

## Lessons Learned – Lessons Enacted? Opportunities for Supply Chain Improvements Coming Out of the Pandemic

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### Abstract

The COVID19 pandemic triggered a flurry of research about pandemic risks in supply chains and how to navigate through and out of the pandemic. Because change in supply chains takes time this work is far from complete. This paper reflects upon opportunities for structural improvement in supply chains coming out of the pandemic. These include (1) the need to move away from over-reliance on unidimensional strategies and consider nearshoring and reshoring, (2) lean and just in time inventory management have not lost all of its value and the need to ensure multiple flexible sources, (3) disruption provides a step up, not a step away from sustainability. We reflect upon these opportunities and the risks of partial enactment of these opportunities in an effort to inspire progress in supply chain management research and practice.

### Introduction

The pandemic triggered a flurry of research on supply chain risk management and methods and approaches for improving the resiliency of supply chains. What was unique about the pandemic was the multi-dimensional, multi-regional and multi-directional [1]. The risk impact of the pandemic was also dynamic and longer lasting than normal disruptions such as a port strike or a hurricane [2]. As a result, not only were companies pursuing most, if not all, well-known risk management techniques, there were also pursuing not only short-term approaches to mitigating risks (such as inventory buffering). Companies are also pursuing medium to longer term (such as reshoring and nearshoring). It is for this reason that one might say the work towards building a more robust and resilient supply chain is far from over.

But change management in supply chains is hard and time consuming, involving multiple stakeholders with varying opinions [3]. And as a result, the question what is the risk of the lessons learned from the pandemic not being fully enacted through change management? We offer three key supply chain risk management lessons learned from the pandemic and consider drivers and approaches to managing these risks better, as well as risks of incomplete enactment of these approaches.

### Literature

Much referenced publications released during the early stages of the COVID19 pandemic calling for research on supply chain risk management during the pandemic [4,5] and the launch of an unprecedented number of journal special issues on the topic during the early stages of the pandemic were followed by a flurry of research and publications. Initial empirical research focused on risks early in the

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pandemic [6] and as the pandemic extended and continued research advanced to publications on risks experienced further into the pandemic [7,8].

Additionally, research developed road mapping for risk management [9] and studied specific risk mitigation approaches such as digitization and near and local sourcing [10]. Research has continued and has started to evolve into research about improving supply chain resiliency in general. As the impact of the pandemic reduced other risks, such as inventory challenges, logistics disruptions, inflation and labor shortages has driven a continued focus on risk management and techniques that can support risk mitigation and an improved ability to improve resiliency.

With the continued focus on this field of research it is important for research and industry to ensure that lessons from pandemic risk supply chain risk management are learned. And that lessons learned considered in ongoing efforts to improve resilience in response to the lasting impact of certain risks, as well as to new risks. It is for this reason that this paper develops key changes in supply chain thinking based upon lessons learned in research and industry, in support of ongoing risk management efforts and in support of efforts to structurally improve supply chain resiliency.

### Method

This reflection paper considers three recommended changes in supply chain thinking coming out of the COVID19 pandemic analytically, informed by literature and industry engagement. During the COVID19 pandemic the author conducted a survey of risks experienced and risk mitigation techniques used in early in the pandemic (spring 2020) and repeated the survey one year into the pandemic (spring 2021). These surveys informed exploratory case study research in the early stages of the pandemic. Case companies were revisited one year later to study evolution of risks experienced and progress with risk management.

To further develop lessons learned the author engaged supply chain professionals using research findings as a basis for workshop discussions on about risk management approaches and lessons learned from the utilization of these approaches. Sessions featured between 25 and 30 professionals from a number of companies to enable rich sharing and reflection on lessons across a multitude of supply chain settings. The first workshops was held late spring 2020 and this workshop focused on early approaches to risk management and initial reflections and lessons from these efforts. A second workshop was held in late spring 2021 and in this session discussion focused on how risks had changed, what progress was made with risk management, one year into the pandemic, and what challenges and risk mitigation remained. In spring 2022 a third workshop was held that focused on the identification of what risks and consequences of the pandemic continued to be experienced in the supply chain and what new risks (including new logistics bottlenecks, inflation and geopolitical uncertainty surrounding the war on the Ukraine) were being experienced.

Across these surveys, case studies and series of workshops covering a three year period of time, key recommended changes in supply chain thinking were developed and the next section will introduce these. Hopefully these recommended changes can both enable the benefiting from lessons learned in the past three years, as well as, provide input to efforts to structur-

ally improve resilience of the supply chain to move past pandemic risks and mitigate new risks today and into the future.

Recommended changes in supply chain thinking coming out of the pandemic

Based upon the study of literature about risk management in response to the pandemic and the engagement with several case companies table 1 summarizes key lessons learned from the pandemic.

From uni-dimensional sourcing strategies to a balanced approach involving a multitude of sourcing strategies

When asked about drivers of pandemic risks, both early on and after year 1 of the pandemic many companies pointed at the rationalization of suppliers to end up with just a few suppliers located in global low-cost source areas [11]. While global sourcing is a reliable source of cost savings, not balancing the logistical risks by ensuring near and local sources drove a high price to pay in the face of transportation disruptions. Equally so, not ensuring near and local alternative sources drove product unavailability from country lockdowns; if companies are down to just a few remaining sources in a consolidated manufacturing base in China a Chinese lockdown leaves them with nowhere to turn. Additionally, many companies saw increased volatility of demand during the pandemic with demand shifting. Companies such as Nike had started well before the pandemic to introduce more near and local sources into their supply chain in order to be able to respond faster to changes in demand.

A risk of limited enactment of this learning originates from the time it takes to identify, qualify and implement new suppliers. In the case of a highly regulated industry such as pharmaceuticals and aerospace, this can take 12-16 months [12]. During this change period drivers in favor of near shoring may alter, given the great dynamics of the pandemic. With logistical bottlenecks easing, the favorability of global sourcing begins to grow again and labor shortages in western markets make it harder to staff local sources. It is our hope that companies will resist the temptation to slip back into old comfort zones and see through the hard work, that companies such as Nike have pursuing for years now, to balance sourcing strategies away from the uni-dimensional global sourcing by including near and local sources.

**From stepping away from lean and JIT to inventory buffering only as a short term, limited approach**

Inventory buffering in response to supply shortfalls was a commonly pursued by companies to, at least temporarily, delay risks of product unavailability and empty shelves (van Hoek 2020 JPSM). It drove discussions around the need to step away from lean and just in time approaches reasoning that the focus on too much inventory removal reduces responsiveness in times of risk. While valid arguments, inventory buffering was still used as a medium-term approach one year into the pandemic [13]. The inventory hang over faced by retailers and manufacturers a year later indicates that buffering was used too long and too extensively.

The recipe for inventory buffering seems to be to limit amount and duration of usage of the technique, while not discontinuing lean approaches and using multiple sources of supply to be able to maintain JIT capabilities in case of supply disruptions in part of the supply base. This however requires discipline and restraint of ordering managers. The trigger point

**Table 1:** Lessons learned from the pandemic.

Lesson learned	Driver	Mitigation approaches	Risk of not enacting the learning
The need to move away from over-reliance on unidimensional strategies	Over-reliance on global sourcing strategy	Nearshoring and reshoring	Identifying, qualifying and implementing new suppliers can take a long time and drivers for reshoring may change during that window
Lean and just in time inventory management has not lost all of its value	Overordering increased supply chain pressures and drove inventory overhang	Ensuring multiple flexible sources and limiting over-ordering	Inventory buffering is of value but limiting the degree and duration requires discipline and restraint
Disruption provides a step up, not step away, from sustainability	Pandemic accelerated efforts to reduce carbon emissions and grow local sourcing	Reduction in travel and global sourcing lead to reduced carbon emission and greater economic inclusion	Risk of seeing disruption as an exception not a new level setting

for reducing buffering is hard to determine during disruptions when lead times are long and uncertain and supply is not guaranteed. The natural tendency is to continue to order until inventory on hand begins to improve but at that point a backlog of orders may have been build up leading to a flurry of shipments and resulting in excessive buffers. Improving collaboration with suppliers to improve visibility into anticipated lead times and product ETA's may proof a fruitful path forward. Equally so can the deployment of digital technologies that can accelerate information exchange about shipments, possibly across multiple tiers in the supply chain.

**Accelerating sustainability efforts, not pausing them**

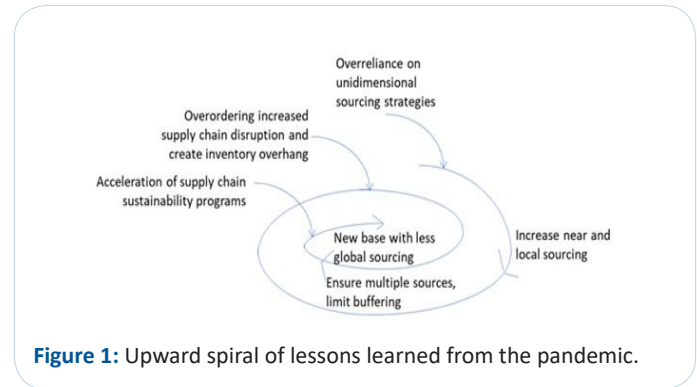
A misperception at the start of the pandemic was that companies would put on hold or back of from their sustainable supply chain programs. Instead, the pandemic provided a stepping stone for acceleration of sustainability programs [14]. The reduction in travel and commuting drove scope 2 carbon emission reductions from the very start of the pandemic. Risk mitigation techniques such as nearshoring and local sourcing hold the potential of reducing global transportation demands and resulting scope 3 emissions. It also drives economic inclusion in regions of operation, adding to social sustainability efforts.

But the risk is that companies will be tempted to revert back to old operating approaches and not use the lower emission standards as a new baseline but as a temporary windfall. Business travel will come back but business travel may never been the same. Commuting to work equally may not come back to pre-pandemic levels as (part) working from home and “work from anywhere anytime” models become mainstay in the new work organization. These efforts will part capture progress made but still bring emissions back up from the year 2020-2021. Hence sustainability efforts need to further progress to keep emissions low and further reduce.

**Conclusion**

The pandemic exposed strategic imbalances in supply chain and sourcing strategies and managerial responses to risk; from

an overreliance on unidimensional global sourcing strategies to a tendency to step away from JIT and lean and over-buffer/over-extend short term ordering tactics too long. Companies have been able to develop more nuanced sourcing approaches that have to be seen through still. These efforts can complement efforts to nuance inventory approaches with balanced supply lines and local alternative sources to ensure availability. On top of that sustainability efforts can be accelerate from a new standards to reduce carbon emissions in the supply chain and improve local economic inclusion. We hope this upwards spiral of progress (illustrated in figure 1) can be a learning and positive momentum from the pandemic. In the words of Churchill: “never waste a good crisis.”



**Figure 1:** Upward spiral of lessons learned from the pandemic.

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