European Economic Letters
ISSN 2323-5233
Vol 13, Issue 5 (2023)
http://eelet.org.uk

Reinventing Supply Chain Management in the Light of Unprecedented Scenario of Covid-19: SLR Based Approach

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Abstract
A coronavirus epidemic exhibits an adverse influence on supply chain management since the pandemic situation affects all manufacturers, retailers, and wholesalers. Covid 19 significantly affects all sectors of the economy. Supply chain and risk management are more important than ever as businesses work to improve their operations and resilience. To solve the pandemic problem, the entire world is currently struggling. As companies try to enhance operations and boost business resilience, the importance of supply chain and risk management is more focussed than ever. Global efforts are being made to find a solution to the pandemic problem. The businesses are in charge of controlling the flow of essential commodities and services. Companies and organisations lack an effective strategy for handling this circumstance. Organizations operate in intricate networks, which makes it challenging for them to manage the supply chain system under the challenging circumstances of COVID19. Significant business and functional interruptions have been experienced by organisations, This have covered anything from minimising the effects of reduced supply to managing disruptions to service providers' operations, as well as undoubtedly overcoming challenges in obtaining their legally binding pledges to clients. This study focuses on the variables that affect the issues of pandemic and offers solutions to resolve them. It also highlights the situations related to endemic outbreaks in terms of their effect on network or transports and nodes of medicine or vaccine vendors through a systematic review of the researches done in relevant field by various researchers.

Keywords: Systematic Literature Review, supply chain, customer relationship, SCM, Disruption, SCM Planning.

Introduction

An organization’s success is based on quality of work inputted all the parties that are related to it in some way or the other. Therefore all the parties entered must be taken into accounts of an organization, such as the supplier's big dealers, traders, retailers for effective execution of supply chain management. Every party whose involvement can aid in the promotion of the administration's market share are a part of Suppply chain Management.

To answer to this ever-increasing complication, confusion, vagueness, and demand for value obtain the core competencies into the supply chains in which they participate. The companies are using effective logistics management system for managing the flow of required goods and services during pandemic.

Supply Chain Management (SCM):

SCM encompasses more than just planning and execution. Instead, a capable and effective SCM necessitates the inclusion of all commercial operations along the supply chain, including those that are connected to both supply and demand of the goods and services.

With produce demands being more modified, reducing product life cycles, and worldwide competition, especially in motorized and electronic trades and also electronic and automatic industry, there is a requirement for an efficient administration of the supply chains. Associations are facing huge business and practical interferences, which includes everything from right from freeing the effects from the diminished supply to administering unsettling influences to composed activities of the suppliers.

Supply Chain Orientation (SCO) is a firm approval of a pre-intended value to handle practical actions and flows through a supply chain. It can be done through following elements-

1. **Internal Integration (II),** refers to the coordinated management of a business's internal operational activities, which may be a necessary condition for outward integration. It stands to reason that there will be significant difficulties when attempting to integrate and manage courses with external entities if businesses are unable to manage and engage in their internal actions.
2. **External Integration (EI**) which refers to the integration of actions outside of the company is a precursor of agility. In order to achieve agile competences in the supply chain, the system must also demonstrate its ability to take flexible and lean action. The Supply Chain Flexibility (SCF) concept highlights an organization's capacity to adapt to shifting business conditions.
3. **The Supply Chain Leanness (SCL**) model focuses on building value for the client by gradually eliminating waste from the value stream. Doing more with less is at the heart of lean. These agile supply chain capabilities will attempt to be supported by these lean and flexible capabilities.
4. **4. Supply chain agility (SCA)** is the ability to produce a variety of low-cost, high-quality goods with incredibly short lead times in various batch sizes that are tailored to specific customer requirements**.**

It is now gradually recognized that these interconnected and inter-reliant supply chains must consciously incorporate integrative behaviors with internal and external partners, flexibility, leanness, and agility practices to obtain the core competencies in the supply chains in which they participate.

To précis the above, it is suggested that the structural features of culture and SCO will affect the observes shown by an organization. These organizational performs, internal and external integration, flexible, lean and agile supply chain will then have an impression on supply chain routine and the profits that firms can acquire through these practices since some deterring matters might be a rise in between. Businesses not have efficient strategies to deal with situation.

Global supply chains have faced tremendous challenges as a wake of the epidemic. Production is hampered by the numerous land closures that continue to slow down or momentarily block the flow of raw materials and completed items. The outbreak did not, however, bring any fresh supply chain issues. Also, it has discovered previously unidentified hazards. Of course, COVID-19 has caused employee shortages and losses in many firms. Yet, in general, it has exacerbated and accentuated already existing supply chain issues. Sectors including service delivery and logistics were severely impacted since businesses said the outbreak had an impact on their staff. Industries with a higher labour demand, businesses are heavily investing in technology to lower workers' exposure to COVID-19. These are but a few instances of the numerous changes that influence the ability to buy items across different industries.

As a result, SCM is not just restricted to operational and logistical tasks. The incorporation of all commercial tasks, including supply and demand-related activities, within and between enterprises in a supply chain is instead necessary for competent and effective SCM. It is thought that supply chain alignment has a significant impact on the levels of internal and external integration demonstrated by a supply chain system, helping it to reach the appropriate levels of incorporation.

Competition in the business atmosphere has lifted from separate firms to their respective supply chains, therefore only an organization with an elastic, lean, and alert supply chain can survive in the operative viable edge.

The corona virus pandemic is having an adverse influence on SCM. This pandemic situation affects

all manufacturers, retailers, and wholesalers. Covid 19 significantly affects all sectors of the economy. The significance of supply chain resilience and risk management is now more important than ever as businesses work to improve operations and business resilience. The pandemic problem is one that the entire world is trying to solve. The businesses are in charge of controlling the flow of essential commodities and services.

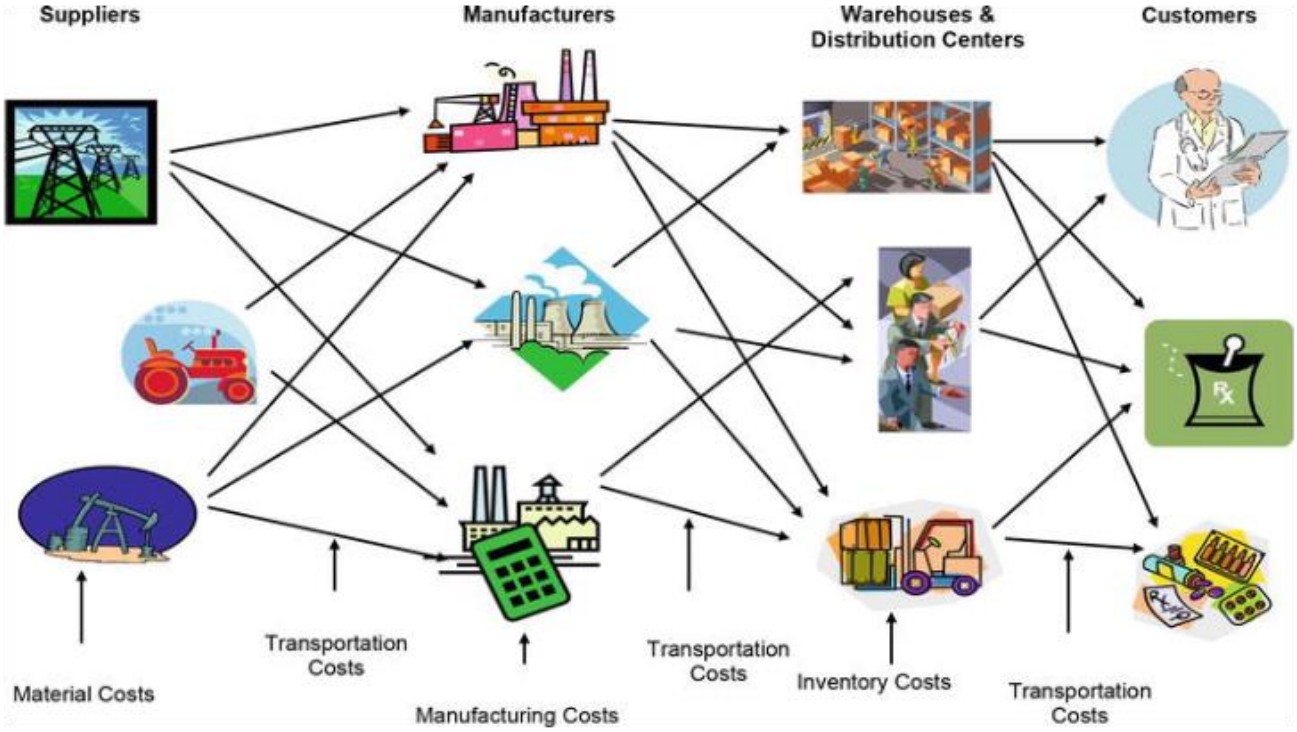

Figure 5.1 A typical supply chain network

To elaborate, it is proposed that SCO and cultural structural characteristics will influence the observations made by an organisation. Since some deterrent factors could arise in between, these organisational performances, internal and external integration, flexible, lean, and agile supply chain will then have an impact on supply chain routine and the profits that businesses can acquire through these practises.

Basics of Supply or Logistics Management

Supply Chain Management "as the deliberate and vital coordination of the customary business capacities inside a specific firm and across organizations inside the production network, with the end goal of working on the drawn-out presentation of the singular firms and the production network in general". This definition comprises all occupational roles, such as logistics, manufacture, buying, selling, finance, research and expansion, predicting, and information technology.

Objectives of the study:

Awareness of significant global chain challenges due to the COVID-19 epidemic.

1. To analyze whether the literature review report about the issues related to disease outbreaks in regards to their effect on logistics and Supply Nodes in distribution.
2. To analyze the issues related to logistics or supply nodes.
3. To find out tools and techniques used to resolve the issues.

Systematic Literature Review:

The SLR is succinctly defined as an effective technique or instrument for testing hypotheses and for determining the immediate and short-term outcomes of ongoing research that are in the early stages. It is also used to evaluate the consistency of earlier investigations. Recently, the SLR has been successfully applied in the area of

supply chain management, demonstrating that the SLR is thought of as a rigorous method for conducting literature reviews. This is because SLR uses a systematic review procedure.

Essentially, the SLR is defined as method or tool for forming conclusions from prior research and assessing ideas. It is also employed to evaluate the consistency of earlier findings. The SLR's systematic approach has lately been successfully utilised in the field of supply chain management, which is compelling evidence that the SLR is regarded as an exacting technique for performing literature reviews.

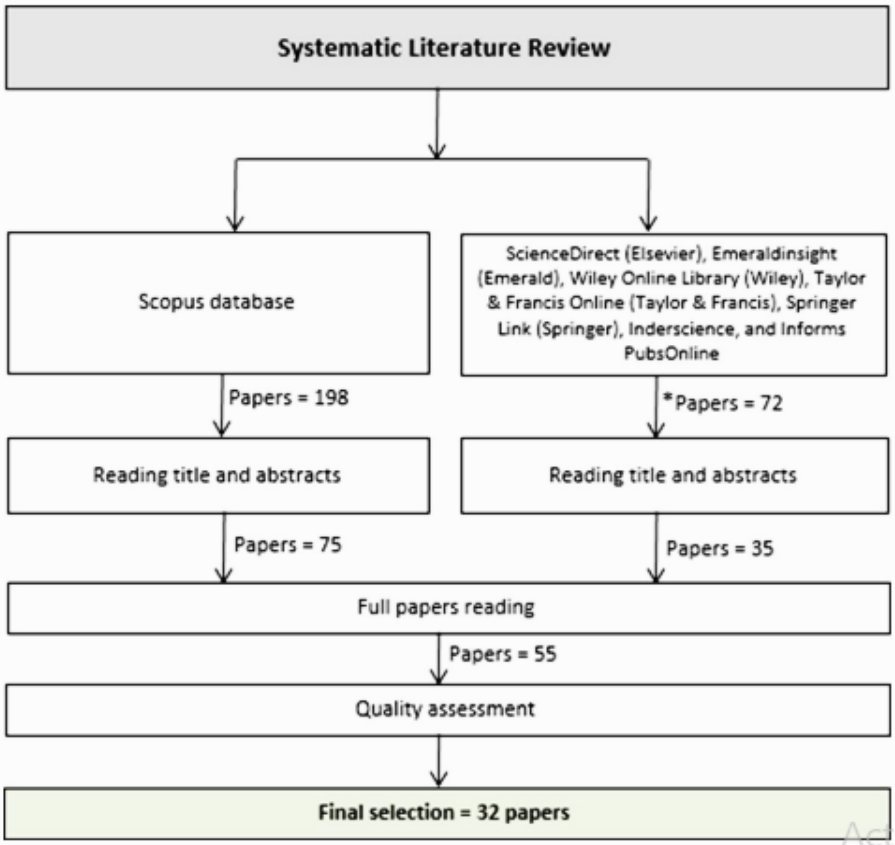

Fig. 1 Research protocol to the SLR

At the first step of our process, we therefore started with defining the scope and restrained the subjects, taking into account their interdisciplinary nature. We created a research procedure to ensure the process was reliable and impartial.

At the second stage, we searched for papers published by various researchers to identify the papers on related topics. The recommendations considered the documents that met the full research procedure criteria of selecting the research paper. To comply with the validity of the various other papers, journals indexed by Scopus only were retained.

The key conclusions from the chosen publications were reported in the third and final stage of the SLR. This revealed a great deal of fundamental knowledge regarding the literature as well as the many papers examined.

Table 1 Research protocol

Research protocol	Details description
Research databases:	Scopus Database, ScienceDirect (Elsevier), Emeraldinsight (Emerald), Wiley Online Library (Wiley), Taylor & Francis Online (Taylor & Francis), Springer Link (Springer), Inderscience, and Informs PubsOnline
Publication type:	Peer-review journals (indexed by Scopus)
Language:	We considered only papers written in English
Date range:	The range period for consideration was 2003–2020 (March 22)
Search fields:	Titles, abstracts, and keywords
Search terms: applied in Titles in Scopus Database and in Titles, Abstracts, and Keywords in the other databases	("outbreak*" OR "pandemic*" OR "epidemic*" OR "disease*" AND "humanitarian operati*" OR "humanitarian relief*" OR "suppl* Chain*" OR "logistic*")
Criteria for inclusion	Papers that presented some outbreak in a logistics/SC context
Criteria for exclusion	Papers that presented outbreak discussion purely without protagonism of the logistics/SC, and review papers
Data extraction	We used an R-tool software Bibliometrix and the qualitative software MAXQDA
Data analysis and synthesis	Supported by the Bibliometrix and MAXQDA, we performed a content analysis approach

1. We noted that our search was precisely designed to highlight of two aspects
   (i) focus on marketable Supply Chains and
   (ii) focus on the evident and tangible logistics, production and SC contexts which means it should be evident from the paper that it explicitly deals with an epidemic and SC issues.
2. In this query the search for the papers considered title, abstract and keywords therefore we preselected only the first potential papers that met the Point No.1. Besides, forthcoming papers were also considered.

Findings from the literature review:

1. Basic details from the papers chosen: We employed Bibliometrix, an R-tool software programme, as mentioned in the part above. The open-source Bibliometrix application provides the ability to import data from a variety of sources, including Clarivate Analytics' Web of Science and Scopus. It has been employed well in a number of literature review efforts, supporting the robustness and dependability of science mapping. As mentioned in the part above, we employed Bibliometrix, an R-tool software programme. The Bibliometrix is an open-source programme with the ability to import data from a variety of sources, including Scopus and Clarivate Analytics' Web of Science, among others. It has been successfully applied in several literature review works, supporting the robustness and dependability of science mapping.
2. The first paper that adhered to researcher study strategy was published in 2008, even though our initial searches were conducted using the year 2011. With 11-year time frame, only 32 research papers were finally chosen keeping in mind all the inclusion requirements of the protocol being followed. The Scopus Database Elsevier, Emerald, Wiley Online Library, Taylor & Francis Online , Springer, Inderscience, and Informs Publications Online are among the research databases that are described in detail in the research protocol.
3. Publication type was of journals Indexed by Scopus (peer-reviewed)
4. Language taken into consideration for documents was written English. The timeframe under consideration was from 2011 to 2022. (March 22)
5. Keyword, title, and abstract search fields Applied search phrases include "outbreak*", "pandemic*", "epidemic*", "disease*", "humanitarian operations*", "humanitarian relief*", "supply Chain*", "logistic*" in the Scopus Database titles.
6. Standard for inclusion of papers are those that described an outbreak in a logistics- or SC-related situation requisites. Standard for exclusion of papers were those discussing the pandemic solely without disapproving the

logistics/SC, as well as review papers. A content analysis approach was taken to analyze data and synthesize them with the help of bibliometrix and MAXQDA.

Review of Literature:

Guan, D., Wang, D., Hallegatte, S., 2020, in their study concluded that The number of countries imposing restrictions is typically a factor in the supply chain losses associated with initial COVID-19 lockdowns, and these losses are more sensitive to the lockdown's duration than its severity. Nonetheless, a longer regulation that can cure the disease imposes a less severe misfortune than shorter ones. General misfortunes can be limited by earlier, stricter, and more limited lockdowns.

Z. Xu, A. Elomri, et.al (2020). The analysis revealed that the COVID-19 pandemic has significantly disrupted the operations of most GSCs, including the pharmaceutical, food, electronics, and automotive industries. In contrast to previous severe disruptions, COVID-19 adversely affected GSCs at every stage of their development, causing significant turbulences in the assembly, handling, transport, and coordinated operations as well as considerable changes in popular culture. According to the analysis, increasing the production network's adaptability is the primary factor in reducing vulnerability during difficult times. Furthermore, the analysis showed that the post-COVID-19 GSCs will often be more constrained due to revised procedures that place a greater emphasis on migrations and back-shoring.

Queiroz, M.M., Ivanov, D., Dolgui, A. et al. (2020). Proposed that during the COVID-19 pandemic, a system for activities and production network that crossed six viewpoints—namely, transformation, digitization, readiness, recovery, far-reaching influence, and manageability—was offered to the board. Their focus also emphasises the necessity for and provides guidance for the writing on the consequences of plague flare-ups on SCs, laying out an examination strategy for academics and specialists working on this emerging study stream.

Anu Sharma, Pankaj Gupta, Rishabh Jha (2020). We ought to pursue advancing Indian business sectors and revise arrangements to assist the nearby labor force with reducing the interdependencies of imports on different nations. This will help in reinforcing the operations production network in India. This will set out business open doors and increment the GDP development.

Barbara Flynn,David Cantor, et.al(2021). The COVID-19 pandemic has brought the significance of store network the executives to the very front of the public's cognizance such that no measure of scholastic examination at any point could. Confronted with deficiencies of purchaser items, for example, bathroom tissue and different sorts of food, and basic clinical supplies, for example, PPE, hand sanitizer, ventilators, and certain prescriptions, individuals have consolidated "production network" into their ordinary jargon, holding discussions about both how store network the board ought to change and celebrating momentous quick inventory network reconfigurations and victories. For scholarly store network the executive’s specialists, this is an astonishing time, with endless new experiences, open doors, and examination questions.

Serpil Aday, Mehmet SeckinAday (2020) concluded that every country should be aware of how terrible the situation is and that, depending on how the epidemic is spreading, activities should be adjusted or slowed down. Also, the inventory network needs to be sufficiently adaptive to address the challenges in the food production network.

Yakun Huang et.al (2021) examined how the COVID-19 pandemic had a negative impact on the Canadian food supply chains by using the lobster industry in Nova Scotia as a case study. Results for four aspects of store network execution—creation stock elements, client execution, monetary execution, and lead-time execution—are obtained using the product AnyLogistix.

Ghazi M. Magableh (2021) The study examines the causes of interruptions, associated challenges, and the pattern of the pandemic to learn how the COVID-19 pandemic affected SCs. The SC stages, stages, and COVID-19 signs were studied. In addition, comprehensive understanding, benchmarking, and a different business environment are necessary for the outcomes, outstanding opportunities, and improvements to study the connections between numerous components.

Takaki Nagao et.al (2021)This Study decisively breaks down the monetary and primary impacts of disturbance on a worldwide inventory network with customs obligation and the transoceanic organization (TPP) understanding. Providers ought to be exchanged relying upon the size of interruption; when numerous far-off

providers should be exchanged, the industrial facility ought to be moved to the nation where these providers are found.

Priyabrata Chowdhury 2021, revealed that there is a lack of observationally planned and conceptually founded studies in the area, which limits the generalizability of the discoveries made so far. The current focus effectively examines the research that has been done on the COVID-19 pandemic in the inventory network disciplines.

Olivares-Aguila & Vital-Soto, A. (2021). In this paper, the meanings of significant disturbances and the techniques to adapt to them are examined. Furthermore, a technique to foster inventory network flexibility guides is conceptualized by investigating existing writing to help plan for startling occasions. The production of guides requires an expectant attitude from all individuals along with the store network. The guide's improvement lays out the establishments for a comprehensive store network interruption planning and examination.

Ferreira, C., Cardoso, C (2021). this study intends to look at the inventory network during the COVID-19 pandemic in little and medium-sized food organizations in the focal area of Portugal, distinguishing possible issues and bringing up the separate arrangements. It was tracked down that little and medium-sized undertakings (SMEs) don't have an arranged store network and that by and large, these organizations have an insignificant financial plan, which requires a consistent quest for new providers that address a decrease in costs. Also, a large portion of the organizations studied confronted startling difficulties, like an absence of elective providers.

Van Hoek, R. (2021) This article presents the first comprehensive observational analysis of the pandemic's main year and provides significant information from the pandemic's beginning and its first year. It was discovered that, despite the risky approaches used by the executives, taking social perspectives into account is essential while looking for a solution to reduce risk.

Udofia, E.E., Adejare, B.O., et.al (2021), This study intends to examine how the (Covid-19) pandemic will affect large businesses in terms of supply disruption, utility, customer loyalty, and firm performance.

Word Tree Map dynamics:

The Word Tree Map dynamics shown by this mapping technique are based on unique words that states that these terms were derived from the references of databases provided by the authors (32 papers). Also, the size of the rectangles is determined by the frequency of the phrases, and the colours highlight the connection between the keywords. Word parts like "epidemic outbreak," "humanitarian logistics," "influenza," "optimization," "resource allocation," and "supply chain" all play distinct roles in this context. We have a variety of related terms in the other rectangles (lower sizes), as well as newly developing subjects that are already being highlighted, like "COVID 19," "coronavirus," "decentralised logistics systems," "digital twin," and "data-driven models."

We have a variety of comparable words in the other rectangles (lower sizes). Words and word groups like "COVID-19", "coronavirus", "decentralised logistics systems", "digital twin", and "data-driven models" might be used to reveal more similar emerging topics. Due to the term dynamics, we can tell that "emergency response" is a topic that has been thoroughly researched. Consequently, it is evident that associated terms are related to our research questions and objectives.

Multiple Correspondence Analysis:

The multiple correspondence analysis (MCA) method to highlight the conceptual structure map. Data reduction method also called the MCA creates a map based on concept of science and structure.

The better these terms are depicted on the map, the more similar and close together they are. To respond to epidemic outbreaks effectively, a concentration of optimization approaches is necessary in this concept.

A substantial concentration of "pandemic response management," "emergency OSCM," "public health emergencies," "healthcare management," "resource allocation," and "vaccine distribution," among other things, is indicative of the efforts associated to epidemic response. Moreover, concentrations in "network modelling," "transportation," "demand forecast," "data-driven models," and "options contract" are also interesting. Last but not least, blue words reflect a new, difficult, and undiscovered COVID-19 pandemic-related problem (Ivanov 2020a, b). In this landscape, significant words appear in this area like “resilience”, “digital twin”, “risk management”, and “pandemic plan”.

Using content analysis to classify the chosen papers revealed fascinating results. First, we discovered that the bulk of publications (43.75%) were devoted specifically to the widespread infection of flu, with studies without a specific focus on an epidemic or outbreak but with some insights into controlling epidemics or outbreaks coming in second (18.75%). Then, COVID-19 (9.38%), Malaria, and Smallpox followed by Cholera and Ebola (12.5%), with one publication devoted to these epidemics, were in third and fourth place.. Also, the selected studies primarily offered resource allocation optimization methods such as medicines availability and distribution of vaccines, contracts of vaccine procurements, number of patients and assurance of vaccines. Yet, other researchers used these pandemic outbreaks as a springboard for subsequent research.

Considering that the majority of studies were about optimization models, it should be noted that they used various mathematical models and techniques as their "Main Method/Theoretical Approach" as described by the authors. As examples, they included case study and simulation, case study and SIR model, case study and stochastic programming/Markov. The following table depicts the distribution of publications by kind of epidemic outbreak.

Epidemic/outbreak reported	Number of papers	Percentage
Influenza	14	43.75
Epidemic/outbreak control	6	18.75
Cholera	4	12.50
Ebola	3	9.38
Coronavirus (COVID-19)	3	9.38
Malaria	1	3.13
Smallpox	1	3.13
Total	32	100.00

Analysis of Papers by Content Analysis Approach

Finally, a number of intriguing points were brought up in relation to the "Supply chain/Logistics/Operations implications". Resource management is a major concern in the situation where widespread of flu has taken place. Therefore we can say that logistics and Supply Chains are crucial for coordinating and integrating the various members' in operations. These members are manufacturers, transportation companies, hospitals, and governments. The study conducted by Paul and Venkateshwara emphasized the importance of the Supply chain members to reduce disease outbreaks. Therefore sufficient quantities of vaccines and supportive materials should be ensured by the members of supply Chain. This will influence how long an epidemic will last.

Research pointers for operations and supply chain management during Pandemic:

This part of the study deals with the main theoretic and supervisory implications of our study with the objective to come to the conclusion towards the research pointers for Supply Chain System at the times of COVID-19 pandemic.

1. It summarizes open research issues in response to the observed gaps in the literature and offers significant recommendations to academics and practitioners.
2. The gaps in the literature were divided into three clusters: the modelling group, the organisational group, and the technological group.
3. The modelling cluster includes approaches like simulation technique, optimization techniques, and other Operational Research techniques.
4. The technology grouping is based on digital technologies, additive manufacturing, and data analytics.

European Economic Letters
ISSN 2323-5233
Vol 13, Issue 5 (2023)
http://eelet.org.uk

5. To facilitate the analysis of the complex research topics, we emphasized some postulates and accepted theories of operations and other theories at the conclusion. In this process appropriate OR/OM approaches are used through mathematical optimization, network and complexity theories.

Factors Affecting Supply Chain Performance:

There are several factors that influence the performance of the supply chain. Among the crucial factors are the supply chain's organisational structure, inventory management practises, information sharing, customer demand, forecasting methods, lead times, and length of the review period. These elements are explained below:

Category	Components
Systems	Structures, resources, capacities, interactions (responses, coordination)
Process	Distribution, transportation, procurement, production, resources allocation, flexibility
Control	Inventory control, sourcing control, manufacturing control, resilience as KPI in optimization models
Recovery	Manufacturing production, human labor, transportation network, suppliers, production flexibility

Factors for supply chain resilience to Epidemic outbreak

a. Supply chain structure:

The quantity of arrangements, the quantity of steps, and the structure of the material and data stream add to the trouble of the chain. The SC designs& structure can be isolated into dyadic, sequential or serialconvergent, divergent, conjoined, and network.

- Dyadic: The dyadic design contains two occupational entities (for example buyer and vender)
- Sequential or serial: Cascading of various dyadic structures structure a consecutive or sequential SC structure, and by and large, it includes retailers, merchants, wholesalers, and maker entities or stages.
- Convergent: Convergent structures are assembly-type designs where every hub or node in the chain has one successor or replacement under normal circumstances, but may have predecessors in any count or number.
- Divergent: Each hub or the node in a divergent has all things considered under one predecessor, yet quite a few successors. A divergent structure can be identified in a SC in which one provider permits stock to its various downstream entities. Mineral managing or dealingout administrations will quite often have various designs or the structures.
- Conjoined: It is a combination of convergent and divergent SC structures and is knowledgeable about online retailing.

b. Inventory Control Policy

Inventory control involves ensuring that the company has enough inventory to avoid stock-outs, stop decline, and provide accurate accounting. The costs incurred and the costs avoided by keeping the material in stock must be financially balanced. Every item that is kept in inventory requires the completion of two fundamental options. Both the date and the amount of the item's supply are factors in these selections. In order to regulate stock, decisions must be made on "when" and "how much" to order.

c. Customer demand:

One of the elements influencing the tone of the SC presentation is the consumer demand approach. The majority of the time in business, demand is unpredictable and limitless. The SC member directs a more flexible order pattern to the top-level contact member when client demand changes excitedly, which may improve the order adjustment with the SC. Instability in consumer demand contributes to high size and stock costs for the manufacturer.

Diverse demand designs such as persistent, seasonal, seasonal with the cumulative trend, seasonal with reducing trend are made up of a common demand maker for diverse values of the several parameters such as base, slope, season and noise encourage the service level and total cost of Supply

Chain. The secure stock essential for the case of non-stationary demand is much superior to for stationary demand of the system. The improved visibility of stock and consumer demand design for the persons reduces SC stock costs by allowing the people to rising better-quality and efficient procedures plans at every level in the SC. The stocks-related profits are mainly sensitive to demand changeability, the service level on condition by the dealer, and the range to which the demand and production cycles are out of point.

d. **Forecasting method:**

The use of demand forecasting is one of the primary causes of the bullwhip effect in the supply chain management. The participants in a supply chain want to project their future demand, yet it is risky to predict demand based on current events. Due to this mistake, the order modification will be strengthened and no real position about the amount need will be given. Prediction accuracy has a significant impact on supply chain performance indicators like inventory cost, backorder cost, lost sales, and satisfaction of the customers.

e. Lead time:

The performance of SC may also be impacted by the renewal of boundaries like lead time and review period. The amount of time between when an order is received and when it is dispersed for delivery is known as lead time, which is the product of the delivery lead time and the order lead time. The prolonged lead time is one of the factors contributing to the bullwhip effect. Order variation is greater below extended lead times, which could be indicative of a bullwhip effect. At four consecutive SC levels where players adhere to a stringent lead time order policy with a zero safety list and operate under a non-commercial outlet, investigate the impact of BWE lead time flexibility on SC. A simulation model was created to examine the impact of lead time variations and interpretation on the four-phase SC series.

f. R**eview period length:**

The span of time between each examination of the inventory status used to determine whether or not to place a new order is known as a review period. The best option for the assessment time is determined by the nature of the product's demand. Shorter review intervals are preferred for items with highly uncertain demand in order to avoid lengthy stock-outs, according to research that looked at how a two-stage supply chain performed under various evaluation period lengths with missing sales circumstances. Additionally, protracted evaluation times for fast-moving consumer products with high carrying or cheap cost should be avoided. According to a study for a sequential three-stage SC with no predetermined evaluation duration, a shorter evaluation period is ideal for lowering the order.

Future Research & Limitations

The chapter indicate to provide a valuable understanding of the present condition of this field of research. The current study also recommends numerous potential directions for future research, which could lead to more research in this vital topic in other nations. More qualitative research is needed to delve deeper into the various supply chain issues that necessitate diverse risk assessments and risk assessment strategies (avoidance, transference, acceptance, exploitation, sharing, enhancement, mitigation, etc.). This research, we think, will be useful to academics and decision-makers since new trends and standards are emerging in SCRM, which will likely lead to future research and different approaches of business implementation There is definitely room for future researchers in the SCRM discipline. Few aspects, like collecting data for all the countries, dividing them into different strata of developing, developed and underdeveloped countries can be done in future research. We have considered the impact of the pandemic on SCM in study, which in turn gives ample scope of researching on the other dependent variables of the same. Recommendations for the future supply chain structure strategy itself, may be the preferred topic for future research. The study was limited to the second data collected.

Conclusion

In this study, a systematic examination of the effects of epidemic outbreaks supported by a structured literature review gave the following results.

1. The study revealed that the interaction between SCs and epidemic outbreaks has been mostly focused on resource allocation issues and the distribution of medical supplies, employing optimisation techniques and

epidemic models.

2. In the conclusion, this study gave academics and industry professionals involved in learning more about the effects of infection outbreaks an informative and difficult research topic. In this line, we found significant gaps in the body of literature and areas for unanswered questions, which we grouped into three clusters (modeling, technology, and organizational).
3. Our study has some limitations, despite the creation of new categories and classifications as well as the articulation of new theoretical tensions. It could be difficult to explore additional SC-related issues because of the keyword search query performed on the databases.
4. We only found 35 documents that totally matched with our research protocol. Furthermore, there isn't much room for comparative analysis because the COVID-19 effects on SCs are still being felt and seem to be becoming worse.

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