



AUTHOR

SIMON EAGLE

Supply chain agility and flexibility

Frequently used words to describe desired supply chain behaviour include agility, flexibility, stability, reliability and, in more recent years, sustainability. Simon Eagle defines them.

Flow

Perfect flow occurs when the end-to-end supply lead-time is composed wholly of value-add activity – that is, no cessation of movement in the form of static inventory whether planned, such as in a finished goods warehouse, or as WIP awaiting processing.

Most supply chains achieve less than 5% when this is applied to individual units of material due to the impact of queuing and batching, which are, respectively, a symptom and cause of the variability that destroys flow.

Variability

Variability refers to the arrival patterns of materials at constraints such as work centres and the rate of processing by, or demand patterns at, those centres. For instance, when a large quantity arrives at a work centre, the backlog queue immediately grows; when a work centre slows down or stops, capacity is irretrievably lost. It is the interaction of these two forms of variability that causes queues. If there was insufficient capacity,

the queue would grow without limit. Queues grow in line with variability and become significantly longer when capacity is tight.

By reducing our levels of supply chain variability we can achieve higher capacity utilisation with lower levels of WIP and shorter lead-times. Assuming we are replenishing what our customers are buying, we will also be achieving our planned service levels.

Reliability

Reliability describes the ability of supply chain value-add activities to deliver their agreed and planned level of capacity when called upon. This capacity can be measured in terms of throughput over planned uptime. If the work centre is unable to process product at the planned level of throughput, then capacity will be lost and an upstream queue of inventory created. Without the existence of spare capacity to enable catch-up, this delay will be permanent; or, if caught up with at the expense of other supply schedules, will ripple out across the supply chain

through material requirements planning's (MRP) network of dependent demand relationships.

Flexibility

The supply chain's flexibility reduces the size of the required aggregate buffer.¹ Flexibility comes from positioning planned buffers between multiple value-add activities to decouple them and prevent the entire supply chain being impacted by local delays. Flexibility is also aided by holding generic upstream inventories in support of postponement, use of multipurpose assets and multiskilled people who can respond to changing demand with fast changeovers. Small batches, enabled through Single-Minute Exchange of Die (SMED) are also a contributor to flexibility by allowing fast response to changing demand patterns.

Stability

Contrary to common belief, stability is not about operations having visibility of future firm schedules many weeks in advance. Very often, companies try to

achieve this form of rigidity through time fences, and generate flow variability by changing the schedules..

In contrast to its commonly understood meaning, operational stability is the various supply chain value-add activities working to their own efficient and predictable sequence with minimal unplanned stoppages, changes and interruptions. Operations need to be capacity-sized correctly, but this is a function of aggregate planning.

The benefits of stability are that costs can be minimised through working to a sequence that maximises changeover efficiencies and can be relied upon so that people, materials and machines can be prepared as necessary so that there is no loss of throughput.²

Agility

Agility is the ability of a supply chain to respond autonomously to demand, with buffers that are minimised, and in the form that best serves both the company and customers.

An agile supply chain, with minimal cost generating buffers, is going to have a high degree of sustainability. It will help the company to be extremely cost competitive

and, by eliminating unnecessary waste, it will be sustainable from a green perspective through minimising use of carbon generating energy and materials.

Supply chain agility is achieved through flexibility, reliability and stability, all of which, in their own way, contribute to minimising variability.

Demand Driven SCM

Demand Driven SCM can be implemented across even the most complex bill of materials and routing networks. This can be done by using simple reorder point/reorder cycle mechanisms at multiple independent inventory positions ensuring material is processed in line with demand (or in advance for significant events) and with adequate independent buffer to absorb local variability and prevent it being amplified up and down the supply chain.

Demand Driven SCM treats supply chains as what they really are: flows of materials that are prone to develop queues in the presence of variability. Instead of using expensive capacity to keep materials moving, Demand Driven SCM eliminates forecast error-induced variability.

Independent inventory buffers absorb process variability and use multiple loose-pull mechanisms to ensure that resource is only used to create what is needed, when it is needed and in a manner that allows maximum capacity utilisation and the right sizing of inventories in line with planned service levels. 

SIMON EAGLE



Simon Eagle works for Camelot Management Consultants and is an endorsed instructor with the Demand Driven Institute. His book *Demand Driven SCM: transformational performance improvement* is being published by Kogan Page on 3rd April 2017.
seag@camelot-mc.com

REFERENCES

1. See HOPP, WALLACE J, *Supply Chain Science*
2. Productivity increases of up to a third have been recorded as a consequence of regular and predictable schedules being introduced into operations through economies of repetition.



The Chartered
Institute of Logistics
and Transport



CILT ANNUAL AWARDS FOR EXCELLENCE 2017

Open for nominations

Celebrating achievement

Development of People | Environmental Improvement | Freight Transport Best Practice | Information Management | Logistics and Transport Journalist
Logistics and Transport Student | Operations Excellence | Passenger Transport Best Practice | Safety | Supply Chain Innovation
Transport Policy and Planning | Vulnerable Road Users Safety | Warehouse Operations | Young Manager

T: 01536 740148
E: events@cilt.org.uk
W: ciltuk.org.uk/awards

Nominations close: **26th May**
Gala Dinner: **19th October**