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*Simplifying Sourcing Series*

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**SIGMATRON**  
INTERNATIONAL



## **Supply Chain Disruption**

*How Well is Your Contract Manufacturer Prepared?*



## **Supply Chain Disruption**

### ***How Well is Your Contract Manufacturer Prepared?***

*By John Sheehan*

Demand is exceeding supply in the current component marketplace and it may be some time before capacity is increased to address the challenge. Two of the biggest industries driving this consumption are the automotive sector and the data processing sector. On the automotive side, China is incentivizing the manufacture and purchase of hybrid electric vehicles while car buying by more affluent consumers pushes up demand. There have been a number of articles on the shortages of rare metals this move is bringing and the need to find alternatives. However, the electronics industry is also seeing an impact on the commodity side because there is increased demand for copper foil, increasing the price of printed circuit boards, and hybrid vehicles require significantly more automotive-grade passives than gasoline-powered vehicles. While this is going on, automobile electronic content in general continues to be on the rise globally. On the data processing front, development of the cloud and concomitant data storage center requirements for companies like Amazon, Google and Microsoft is also driving increased consumption of memory devices and many other components.

If those two new sources of increased demand aren't enough, the global economy is picking up. Merger and acquisition activity among component manufacturers has limited some sourcing options and reduced capacity. While component suppliers are now working to increase capacity, in the short-term shortages and allocation will abound.<sup>1</sup>

That said, allocation and long lead-times are a cyclical part of supply chain management that a contract manufacturer's supply chain management approach should be prepared to address. SigmaTron International's supply chain business model focuses on six key elements to mitigate the risk of supply chain disruption:

- Real-time systems visibility that includes access to customer demand trends, raw material status, inventory status and production status
- Excellent systems linkage among purchasing teams in Asia and North America
- Vendor-managed inventory (VMI) programs with strategic suppliers
- Appropriately-sized finished goods Kanban stocked near major customer facilities, when required
- Enough trends visibility to be able to increase production to replenish finished goods Kanbans if inventory levels start dropping

- Strong relationships with both customers and suppliers allowing collaboration to address specific challenges.

### **Real-Time Visibility**

You can't monitor trends without real-time supply chain visibility. SigmaTron's proprietary iScore system links all its facilities globally to provide company-wide visibility into inventory levels and materials status. The same suite of supply chain management tools is also linked to customers and program managers. This provides a powerful "what if" capability should material availability or scheduling assumptions change. For example, if a production schedule is changed, the International Purchasing Office (IPO) in Taiwan can see the requirements up on the system, view the Approved Vendor List (AVL), and the stocking levels and demand. This lets them determine immediately how urgent the part requirement is and whether air or sea is the best shipping option. Similarly, in the case of a shortage caused by supply chain disruption, the team would be able to quickly determine material on hand, alternate sourcing options, impact to production and current levels of finished goods Kanban.

Customers also have the same level of visibility via the Score system. This provides an excellent dashboard for monitoring forecasts and inventory/material-on-order levels, and adjusting as needed.

VMI programs with strategic suppliers help ensure materials availability within each customer's historical demand variations. Finished goods Kanban provides a final tool for supporting demand variability which can't be easily controlled within the system. This service option is negotiated with customers on a case-by-case basis. In the event of widespread unanticipated supply chain disruption, as with the West Coast shipping port slowdown in early 2015, Kanbans also help ensure an uninterrupted flow of product as alternate sources of supply or alternate logistics strategies are implemented. While both VMI and finished goods Kanbans require increased working capital, the buffers they create help "buy" time for forecast and/or supply chain realignment in the event of unanticipated demand variability or supply chain disruption. The bonds set in VMI push some inventory carrying responsibility back to the supply chain, while ensuring availability of a set percentage of added parts should demand increases occur. If the supply chain disruption is related to shortages in the material pipeline VMI agreements may provide some protection initially, although in the event of a widespread, severe shortage, they are less effective. Finished goods Kanbans provide solid protection for unanticipated spikes in demand or situations where logistics lead-time is increasing over the short-term, but are only effective if replenishment can occur as Kanban is pulled.

### **Global Perspective, Local Support**

Philosophies such as Lean Manufacturing often have unintended consequences. For example, traffic studies in Tokyo after widespread adoption of just-in-time manufacturing practices, found that trucks

rushing among factories delivering parts were actually causing traffic gridlock. Similarly, casebook implementation of Lean philosophy in supply chain management leaves very little buffer should an unanticipated supply chain disruption occur.

That said, inefficiency and waste can still be eliminated in materials sourcing by taking a strategic approach to supply chain management and rationalization. SigmaTron's model relies on centralized supply chain management coordinated with its International Purchasing Office (IPO) in Taiwan. In addition to identifying best sources and monitoring trends in each commodity, the IPO team manages supplier quality in Southeast Asia. Team members are Green Belt-certified and use Six Sigma tools to analyze supplier quality issues

There is centralized management of key commodity segments such as printed circuit boards, semiconductors (ICs and linear logic), power products, connectors, electronic components (relays, electrolytic, ceramic and film capacitors), plastics and metals. This approach helps minimize supplier count by establishing a core of competitively priced suppliers with the right mix of capabilities. In SigmaTron's model, major commodities undergo periodic review, depending on pricing volatility, to ensure pricing stays competitive. This type of approach provides customers with a clear path to best cost competitive options.

The risk with any centralized model, is the possibility the unique needs of individual facilities are ignored. Another potential downside can be excess transport of materials which might better be sourced locally or within a specific region.

SigmaTron's supply chain model addresses this with local purchasing teams supporting each facility. While the IPO is integral to the overall commodity management effort, each team has the ability to source locally when that addresses regional business requirements. The local teams also identify potential suppliers within their region who may be a fit for global or regional sourcing, particularly in the area of maintenance, repair and operating (MRO) supplies.

Distribution is also an important channel in SigmaTron's Lean supply chain management strategy. Distributors play a vital role in the supply chain for three reasons. First, they Lean the supply base by representing a common source for many varieties of components, enabling an EMS provider to purchase against customer AVLs without adding suppliers. Second, they have optimized their services to align well from a systems perspective with those of highly automated EMS providers and they are well positioned to support VMI programs. Finally, franchised distributors represent a known chain of custody for the manufacturers they represent. This can reduce material integrity documentation requirements and helps eliminate the defect opportunities that counterfeit components can otherwise create.

### **Strong Systems and Supply Chain Linkage**

Where possible, SigmaTron's model uses automated systems to keep correctly-sized pipelines flowing based on pull signals. This systems-driven approach frees the team to focus on trends and exceptions. Via its proprietary iScore system, each operation has visibility into forecasted demand, actual demand, inventory in each facility and inventory on order. The IPO and distribution partners in each region act as "single" suppliers, for many materials, increasing efficiency. Auto-replenishment tools supported by an MRP share system take the "touches" out this process. VMI programs ensure onsite materials availability.

The primary tools for auto-replenishment are SigmaTron's Production-Driven Replenishment (PDR) system and its Automatic Replenishment System (ARS) tool. Distribution and other strategic suppliers have linked their systems with SigmaTron and receive pull signals via PDR. PDR is triggered automatically when the iScore system checks inventory for shortages as shop orders are released. If a shortage is detected, a PDR pull signal is sent to the supplier and parts are received in 2-5 days. The ARS tool is utilized with MRP share for the lowest cost products suppliers typically have on the shelf.

Low average selling price (ASP) components are stocked at higher inventory levels, because the administrative cost of multiple transactions is greater than the cost of bulk purchases stocked in inventory.

This combination of commodity-based, centralized supply chain management with input at a facility level helps ensure both flexibility and lowest total cost. Taking a systems approach which links the customer, the EMS team and suppliers, and driving auto-replenishment based on actual demand, helps eliminate unneeded inventory and non-valued added transactions.

The final failsafe in the system is finished goods Kanban, which is negotiated on a customer-by-customer basis and sized based on customer preference and historical demand variability. Where possible, the Company's IPO and factory-based purchasing teams identify local, alternate sources for critical materials.

The company-wide systems visibility provided by iScore enable SigmaTron's supply chain management team to have real-time visibility into consumption trends related to inventory, and inventories are appropriately-sized to demand and availability trends. Systems linkages with customer forecasts provide visibility into future demand trends and systems linkages with suppliers enable rapid adjustments as forecasts and inventories change.

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The strong relationships and trust among customers, suppliers and SigmaTron's team have been enabling candid conversations about the shortages being caused by current market dynamics and the available options for addressing them.

It is impossible to eliminate all risk of supply chain disruption. However, supply chain strategies that balance efficient practices with reasonable inventory buffers, utilize partnering programs such as VMI with strategic suppliers, provide real-time visibility into production and materials status to all key parties, cultivate a large enough supply chain to provide good alternate sourcing options, and foster an atmosphere of collaboration, ultimately do mitigate the impact of supply chain disruption.

### REFERENCES

1 Sheehan, J. "How Lean is Too Lean in Supply Chain Management," November 2017, Circuits Assembly.

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