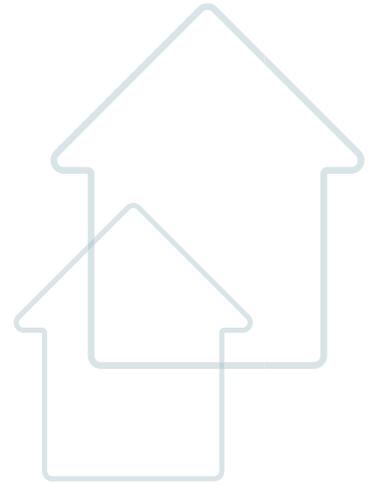


**BUILD**

**TO**

**BUFFER**



## An Indian company overhauls inventory with the TOC

By Mahesh Gupta and  
James F. Cox III, PhD, CFPIM, CIRM



India is in the midst of a retail revolution. By 2015, it is set to become one of the top five retail markets in the world. The country also is the second-largest global producer of footwear. While international brands such as Gucci, Charles and Keith, Nike, and Adidas have made their presence felt in higher-end markets, domestic companies largely cater to the mass and economy markets.

Liberty Shoes is one of those companies. Since opening in 1954, it has become one of the five largest footwear manufacturers in the world and is the only Indian leather shoe brand. It maintains a global presence, doing business in more than 25 different countries, including Russia, Italy, and France, as well as throughout the Middle East. Marketing at Liberty Shoes includes a network of more than 70 distributors; 5,000 multi-brand outlets; and exclusive retailers, consisting of 148 showrooms and 54 Liberty-branded retail outlets.

Four years prior to undertaking a new distribution and replenishment solution, Liberty's sales were flat and profits were negligible. Market share was less than 2 percent, despite its reputation as a top domestically produced Indian brand. Even though sales were stagnant, the company introduced many products each season under the assumption that new fashion lines would increase sales.

Liberty planned for the two seasons of summer and winter with a forecast horizon of six months. Its factories produced to capacity. Production and distribution lead time was about 60 days. Distributors and exclusive shops were under pressure to place orders for the next six months, and items were pushed as close to consumers as possible (see Figure 1).

One challenge in the fashion industry is that forecasts often are wrong, especially at the individual item and retailer levels. Additionally, only about 15 percent of new designs turn out to be winners, selling out in about six to eight weeks. These facts, along with a push distribution model, create a feedback loop that produces stockouts; a limited range of new products; less buying; high receivables; and large amounts of slow-moving and buffer inventory everywhere, including at the central company, distributors, and shops. The increased inventory

negatively affects growth, profitability, and relationships with shops and distributors.

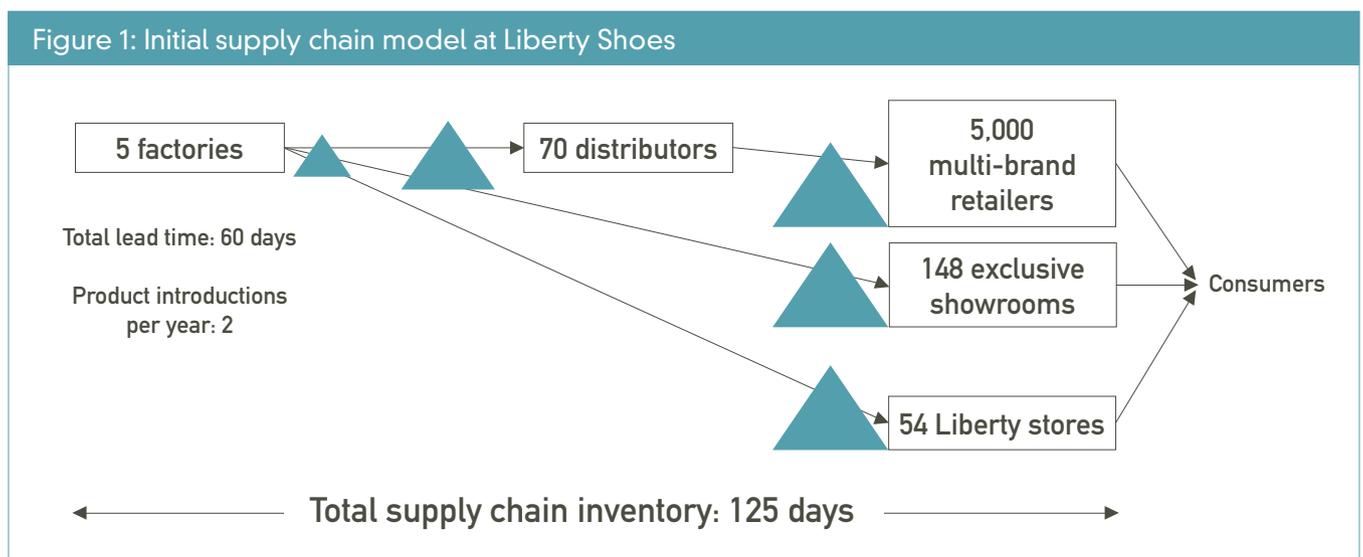
### Enter the theory of constraints

In *It's Not Luck*, Eli Goldratt proposed a distribution and replenishment solution based on the theory of constraints (TOC). In the simplest terms, the approach exploits the fact that the cumulative forecast at the plant level is more accurate than at individual links. Using heuristic models, replenishment and emergency inventory levels at strategic supply chain links are determined. It is a powerful tool, but relatively difficult to implement: It first requires that each supply chain link undergo a paradigm shift in processes and thinking.

Common wisdom is that improvement occurs when forecasts improve, enterprise resources planning systems become faster and more powerful, inventory visibility is raised, better personnel are acquired, key performance indicators are modified, and the like. Instead, supply chain improvement comes from establishing a distinctive competitive edge. An effective supply chain solution must ensure that each link in the chain, from raw materials supplier to consumer, recognizes its state of ideal performance.

For distributors and showrooms, this state is to keep inventory levels low but maintain high availability—to buy less of each item, but with more variety and quick resupply of popular items. For this to occur, replenishment lead times must drop dramatically, boosting sales without raising fixed cost. With higher inventory turns, distributors and showrooms achieve significantly greater return on investment. With higher returns on investments, it's easier to attract new distributors. The company can capitalize on these advantages, further broadening its reach and range. Meanwhile, the consumer finds the perfect shoe. Every supply chain link benefits from the decisive competitive edge.

With guidance from the Vector Consulting Group, Liberty Shoes implemented a TOC initiative with the aim of raising sales and, more importantly, profitability. The implementation took the form of the following six discrete steps.



**Step 1: Establish a central warehouse.** About 70 percent of footwear is sold for more than six months—these are termed replenishment items. The central warehouse carries replenishment items up to a buffer target and acts as the aggregation point for stocks to serve many different distributors. One immediate benefit is that the central warehouse’s aggregated forecasts are more accurate than at the retailer level. Inventory is communicated daily to the factory, which produces to buffer levels. In effect, the central warehouse decouples production lead time from replenishment lead time, greatly reducing distributor lead time from about 60 to 15 days.

**Step 2: Implement a production priority system.** Most items deplete some amount of buffer every day. As demonstrated in Figure 2, buffer is divided into three zones: green, which represents high inventory levels; yellow, meaning adequate inventory; and red, where there is a risk of stockouts. (Not shown is a black level of inventory exhaustion and potential lost sales.) At the factory, risky items are produced first, followed by items with more stock available. Facilities produce to demand, and production lead times are further reduced.

**Step 3: Ensure retail availability.** Shops maintain inventory for replenishment items equal to transportation lead time plus some amount of safety stock. Retail outlets communicate daily sales or current buffer for each item, and computer systems generate replenishment orders automatically. Tight replenishment practices at the retail level, coupled with high availability at the central warehouse, ensure high availability and lower inventory at distributors.

**Step 4: Decouple production and raw materials lead times.** If raw materials are unavailable for replenishment items in time for orders, production lead times can increase. Hence, it

is critical to ensure availability of raw materials at all times. A buffer replenishment system for raw materials similar to that described previously can be implemented with suppliers. Each week, suppliers receive buffer penetration reports along with priorities, ensuring effective raw materials management.

**Step 5: Identify fashion winners and losers quickly.** When products were introduced only twice a year, distributors ordered for a six-month horizon across a wide range of styles, faced inaccurate forecasts, and had limited capital. As they would not be restocked within a season, distributors were loath to take on risk and bet on potential winners.

There is a better way, and smart buffer management is the key. If an item is continually in the red, it likely is a winner and buffer targets increase. Likewise, green items are losers and require less buffer. In this model, sales trends can be tracked on the fly, generating product portfolios for individual shops and the central warehouse.

**Step 6: Increase the number of new products.** This has the effect of smoothing production and cash requirements. Instead of twice a year, Liberty now introduces products eight times with smaller ranges in each introduction. The sellers can buy in smaller quantities than before. Once a winner is identified, it becomes a replenishment item in the central warehouse, ensuring that a wider range of products reaches, and is maintained on, retail shelves.

### Charting the outcomes

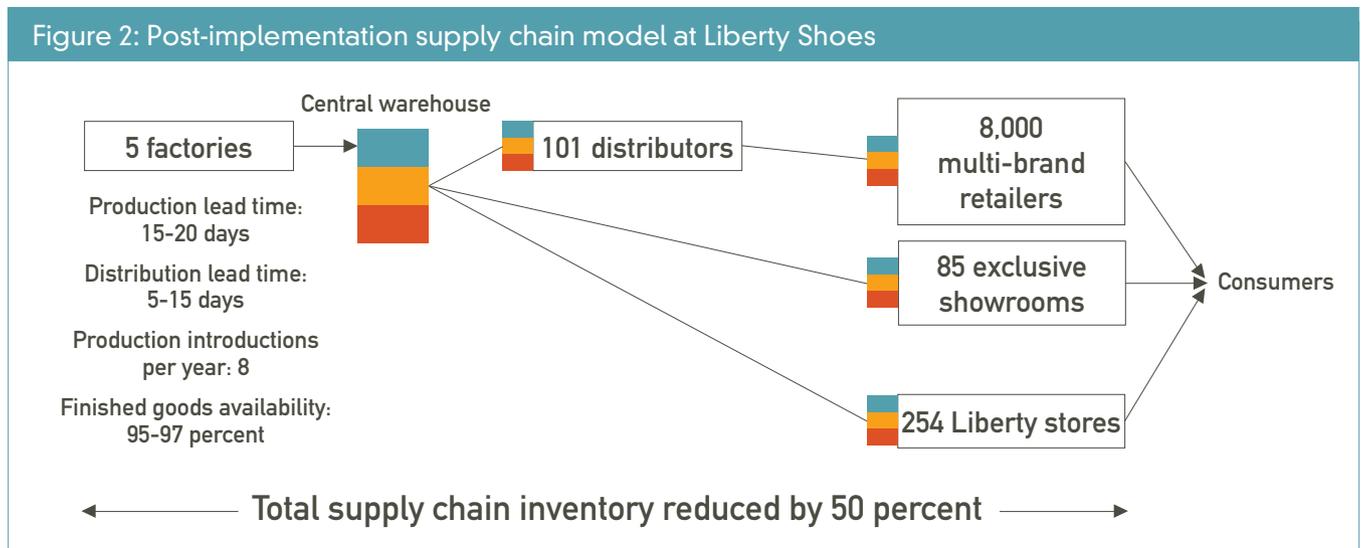
Following implementation of the TOC distribution and replenishment system at Liberty Shoes, replenishment frequency for each item at each stocking point became greater. The forecasting horizon is now about one month, compared to about six



The daily, automatic replenishment of items prevents immeasurable lost sales.



Figure 2: Post-implementation supply chain model at Liberty Shoes





Workers assemble shoes in a Liberty facility.

months previously. This prevents retail stores from getting stuck with slow movers and enables continuous reordering of winning items. Distributors and retailers have a much greater return on investment and tripled inventory turns, and they can more rapidly expand with fewer risks.

Additional benefits include the following:

- Availability at the central warehouse is above 97 percent.
- Overall inventories are down by about 50 percent.
- There now are 101 distributors, about 8,000 multi-brand retailers, 85 exclusive showrooms, and 254 Liberty-branded retailers.
- The strike rate of new items—the frequency of sales per sales opportunities—has increased from 15 percent to more than 60 percent.
- Inventory liquidation sales are needed much less frequently.
- More new retailers and distributors are coming to Liberty Shoes—about two new stores have opened each week in the past year.
- Sales at exclusive showrooms and Liberty-branded retail outlets are up about 30 percent.
- Overall sales are up about 20 percent.
- Finally, the daily, automatic replenishment of items prevents immeasurable lost sales.

Perhaps most importantly, the thinking at Liberty Shoes now is guided by TOC philosophies. Company leaders and shop floor workers alike are better able to identify root causes of problems, construct win-win solutions, and develop effective implementation plans. The replenishment system responds

more quickly to demand changes. And the need for fighting fires has reduced significantly, freeing up senior managers to focus on other projects in order to ensure future growth.

The challenge in implementing the type of TOC distribution and replenishment model described in this article is that it requires major evolution of the collective thinking of all parties in the supply chain. It demands thinking holistically and means that retailers must learn to devalue discount schemes and operate in a pull distribution mode, where supplies are based upon consumption. It is a difficult transition for the entire business, but with proper care in implementation, it will create a decisive competitive edge.

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