theory of constraints

a self learning program

TOC on Marketing

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By Eliyahu M. Goldratt

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Self Learning Program

By Eliyahu M. Goldratt

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TOC
on Marketing

A Self Learning Program

By Eliyahu M. Goldratt

Produced by: Goldratt's Marketing Group

Goldratt's Marketing Group:
P. O. Box 334
Hamburg, New York 14075
USA: 1.888.301.6141

e-mail: info@TOC-Goldratt.com
www.TOC-Goldratt.com

For any information on TOC and/or books by Eliyahu M. Goldratt please contact:
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A Complete Self Learning Program

TOC
on Marketing

A Self Learning Program

By Eliyahu M. Goldratt

Contents

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on Marketing

A Self Learning Program

Marketing:

Bringing the market to desire your service/product.

Sales:

Closing a deal.

What to change?

What is the problem?

SUPPLIER PERCEPTION OF VALUE -

according to investment in the product:
design, production, distribution, marketing, etc.

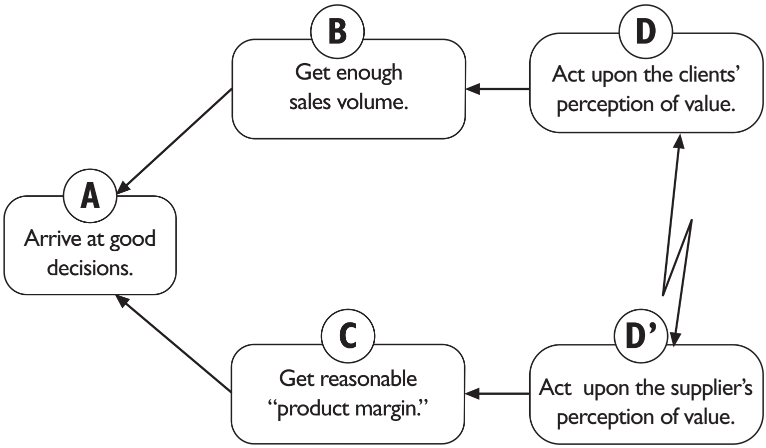
The perception is that there is one fair price
(cost + reasonable margin).

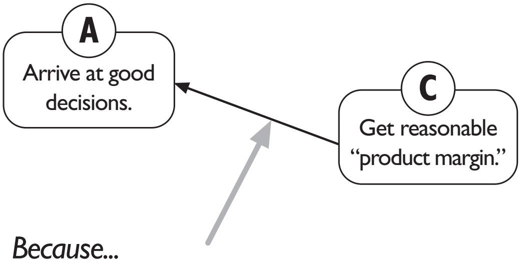
CUSTOMER PERCEPTION OF VALUE -

according to the benefits expected from
acquiring the product.

Different customers have different needs and thus, different
perceptions of value.

The Marketing Cloud



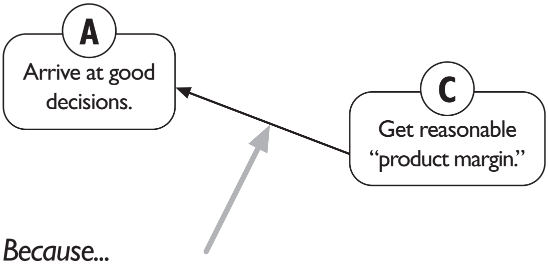


Because...

having positive "margin" for each product/service guarantees that the company is profitable.

As long as there is an uncertainty
about the quantity to be sold,
the above assumption is false.

There is no point in trying to impose certainty
on a situation which contains high uncertainty.



Because...

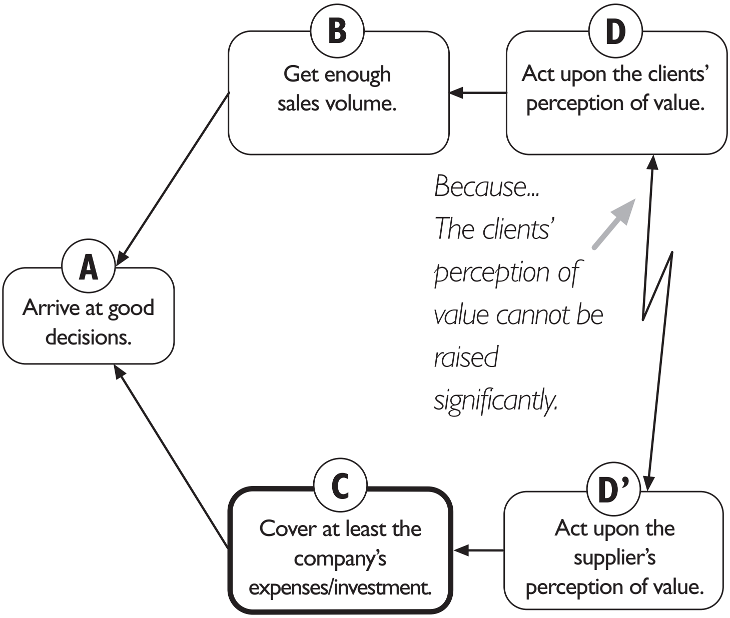
any sale which has "negative margin" reduces the company's profitability.

The story line:

A company has sales of $100m and losses of $2m. There is enough excess capacity to increase volume by 20%. The company can sell this additional volume in a segmented market for a price which is 30% lower than current prices. Raw material, subcontracting and shipping are in total 40% of current selling price.

1. What will be the impact on the profit this year if the company elects to produce and sell the additional volume?

2. What will be the impact next year, and the year after?


B
Get enough sales volume.
D
Act upon the clients' perception of value.
A
Arrive at good decisions.
Because...
The clients' perception of value cannot be raised significantly.
C
Cover at least the company's expenses/investment.
D'
Act upon the supplier's perception of value.

What to change to?

What is the solution?

1. Increase the customer's perception of value for our products/services.

2. Do it in a way that the competitors cannot quickly imitate.

CUSTOMER PERCEPTION OF VALUE -

according to the benefits expected from acquiring the product/service.

A product/service that relieves customer's problems brings benefits - the more and bigger the problems that it relieves, the greater are the benefits.

Analyzing the market

- Start with the next link in your sales chain. Make a list of its undesirable effects that might be somehow connected to your products/services (if you cannot identify several undesirable effects move to the next link in the chain).

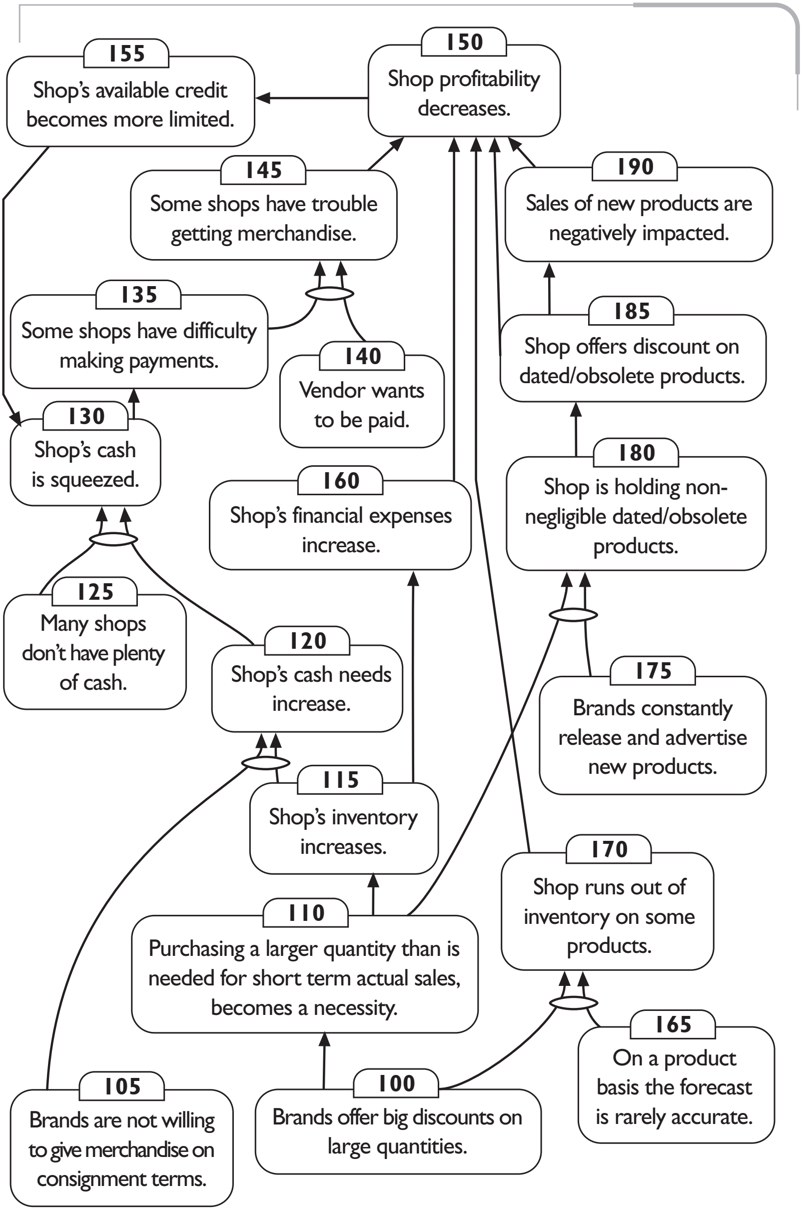
- Write the clouds of three of the undesirable effects.

- Generalize the three clouds into one generic cloud.

- Expose assumptions that relate to modes of operation of your link.

- Build the Current Reality Tree starting from the identified modes of operation and ending at the undesirable effects.

Current Reality Tree of Shops

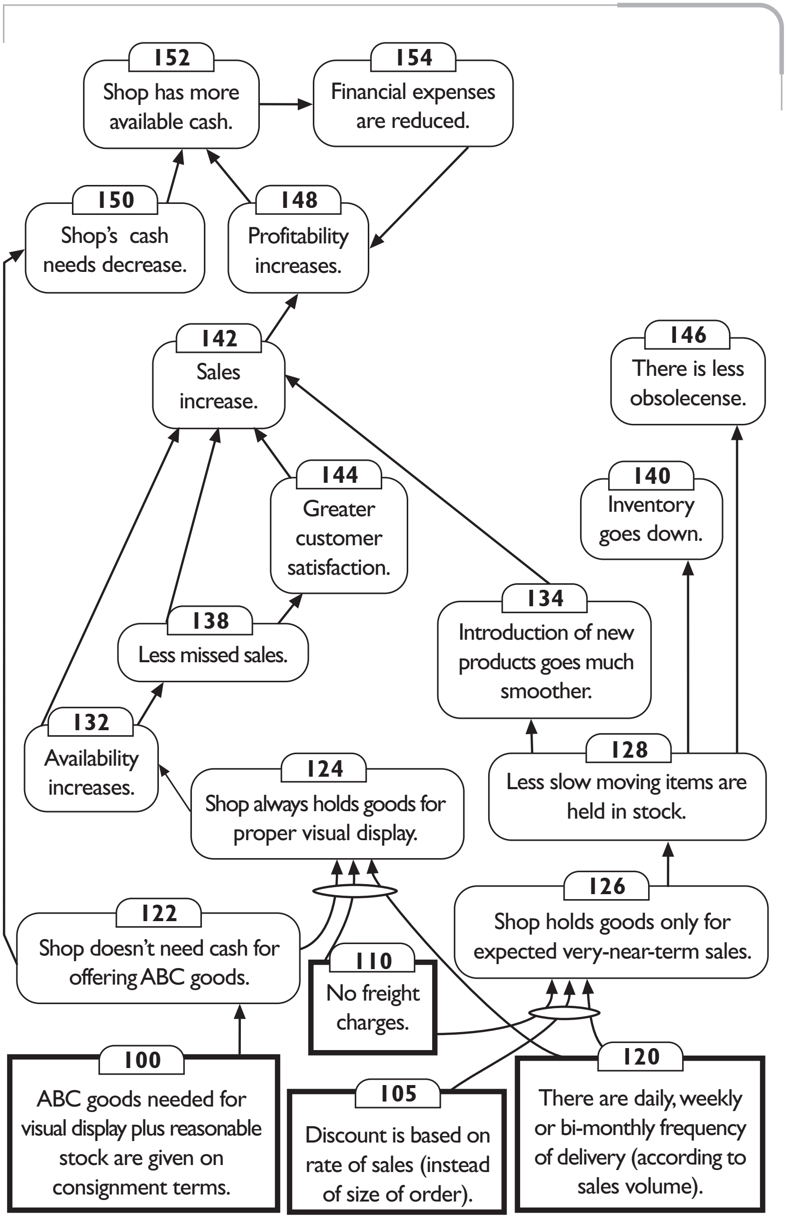


Building the Un-Refusable Offer

- Identify the required changes in your company's mode of operation.

- Start with the changed mode of operation and, using cause and effect relationships, prove that most of the undesirable effects of your customers are unavoidably bound to improve.

Future Reality Tree of Retail Shop



Polishing the Un-Refusable Offer

- Spread copies to enough "yes, but..." people in your company and ask for their reservations.

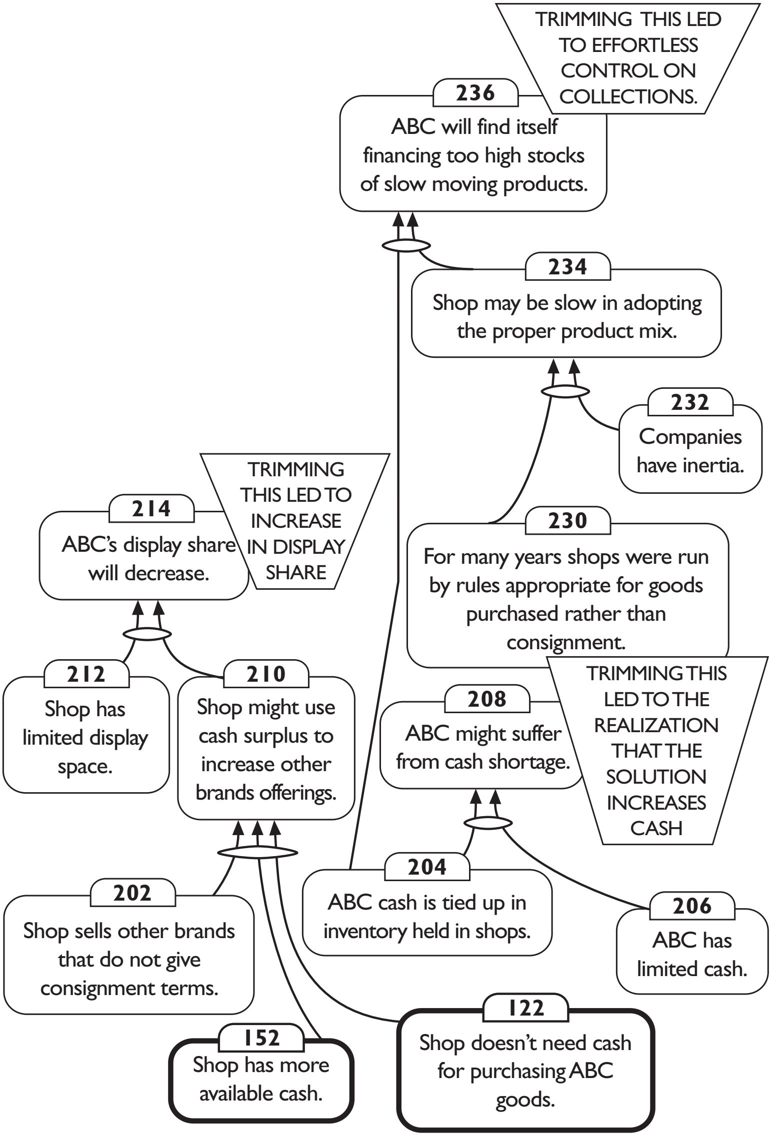
- Document the resulting reservations using cause and effect relationships that tie your suggestion to the predicted new undesirable effects.

- Check the documented reservations with the originators.

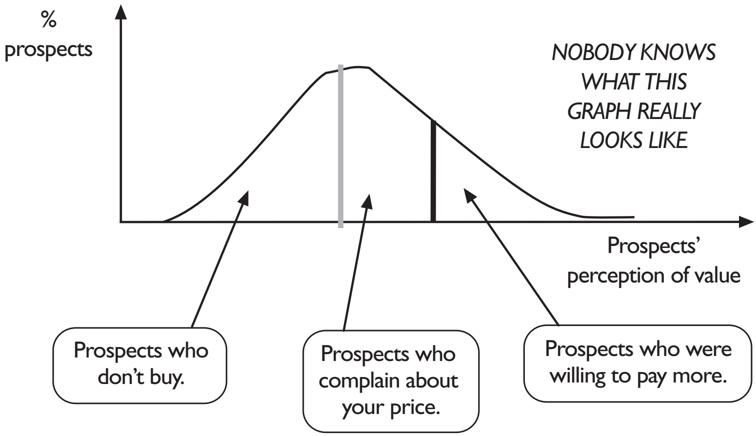
- Solicit/figure-out effective modifications.

- Embed the modifications in your suggestion.

The potential negative branches on the Future Reality Tree of a Retail Shop



Different customers have different needs and thus different perceptions of value.

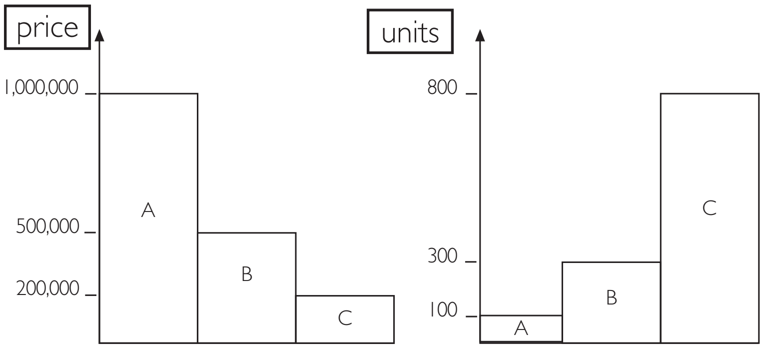


When different customers have somewhat different undesirable effects, the market is inherently segmented.

The only thing that prevents an effective segmentation is your offer.

The story:

A company produces a high-tech product, most of the product is electronics. The upper echelon of their market is willing to pay $1,000,000 for a full-blown product, the middle echelon is willing to pay $500,000 for a product that has less functions. The lower echelon can afford only $200,000 for a more modest product. The market sections are also quite different in size; the company can expect to sell (at the above prices) in the upper section only 100 units, in the middle one 300 units and in the lower, 800 units.



The development expense for the top unit is $80,000,000; the middle level unit $60,000,000 and the lower one $40,000,000. The production expenses (including materials) is $100,000 for the top unit, $90,000 for the middle unit and $80,000 for the lower unit.

Suppose that the company cannot invest more than $100m in development.

What should the company do and what will be the resulting net profit?

SEGMENT THE MARKET, NOT THE RESOURCES.

OH, by the way:

It is technically possible and very easy to downgrade the top product to be the middle and lower products. The additional development will require only $1,000,000. Of course doing so will cause the production costs of the middle and lower product to be equal to the top one.

What is your recommendation now?

What is the resulting net profit?

Did you ever hear the term "field upgrade" when large computers were discussed?

Development of top product:	$80,000,000
Development of other products:	$1,000,000
Cost of producing 1200 units:	$120,000,000
Total investment:	**$201,000,000**

Sales of top units:	$100,000,000
Sales of middle units:	$150,000,000
Sales of lower units:	$160,000,000
Total sales:	**$410,000,000**

And what about the clients that will want to upgrade later?

And what about the fact that engineers prefer to develop the top of the line?

And what about the fact that it is much easier for the logistical system - purchasing, production, distribution?

And what about the fact that it is much easier for service and maintenance?

SUMMARY

There is no such thing as product profit or product cost.

- The key is to realize that prices are determined by the customer perception of value and this perception is according to the benefits expected from acquiring the product/service.

- For each product/service which is valid (already sold) there is an Un-Refusable Offer.

- Now you know how to construct it.

TRY!

TOC terms and definitions

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To obtain the complete APICS dictionary, TOC publications, APICS Membership, or information on the Constraints Management Special Interest Group and other APICS activities, contact:

APICS, The Educational Society for Resource Management

1-800-444-2742
www.apics.org

activation
– In constraint management, the use of nonconstraint resources to make parts or products above the level needed to support the system constraint(s). The result is excessive work-in-process inventories or finished goods inventories, or both. In contrast, the term *utilization* is used to describe the situation in which nonconstraint resource(s) usage is synchronized to support the needs of the constraint. See: utilization.

buffer
– In the theory of constraints, buffers can be time or material and support throughput and/or due date performance. Buffers can be maintained at the constraint, convergent points (with a constraint part), divergent points, and shipping points.

buffer management
– In the theory of constraints, a process in which all expediting in a shop is driven by what is scheduled to be in the buffers (constraint, shipping, and assembly buffers). By expediting this material into the buffers, the system helps avoid idleness at the constraint and missed customer due

dates. In addition, the causes of items missing from the buffer are identified, and the frequency of occurrences is used to prioritize improvement activities.

constraint

– Any element or factor that prevents a system from achieving a higher level of performance with respect to its goal. Constraints can be physical, such as a machine center or lack of material, but they can also be managerial, such as a policy or procedure.

control points

– In the theory of constraints, strategic locations in the logical product structure for a product or family that simplify the planning, scheduling, and control functions. Control points include gating operations, convergent points, divergent points, constraints, and shipping points. Detailed scheduling instructions are planned, implemented, and monitored at these locations. Other work centers are instructed to "work if they have work; otherwise, be prepared for work." In this manner, materials flow rapidly through the facility without detailed work center scheduling and control.

convergent point

– In the theory of constraints, a control point in the logical product structure where nonconstraint parts are assembled with constraint parts. To maintain the flow of parts to products, the schedule of nonconstraint parts must be synchronized with that of constraint parts.

critical chain

– In the theory of constraints, the longest route through a project network considering both technological precedence and resource contention constraints in completing the project. Where no resource contention exists the critical chain would be the same as the critical path.

critical chain method

– In the theory of constraints, a network planning technique for the analysis of a project's completion time, used for planning and controlling project activities. The critical chain, which determines project duration, is based on technological and resource constraints. Strategic buffering of paths and resources is used to increase project completion success.

current reality tree (CRT)

– A logic-based tool for using cause-and-effect relationships to determine root problems that cause the observed undesirable effects of the system.

divergent point
– In the theory of constraints, a control point in the logical product structure where a common part or assembly can be directed to two or more different end items. To maintain the flow of parts to products, the schedule of common parts must be synchronized with the constraint schedule and shipping commitments.

drum
– In the theory of constraints, the constraint is viewed as a drum, and nonconstraints are like soldiers in an army who march in unison to the drumbeat; the resources in a plant should perform in unison with the drumbeat set by the constraint.

drum-buffer-rope
– In the theory of constraints, the generalized technique used to manage resources to maximize throughput. The drum is the rate or pace of production set by the system's constraint. The buffers establish the protection against uncertainty so that the system can maximize throughput. The rope is a communication process from the constraint to the gating operation that checks or limits material released into the system to support the constraint.

drum schedule
– In the theory of constraints, the detailed master production schedule for the plant that sets the pace for the entire system. The drum must reconcile the customer requirements with the system's constraints.

evaporating cloud
– In the theory of constraints, a logic-based tool for surfacing assumptions related to a conflict or problem. Once the assumptions are surfaced, actions to break an assumption and hence solve (evaporate) the problem can be determined.

excess capacity
– A situation where the output capabilities at a nonconstraint resource exceed the amount of productive and protective capacity required to achieve a given level of throughput at the constraint.

excess inventory
– Any inventory in the system that exceeds the minimum amount necessary to achieve the desired throughput rate at the constraint or that exceeds

the minimum amount necessary to achieve the desired due date performance. Total inventory = productive inventory + protective inventory + excess inventory.

five focusing steps
– In the theory of constraints, a process to continuously improve organizational profit by evaluating the production system and market mix to determine how to make the most profit using the system constraint. The steps consist of (1) identifying the constraint to the system, (2) deciding how to exploit the constraint to the system, (3) subordinating all nonconstraints to the constraint, (4) elevating the constraint to the system, (5) returning to step 1 if the constraint is broken in any previous step, while not allowing inertia to set in.

future reality tree (FRT)
– In the theory of constraints, a logic-based tool for constructing and testing potential solutions before implementation. The objectives are to (1) develop, expand, and complete the solution and (2) identify and solve or prevent new problems created by implementing the solution.

idle capacity
– The capacity generally not used in a system of linked resources. Idle capacity consists of protective capacity and excess capacity.

idle inventory
– The inventory generally not needed in a system of linked resources. Idle capacity generally consists of protective inventory and excess inventory. See: excess inventory, productive inventory, protective capacity.

inventory
– In the theory of constraints, inventory is defined as those items purchased for resale and includes finished goods, work in process, and raw materials. Inventory is always valued at purchase price and includes no value-added costs, as opposed to the traditional cost accounting practice of adding direct labor and allocating overhead as work in process progresses through the production process.

operating expense
– In the theory of constraints, the quantity of money spent by the firm to convert inventory into sales in a specific time period.

policy constraint

– In the theory of constraints, a constraint which is not physical in nature. This category includes the entire system of measures and methods and even the mindset that governs the strategic, tactical, and operations (day-to-day) decisions of the organization.

prerequisite tree (PRT)

– In the theory of constraints, a logic-based tool for determining the obstacles that block implementation of a problem, solution or idea. Once obstacles have been identified, objectives for overcoming obstacles can be determined.

productive capacity

– The maximum of the output capabilities of a resource (or series of resources) or the market demand for that output for a given time period.

product structure

– The sequence of operations that components follow during their manufacture into a product. A typical product structure would show raw material converted into fabricated components, components put together to make subassemblies, subassemblies going into assemblies, etc.

protective capacity

– A given amount of extra capacity at nonconstraints above the system constraint's capacity, used to protect against statistical fluctuation (breakdowns, late receipts of materials, quality problems, etc.). Protective capacity provides nonconstraints with the ability to catch up to "protect" throughput and due date performance.

protective inventory

– The amount of inventory required relative to the protective capacity in the system to achieve a specific throughput rate at the constraint.

supply chain

– 1) The processes from the initial raw materials to the ultimate consumption of the finished product linking across supplier-user companies.

– 2) The functions inside and outside a company that enable the value chain to make products and provide services to the customer.

theory of constraints (TOC)

– A management philosophy developed by Dr. Eliyahu M. Goldratt that can be viewed as three separate but interrelated areas-logistics, performance measurement, and logical thinking. Logistics include drum-buffer-rope scheduling, buffer management, and VAT analysis. Performance measurement includes throughput, inventory and operating expense, and the five focusing steps. Thinking process tools are important in identifying the root problem (current reality tree), identifying and expanding win-win solutions (evaporating cloud and future reality tree), and developing implementation plans (prerequisite tree and transition tree).

theory of constraints accounting
– A cost and managerial accounting system that accumulates costs and revenues into three areas–throughput, inventory, and operating expense. It does not create incentives (through allocation of overhead) to build up inventory. The system is considered to provide a truer reflection of actual revenues and costs than traditional cost accounting. It is closer to a cash flow concept of income than is traditional accounting. The theory of constraints (TOC) accounting provides a simplified and more accurate form of direct costing that subtracts true variable costs (those costs that vary with throughput quantity). Unlike traditional cost accounting systems in which the focus is generally placed on reducing costs in all the various accounts, the primary focus of TOC accounting is on aggressively exploiting the constraint(s) to make more money for the firm.

throughput
– In the theory of constraints, the rate at which the system (firm) generates money through sales. Throughput is a separate concept from output.

TOC performance measures
– In the theory of constraints, throughput, inventory and operating expense are considered performance measures that link operational decisions to organizational profit.

transition tree (TRT)
– In the theory of constraints, a logic-based tool for identifying and sequencing actions in accomplishing an objective. The transitions represent the states or stages in moving from the present situation to the desired objective.

utilization
– In the theory of constraints, utilization is the ratio of time the resource is needed to support the constraint to the time available for the resource, expressed as a percentage. See: activation.

VAT analysis

– In the theory of constraints, a procedure for determining the general flow of parts and products from raw materials to finished products (logical product structure). A *V logical structure* starts with one or a few raw materials, and the product expands into a number of different products as it flows through divergent points in its routings. The shape of an *A logical structure* is dominated by converging points. Many raw materials are fabricated and assembled into a few finished products. A *T logical structure* consists of numerous similar finished products assembled from common assemblies, sub-assemblies, and parts. Once the general parts flow is determined, the system control points (gating operations, convergent points, divergent points, constraints, and shipping points) can be identified and managed.