The Logic Fault in Today's Supply Chains

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In 2006, the Global Commerce Initiative, a group of executives from retailers, manufacturers, logistics operators and service providers produced a vision of what supply chains in 2016 might look like. They identified three challenges. The consumer goods industry must:

- develop new ways of working together
- share information more readily and freely
- redefine the 2016 value chain

This article – the first in a series of four - identifies faulty and damaging logic at the very heart of today's supply chains that the author believes is responsible for many of the issues facing organisations across supply chains. Many current supply chain initiatives are merely addressing the symptoms caused by this logic fault rather than the root cause. Most people seem to be unaware of this logic fault built into most supply chain systems. Until this logic fault is recognised and addressed, achieving the GCI vision will be extremely difficult, if not impossible.

The GCI's vision is illustrated in Figure 1.

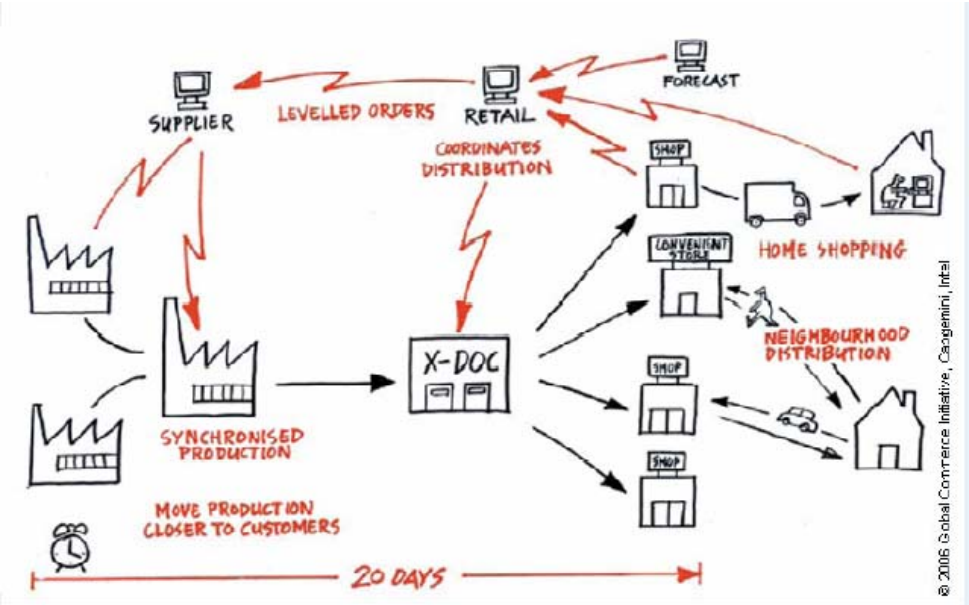

Figure 1: Supply chains of the future *Source: GCI*

The three most important items in this map are levelled orders, synchronised production and coordinated distribution. They go right to the heart of the first challenge identified by the GCI: "new ways of working together". Without new and better ways of working together, none of these building blocks can be achieved. But there is something blocking our progress towards this; something embedded deep into how today's supply chains are organised. It is the faulty logic of "economic order quantities" (EOQ) or batch logic. If we cannot overcome this batch logic, progress will be impossible.

Chaos from order

It's common knowledge that EOQs cause peaks and troughs in supply chains – problems most commonly discussed under the headings of 'the bull whip' or 'the Forrester effect'. Strangely, even though supply chain managers are well aware of these problems, they still form the basis of most planning systems. To illustrate just how bad the problem can be, consider Figure 2 which shows actual consumer sales of a single product through the tills of a major retailer over the 52 weeks of a year.

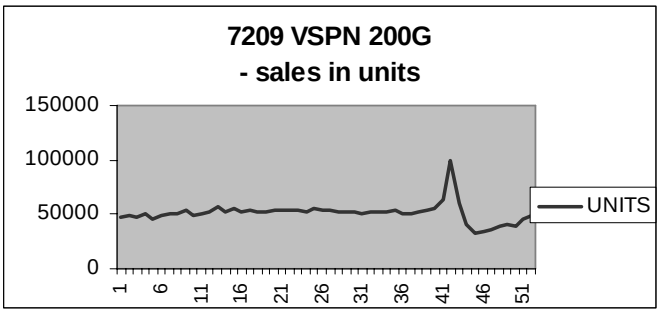

Figure 2 Actual sales of a consumer product, week by week

Apart from a peak at Christmas and a subsequent dip in January, the rest of the year is practically flat. Underlying demand is surprisingly stable. Knowing this, we would expect the retailer's planning systems to show stable orders to its supplier. But the actual orders received by the manufacturer are shown in Figure 3. One step in the process and EOQ converts a level demand into orders varying between 300 and 3000 cases!

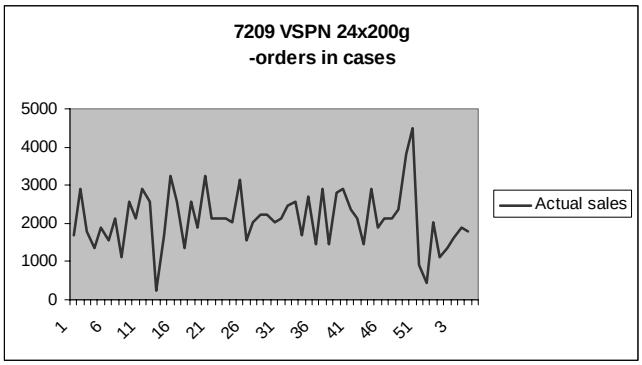

Figure 3: Actual orders received by manufacturer from retailer

This is bad enough, but the effects of this order volatility are compounded by the way modern production planning systems work.

EOQ logic tries to maintain a target stock level: a fixed point level calculated to be the theoretical balance between a series of conflicting objectives of customer service, working capital, run length versus set up losses (to name but a few).

Every time a plan is calculated, whether it is what to order from suppliers or what to make in production, the system re-calculates back to this set figure. If all the data in this calculation was all perfectly correct, this calculation might come up with the 'right' answer. But in real life, the data never is 100% accurate.

There are always some inventory record and bill of material inaccuracies. Sales are always different to what is forecast. Suppliers will often deliver slightly less or more than what was actually planned. Production lines will always produce slightly less or more than what was specified in the plan. So there is only thing we can be 100% sure of, and that is that somewhere, to some degree, the data used to generate the plan will not fully reflect the underlying reality. That is why every time a plan is produced, it soon becomes clear that there is a discrepancy between what the plan says and what's actually happening … which requires the production of a new plan.

Most people believe that plans change because customers are forever changing their requirements. This belief triggers a domino-effect of finger-pointing. "**We** have to change our plans because **your** data is inaccurate."

“No! That’s not true. **You** never supply us with the accurate information **we** need!”
In reality, the idea that inaccuracies are introduced by external forces is a myth. Empirical research shows that customer order changes are one of the least common causes of plan changes. The biggest cause, by far, is issues and errors in the organisation’s own operations and supply chain. Result: endless noise echoing its way back and forth through its own systems.

Of course, suppliers of ERP/MRP systems have ready answers to these problems. They say things like:

- “you need to track and monitor every step in the process to get data accuracy. Of course, this means you need even more sophisticated systems like radio frequency tracking”
- “you also need to run the plan more frequently … which means you need a bigger computer!”
- “of course we can provide consultants to help you implement better processes to make your data accurate”

What they don’t say is that the more sophisticated the systems are, and the more steps that are needed to create ‘the perfect plan’, the more errors are likely to be introduced, creating the need for even more sophisticated systems … and even more consultants. Wittingly or otherwise, they have created a miracle: the miracle of a perpetual motion machine for issuing new and ever more expensive consultancy contracts.

A case study

To illustrate the impact of batch logic, let’s look at a large global branded FMCG company which shall remain nameless for the sake of its reputation. Rest assured: their case is far from unique. We asked the Vice President of the Global Supply Chain to map what happened to the weekly production schedule after it was issued. How many copies were made? Where did they go? What other plans were generated from the schedule? How many times a week did the plan change? Figure 4 shows the result.

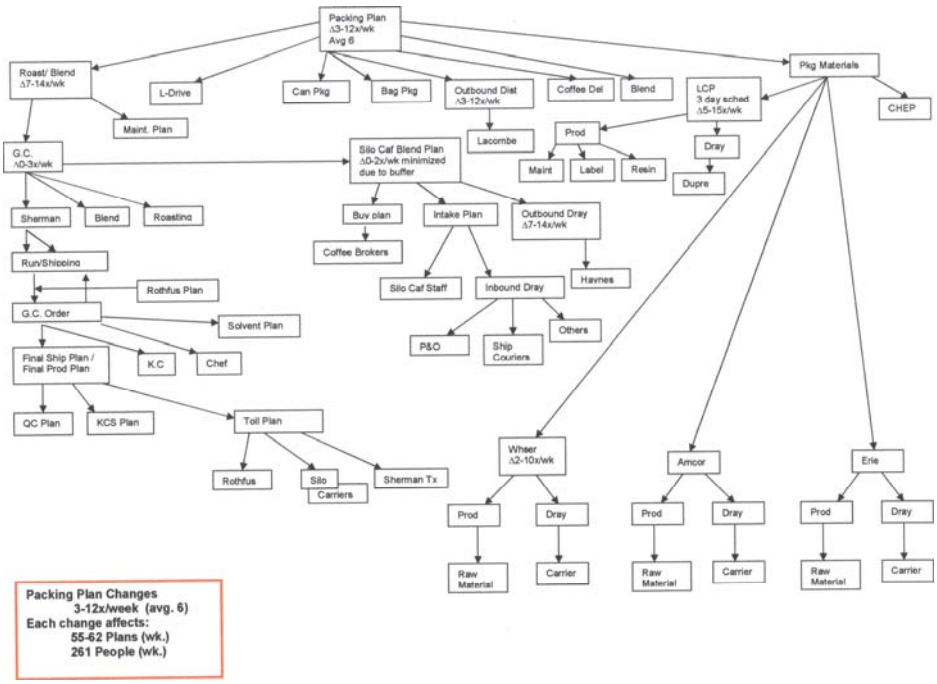

Figure 4: Mapping what happens to the weekly production schedule

The map shows that fifty-five different areas needed to receive a copy, or derived plan, of the weekly production schedule …and it changed on average six times a week! With this happening, was there *any* chance that everyone would be working to the same plan? Remember, this is a highly successful and well regarded organisation equipped with the latest ERP computer systems.

But it gets worse.

This company prided itself on building flexibility into its manufacturing facilities. As the product progresses through the various stages of manufacturing and packing, production managers are able to use different equipment and to switch routings through the factory. There was a good reason for this (or so they thought). It was “to meet the demands of our customers when they change”.

But when we asked the company to keep a simple check sheet of why plans change, the biggest reason was issues within their own organisation. The real reason the company placed so much emphasis on ‘flexibility’ was to cope with problems arising in its own production process: ‘if there’s a problem, switch from one piece of equipment to another’. Figure 5 shows

the effects of this production flexibility for each stage of manufacturing for a factory making liquid products.

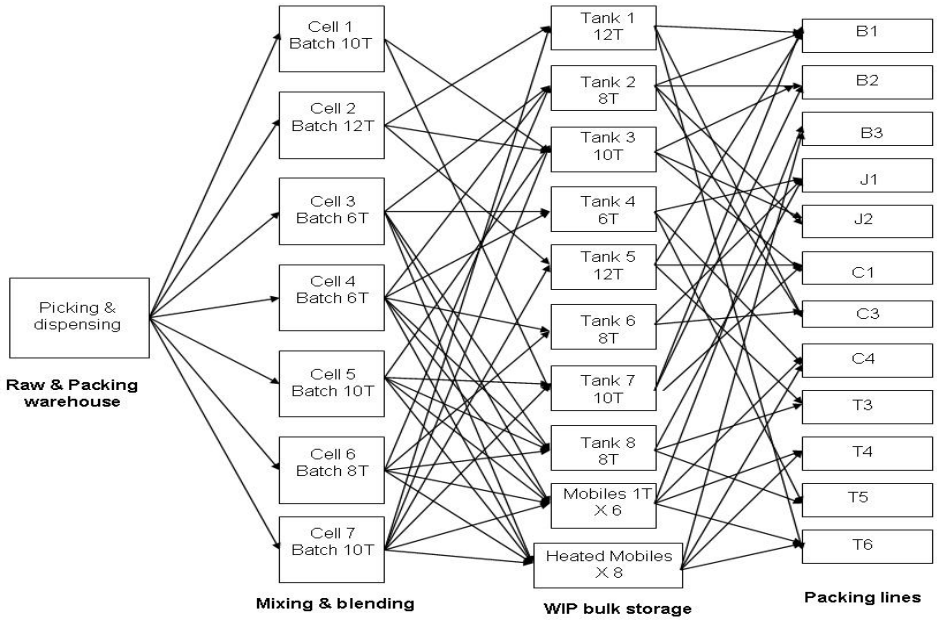

Figure 5: Complexity created by 'flexible manufacturing'

Now couple this "flexibility" to the schedule map shown in Figure 4. Is it any wonder companies find it hard to create and keep to stable, orderly plans? This complexity and confusion is also compounded by broader market trends such as increasing numbers of product types, promotions and shorter product life cycles. The result is a production environment characterised by endless fire fighting, chaos and stress for everyone involved.

The GCI identified a need for the industry to develop new ways of working together. We will *never* achieve this as long as we plan and manage our daily activities around a logic that disrupts and destroy the very planning (and therefore the ability to cooperate better) that it claims to promote. EOQs and batch production *are* this self-destructive logic at work. What we need is a new and different logic that drives supply chain processes capable of coping with a degree of data inaccuracy *without* causing short term plan changes. The good news is this alternative logic exists. It is "flow logic" and he next three articles in this series will describe this alternative logic, how to start implementing it, and how to roll it out across the entire supply chain. It is also described in the workbook "Breaking through to flow" published by the Lean Academy UK www.leanuk.org.