

# New Market Innovation Through Supply Chain Management

By Gary Luck

How well is your business performing today? It's probably difficult to say exactly, given that the information currently on your desk or computer is incomplete. It's even harder to predict how your business will be performing in the coming months.

Three common measures of performance are net profit, return on investment and cash flow. These three financial measures can be impacted upon positively by three crucial operational measures, namely:

- an increase in throughput, i.e. the rate at which money is generated through sales
- reduction in inventory i.e. all the money invested in purchasing the product the system intends to sell
- reduction in operating expense i.e. all the money spent turning inventory into throughput

In the context of this article we shall examine how the simultaneous focus on these three operational measures can deliver not only market-leading performance, but also enable innovative strides to be taken into new products and markets. New approaches to operational performance can re-shape existing markets and open up new strategic opportunities. These resources can be deployed to produce and market new products or services that rely upon speed, flexibility and variety.

We have chosen the story of a manufacturing company, Remploy, to illustrate how a company is in the process of moving into new markets after having delivered dramatic improvements in its own operational performance and that of its clients. There are many similar examples, in both manufacturing and service industries.

Traditionally, managers have focused on improving sales and/or reducing costs, but rarely on all three of the above measures, simultaneously. It was breaking away from focus on part cost-control, looking at whole system benefits (through simultaneous focus on all three measures) that enabled Remploy to transform its performance at a critical time for the company and the country.

### Remploy

Any manufacturing company aims to deliver on time, in full and to specification. In May 2003, Remploy secured an order to supply 94,000 NBC protection suits to the MOD. This meant more than doubling their existing production output. Failure to meet the MOD order would not only endanger lives in Iraq, but would also jeopardise any chance of future orders for existing products or the

**DEFINITION**

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The Theory of Constraints addresses three key questions:

*What to change?  
What to change to?  
How to cause the change.*

*The key principles of the theory provide a framework that enables the analysis of systems and identification of the underlying constraint.*

opportunity to bid for the supply of other products to the MOD. Such a contract was also vital to secure ongoing opportunities for training and employment of disabled people who make up 90% of their workforce.

It was clear that a radical new approach was needed to ensure fulfilment of the MOD order. A '3x' programme (aiming to triple profits) had already been installed and was producing dramatic results. The question now posed was whether some of the measures that had contributed to the success of 3x, could help meet this current manufacturing challenge. To be specific, how could Theory of Constraints (TOC) methodology, invented by Eliyahu M. Goldratt, that had transformed production within a single factory in Stirling, be applied to the Remploy supply chain?

Production and supply of garments were not new to Remploy. A central cutting unit (CCU) in Birkenhead supplies 4 sewing factories in Dundee, Stirling, Cowdenbeath and Clydebank. In all the factories there was abundant stock and work in progress. However, the specifications for their new contract were far more exact; suits of exactly the

## IT WAS TIME TO QUESTION CONVENTIONAL 'WISDOM' AND CHALLENGE PRECONCEPTIONS



**OPERATIONALLY, THE RESULTS WERE DRAMATIC... IN 3 OUT OF THE 4 FACTORIES, THROUGHPUT HAD INCREASED BY 18% OR 19%, ACCORDING TO A 4 WEEK ROLLING AVERAGE. OUTPUT PER EMPLOYEE WAS UP BY 13.4%. WORK IN PROGRESS IN THE FACTORIES WAS REDUCED BY MORE THAN 50% AND IN THE CCU BY 25%.**

right size, type and colour were needed urgently. To respond to the demand, they were required to:

- Dramatically increase flexibility, and
- Reduce the lead time of manufacture and supply

It was time to question conventional 'wisdom' and challenge preconceptions. For example, the logic of minimising transport costs is rarely questioned. Remploy had managed this cost well, with a weekly delivery of cut pieces transported from Birkenhead, on a run that visited each of the 4 making-up factories. A central feature of the reviewed approach would be the introduction of 4 deliveries per week to each factory, quadrupling transport costs. Could this really be an improvement?

The way forward was dependent on a new approach in the factories, which meant a new approach to the supply chain process, both based on the TOC applications. In the factories a system of Drum-Buffer-Rope was implemented.

Based upon the TOC Distribution Application, there was a shift from 'push' to 'pull' production, according to the demands made by the requirements of the customer order.

It was vitally important to secure buy-in from all the factory workers for these new ways of working, which were clearly likely to provoke scepticism if not direct opposition. The Remploy team of internal consultants, who were part of the 3x programme, ran workshops with staff from the CCU and the factories. There was general agreement that the TOC Distribution Application and the Drum-Buffer-Rope approach made good sense, but several concerns were voiced. One of these was that the cutting machine was not suited, technically, to being frequently switched on and off, and might, as a result, break down. Another was that delivery of smaller batch sizes might result in the need to stop production lines due to 'out of stock' situations. However, on balance it was decided that the changes should be implemented. The very first step

was to stop any further cutting at the CCU for two whole weeks to reduce work in progress.

**Results**

On a return visit 5 months later, the extent of the improvements was immediately visible. There was far more space in the factories, both on the shop floor and in the delivery areas. Whereas in one factory on the previous visit the stores had been choked with 3 weeks' supply of 64 bins per week (each containing component parts of 50 suits), there were now just 16 bins, representing just one day's delivery. Far less time and effort was wasted

**DEFINITION**

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 Drum-Buffer-Rope

*A system can only run as fast as the speed of its weakest link, or bottleneck. A drum beats the pace of the bottleneck for the whole system. A buffer is put in place before the bottleneck to make certain that this most constrained link in the system is always worked to its full capacity. The rope is the communication (from the bottleneck) of the rate at which material should be brought into the front end of a system.*

## THE NEW WAYS OF WORKING IMPLEMENTED:

### Reduced work in progress

This enabled more visibility, for example, of problems around a bottleneck where work in progress would build up. Once seen, such problems could be addressed.

### Smaller batch sizes, delivered more frequently

The cutting machine would produce smaller numbers of each batch before being stopped and adjusted to cut different sizes according to the demands of the order, enabling greater flexibility and a reduction in the lead time for each garment. This meant that if a sewing factory needed to assemble for example, trousers that measure 32" waist and 32" leg, the correctly cut pieces could be delivered within 24 hours rather than possibly not until a week later, with the next delivery. The completion and despatch of the garment from the sewing factory would be correspondingly quicker. Meanwhile, the same factory would not have to store delivered component parts that were not appropriate to the immediate specification of current orders. This reduced work in progress and cash tied up in the business.

### Daily measurement

The schedule of production would be set daily, on the basis of orders placed by the customer.

### Gradual raising of the bar

The 'bar' that identifies production targets would be set low at the start and raised gradually by 5% as subsequent targets were met

in moving and handling stock, as it was easy to locate and identify the low level of stock in the stores. There was much better visibility of work in progress and better control over raw materials and finished goods. The changeover from product to product was smoother. Contrary to earlier fears, the production line had never had to be stopped as replenishment of stock was both more frequent and more reliable. The transport, a crucial part of the new way of working, had never failed to make a delivery. The cutting machine had withstood being switched on and off without significant increase in break down rates.

Operationally, the results were dramatic. From component parts of a garment being cut in Birkenhead to the finished garment being despatched from a factory in Scotland to the MOD, the elapsed time was now only 3 days. In 3 out of the 4 factories, throughput had increased by 18% or 19%, according to a 4 week rolling average. Output per employee was up by 13.4%. Work in progress in the factories was reduced by more than 50% and in the CCU by 25%. By the end of September production was close to 100% on target, in full. £156,000 had been saved as a result of a reduced need to subcontract. The increase in cost of transport of about £20,000 was negligible compared to the increased profitability. As well as every employee having increased their productivity, they were far happier and better motivated.

Absenteeism in the factories was reduced from levels of 10% down to 3%.

Remploy have improved speed, flexibility and variety to such an extent that they are now able to supply new and different products. Through their simultaneous focus on the three key operational measures, they are now able to move in new and innovative strategic directions. Whilst Remploy cannot exactly predict the future, their latest management information provides a sound basis for future strategy.



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