# <u>*How the TOC Distribution Solution Can Be Used to Increase Profits*</u>

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*Eliyahu Goldratt, Kevin Fox, and Stewart Witt wrote this paper. It was written for people who have experience with the Theory of Constraints (TOC.) Dr Goldratt first suggested the TOC in the early 1980's followed by his seminal novel on the subject "The Goal" in 1984. This forward defines the terms used herein, which may not be familiar to readers who may be new to TOC.*

*T stands for Throughput. T is the money that comes into a business from any source less such costs that can be described as "totally variable," that is for every increase in revenue there is a corresponding increase in these costs.*

*I stands for inventory. I is all funds that the company has invested in purchasing things that it intends to sell. In other words, Inventory is the current value of all the things that the organization owns and uses to create its product or to deliver its service to the market.*

*OE stands for Operating Expense. OE is the funds the organization spends to turn I into T, excluding any expenses included in "totally variable costs." In other words, T less OE equals Net Profit.*

The TOC Distribution solution delivers direct financial benefits through a number of mechanisms. While not every one will apply to each company's situation, it is important to understand how the solution can be deployed to deliver the maximum benefit to companies. This document contains an overview of how these mechanisms impact T, I, OE at the plant, distribution and customer levels. Each of the mechanisms is explained in the section below. The most important avenue of improvement is of course the T-channel, which should be given central importance in achieving a depth of understanding of how the solution delivers benefits. As a reminder, keep in mind that the essence of the solution is rapid replenishment, enabling much better availability of products at much lower inventory levels-typically a 3rd of current levels.

## *How TOC Distribution impacts I and OE*

1. **Reduction of order lead time (order quantity)** - Order lead time is the time between customer orders.

   When customers order more frequently they hold less inventory on the site. If they order monthly they must hold at least a month's stock to insure availability. When they order weekly they can hold closer to a week's inventory. The costs of stocking the inventory are reduced, as are the lost revenues from scrapping or discounting out-dated product. The most dramatic effect of this is felt at the customer (re-seller) site.

2. **Reduction of the dependency on forecasts**

   Since no one has yet invented a crystal ball that shows exactly how much of a product the market will buy at any given place, in any given point in time, forecasts are by definition unreliable. By producing products closer in time to the actual sale (replenishment of much smaller inventories) the TOC solution enables companies to produce more reliable levels of what they will sell, reducing OE and I. Both the manufacturer and re-seller see considerable gains from this.

3. **Central warehousing of inventory**

   There is less variability in the demand of products across the entire market than there is at a given store or sales outlet, and inventory must be held to cover the peaks in demand, not just the average. So, companies that hold inventories in more centralized locations can do so based on a much more stable usage. This enables the producer to hold far less inventory (typically a third or less than the old levels) to meet demand than if the inventories are held closer to the point of purchase.

4. **More frequent replenishment**

   By replenishing inventory more frequently companies can reduce the stocks that are held considerably. This insures that inventory and capacity can be deployed to meet immediate sales, rather than for future (uncertain) demand. By putting a mix of product onto trucks, rail cars, or ships rather than larger batches of a single product, transportation costs will not increase.

5. **More stable production schedule**

   With the TOC Distribution solution inventory is produced to replenish the stocks of the central warehouse, insuring that there will be far fewer stock outs, which prompt emergency orders. Emergency orders disrupt the production schedule from its optimal model, and frequently increase costs through overtime and expedited shipments.

6. **Holding Inventory in more common/flexible states**

   When inventory is held centrally it is often possible for the company to hold the inventory in a more common state (i.e. not in its final SKU form) and then complete the product based on actual orders. Because the reliability of consumption is greater at these common states (e.g. we know that we will sell about 10 million aspirin tablets a month, but not as accurately whether they will sell in 25, 50, 100, or 500 count bottles. Since inventory must be held to cover the peaks in demand, less total inventory will be held.

## *How TOC Distribution can be deployed to Increase T*

1. **Better availability of product at the point of purchase (elimination of shortages)**

   A more reliable availability of product increases sales because customers who want to buy can always find what they are looking for and will not turn to an alternative or delay their purchase. While many companies estimate these shortages as being quite small (2-4%) they are generally much larger in reality. And since companies have no way of tracking what wasn't sold due to availability (many customers do not ask for a missing item, and store people do not record the vast majority of the requests they do receive) it is hard to put a good estimate on this.

2. **Increase of shelf space**

   In many environments shelf space and total sales are very closely related. Companies applying the TOC distribution achieve much higher turnover rates from their shelf space than their competitors because they can replenish very reliably and insure full availability with lower inventories. This enables them to demand and get more shelf space.

3. **Increase of shelf life/product quality-**

   By operating with lower, fresher inventories many products perform better, increasing customers' positive experience with them and thus their demand for them. When products arrive to the point of sale earlier (sooner after production) they have a longer effective shelf life at the retailer, reducing the need for discounting, disposals and returns.

4. **Reduction of near expiration/poor quality product-**

   Lower inventories, replenished faster means that products on the shelf are much fresher with the TOC solution. This increases sales because some customers are reluctant to purchase products that are close to their expiration date (milk, meat, and medications are some examples) or which look like they have been sitting around for a long time. Additionally customers who do buy a product near the expiration date may have a bad experience, which will damage future T, especially if they tell others about the experience, as is often the case.

5. **Faster new product introductions-**

   When companies operate with much lower inventories they can launch new products earlier than the competition without having to clean out the pipeline of the old products, or risk discounting or writing off old technology or models. High tech products, cars, fashion items, and other goods where change or advancement reduces the demand for an older product are some examples.

6. **Opening new sales channels-**

   One of the obstacles companies face in moving into new sales channels is the investment the client must make in stocking and managing the inventories. When a company can provide full availability at much lower inventory levels this barrier is greatly reduced. With this solution and highly reliable deliveries, additional offers can be made to make the offer to new channels unrefusable. These might include offering to pay penalties on stock outs, and to manage the replenishment for the re-seller.

7. **Increasing the product portfolio-**

   In our time the market demands increased choices and customization of products, still companies are rationalizing SKU's due to the challenge of managing and supplying so many product configurations. A company that can offer more and more SKU's to meet the needs of customers will increase its sales. Companies using the TOC solution to deliver very reliably with much lower inventories have both the cash and the operational excellence to readily increase their lines. This capability can be used to increase sales through existing channels or to further entice new channels with a broader product line. Co-branding and other mechanisms also become available.

8. **Turn slow movers into make to order-**

   Many companies that stock slow moving items find that they can produce these products to order for the customers within their tolerance time. The more flexible supply chain and the reduction of "emergency orders" (which is the norm in conventional systems) mean that companies can produce odd items quickly with little disruption and get them where they need to go faster. For many companies, the ability to deploy such a strategy means they can meet more and more unique customer needs, increasing sales.

9. **Ability to react to demand within a peak-**

   For seasonal products or hot products experiencing a peak of demand, the flexibility of TOC Distribution and the reduction of emergency production orders means that companies can re-deploy capacity based on actual market preference versus building to forecast. Companies can produce and sell more of their hot products when they are hot.

   In a supply chain managed according to the TOC, it is clear that there are so many common improvements that virtually all companies will benefit. It does not take long for TOC companies which enjoy greater sales, lower expenses and cash produced from reducing excess inventories to gain not only market share but market dominance.