
Usage of Technology in Logistics Sector: A Literature Review

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ABSTRACT: Logistics plays a crucial role in any economy of the country. Improved infrastructure of trade logistics such as roads & highway, ports, railway, airports, warehousing infrastructure are all necessary for the sustainable and balanced economic development. Especially logistics technology allows players or various stakeholders in the industry to manage the flow of goods. Thus, this research paper tries to focus on literature review on various technologies that are used in the logistics sector by various players and countries. This paper tries to summarise the types of technology used in the logistics sector through literature review.

KEYWORDS – Logistics, technology, sustainability

1. INTRODUCTION

The logistics sector in any country is a gateway to holistic growth and development for the entire economic ecosystem. When goods move, business move and so do lives. Logistics is the process of planning and carrying out the transportation and storage of commodities from the point of to consumption for meeting customer demands in a timely and economical manner. In 2022, the global logistics market attained a value of nearly USD 9.96 trillion. The market is projected to grow at a CAGR of 6.3% between 2023 and 2028, thus to reach about USD 14.27 trillion by 2028. The growth drivers for this sector is the growing retail sector, especially e-commerce, rapid urbanization, rising disposable income, and increasing technological advancement. The key trends that is guiding the logistics market includes the increasing deployment of automated material handling equipment, growing preference of green logistics, popularity of drone delivery etc. The major regions that drives the logistics industry are North America, Latin America, Middle East and Africa, Europe and Asia Pacific. Out of these regions the largest market is of Asia Pacific.

Technology in Logistics Sector

The evolution and increase of technology are pushing the boundaries and changing the business carried around the world. Today we all are accustomed on everything to be online and at the figure tips for immediate access. The technological boom in 20th century has captured the global logistics industry into a new height. In today's logistics sector, technology is fast transforming into a key driver for a successful business, innovation and competitive edge over other companies. Improved technology has increased productivity in the supply chain, minimizing errors and costs. These advance benefits cover all the areas of logistics industry, trucking transportation, international transportation, supply chain management and shipment tracking. Thus, logistics industry has been very much impacted by advances in communication technology, information technology and the transformation from manual to automatic. The importance and the extent usage of technology for the various activities in logistics sector can be traced through the literature review

2. LITERATURE REVIEW

The researcher has reviewed few papers from reputed journals which are based on the usage of technology in the logistics sector. From the research papers it can be observed that majority of the developing countries are trying to implement the technology in the logistics sector and for various activities like for port operations, documentation, chartering etc. It can be further observed that various technologies like blockchain, smart integration system, IOT, sensitivity analysis, AI and other disruptive technologies are used in the global logistics sector.

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Sr.No	Name of the Author	Year	Technology discussed in the research paper	Name and category of the stakeholder	Discussion on the technology in the research paper
1	Jiuh-Biing Sheu	July 2007	Hybrid Neuro-Fuzzy methodology	Information Technology industry of Taiwan	To identify proper global logistics mode for the implementation of global supply chain management
2	Rukshanda Kamran and Nasreen Khan, Balan Sundarakani	August 2020	Blockchain technology	Global Logistics companies	The blockchain reference model integrates with supply chain thus creating transparent process, efficiency and real time communications
3	Andre Wheeler	Oct 2022	Global smart supply chain integration system	Chinese companies	It creates the gateway to establishing China as an economic hegemon that has the tools to coerce and manipulate supply chains and trade for the benefit of Chinese Companies.
4	Deepti Chhabra, Rajesh Kr Singh, Vikas Kumar	March 2021	GPS and IOT	Logistics companies	Considerable saving in terms of carbon emission, time and cost saving by practice of green logistics in monitoring system
5	Ruthramathi Raja, Sivakumar Venkatachalam	June 2022	Digital Technologies	Third party logistics	The framework suggests that Performance will be higher when digital technology is used in logistics with the strengths inherent in the firm's logistics.
6	Khulood Mahdaly, Iman Adeinat	Jan 2022	RFID Technologies	Saudi Logistics Companies	Small and medium Enterprises in the logistics services

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					industry require governmental support in terms of providing funding, training and a supportive regulatory environment. Support of this nature would encourage logistics services companies to adopt new technology and move toward applying the global standards developed in the industry to date
7	Mena Report	Jan 2021	Global Transportation Management System	C H Robinsons	Digital connectivity and sophisticated analytics that improve shipping performance for customers and carriers
8	Balan Sundarakani, Vijay Pereira and Alessio Ishizaka	Aug 2020	Sensitivity analysis	Logistics Managers	Test the cost benefit trade offs against their existing facility location and relocation decisions while operating under uncertainty
9	Minárik, M., Zábajník, S., Pásztorová, J.	2022	Liner regression analysis	V4 group of countries	Investigate the role of service providers
10	Rösch, Anna-Lena ; Härtling, Ralf-Christian ; Gakharia, Sopiko	2022	Digital technologies	Global value chain	Direct or indirect substantial impact by digital technologies on the robustness and resilience of global value chain.
11	Hoa Tran-Dang, Dong-Seong Kim	June 2020	Internet of Things	Logistics network	The major challenges regarding the implementation of the IOT into the

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					emerging logistics concept
12	Jasmin Mikl, David M. Herold, Kamila Pilch and Marek Cwiklicki, Sebastian Kummer	Oct 2020	Disruptive technologies	Global logistics industry	How logistics managers can predict disruptive transitions and develop strategies for allocating the funds
13	Edvard Tijan, Marija Jović, Saša Aksentijević, Andreja Pucihar	May 2021	Digital transformation	Maritime transport sector	The barriers which are slowing down digital transformation compared to other industries are highlighted, such as the lack of awareness of how digital transformation may affect the business, and the lack of standards and cooperation among stakeholders.
14	Irina Harris, Yingli Wang, Haiyang Wang	Sept 2014	Information and communication technologies	Multimodal transport at Europe	Barriers to e-enabled multimodal transport and emerging ICT applications in the field of multimodal transport
15	James R. DeChant	2019	Artificial Intelligence	Shipping industry	Barriers of implementation of AI and advantages of AI in shipping for an improved future
16	International Transport Forum	2021	Automation	Ports	Positive Effects of container port automation
17	PRATNASHREE BASU	May 2020	Digital methods	Shipping companies	Due to the impact of the covid19, it has accelerated the moves towards digitisation
18	Valentin Carlan,	April 2018	Digital	North	Innovations which

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	Christa Sys, Agustina Calatayud, Thierry Vanelislander,		innovations	western Europe maritime supply chain	is supporting the flows of maritime supply chain like the physical flow, document flow and financial flow
19	Dieter Berg	Oct 2021	IOT and interconnected of data	Shipping logistics	Various marine liability and risk issues increases due to higher usage of digitalization. Active loss prevention focusing on digitalization in marine insurance.
20	Markus Fruth, Frank Teuteberg,	November 2017	Big Data and emerging digital technologies	Shipping and maritime logistics	It focus on the current state of digitization in marine logistics, existing problem areas and the potential
21	Michael Papageorgiou	December 2020	Digital transformation	Shipping companies	The advantages of digital transportation are significant cost savings up to 15% OPEX reduction
22	International Transport Forum	2018	Information Sharing, Data collection and governance through open standard	Maritime logistics	Few recommendations to address the issue of open standards at the time of implementation between proprietary and open systems
23	Murat AKKAYA, Hakan KAYA	Oct 2019	Technologies within logistics 4.0	Logistics	Importance and implementation of various technologies like IoT, wearable technologies, cloud technologies, block chain, big data etc.
24	Nexhat Kapidani, Sanja Bauk, Innocent	November 2020	Intelligent information and	Developing and	Due to sharing the expertise in the

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	E. Davidson		communication technologies	developed European countries	rational and intelligent use of ICT developed EU countries can support developing EU countries towards a sustainable region.
25	Maria Lambrou, Daisuke Watanabe, Junya Iida	2019	IoT, blockchain, AI, smart cargo booking	Shipping companies	Various key factors for successful shipping digitization are technology typology, shipping company's management rationales and practices of shipping companies towards digitization.
26	Capt Rahul Bhargava	Sept 2021	Blockchain technology, IoT, digitalization of process, robotics, augmented reality	Maritime Industry	The technological revolution due to covid and increase in the use of robotics, smart containers and AI, ML, IoT, drones. Use of these technologies in the maritime sector

The below mentioned table reflects the summary of the literature review.

From the above-mentioned literature review we can summarize the same based on the types of the digital technology that are used by various players in the maritime ecosystem. Thus, the below mentioned table gives a better understanding of what type of the technology is used by which stakeholder and how that stakeholder has implemented the technology in terms of advantage from the technology in the organization

Summary of types of digital technology

Sr. No	Name of the Digital Technology	Implementation/Usage of the technology	Name of the stakeholder
1	Neuro Fuzzy Methodology	Used for identifying global logistics mode for implementation of supply chain management	Taiwan logistics sector

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2	GPS, IoT, RFID, Barcode, Cloud computing, Artificial Intelligence, Blockchain, Big Data and emerging technologies	Improving the efficiency/performance and having transparent process, thus having time and cost savings	Saudi based small and medium logistics companies. Shipping companies and global logistics companies and 3PL companies
3	Global smart supply chain system	Establish as an economic head	Supply chain and trade in China
4	Sensitivity analysis	Cost benefit trade offs against the existing facility location and relocation decision	Logistics manager
5	Liner regression analysis	Role of service providers within the global value chains	V4 group of countries
6	Automation	Positive effects of container port automation at ITF member countries	ports
7	Data collection, governance and information sharing through open standard	Recommendations for the issues of open standards at the time of implementation between proprietary and open systems	Marine Logistics companies
8	Intelligent information and communication technologies (ICT)	Intelligent use of ICT will help the developed EU countries to support developing EU countries	European countries

Thus, from the above-mentioned summary of the literature review we can mention that there has been usage of various technologies like software and hardware in various parts of the globe. There are technologies like neuro fuzzy which is used logistics sector at Taiwan, various emerging technologies like AI, ML, IoT etc are used at Saudi based small and medium scale logistics companies and shipping, logistics and 3PL companies are using the same over globe. Further it can be noted from the above-mentioned table that the technologies have been used in various parts of the world like Taiwan, china, European countries, Saudi etc. The above table is able to give a concrete idea on what type of technology are used by which stakeholder and in which country.

Future prospects and limitation

As a stakeholder in the industry, one will get a basic understanding of what type of technology is used in which country and who is using. Thus, this information will be helpful as a stakeholder to initiate the technology understanding for the new company or for the company where the implementation of the technology is to be done. This literature review information will be helping the logistic ecosystem to understand at a primary level of what type of technology are used and how the companies are able to get the advantage of the same.

In the future keeping into consideration this research paper one can practically check the usability of these technologies and to what extent such technologies are useful for the ecosystem.

The major limitation of the research is that it is merely based on the literature review of few papers.

3. CONCLUSION

In this research paper, the researcher has collected the literature review from various reputed journals and tried to see the logistics technologies used in the globe. With this literature review-based paper the researcher is trying to summarise various types of technologies and thus will be helpful for the implementation of various upcoming technologies to be implemented by the stakeholder. This research will be helpful and will give a starting base line on the logistic technology towards the understanding of various technologies for the stakeholders in the industry and even will be helpful to various researchers who are doing their research in logistic technology

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