

A Systematic Literature Review: Use and Impact of New Technologies in the Supply Chain Management during COVID-19 Pandemic

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Abstract:- This study's objective is to investigate how new technologies were used during the COVID-19 epidemic and their effects on supply-chain management. In order to determine the application and influence of contemporary technologies on supply chain management, a thorough study was conducted. Following the discovery as block chain technology, Internet - of - things, artificial intelligence, big data analytics, cloud technology, smart phone application, and 5G are the key new techniques employed during COVID-19 in supply-chain management, drones & robotic utilisation is essential. They also shown a significant impact mostly on adaptability, versatility, and dependability chains. The main obstacles to any of these innovations are the massive cost of expenditure, the lack of government sponsorship and regulations, and the lack of adequate technological and skilled human capital. The study used information gathered from Google Scholar as well as from academic journals, dissertations, conference papers, as well as peer-reviewed books.

Keywords:- Cloud Technology, Artificial Intelligence, Supply-chain, industry 4.0, block-chain, application, impact, IoT.

I. INTRODUCTION

The international marketplace has profound effects on every industry, and also the 21st century is rife with difficulties. The aberration and upheavals often proposed the world into a stage of complete chaos in antiquity for unexplained reasons. Importantly, the shift in global policy, the crude prices crisis, and the 2008 economic recession have shook every aspect of existence (Papadopoulos et al., 2020). Akin to how several plagues and catastrophic events already have completely disrupted the world. The Bird flu, Ebola virus, Hpv, Influenza, and SARS CoV2/COVID-19 were the significant natural disturbances. These issues have all put old ways of thinking and acting to the test. Natural disasters that occurred prior to the corona had a greater global influence, but the COVID-19 outbreak had a deeper and much more severe impact on global commerce. The objective of today's entrepreneurs is for the world to become more competing and to benefit from geographic advantages. The main causes of increased complexity, interdependence, and interlinkage are globalisation and technology advancements.

As a first step in preventing the dissemination of the lethal COVID-19 infection, boundaries and even local travel were curtailed as a result of the outbreak. The principal step was a trade embargo for human purposes, which halted global supply flows. Following graph presented the COVID-19 impact on international supply-chain management:

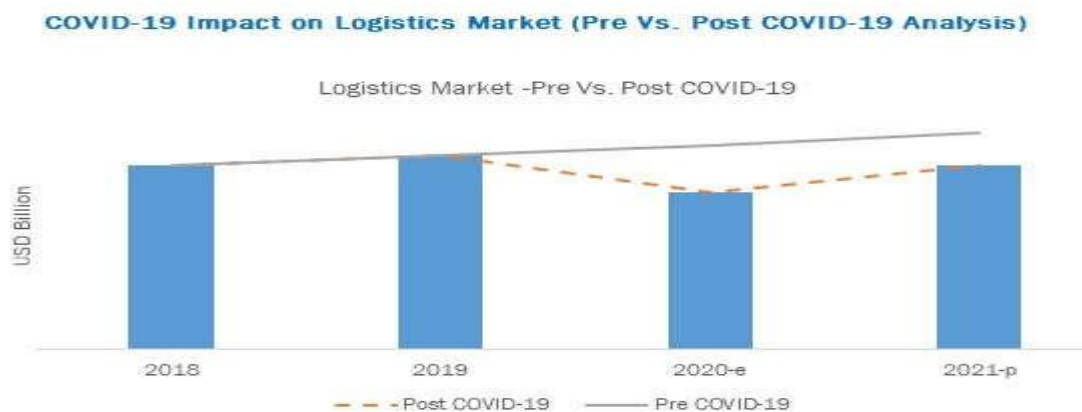


Fig. 1: Impact of Covid 19 on Logistics Market

Source (<https://www.marketsandmarkets.com>)

According to the graph above, which shows that the worldwide market for logistics and supply chains will expand 17.6% from 2020 to 2021 after COVID-19, the projection for 2021 is expected to decrease by over 10% to

15% compared to pre-COVID-19 estimates.

Impact of COVID-19 on supply chain delay India 2020 by duration:

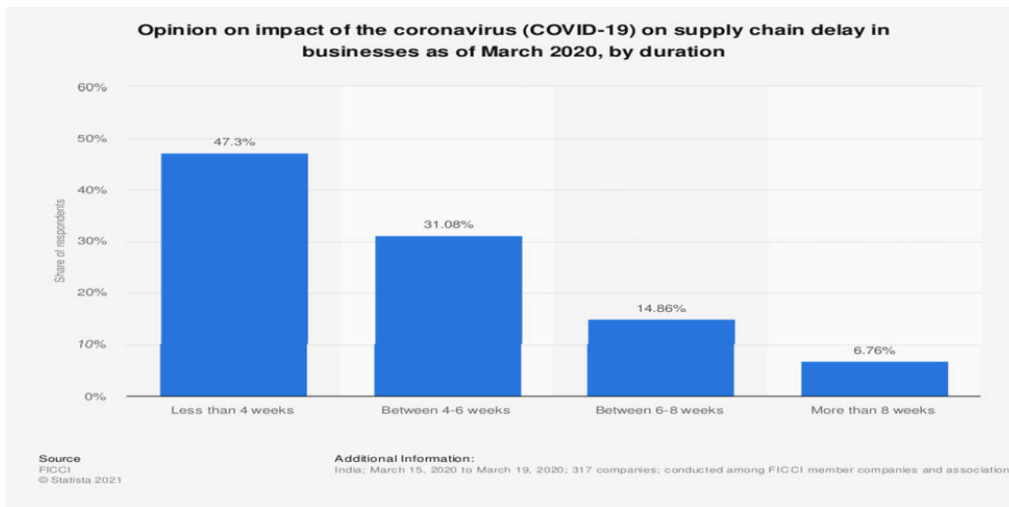


Fig. 2: Opinion on Impact of Corona Virus

Source(<https://www.statista.com/statistics/1106237/india-impact-of-novel-coronavirus-on-supply-chain-delay-by-duration>)

Following the findings of the research performed in India to determine the impact of coronavirus (COVID-19) on Indian industrial sector, it is shown in the above figure that 63 % of participants acknowledged impairment in their logistics system. Employees of international corporations as well as private and public business sectors in India participated in this poll.

To lessen the repercussions, appropriate measures must be taken, including powerful supply chain sustainability plans (Chen et al., 2019; Ivanov and Sokolov, 2019).

The main nation where a limited supply of goods was originally noticeable was China. The major corporations around the world with processing facilities in Wuhan City, China, including General Electric, Volkswagen, Nike, Airbus, and Toyota, have ceased operations. As the centre of global industry, China is where the COVID-19 pandemic disturbance first emerged and spread throughout the globe.

The value chain experiences crisis at many points, and these occurrences force the businesses to take the necessary actions to address such catastrophes. Contemporary & innovative applications, like as social networking sites, predictive analysis, intelligent systems, manufacturing 4.0, cellular and related techniques, broadband like 3G/4G and moreover 5G, provide value to an organisation 's procedures and give it an edge over its competitors. The documentation on the usage, diffusion, and implementation of these tools of information technology in logistics operations, particularly in supply chain collaboration, is currently lacking.

II. BLOCK CHAIN TECHNOLOGY



Fig. 3: Upcoming trends in SCM

Source (<https://www.selecthub.com/>)

Expedite all the processes in the extremely complicated world of e-commerce. Businesses are looking for ways to meet their needs, and one conceptual model suggests that any operations or activities that take place between should be regarded as part of a perfect logistics system that can then be transformed into a supply chain. The efficiency of corporate operations has increased significantly as a result of a few new technologies that have arisen during the past few decades. In today's world, when customers have very high expectations, block chain technology is really beneficial and useful. The consumer is the key focus in today's cutthroat business environment. How to locate a supply chain that isn't halted, where all the participants are interconnected to one another and carry out their responsibilities effectively to boost efficiency and productivity in all the activities and significantly enhance value addition in the creation of any commodity. No matter what kind of product a company manufactures or sells, maintaining a trustworthy and dependable supply chain network is essential for short-term assurance, as well as

being crucial for ensuring that customers are pleased overall and that the company meets its financial goals on schedule. Drive complete visibility from distribution all the way to the end user.

Comprehensive logistics. the openness of We need to create a paradigm where the only goal of every project's accelerators is to accelerate time in order to increase supply chain efficiency. When attempting to create an implementation approach, the following areas require a more focused approach.

Starting with design thinking will help us determine what should be designed, as well as our pain points, consumers' difficulties, and any particular needs they may have. And a theory would be developed to address the issue. Timely delivery is based on the need being felt and being met by all stakeholders, and the supply chain concept extends and develops perfect cooperation.

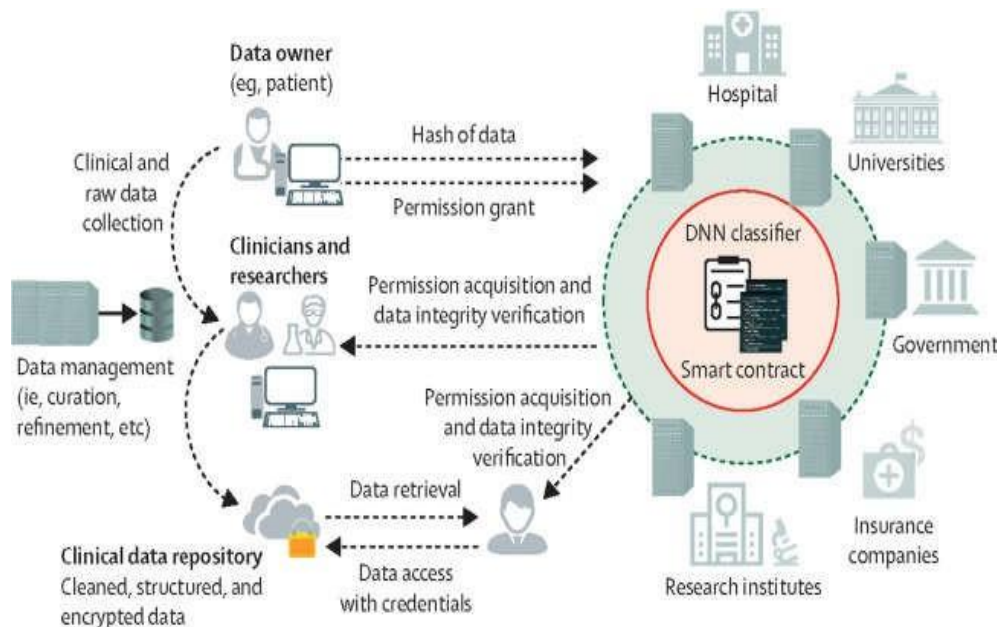


Fig. 4: Blockchain-based health-care data management system between multiple stakeholders (nodes) within a health-care ecosystem

III. BLOCK CHAIN TECHNOLOGY HEALTH AND ITS ROLE IN HEALTH CARE SECTOR

Each aspect of life is undergoing profound transformation as a result of the technologies that evolved in the previous decade, including artificial intelligence, 5G connectivity, the Internet of Things, manufacturing techniques, cloud - based services, and big data analytic. There may be a significant role for these innovations across all fields. Medical records and access to the proper documents, supply chain and logistics management for electronics manufacturing, financial data compilation, and mobile health management are also included. One of these novel technologies, the block chain technology, has distinctive features and characteristics, including as The main results of blockchain technology are immutability, transparency, and decentralisation.

We discovered numerous reports that were published in the databases Medline, SpringerLink, ScienceDirect, and Google Scholar. We have included all of the studies that incorporate both clinical and technological design. A total of 90,000 articles and 450 full-length reports are available, with 32% of the technical design and 2/3 of the articles coming from the Block Chain platform. The majority of the report's conclusions demonstrate that the use of blockchain technology in medical care industry has enormous potential, both for Covid 19-related and unrelated applications. In the healthcare industry, block chain technology has been proven to be particularly useful for integrating various varieties of technology. It can be seen as a substitute for the conventional data-base system, which has significant drawbacks such as the inability to enable sensitive peer-to-peer sharing of information. The distinctive characteristics of block chains technology by its nature, Transparency,

inability to refute, disintermediation, removal of intermediates from decision making process, signature

validity and immutability.



Fig. 5: Process Excellence of SCM

Source: [Process excellence - Google Search | Process improvement, Lean six sigma, Business process \(pinterest.co.uk\)](#)

The entirety of the article's findings show that there exists immense opportunity for using blockchain - based in the medical care sector, including both Covid 19-related and uncorrelated purposes. Block chains technologies has shown itself to be especially helpful for integrating many types of technology in medical sector. It can be viewed as a replacement for the traditional data-base system, which has many shortcomings including the inability to support delicate peer-to-peer information exchange. The unique qualities of block chains.

- Relationship management with suppliers:
 - Reliable and accountable.
 - Complete information on the supplier.
 - Procurement — Dispute Resolution.
 - Labor management and contingent plans.
 - Management and contract law.
- Production
 - Trustworthy Procurement
 - Reputable Procurement
 - Asset administration.
 - Replacements component Administration.
- Transportation
 - Conflict resolution.
 - Visibility from the provider and the customer.
 - End-to-end delivery visibility.
 - Delivering Agreement.

- Distribution
 - Incoterms are to be used as per order specification.
 - Ensured safe and timely delivery to the retailer and end user.

IV. OBJECTIVES OF STUDY

- To determine which industries or regions have successfully benefited from evolving technologies in terms of supply chain management.
- To find out how these new, emerging technologies are affecting supply chain management.
- To find the barriers in implementing the emerging technologies in supply chain management.

V. INDUSTRY WHERE EMERGING TECHNOLOGIES WERE IMPLEMENTED

Implementation of the Emerging Technologies Ambidexterity, agility, flexibility, and improvisation were heavily exploited throughout the COVID-19 period, which has never before been seen in business model innovation or the extensive usage of developing technology (Dilyard et al., 2020). The pharmaceutical industry, agri-food industry, manufacturing, service industry, electronic industry, and construction industry are well-known sectors that have incorporated developing technology into their supply chain operations and business models (Dilyard et al., 2020; Manalu et al., 2020; Salah et al., 2020).

Disruptive technology uptake and application in these sectors contribute significantly to the effort to counteract pandemic consequences.

Technique	Industry	Role Played
Blockchain	Blockchain for pharmaceuticals enhanced the traceability	Supply chain resilience responsiveness.
Cloud based Livestock	Livestock	lowers transactional costs and generates information for future usage
Mobile Device Technologies	Production	useful for controlling machinery remotely
computational intelligence	Farming	Ai technology offers viable business models.
network of entities (IoT)	Pharmaceuticals	The Internet of Things made it possible to track and forecast future supply chains.
Production Using Additives	Production	Medical device manufacturing can be completed quickly thanks to additive manufacturing.
predictive analytics using big data	Supply chain/ manufacturing	BDA enables precise, safe, and transparent transactions between parties while boosting confidence.
5G Technology	Manufacturing	Successfully expedite traditional Transactions.
the use of drones	FMCG	Deliver medical equipment and other products to far-off locations.

Table 1: Role of New Techniques in different Sectors

Source (International Journal of Economics and Business Administration)

A. During COVID-19, the effect of emerging technologies on supply chain resilience was examined:

The use of emerging technologies in supply chain operations during COVID-19 and their influence on supply chain both flexibility and performance were found after a thorough literature study. The study discovered that the use of block chain technology in publicly accessible transmission networks greatly lowers theft and phantom demand. Additionally, RFID technology can reduce shrinkage and misplacement of grains that have been purchased (Kumar, 2020). A study by Ray et al. (2020) found that 5 G-IoT integrated drones may make medical deliveries simple and feasible and provides proof of block chain utilisation in medical delivery drones in 5 G-IoT periods. They list the applications for drones with 5G-IoT integration, including getting to disaster-affected areas, caring for patients away from hospitals, assisting with hospital operations, and facilitating the supply of blood, sputum, vaccines, surgical instruments, and human organs. Ray et al (2020). In 2020, Shen, Yang, and Gao discuss the COVID-19 pandemic crisis and discuss how businesses might exploit emerging technology. Similar to this, Hopkins (2021) examined the role of industry 4.0 as an innovative tool in the Australian context and discovered that the adoption and incorporation of industry 4.0 technologies are still in their infancy in the nation, with larger firms being more prepared to adopt and incorporate than smaller ones. He also discussed how different sectors have been affected by digital technologies. Discusses the significance of lengthy autonomous cars in supply chains and offers convincing evidence of decreased shipping costs, decreased daily driver wages, decreased unintentional incidents, and reliability. Hopkins (2020) cites earlier research that claims big data analytics improve supply chain agility, enabling businesses to more accurately estimate future demand and consumption. This in turn increases marketing sales. Similar to this, businesses can improve the accuracy of supply forecasting with the internet of things (IoT) by putting

sensors into containers, cars, and products. On the other side, using blockchain technology can enhance precise, safe, and transparent transactions as well as partner engagement throughout the supply chain.

Additionally, according to their empirical findings, 12% of organisations claim to already be using autonomous vehicles, 44% of organisations are already using BDA, only 11% are using block chains, 16% are already using drones for their supply chains, 48% are actually using IoT technology, and 29% are using robotic technology. Furthermore, 18% of organisations claim to be using artificial intelligence.

The COVID-19 epidemic has placed limitations on and presented difficulties for supply chains all around the world. The COVID-19 pandemic's most significant industry victim are the supply chains for a variety of goods and services. In this context, Kumar et al. (2020) identified 12 critical performance challenges that retailers face in effectively supplying diagnostic products to end-users and suggested the use of industry 4.0. They have contributed to industry 4.0 by enabling things like deep connections with partners in the supply chain through intelligence gathering, cost- and incentive-sharing by governments, increased trust through block chain, and information architecture in systems and IoT, which can each overcome these difficulties.

B. Barriers in Implementing the Emerging Technologies

Different writers have highlighted 19 pandemics as being combated by developing technology, but there are some significant barriers to their application that need to be overcome. The probable obstacles to implementing industry 4.0 or emerging technologies in supply chain operations were mentioned by Koncar et al. in 2020. They determined that the higher investment costs, a lack of personnel with the necessary skills to deploy and operate the technologies, particularly IoT, and a lack of current infrastructure to support industry 4.0 are the obstacles to integrating these

technologies into supply chains.

For policymakers, our study has important practical ramifications. It also points the way forward for further research. We discovered through a thorough analysis of the literature that global supply chains and company operations rely on developing technology as their mainstay for sustainability. In light of the effective application of those technologies during the pandemic, we advise that proper acquisition, acclimation, and incorporation of industry 4.0 technologies are essential for the future success of supply chain operations. Furthermore, we came to the conclusion that the conventional resource-based view of a firm's competitive edge had almost completely given way to the technologically focused view. To get a competitive edge in the upcoming future, businesses must critically concentrate in these emerging technologies.

Along with them, governments and politicians need to focus on removing the obstacles to supply chain management's adoption of innovative technology. Additionally, we chose papers from conferences and published articles. Additionally, the current research on digital and emerging technologies is not based on any theoretical foundations. The theoretical lens can be applied to future studies on the application of new technologies within the supply chain to support the comprehension and originality of these technologies.

VI. CONCLUSION

A thorough examination of the literature has been done to determine how new technologies were used during the COVID-19 epidemic. We have combed throughout the Google Scholar dataset to discover the numerous articles, whitepapers, and research articles from 2019 through 2021 that have been released in scientific, consensus publications. Compelling evidence of the effective application of new technology in supply chain administration across a diverse range of industries can be uncovered in the literature. We also highlighted the automated systems that supported the distribution network for services and goods during this epidemic. The Internet of things (IoT), artificial intelligence (AI), big data analytics (BDA), robots, drone, and unmanned aerial vehicles (UAVs), as well as 5G technologies, are reported to be among the most widely employed innovations in supply chain operations at current time. We explicitly outline important obstacles to utilising these cutting-edge technology. Finally, we offered conclusions and recommendations for further research.

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