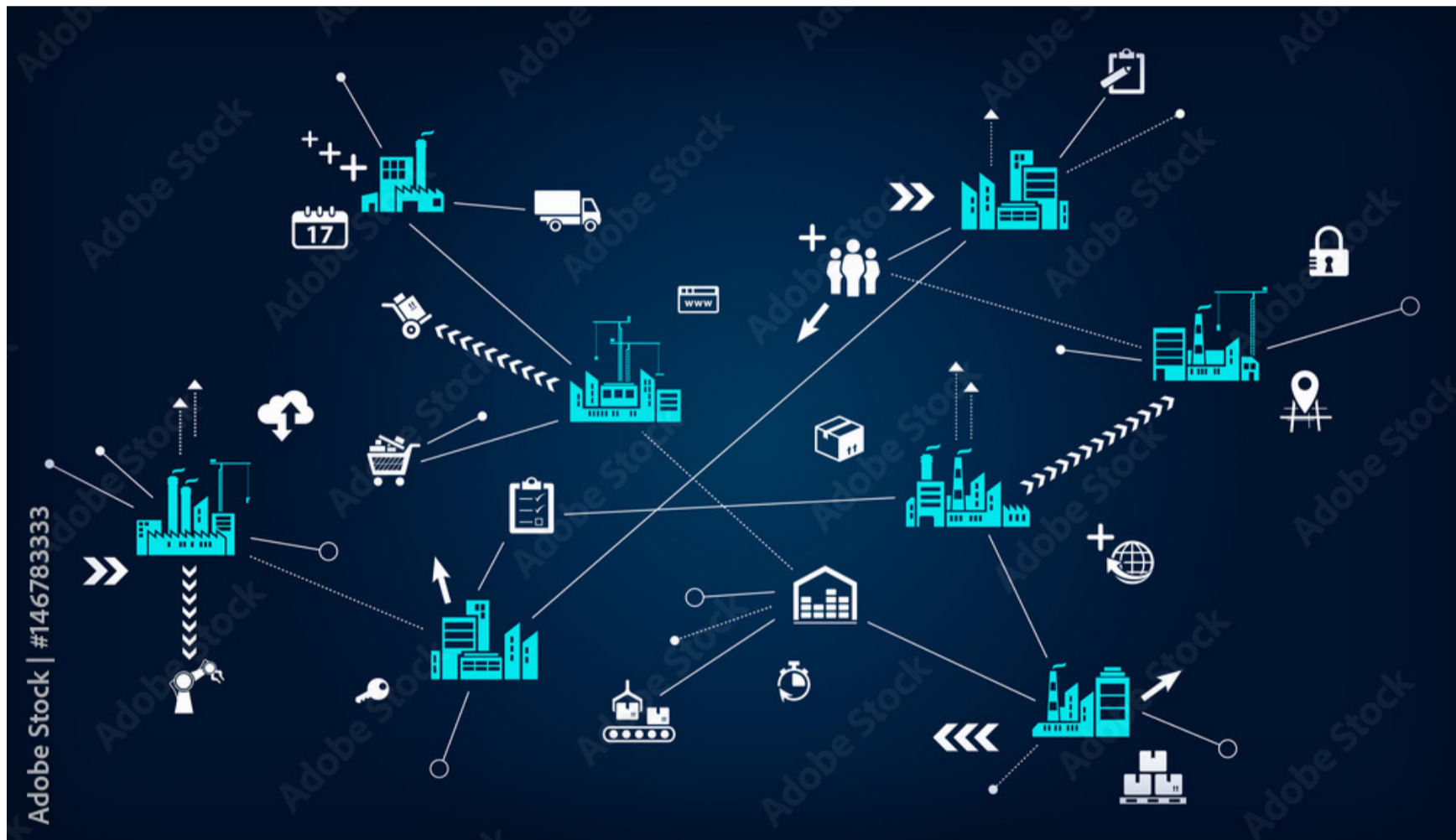



 facility asset management

Putting Supply Problems into Perspective

By Yossi Sheffi, Ph.D.

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As procurers of a wide range of products, facilities managers are familiar with the supply problems many organizations have experienced over recent years. These problems have subsided as the disruptive impact of the Covid-19 pandemic on supply chains has receded, but shortages and delivery delays have not disappeared.

Such snafus are frustrating for buyers, but gaining a better understanding of how supply chains are managed can help to put supply problems in perspective and may even highlight ways to mitigate them.

Hidden Complexity

Many supply issues are rooted in the sheer complexity of modern supply chains. The term “supply chain” oversimplifies the globe-spanning series of linkages and processes that underpin modern-day supply channels. The term suggests that supply chains are linear and focused on physical flows of materials, parts, and products. However, supply chains are characterized by two additional flows: the flow of information and the flow of cash.

Money usually flows in the opposite direction of the physical flows as customers pay suppliers for the items received. Information, however, flows in both directions as purchase orders flow upstream and acknowledgments and alerts flow downstream.

Another aspect of this simplification is its depiction of a single supplier for each stage. In reality, each organization in a supply chain has multiple suppliers because the organization’s products have multiple materials and parts in the bill of materials or BOM (a list of the materials and components required to make a product and information on how it is manufactured). For example, a typical car has 30,000 parts, and a disposable diaper can have 50 parts provided by multiple suppliers. The multiple parts on every product’s BOM present both an operational and a strategic challenge, driven by the simple fact that if the company faces a

shortage of even a single part on the BOM, it cannot build the intended product. Consequently, supply chain managers have to ensure that the factory always has enough of every single part and subassembly required to run its operations and make the product.

How Many Suppliers?

The strategic challenge lies in finding a supplier for each required material and subassembly, making sure that each has the capacity to provide the parts, ensuring that the parts are of high quality, and establishing a good working relationship. Good working relationships are key to ensuring a continuous flow of needed parts when supply chains are disrupted. Even so, to minimize the risk of impacts from a supplier failure, companies may contract with more than one supplier for a given part.

Deciding whether to have a single supplier or multiple suppliers for each part involves many trade-offs. On the one hand, a single supplier providing all the company's requirements for that part may offer a lower price based on the higher volume it will sell to the company. Another possible advantage of a single supplier is that the supplier may give the company preference in the event of a shortage or disruption when the supplier does not have enough inventory for all its customers and must select which orders to fulfill. However, that singular dependence involves a risk for the company should the supplier fail. Multiple suppliers, on the other hand, allow the company to continue production (at least partly) when one supplier fails. Nevertheless, having multiple suppliers increases the management complexity by creating the need to manage, inspect, audit, and negotiate with many more entities. It also increases the company's exposure to reputational risks if any one of the multiple suppliers is found to have unprincipled processes.

Moreover, not only does the company have multiple suppliers, but at every stage, each part and subassembly involves the management of its own supply chain with multiple sub-suppliers. The final product manufacturer (often known as the original equipment manufacturer [OEM] or "the brand") buys subassemblies and systems from suppliers that have their own supply chains for procuring parts and materials from suppliers deeper in those supply chains. In fact, each entity along the supply chain of a company has its own challenge in supply chain management.

Thus, instead of a supply chain being a single, linear string (or one string for each part), it's a tree-like structure of tiers of suppliers that expands back up the supply chain from the OEM (or any other manufacturer or retailer). The first tier of suppliers, those that the OEM buys parts and subassemblies from directly, are known as Tier 1 suppliers. The direct suppliers to the Tier 1 suppliers are known as Tier 2 suppliers of the OEM, and so on. (Of course, Tier 2 suppliers to the OEM are Tier 1 suppliers to the OEM's Tier 1 suppliers.) For example, an OEM such as Ford Motor Company has about 1,200 Tier 1 suppliers but thousands of Tier 2 suppliers and tens of thousands of deeper-tier suppliers.

Shining A Light on Supply Issues

The above explanation of how supply chains are structured is by no means a complete picture of these complex entities. However, hopefully, this brief description helps put supply problems into perspective and make such experiences less frustrating.

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