Building Resilience to Post-Pandemic Supply Chain Disruptions

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***Abstract*: In recent times, the pandemic has brought about a paralytic set of conditions, proving to be a "black swan" event that no economy was ready for. The unprecedented and sudden fall in demand, disruption in production, supply chain hiatus, imbalance in costs, change in consumer requirement and mindset, unsatisfactory and irregular sales, steep drop in output, etc. have had businesses on their toes for finances. It impacted every single aspect of life as we know it. At the workplace, it introduced an abrupt disruption to which eventually corporates were able to adjust to- but at the cost of hours of productivity, financial loss, extensive trial and error and heavy dependency on technology. One such aspect is Supply Chain Management. At a point where production halted worldwide, supply-demand more turbulent than ever, and the future astonishingly ominous, supply chains irrespective of industry and scale, fell apart. While supply chain 4.0 was underway since long before the pandemic, it was simply accelerated with the onset of COVID-19. The objective of this article is to understand how supply chain practices have transitioned over time in order to be more resilient to disruptions.**

***Keywords*: Supply chain 4.0, disruptions, e-commerce, digitalisation**

I. INTRODUCTION

Back in December of 2019, when the virus first rattled China, leading to imposition of lockdowns and suspension of trade and commerce, it sent economies around the world into a worrisome state since China is the epicentre of multiple trade cycles, subjecting several businesses to a supply chain shockwave. Although staying at home was a *crème de la crème* precautionary measure, it was not realistically possible to continually keep economic activities at a standstill. This brings to limelight the fragility of current supply chain models that lack a firewall to make their business resilient to threats caused by blind and concentrated dependency. However, resilience is preached than achieved considering the various internal and external factors leading to why businesses make certain decisions.

Supply chains are elaborate links between complex processes that include planning, sourcing, inventory management, production, transportation, return of goods, among other micro aspects of a business and thereby synchronising these activities. Disruptions can be caused due to natural calamities, inaccurate forecasting, reformation in government policies, et cetera. In reality, no supply chain can achieve a euphorian phase where there are no fall-outs but in order to build resilience, policy makers and strategists must reflect upon the intricate details of their cycle, outlining all particulars that may pose potential threats.

A common phenomenon observed worldwide during any crisis is stockpiling, which is often fuelled by anxiety in consumers and further aggravated by the public's herd mentality, leading to bottlenecks. In a mode of panic, brand loyalty takes a backseat to product availability. This can either give away the company's existing consumer base or lead to the opportunity for creating new ones. It must be noted that this is not a new phenomenon. Historically, hoarding of stock in house basements and store rooms has been observed in dramatically different situations, from Barack Obama's Presidential win, the Y2K phenomenon to the Cuban Missile Crisis of 1962. While some robust chains effectively make up for the gap and generate lustrous sales, most businesses experience an inventory nightmare in lieu of the systemic demand shockwave and production slowdown. In this situation, worker unavailability, shortages of input materials, and limited logistics service act as catalysts of planning disruption where all links stand tentative.

Assessing Change in Consumer Behavior

Consumers live in a very protean environment, and it forms the basis of all business activities. This makes their behaviour change frequently, and with close monitoring, it is predictable. Most recently, due to the economic slowdown and its consequent impact on unemployment, mass lay-offs, inflated prices and salary cuts, consumers are making a conscious effort to reduce "unnecessary" spending of their disposable income and are inclined towards saving for an uncertain future. Some essential items have seen a spike in demand whereas some products are registering insignificant sales. However, the term "essential" is debatable as unlike a natural disaster or war, consumers are unaware of what is their top priority and therefore keep a buffer stock of what they *believe* is critical to daily well-being. According to a report by Forbes, retailers selling non-essentials are recording double & triple-digit increases in online sales during the ongoing crisis. A well designed marketing mix might just be what can influence the consumer base in a time where they are ready to believe what the herd calls "essential"- in case inventories pile up beyond capacity.

Forward & Backward Planning

Effective planning is often driven by market insights and analysis of data from internal and external sources. All plans are directed towards achieving a goal. In order to establish a goal, benchmarks are set. However, when we aim at being resilient, we look backwards. Is our data reliable when applied in dynamic contexts? Is our measurement system reliable? What are the various loopholes in the existing plan? Does the existing plan provide for non-seasonal and unplanned change in demand-supply or production, and advise alternatives in such a situation? These are just a few questions to ponder over while reassessing planning. While analysing the same, one may conclude that resilience starts with a multi-tier demand plan that is reviewed at regular intervals keeping in mind the various changes in their dynamic micro and macro environment.

Then comes the Sales & Operation Planning where in sales, marketing, procurement, logistical arrangements, demand management, production, dynamic aggregate inventory management, forecast assumptions are regularly monitored and reviewed. Additionally, stress tests and risk assessment are important. While much of the literature available is forward-looking, and indeed has emerged only in the last two or three years, almost all of the technologies discussed are being implemented today, at least by firms at the frontier of supply chain management, which by and large are in high-income countries.

E-Commerce & Product Availability

In a mode of panic, brand loyalty takes a backseat to product availability. This can either give away the existing consumer base or open an opportunity for creating new ones.

As social distancing plays a crucial role in curbing the spread of the virus, most people are avoiding in-store shopping. This leaves them with a second, and rather more comfortable option of e-commerce, where everything is delivered at the doorstep of the consumer. Many studies suggest that even after normalcy is established, people are likely to continue digital shopping through e-commerce websites due to the convenience it offers to its customers.

Here, it becomes essential to bring the product or service online in order to ensure satisfactory or even increased sales. Supply chains need to align this requirement along with product complexity in order to capitalise the new platform. With demand for home delivery is at record level, companies should also consider partnering with established players who can offer digital ordering and/or last mile delivery capabilities. A key supply chain focus could also be on conducting an analysis on warehouse and front-end processing capacity along with its impact and would recognise stress hotspots that need attention.

Regulated Dependency and Alternatives

As per data from Dun & Bradstreet, wholesale, services, manufacturing, and retail account for more than 70% percent of businesses in the pandemic affected region of China. On a global level, 51,000 companies have one or more Tier 1 suppliers from the region and an additional five million companies have Tier 2 suppliers there, with 938 of those being Fortune 1000 companies. Over 25% of India's automobile part imports come from China. Recently, Maruti Suzuki Chairman RC Bhargava said, "we import as we have no choice, not because we like to." This led to a worldwide dwindle in global value chains and the regular cycle of trade.

This dependence can prove to be fatal especially when supply chain executives have not planned alternatives, or in other words, a "Plan B." Although it is not practically possible to divide supply chain dependency so well proportionately that the subsequent risk is manageable, it is possible to transparently define the chain and keep alternatives ready in our databases. This requires a herculean effort as it includes several aspects of an organisation's operations including a legal team that formulates contracts that provide for such flexibility in business operations. A critical aspect is the establishment of a multi-tier network of suppliers and intermediaries, and training executives to handle the dynamics that come with the same. Some brands have even started manufacturing temporary products such as masks and sanitizers in order to cater to rising demand.

Some companies have planned to reshore their production locally, while many governments are incentivising it. Make in India, America First and Brexit are a few examples of the same. Nevertheless, there needs to be a balance between reshoring and rightshoring. Having multiple plants spread around the world rather than concentrated in one place, otherwise called as distributed manufacturing, greatly reduces disruption risk.

The Transition from Traditional

Traditional, on-premises SCM technology is often prone to displays of fragility instead: demanding interventions, modifications, and workarounds to keep functioning as customer and business requirements change. The direct influence can be seen on their supply and production planning.

It employs a linear and fairly rigid approach to designing, sourcing, making, and delivering goods.

1. Seller/supplier control: Organisations built the products they believed customers would buy.
2. "Push" distribution: Products were distributed via channel partners for sale to consumers.
3. Single-channel purchasing: Customers typically purchased products through a single retail outlet or sales contact. This paradigm no longer works as the marketplace has become connected. Today's demand-driven and increasingly dynamic supply chains require capabilities that legacy SCM systems simply weren't designed to deliver.

Clear as day, over the past few decades, this has brought about disadvantages of its own. To begin with, it is often prone to

displays of fragility instead: demanding interventions, modifications, and workarounds to keep functioning as customer and business requirements change. Additionally, same-day fulfilment and customised products can be powerful differentiators, yet they can also be high-risk activities when integration gaps or data quality issues in traditional supply chains result in companies making promises their manufacturing and fulfilment systems can't always keep.

Reinforcement of Supply Chain 4.0

Supply chain has become the battleground for customer loyalty as companies respond to fast-changing demands and business conditions. New technologies enable deeper visibility and more precise control in supply chain management. Supply Chain 4.0 can be seen either as an advanced management practice, or as a cluster of technologies more likely to be adopted as the result of advanced management practices. As shown by recent survey-based research, improvement of management practices – such as may be associated with adoption of Supply Chain 4.0 – is likely to enhance productivity and profitability, leading to higher-quality outputs produced using higher-quality inputs.

New age supply chains require reallocation of resources, enhanced management capability, massive digitalization of product profile, receipts and warranty/guarantee cards, new technology training, close monitoring of online trends, maintaining a balance between online and offline sales trajectory, revising inventory capacity as per changing demands and new customer service among others. This also means that documents, except for the ones required in paper by law (bill of lading, etc.) should be digitised. The order placement, the designated suppliers, transportation, warehouses, taxes, et cetera- all in a database that can be accessed by multiple members across an organisation which is much more beneficial as compared to traditional systems, where giving data access is a lengthy and risky task. Complementary to this is developing or purchasing a security system that maintains data privacy.

Supply Chain 4.0 technologies may enable firms to reduce the number of stages in supply chains by reshoring routine labour-intensive activities in developing countries back to the developed countries. These technologies make undertaking some production stages in high-wage countries more profitable by reducing the amount of labour required, thus weakening the incentive for firms to locate in low-wage countries and reducing the importance of low labour costs in determining comparative advantage, providing instead an advantage to integrating multiple stages of production at a single automated location.

Most digital communication in the supply chain happens via Electronic Data Interchange, excel spreadsheets and sometimes blockchains. This also widens an organisation's working culture scope by making "work from home" and "network organisations" viable options and eliminating barriers of distance, thereby tapping operational effectiveness. In today's time, companies are using machines, computers and robotics to advance their supply chain for increased forecast accuracy, predictive consumer behaviour and enhanced SKU portfolio to name a new. For example, the concept of "predictive shipping," where products are shipped before the customer places an order. Adaptation of "supply chain cloud" is also an indication of the digital revolution supply chains are undergoing. Some systems are also developed to indicate risks in the chain, therefore assisting resilience.

This also helps in regularly making changes and updates as and when they occur, so as to clearly define the entire supply chain and all of its components including supplier data (key suppliers, alternate suppliers, etc.), flow of transportation (exact trace and status of material mobility, etc.), inventory (for example, planned blanket orders, etc.), warehousing (evaluating current stock available at any particular warehouse, etc.) and process mapping unlike traditional systems where accuracy of data itself is doubtful since their refreshment is seldom.

From Insight to Action

The most successful organisations do not simply assess demand; they predict and anticipate what their customers want, as well as where demand will be the greatest. Armed with these predictive insights, a company can remove the element of chance from its innovation and commercialization, planning, manufacturing, logistics, and inventory-carrying decisions. It can also improve customer experience by enabling the same rapid fulfilment and delivery practices that define the very best consumer e-commerce brands today.

A modern, cloud-based supply chain management solution is built on the following three capabilities which ensure that the company can plan, implement, and respond to supply chain events in real time:

1. *Orchestration:* This includes supply chain decisions that drive coordinated changes across every system, every transaction, and every relevant trading partner. A transition from juggling disparate technology and processes to leveraging single cloud technology for end-to-end processes results in unified planning, analytics, and process orchestration with easier implementation, usage and upgradation.
2. *Responsiveness:* Sequential and batch planning is a recipe for waiting- and for waste. Cloud-based supply chain management uses a continuous monitoring and response model to execute decisions and implement changes virtually in real time. Rapid monitoring, simulation, and response capabilities, reflected through how businesses continuously respond to changes in the dynamic business environment, enhance the quality and speed of decision-making.

3. *Clarity:* Supply chain management also integrates planning and reporting data to present a single view of the truth. Decision-makers get the confidence that they are always solving the right problems, at the right time and place. From reconciling multiple plans and receiving delayed reports to dynamically analysing and acting on one version of the truth, end-to-end visibility with flexible segmentation improves planner productivity and business agility.

Post-Disruption Critical Analysis

It is crucial for a supply chain to evaluate its behaviour and performance during a disruption after the instability subsides in order to learn from experiences, for that is when previously unnoticed loopholes emerge. Depending on the nature of their products, supply chains must now also be prepared for inventory bounce (in case their products are currently experiencing a sales dip, but will recover immediately as businesses resume normal functions) or in other cases, the consequence of the Forrester Effect (caused due to stockpiling, et cetera as discussed above).

According to KPMG's research, organisations with a robust day-zero (date on which lockdown restrictions ease from a functional business environment perspective) plan to achieve 35-55% higher profitability than those without a plan during the first four weeks after day zero. It also states that packaging material suppliers and transportation partners have been identified as the two high-risk supplier categories from an operations discontinuity perspective, during supplier risk assessment exercise. As a report by McKinsey summarises, resilience begins with establishing a supply chain-risk function tasked with assessing risk, continually updating risk-impact estimates and remediation strategies, and overseeing risk governance. Processes and tools created during the crisis-management period should be codified into formal documentation, and the nerve center should become a permanent fixture to monitor supply chain vulnerabilities continuously and reliably.

II. CONCLUSION

Traditional, on-premises SCM is tied to entrenched approaches; it forces businesses into reactive and defensive postures; and it equates change with cost, complexity, and risk. Modern SCM, on the other hand, enables innovative, proactive, and continuously improving supply chain practices. The essential elements of a modern, cloud-based SCM system reflect and reinforce the concept of building tomorrow's supply chain, today. Today's supply chain workplace is driven by more intangible than tangible. It depends on more efficient, low-friction supply chain processes which provides end-to-end visibility into those processes so you can solve problems instead of just moving them to another part of the enterprise. Moreover, it is demand driven. Analytics and reporting capabilities, for example, enable cost-effective manufacturing and distribution of customised products or services. Unlike traditional ways, the workplace we see today not only works in responsiveness to change, but also to be the very enabler of change. The agility which comes along with the integration of supply chain 4.0, gives you the information to understand in real time what is changing and how to react to it.

After all, it only makes sense for a business to be prepared for unexpected risk events, have recovery plans to tackle potential disruptions in order to return to its ideal situation or even grow by moving to a new, more desirable state in order to gain control over market share and financial performance and satisfy and retain its customers.

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