent personnel also has been a difficult problem for most shipyards. This problem is chiefly due to the cyclic nature of the order books and the workflow. Compounding the problem is the availability of work in the construction industry at higher levels of pay. A workload with a reasonable promise of continuing stability is the most significant factor in the attraction and retention of competent personnel. The cost and availability of material is always important to a shipbuilder, since material constitutes about half the cost of the usual commercial vessel. Since favored ship types of the market changes frequently every year, strong engineering capability is the only way to maximize profit opportunity by changing product mix regardless of market changes. Hence presence of designers and engineers in the yard is essential. Technical solutions satisfying the rules and standards are very often complex and require a lot of technical development. Approval procedures are not always clear and subject of changes during the rule definition procedure. Therefore, the risk to fail by starting the development too early is quite high. On the other hand, suppliers have to assure to be ready for the market in time.

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### Conflict of Interest

No conflict of interest.

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