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THEORY OF CONSTRAINTS - THROUGHPUT ACCOUNTING: ASHIFT IN PARADIGM

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Abstract
The practice of Throughput Accounting (TA) is about how to bring more profits from the company by focusing strictly on the management of the bottleneck resource or constraint. This approach is entirely at odds with the traditional use of detailed allocations to arrive at fully burdened costs for products, customers and sales regions which can yield results so convoluted that a company can become paralyzed with indecision. TA involves concepts of constraint management, its application within the accounting department. This study highlights how TA yields crisp and easy to understand results for a broad range of management applications. A conceptual comparison ofThroughput Accounting and other Cost Accounting techniques is done and how TA can be used to find best solutions in the real world is analysed in the paper. Through this study the researchers were also able to study the current significance of Throughput accounting in the industry and relevant suggestions for the same are mentioned.

Keywords: Throughput Accounting, Traditional Accounting, Comparison, Emerging Paradigms.

1. Introduction

Developed by Eliyahu M. Goldratt in the early 1980s, The Theory of Constraints (TOC) is anoverall management philosophy. The fundamental thesis of TOC is that constraints establish the limits of performance for any system. Most organizations contain only a few core constraints. TOC advocates suggest that managers should focus on effectively managing the capacity and capability of these constraints if they are to improve the performance of their organization. The practice of Throughput Accounting (TA) is about how to bring more profits from company by focusing strictly on the management of bottlenecks resource or constraints.

Figure 1.1: Components of Throughput Accounting

Out of these three, throughput is the most important one since the goal is to create a high throughput. This approach is completely at odds with the traditional use of detailed allocations to arrive at fully burdened costs for products, customers and sales regions which can yield results so convoluted that a company can become paralyzed with indecision. TA yields crisp easy to understand results for a broad range of management, its application within the accounting department. It begins with comparison between TA and other Cost Accounting and how TA can be used to find best solutions in the real world. TA analyses traditional budgeting and how it integrates throughput concepts. It helps to design control system which warn the problems related to the constraint. Several supporting functions are planned to accumulate information from GAAP which improve company performance.

Once considered simply a production-scheduling technique, TOC has broad applications in diverse organizational settings. For example, TOC has proved to be a milestone concept leading to process improvement in organizations such as Avery Dennison, Bethlehem Steel, General Motors, National Semiconductor, United Airlines, Boeing, ITT, and Procter and Gamble. Similarly, the United States Air Force Logistics Command had adopted constraint management concepts to improve the performance of aircraft repair depots, while the United States Navy has implemented TOC concepts in its Transportation Corps.

TOC challenges managers to rethink some of their fundamental assumptions about how to achieve the goals of their organizations, about what they consider productive actions, and about the real purpose of cost management. Emphasizing the need to maximize the throughput— revenues earned through sales—TOC focuses on understanding and managing the constraints that stand between an organization and the attainment of its goals. Several key principles underlie TOC –

Processes/organizations as chains, local versus system optima, cause and effect, physical versus policy constraints and total system impact which acts as a baseline to use TOC.Elegant in concept and design, TOC focuses management's attention on the factors that impede system performance.

TOC management systems normally consist of the elements like logistics/ Scheduling, performance measurement, problem-solving/ thinking process, project management and market segmentation.TOC has broad applications in manufacturing organizations, but it can also be used effectively to improve performance in areas outside of manufacturing, such as marketing and administration. TOC can be used in conjunction with other management techniques such as total quality management (TQM) and just-in-time (JIT) to provide a comprehensive, linked set of techniques that emphasize continuous improvement in all areas of operation. TOC has also been applied at the supply chain level to coordinate the activities of upstream and downstream trading partners.

2. Objectives

The focus of this study is on those TOC techniques dealing with logistics/scheduling, market segmentation, and performance measurement. It is beyond the scope of this guideline to discuss the TOC generic problem-solving techniques referred to as the "Thinking Process" and "Project Management" since these are the least researched and least visible of the TOC concepts for finance and operations management.

- To determine the basic concept of Throughput Accounting
- To identify the conceptual comparison of Throughput accounting with other Accounting Concepts

3. Throughput Accounting Concepts

TOC can help an organization leverage its core capabilities to optimize financial performance. According to various study on this field we can deduce that every company must have at least one physicallimitation (whether internal or external), and may or may not have any intangible constraintsthat limit the performance of the material significantly influences. From the definition of thebottleneck then be inferred that all other sources, except for a narrow space, must have ahigher capacity than it needs a resource that constitutes a restriction on the system.TOC is a vital part of the expanded toolkit, providing unique insights and focus into the ongoing challenges of identifying the products and services that will maximize customer value-added and organizational profitability.

3.1 Throughput and Traditional Cost Accounting Concepts

Under conventional accounting managers try to make significant budget and headcount since cost is the primary measure of performance improvement. As a result, organisations can end up milking the present to the detriment of the future. Whereas main objective in the TOC model is to identify and manage the primary constraint. The goal is to find ways of improving the utilization of the fixed costs and resources of the organisations to reduce waste and enhance profitability rather increasing profits by reducing costs.

3.1.1 TOC and Cost Management

TOC presents a significantly different perspective on how best to control operations. It does not work well with conventional accounting systems that emphasize cost absorption and standard cost variance analysis. The reasons for this are many, including the fact that building inventory to "earn hours" of labour and overhead is an alien concept in the TOC environment.

Within the more traditional cost management perspective, managers often focus primarily on decreasing the unit cost. Others may be less concerned with unit costs, placing their emphasis on decreasing the operating expenses and inventory (investment) of the organization. According to TOC advocates, behind these worrisome trends lies the management accounting system and its excessive focus on unit costs and allocations.

3.1.2 TOC and Absorption Costing

Absorption costing develops a full product cost by combining the cost of raw materials, direct labour, and a "fair share" of manufacturing overhead. Absorption costing has been found to be inconsistent with a throughput environment because it penalizes managers who reduce inventories. Excess inventories are a signal that production should be cut back. This can lead to unabsorbed overhead in the traditional cost world, but under TOC reducing inventories results in increased throughput. The former can be seen as a negative result for a production manager, while the latter is the driving force behind TOC.
In TOC, inventory is to be eliminated; in absorption costing it is the basis for covering costs. If no immediate demand exists, absorption-driven logic would have a company make product ahead to "absorb" its overhead costs into inventory. Instead of absorption costing, most TOC companies use some variation of variable costing that begins with the assumption that direct materials are the only variable cost.

3.1.3 TOC and Variable Costing

TA resembles variable costing because of its heavy emphasis on managing the incremental change in costs due to volume shifts (more throughput). At the conceptual level, throughput is very similar to the more traditional contribution margin estimate (contribution margin is simply sales minus all variable costs). The difference lies, as has been noted, in the fact that TOC uses a much stricter definition of variable cost than is used for contribution margin analysis. Specifically, some TOC proponents maintain that only the cost of raw materials should be deducted from sales to derive throughput. Others, though, take a more moderate approach, noting that any cost that acts in a truly variable fashion should be deducted from revenue to determine throughput values.

While many similarities exist between TOC and variable costing, there is one significant difference: A product cost is not the goal of TOC. Seeing product cost as an arbitrary amount, the focus is instead on optimizing the performance of the system.

3.1.4 TOC and Relevant Cost Analysis

Relevant cost analysis is a key element of TOC. As is noted in any reasonable management accounting text, though, relevant costs do not include all the cost elements found in a traditional product cost. As with traditional accounting models, TOC recognizes that costs that do not differ between alternatives are irrelevant to managerial decisions. The specific estimates TOC advocates that should be considered in decisions, such as when to add or drop a product, are operating cost reductions that will be experienced if production is eliminated compared to the reduction in throughput that the loss of the production will create.

3.1.5 TOC and Activity-Based Costing

For many years there has been an ongoing debate about whether an organization seeking to break out of established paradigms that limited profits should use activity-based costing (ABC) or TOC. This is because decisions generated from the application of an ABC-based analysis are not always consistent with those suggested by TOC. The reasons for this result are numerous, including the fact that ABC considers all costs to be variable in the long run, the relevant time frame of analysis for many decisions.

A significant number of articles have been written about ways in which ABC and TOC complement each other. While the main proponents of these two management approaches may be at conceptual odds, the reality of the fact is that each of these tools provides unique insights and information.

Table 3.1: TOC for manufacturing and ABC to analyse and charge the support costs

(in thousands)	Bourbon	Gin	vodka	Total
Sales	$52500	$19500	$18000	$90000
Materials	15750	5500	5875	27125
Commissions	2625	975	900	4500
Net throughput	$34125	$13025	$11225	$58375
Advertising-direct	1500	750	700	2950
Contribution to indirect activities	$32625	$12275	$10525	$55425
Marketing-other	2235.5	1169.5	1070	4475
Administrative	3081.5	1623.5	1520	6225
Production overhead	23450	8850	9075	41375
Operating income	$3858	$632	$(1140)	$3350
Total gallons	15000	7500	7000	
Net throughput/gallons	$1.14	$0.87	$0.8	
Variable cost/ gallon(material and commissions)	0.615	0.43	0.485	
ABC cost/gallon	1.62	1.26	1.365	

This type of logic drove the integration of TOC and ABC at a Kentucky distillery. While the simplicity of TOC had merits in terms of implementation speed within this organization, analysis suggested that TOC would oversimplify the underlying cost structure of the organization to such an extent that it might prove useless, or harmful, to long-term decision making. The optimal solution seemed to be to develop a hybrid system that utilized the best aspects of ABC and TOC. The resulting analysis, as suggested by Table 3.1, used TOC for manufacturing costs to derive the manufacturing "contribution," and ABC

to analyze and charge the support costs (people-intensive) to the three primary product lines. This integration permits the distillery to answer traditional cost-volume-profit questions, facilitates the evaluation of profitable product lines, and better answers the question of bottom-line profitability by product and customer.

3.2 Throughput and Generally Accepted Accounting Principles

Generally Accepted Accounting Principles are concerned with the measurement of economic activity, the time when such measurements are to be made are recorded, the disclosure surrounding the activity, and the preparation and presentation of summarized economic information in the form of financial statements. There are several areas in which throughput accounting varies from GAAP. The most important issues is that GAAP requires that overhead costs be allocated to inventory, which intern may or may not be charged to expenses in the current period. The accounting research bulletin provides the following guidance regarding overhead allocation:

Table 3.2: Difference between GAAP and Throughput

BASIS	GAAP	THROUGHPUT
Accounting for inventories	GAAP clearly states that overhead must be allocated to inventory, and failure to do so is not acceptable.	Throughput accounting takes the opposite stance that overhead costs are not related to inventory in any way, and so should not be allocated to inventory.
Basic Assumption	GAAP accounting assumes that both the inventory held in storage and the overhead costs allocated to it are valuable company assets, only to be charge to expenses when the inventory is sold.	Under throughput accounting, the preferences is to avoid the production of excess inventory because it represents immediate use of cash (for the materials contained within the inventory). Thus, throughput accounting assumes that inventory is to be avoided, which is a common characteristic of a liability.
Effect on Contribution	Contribution under GAAP will be lesser compared to throughput	The throughput contribution will be substantially higher than under GAAP reporting, because throughput accounting assumes that direct labour and the overhead expenses are part of operating expenses, not the cost of goods sold.

Table 3.3: Income Statement layout using GAAP and Throughput Accounting

Particulars	GAAP Format ($)	Throughput Format($)
Sales	4125000	4125000
Cost of Goods Sold		
Materials	825000	825000
Direct Labor	412500	
Overhead	1025000	
Total Cost of Goods Sold	2262500	
Gross Margin	1862500	
Throughput Contribution		3300000
Operating Expenses		
Advertising	37500	
Commission	25000	
Depreciation	40000	
Outside Services	10000	
Salaries and Payroll taxes	1502500	
Supplies	30000	
Utilities	17500	
Total Operating Expenses	1662500	3100000
Net Income	200000	200000

3.3 Throughput and Management Accounting

Management accounting originated from the 19th and 20th century together with industrial revolutions.Systems to track costs became needed as decision support for the managers when the industries started to grow become large scale and more

complex to run (Johnson and Kaplan, 1987). When reviewing literature regarding management accounting systems, it is obvious that the interest in the topic has grown in recent years. Already in 1992, spicer meant there were two factors for the increased interest that has been seen both amount practitioners and academia. One factor is the globalization, where increased competition and accelerated pace of technological change have led to new conditions in how to manage the operations. The other factor is the research done by Robert Kaplan presented in a series of publications during the 1980s(Kaplan, 1983: Kaplan, 1984a; Kaplan, 1984b; Kaplan, 1986; Johnson and Kaplan, 1987). In this series, Kaplan presents three arguments for why there is need to put more focus on management accounting systems:

- Practitioners in management accounting have failed to keep pace with the changes in manufacturing and competition.
- Researchers know little about how these changes affect in practice.

Commonly used economic theories are too limited and not suitable for the new environment.In the 1980s, Kaplan realised the importance for companies to work with aligning their management accounting systems and [production systems. Later, other researchers (e.g. Hughes and Paulson Gjerde, 2003;Grasso, 2005; Radnor and Barnes, 2007; Maskell at al.,2012) have confirmed that the problem still exists since management accounting systems still do not provide sufficient and relevant information to manage and control manufacturing according to the company strategy. One reason for this is that management accounting systems have developed to support financial accounting instead of for manufacturing decision making (Johnson and Kaplan, 1987). "There no value to integrating the management accounts and the financial accounts. Each is serving a different purpose, linking them is irrelevant. The management accounts should not be driven by the needs of financial accounts.

The first step to understanding world class business concepts is to recognize where the varied philosophies agree and where they differ from traditional mass production concepts. Lean and TOC are the best examples, but many others are out there (Demand Flow Technology, Velocity, etc.,) to engage in sustainable real world implementations it eventually becomes beneficial to embrace one specific philosophy, but it does not require rejecting the others.

The real breakthrough is teaching others to reject the concepts of traditional mass production which have become intuitive to us all. To undermine one or the other undermines the potential for a revolutionary breakthrough toward either.A key to fully understanding TOC is that it is not just a system of eliminating constraints (bottlenecks) but more a system of managing constraints. A truly enlightened organization will know exactly where it wants the constraints to be. Constraints are a reality, the question is whether you want them to be internal, where you can control them or external (i.e. the market). A company that is in control of its own destiny can use its constraints like a valve to control and continually promote the flow of value.

4. Conclusion

The concepts discussed in this document applypredominantly to large and small organizations and enterprises in all business sectors.Through this study the researchershave tried to answer, how can throughput accounting help various stakeholders?
Throughput Accounting focuses on increasing revenue (throughput), improving cash flow (investment) and providing capacity (Operating expense). Every management decision is made base on expected changes in throughput, investment and operating expenses. Throughput accounting allows manager to take a more balanced approach to decision making, giving an accurate picture of the results of decisions. Throughput accounting also demonstrate ways to make more profitable pricing and marketing decisions.

Throughput accounting shift the emphasis in decision making from managing cost and budget to maximising throughput and profitability. It emphasis the improvement of flow through system, proving feedback on the financial impact of the constraint. It drives management decision to improve to constraints efficiency; ensuring all company resources support the constraint, so that profit can be maximised.

This approach differs substantially from traditional cost accounting because the company is not focused on every machine and employee working at optimal efficiency. Instead, its basis is that if the company optimizes any non-constraint, it will overload the constraint and create excess inventory.

Throughput accounting provides a way to measure productivity improvement efforts based on how they affect cost and throughput. It can be applied to decisions that affects all the aspects of a company including product price, process improvement, reward structures, investment justification, transfer pricing and performance management. The result is a thorough understanding of how a company is functioning as a whole and the ability to analyse the true impact of management decisions before they are made.

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