Effective Use of Supply Chain Analytics to Mitigate Business Disruptions

Noha Tohamy, Distinguished VP Analyst

14 May 2020
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Published 14 May 2020 - ID G00723779 - 6 min read

Initiatives: Supply Chain Strategy, Leadership and Governance

A large majority of companies are facing more frequent and impactful disruptions to their operations. Supply chain leaders looking to build a holistic analytics competency can support their organization in mitigation, recovery and longer-term planning goals.

Overview

Key Challenges

- As a disruptive event unfolds, companies are challenged to quickly understand the impact of the event on their specific supply chains, locations and suppliers.

- Supply chain organizations struggle to respond immediately to the disruption to minimize the impact on their ability to fulfill customer demand.

- Companies that lack a strong analytics competency are slow to determine the midterm and long-term actions required to recover from a current event and better mitigate future disruptions.

Recommendations

Supply chain leaders responsible for analytics strategy and adoption should:

- Track the current scope and severity of a disruptive event by acquiring relevant data and investing in real-time analytics.
- Leverage a wide portfolio of analytics techniques by understanding which is most effective in sensing, responding, recovering and mitigating a disruptive event.

- Invest in a strong analytics competency to support response and recovery by building a strong data foundation, securing the technical and business skills and adopting advanced technologies.

Introduction

In supply chain, minor disruptions are inescapable. These can range from late supply delivery to a shutdown of a production line or a shortage in transportation capacity. Most supply chain organizations can quickly sense and respond to events with minimal impact to their customer service and operations.

In today's environment, however, organizations are increasingly facing major disruptions that significantly impact their supply chain operations. In a recent Gartner survey, 76% of supply chain executives indicated that compared to three years ago, their company today is facing more frequent disruptions in their supply chain. Meanwhile, another 72% reported that the impact of the disruptive events has increased.¹ These events range from tariff disputes, natural disasters, major supply failure, or most recently, the COVID-19 pandemic.

With more available and reliable data, organizations are looking to leverage analytics to sense the disruption, comprehend its magnitude, impact on the supply chain and to formulate a response. To succeed, they must rely on a strong analytics competency that combines a broad range of analytics strategies and approaches.

This research outlines how supply chain executives can deploy a portfolio of analytics techniques while they sense, mitigate and recover from current events and prepare for future disruptions (see Figure 1).

Figure 1: The Use of Analytics in Supply Chain Disruptions
The Use of Analytics in Supply Chain Disruptions

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<td>Monitor the unfolding disruptive event</td>
<td>Contextualize the event’s impact on supply chain</td>
<td>React to minimize negative impact</td>
<td>Consider future demand and supply scenarios</td>
<td>Evaluate alternative supply chain policies</td>
<td>Configure supply chain for resiliency and agility</td>
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Real time | Short term | Midterm | Long term

Source: Gartner (May 2020)

Analysis

Use Real-Time Data and Analytics to Track Unfolding Disruption

Supply chain organizations can leverage publicly available data to track how disruptive events unfold. This data can be provided by governmental bodies, academic institutions for free or it can be offered for a fee by service providers.

For example, Johns Hopkins Coronavirus Resource Center data offers up-to-the-minute updates of COVID-19 (coronavirus) cases and deaths. Supply chain organizations rely on this information to start gauging the impact of the pandemic on their employees, suppliers, trading partners and locations. These insights can, for example, be used in a business review or a sales and operations planning (S&OP) meeting to get a quick view of how the disruptive event is unfolding geographically.

Similarly, supply chain organizations can leverage real-time analytics using mobility and location-specific data collected from satellites and distributed sensors to track the event. For example, using data from devices on ocean carriers can provide an organization with insights into changing maritime shipping patterns. These insights can then be leveraged to determine the impact of the disruption on its transportation network.

Deploy Visualization to Map Your Supply Chain Against the Disruption

Visualization analytics help organizations gauge the impact of the disruptions on the supply chain. This is especially critical for companies with global, complex supply chains.
with thousands of suppliers for millions of parts and components. Overlaying the span of the disruptive event onto locations, multiple tiers of suppliers and customers can highlight supply chain vulnerabilities; specifically, critical fail points’ risk exposure. Supply chain organizations can use mapping capabilities in their existing business intelligence (BI) platforms, such as Power BI or Tableau, that provide native mapping solutions or integrate with providers, such as Esri, to overlay their supply chains against the pattern of disruption. Alternatively, they can rely on platforms like SourceMap to visualize and create risk maps for their supply chains.

**Use Machine Learning and AI to Triage the Supply Chain in the Near Term**

Combining machine learning and artificial intelligence (AI) allows organizations to track unfolding events and take immediate action to minimize impact on their supply chains. Unlike traditional statistical modeling that relies on past representative data, machine learning algorithms lend themselves to forecasting and leveraging noisy, near-real-time data that reflects a dynamically evolving event. For example, a consumer products manufacturer used a machine learning algorithm to sense changes in demand patterns following Hurricane Harvey in 2017. The company then leveraged AI to autonomously reallocate available supply and reprioritize demand to avoid a service disruption to a key customer.

**Leverage Predictive Analytics and Simulation to Gauge Likely Future Scenarios**

Once immediate actions are taken to dampen the short-term impact of the disruption, supply chain organizations turn their attention to understanding short-, midterm and long-term scenarios to predict the impact of the disruption on their business. For example, due to a port shutdown caused by a labor strike, a high-tech manufacturer expects a shortage in available inventory. Using predictive analytics and simulation, the manufacturer analyzes the likelihood of different strike durations and the impact on their ability to fulfill customer demand.

**Use Scenario Modeling and Prescriptive Analytics to Revise Supply Chain Policies**

Predicting changing business needs resulting from a major disruptive event, supply chain organizations can rely on approaches like optimization and scenario modeling to make policy changes. Using optimization, companies can evaluate different supply chain policies, balancing the trade-offs of managing a lean supply chain while building a level of resilience that would allow for quick recovery from or avoidance of a disruption. For example, companies may opt for carrying higher levels of inventory to build more resiliency in the supply chain.
While not the most cost optimal, inventory buffering would minimize the impact of disruption on customer service levels.

**Apply Long-Range Forecasting and Optimization to Redesign Supply Chains for New Business Reality**

Using long-range forecasting, simulations and other advanced analytics techniques, organizations can predict the long-term impact of disruptions on their business under different scenario conditions. They can then determine the required action to position their supply chain to take advantage of new opportunities (see "Winning in the Turns: A CSCO Action Guide — Identify Strategic Issues, Protect Innovation and Nurture Talent"). For example, online grocery delivery services that are now seeing a boon due to social distancing can look to future opportunities to capitalize on the growth in this retail channel. Additionally, supply chain organizations can leverage long-range forecasting and optimization to increase their supply chain resiliency (see "Design Resilience Into Your Supply Chain With Scenario Planning to Weather the Unexpected").

**Build the Requisite Foundation to Employ These Various Analytics Approaches in Mitigating Disruptions**

Without a strong analytics foundation, a company will likely be incapable of leveraging analytics to sense, mitigate and recover from major disruptive events. For example, without a strong data infrastructure, an organization will be challenged to acquire, manage and harmonize external event data. Without technical and supply chain expertise, the organization will be challenged to evaluate different recovery scenarios and choose the most optimal to its current and future business needs (see "Essential Roles to Support Supply Chain Analytics"). Similarly, lack of advanced technologies will hamper an organization's ability to respond to disruptive events. Beyond Excel, technologies that offer optimization, machine learning, statistical modeling and real-time analytics are critical to respond to disruptions quickly and at scale.

**Evidence**

1. **Gartner’s Decision Quality Study.** To understand how to improve decision-making quality in response to disruptions, our research involved quantitative analysis from a study of over 600 supply chain professionals and qualitative interviews with more than 60 chief supply chain officers.


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Four Categories of Benefits to Track Supply Chain Analytics’ Full Value
The Supply Chain Analytics Leader's First 100 Days
Industrial Supply Chain Innovator Finalists 2020: Enabling Analytics at Scale
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Open-Source Change: Driving Effective Transformations in Supply Chain