



# HOW TECHNOLOGY CAN STRENGTHEN SUPPLY CHAIN POST COVID-19?

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**Abstract:** Global spread of COVID-19 pandemic has once again brought to surface the supply chain susceptibilities. Many of the Companies did not have a plan in place to address the supply Chain disruption. Due to lockdowns, most of the Employees were asked to work from home. The health of Employees has become highest priority. The minimum workforce operating in warehouses/production lines was also to be monitored as one member is diagnosed positive, then entire team would be quarantined. Lead times also became longer with transportation issues and border closures. The challenges faced by Supply Chain are mainly in the areas of Workforce management, Visibility of Suppliers beyond Tier 1, Transportation and inventory. Emerging Technologies like AI, IoT and Blockchain can play an important role to enhance the resilience Supply Chain during the disruptive situations like COVID-19, not only in planning, but also can provide the required visibility of Supply Chain.

**Index Terms – Supply Chain, COVID-19, Technology**

## I. INTRODUCTION

COVID 19 event is forcing many companies to rethink about the current global supply chain model and the need to transform it. The need for the visibility across the supply chain has become much more crucial than ever before.

Institute of Supply Management (ISM) conducted a survey between Feb. 22 and March 5, and the survey was based on 628 respondents largely representing U.S. manufacturing (52%) and non-manufacturing (48%) organizations, 81% of which have revenues of less than \$10 billion (USD). Respondent roles range from emerging practitioner (4%), to chief procurement officer (6%), with 73% being experienced practitioners, managers and directors in a supply chain management role, ISM reports.

The survey revealed that more than 44% of respondents do not have a plan in place to address supply disruption from China and out of these 22% report current disruptions.

The areas which impacted Supply Chain because of COVID 19 are:

### **Impact Area 1: Workforce**

Because of the lock outs and people tested positive for Coronavirus, many companies faced reduction in production and warehouse capacities. If a worker is tested positive, the entire team will be put under quarantine.

On an average, suppliers operated at 50% production capacity in China and proportion of normal staffing levels at 56%.

Well-being and protective equipment are of paramount importance for workers in times of pandemics like Coronavirus. Amazon has faced this situation with workers speaking about their well-being and even staged walk out in protest of their conditions.

### **Impact Area 2: Products**

There is a risk of loosing market share for the commoditized products and consumers can adopt a conservative approach to buying. In addition, there is a possibility of sharp increases in demand for products or unexpected consequences from the event, such as panic buying for essential items. A lot of demand shifts to online.

### **Impact Area 3: Transportation**

As per Institute for Supply Management, 62% of the respondents experienced delays in receiving orders with 48% companies having delays in moving goods within China.

According to McKinsey report, trucking capacity to ship goods from factories to ports in China at around 60-80% of normal capacity, with goods facing delays around 8-10 days on the journey to ports

### **Impact Area 4: Sourcing**

COVID -19 has also exposed the vulnerability of many companies on the dependence of China to fulfil their need of raw materials and finished products. More than 200 of the Fortune Global 500 firms have a presence in Wuhan, the highly industrialized province where the outbreak originated. Companies whose supply chain is reliant on Tier 1 (direct) or Tier 2 (secondary) suppliers in China have experienced significant disruption.

### **Impact Area 5: Cost**

In addition to the increase in cost of shipping, there will be many financial impacts. Even, the contractually agreed prices and quantities of materials might no longer be valid. Supplier could invoke force majeure clauses or otherwise look to pass on additional costs up through the supply chain.

## II. PROBLEM STATEMENT

COVID -19 has spread globally, despite the individual governments taking significant measures like lock downs, quarantining and enforcing social distances among citizens etc., The full impact of COVID-19 on supply chains is still unknown, but what is certain is that it will have global economic and financial ramifications that will be felt through global supply chains, from raw materials to finished products.

## III. PURPOSE

This article tries to find out about – (1) What are the supply Chain areas that gets affected during pandemics like COVID 19? And (2) How technology can help in mitigating the vulnerable areas of Supply Chain?

### Review of Literature

The over dependence on China exposed the vulnerability of global supply chain<sup>1</sup>. With the supply chain disruption due to Coronavirus , the need for visibility across the chain has become more crucial than before, because the impact of the disruption on the rest of the chain can be understood so that others in the ecosystem can plan and take action<sup>2</sup>. Organizations know what is happening with their tier-1suppliers and not with their partners. Multiple supply chain disruptions happened because of COVID – 19 outbreaks<sup>3</sup>.

In the fight against Coronavirus, technology has also played a significant role. Connected wearables have played an important role. Patients and staff at a field hospital in Wuhan, China wore bracelets and rings synced with an AI platform from CloudMinds and Drones are also used to deliver medical samples and supplies to and from COVID-19 hotspots<sup>4</sup>.

The global spread of COVID-19 caused economic crisis and significant human suffering. But in facing this unprecedented situation, the need for the business to respond to the future crises has come into a sharp focus. In this backdrop, it is imperative and extremely important to study about how technology can strengthen the resilience of supply chain.

## IV. METHODOLOGY

The method used is based on the analysis of literature review of published articles and internet resources. The articles referred are those that discussed on the impact of COVID – 19 on supply chain and how Technology was used in managing the crisis.

## V. RESULTS AND DISCUSSION

The traditional Supply Chain focussed on minimizing costs, reducing inventories and shorter cycle times. Later, the digital supply networks (DSNs), enabled organizations to become connected to their complete supply network to enable end-to-end visibility, collaboration, agility, and optimization.

The benefits of Emerging Technologies like IoT, AI and Blockchain are already widely discussed and these technologies have also been proved useful in the health management during Coronavirus outbreak.

AI platforms, connected through bracelets or rings of patients, provided constant monitoring of vital signs, including temperature, heart rate and blood oxygen levels.

Drones have also been used to deliver medical samples and supplies to and from COVID-19 hotspots.

These technologies can be utilized to safeguard and strengthen the Supply Chains and make it pandemic resistant and resilient in the following ways.

### Detecting an Epidemic

An AI algorithm can be used which can mine news reports and online content from around the world to help experts recognize anomalies even before it reaches epidemic proportions. During Coronavirus outbreak AI was used to study flight traveler data to predict where the novel coronavirus could pop up next.

For example, Canadian artificial intelligence firm BlueDot provided warning about the new coronavirus days ahead of the official alerts from the Centers for Disease Control and Prevention and the World Health Organization.

Traditional epidemiology can track and identify the source of the outbreak and which populations are most at risk. AI systems like BlueDot's model how diseases spread in populations, which makes it possible to predict where outbreaks will occur and forecast how far and fast diseases will spread.

The organizations can utilize these predictions and arrive at what geographical locations will be affected and evaluate the plants, vendors and transportation requirements in those locations for better supply chain management.

### Workforce

The major concern in a pandemic situation is the health of workforce. Supply chain leaders should think about how to protect the health of workers, and support individuals who are ill. A clear and a consistent communication between the Company and Employees will be very crucial.

Connected wearables will play a vital role in this endeavor. These wearables can monitor vital signs like temperature, heartbeat etc., This will be useful for those who are working in production lines or warehouses.

Amazon has used thermal cameras at its warehouses to speed up screening for feverish workers who could be infected with coronavirus<sup>6</sup>. Technology also helped in monitoring how Work from home employees are feeling and enabled companies to provide a real-time support in the high-stress times during Coronavirus spread. For example, SAP Qualtrics has offered a free Work Pulse tool which enables companies to listen to what is going on with their employees on a day to day basis on personal health issues, connectivity issues, team interacting issues etc., The offer discovered huge demand from 7,600 companies within a period of 1 week.

### Supply Chain Visibility

Visibility of inventory at the supplier location, supplier production schedules, and supplier shipment status will help to predict supplier shortages and respond better.

For very critical supplies, the information about Tier 2 suppliers will be very beneficial to predict potential supply disruptions and to work proactively to alleviate the impact.

In global lockdowns during Coronavirus spread, companies which were using SAP Ariba Discovery, are able to post their immediate sourcing needs to a large network of suppliers and allows ANY supplier to respond to show they can deliver.

Diversifying supply sources, keeping closer tabs on Tier 2 suppliers, obtaining the right insurance coverage should all be part of the strategy.

### **Production and Warehousing**

Robots are already being used in production lines and warehouses. As per industry analysts, robots will replace many humans in their work and the coronavirus epidemic is speeding up the process.

Consumers generally prefer human interaction, but COVID-19 has changed this. Companies will now expand their use of robots to increase social distance and reduce the number of employees who must physically come to work.

Amazon and Walmart are already using robots to improve efficiency. The Covid-19 epidemic prompted the two companies to increase the use of robots for sorting, shipping and packaging in their warehouses. More and more Robots will be used for cleaning schools or offices in future.

The usage of Drones will also increase post COVID-19. The Japanese company Terra Drone employed drones to transport supplies in China and claimed this increased the speed of transport by more than 50% compared to road transportation, during Coronavirus lockdown.

### **Moving away from paper to digitization**

In the situations of lockdowns and Employees working from home, Block Chain Technology will likely get prominence. This technology may not be able to address the impact of COVID-19 directly but can help with supply chain visibility.

Especially in International trade where heavy documentation and physical verification of these documents are a must, Blockchain can help with its immutability of records and Trust to pave way for the supply of critical items during challenging times.

A Blockchain is basically a digital distributed ledger and this distributed ledger is a database of transactions that is shared and synchronized across multiple computers and locations – without centralized control.

Each party in a Blockchain owns an identical copy of the record, which is automatically updated as soon as any additions are made.

The transactions in this ledger are recorded in a series of blocks and multiple copies of ledger exists to multiple computes (nodes). This is highly secured as each new block is linked to previous blocks and tampering of data is virtually not possible.

The benefits of Blockchain to Supply Chain:

- Elimination of physical documents: Handling of physical documents is a major issue in transportation. Misplacement of documents lead to delays and sometimes hefty demurrage charges. There is no need to courier the documents from one point to another as multiple stakeholders are involved.
- Instantaneous Information: Real time information is available to all the parties. The status of the Material movement and approvals can be viewed instantaneously.
- Transparency: Entire process will be transparent. No record can be modified or deleted.
- Elimination of Intermediaries: Intermediaries act as trust agents. Because of the in-built trust by way of transparency and immutability of Blockchain technology, the necessity of having Intermediaries is eliminated.
- Increasing the scope of Accounting: Blockchain Technology has potential to enhance the accounting and auditing professions by reducing the costs of maintaining and reconciling of ledgers, providing certainty of ownership of assets and its history. It can also automate the transaction-level accounting done by the accountants, thereby increasing the scope of accounting

In a scenario like COVID-19 where there are restrictions of movement of people and most of the work is done from homes, Blockchain can be highly effective for not only performing transactions, but also to manage supplier identities and reputations.

## **VI. CONCLUSION**

Global Coronavirus spread exposed the vulnerability of Supply Chains of several companies. It also showed how technology augmented the efforts of healthcare professional during highly critical situation. These technologies can also enhance Supply Chain resilience by bringing predictability, visibility and responsiveness.

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