

A Literature Review on the Changes Made in the Supply Chain due to Covid-19

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Abstract

La Londe and Masters proposed that a supply chain is a set of firms that pass materials forward. (Mentzer, John T., et al. "Defining supply chain management." *Journal of Business logistics* 22.2 (2001): 1-25.). There was a profound change in the supply chain during the pandemic. The sudden demand of the goods during the pandemic completely changed the supply chain. There was a realization that the old methods like Just-In-Time, Lean Management, etc. were not working at all. There was a panic buying of goods going on in the globe and the organizations were unable to meet them. Due to the disruptions, many organizations were unable to survive in the sector and were forced to close. It was realized that there should be changes made in the sector of the supply chain.

This review of the literature is the outcome of various research papers which find out what changes were made in the supply chain during and after the pandemic. There were times when the review's dependability was a problem. The reviews revealed the need for resilience in the organizations and how supply chain needs to be digitalized and start using agile contracts. The review concludes by realizing the need for making changes in the supply chain for sustainability of it in the future.

Keywords: Review, supply chain, changes in supply chain, Covid 19

Introduction

Supply Chain being going on for years, is the oldest and crucial division of an organization. Mostly, their division is dependent on Just-In-Time management (method in which goods are received from suppliers only as they are needed), and very few policies like lean management, economic order quantity. However, a sudden change due to the occurrence of the pandemic brought out sudden changes; disruption of supply chains which involved certain demand of goods for which organizations were unable to meet. Besides shipments of the commodities were found out delayed, therefore getting cancelled. This disruption brought out a concern for the organization as its grievances would make organization unaccountable to hold them.

Significance of the Study

Supply Chain being a broad sector has transformed itself with the introduction of technologies and other significant changes. This research paper's objective is to refute the specific impacts that the Covid brought to the global supply chain and variations in the organization to ensure sustainability in the Supply Chain sector.

Methodology

We are taking purely secondary data. In this literature review, we have taken research papers from different journals. Most of the journal types are operation and product management journals, management and business journals and economic journals. We took these thirty articles as these explain the changes that were made in the supply chain due to COVID-19.

The research papers were searched using special keywords: Supply Chain, COVID-19, Flexibility, Disruption and Sustainable.

These keywords captured the main elements of our objective of the study as well as our research topic.

Articles found using these keywords were evaluated only if they presented all required information.

Objectives of the study

1. Inspection of the changes made in the supply chain due to COVID-19 and the development of resilient strategies across the supply chain.
2. Surveying the application of sustainable practices in response to COVID-19.

Review of various researchers' contribution:

1. **Supply chain sustainability: learning from the COVID-19 pandemic Joseph Sarkis, 2020.**

The research paper shows how the Covid-19 pandemic has affected the supply chain management of organizations and how much it would affect sustainability. The research shows that the supply chain of different organizations has turned into chaos during the pandemic and resonance effects all over the globe and it even shocked the supply chains. It was found in the study that to be in the same position as before, the supply chain must focus on internalized decision-making and must use IoT for the easy transfer of information.

2. **Supply Chains and the COVID-19 Pandemic: A Comprehensive Framework, GHAZI M. MAGABLEH ,2021.**

As evidenced by the research paper, the Covid-19 pandemic has impacted the supply chain on an international level. During the pandemic, 75% organisations complained about their disruptions in supply chain. Global Supply Chains in Europe, the USA and China were heavily affected in their supply chain regions. Due to the bulk buying of people during the Covid, there was an immense demand for food and medical supplies, which was the main cause of price fluctuation. Companies are putting up with the new trends in the supply chain and only those companies doing well in the supply chain are taking actions to mitigate the risks. To survive the impact of covid-19 on the supply chain, areas of improvement were introduced along with global value chains.

3. **Food supply chain resilience and the COVID-19 pandemic: What have we learned? Jill E. Hobbs, 2021.**

The influence of Covid-19 on the food supply chain is the focus of the research paper. The research showed that the supply chain disruptions were processed meat, fruit, and vegetables.

This was caused by the shift from food service to food retail which caused the reluctance of different countries to buy processed meat and fruit and vegetables.

4. Supply chain disruptions in the context of early stages of the global COVID-19 outbreak, Lenka Veselovská, : 6th of July 2020

The study focuses on the initial response of Central European Companies during the early stages of the outbreaks. The survey collected data from various companies to gauge how the supply chain took the pandemic's early stages. It founded that some companies adjusted their operating volumes and formed new supply chain partnerships. Some disruptions even had a positive impact on the revenues. Overall Central European Supply Chain showed resilience, with most companies overcoming the challenges like the long-lasting effect on food supply chains, such as the growth of online grocery delivery and consumer preference of local food.

5. The future of Global Supply Chains in a post-COVID-19 World, 2022, Rajat Panwar, Jonatan Pinske and Valentina De Marchi

In the research paper, it is addressed how Covid-19 changed enterprises, especially global supply chains. Just-in-time delivery, and lean manufacturing are some practices that have led to an efficient supply chain, yet the disturbance in supply chain has led to supply shortages for products like electronics, clothes, and toys due to increased demand during lockdown. Supply chain disruptions have been faced by 94% of the Fortune 1000 companies, with three-fourth reporting negative impacts such as consumption shocks, supply shortages, and logistical challenges. Companies are expected to focus on both surveillance and collaborations with suppliers, by developing visibility into suppliers' inventories. It is envisioned that there will be investments made in "micro supply-chains" with flexible contracts and manufacturing closer to the point of sale. Strengthening demand forecasting with help of the machine learning will also play a crucial in handling the disruptions.

6. Impact of COVID-19 on food supply chain, 2020, Serpil Aday and Mehmet Seckin Aday.

The aim of this article is to provide information on the effect of covid-19 outbreak on the food sector industry and the measures taken to minimize these effects. Covid-19 had a significant impact on the agriculture and food sector, affecting production, distribution and demand. Movement restrictions, changes in consumer demand, and trade policies caused problems. The food industry being essential for the economy faced income drops and had to make tough decisions like temporary shutdowns. There were 4 major issues in the food industry and supply chain. Firstly, demand for functional food with bioactive ingredients increased as people focused on healthy diets. Secondly, food safety gained attention to prevent virus transmission. Thirdly, food security concerns arose due to lockdown restrictions. Lastly, sustainability problems emerged. Measures were taken to minimize the problems, and valuable bioactive components from food waste can be used in food production. Techniques like extractions and isolation are used. Additional collection and processing centres are needed. Robot systems ensure food safety. Decentralization of food manufacturers can reduce risks associated with centralization.

7. Supply chain management during and post-COVID-19 pandemic: Mitigation strategies and practical lessons learned, 2022, Alok Raj, Abheek Anjan Mukherjee, Ana Beatriz Lopes de Sousa Jabbour, Samir K. Srivastava.

The research analyses how much the supply chain has changed since Covid-19 hit us. According to the paper, the supply chain during the covid times was changed in three ways: on the side of supply, on the side of demand and on the side of logistics. Before COVID, firms used to use just-in-time policy but after the pandemic, everything changed. There was a gap in supply and demand as there was either too much demand for goods or too little demand for goods. Moreover, there was an issue of delays in shipments which were usually postponed. Due to this, many firms changed their supply chains from global to local level, changed their inventory strategies and became more resilient. The research suggested ways to improve the supply chain in all three categories, it suggested to change focus more on risk management and making proper decisions in the case of both short-term and long-term deliveries.

8. Strengthening supply chain resilience during covid-19: study of JD.COM

The study examines the impact of the pandemic on the supply chain resilience, focusing on the retailing sector in China and the response of JD.com. During pandemic, there was surge in demand for medical supplies and food, while demand for the other products decreased. The outbreak disrupted supply, demand, and logistics infrastructure. JD. Com demonstrated resilience in its supply chain due to its integrated structure, collaboration, information sharing and agility. The company has developed an intelligent platform for prediction, replenishment and warehouse optimization.

9. Impact of COVID-19 in the food supply chain: Disruptions and recovery strategy, 2021, Abhijit Barman, Rubi Das, Pijus Kanti De.

The subject matter of this research is how Covid affected the food supply chain. It has been said in the research paper that there were immense changes in both food demand and supply and moreover, it even made a high risk of food insecurity among people. In European countries, there was a 76% increase in the demand for bread and a 52% hike in the demand for vegetables in the first week of COVID-19 only. Not only this, but the paper also mentioned that there was a higher demand for alcohol in the pandemic. Besides all this, it created suggested ways like better storage of goods and planning not only for just-in-time inventory.

10. Supply chain recovery challenges in the wake of COVID-19 pandemic, 2021, Sanjoy Kumar Paul, Priyabrata Chowdhury, Md. Abdul Moktadir, Kwok Hung Lau.

This research has brought light to the vulnerabilities of global supply chains, including the ready-made garment industry in Bangladesh due to the pandemic. The RMG industry plays a crucial role in the country's economy and has experienced a decline in export growth and an increase in cancelled orders. The impacts can be categorized into three phases: material crisis, delayed payment and order cancellation. To address these challenges, it is important to understand the cause-effect relationship and develop effective recovery strategies. Identifying specific challenges faced by the supply chain is the first step towards designing a comprehensive recovery plan.

11. Supply chain resilience during the COVID-19 pandemic, 2022, Dilek Ozdemir, Mahak Sharma, Amandeep Dhir, Tugrul Daim.

The research examines the effect of Covid-19's impact on the UK market for perishable items and its supply chain. It was explained how the whole system of supply chain was disrupted

during COVID-19. It was suggested that organizations must be resilient to survive the post-covid era. To be resilient, it was suggested that organizations be innovative flexible and open to changes. Moreover. It was explained how the size of the organization would affect the risks of the organization, the bigger the organization, the bigger the risks. It was even suggested that organizations should maintain a healthy relationship with their distributors too.

12. The Covid-19 pandemic as a window of opportunity for more sustainable and circular supply chains, 2023, Ariana Alva Ferrari, Kristina Bogner, Veronica Palacio, Diego Crisostomo, Nadja Seeber, Bernd Ebersberger.

The research discusses current and future studies on seizing opportunities through crises and taking the steps to reduce the supply chain vulnerabilities. The weaknesses in the global supply chain include resilience, which refers to the ability to withstand, adapt, and recover from disruptions while meeting customers' demands and maintaining performance. Researchers emphasise the importance of not returning to normal and instead advocating for sustainable transitions in production and consumption patterns. Implementing sustainability standards and targets throughout the entire supply chain, from sourcing to delivery, can create opportunities for partnerships, enhance productivity, reduce risk etc. Experts highlight the ongoing shift towards reducing greenhouse gas emissions, divesting from fossil fuels and promoting resilient solutions. This ultimately enhances supply chain resiliency, circularity and sustainability

13. Towards supply chain viability theory: from lesson learned through Covid-19 pandemic to viable ecosystems, 2023, Dmitry Ivanov, Alexandre Dolgui ,Jennifer V. Blackhurst &Tsan-Ming Choi.

This research paper talks about how COVID-19 has triggered new research on supply chain resilience including viability. Viability focuses on the survival of supply chains and ecosystems during short-term and long-term crises. The research paper says that the supply chain needs to focus on survivability or viability to prevent collapses and ensure the provision of goods and services. The ripple effect of disruptions can lead to a shortage economy. Existing supply chain design may not be able to handle the “new normal “without constant modifications and adaptations, resulting in time delays, coordination efforts and shortages. Creating adaptable and changeable networks is crucial for achieving supply chain viability. Supply chains are also transforming into technology-driven digital ecosystems where different industries interact and share common suppliers, manufacturers and warehouses. The valuable supply chain model can assist firms in making decisions on recovering and rebuilding supply chains after global, long-term crises.

14. Covid-19 Supply Chain Disruptions, 2020, Matthias Meier, Eugenio Pinto.

Disruption of the international supply chain is the focus of this research paper. There was an immense decline in employment, production, imports and exports in the highly exposed sectors. Further in the paper, it shows us how the United States supply chain suffered greatly during COVID-19 as they were getting a lot of exports from China. There were delays in getting the exports, moreover, there was a disruption in the prices of the goods, and due to fear of buying, there was even more disruption in the demand and supply of goods.

15. COVID-19 and Supply Chain Management: A Review with Bibliometric, 2022,

Kedwadee Sombultawee, Pattama Lenuwat, Natdanai Aleenajitpong, Sakun Boon-itt.

The research highlighted the significant negative impact of the pandemic on the supply chain. Lockdown and remote working disrupted the flow of materials and products, leading to capacity storage and losses. To enhance supply chain resilience and viability, firms should invest in technology for better visibility, flexibility and decision-making. It is crucial to take pandemic risks seriously and plan for future disruption. The study emphasizes the need for more resilient supply chains that can effectively address and mitigate the impact of global crises like COVID-19.

16. COVID- 19: outcomes for Global Supply Chains, 2020, Luis Miguel, Américo Lopes AZEVEDO.

The impact of Covid-19 on all the organizations around the world is the focus of this research paper. It mentions how previously organizations would use mostly just-in-time methods in supply chains and how that affected them through low sales and delayed shipments. It was mentioned in the paper that only those organizations that would be successful in their supply chain after Covid who would be resilient and would make new strategies according to the changes in the supply chain world.

17. Food supply chains during the COVID-19 pandemic, 2020, Jill E. Hobbs.

The research paper is about how the food supply chain in Canada has been affected by Covid-19. There was an abrupt change in both demand and supply in the food supply chain sector. Due to panic buying, there was a sudden increase in the demand for food, and it also disrupted the supply of the goods as there were border restrictions and delays in the shipments. Since the restaurants were closed, people shifted more towards food retail than the food sector which was another reason why there was an abrupt change in demand. It mentions how organizations should have a strategic solution for both short term and long-term shipments.

18. Developing a framework for enhancing survivability of sustainable supply chains during and post-COVID-19 pandemic, 2020, Manu Sharma, Sunil Luthra, Sudhanshu Joshi, Anil Kumard.

The research paper is focused on how the global supply chain has changed and how we can make it sustainable after the Covid era. The Global Supply Chain before the Covid was mainly focused on the Just-in-Time method which instantly failed in Covid. Due to this, there were delays in shipments, unable to meet the demand and so much more. The paper explained how organizations should make their supply chain resilient and adaptive to change. FMCGs should be more focused on factors such as demand forecasting, real-time collaboration, and collaboration. Moreover, it explained how contactless deliveries an effective change in global supply chains is.

19. Heading for Tomorrow: Resilience Strategies for Post-COVID-19 Grocery Supply Chains, 2022, by Lorenzo Bruno Prataviera, Alessandro Creazza, Marco Melacini. Fabrizio Dallari.

This research examined the impacts of a pandemic on the supply chain tiers and the importance of managing risks for the continuity of the business. Supply chain resilience is crucial for recovering and improving communication about risks and resilience strategies. The researcher focuses on the manufacturers in the Italian grocery supply chain and utilized a survey instrument. The study highlights the significant uncertainty in both the supply as well as the demand. During the pandemic, the Italian grocery supply chain was significantly impacted. Manufacturers in this supply chain were studied and it was found that make-related impacts greatly influenced their prescription and attitude towards future resilience strategies. To address disruption strategies such as introducing extra manpower, activating multiple sourcing of raw material, redesigning logistics network and prioritizing the product range were identified as a priority. One effective strategy to mitigate the disruption is to introduce the inventory buffer and backup sources throughout the supply chain.

20. The future of industry 4.0 and supply chain resilience after the covid-19 pandemic: Empirical evidence from a Delphi study, 2023, Alexander Spieske, Maximilian Gebhardt, Matthias Kopyto, Hendrik Birkel, Evi Hartmann.

The research focuses on how the covid-19 has tested SCRM in many industries Outsourcing and globalization have led to longer, more complex and vulnerable supply chains. Disruptions caused higher costs, sales losses and damaged brands. Many firms have faced challenges like supplier failure, capacity restrictions and demand uncertainties. Company leaders aim to increase resilience in their supply chains to mitigate future disruptions. Health care supply chain have benefited from digital tech enabling effective product allocation and timely delivery. Scholars expect the pandemic and positive experience to drive SCRM digitalization. Experts predict that by 2030 4.0 technologies will benefit supply chain resilience through agility, collaboration and SCRM culture. Remote working and digital capabilities have a positive impact on SCRES.

21. Impacts of covid-19 on US agri-food supply chain business: Regional survey results, Hikaru Hanawa Peterson, Gigi DiGiacomo, Christa D. Court, Michelle Miller, Gustavo Oliveira, Andrew W. Stevens, Li Zhang, Lauri M. Baker, Joseph Nowak, Eyrika Orlando, Bijeta Bijen Saha, 2023.

The covid-19 pandemic caused disruptions in the agri-food supply chain, exposing vulnerabilities particularly in labour supply and food services. However, studies show that the overall North American food systems exhibits resilience and were able to recover relatively quickly. The impact varied across regions and depended on public health measures. Additionally, state-level loan programs and relief packages were introduced to support local, small, and ethnically diverse businesses facing financial hardships. The agri-food systems in Minnesota and Wisconsin are more balanced and resilient compared to those in California and Florida, which prioritize efficiency over resilience resulting in a higher concentration of food systems in processing, wholesale and distribution.

22. Supply chain performance and economic growth: The impact of COVID-19 disruptions, 2021, Rajeev K. Goel, James W. Saunoris, Srishti S. Goel.

The research's purpose is to find the link between the growth in supply chain and the economic growth. The importance of supply chain was immensely increased during the covid times, and it was realized how important it is to have a strong supply chain system. It has been found out that a strong supply chain can lead to a strong economic growth, countries who will not focus

on their supply chain will have low economic growth in the future. It has been seen that a 1% growth in supply chain will result in 1.4% growth in the economic growth of the country.

23. Global supply chains after COVID-19: the end of the road for neoliberal globalisation? 2020, Clinton Free and Angela Hecimovic.

This paper aims to examine the vulnerabilities exposed by COVID-19 in the global supply chain. It explores the drive of these vulnerabilities and how they are influenced by neoliberal globalisation. The outbreak led to a significant decline in industrial production in China, causing a ripple effect worldwide. Global supply Chains have facilitated the shift in manufacturing from the global north to the global south, with developing countries contributing a significant share. Leaders in India and the European Union have emphasized the importance of economic self-reliance and strategic autonomy respectively.

24. Exiting the COVID-19 pandemic: after-shock risks and avoidance of disruption tails in supply chains, 2021, Dmitry Ivanov.

The disruptions of supply chains all over the globe is the focus of this research. Before covid, the supply chains went from insourcing to outsourcing and instead of local production, they went to global production. But this all changed when the covid started. The covid disruption made the organizations realize that there should be some flexibility and innovation in their supply chain and there should be a major need for the supply chain to be resilient.

25. Supply chain disruption during the COVID-19 pandemic: Recognizing potential disruption management strategies, 2022, Javid Moosavi, Amir M. Fathollahi-Fard, Maxim A. Dulebenets.

The research is about how organizations could help in the disruption of supply chain during the pandemic. Multiple sectors in the supply chain were abruptly disrupted due to many factors such as panic buying, switching towards food retail to food service and so much more. To help the organizations with this disruption, it was suggested to keep resilience and sustainability as their focus areas and to be flexible with their supply chains.

26. Global supply chain in pandemic, 2021, Barthélémy Bonadio, Zhen Huo, Andrei Levchenko, Nitya Pandalai-Nayar

The study found that global supply chain has a significant impact on the economic contraction during the covid-19 pandemic. Renationalizing supply chain may not make countries more resilient to labour supply shocks. Reliance on domestic inputs would increase and if those inputs are also subject to lockdowns, it wouldn't mitigate the contraction. The future may see some renationalization of supply chain, but it is important to consider each country's specific lockdown policies.

27. How COVID-19 vaccine supply chains emerged in the midst of a pandemic , 2021, Chad P. Bown, Thomas J. Bollyky.

The research paper examines the vaccine production and distribution that was done during COVID-19. It was seen how multiple organizations, whether public or private came up with strategies for the distribution of COVID-19 vaccines when COVID was at its peak. It was seen

how the United States prioritised the investment of risk supply chains as the best decision possible.

28. Conversion strategy builds supply chain resilience during the COVID-19 pandemic: A typology and research directions, 2023, Masahiko Haraguchi, Thomas Neise, Wenyuan She, Makato Taniguchi.

This research's purpose is to find out whether we can apply the natural hazard risk framework in supply chains during the time of covid or not. The research presented six approaches to reduce the effects of disruption in supply chain: altering production locations, adjusting production lines, modifying storage methods, adapting product usage, reconfiguring distribution channels, and retraining the workforce. It also indicates to focus on the policymaking of the organizations to not cause can disruption again.

29. Global supply chains risks and covid-19: supply chain structure as a mitigating strategy for small and medium sized enterprises, 2023, Mustafa Cagri Gurbuz, Oznur Yurt, Sena Ozdemir, Vania Sena, Wantao Y

The focus of this research is on the supply chain disruptions and risks faced by textile companies, particularly SMEs, during the COVID-19 pandemic. It highlights the need for SMEs to configure their supply chains to effectively mitigate major disruption. The study reveals that a significant number of SMEs have been affected by supply chain disruptions compared to larger companies. Developing strategies to mitigate global supply chain risks has become a priority post-pandemic. The study emphasizes the importance of supply chain network structure and the cost-effectiveness of risk mitigation strategies for financially constrained SMEs. Partnering with a diverse range of smaller suppliers/buyers in different locations can help reduce both demand and supply disruptions and improve fill rates.

30. Perspectives on supply chain management in a pandemic and the post covid-19 era, 2020, Shuichi Ishida.

Companies globally are facing challenges with distribution and sales. The automotive industry is adopting centralized management, while the PC industry is using a global supply chain with the local suppliers. Supply chain cooperation plays a crucial role in business continuity planning during disasters. The automotive industry can benefit from a centralized management approach that prioritizes proximity between suppliers and production sites.

Findings of Literature Review

1. In this research paper, we find out that organizations need to be resilient and flexible to be sustainable in their supply chain processes.
2. In this research paper, we find out that organizations need to keep up with the latest trends and technologies for the betterment of their supply chain departments.
3. This research paper is particularly based on the food industry supply chain in covid. It explained how the processed meat and the food retail industry was heavily affected in the pandemic
4. In this research paper, we find out that how the Central European Companies have founded a resilience for their disruption in their supply chains and long-lasting effects on food supply chain.

5. In this research paper we find out how the Forbes 1000 companies have been keeping up with their disruption in their supply chain and how they are recommended to make collaborations with their suppliers & the automation and digitalization of their system.
6. In this research paper we find out how the food and agriculture industry were mainly affected during the pandemic. Solutions were made to maintain their demand and supply of the fruits and vegetables so that people could have the needed goods.
7. In this research paper we find out how the global supply chain was immensely affected by the covid times in the demand, supply, and logistics side of the supply chain. Moreover, the organizations changed their strategies to become more resilient.
8. The research highlights the importance of non-commercial activities and social activities of the firm by taking the case study of China based company called JD.com. It presents JD.com managed its supply chain with their enormous demand and logistics disruption with its integrative structure.
9. The research paper in about the food supply chain during the pandemic. It was mentioned how there was a sudden hike in the demand of bread, vegetables, and alcohol.
10. The research paper focuses on the suffering of the ready-made garment industry in Bangladesh. In this it has been described how the RMG industry faces three major problems like: material crisis, delayed payments and order cancellation which has impacted country's economy on a major level.
11. The research is based on the disruption of the perishable goods sector in the UK. The organizations must be innovative, flexible and open to change to be resilient in the pandemic.
12. The research addresses the vulnerabilities of the supply chain during the pandemic. It emphasized on the importance of not following the old ways and look opportunities into creating partnerships, productivity, and flexibility.
13. The research paper emphasized the need of more research in supply chain. It was recommended to put more concentration on viability to avoid the chaos in the supply chain. The supply chain should be more technology driven so that organizations could share suppliers, manufactures and warehouses.
14. The research paper is based on the effects of the pandemic on the international supply chain. It has been noticed that the people were losing their jobs and there was a chaos in the supply and demand of the goods.
15. The research paper is about the negative effects of the pandemic in the supply chain. To become resilient, it has been suggested to improve their technology and improve their decision making & flexibility.
16. The research paper focuses on the organization's supply chain after the pandemic. It has been mentioned that organizations who would follow just-in-time method will not survive now and should try to innovate some new ideas to maintain their supply chain.
17. The focus of this research is on the effects of the pandemic on the supply of goods in Canada. It was observed that there was an imbalance in the demand and supply of food and that people immediately shifted from food service to food retail.
18. The research paper is based on the impact of the pandemic on the global supply chain. It has been observed that the just-in-time method failed instantly in the covid. It was suggested to different FMCGs that they should focus on their decision-making, real-time collaboration, etc.
19. The research is based on the disruption of demand and supply of goods in the Italian grocery sector. It was observed due to panic buying of goods there was a sudden increase in the demand for grocery goods and the suppliers were unable to meet the demand.
20. The research is about risk management in the supply chain during the pandemic. It was observed due to low-risk management, many industries suffered huge losses during the pandemic. To be resilient, it was suggested to focus more on risk management and bringing technology into the supply chain.

21. The research paper described the effects of the pandemic on the agri-food supply in the USA. It was observed that the USA was able to become resilient quickly as compared to others and how states like Wisconsin, California & Minnesota were able to recover quickly with the disruption in the agri-food supply chain.
22. The research paper emphasized the relationship between the development of a supply chain and a country's economic growth. It was observed that if the supply chain of a country was developed, it also resulted in the economic growth of the country.
23. Vulnerabilities of the supply chain in the pandemic era is the focus of this research. It was seen how these were driven by neoliberal globalisation. Moreover, it explained how it cause a ripple effect all over the globe.
24. The research paper describes the disruption of growth in supply chain during the pandemic. It has been observed how organisations went from global trade to local trade in the pandemic. Being resilient and flexible was some of the suggestions given to them.
25. The study is based on how organizations need to be resilient and flexible in their supply chain sectors so that they could survive in the post covid times.
26. The study is focused on the effect of the pandemic on the economic contraction of the countries. It focuses on how important is to consider the lockdown policies of every country to make renationalizing supply chain work for the country to make it more resilient.
27. The research is based on the supply of vaccines all over the world in the covid times. It was seen how USA was proven to be beneficial by investing in the risk management during the pandemic.
28. The research is done to see whether organizations could apply natural risk hazard situation framework in the pandemic. It was seen how organizations need to be more creative in their decision making and policy making for situations like these.
29. The research is based on the effects on the textile industry during the pandemic. It was observed how small and medium textile enterprises were more affected by the pandemic than larger companies. It has been suggested to focus more on creating strategies in the supply chain after the pandemic.
30. The research paper is focused on the automotive, PC, and home furnishings industries, and how they are facing challenges with distribution globally. It is recommended to adopt the centralized management to PC industry.

Research Gap

1. There should have been more ways for the continuous improvement in the supply chain like constant evaluation, evaluating processes to adapt the changing circumstances rather than being resilient and flexible.
2. Digitalization should be done effectively with the help of tools like blockchain & AI in the supply chain. This can enhance traceability and efficiency.
3. Implementation of real-time inventory system should be done in the supply chain industry so that one can have record of their supplier's inventory and have a better demand forecasting.

Entire Findings

Of all the research paper we have reviewed, following things were ruled:

1. The food service industry was heavily affected by the pandemic. There was a huge loss in the sector as people immediately switched to food retail industry in the pandemic.

2. Better decision making needs to be done in the organizations for their supply chain sectors like resilient logistic networks, sustainability such as ethical sourcing, decreasing carbon footprint and lowering wastes.
3. The supply chain sectors need to be digitalized so that organizations could share their suppliers, distributors, and warehouses.
4. There have been research papers who talk about the development of such contracts that allows sudden adjustments in delivery, production volumes and fluctuations of market demand known as agile contracts.

Conclusion & Directions for Future Research

Covid-19 has become an assist for the changes in supply chain. Policies like Just-In-Time, Lean Management etc. failed during the supply chain and the need for new policies and resilience was realized. Many research papers expressed that organizations should have visibility, flexibility and resilience in their supply chain sector. Covid-19 underscored the vulnerabilities and mistakes in the supply chain and urged the organizations to make better decisions for both of their short-term and long-term projects. Moreover. The literature review resulted with a need of sustainability in their supply chain.

Future research should go for finding more policies in supply chain that would help in the development of it. Moreover, more research should be done in this topic so that we could further analyse this situation.

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