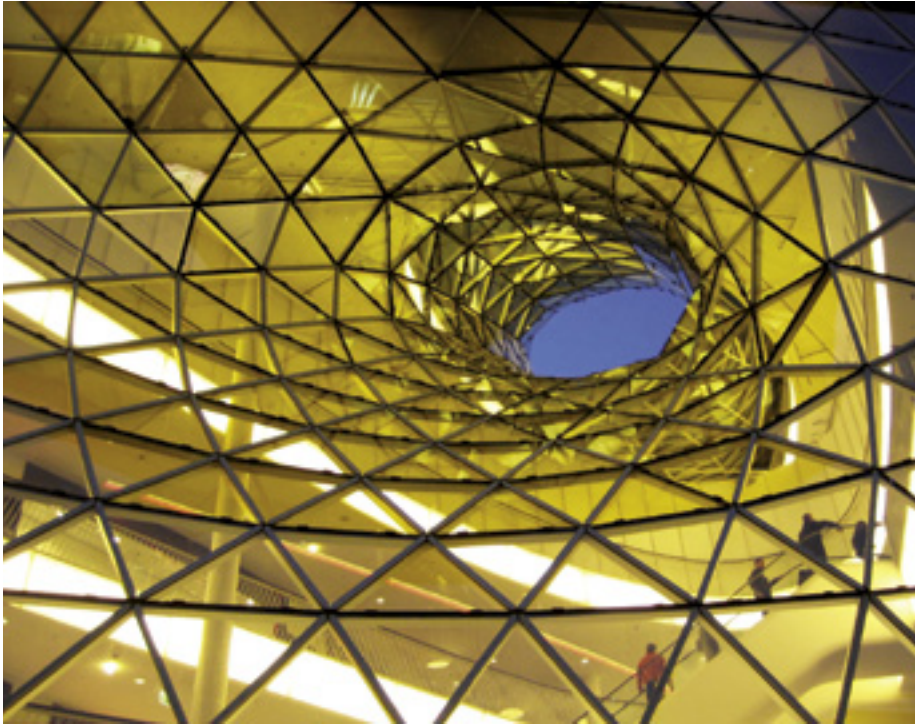


SUPPLY CHAIN NETWORK OPTIMISATION

MARK GIBSON



From inventory optimisation, manufacturing capacity optimisation and warehouse space optimisation through to route optimisation - we've all heard of or engaged a number of different optimisation approaches. Each methodology provides benefits to the organisations engaging their techniques, but in most cases, each approach deals with the separate pieces of a supply chain network.

Having driven savings out at a local facility level, companies now realise they can deliver the next wave of improvements in cost and service by examining their network of supply chain facilities and taking a 'whole of supply chain' view to optimise networks.

What is supply chain network optimisation?

Supply chain network optimisation (SCNO) takes all of the flows of material needed to satisfy demand into and out of the network, considers the costs and constraints associated with those flows around all of the facilities in the network, and then finds the lowest-cost solution satisfying all of the identified constraints.

As examples, costs can include fixed and variable costs for manufacturing, the receiving, handling and despatching costs at each storage facility as well as the various transport mode costs. Constraints can include the manufacturing or delivery lead times from each facility

to its customer, the percentage of customers serviced within those delivery lead times, minimum order quantities or a minimum or maximum capacity constraint.

Approaches – from rough cut to sophisticated, simple to detailed

It is relatively simple to design a distribution network in Australia if all you want to do is satisfy a next-day delivery promise with a road transport delivery, but what do you do if it's a little more complex than leasing a warehouse in each capital city, filling it with stock and getting a logistics service provider to deliver it for you on their trucks?

A basic approach would be to linearly scale up your inventory and operational capacity until you reached a nominated limit (number of pallet spaces as an example), then looked at the options for expanding your footprint. That's fine, but it doesn't optimise your costs.

A better approach would be to set up a centre of gravity or a network optimisation model using Excel's Solver function, with its objective function set to minimise the total costs while satisfying the model's constraints. Unfortunately, Excel has a limited number of decision variables it can consider, so whilst it can provide a rough-cut guide that will lead to a better decision than linearly scaling your operation, it lacks the capacity and levels of

granularity that specific network optimisation modelling software provides.

Network optimisation modelling software like Axxom's OR-ion PI for example, can take demand by SKU at a customer postcode level, take into account the network fixed and flow costs, the facility capacity constraints and lead time constraints, and provide a view that represents the best network satisfying those requirements.

What creates the need for an organisation to look at SCNO?

Primarily, an organisation's supply chain strategy should use the operational model that best meets the responsiveness criteria of its customer service offering in the most efficient and effective manner with the resources at its disposal. What does that mean? If we look at the four key supply chain resources an organisation has at its disposal – its facilities (manufacturing plants, warehouses), the inventory in those facilities, its transportation network and the information relating to all of the activities in it – the way an organisation chooses to utilise them and design its supply chain network will dictate both the level of service it provides its customers and the costs it incurs in delivering that service. So to answer the question, companies should look to performing a network optimisation analysis when the following changes emerge in their operational environments:

- Grow beyond their last business plan and strategy constraints (e.g. gone from a state-based business to a national business).
- A review of their complete network aimed at finding the optimal cost model to fit their business strategy.
- Testing their strategic options to see if they deliver the anticipated results.
- Expansion through acquisition and have potentially overlapping distribution networks.
- Plans to change their customer service offering.
- Re-aligning their supply chains to their customer and market channels.
- Rationalise their inventory holding (e.g. centrally stock certain products or product groups).
- Rationalise or change their manufacturing operations or supplier base.

Other factors that drive requirements may include:

- When their supply chains change from outside influences such as:
 - Emerging low cost manufacturing economies, shifting sourcing considerations from China to Thailand, Vietnam, India,

- Philippines and other locations.
- Emerging opportunities to use regional consolidation centres in China and Singapore servicing the low-cost manufacturing economies.
- Political influences including changes in taxation and investment incentives.
- Improving infrastructure providing cost and service improvements.
- Carbon emission reduction schemes, driving a need to reduce the transportation kilometres travelled.
- Shifting their customer and market channel model from wholesale to retail to incorporate a growing online channel segment or other cross channel segments.
- Manufacturing and distribution centres reaching the end of their effective life span.

What's involved?

To undertake a network modelling exercise, the first step should be to develop a map of the network that considers all of the flows in from supply sources and out to customers, the costs associated with those flows, the delivery times, the manufacturing, storage and distribution capacities of its facilities and all of the costs and constraints associated with operating those facilities. Once a

map of the existing network has been developed and the data underpinning that map has been obtained, a baseline model that closely replicates the existing network should be drafted. From there, a series of scenarios can be tested and the changes in the model outputs brought about by either changing the volume, cost, service levels or capacity variables from the current ones or allowing the model to find the optimal situation based on the business strategic constraints can be compared against the baseline model.

What benefits can you expect?

There are four key benefits from a fact based network optimisation project:

1. To reduce the costs in a given network - depending on the constraints placed on the network, companies could expect savings over their supply chain networks to be in the 5 -15% range.
2. To improve your customer service offering by better locating facilities and inventory across the network, companies can expect to see improvements in both their customer service levels and against their market service offering.
3. To ensure that your supply chain network meets your strategic requirements for a given time horizon and set of assumptions.

4. To identify the risks associated with the implementation of a supply chain strategy and increase stakeholder confidence in the solution.

Conclusion

Undertaking a 'whole of supply chain' network optimisation review can be a worthwhile exercise to ensure strategic initiatives are met at the lowest possible cost. If you've taken as much cost out of your supply chain network at a local facility level as you can, or your operation is reaching its capacity or the end of its effective lifespan, this is a logical next step to improve your supply chain's operational effectiveness and responsiveness. In an increasingly complex environment, utilising the latest analysis tools and techniques to perform a fact-based analysis across your network provides your business with a far more effective view for planning and designing its supply chain network to meet the expected demand and achieving your business strategy at a lowered level of risk.

Mark Gibson is a senior manager at GRA, a consulting firm specialising in supply chain strategy, planning and execution. For more information call (03) 9421-4611, email mgibson@gra.net.au, or visit www.gra.net.au. mhd



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CONVEYOR TECHNOLOGIES PTY LTD
 ABN 17 089 670 557
 Designers & Manufacturers of
 Conveyor Systems and Equipment.

SYDNEY
 Head Office & Factory
 6-8 Amour Street,
 Milperra, NSW 2214
 P.O. Box 225,
 North Revesby, NSW 2212

Phone: (02) 9771 4655
 Fax: (02) 9771 3682
 Email: sales@adeptconveyor.com.au

MELBOURNE OFFICE
 Unit 1, 116 National Boulevard,
 Campbellfield, VIC 3061

Phone: (03) 9357 8814
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