

## How Supply Chains Create Shareholder Value

by Dr. David Lascelles, Supply Chain Planning UK Limited

Supply chain management is no longer a boring Cinderella of the business world. Not since the mid-nineties when enterprises as diverse as Amazon, Cemex, Cisco Systems, Dell Computers and Zara started to create dominant competitive positions, build huge market capitalisations and delight their shareholders through the brilliant management of their supply chains. No, supply chain management has become a hot topic in boardrooms worldwide.

The case histories of Internet retailer, Amazon; web systems builder, Cisco; PC giant, Dell; and Spanish fashion retailer, Zara are well documented. But Cemex, a Mexican cement supplier? Well, you don't need to be in hi-tech or high fashion to reap the benefits of supply chain excellence. The effects can be just as dramatic for a commodity supplier. As a result of its supply chain performance improvement efforts, Cemex enjoys the highest value-to-sales ratio of the world's six largest cement manufacturers.

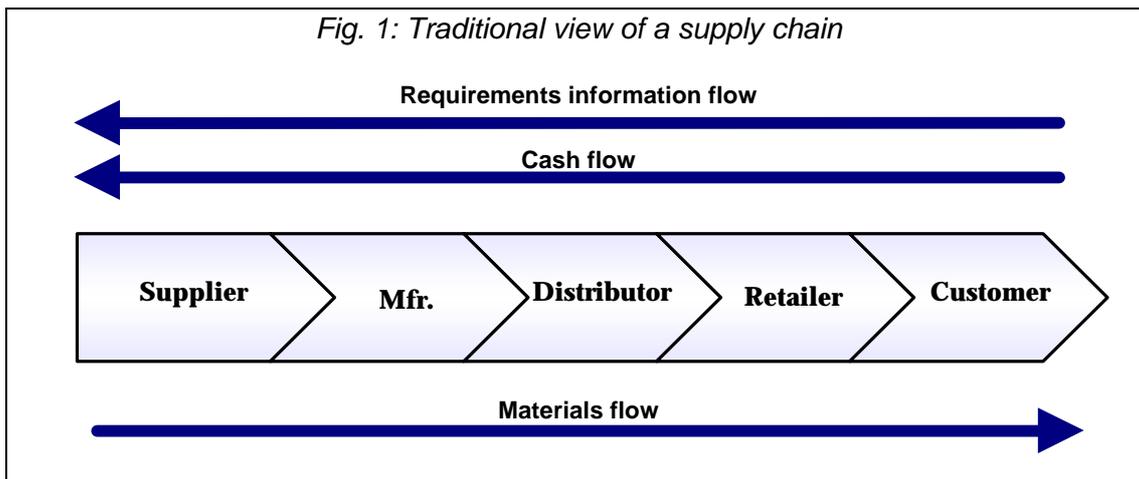
These enterprises represent just the tip of the iceberg. More than one study indicates that superior performing supply chains increase free cash flows – the key driver of shareholder value – by up to 20% on average. Supply chain excellence is a crucial engine of economic growth.

And yet, even though it represents one of the most exciting opportunities to create value and build market share, the supply chain remains one of the most confusing and least understood aspects of business. The purpose of this briefing is to help you review the salient issues and apply the findings in a real-world environment.

So let's start with a simple definition of the supply chain and supply chain management:

*The supply chain is a flow of materials, information and money through a network of suppliers, manufacturers, distributors and customers. Excellence in supply chain management boils down to having the right product in the right place, at the right price, at the right time and in the right condition. And in doing this better than your competitors.*

A supply chain consists of all the stages involved in fulfilling a customer order or requirement. This is a concept increasingly referred to as *the extended supply chain*, spanning a market or industry sector, from original source to point of consumption. The extended supply chain not only includes manufacturers and suppliers, but also distributors, retailers and end-customers. Figure 1 shows how the extended supply chain is usually envisaged.



The customer is an integral part of the supply chain. The primary purpose for the existence of any supply chain is to satisfy customer needs, and in doing so to generate profits. Supply chain management activities begin with a customer order and ends when a satisfied customer has paid for the purchase – a process often called *the cash-to-cash cycle*. The end-customer is the only real source of positive cash flow in the supply chain.

In a retail supply chain, for example, the customer purchasing a box of detergent, or a washing machine, is the sole provider of positive cash flow. All other cash flows are basically exchanges of funds between the different enterprises participating in the supply chain. All flows of material, information and money between participants successively diminish the value of that positive cash flow. Therefore, effective management of these flows is vital to supply chain success. In fact, it could be argued that supply chain success should be measured in terms of supply chain profitability overall, and not in terms of profits at individual stages.

Excellence in supply chain management is a combination of operational effectiveness and added value performance. Each participating enterprise must skilfully manage all the functions involved in fulfilling its stage of the extended supply chain (essentially *operational effectiveness*). The more skilful they become, the better able they are to increase customer loyalty, win market share and improve free cash flows for themselves and the extended supply chain (hence *added value performance*).

This is a crucial point to bear in mind when auditing supply chain operations, especially in view of the broad scope of activities and issues normally covered. Basically, an audit of supply chain operations seeks to determine if the enterprise:

- Effectively manages its stage of the extended supply chain to satisfy customer requirements.
- Adds real economic value for its owners through improved positive cash flows.

Before getting down the nuts-and-bolts of the audit, it is worth taking a quick look at the fundamentals of this high-impact mission.

## Visualising the Supply Chain

The term *supply chain* implies movement of products from suppliers to manufacturers to distributors to retailers to customers along a chain. The term may also imply that only one enterprise is involved at each stage. In reality, a manufacturer will receive material from several suppliers and then, in turn, supply several distributors. Therefore, most supply chains are actually networks. So it would be more accurate to use the term *supply network* or *supply web*. However, for the sake of consistency, the term *supply chain* will be used in this paper.

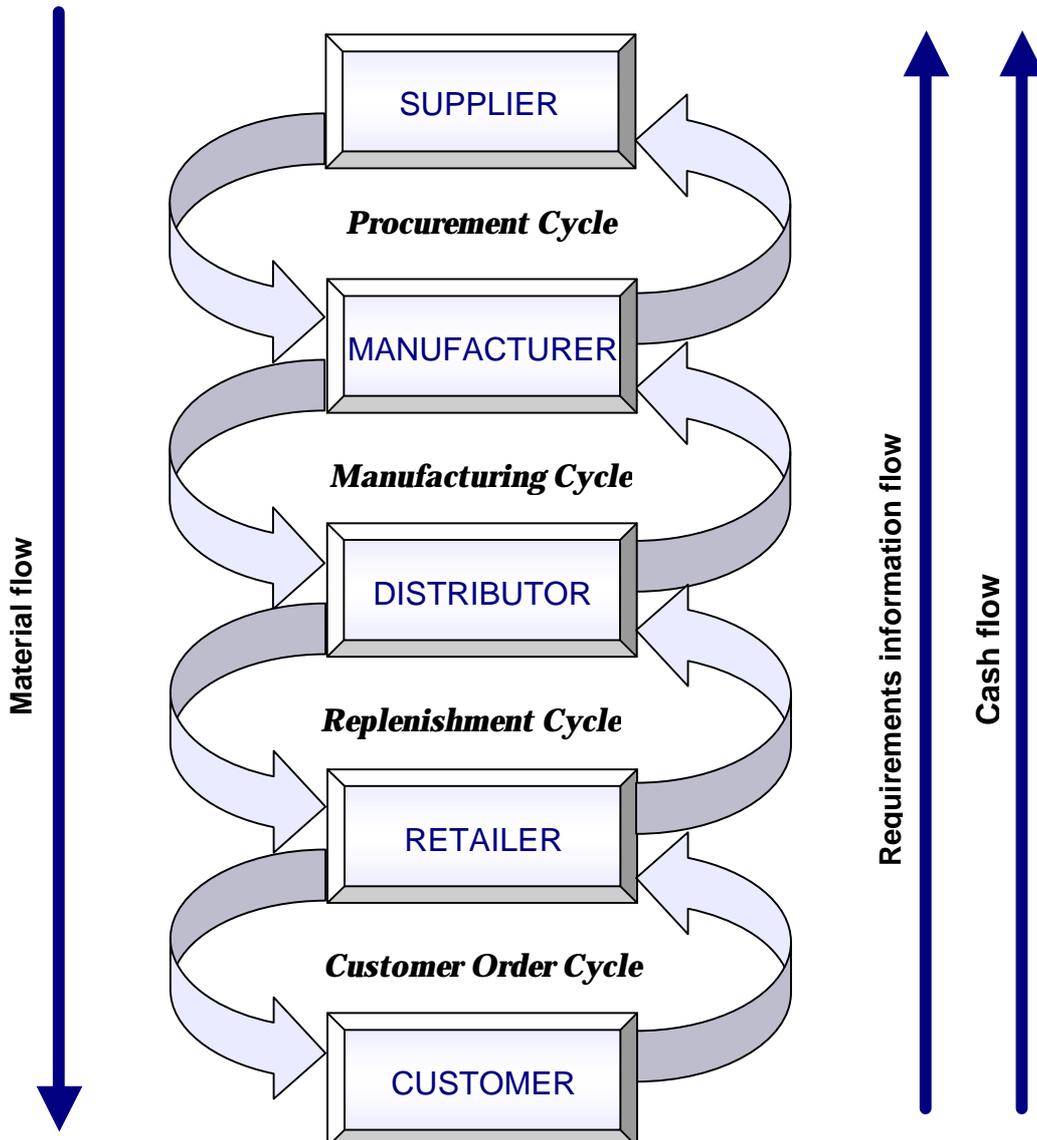
The supply chain can be viewed from two perspectives: as a cycle and as a process.

### Cycle View of the Supply Chain

A supply chain is a sequence of material, information and cash flows that take place within and between different supply chain stages and combine to fulfil a customer requirement for a product or service. These flows are, in effect, a series of operating cycles.

Each cycle is performed at the interface between two successive stages of the supply chain. The generic extended supply chain can be divided into four operating cycles, as shown in Figure 2. These are as follows:

**Fig 2: Supply chain operating cycles**



### ***Customer order cycle***

The customer order cycle occurs at the customer/retailer interface and includes all the processes involved in receiving and fulfilling the customer's order. Typically, the customer initiates this cycle at a retailer site (store, call centre or website). The retailer's interaction with the customer starts when the customer arrives or the contract is initiated and ends when the customer receives the product/service ordered.

### ***Replenishment cycle***

The replenishment cycle occurs at the retailer/distributor interface and includes all the processes involved in replenishing retailer inventory. It is initiated when a retailer places an order to replenish inventories to meet future demand. In some cases, replenishment takes place from a distributor's finished goods inventory. Alternatively, replenishment may occur directly from a manufacturer's production line.

### ***Manufacturing cycle***

The manufacturing cycle typically occurs at the distributor/manufacturer (or at the retailer/manufacturer) interface and includes all the processes involved in replenishing distributor (or retailer) inventory. The manufacturing cycle is triggered by customer orders, replenishment orders, or by forecasts of customer demand and current product availability from the manufacturer's finished goods inventory.

### ***Procurement cycle***

The procurement cycle occurs at the manufacturer/supplier interface and includes all the processes necessary to ensure that materials are available for manufacturing to proceed according to schedule. During the manufacturing cycle, the manufacturer orders components or materials from suppliers that either replenish its material/component inventories or feed directly into the production process.

Although the five stages of the generic supply chain are separated by four operating cycles, not every supply chain will have all four cycles so clearly differentiated. Consider two contrasting examples. A grocery supply chain, in which a retailer stocks inventories and places replenishment orders with a distributor, is likely to have all four cycles separated. Whereas, Dell sells directly to customers, bypassing both distributor and retailer. Dell's supply chain has three stages: customer, manufacturer (Dell) and supplier(s); and just two operating cycles: a combined customer order/manufacturing cycle and a procurement cycle.

A cycle view of the supply chain is a useful aid to operations management in four respects. A cycle view of the supply chain:

- Clearly outlines the roles and responsibilities of each participant in the supply chain.
- Identifies the interface points where value might be added or subtracted.
- Provides the basis for more accurate lead-time and cash-to-cash cycle calculations.
- Encourages a process-oriented view of the supply chain from start to finish.

This final point is central to the design and management of an effective supply chain. A supply chain is not only a series of operating cycles, it is also a sequence of

business processes. Each supply chain operating cycle is in fact a core business process. A thorough understanding of business processes improves an enterprise's ability to manage and exploit the dynamics of supply chain operations.

Moreover, by linking business processes to the concept of supply chain operating cycles, management teams begin to recognise that process management activities do not cease at corporate boundaries. The dynamics of supply chain management demand that all participating enterprises take a *horizontal* view of their operations through both functional and corporate boundaries.

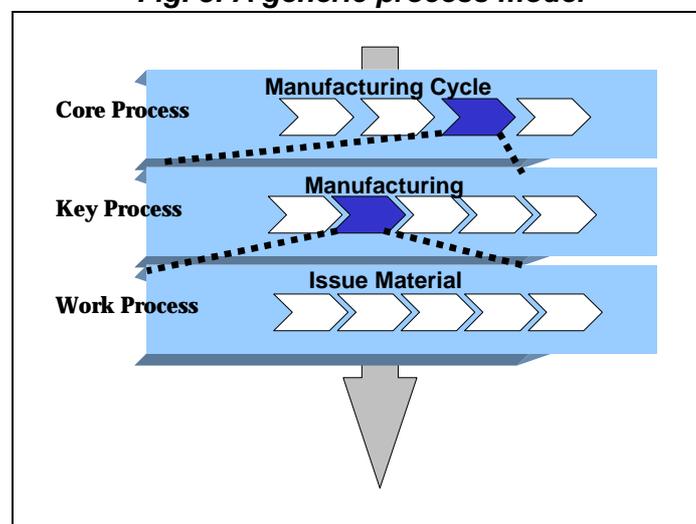
## Process View of the Supply Chain

Smart management teams develop a process model to enable people to visualise processes throughout the enterprise. A process model also helps us to explain what a process is. A process is a series of steps or activities that produce a product or service, and is a blend of people, equipment, method, materials and environment. All work is fundamentally a process.

The extended supply chain is a series of core processes. Each supply chain operating cycle (i.e. customer order cycle, replenishment cycle, manufacturing cycle and procurement cycle) is essentially a core process of the enterprises involved.

Core processes are enterprise-wide and each one consists of a sequence of four key process types: planning processes, sourcing processes, manufacturing processes and delivery processes. Within each key process is a sequence of work processes. This means that a core supply chain process is, in effect, a hierarchy of interrelated and nested key processes and work processes, as shown in Figure 3.

**Fig. 3: A generic process model**



The following brief example explains how this works in practice. For a manufacturer the manufacturing cycle is a core process, spanning plan/source/make/deliver operations. *Make-to-order* is a key process comprising six work processes: schedule manufacturing activities, issue material, manufacture and test, package, and release product for delivery. Each work process, take *issue material* as an example, consists of a series of process steps based on best practice and configured to meet output requirements.

The whole point of developing a process model is to give us a helicopter view of the network of processes in our part of the supply chain. We should also therefore consider how our processes interconnect and react to those of our customers and, if necessary, our customers' customers. All processes fall into one of two categories, depending on the timing of their execution relative to customer demand. The two process categories are: *pull* processes and *push* processes

The execution of pull processes is in *response* to a customer order. Whereas, push processes are executed in *anticipation* of customer orders. At the time of execution of a pull process, demand is known with certainty. At the time of execution of a push process, demand is not known and must be forecast. The boundary line between these two types of processes is known as the *push/pull boundary*.

Being able to accurately locate the push-pull boundary facilitates a more global view of supply chain design and better decision-making in key processes. One logical consequence of taking such a global view might be to transfer managerial responsibility for certain processes to another enterprise in the supply chain, if this allows a push process to become a pull process.

## Operational Effectiveness

The primary goal of supply chain operations is effective management of the local operating cycle to profitably service customer requirements and enhance positive cash flow throughout the extended supply chain. Achieving this goal poses a deceptively straightforward challenge: an enterprise must get the right amount of product from source to customer in the least amount of time and at the lowest cost. And an enterprise must also maintain sufficient flexibility to allow for rapid response to marketplace changes, as well as efficiently managing its assets. Meeting this challenge is the yardstick by which operational effectiveness is measured.

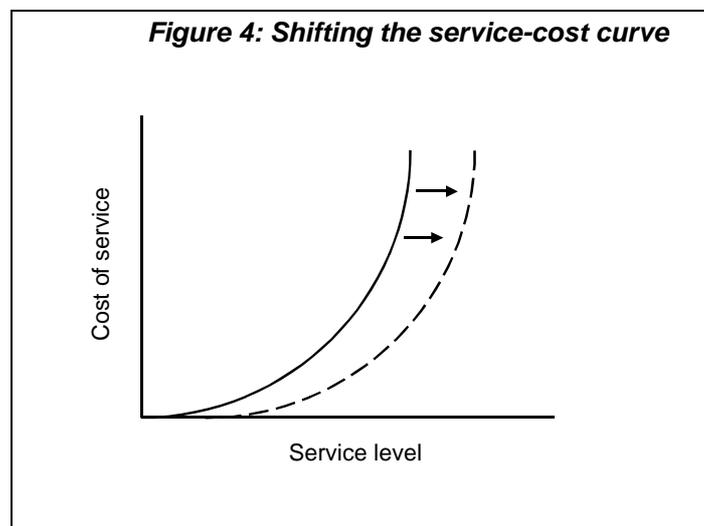
The performance attributes developed by the Supply Chain Council provide a useful framework for measuring operational effectiveness along five dimensions. These are outlined in Table 1.

Table 1: Operational performance attributes		
Performance Attribute	Performance Attribute Definition	Level 1 Metric
<i>Supply-chain delivery reliability</i>	The supply chain's performance in delivering the right product, to the correct place, at the right time, in the right condition and packaging, in the right quantity, with the right documentation, to the right customer.	Delivery performance
		Fulfilment rates
		Perfect order fulfilment
<i>Supply-chain responsiveness:</i>	The velocity at which a supply chain provides products to the customer.	Order fulfilment lead-times
<i>Supply-chain flexibility:</i>	The agility of a supply chain in responding to marketplace changes to gain, or maintain, competitive advantage	Supply chain response time
		Production flexibility
<i>Supply-chain costs</i>	The costs associated with operating the supply chain.	Cost of goods sold
		Supply chain mgt. Costs
		Warranty/returns costs

<i>Supply-chain-asset management efficiency:</i>	How well the enterprise manages its assets (fixed and working capital) to support customer demand satisfaction.	Cash-to-cash cycle time
		Inventory days of supply
		Asset turns

All five performance attributes contribute to the customer's most basic perception of supply chain operational effectiveness: whether the product is available when required. Product availability is, in essence, what is meant by the term *customer service level*.

A supply chain with a high level of product availability is in a position to increase sales volume and revenue by ensuring that product is always available when a customer wishes to make a purchase. However, higher levels of product availability necessitate higher levels of inventory, production capacity and asset intensity throughout the supply chain; all of which increases cost. Therefore, a supply chain must seek to balance the level of product availability and the cost to provide that level of product availability. The basic relationship between the level of service and cost of service can be depicted as a sharply rising curve, as in Figure 4.



The real challenge of operational effectiveness is to find ways of meeting the pressures on the enterprise to increase customer service levels without increasing the costs to provide them.

However, even this challenge is not as straightforward as it might seem. There are two complications that an enterprise must manage: fragmented customer service requirements and uncertainty of demand.

### ***Fragmented Customer Service Requirements***

The overall aim of any supply chain is, of course, to provide all customers with the level of service they require. But different customers have differing service expectations of the supply chain, and as markets become increasingly fragmented, so do customer service requirements. Furthermore, not all customers are equally profitable, and they should not be treated equally.

Customers yield different profit margins, represent varying potential for growth, and generate a disparate range of selling, administration, service or replenishment costs. Segmenting supply chain services based on these criteria is probably one of the most effective ways to improve operational effectiveness and the bottom-line.

Identifying customers with similar service requirements and clustering them into specific segments facilitates a more coherent customer service strategy. Different customer service segments may have significantly different requirements, so attempting to manage a fragmented set of service requirements with a one-size-fits-all supply chain strategy does not make much sense. Instead the logical approach is to treat the service requirements of each customer segment as a separate operational mission with its own service strategy and performance criteria.

### ***Uncertain Demand***

The second major hurdle to operational effectiveness is managing customer demand. That means being able to forecast, or otherwise anticipate, the volume of product that customers are likely to order from you in the future, and when these orders will be placed. The further downstream of the extended supply chain an enterprise is positioned, the closer it is to the end-customer and the relatively easier anticipating actual demand becomes.

So the task of demand forecasting and order management is usually more straightforward for a direct seller of products, such as Dell, than it is for a *manufacturer* or *supplier* in an extended grocery supply chain. The further away from the final point of consumption an enterprise is located, the more prone it is to suffer from the so-called *Bullwhip Effect* of inflated and volatile demand forecasts.

The Bullwhip Effect describes the way in which orders inflate as they move up the supply chain from retailer to distributor to manufacturer to supplier. The Bullwhip Effect distorts actual customer demand within the supply chain as different stages generate different, and increasingly larger, estimates of demand.

Because the various stages do not, in this scenario, have sight of actual end-customer demand, they tend to inflate their own orders to upstream participants by adding a safety margin to buffer themselves against unexpected swings in demand. The results of this behaviour include unnecessary production volumes, higher levels of inventory, lower levels of product availability and higher costs. All of which is due to a lack of synchronisation of operations within the supply chain.

Therefore, meeting the challenge of operational effectiveness demands that each stage in the supply chain must work to understand not only their customer's requirements but also their customer's customer's requirements, and the implications for their supplier's supplier. Otherwise, uncoordinated supply chain operations start to subtract value for the stages, rather than add it, as positive cash flows leak away into cost sinks.

### **Added Value Performance**

In addition to effectively satisfying customer requirements and protecting overall supply chain cash flows, the other prime measure of supply chain success is the creation of additional value for the owners of each stage of the supply chain. In other words, are supply chain operations making a positive contribution to shareholder value?

There are several ways to measure shareholder value, but, fundamentally, calculating how much a business enterprise is worth comes down to estimating the net present value of future cash flows. Free cash flow is the money left over after subtracting expenses, taxes and capital investment from revenues, as outlined in Table 2.

<b>Table 2: Free cash flow</b>
<p><b>Net operating profit</b>  less  <b>Taxes</b>  less  <b>Returns on working capital</b>  less  <b>Returns on fixed capital</b>  =  <b>After tax free cash flow</b></p>

Free cash flow is essentially a measure of profitable revenue growth, and it can come from only one source: customers. Although, as discussed earlier, the actual value of the stream of after-tax free cash flows is largely a product of how well supply chain operations are managed. This leads us to the concept of return on investment.

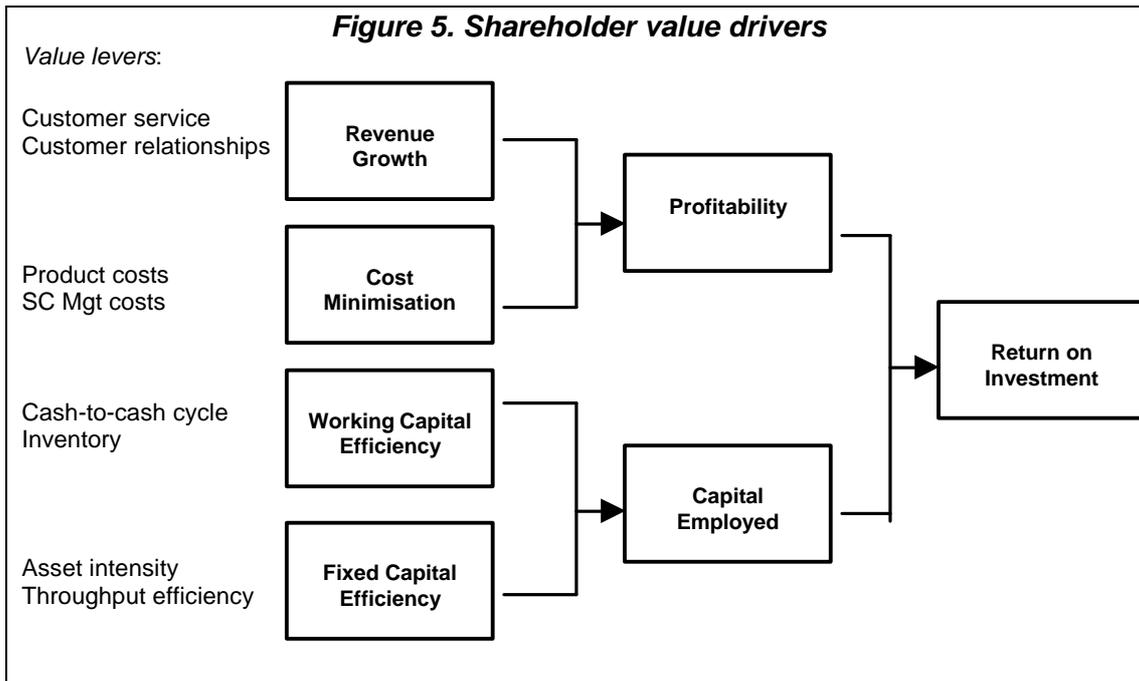
The phrase *return on investment* refers to one of the most important concepts in business finance. Each dollar/euro/pound of assets has to be matched by a dollar/euro/pound of funds obtained from the finance markets. These funds have to be paid for at the market rate. Payment can only come from free cash flow, derived from the efficient use of assets.

As illustrated by Table 3, return on investment (ROI) is the ratio between net profit and the capital employed to produce that profit. ROI is the product of two ratios: profit/sales (i.e. *margin*) and sales/capital employed (i.e. *asset turnover*). To improve ROI means improving either or both of these ratios. ROI is in fact the primary measure of how operations add value.

<b>Table 3: ROI ratios</b>
$\text{ROI} = \frac{\text{Profit}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Capital employed}}$

The combined effect of free cash flow and ROI on value creation is clear. Increasing profit margins and more efficient utilisation of capital employed will generate greater free cash flows and, thus, shareholder returns. And, of course, most supply chain managers would readily acknowledge improving margins and asset turnover as prime performance goals. However, many practitioners are less clear how their supply chain operations actually drive these twin performance goals.

Effectively managed supply chain operations can leverage the drivers of ROI in a variety of ways. The relationship of these supply chain management value levers to the drivers of ROI is outlined in Figure 5. The drivers of ROI fall into two general categories: profitability and capital employed.



### ***Profitability***

Greater profitability is a function of revenue growth and lower costs. Revenue growth depends on acquiring and keeping profitable customers by efficiently servicing their current requirements and by developing value-adding relationships with them. Cost minimisation necessitates focussing on not only product costs (i.e. cost of goods sold), but also on the costs of servicing customer requirements (i.e. supply chain management costs).

The value levers for supply chain management include:

- *Customer service*: Even though meeting the challenge of increasing product availability at the same or lower cost is increasingly regarded as the price of continuing to do business, the quicker and further to the right you are able to shift the customer service-cost curve, the greater your chances of growing sales revenue.
- *Customer relationships*: By seeking to understand how your supply chain operations can add strategic value to the business performance of customers, rather than just satisfying their service requirements, it is possible to develop the kind of long-term relationships that lock-in customers and attract a greater share of their purchasing spend.
- *Product costs*: Reducing the direct costs of a product, without compromising functionality, feature-count or perceived value, demands an innovative cost reduction strategy embracing product and production design flexibility, intelligent win-win collaboration with suppliers and careful application of manufacturing technology; not slash-and-burn tactics.
- *Supply chain management costs*: are the total process costs of managing the plan-source-make-deliver operations. For most supply chains, simply identifying and analysing these, largely indirect, costs will reveal significant improvement opportunities.

## **Capital Employed**

Return on capital employed can be improved by the more efficient use of both working and fixed capital. Greater working capital efficiency is largely a function of speeding-up the flow of cash from customers (thus lowering accounts receivable days-of-sales-outstanding), and reducing the amount of cash required (primarily to fund inventory) during this cash-to-cash cycle. More efficient utilisation of fixed capital usually means finding ways to reduce asset ownership and to make retained assets work harder.

The value levers for supply chain management include:

- *Cash-to-cash cycle*: means the time required to convert a customer order into cash. Any cut in the total time that working capital is committed to funding the fulfilment of an order, from when materials and components are procured to receipt of payment from the customer, will reduce the total amount of working capital needed by the enterprise.
- *Inventory*: is the total volume of materials, components and finished products currently in the supply chain, and frequently accounts for more than 50% of an enterprise's current assets. Not only do high levels of inventory consume working capital, but the cost of carrying that inventory can add up to 40% on top of the cost of the actual inventory.
- *Asset intensity*: Decreasing the level of fixed assets employed in the supply chain will obviously reduce asset funding requirements. However, this should be part of a considered strategy to improve supply chain flexibility and responsiveness by leveraging external capabilities, and not simply to tidy up the balance sheet.
- *Throughput efficiency*: Getting more output from the fixed assets utilised throughout the extended supply chain should increase capital productivity for all of its participants. Doing so requires a collaborative focus on supply chain design, capacity utilisation, waiting times and waste in order to improve overall throughput efficiency.

Just consider the following for a moment: if you could improve operational performance to grow revenue by 5%, reduce costs by 5% and improve capital efficiencies by 5%, what would be the impact on ROI in your business? When looked at in this way, supply chain management becomes a key boardroom agenda item and operations assessment a worthwhile exercise.

## Creating Supply Chain Excellence

Supply chain excellence represents one of the most exciting opportunities to create value – and one of the most challenging. The key to success lies in knowing which levers to pull. Our research, together with practical experience, reveals that supply chain excellence is, essentially, a function of five critical success factors:

1. **A clear strategy:** for the entire supply chain, tuned to market opportunities and focussed on customer service needs.
2. **An integrated organisation structure:** enabling the supply chain to operate as a single synchronised entity.
3. **Excellent processes:** for implementing the strategy, embracing all *plan-source-make-deliver* operations.
4. **Reliable information:** utilising integrated technology to support effective supply chain planning, execution and decision-making.
5. **Effective performance management:** of all supply chain operations to achieve top-line revenue growth, optimum asset utilisation and bottom-line profitability.

How well does your enterprise manage the critical success factors of supply chain excellence? Supply Chain Planning Ltd has developed the *Supply Chain Operations Audit* to help you find the answer to this crucial question. For more details, please contact us by email or by phone.

**Contact Details**  
**David Lascelles**  
**Supply Chain Planning UK Limited**  
**Building 243**  
**University Campus**  
**Cranfield**  
**Bedford MK43 0AL**  
**Tel: +44 (0)1234 750323**  
**Fax: +44 (0)1234 752040**  
[info@scp-uk.co.uk](mailto:info@scp-uk.co.uk)  
[www.scp-uk.co.uk](http://www.scp-uk.co.uk)