Find the weak link in your supply chain

An Individual Paper

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Abstract

A big challenge in today's world of far-flung, complex supply chains is the limited understanding of the impact on operations of unexpected disruption at one supplier's site.

A method is developed which helps to prioritize the financial or operational impact of risk that lets companies focus their mitigation efforts on the most important suppliers and risk areas. This technology was implemented on Ford. But it is found that Suppliers tend to be optimistic about the information that they provide. In response to that a remedy was developed.

A central feature of the original model was time to recovery (TTR). The TTR values are determined by examining historical experience and surveying the firm's suppliers. But the suppliers were optimistic about their TTR since they know that a long TTR is not going to be accepted by the manufacturer. So it was necessary to find a way to identify bottleneck suppliers for which it's critical to obtain accurate TTR information and distinguish them from other suppliers where even plus or minus 30% error in TTR information will have very little impact on the supply chain.

A new metric called "time to survive" (TTS) is created. It is the maximum duration that the supply chain can match supply with demand after a node is disrupted. If the TTS of a specific site is greater than its TTR, this site does not expose the firm to any risk since during the time the site is recovering from a disruption, the firm can still match supply with demand. On the other hand, if the TTS of a specific facility is smaller than its TTR, its disruption will expose the firm to financial and operational problems. TTS associated with a specific node is determined by, removing the node from the supply chain and calculating how long using inventory in the

pipeline and other available supply sources it is possible to serve customer demand without that node.

The new metric motivated the development of a model to assess the level of strategic inventory: inventory used to respond to a disruption anywhere in the supply chain. Combined use of TTS and TTR metrics, determine how much strategic inventory the firms needs and where to position this inventory. This leads to a robust supply chain and when a node has a TTS greater than its TTR then the disrupted node will always recover before the available resource expires.

When the new metric was applied to Ford's supply chain, it revealed that some supplier sites had a TTS equal to just a few days and other suppliers had a very long TTS. The ones with shorter TTS are critical suppliers and a careful review of their TTR is necessary. But it is an opportunity to cut costs on the suppliers with longer TTS as cutting inventory for these suppliers by 50%, for example, will have very little impact on its ability to respond to a disruption.

Using these metrics, Ford is monitoring risk exposure on an ongoing basis and making adjustments based on changes in the environment. For example, with respect to the change in inventory levels in the supply chain, the risk exposure changes. When risk exposure is above a certain level, perhaps due to low inventory levels or delayed supply, an alert is triggered which requires procurement managers to review the drivers of the increase in risk.

Ford executives have said that they are using this method and technology for three levels of decisions, which are the strategic, tactical and operational decision.

Strategic decisions were to identify exposure to risk associated with parts and suppliers, prioritize and allocate resources effectively, develop mitigation strategies, and identify opportunities to reduce risk mitigation cost, the tactical decision was to monitor changes in risk

exposure on a daily or weekly basis and the Operational decision was to identify an effective way to allocate resources after a disruption

Relevance of the article to Global Supply chain management

The article discuss about sourcing, procurement and matching supply with demand despite when there is a disruption with a resource, which in this case is suppliers. The risk involved in Supply chain management is stated in the article. It discuss the operational failures that the suppliers might encounter under their roof and its impact on the Supply chain. The important aspect of supply chain is getting the right product at the right time. A lag in getting the product at the right time will affect the supply chain. So evaluating these risks involved in the suppliers and maintaining the supply chain profit is discussed in this article. The supply chain profit can be improved by reducing the strategic inventory level. By reducing the inventory on few suppliers, who can still provide supply before the necessary demand arises, irrespective of the disruption faced by them, the supply chain surplus can be increased. By introducing the metrics TTR and TTS, the bottleneck resources are identified. The combination of production capacity and Inventory are important in order to manage supply. So stabilizing the resources and maintain the required inventory by reducing waste become the key features here. Demand is flexible but supply is not flexible. So with the uncertain demand faced, it is important to know the flexibility of the resources and their maximum capacity. Inventory and sourcing are two important supply chain drivers and having control over them will improve the operations. Supplier reliability and supply lead time are the main discussion of this article. It is important to maintain all stages of the supply chain aligned to achieve strategic fit, therefore maintaining the suppliers in spite of the disruption is important to achieve this fit. An appropriate level of safety inventory is required

to satisfy the uncertain demand. The article tells how to manage the pipeline inventory when there is a disruption in any of the resources, importantly in the bottleneck resources.

Article's enhancement in understanding of Supply chain management

It is understood that the important supply chain drivers like facility, inventory, transportation, sourcing can be disrupted in the real business in a business unit. Having a strategic plan to manage these disruptions without affecting the operations is important. So it is thus critical for global supply chains to be aware of the relevant risk factors and build in suitable mitigation strategies. For building such strategies, few metrics are coined in this article and a technology is used to evaluate these risks and mitigate them. Increasing responsiveness and flexibility of supplies without increasing the inventory or decreasing the redundant inventories in the technique used here in order to manage risks. Aggregate planning of procurement by managing contracts, suppliers, inventory and utilization of capacity is necessary. The importance of understanding the capacity of every resources in order to match the uncertain demand or the normal demand during an operation failure can contribute to a good supply chain management. Such strategies may dictate terms like which trade-off to be enforced when the capacity has to be increased and what resources has to be used as an overtime, regular time and the ones to be contracted. Supply chain coordination improves if all stages of the chain take actions that are aligned and increase total supply chain surplus. So knowing the limits of the supply chain is important for taking actions. So if the replenishment lead time doesn't coordinate with the other stages of the supply chain, then the relationship across the supply chain may fail. Similarly all the supply chain drivers must be analyzed for their capacity and time to recover, in case of unexpected disruptions. And this has to be done without mounting the inventory to improve the overall supply chain surplus.

References

David Simchi-Levi (June 09, 2015), OPERATIONS MANAGEMENT, Find the Weak Link in Your Supply chain. https://hbr.org/2015/06/find-the-weak-link-in-your-supply-chain