The Theory of Constraints and its Thinking Processes

A Brief Introduction to TOC

AGI Goldratt Institute℠
Focused System Improvement

The core constraint of virtually every organization AGI - Goldratt Institute has worked with over the past 20+ years is that organizations are structured, measured, and managed in parts, rather than as a whole. The results of this are lower than ex- pected overall performance results, difficulties securing or maintaining a strategic advantage in the market- place, financial hardships, seemingly constant firefighting, customer service expectations being rarely met, the constraint constantly shifting from one place to another, and chronic conflicts between people representing different parts of the organization, to name a few.

Once the barriers that block those parts from working together as an integrated system are removed, significant and sustainable improve- ment in each and every problem mentioned above is the result.

What blocks organizations from tearing down these barriers? Organi- zations are often so consumed by the pressures to achieve their short- term performance targets, that taking the time to plan for the future is a luxury they can't afford. Or, they have plans for the future, but are faced with the difficulties of balancing the risks of change with the opportu- nities they create – *"if it ain't broke, don't fix it!"*

Is it possible to use change to create a competitive advantage? Is it possible to do that quickly, without risk, and while creating a reliable platform from which to seize the opportunities of tomorrow?

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Summary of an Independent Study
Sampling of Companies Using TOC

Due Date Performance (On-time Delivery): Mean Improvement — 44%

Combined Financial Variable: Mean Increase — 63%

Revenue/Throughput: Mean Increase — 73%

Lead Times: Mean Reduction — 70%

Cycle Times: Mean Reduction — 65%

Inventory Levels: Mean Reduction — 49%
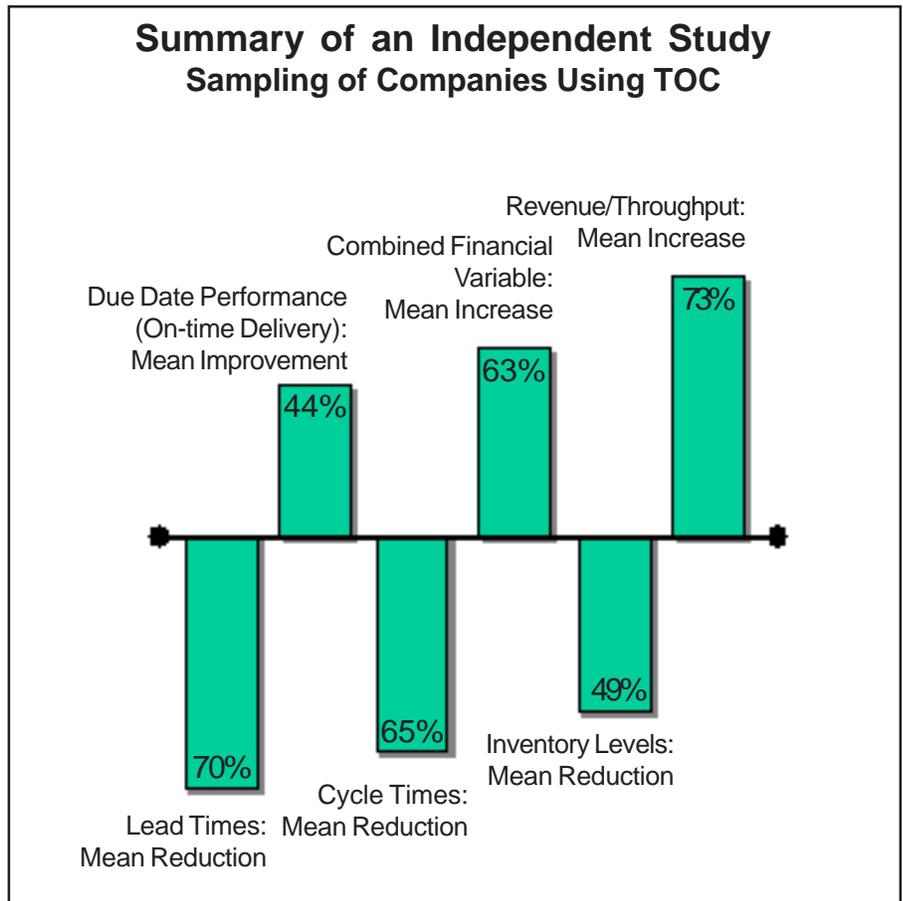
Source: The World of the Theory of Constraints, Vicky Mabin and Steven Balderstone, St. Lucie Press, 1999.

INTRODUCTION

Today, more than ever, change is essential to satisfying expectations. Customers expect higher product and service quality than the price they're willing to pay to acquire those products and services. More than ever, employees expect security in their jobs. Shareholders expect that today's investments will yield a higher rate of return over a shorter timeframe. Yet, "to make ends meet," management is constantly pressured to keep costs under control.

In not-for-profit organizations, change means achieving higher levels of human or social capital with less budget.

In light of today's competitive pressures and a rapidly changing environment, to not change is to give way to one's competitors. Hence, we should understand that to *improve* means to *change*. We know that to improve means we must:

- Provide products and services that solve customers' problems
- Release products and services consistent with market demand
- Reduce variability in our processes
- Have measurements that indicate success relative to achieving our goal
- Reward people for their contribution to change

Rather than reacting to external change, or being subjected to random internal change, many organizations have concluded that a process of on-going improvement is an absolute necessity. For an organization to have a process of on-going improvement, certain basic questions need to be answered faster and more effectively. Those fundamental questions are:

What are some of AGI's customers using the TOC Thinking Processes for?

- *Design of Manufacturing Systems*
- *New product development*
- *New market entry*
- *Pipeline Management*
- *Segmentation of existing markets*
- *Strategic Planning*
- *System of Systems Design*

- "What To Change?"
- "What To Change To?"
- "How To Cause The Change?"

This white paper provides an introduction to the Theory of Constraints and its Thinking Processes.

PROCESS – A HEALTHCARE ANALOGY

The Theory of Constraints (TOC) applies the cause-and-effect thinking processes used in the hard sciences to understand and improve all systems, but particularly, organizations. The process a clinician applies to treating a patient is an excellent analogy for explaining how TOC recommends going about solving a systems problem. If we were to describe the overall process used by a clinician treating a patient it would look something like:

1. **Diagnosis:** Knowing the futility of treating the symptoms, a clinician begins with a list of observable symptoms and uses cause and effect to seek out the underlying common cause for all of them, the "disease" or core problem.

2. **Design of a Treatment Plan:** Considering the uniqueness of the patient and his/her diagnosis, a treatment plan is developed that first and foremost treats the disease (e.g., surgery), but also suggests what other things must be done alongside that "cure" to ensure the treatment will work (e.g., pain relief and bed rest) and that the best possible health is restored to the patient (e.g., physical therapy). In this process, any potential side effects of the treatment are identified, and the means for preventing or mitigating them become key elements of the treatment.

3. **Execution of the Treatment Plan:** Taking into consideration, the uniqueness of the patient's situation, a plan is developed for how to implement the treatment (e.g., surgery and pre-op work are scheduled, arrangements for transportation to and from the hospital are secured, hospital beds to be used at home are ordered).

The Jonah Program® is for individuals and management teams that want to accelerate the improvement process in their area of responsibility or throughout their organization. It is also for those who want to accelerate the improvement process in a subject matter or specific area of interest.

The Jonah Program® focuses participants' common sense and intuition through the Theory of Constraints Thinking Processes. The results are detailed answers to each of the three questions for the selected subject. Participants also gain the tools needed to apply the same rigorous process to other subject matter.

- · *Accounting*
- · *Aerospace*
- · *Automotive*
- · *Consulting*
- · *Defense*
- · *Healthcare*
- · *High-Tech*
- · *Lumber*
- · *Manufacturing*
- · *Metals & Mining*
- · *Semiconductor*
- · *Steel*
- · *Telecommuncations*
- · *Textile*
- · *Universities and Colleges*

APPLYING TOC TO ORGANIZATIONS

The TOC processes used to improve the health of an organization (or solve any problem) are almost identical; however, the terminology is changed to better suit the language of problem-solving in organizations. In TOC, the process is described via the use of three questions: *What to Change?, What to Change To?, and How to Cause the Change?*

1. **What to Change?** From a list of observable symptoms, cause-and-effect is used to identify the underlying common cause, the core problem, for all of the symptoms. In organizations, however, the core problem is inevitably an unresolved conflict that keeps the organization trapped and/or distracted in a constant tug-of-war (management versus market, short-term versus long-term, centralize versus decentralize, process versus results). This conflict is called a *Core Conflict.* Due to the devastating effects caused by Core Conflicts, it's common for organizations to create policies, measurements, and behaviors in attempts to treat those negative effects (often referred to as band-aid fixes) that, when treating the Core Conflict, must be removed, modified, or replaced.

What to Change?

2. Current Reality Tree:
Is the core conflict really the core conflict?

1. Core Conflict Cloud:
What core conflict is responsible for all the UDEs?
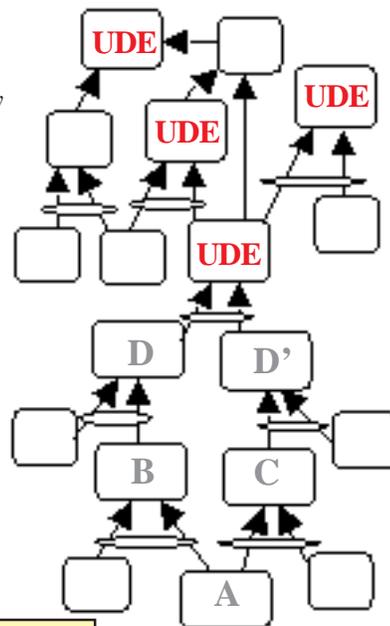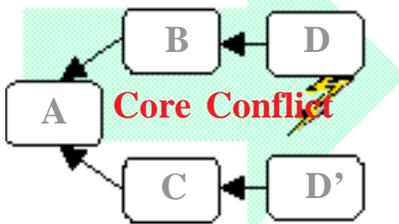
2. Build a *Current Reality Tree* that validates the identification of the Core Conflict, helps us understand the existing cause-and-effect relationships of the subject and identifies the conspiring formal and informal policies, measurements and behaviors that support the existence of the UDEs.

1. Identify the *Core Conflict* causing the symptoms, or UnDesireable Effects (UDEs), of the chosen subject using the *Three-Cloud Process.*

UDE: UnDesireable Effect
ù•dee - *n.* something that exists in reality that is negative, and has penalties for its continued existence. *pl.* UDEs (ù•deez) *syn.* problem, symptom.

2. **What to Change To?** By challenging the logical assumptions behind the Core Conflict, a solution to the Core Conflict is identified. This is only the starting point for the development of a complete solution – a *strategy* – for resolving all of the initial symptoms, and many others, once and for all. As in the *Design of a Treatment Plan* above, the strategy must also include the changes that must be made alongside the solution to the Core Conflict to ensure that the solution works and that the organization is restored to its "best possible health." Respectively, these are often the changes to the policies, measurements, and behaviors identified in *What to Change?*, as well as the organization's strategic objectives. Lastly, the strategy is not complete until all potential negative side-effects of the strategy have been identified, and the means for preventing or mitigating them become key elements of the strategy. Trimming these negatives side-effects allows an organization to intentionally and systematically create strategies that are a win for all those affected.

3. Identify and break the assumptions that allow the *Core Conflict* to persist

What to Change To?

3. Core Conflict Cloud: *What assumption(s) are we going to challenge?*

Assumption Injection

DE
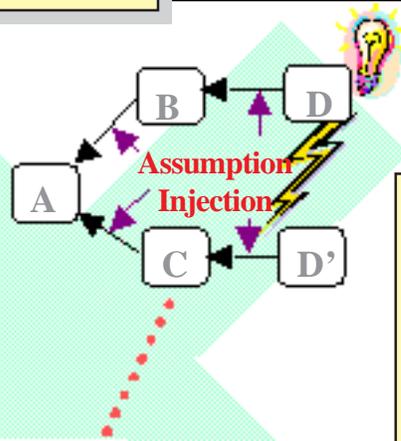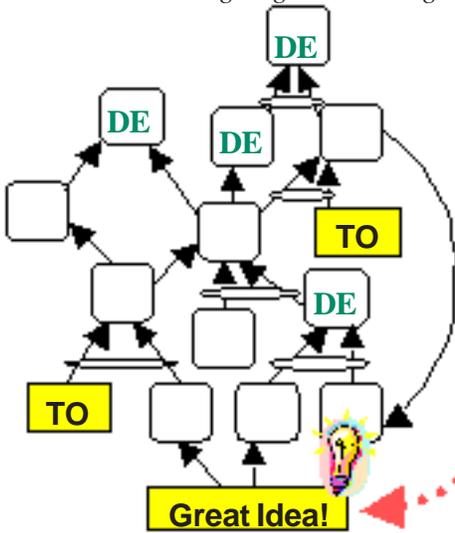
4. Future Reality Tree: *Ensures that the starting injection will lead to all the DEs without creating negative branches.*

Great Idea!

4. Construct a *Future Reality Tree* that lays out the complete solution/strategy that:

- Resolves all of the UDEs by making their opposites, the *Desired Effects*, exist

- Ensures alignment with the *Strategic Objectives* (SO) of the bigger system that the subject is a part

- Ensures that no new negative side-effects (*Negative Branches*) will occur from implementing the solution/strategy

- Identifies what changes in the culture (formal and informal policies, measurements and procedures) of the system and/or sub-system must be made to ensure the symptoms are resolved

- Leverages the existing TOC applications that are needed to make the solution/ strategy work, and

- Quantifies the "bottom line" value of achieving those DEs and SOs

DE: Desireable Effect
dee•ee - *n.* something that we want to have exist in place of the UDE; opposite of the UDE. *pl.* DEs (dee•eez)

3. **How to Cause the Change?** Taking into consideration the unique culture which exists in every organization, a plan is developed to transition an organization from where it is today to realizing the strategy. In other words, a plan for successfully implementing the strategy is created, including what actions must be taken, by whom and when. Because **resistance to change** can block even the most perfectly laid strategies and plans, building active consensus and collaboration, or buy-in is crucial.

5. Build a *Tactical Objectives Map* that charts the overall course for getting from the current reality to the future reality, where the solution/strategy is fully implemented. Flesh out the details of what each part of the system/sub-system must contribute, and when, to achieve each of the milestones of the TO Map using a *PreRequisite Tree* (PRT)

6. Create detailed task interdependency diagram, using *Transition Trees* (TRTs) when necessary to flesh out crucial actions

How to Cause the Change?
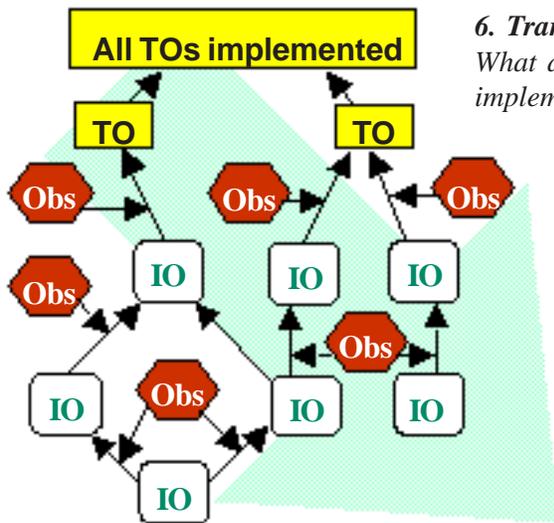
6. Transition Trees:
What actions must we take to implement the PreRequisite Tree?
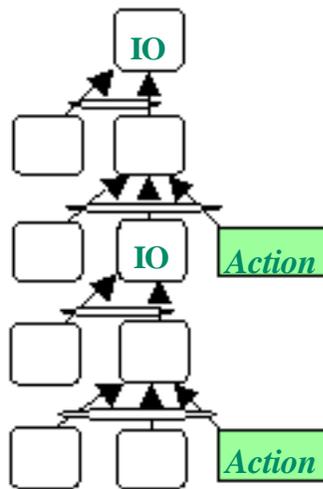
5. PreRequisite Tree:
In what order do we implement the T.O.s and what blocks their implementation?

- Internalize TOC's 6 Steps of Buy-In to achieve the needed approvals, buy-in, or active collaboration to proceed with implementation via the design/customization (again, using TRTs) and role-playing of specific buy-ins the participant will have to perform in their subject environment, and
- Transform action plans into a complete project network that can be effectively managed using project management techniques (preferably, TOC's Critical Chain project management solution).

OVERCOMING RESISTANCE TO CHANGE

TOC has developed a process based on the psychology of change that acknowledges and systematically addresses the questions people intuitively ask when evaluating a change.

    a. Is the right problem being addressed - *mine*?

    b. Is the general direction that the solution is heading a good one?

    c. Will the solution really work to solve the problems and what's in it for me?

    d. What could go wrong? Who might get hurt?

    e. How the heck are we going to implement this thing?

    f. Are we really up to this? Do we have the leadership and the commitment to pull this change off successfully?

If these questions aren't answered frankly and effectively with both the people who must implement the change and those who will be affected by it, the proposed change will not have the buy-in and support to succeed. Like most changes, no matter how great the idea or tremendous the value, the strategy and tactics are doomed from the outset.

The three questions, *What to Change?, What to Change To?, and How to Cause the Change?,* provide the framework for what's called the TOC Thinking Processes. The Thinking Processes are a set of tools and processes that allows an individual or group to solve a problem and/or develop an integrated strategy using the rigor and logic of cause-and-effect, beginning with the symptoms and ending with a detailed action plan that coordinates the activities of all those involved in implementing the solution.

As a result of applying TOC's Thinking Processes to countless organizations over three decades, generic TOC solutions have emerged that have applicability across all organizations, both for-profit or not-for-profit. To this day these applications continue to evolve, resulting in more and more significant and sustainable overall and bottom line performance improvements where implemented.

THE FIVE FOCUSING STEPS OF TOC

How can any generic solution have such broad applicability? It turns out that no matter what an organization's offering is – products and/or services – the methods for most effectively and efficiently managing processes and resources are basically the same. To use another powerful analogy: just as *the strength of a chain is dictated by its weakest link*, the performance of any value-chain is dictated by its constraint. Recognizing this, the resulting steps to maximizing the performance of a value-chain are:

1. *Identify* the constraint.
2. Decide how to *exploit* the constraint.
3. *Subordinate and synchronize* everything else to the above decisions.

To improve the performance of that same value-chain, continue:

4. *Elevate* the performance of the constraint.
5. If in any of the above steps the constraint has shifted, *go back to Step 1.*

> WARNING
> DO NOT LET INERTIA BECOME THE
> SYSTEM'S CONSTRAINT

These are called the *5 Steps of TOC* and provide the foundation for many of TOC's generic solutions, which include, the management of processes, inventory, supply chains, product development and projects (single and multiple), personnel, and decision-making.

Although the *5 Steps of TOC* can be applied to every process at every level in an organization, which is how TOC is frequently often implemented, the true power - and *results* - comes from:

- Understanding the interdependencies *between and across processes* that contribute to delivering a product or service,

- Understanding the impact that those interdependencies and normal variability have on their *combined, overall performance*, and

- Appropriately buffering for interdependencies and normal variability so that that performance can be predictably and consistently high.

Understanding these three points allows the 5 Steps of TOC to be much more than simply another methodology for managing processes, but in fact, to be a methodology for consistently and significantly increasing the overall performance of *systems*.

The *5 Steps of TOC* implemented in this context enables an organization to create a stable and reliable value delivery system from which its leadership can quickly respond to any opportunity that presents itself. The *TOC Thinking Processes* enable it to develop strategies to seize those opportunities in a way that result in significant strategic advantage and value to all stakeholders. An organization using TOC is only limited by how big it dares to think. ***Imagine!***

For more information regarding the Theory of Constraints and its Thinking Processes, or AGI - Goldratt Institute's products and services, please contact us at 1.800.394.GOAL or +1.203.624.9026.

Why AGI?

AGI brings to the table a high-octane blend of technical competence, dedication, enthusiasm, and implementation techniques that get results. With over 20 years experience, they continue working in a spirit of close partnership with their customers to deliver the maximum impact for the least investment, leading as quickly as possible to organizational self-sufficiency in a sustainable culture of ongoing improvement.

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