

Performance Incentives

These are often different for different companies and individuals in a supply chain. Each company can see its job as managing its position in isolation from the rest of the supply chain. Within companies, individuals can also see their jobs in isolation from the rest of the company. It is common for companies to structure incentives that reward a company's salesforce on sales made each month or each quarter. Therefore as the end of a month or a quarter approaches, the sales force offers discounts and takes other measures to move product in order to meet quotas. This results in product for which there is no real demand being pushed into the supply chain. It is also common for managers within a company to be motivated by incentives that conflict with other company objectives. For instance, a transportation manager may take actions that minimize transportation costs at the expense of customer service or inventory carrying costs.

Alignment of performance incentives with supply chain efficiencies is a real challenge. It begins with the use of accurate activity-based costing (ABC) data that can highlight the associated costs. Companies need to quantify the expenses incurred by forward buying due to month-end or quarter-end sales incentives. Companies also need to identify the effect of conflicting internal performance incentives. The next step is to experiment with new incentive plans that support efficient supply chain operation. This is a process that each company needs to work through in its own way.



EXECUTIVE INSIGHT

Eliyahu Goldratt wrote a book, titled *The Goal*, about a factory manager's quest to save his factory from being closed down for lack of profitability. It chronicles the process that the manager and his staff go through as they learn how to save their factory. What they learn is how to apply the principles of what Mr. Goldratt calls the "Theory of Constraints."

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Mr. Goldratt and others have realized that the theory of constraints applies equally well to the operation of a whole supply chain as to the operation of a single factory within a supply chain. Lawrence Fredendall and Ed Hill, in their book, *Basics of Supply Chain Management* (2001, Boca Raton, FL: St. Lucie Press), have put forth a clear explanation for how to apply the theory of constraints to synchronize the operations of a supply chain.

The theory of constraints provides a useful model to conceptualize and manage the supply chain within a single company or across a collection of companies. The theory of constraints is based upon the idea that all systems have at least one constraint and that it is better to manage constraints than to try to eliminate them. This is because when one part of a system ceases to be a constraint, a different constraint will occur in another part of the system. This is inevitable because the capacities of each part of a system are not all the same. So instead of forever reacting to new constraints or bottlenecks as they appear, why not choose a small group of constraints and manage them deliberately and efficiently?

To apply this model, the first step is to define the goal and decide what measurements will be used to measure progress toward the goal. Mr. Goldratt's definition of the goal for a manufacturing company also works for a supply chain. The goal is defined as "Increase throughput while simultaneously reducing both inventory and operating expense." Throughput is the rate at which sales to end customers occur.

Once a goal has been defined and there is agreement on how to measure progress toward the goal, it is possible to apply the five focusing steps. These steps help clarify the situation being investigated and lead to the decisions necessary to reach the goal. The five steps are:

- 1 *Identify the system's bottlenecks or constraints*—Trace out the workflows and the paths that materials travel in a factory or a supply chain. Find out where slowdowns and backups occur.

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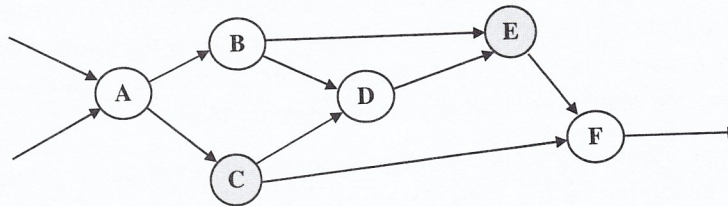
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- ② *Decide how to exploit these bottlenecks*—Figure out how to maximize the operation of those activities that are bottlenecks. The rate of throughput for the entire system is set by the rate of throughput achieved by the bottlenecks. Ensure the bottlenecks operate at maximum capacity by providing them with enough inventory so that they can continue to operate even if there are occasional slowdowns elsewhere in the system.
- ③ *Subordinate everything else to the above decision*—Do not try to maximize the operation of a non-bottleneck operation. Additional productivity achieved by non-bottleneck operations that exceeds the capacity of the bottlenecks to process will be neutralized anyway by the slowdowns and backups caused at the bottlenecks. Synchronize all system operations to the rates that can be efficiently processed by the bottleneck operations.
- ④ *Elevate the system's bottlenecks*—Add additional processing capacity to the bottleneck activities. Since the rate of throughput of the entire system is set by the throughput of the bottlenecks, improvements in the bottlenecks will increase the efficiency of the entire system and provide the best return on investment.
- ⑤ *If, in a previous step, a bottleneck has been broken, go back to Step 1*—As the capacity of one system bottleneck is elevated, it may cease to be a bottleneck. The bottleneck may transfer to another operation that could keep up before but now cannot keep up with the new increase in capacity. Watch the entire system to see where slowdowns and backups occur; they may shift from one area to another. If this occurs, start again at Step 1.

The theory of constraints says that the throughput of the whole system is set by the capacity of the bottlenecks. Exhibit 6.2 shows a sample diagram of workflows and bottlenecks in a factory. This model of workflows in a factory can be applied to the workflows in

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EXHIBIT 6.2

Flow of Work and Inventory
through a Factory

a supply chain. One constraint or bottleneck in every supply chain is the demand that is generated by the market that the supply chain serves. In many cases, market demand is the only constraint because supply of products equals or exceeds demand. In cases where demand exceeds supply there will be some other constraints elsewhere in the supply chain. If we apply this model to a supply chain, we get a powerful method to organize and manage supply chain operations.

The bottlenecks or constraints in the flow of work through this factory are operations C and E. The productivity set by these two operations sets the pace for the *entire* factory. Productivity improvements in the other operations will not result in any improvement in the productivity of the factory as a whole. Apply the five focusing steps to manage this system and move it toward the goal defined for it.

A very effective response to the bullwhip effect is to manage the entire supply chain as a single entity and to synchronize it to the timing of actual market demand. Exhibit 6.3 illustrates this idea. This can happen if the supply chain participants closest to the end-use customers share their sales numbers and their sales forecasts

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with the other companies in the supply chain. Each company can then manage its actions based on the most accurate data about market demand.

Buffers in the supply chain are determined by the degree of uncertainty about future market demand and the service levels required by the market. The lower the uncertainty about demand, the smaller the buffers can be and still maintain high service levels. Companies can manage their buffers by using either productive capacity or inventory, whichever is most cost effective for them.

Synchronized supply chains avoid the volatile waves of demand that are generated by the bullwhip effect. And increased predictability makes the productivity of each company easier to manage and the supply chain as a whole becomes more efficient and profitable.

The model in Exhibit 6.3 is called “drum-buffer-rope.” Market demand is the constraint on the system and it sets the drumbeat or pace of the supply chain. Individual companies manage uncertainty in their stage of the supply chain by using a buffer of either inventory or productive capacity. Buffers are kept low because uncertainty is minimized by sharing market demand data. This data is the rope that ties the participants together and allows them to synchronize their actions.

EXHIBIT 6.3

Flow of Inventory through a Synchronized Supply Chain

