

A Conceptual Study on the Role of Technology in Maritime Logistics in India

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Abstract

It has been observed that around 90% of India's external trade is moving by sea. With the economy growing at a rate of over 8% and positioning itself as manufacturing and outsourcing base, new technologies are needed to be developed in the light of the emerging scenario in the Maritime industry. The scope and role of logistics have changed dramatically over the years. Logistics used to have a supportive role to perform primary functions such as marketing and manufacturing. But now the industry expanded to cover warehousing and transportation activities, purchasing, distribution, inventory management, packaging, manufacturing, and even customer service. More importantly, logistics management has evolved from passive, cost-absorbing function to that of strategic factor that provides unique competitive advantage. The global marketplace has compelled every industry to technological innovations in the Indian Logistics Industry: The focus is to transform itself into a truly customer-oriented, service-focused enterprise, irrespective of the products and services it sells. Especially, logistics service providers have to adopt and creatively deploy up-to-date technology, because logistics industry strongly depends on information for efficient operations. Logistics technologies refer to the hardware, software, and network design required facilitating processing and exchanging. It includes related components in the supply chain, such as satelliterans missions, web-based ordering, EDI, bar coding, systems for order entry, order processing, vehicle routing and scheduling, inventory replenishments, automated storage, and retrieval systems, etc. The correct implementation of technologies can be a significant source of competitive advantage to the service providers. The research paper is completely conceptual and the study is made to understand the use of technology in maritime logistics. The objective is to study the impact of technology on the growth and development of port shipping and logistics.

KEYWORDS: Maritime Logistics, Technology, Indian Shipping Industry.



INTRODUCTION:

Logistics and supply chain is considered to be the backbone of any country's economy. Logistics is an integral activity of economic growth as it involves the management of flow

of goods and services from place of origination to place of consumption. The sector mainly comprises shipping, port services, warehousing etc. The global logistics market currently generates over USD 8 trillion annually and represents around 11% of global GDP.

The Logistics industry of India is growing rapidly. It has become an important area of operations it lead to reduced operational costs, improved performance of delivery and increased customer satisfaction levels, therefore makes an organization more competitive in terms of cost, quality, delivery and flexibility. The Indian logistics industry is complex and under developed. Logistics costs are high due to poor physical and communication infrastructure; high dwell time at ports; low levels of containerization; and a multi-layered tax system, interstate tax system contributing to significant delays at state border crossing points. The growth of logistic sector is linked to the growth of International trade and thus enhances the shipping and logistics industry. Indian logistics trade was badly affected in the year 2008-2009 because of global financial crisis.

Going forward, the trend towards integration of logistics service providers is expected to continue and new players/business models are expected to emerge amid the digitization and automation of business processes, implementation of the new GST (goods and services tax), and expansion in the 3PL/4PL service landscape.

MARITIME LOGISTICS IN INDIA:

Cargo traffic handled by India's major ports increased 5.56 per cent year-on-year to 113.63 million tonnes (MT) during April-May 2017. In terms of composition of cargo traffic, iron ore traffic volume rose 33.28 per cent to 9.96 MT, coking coal grew 12.67 per cent to 9.30 MT, and fertilizer traffic went up 20.09 per cent to 1 MT during the period.

The country's major ports handled a combined traffic volume of 647.43 million tonnes during 2016-17, registering an annual growth rate of 6.79 per cent, as against a growth of 4.32 per cent in FY 2015 -16. The major ports recorded the highest ever capacity addition of 100.37 MT in 2016-17, thereby raising the total capacity to 1065 MT per annum, as against a capacity of 965.36 MT per annum in 2015-16. The government has taken several measures to improve operational efficiency through mechanisation, deepening the draft and speedy evacuations. The major ports have outperformed private ports for the second consecutive year by registering a growth 6.79 per cent in 2016-17, whereas the private ports recorded a traffic growth rate of 4 per cent. The Department of Industrial Policy and Promotion (DIPP), Ministry of Commerce and Industry, reported that the Indian ports sector received FDI worth US\$ 1.64 billion between April 2000 and March 2017.

The emergence of new technologies is also helping the shipping and maritime industry to build the competitive advantage in various functional areas of management including logistics and supply chain management. However, the degree of success depends on the selection of the right technology for the application, availability of proper organizational infrastructure, culture and management policies. In maritime logistics the information,

communication and automation technologies has substantially increased and helped in increasing the speed of identification, data gathering, processing, analysis and transmission, with high level of accuracy and reliability. Technology is a means to enhance business competitiveness and performance. It plays a major role in success of supply chain by enhancing the overall effectiveness and efficiency of the logistics system. In logistics many new technologies are used in developed country while in India adoption process is very slow. However due to liberalization of the Indian economy the competitive pressure is building up and the only option to face the competition is to go in for technology enabled operations.

- **OBJECTIVE OF STUDY:**

- 1) To study the logistics and supply chain industry especially from for waterways.
- 2) To study the role of technology in logistics and supply chain.
- 3) To study the impact of technology on the maritime logistics & SCM.

- **RESEARCH METHODOLOGY:**

The research study is a conceptual study based on the facts available through secondary data study. The research is an exploratory research with a qualitative approach. This study discusses the various new technologies in the field of maritime logistics and various cases of applications of Information technology.

- **ROLE OF TECHNOLOGY IN MARITIME LOGISTICS:**

Over the years it has been observed that around 90% of India's external trade is moving by sea. With the economy growing at a rate of over 8% and positioning itself as manufacturing outsourcing base, new technologies are needed to be developed in the light of the emerging scenario in the Maritime industry. India is growing fastly and adopting new technologies for delivering qualitative services to the national and international trading firms through maritime logistics. Due to the globalization, international logistics relies more on the maritime transportation than ever before.

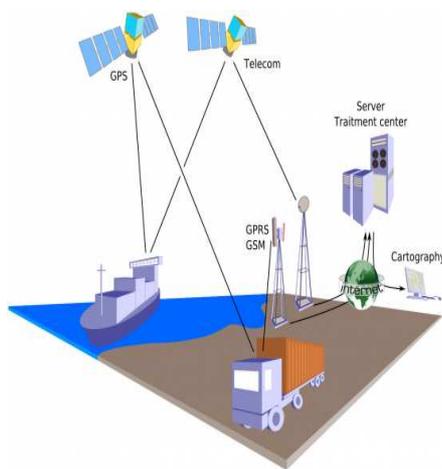
The growth story of Indian Shipping industry has also been supported by the implementation of innovative technology. The various types of technology used by shipping industry on shore and off shore are studied individually to make the study more concrete

- a) **Vessel Tracking Management System:**

A vessel tracking system is a device which helps in effectively tracking and monitoring the location of a container or vessels when off shore. A vessel tracking system is a collection of equipment's which helps marine and naval vessels to track, identify and monitor a ship's position, location and any other detail that might be important in maneuvering and stabilizing a ship's route and course. With the objective to improve the interoperability among different vessel traffic control systems are designed. Also to support new operations, like remote control or

automatic vessel identification, has driven towards the development of advanced information management systems

Today's highly revolutionized world, a vessel tracking system plays a very important role as it helps in bringing about a long range connectivity not only between ships and coast guards of nations but also among ships as well. Also, since the pioneering of the internet, many such vessel tracking systems have managed to incorporate internet connectivity as a part of their core objective thus providing a much better service. There is a wide variety of vessel tracking systems that are available in the naval vessel market and each has its own unique feasibility. The most common among the wide array of vessel tracking system is the GPS. The Global Positioning System or as it is more commonly pronounced, the GPS is a vessel tracking system that has managed to attract and hold the attention of the widespread consumer market.



A Vessel tracking system works with the help of GPS. An onshore and offshore connectivity is made possible via satellite connectivity. Various equipment's like Automatic Identification System (AIS), AIS Monitor, CCTV System, Radio Direction Finder, Weather system, AIS Base Station, Central Server, VHF Communication System are combined to make the VTS functional. VTS also helps the cartographers in identifying the tracks, performing geological calculations in terms of geographical distances and areas, defining operational constraints in form of maps or lines carrying out statistical analysis to be presented on the geographical picture, defining critical path and threshold for all alarms and events • performing route monitoring and assigning a stable route to live tracks and/or monitor dead reckoning tracks • preventing system accident using Space-Time representation of vessels "sequences" along a path.

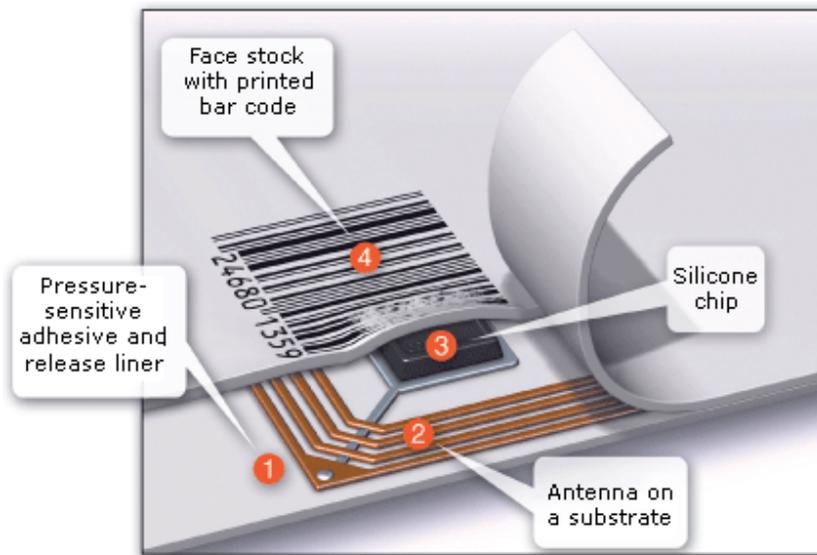
In addition to this, the integration of new equipment can enhance the availability of real-time information about navigation conditions and traffic in given areas, necessary to foresee accidents and minimize their impact. These new elements have to be integrated within the Vessel Traffic Service (VTS), together with new

technologies that are changing communications, signal processing, modelling and simulation. A VTS is to improve the maritime safety and efficiency of navigation, safety of life at sea and the protection of the marine environment and/or the adjacent shore area, work sites and offshore installations from possible adverse effects of marine traffic in a given area". The main system capabilities include: • Remote sensors monitoring and control • Real time and off-line data archiving • Global picture creation and management • Support to operators 'decisions in critical situations • Presentation of traffic navigation and vessel information

b) Radio Frequency Identification: (RFID)

RFID stands for **Radio-Frequency Identification**. RFID is a small electronic device that mainly consists of a small chip and an antenna. The chip typically is capable of carrying 2,000 bytes of data or less. It serves the same objective as a bar code or a magnetic tape of a credit card or ATM card. The bar code or a magnetic tape is scanned to retrieve any information. A significant advantage of RFID is that the device need not to be positioned close to the scanner, RFID devices works relatively at a distance upto a 20 feet for high-frequency devices from the scanner. For example, you could just put all of your groceries or purchases in a bag, and set the bag on the scanner. It would be able to query all of the RFID devices and total your purchase immediately. RFID technology has been available for more than fifty years. It has only been recently that the ability to manufacture the RFID devices has fallen to the point where they can be used as ainventory control device. Lack of standards in the industry is the main reason for RFID to be introduced into a common use. Most companies invested in RFID technology only use the tags to track items within their control; many of the benefits of RFID come when items are tracked from company to company or from country to country.

RFID belongs to a group of technologies referred to as Automatic Identification and Data Capture (AIDC). AIDC methods automatically identify objects, collect data about them, and enter those data directly into computer systems with little or no human intervention. RFID methods utilize radio waves to accomplish this. At a simple level, RFID systems consist of three components: an RFID tag or smart label, an RFID reader, and an antenna. RFID tags contain an integrated circuit and an antenna, which is used to transmit data to the RFID reader (also called an interrogator). The reader then converts the radio waves to a more usable form of data. Information collected from the tags is then transferred through a communications interface to a host computer system, where the data can be stored in a database and analyzed at a later time.



The scanning antenna puts out radio-frequency signals in a relatively short range. The RF radiation does two things it provides a means of communicating with the transponder (the RFID tag) and it provides the RFID tag with the energy to communicate. RFID tags do not need to contain batteries, and can therefore remain usable for very long periods of time (maybe decades).

c) **Geographical Information System: (GIS)**

Geographical Information Systems and advanced mapping is a tool which is used by the supply chain department to locate the potential risks and mitigation strategies as well as to track people and assets. The main advantage of GIS is advance visualization. It helps to tie up various data sources in such a way that the users can even without using the spreadsheets can have a intuitive picture of what's happening in the Supply chain.

GIS mainly works on GPS technology to locate purposes, but GIS adds data in a way that allows the user to make intelligent strategic and tactical decisions. GIS also plays an important role in risk management, For e.g. during natural disasters the suppliers might not able to ship the product to desired destination, the suppliers can see the value for strategic planning of knowing what risks are inherent in the geography - flat coastal areas where a disaster might hit. Such information can be forecasted with the help of mapping tools and overlaid data, so that a supplier knows which manufacturing facilities and which transportation routes will be impacted."

GIS also is valuable in real-time planning. They can take that information and make operational decisions in real time to help manage the supply chain and mitigate risk. There is no way to see that information looking at spreadsheets and databases."

Another application is to map movement inside facilities to do pattern analysis, he says. For example, retailers can see which aisles get the most traffic, providing insights on where to place merchandise.

The biggest challenge for this technology is the lack of standardization in terms of all the different data sources, says Hall. "Standardization needs to happen among industries to make it easy for anyone to access any type of data."

• **Conclusion:**

The growth story of Indian Shipping Industry has supported by the overall economic growth of the country, especially in the development of infrastructure, power and energy sectors. Many large businesses prefer the Maritime logistics for the transportation. The shipping market had been cyclical and depends on the demand and supply scenarios in a given time in the global market. Apart from this the industry is facing other hurdles like strict tax regime, multiplicity of regulations, declining cargo support, lack of skilled manpower, high port calling costs, ports congestion, poor connectivity and underdeveloped coastal shipping. It is very important to embark various modernization projects which includes the latest port equipment's, back up facilities. Despite all the challenges & bottlenecks. However, the ray of hope is that perceptions seem to be changing. The reason behind the changing perceptions appears to be mainly that government seems to very aggressive & wants to revive the industry & economy. Recent Budget shows some government stances on improving infrastructure which improve India's logistics sector. Some key measures are: Enhance government spending on infrastructure to stimulate economic growth. Focus on the maritime sector as an important economical route for bulk transport with initiatives, such as Sagarmala, Focus on the development of inland waterways for passenger and freight transport to decongest existing road traffic, schemes for incentivizing coastal shipping besides other initiative and policy.

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