

Theory of Constraints- Lessons for Academicians and Practicing Managers from “The Goal - II”

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Abstract—Theory of Constraints has been emerging as an important tool for optimization of manufacturing/service systems. Goldratt in his first book “ The Goal ” gave the introduction on Theory of Constraints and its applications in a factory scenario. After the success of this book, he wrote Goal-II. In this book, he has tried to extend the application of TOC to other functional areas like Marketing Management and to the Management of a division comprising of many companies. This paper summarizes the key findings from Goal-II. In this paper, the drawbacks of many conventional strategies and business tactics are highlighted and the features of good Marketing strategies are presented. Similarity between Goldratt’s concept of positives and negatives of a product and the components in the Juran’s definition of Quality are also highlighted. The book highlights that the five step process of ongoing improvements and thinking process can be successfully used to break the marketing constraint facing any type of company.

Keywords—Theory of Constraints, Drum-Buffer-Rope, Evaporation Cloud, Policy constraint.

I. INTRODUCTION

THEORY of Constraints has been emerging as an important tool for optimization of manufacturing/service systems. Goldratt in his first book “ The Goal ” gave the introduction on Theory of Constraints and its applications in a factory scenario. After the success of this book, he wrote Goal-II. In this book, he has tried to extend the application of TOC to other functional areas like Marketing Management and to the Management of a division comprising of many companies. This paper summarizes the key findings from Goal-II. In this paper, the drawbacks of many conventional strategies and business tactics are highlighted and the features of good Marketing strategies are presented. Similarity between Goldratt’s concept of positives and negatives of a product and the components in the Juran’s definition of Quality are also highlighted. The book highlights that the five step process of ongoing improvements and thinking process can be successfully used to break the marketing constraint

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facing any type of company Theory of constraints is the result of pioneering work of Dr Eliyahu Goldratt [1]. Initially, Goldratt presented his rules of production scheduling in the form of software called Optimized Production Technology (OPT). Later on, he presented his ideas of production Management in the form of a book “ The Goal”. Goldratt [1] highlights the difficulties faced by most of the production managers in their day-to-day work. He presented some of the unorthodox methods to solve these problems. He presented the drawbacks of conventional measurement systems and suggested three measurement yardsticks to gauge the performance of a system. These yardsticks are defined below

- Throughput: It is defined as the rate at which a system generates money by the sale of goods and services which it produces
- Inventory: It is the money that a system has invested in purchasing the things that it intends to sell.
- Operational expenses: It is the money, which a system spends to convert inventory into throughput.

Throughput is the money coming into the system; inventory is the money currently held inside the system and operational expenses is the money we have to pay to make the throughput happen. Therefore all the parameters can be defined in terms of money. Any activity that effects favorably at least two of the above three measures is productive. Otherwise it is unproductive.

He highlighted the reasons for buildup of inventory in the manufacturing organizations. He defined a bottleneck resource, the role of bottlenecks in determining the output of organization, method to identify and exploit bottlenecks. He also gave the steps for ongoing improvement. These steps are listed below

- Identify the system bottlenecks
- Decide how to exploit these bottlenecks
- Sub-ordinate everything else to the above decision
- Elevate the system bottlenecks

If in the above process a bottleneck has been broken, go back to the first step. But do not allow inertia to cause a system constraint.

These steps have been explained in greater details by Goldratt [3] in his book “Theory of constraints”. For continuous improvement of an organization, these steps are to be repeated again and again. From this early work, practicing managers started thinking that application of TOC

is confined to production area only. To break this misconception, Goal 2 was written and it highlights the method to apply TOC in marketing

II. THREE IMPORTANT GOALS OF ANY ORGANIZATION

In his earlier work, Goldratt has defined the sole goal of an organization is to make money now as well as in the future. In Goal 2, he has expanded this goal and has included the interests of two other stakeholders i.e. employees and customers. Following are the three important goals of any organization: -

- a. To make money now as well as in the future
- b. Provide a secure and satisfying environment to the employees now as well as in the future.
- c. Provide satisfaction to the market now as well as in the future.

If any one of these is taken as the goal of the organization, the other two will become the necessary conditions for the achievement of this goal. It is easier to find the strategies that protect or enhance the interests of one group of stakeholders at the cost of other group but a good strategy is one that enhances the interests of all the three stakeholders simultaneously. The organizations fail to achieve higher level of success because the owners generally develop the strategies to enhance profitability of the organization without bothering about the interests of other two groups while the unions work to promote the interests of the workers even at the cost of future survivability of the organizations.

People generally lay more importance on the first goal because a measurement yardstick in the form of money is available for it. But no such yardstick is available for the other two goals. The non-availability of such measurement yardstick does not make them less important for long-term survival and growth of the firm

III. BRIEF SUMMARY OF THE BOOK

Alex Rogo is the vice president of a division with three companies i.e. a printing press, pressure vessels manufacturing company and a cosmetics products manufacturing company. When he took over as the Vice president of the division, all the three companies were running in losses. He helped in identifying and resolving the production problems of these companies using TOC. Through these efforts, all the three companies came out of the red. But still these companies were not very profitable. After breaking the production constraint, insufficient market demand was the next constraint. Alex and the managers of these companies use the thinking process tools of TOC to break the marketing constraint as explained below :-

3.1 Solution of marketing problem of printing press:

The printing press was not profitable. According to the managers of the company, the technology being used in the company was old and the per unit cost of production was higher as compared to the competitors. The company was losing the high volume candy wrappers business to competitors. In their opinion, the only way to compete and to

improve the profitability of the company was through investment in the latest technology machines. Division was not having the funds to buy new machines. Alex persuades them to think about some other method to compete. They are able to find a solution by analyzing the problem from the point of view of the customer. Customer is the persons in the purchase department of the Candy manufacturing companies. The performance of purchase department is measured on the basis of purchase cost. To reduce the purchase cost, they place an order for larger quantity as suppliers charges lesser per unit price for larger purchase quantities. On the other hand, these candy manufacturers are operating in a highly competitive market. To compete successfully, they have to come out with new promotion schemes very frequently. Whenever, they launch a new scheme, the wrappers of the candies have to be altered to display new information. So, a large percentage of the purchased wrappers are not used. The printing press division develops an offer to eliminate this wastage of the customer. In their offer, the customer can avail quantity discount by placing a larger order but the shipments to the customer will be staggered and the customer will be allowed to alter the wrapper design during this period. This will eliminate the wastage at the customer's end. Since, the company was using older slower speed machines, the set up time and cost for the company was low and could afford to stagger the manufacturing in smaller lots while the competitors with latest technology and higher set up costs could not afford to do so. This approach helped the company to win the business of many candy manufacturers and the profitability of the company improved

3.2 Solution of marketing problem of cosmetics products company:

It was a make to stock company. Since they were dealing in the fashion goods, the total product variety was very high (approximately 650 different products). To respond to the retailer's requirements quickly, the company had established 20 different warehouses in different parts of the country. The company was maintaining one month's stock at these warehouses. The stock requirement was calculated on the basis of forecast at each individual warehouse. Fashion goods have a high rate of obsolescence, so the company had to introduce new products quite frequently. Although, company was maintaining high inventory at the warehouses, still the warehouses could be found short of one or two items demanded by the retailers. The non-availability of these one or two items used to result in delay of complete shipment. Because of poor due date performance, retailer used to shield himself with higher buffer stock. Also the company was offering quantity discount for bulk purchase, the retailers were buying in bigger lots to save on the purchase cost. The shipment from the factory to the warehouse was considered as a sale for the factory, the factory people had a tendency to ship whatever they could produce to some of the warehouses of the company. The result of all these actions was a considerable amount of inventory at various points in the system and still a shortage of some of the needed items. It was decided to reduce the inventory level at the regional warehouses from one month to one week and to maintain

some buffer stock at the central level in the factory. This reduces the total system inventory because if we aggregate the fluctuations at different points, the total aggregated fluctuation is less than the sum of fluctuations at the individual points. The frequency of replenishment to the warehouses was increased thereby reducing the period of non-availability of an item in the warehouse. To avail quantity discounts, the retailers used to buy in bulk. Since they were not having sufficient funds, they used to get the money financed from the banks thereby increasing their interest liabilities. Since the products were having shorter life cycles, by the time they have sold only half of the items, the fashion changes. But they have money tied up in the inventory and thus they are not able to buy the fresh stock. So, they carry inventory of obsolete items and a shortage of new products actually needed by the customer. On the other hand, manufacturer wants to launch the new product, So, he has to relax the credit terms. The root cause of all these problems was an erroneous policy of quantity discount. It was changed to incentive based on the total sales in an year. Indirectly, a major portion of the inventory carried by the retailer was actually financed by the manufacturer. So, even if the manufacturer gives the material to retailer on the consignment basis, the investment of the manufacturer was not going to increase. But this practice will reduce the systems inventory and the retailer's liability towards the bank. This policy was introduced and resulted in big success

3.3 *Solution of marketing problem of pressure steam division :*

This company was supplying pressure vessels and spare parts for these vessels to industrial customers, as per their requirement. Whenever, a breakdown occurs in any pressure vessel at customers site, the customer needs the spare part immediately. The customer used to maintain some inventory of frequently needed spare parts. But they cannot maintain a stock of each and every item, as it will be very costly. These customers are mostly having tight cash situation as well. To solve their problem, it was suggested to give spares on consignment basis. To further solve their problem, it was suggested to supply the whole equipment on consignment basis where the customer will have to pay only for the usage of the equipment. This was an innovative strategy for that company

3.4 *Generic method to solve marketing problem :*

If we analyze the solutions provided for all these three situations, there is one thing common i.e. in all the three situations, the problems were analyzed from the point of view of the customers and the solutions could make the customers life easy. Since these cases cover job shop, batch production and mass production situations, thus a generic methodology can be developed to solve the marketing problems of any type of company. Some of the points of this methodology are as given below: -

- a. Prepare a list of undesirable effects (UDEs) of using our / competitors products from the customer's point of view. Since most of us are well trained in bitch and moaning, it

is very easy to get the customers UDE from them by properly igniting them. Since the offering of most of the companies operating in a particular industry is almost similar, customer will have same UDE for products of almost all the manufacturers in a specific industry.

- b. Since the requirements of customers in different customer segments will be different so many of their UDE will also be different. Segment the market on the basis of UDEs.
- c. Initially, prepare only one current reality tree for all the segments. On this tree, mention which UDE belongs to which market segment. It is usually found from this tree that most of the UDEs are common to most of the segments or the root cause of these UDEs is common.
- d. Initially, develop a product or offering that solves the common UDEs.
- e. Tailor the product or offering developed in the previous step according to the UDEs specific to each market segment

In developing new products, we should remember that the new product needs not to be categorically different from the existing product. Product differentiations can be introduced either by increasing something positive in the product or by reducing something negative in it. Reducing-eliminating negative is easier than increasing positives by adding new features.

There is always a difference between seller's perception of right price and the buyer's perception of the right price. To be successful, the seller has to set a price according to the buyer's perception. For products like electronic goods, the buyers perception of correct price decreases with time, So, the seller has to reduce the price even though the demand in many situations is more than the supply. Similarly, the customers in different market segments will have different perception of the right price for virtually the same product. So, the seller has to charge different price in different segments. Rather the market segmentation should be done on these different perceptions only. The segmentation has to be done very carefully. Two sections of the market are said to be segmented from each other, if the price changes in one segment does not require similar price changes in the other segment. A manufacturer should not only accept segmentation but he should intentionally try to create such segmentation by using design differences, packaging differences, service level differences etc. Similarly, a seller should try to improve the perception of his product in the mind of customers. An advertisement is said to be effective, if it can improve the perception of company's product in the mind of customers both above the company's perception about their own product and customers perception about the competitor's product.

Even if you are negotiating the sales of certain company under your control, do not calculate the selling price from the value of assets of the company. Try to see the benefits of the buyer from buying your company and charge the price according to those benefits. More the perceived benefits, higher the price the customer will be willing to pay. e.g. If a competitor wants to buy your company in the hope of increasing his business and capacity utilization by acquiring your company, he will recover the investment by dismantling

the unit and will serve the customers of your unit from his existing company thereby increasing his capacity utilization. So, he can pay a higher price. Similarly, if a competitor can copy the method of working prevalent in your plant to his existing company, he can gain additional benefits. Again such a buyer can pay some premium price.

A manufacturer dealing with only a few big customers (like OE suppliers) or only a few segments is always at risk. A manufacturer should never try to snatch a too big market share in one or few segments only. Rather he should try to enter into many anti cyclic segments. So that when the sales in one segment goes down, the sales in some other segment picks up and he always has work for his workforce.

3.5 Proper method of presentation:

After developing a product offer which can eliminate most of the UDEs of the customer, convincing the customer about the offer by proper presentation becomes important. In this situation, if a sales person starts his presentation by stressing the greatness of his offer, his chances of getting the business are low because the buyer sees the generosity of the seller with suspicion. The correct method is to get an agreement on the customer's UDEs and then present your offer as a solution to these UDEs. Long duration meetings with the buyers are good for the seller as he gets more time to understand the requirements of the customers

IV. SOME WRONG BUSINESS STRATEGIES

In this section, a few wrong strategies generally practiced by the managers along with the drawbacks of these are discussed.

- a. The managers are generally under pressure to increase the profits of the organization they are managing. One of the methods to increase the profits is to reduce the costs and the other is to increase the sales. Decreasing the cost is internal to the organization and is considered easier than increasing the sales which depends upon external market forces also. So, most of the manager's resort to the first method. But in this attempt, they resort to what is called blind cost cutting. Blind cost cutting is cutting the cost without considering its long-term impact on the survivability of the firm. One tool of this blind cost cutting is layoffs. Generally the layoffs are done in the department where the employees have improved their work methods; thereby the same volume of work now requires lesser manpower. While in the departments that have not improved their working, It appears that the manpower working there is required. So, the progressive people suffer the most. Further, this act of management discourages the employees from making further improvements and by laying off the good employees, the company also falls short of good manpower. So, blind cost cutting by layoffs is not the right approach. Rather we should follow the second approach i.e. increasing the profits by increasing the sales.
- b. Similarly, trying to increase the sales by reducing price may not always work. Because, the price currently being charged may be low enough or the market may not be

very price sensitive or the competitor may initiate the similar price cuts.

- c. Giving quantity discounts to boost the sales is not a good strategy particularly if the products have short product life cycles. Because, to avail the discount, the retailers place an order for larger quantities. This increases their investment and by the time they are able to sell only half of the merchandize, the fashion changes. So, they always carry lot of obsolete items and are always short of latest products being demanded by the customers. This reduces their sales further. The best method is to give incentive on total sales in a period.
- d. The new products should not be thought as new to the world products. As developing such products is difficult and require lot of time and resources. The best method is to alter the existing product by eliminating the negatives in it.
- e. It is not good to try to snatch a very big share in one segment. Rather enter in a number of anticyclic segments.
- f. Developing your business strategy on the market forecast alone is wrong. Because it is impossible to forecast the demand with high degree of accuracy.
- g. Establishing different plants for different market segments is bad. Rather a single plant should cater to the needs of a number of segments simultaneously.

Correct Business Strategy

Companies should work to develop a decisive competitive edge . It can be due a unique technology or an outstanding product. It a company cannot develop either of these then it should concentrate on small change that can eliminate negatives for a market e.g. change erroneous policies. Work to develop competitive edge in many market segments. But one should remember that there is no absolute competitive edge, it is only a window of opportunity that you could discover earlier and better than your competitors. The competitor will sooner or later close this gap. So, your search for new opportunities has to be a regular process and not a one time activity.

Correct Marketing Strategy

If a company is facing marketing downturn, because some competitor has snatched market share from them, then the correct strategy is to segment the market on the basis of factors like Geographical distances, demographic differences, packaging differences, Guarantee differences etc. Identify the right price from customer is ready to pay in each segment and offer the products at these right prices in such a way that each segment feels that the price being charged is justified and the lower price in one segment does not make the customers in the other segment to press for price decrease

Effective Method Of Negotiation And Conflict Resolution

Most of the time, the core problem of the organizations is found to be some unresolved conflict between different functional areas or between different levels of hierarchy or with external parties (suppliers and customers etc). Without resolving this conflict, an organization cannot progress

further. For resolving the conflict, the conflicting parties have to sit together and negotiate. During negotiation, do not think that the other party is obstinate as he may also be thinking the same about you. Similarly, do not blame the person rather it is the situation that is to be blamed. It is a situation in which what you want and what other party wants appears to be mutually exclusive. If during negotiation, there does not appear to be an acceptable solution stop the negotiation, rethink the problem from the point of view of other party and come back and renegotiate. The following points can be used to resolve the negotiation deadlock :

- a. Stop negotiation
- b. Set up a right frame of mind
- c. Write the cloud. Start by asking what I want and what the other party wants
- d. Then ask the reason for what each party wants and then look for the common objective. Stress this common objective to arrive at the solution. But the solution should not be a compromise-based solution.

The general conflict diagram is shown below

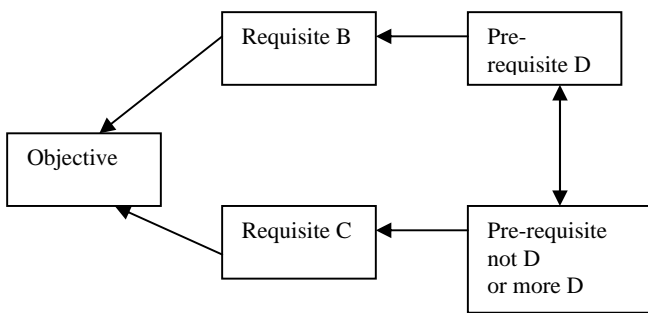


Fig. 1 Basic conflict faced by managers

During negotiation, whenever the response of other party is “obvious” or “Commonsense”. It is an indication that the other party has started paying attention to what we are saying and thus we are communicating and hence there is a possibility of resolving the conflict.

V. CONCLUSION

It is wrong to believe that the application of Theory of Constraints is confined to production function only. It can be applied to any functional area and any type of organization with the same degree of success. Mostly the low sale of a company is not due to insufficient market demand but it is due to wrong policies of the company. A company can identify these wrong policies and can find the suitable substitute for these policies by using Thinking process of TOC. It is futile to try to increase the profits of the organization by ignoring the interests of the customers and employees. Many policies derived from cost based approach needs to be altered, if the organizations are to survive and prosper. The marketing concepts presented by Goldratt needs to be tested in the real world situations.

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