

## All supply chain networks need be synchronised, resilient and sustainable

### Supply chain management needs to take some steps forward

Most supply chains still operate within siloes and consequently suffer from high stocks, are forced to make larger production runs than necessary, and have long frozen planning periods. Customer service is not robustly engineered into the process and requires manual intervention to achieve, if at all. The problem seems to have no end in sight, yet the financial goals of the business are still to have low inventory, low cost, and high service which are often seen as competing objectives, but this doesn't have to be the case.

The belief is that achieving higher service levels with lower inventory will cost more, because this will require smaller production runs which will cost more to produce. But this can be proven wrong if the right strategy is adopted. There is a way to solve these apparent trade-off issues, enabling a mutually supportive approach that delivers a new level of performance for the business.

In normal times, solving this problem is hard enough but over the last few years external factors have led to high market volatility and supply reliability issues throughout supply chains. Many companies see high inventories as a logical response to these conditions to maintain high service levels and protect operational costs.

Whilst this may have been the right short-term response, and some businesses may be resigned maintaining higher inventories, it doesn't have to be the answer in the longer term. The role of the modern supply chain manager is to manage these issues and keep driving supply chain performance forward. Solutions need to be found. Just-in-time perfect flow has risks BUT it is the right goal, it just needs protecting. The strategic answer is not "Just-in-Time", it's what I call '**Resilient Just-in-Time**'. We need to create resilience in the network AND resolve the apparent contradictions of traditional supply chain management.

Firstly, let's consider the trade-off question.

### Resolving conflicts and synchronising for success

To change the thinking regarding inventory levels, time buffers, and costs in the supply chain, you need to think about the hand-offs across the process and ask yourself how these can be made more seamless. The key question to be asked is: 'How can the information flow and the demand pattern be shaped to enable a win-win situation? Moreover, how can the information flow be changed to deliver a sustainable step forward and not just cause the business to continually to go round in circles. I.e., Inventory reduction for a period, which causes cost increase, then cost reduction for a while, that results in inventory increase.

To make the hand-off between functions more seamless, demand needs to be placed onto the supplying function in a way that will help to deliver the outcomes the customer needs. For the supply chain / manufacturing hand-off the demand signal needs to:

- reduce uncertainty and variability in quantities onto manufacturing to help resource and material planning
- be co-ordinated from multiple sites so that a single production run will meet the supply needs of all locations
- arrive in groups and batches and agreed sequences to reduce the need for the scheduling activity and horizon

These requirements can be met by using the production wheel (or rhythm wheel) approach to supply chain planning. Production wheel methodology solves the trade-off problem:

Design	Benefit
1. Demand is always placed onto the factory in the product grouping and sequence that enables manufacturing efficiency.	1. Reduces the complexity and difficulty of scheduling production, so frozen periods can be collapsed, immediately making the supply chain more responsive.
2. Predictable drumbeat of supply is established	2. The plan, activities and expectations become clear and known and deviation from plan is easily spotted and can then be managed. <ul style="list-style-type: none"> <li>• Processes become more reliable</li> <li>• Reduces need for safety stock in the supply chain.</li> </ul>
3. Well-designed production wheel	3. Batch sizes are likely to be smaller by taking advantage of a stable sequence. Fewer interruptions to the ideal sequence will reduce changeover time and costs. The shop floor has a stable pattern supporting quick changeover initiatives which will drive further improvement.
4. Manage complex multi-tier inventory networks with better co-ordination	4. The drumbeat makes networks simpler to plan. With cross-docking strategies being applied for faster moving SKUs. Replenishment triggers co-ordinated across sites.
5. Inventory buffer for resilience and less manual intervention in the planning processes	5. More precise stock policies can be set as the supply chain will be more predictable. Buffers being paced to protect drumbeat cycles eliminates fire-fighting and manual intervention.
<b>IMPACT</b>	<b>20% to 40% reduction in inventory and waste, and improved OEE.</b>

The drumbeat generates stability and predictability and enables the organisation to have a platform for continuous improvement. Implementation is simple but designing the optimum production wheel is hard, requiring a large, complex mathematical problem to be solved. This is where modern software can help. We at SupplyVue have a production wheel design application which leverages the latest cloud computing power and algorithm technology, that is easy to use, and solves this problem quickly.

The SupplyVue software designs the production wheel and then uploads a set of planning parameter values for your network planning application to prime your supply chain for vastly improved performance. The drumbeat process is demand driven, replacing inventory that was sold in the previous cycle. It is an excellent approach for both supply chain and operations, it's an AND rather than an OR strategy. The planning process will level demand onto operations, using the drumbeat template, and by doing so will create a platform of stability and predictability for operations. This will enable efficiency, reduced lead-times and smaller batch sizes. This will be possible as more changeovers can be bought from efficiency gains from the stability and the reduced number of 'unplanned' changeovers. Lower inventory and higher service levels will result without disruptive manual intervention.

### **Creating a resilient supply chain**

The classic supply chain mantra of replacing inventory with information still applies. But now the problem is more complicated because of the more volatile and unpredictable world we are living in. Supply chain managers need to expand their peripheral vision of the supply chain to see further upstream and downstream. This information can then be used to design the most effective way of delivering resiliency, whether through structural changes or creating more robust and responsive processes.

It is the classic supply chain management need of having better information, however, the information that we need – of both demand and supply - is spread further and wider and not necessarily owned by us. To replace inventory and buffers, you need:

- Timely and accurate data
- Extended visibility of your supply chain
- The analytics capability to assess and evaluate risk and resilience
- Optimisation capability to set buffers
- To invest in alternate sources and routes to create a more resilient network, with fewer points of failure

So how do you get the required information?

Demand visibility – understanding the market dynamics

The commercial side of the business needs to invest in improved understanding of the market. They should establish models that describe how the market operates and can sense and predict short term changes to demand profiles.

Forward supply visibility and collaboration

For B2B businesses the benefit of close collaboration between customers and suppliers was proven during the pandemic lockdowns. Forward visibility of demand can be analysed and monitored to generate early warnings of changes and inventory depletion rates to enable more accurate planning. One step better is to integrate your planning system with your key customers data so that the system can automatically adjust as rates of sale change. To match supply with demand, producers and retailers need to collaborate and build joint plans using the most up-to-date data available. Having real-time data visibility will enable accurate adjustments to plan and schedule quantities and better synchronise the extended supply chain.

Upstream visibility and supply side resilience

Collaboration with suppliers and helping them do a better job for you is key to supply chain performance. Capturing data from suppliers, building a picture of how the supply side network has performed in the past and then creating a corresponding model of that network will provide an invaluable capability for your business. You need to create a digital twin of your inbound supply network so you can analyse performance and assess the resilience of the network. Identifying key points of potential failure and then taking action to create alternative sources or routes will build resilience into your network. Before alternative source are established, inventory buffers should be placed to protect the supply chain. This buffering decision is a carefully evaluated proactive value-based decision, with known causes and justification for the buffer, which can be monitored over time to see whether the buffer is still required. So, having inventory is not a bad thing, but what you should be is very clear on is precisely why the buffer is there and which particular risk it is covering.

A specific example is the single sourcing of key materials, or materials sourced through convoluted, delay prone supply routes. Finding alternate materials and sources should become key product design projects.

Using the digital twin, many alternative demand and supply disruption scenarios with costed mitigation actions can be modelled to identify the most appropriate and efficient investment strategy for the business that will protect revenue and profit.

This focus on network resilience analysis is now a fundamental requirement of supply chain management.

### **View the supply chain with a carbon lens**

Today, there are more issues to be considered than the traditional balancing of cost, inventory, and service. The world is far more complicated. There are other goals and obligations that need to be brought into the evaluation of strategy, tactics, and day-to-day decisions of supply chain management.

#### Carbon and social responsibilities

In considering new sources of supply, businesses need to consider carbon visibility and more importantly carbon management. There's an obligation to report on your supply chain carbon footprint, which should include all aspects of the supply chain, scope 1,2 and 3 emissions.

As part of building the digital model of your supply chain, data to show the carbon build-up through the chain should also be captured and added to the model. This can then bring a carbon lens of the performance of the supply chain and ensure carbon management becomes a core part of the supply chain analysis, modelling and decision making.

In addition, businesses have social responsibility obligations and there is good reason to be able provide evidence of provenance of materials and components.

- Do you know and can you show where your material components have come from?
- Do your suppliers comply with social policies and requirements?

So, the obligations and requirements on sourcing policy and selection are far more onerous than before. The balanced scorecard of supplier performance and measurement has expanded as has the entry criteria to be selected. Suppliers need to be able to track, monitor, and report on compliance and demonstrate progress to higher levels of performance. All this information needs to be built into your model of your supply network so that you can assess performance across this broad set of criteria.

### **Supply chains are complex and expensive**

Supply chains, the portfolio of products being supplied to geographically dispersed customers, are complex, interconnected, dynamic and fast moving. They are also expensive. Poorly managing a supply chain has significant financial consequences for your business – higher costs and lower sales.

Your organisation needs to be capable of managing this complexity and keep moving forward, developing and learning, it needs:

- A model of the market dynamics that can be constantly improved so your demand projections become more reliable
- A vision for how the supply chain should operate, your 'way' of operating and functioning

- A process to drive constant improvement of the supply chain process, effectiveness, efficiency, and reliability

Supply chain managers need the tools, information, and support to help them meet these challenges, they need:

- Data, analysis, and analytics that surface issues requiring their attention
- Capability to see beyond the four walls of their own business
- Modelling, algorithms, and decision support capability to enable responsive and accurate decisions

The collaboration and visibility that is needed to create resilience will reveal a large complex supply chain that people will need help to manage. So, what do you need to do to achieve supply chain success in this context?

### **Create a learning organisation**

We strongly recommend the synchronised drumbeat approach to supply chain planning and execution to create stability and predictability. Deviation from the drumbeat is quick and easy to spot, so you can respond quickly to such events. This will create more reliability and resilience. The drumbeat approach also creates organisational alignment as it is a win-win strategy.

Adding a digital twin capability to this approach, and to your business, provides the visibility and modelling capability and the transparency required to support a learning culture, one that is working at improving the process, speeding the cycles, removing time and waste, and delivering greater value for the business. We have the capabilities to help make your business a supply chain management learning organisation.

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