

## Is **TOC** for you? If your company is considering the **Theory Of Constraints**, here are five quick things to remember.(Business Management)

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Are you familiar with the **Theory of Constraints (TOC)**? Physicist Eliyahu M. **Goldratt** introduced this management technique in 1986 in the bestselling novel *The Goal*. **TOC** is another operation improvement technique centered on an innovative decision-making process. Just like ABM, BPR, CI, and TQM (Activity-Based Management, Business Process Reengineering, Continuous Improvement, and Total Quality Management), **TOC** is founded on its own philosophy and has its own buzzwords. And like the other operation improvement programs, **TOC** considers speed, waste reduction, capacity, direct labor use, and the like according to its own unique perspective. But its foremost appeal is its simplicity. **TOC** is based on three logical, straightforward premises:

1. The only reason that companies do anything is to make money.
2. Anything that a company does to speed up the processes that generate money is appropriate.
3. Each business operation is one big process with many subprocesses.

According to **TOC**, companies that keep these three things in mind will prosper.

### **TOC** TALK

**TOC**'s basic vocabulary emphasizes its philosophy and its three performance measures. Throughput equals sales revenue minus direct materials cost--it measures the speed at which the company makes money. Inventory is the raw materials value tied up in work in process and finished goods. Large amounts of inventory are undesirable because it means that the company has spent money for production that hasn't generated revenue yet. Operating expenses are all of the costs of operations other than direct materials costs. Under the **Theory of Constraints**, operating expenses are fixed and therefore irrelevant to any **TOC** decision. Of the three terms, throughput is the most important. It tells the company that it is achieving its goal of making money. Moreover, increases in throughput mean that the rate at which the company is making money is increasing.

### PROCESS IMPROVEMENT PROCEDURE

According to **Goldratt**, there are five basic steps to operations improvement:

1. Identify the system's constraint(s), and prioritize them according to importance.
2. Exploit the system's most critical constraint.
3. Subordinate everything else to the action taken in Step 2.
4. Elevate the system's constraint(s).
5. Repeat Steps 1-4, focusing on the new constraint.

(These are paraphrased from *The Goal*, p. 307.)

What these steps accomplish are incremental improvements in the operation as a whole. In Step 1, an assessment of the entire process identifies the slowest subprocess. This subprocess is called the constraint or the bottleneck. Identifying the constraint is

very important because it sets the pace of the whole operation. The Goal uses Boy Scouts on a hike to illustrate this concept. We learn that no matter how fast some of the boys walk, the boy who walks the slowest always sets the pace and determines when the whole troop will reach its destination. Faster boys in the front of the line will get far ahead, but faster boys at the end of the line won't be able to walk any faster than the slowest boy. Using this example, we can easily visualize the constraint in a production operation: Work in process is piled up in front of (or before) the constraint, and the processes behind (or after) the constraint sit idle waiting for something to do.

In Step 2, the company determines how best to "exploit" the constraint. Exploiting means finding ways to get the maximum output possible from the constraint without overloading it and requires that the whole operation be slowed down to the pace of the constraint. The most obvious way to exploit the constraint is by proper scheduling and control that favors the constraint's capacity. It's also important to improve quality control so that the constraint will work only on good inputs. Waste of time and effort incurred when the constraint spends its valuable time working on output that will eventually have to be scrapped or reworked should be avoided.

In Step 3, the company subordinates all other operation improvement opportunities to exploiting the constraint. This may cause problems with managers and workers who have their own ideas about operation improvement. Glaring problems that everyone can see and that most know how to correct will always be present in any operation, but **TOC** requires that all operation improvement opportunities other than those dealing with the constraint be ignored. This may be very difficult for managers and employees to accept if they don't understand what's going on. Therefore, **TOC** recommends that the company discuss the **Theory of Constraints** and its rules with all employees involved so that they will understand what is going on, support it, and be willing to help.

Step 4 calls for "elevating" the constraint. This means that the company finds ways to increase the capacity of the constraint. Ways to increase the output of the constraint include:

1. Performing regular maintenance on the constraint to prevent breakdowns.
2. Running the constraint for extra shifts.
3. Automating the constraint.

Since the constraint sets the pace, making it faster will speed up the whole operation. This increases the rate of throughput (i.e., the rate at which it generates money), which is the company's overriding objective.

By now you've probably guessed that after performing Steps 1-4 the original constraint is faster and no longer the constraint. Considering the value of continuous improvement, Step 5 says to find the new constraint and start the **TOC** process again.

## WHAT ABOUT PERFORMANCE MEASURES?

So far, we've discussed increasing speed and output and improving quality, but we haven't mentioned any of the conventional management accounting performance measures (i.e., productivity, cost per unit, etc.). **TOC** won't suggest using any of them, either. Moreover, according to **TOC**, not only are conventional management accounting performance measures unnecessary, but focusing on them can make things worse. Of course, we still need management accounting--we just have to be very careful about what we believe is important, the measures we take, and how we use them.

Here are five "truths" about management accounting to think about as they relate to **TOC**.

Management Accounting Truth #1: Process improvements work together to speed up the whole operation. We know that in Total Quality Management and Continuous Improvement the objective is to eliminate waste and speed up every process. The **Theory of Constraints** takes almost the opposite view. It requires that we focus on the constraint while leaving all other people, processes, and machines alone. Consider what would happen to **TOC**'s inventory (i.e., work in process) if a process located before the constraint were sped up. This process would produce even more work in process than the already overloaded

constraint couldn't handle. Likewise, if the newly improved, more efficient process were located after the constraint, it would still be sitting idle, waiting for the constraint to send it work. Remember, increasing the speed of nonconstraint processes will only make things worse. Extra costs will be incurred with no increase in throughput.

Management Accounting Truth #2: You have to spend money to make money. Under other operation improvement programs like Business Process Reengineering, a company is required to make radical process changes, usually by purchasing expensive machines, equipment, and/or technology. For example, in the landmark book *Re-Engineering the Corporation*, Michael Hammer and James Champy talk about the way that IBM Credit Corporation turned its step-by-step paper-based credit approval process into a one-step computerized process. Credit approval time went from seven days to four hours--an amazing improvement. But **TOC** discourages large expenditures for process improvements. It presumes that companies are already working at capacity and that all resources are running as efficiently as possible. According to **TOC**, all that a company needs to do is slow things down and work to the capacity of the constraint. Expensive improvements can be made, but only on the constraint. Remember, be very careful that all money spent on new equipment, hardware, or software goes toward maximizing the capacity of the constraint.

Management Accounting Truth #3: Operations can be made more efficient by improving labor efficiency variances. Who doesn't believe that keeping workers busy earning their pay benefits the firm? Well, **TOC**, for one. Just like any other nonconstraint, fully utilized labor will produce more work in process than the constraint can handle. This causes the same problems that happen when any other nonconstraint process becomes more efficient. Think what would happen if idle workers from processes located after the constraint were moved to processes located before the constraint to keep them busy. Let the workers spend their free time on machine maintenance, on learning new skills, or just having a rest. They will be happier, and the company will eventually have more money to spend. Remember, increasing labor efficiency when labor isn't the constraint will only increase work-in-process inventory and tie up money that could be used more effectively somewhere else.

Management Accounting Truth #4: Large production runs are desirable because they are an efficient use of setup time and fixed costs. Moreover, large production runs reduce per-unit costs, which will increase profit. Actually, the opposite is true for **TOC**. Large production runs overload the constraint and increase work in process without increasing throughput. Moreover, **TOC** views all costs other than direct materials as irrelevant fixed costs. It doesn't matter how they are arbitrarily allocated among individual products. Remember, making production decisions based on reducing per-unit costs works against the objectives of **TOC**.

Management Accounting Truth #5: Product mix should be determined based on maximizing total contribution margin. Traditional product mix decisions consider individual product profitability measured by contribution margin per unit. This makes sense in an operation with no constraint. But in operations with a constraint it's better to select among products based on the benefit (i.e., throughput) received per unit of capacity of the constraint. This is the same analysis used in traditional management accounting when the system is bound by a scarce resource. With **TOC**, the constraint is the scarce resource, so the benefit obtained from it should be maximized. Remember, wise use of time at the constraint is the thing to consider in **TOC** product mix decisions.

The simplicity and logic of the **Theory of Constraints** make it very appealing. All that it requires is a thorough knowledge and understanding of the processes that are already in place. In addition, except for slowing things down (which can have its own benefits to work atmosphere and morale on all levels), no expensive or demoralizing changes will be needed. Finally, remember, you should adapt your performance measurement to your new understanding of processes and outcomes so that you can correctly gauge your performance and make effective decisions. Our five suggestions should help.

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