

## Activity-Based Costing and Throughput Accounting of TOC: a Hybrid System in the Managerial Accounting

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**Abstract.** *The Throughput Accounting (TA), based on the Theory of Constraints (TOC), has as goal to supply managerial information to find bottlenecks generated by resource constraints, so that the same ones can be explored and later high, increasing the gains of the organization. Goldratt affirms that any system has at least one constraint that limits the company in the attempt of reaching its goals. The Activity-Based Costing (ABC) has as basis the tracing of activities that consuming resources and allocation of the same ones in the products. This trace is made through the processes mapping, which can also help in the identification of bottlenecks, generating causes and eventual forms of reducing them or even to eliminate them. This article analyzes as antagonistic systems like ABC that has focus in the product's cost and TA that the goal is to maximize the product's gains, can be complemented and be used for generation of a robust costing system and to leave available coherent and useful information for managerial decisions. This comparative analysis evidences that the decisions based on hybrid systems are more efficient. A case study is presented, in that the use of the Throughput Accounting (TA), as managerial tool, supported by Activity-Based Costing (ABC) took the investigated company to improve its results.*

**Keywords:** Activity-Based Costing-ABC, Throughput Accounting (TA), Constraint

### 1. Introduction

“Managerial Accounting is not only an existence, but to do [...] Managerial Accounting is action, rather than specific techniques of accounting [...] There is no Managerial Accounting, you do it or not” (Padoveze, 1993, p. 28). These reflections help us to seek, in a hybrid way, methodologies which help managers in their operational decisions according to the strategy of the company.

Eliyahu Goldratt is a great critic of the utilization of cost accounting as a managerial tool. Since the introduction of his “Theory of Constraints” – TOC, in the Seventies, he has been provoking changes in the accounting practices of the organizations, and suggesting a change from cost management to throughput management, this way avoiding several misunderstanding in the decisions.

The same way, many works have been introducing criticisms to his theory, claiming inconsistency in the long-term decisions, even accepting its value in short-term decisions. These criticisms are done by followers of the utilization, as a managerial tool, of cost accounting, especially by the followers of Activity Based Costing – ABC.

This article will present a proposal of a hybrid model in the financial management system in manufacturing companies, due to the fact that there is no an unified theory to managerial accounting, as McLean (1988, p.44) affirms “in fact many academics argue that there is no such thing as an overall theory of management accounting. Indeed management accounting may be viewed, somewhat crudely, as simply consisting of a ragbag collection of technique.”

The throughput accounting of TOC has been showing itself very efficient in the support of taking managerial decisions, however the deficiency of the companies in achieving a good mapping of their processes complicates the identification of the system constraint, making this tool fragile, and many times the premise that “the company must gain money, in the present and in the future”, is not fulfilled, according to Goldratt (1991, p.14). To guarantee a higher efficiency in applying this theory, the activity-based costing of cost accounting might be useful to identify the constraint through the process balance, and still use the concept of TOC, that is concerned about the gain, instead of the focus of the attention on the cost, as in the cost accounting.

This article is organized in six sections. Section 2 presents the concepts of theory of constraints, develop by the physicist Eliyahu M. Goldratt. Section 3 considers the aspects of throughput accounting from the same author. Section 4, the method of activity-based costing (ABC) is added, concluding the theoretic base of this article. Section 5 presents a case study, where the utilization of a hybrid system using the models ABC and throughput accounting of TOC took the investigated company to improve its financial results. Finally, in section 6, the conclusions of the work are presented.

## 2. Theory of Constraints - TOC

The Israeli physicist, Eliyahu M. Goldratt, started in the Seventies, in the United States of America, the development of the theory of constraints. According to Corbett (1997, p.39) “ the TOC is based on the principle that there is a common cause for many effects, the phenomenon that we can see are the consequences of the deepest causes. This principle take us to a systemic view of the company”.

In TOC, the company is analyzed as a system, defined as a group of dependent elements and, therefore, the global performance of this system is dependent of the efforts of all elements, therefore the bad performance of an element will influence the global result of this system. The essence of TOC is the understanding of the existence of the system constraints, supported by Corbett (1997, p.40), when he says that: “The statement that every system should have, at least one constraint is explained by the fact that if there was nothing to limit the system’s performance, it would be infinite. If there was not a constraint in a company, its profit would be infinite”. The constraint is always in any resource of the system, according to what is explained by Corrêa and Gianesi (1993, p. 143):

“ The resources can be understood here as any necessary element to the manufacturing of a product, like people, equipment, devices, measure instruments, space, etc. [...] The bottleneck resource, by definition, is busy during all the time of its availability.”

The Theory of Constraints approach is also known as synchronous manufacture, or drum-buffer-rope, according to Gaither e Frazier (2001, p. 362).

The five steps of the methodology used by the Theory of Constraints are:

- a- Identify the system’s constraints;**
- b- Exploit the System’s constraints;**
- c- Subordinate everything to the decision above;**
- d- Elevate the system’s constraints;**
- e- Go back to step one, but do not allow inertia to become the system’s constraints, when a constraint been broken.**

In order that all the five steps are answered, it was created tools, according to what is described below, with the help of Oliveira’s article (2003):

### **a- Identify the system’s constraints.**

It is necessary to make a diagnostic of the situation. Try to find the Root-Problem of the problem. The presupposition behind this analysis is that there are few common causes that explain the several effects of a system. Once this presupposition is accepted, the symptoms of the system should not be attacked, but its common causes. To respond to this first question it will be used the Actual Reality Tree (ART) (GOLDRATT, 1994).

The ART is a diagram that through connections of cause and effect, connects all the system’s problems, and allows finding the Root-Problem (the constraint), it is what interfere the organization to improve its performance, so that its constraint is found.

### **b- Exploit the System’s constraints.**

Most of the times these constraints are the company’s policies. Now that we have already found the constraining policies of the company, we need to define the new policies that will substitute these constraining policies. To do that it is necessary to understand why these constraining policies still exist.

Most constraining policies of the organizations are chronic diseases, that is, they are diseases caused by a conflict. To start answering to the second question, we need to find out an exit to this conflict.

To solve the constraining policy (the Root-Problem), it is necessary to define the conflict behind itself. For that we use the Dispersion Diagram (DD), developed by Golratt (1994), which has 5 entities.

A - The objective, which is the opposite of the Root-Problem of ART

B - A necessary condition to achieve the objective

C - Another necessary condition to achieve the objective

D - An essential requirement to achieve the necessary condition B

D' - An essential requirement to achieve the necessary condition C

D and D' are mutually excluding entities, that is, it is not possible to have both of them at the same time, but the perception says that we need both of them to be able to achieve the objective. Most people try to find a middle term, that give in a little in D and D'. What it is necessary to do is, to find a solution that eliminates the entire conflict.

To discover what other things are needed to create in the reality in order to improve the performance, it is necessary to build the Future Reality Tree (FRT) (GOLDRATT, 1994).

In the construction of the FRT, we also search for the negative branches, which are the side effects of the ideas which are being elaborated. When they find the negative branches, it is necessary to create ideas that extinguish them, these ideas will complement the final solution.

### **c- Subordinate everything to the decision above.**

With the FRT concluded, the strategy is ready. It is known that it is necessary to implement to improve the performance of he system. Now, what it is time to define how the strategy will be implemented.

To start to set up an implementation plan, the Pre-Requirement Tree (PRT) is built, developed by Goldratt (1994). In this logic diagram the necessary steps are built to implement the FRT, and put them in logically sequence. In the FRT the intermediary objectives are defined that should be reached to be able to implement the FRT.

**d- Elevate the system's constraints.**

In this next step the Transition Tree (TT) will be built, developed by Goldratt (1994), which defines what actions are necessary to be taken, and in what sequence, in order to be able to achieve the intermediary objectives of PRT. It is discovered which necessary actions in the TT are necessary and enough to change the reality.

**e- Go back to step one, but do not allow inertia to become the system's constraints, when a constraint been broken.**

This is an extremely important point, where Goldratt says to take care with the inertia. What is always said is that most of big companies do not have physical constraints (as a bottleneck in a factory) but constraining policies. That means that most of the times what limits the system's performance is the inertia. That's why Goldratt created the Ratiocination Process of TOC. Based on this ratiocination, Goldratt created a continuous optimization process for the constraints. A group of Israeli researchers, where Goldratt was part of it, developed a software called OPT, that Goldratt himself ended up being the main spreader, where the concept of the theory of constraints is applied. Slack; Chambers; Harland; e Harrison (1997, p.466), clarify the OPT as being:

The OPT is a computerized technique that helps the manufacturing system programming, in a rhythm commanded by the means more strongly charged, that is the bottleneck. If the activity rate in any part of the system exceeds that one of the bottleneck, items will be manufactured without being used. If the work rate falls below the bottleneck rhythm, all the system is under used.

### **3. Throughput Accounting (TA) – (Theory of Constraints)**

The goal of the company is to get money, and for these, some indicators will be necessary, argues Goldratt (2002 p. 36; 37; 49):

"So your company is gaining 36% more money with its factory only with the installation of some robots? [...] your factory was capable of dispatch one more product a day due to what happened product ...? [...] its inventories decreased? [...] The goal of the industrial company is to gain money".

Knowing the necessities of the mensuration of the performance of the organization to reach the goal, and being a big critic of the indicators generated by the cost accounting, Goldratt (1991) created a particular methodology of generating financial index, called Throughput Accounting. This methodology approaches in a simple way the path to obtain a good managerial accounting, breaking out the existent paradigms in the price formation of the products and the analysis of its profitability. For him, the administrators needed to have answers to three questions: 1- How much money is generated by the company? 2- How much is captured? 3- How much it is necessary to operate it? To obtain the answers to these questions, it was defined three indicators:

<b>(T)</b>	<b>- Throughput</b>
<b>(NP)</b>	<b>- Net Profit</b>
<b>(ROI)</b>	<b>- Return on Inventory</b>

**(T) Throughput** - Corbett (1997, p. 43) defines gain as "all the money that enters for the company, minus what it has paid to suppliers; this is the money the company generated; the money paid to suppliers is the money generated by other companies" that is: "Gain is the money generated by the company" (CORBETT, 2000, p.38).

Following this concept we have the first index for the analysis of the management direction in relation to the goal of the company:

$$T = S - TVC$$

**(NP) Net Profit** - This index is the same of the cost accounting, however its algorithm is essentially different, because de base of the TOC is the maximization of the gain and in second plan, the reduction of the operational expenses.

$$NP = T - OE$$

**(ROI) Return on Inventory** - The main function of this index is the verification, in a macro way, of the cash flow of the company. It demonstrates the capacity of growth by the utilization of its own capital, as well as enable to take managerial decisions on the strategic reductions or increase of inventories, without the commitment of the money of the company.

$$ROI = NP / I$$
$$ROI = (T - OE) / I$$

These indexes should not be measured in an incremental way, but globally, otherwise they would be confused with the index of cost accounting and its apportionment, what is toughly criticized by Goldratt.

The indexes are obtained through for parameters:

(S)	- Sales
(TVC)	- Total Variable Cost
(I)	- Inventory
(OE)	- Operacional Expenses

**(S) Sales** – Goldratt (1991, p. 17) says “Gain means bringing money from the out side, [...] through sales”. In this work, sales is understood as making money through the “core business” of the company, and never through the availability of the capital assets or any other item that is not part of the business.

**(TVC) Total Variable Cost** – In this article, TVC will be every cost with the variation proportional to the sales, Corbett (1997 p. 44) affirms “TVC = Total Variable Cost, that is, the amount that changes for each adding of an unit in the product sales (in many cases it is only raw material)”. What is important in this statement that ratifies Goldratt (1991), is the differences of cost accounting, which believes that direct labor is a variable cost, even if its variation is not proportional to the sales, as we can see below.

**(I) Inventory** – Corbett (1997, p. 45) defines as: “all the money that the company invests on the purchase of things they intend to sell”. Goldratt (1991, p. 21) differs from the traditional cost accounting, where the “apparent profits” created by inventory are shown. In this statement “it possible to assign only the price that was paid to our suppliers form the purchased material and part that go in the product. There is no added value by the system, and not even direct labor.”

This parameter is translated in many Brazilian literature as “Investment”, but to avoid confusion with the denomination investment from the traditional accounting, that represents the buying of assets, here it will be treated as “Inventory” and will be everything that the company buys and that intends to sell, but inside its “core business”, because otherwise, the inclusion of sales of machinery, real estate or other assets would also masquerade the results, as explained by Goldratt (1991, p.17) “Throughput can not be associated to an internal maneuver of money [...]”.

**(OE) Operational Expenses** – By exclusion, this parameter will be represented by the other expenses of the company, that is, if a disbursement is not (I) nor (TVC), it will be operational expenses (OE). Based on this, Corbett (1997, p. 45) defines:

Operational Expenses (OE) is intuitively comprehended as all money that Goldratt (1991, p. 16) ‘that we have to put constantly inside the machine to move its gears’ – salaries, from the president of the company to the direct labor, rent, electricity, social incumbencies, depreciations, etc. The OE is simply all the other expenses that do not go in the throughput or in the investment.

**Product does not generate profit, leaves a throughput.**

**Who generates the profit is the company, through the sum of the product’s throughput minus the total operational expenses.**

Padoveze (1997, p. 256) affirms: “[...], the company’s administration must worry about generating the maximum contribution of the production (or added value) and administrate the other expenses through the resource concept, using the theory of constraints or bottleneck.”

#### **4. Cost Accounting – Activity-Based Costing (ABC)**

In an attempt to investigate the results presented by the usual defrayal accounting, emerges the activity-based costing (ABC). This model, exchanges the criticized apportionment of indirect costs practiced in the costing by absorption for a more refined way, where the costs are tracked through the mapping and identification of the activities consumed by the products. This chapter presents the model of the activity-based costing that has as its main ally, a though system of mapping of the processes to identify the activities.

##### **4.1. Historical Panorama of the ABC**

According to Sohal (1998, p. 137), “*Activity-based costing* emerged as an alternative for the conventional systems of costing. It was developed in the USA at Harvard Business School by the Professors Kaplan and Cooper. Cooper, himself (1996, p. 14) shows the importance of this system affirming that “the ABC can present an important supporting role in the prosperous expansion of the lean manufacturing.” Kaplan (1995, p. 8) complements informing that “the activity-based costing system was developed to make more precise information available of the company’s activities and processes, and the products, services and clients served by these processes.”

This model of costing had a great expansion in the 80’s and 90’s, and apparently it will continue to expand in this new century, as predicted by Foster (1996, p. 39) when affirming that “after the year 2000 the trend of using ABC will

continue, with a crescent recognition in the non-productive areas". Martins (2003, p. 87) shows that this chronology corresponds "to a technological progress and the crescent complexity of the production systems, where in many industries, the indirect costs have been increasing continuously" and this raise demands each time more from the companies the reduction of costs, that until this moment had as main components, the direct costs. Ganzel (1995, p. 3) also agrees that "the *overhead* or the indirect costs show, in reality, an increasing tendency of growth." Nakagawa (1995, p. 33) complements by presenting the relation of this growth with the increase of technological progress and methodologies. Emphasizing that this tendency also reaches the Eastern countries. Sakurai (1995, p. 23) shows that "Japanese companies also have raised their indirect costs dramatically in the last 25 years."

In this historical panorama, it can not be forgotten the evolution of computing, propitiating means for the knowledge and management of the activities, core of the ABC. Kaplan (1997, p. 3) affirms that "the advent of the information age in the last decades of the twentieth century has turned obsolete many of the fundamental premises of the industrial competition."

Many authors studied and study the usage of the ABC in different sceneries. Player (1995) analyses the implementation of this model in distributor of electronic components with the objective of increasing the sales, because in this company normal orders of clients may contain hundreds or even thousands of pieces and the total value of the invoice of only US\$ 100.00. McGuire (1997) studied the difficulty found for a manufacturing company of plastic raw material in the usage of the traditional systems of costing and the solution presented by the ABC model that presents a successful result totally opposite from the other models. But to support the activity-based costing, the process mapping is an indispensable tool in this context and with no doubt, requires a brief analysis of BSC that according to Kaplan (1995, p. 7) "ABC (*Activity-based costing*) and the BSC (*balanced scorecard*) are the new rules for the information of managerial accounting".

#### 4.2. Activity-Based Costing

The technological progress associated to the great diversity of the products and models manufactured nowadays, requires an adequate treatment in the allocation of the indirect costs of production, as Martins affirms (2003), highlighting the importance of the usage of the ABC according the accounting principles generally accepted and in this way, be recognized by the Financial Accounting Standards Board (Fasb) and Internal Revenue Service (IRS) as a valid costing system, and this way avoiding the necessity of the maintenance of the parallel managerial costing systems, as in the variable costing. Turney (1991, p. 8) complements clarifying that "inappropriate costing systems also can frustrate the benefits to be gained in worldwide projects."

Many literatures affirms that the ABC is only a disguised way of prorating the indirect costs, but there is a great difference between the criticized prorating cost of absorption and the tracking of the occurred costs in this model. Nakagawa (1995, p. 29) affirms that "the ABC is a method of cost analysis, that tracks down the expenses of a company to analyze and monitor the diverse routes in the use of resources". Nakagawa shows, in the Fig. 1, a model where the minimum of resources that have not been tracked down can then, be tracked, minimizing the distortions from the prorating.

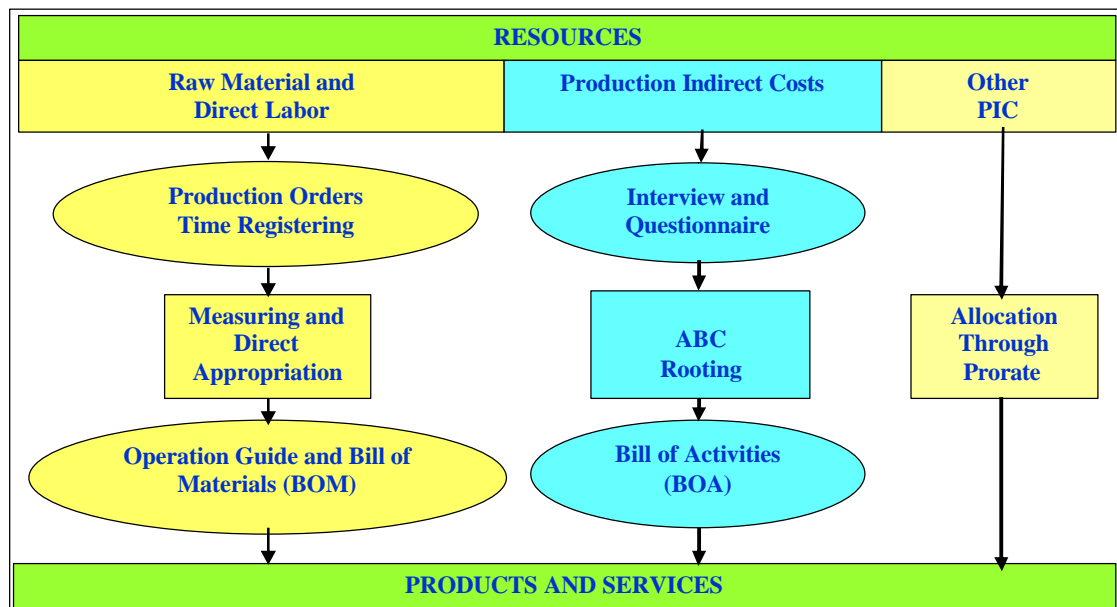


Figure 1. The ABC and the Production Indirect Costs

## 5. Case Study of a manufacturing company (KPG S.A.)

The investigated company, used until 1999, the absorption costing of cost accounting as a managerial tool and it presented difficulties to obtain financial success in its administration. In 1999, with the decision to use the throughput accounting as the managerial accounting, the company started to present sensible improvement in its results. In 2002, a new change happened, where in a hybrid way, it was used the throughput accounting, but with the support of the activity-based costing – ABC from cost accounting, what permitted KPG S/A to know its processes in depth and mapping the main activities using the resources, and making a higher stability and toughness in the utilization of throughput accounting of TOC possible, once it depends on identification of the constraining resource of the system.

The tables that will be presented represent KPG S.A. that has approximately 280 different products, with 900 sub items in inventory; however the results will show, in a didactic way, only three products, without changing the reality of the evolution of the results.

### 5.1. Situation until 1999

By using the techniques of cost accounting, the managerial decisions were taken based on data supplied by cost accounting, and impelling to misconception in the decisions, as shown in Tab. 1.

Table 1. Cost accounting based on the Planning of Sales

Products	A	B	C	TOTAL
Estimated Revenue	\$10.000	\$15.000	\$30.000	\$55.000
Cost with Raw material	\$2.000	\$4.000	\$6.000	\$12.000
Cost of Direct labor	\$3.000	\$4.000	\$5.000	\$12.000
Costs/ Prorated Fixed Expenses	\$4.000	\$10.000	\$7.000	\$21.000
Net Profit	\$1.000	-\$3.000	\$12.000	\$10.000

A simple analysis of Tab. 1, take us to believe that there is no other acceptable managerial decision than the immediate stop of the production of product “B” which is having a loss of \$ 3.000.

After the mistaken decision of stopping the production of product “B”, we have the results shown in Tab. 2, showing a profit reduced in 95%. What is the reason of this reduction, if product “B”, was causing loss?

Table 2 – Cost Accounting, based on the Planning of Sales without Product “B”

Products	A	B	C	TOTAL
Estimated Revenue	\$10.000		\$30.000	\$40.000
Cost with Raw material	\$2.000		\$6.000	\$8.000
Cost of Direct labor	\$4.500		\$6.000	\$10.500
Costs/ Prorated Fixed Expenses	\$8.000		\$13.000	\$21.000
Net Profit	-\$4.500		\$5.000	\$500

### 5.2. Situation after 1999

At this moment, KPG S.A. has changed to throughput accounting of TOC, where the misconceptions above could be corrected. In Tab. 3, it will present to Tab. 1 with the information disposed according to the new methodology.

Table 3 – Throughput Accounting, based on the Planning of Sales

Products	A	B	C	TOTAL
Estimated Sales	\$10.000	\$15.000	\$30.000	\$55.000
CTV – Only Raw Material	\$2.000	\$4.000	\$6.000	\$12.000
T- Throughput	\$8.000	\$11.000	\$24.000	\$43.000
OE – Operational Expenses				\$33.000
Net Profit				(T-OE) \$10.000

The analyses of Tab. 3, all the products give to the company a gain and they should continue to be manufactured, and it presents the information that the gain of product “A” is lower, and not from product “B” as presented by the cost accounting. Another important decision was to incentivize the sales of item “C” until its maximum manufacturing capacity, even if the price is reduced, because this one represents the higher gain. Although the sensible inversion of the results, the continuing improvement proposed by TOC is impaired by the deficiency of the information processes, and consequently making the identification of the constraining resources more difficult, as well as the deficiency in the identification of the consuming activities of bigger resources, so that TOC can request more from the structure of the

company. The architecture of this system can be seen in Fig. 2, where the Activity-Based Costing will supply information to the external players (banks, shareholders, auditors, etc.), in addition to supply the data of throughput accounting of TOC, that will provide the managerial accounting, main tool of internal players (top management, middle management, etc.).

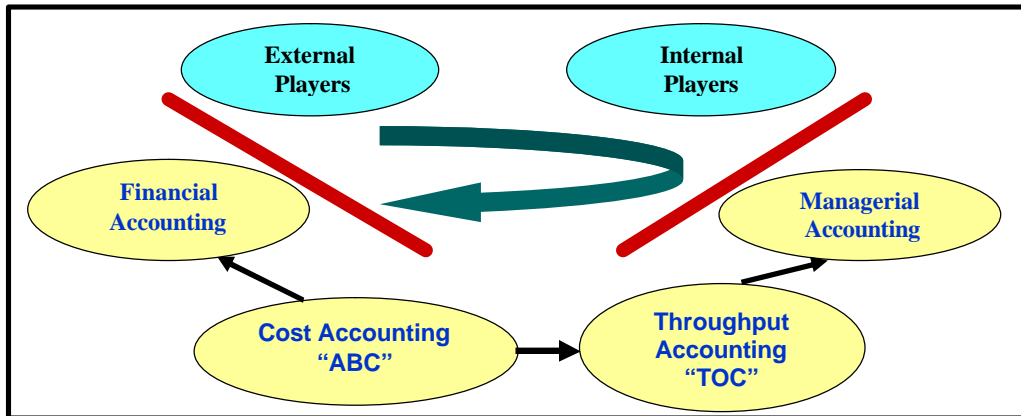


Figure 2. Architecture using the Activity-Based Costing and the Throughput Accounting

### 5.3. Situation after 2002

This moment, the KPG S.A. has changed its managerial accounting for this hybrid system, and the base has continued to be throughput accounting of TOC, but it started to use the support supplied by the activity-based costing through the tough mapping system used to help in the identification of the constraints and the rooting of consume of resources, supplying subsidies to the TOC demand more from the structure of the company, and consequently improve the stability on the resources.

This knowledge of the processes made the company to install cell “*layout*” and the strengthen the training of personnel, identified as the main constraints of the system. These actions helped the company to improve its financial results in a continuing and significant way. The Tables 4 and 5 respectively show, that the result based on the sales forecast did not change, and in the case of a recession market, the company is still presenting a higher profit.

Table 4 - Throughput Accounting, based on the Planning and Transformation of 90% of the MOD for TVC

Products	A	B	C	TOTAL
Estimated Sales	\$10.000	\$15.000	\$30.000	\$55.000
TVC – M.P. + 90% of MOD	\$4.700	\$7.600	\$10.500	\$22.800
T- Throughput	\$5.300	\$7.400	\$19.500	\$32.200
OE – Operational Expenses				\$22.200
Net Profit				(G-DO) \$10.000

Table 5 – Throughput Accounting, based on the Real Sales and the transformation of 90% of the MOD for TVC

Products	A	B	C	TOTAL
Real Sales	\$7.000	\$12.000	\$26.000	\$45.000
TVC – M.P. + 90% da MOD	\$3.300	\$6.100	\$9.100	\$18.500
T- Throughput	\$3.700	\$5.900	\$16.900	\$26.500
OE – Operational Expenses				\$22.200
Net Profit				(G-DO) \$4.300

New decisions can be taken in order to improve the usage of the structure of the organization, even if the company presents an apparent loss in net profit, but making the managerial decisions possible from the data supplied by the throughput accounting.

## 6. Conclusion

This article analyses the cost accounting and the throughput accounting in the state of art and investigates the results obtained in a case study, where it is observed that a hybrid system using as base the throughput accounting associated to activity-based costing of accounting that created financial stability to the investigated company, even in circumstances of recessive market.

The investigated company passed through three different phases in its managerial accounting, presenting the obtained results in each of these phases. An interesting aspect is that the fact of the change from cost accounting to throughput accounting in the managerial system has helped the company to correct the previously erroneous managerial decisions, but in the following phase, the cost accounting, through activity-based costing, supplied a bigger knowledge of the managerial processes, facilitating the identification of the system's constraints strengthening the results presented by the throughput accounting of the TOC.

## 8. Referências Bibliográficas

- Gaither, Norman and Frazier, Greg, 2001, "Administração da Produção e Operações", Ed. Guazzelli, São Paulo.
- Cooper, Robin, 1996, "Activity-Based Costing and the Lean Enterprise", Journal of Cost Management, V. 9, # 4, Warren, Gorham & Lamont, RIA Group.
- Corbett Neto, Thomas, 1997, "Contabilidade de Ganhos", Ed. Nobel, São Paulo.
- Corbett Neto, Thomas, 2000, "Throughput Accounting and Activity Based Costing: the driving factors behind each methodology", Journal of Cost Management, Jan/Feb 2000: 37-44.
- Corrêa, Henrique L. and Giansi, Irineu G. N., 1993, "Just in time, MRPII e OPT: um enfoque estratégico", Ed. Atlas, São Paulo.
- Foster, George., 1996, "Management Accounting Beyond in 2000", Journal of Cost Management, V. 9, # 4, Warren, Gorham & Lamont, RIA Group.
- Gantzel, Gerson L., 1995, "A Utilização Integrada dos Métodos ABC e UP", In: IV Congresso Internacional de Custos, 1995, Campinas. Anais... Campinas: Universidade Internacional de Campinas.
- Goldratt, Eliyahu M., 1991, "A Síndrome do Palheiro, garimpando informações num oceano de dados", IMAM, São Paulo.
- Goldratt, Eliyahu M. and Cox, Jeff, 2002, "A Meta", Ed. Nobel, São Paulo.
- Goldratt, Eliyahu M., 1994, "Mais que sorte um processo de raciocínio", Ed. Educator, São Paulo.
- Hansen, Don R. and Mowen, Maryanne M., 2001, "Accounting and Control (Gestão de Custos, Contabilidade e Controle)", Ed. Pioneira, São Paulo.
- Kaplan, Robert S., 1995, "New Rules for Management Accountants", Journal of Cost Management, V. 9, # 3, Warren, Gorham & Lamont, RIA Group.
- Kaplan, Robert S. and Norton David P., 1997, "A Estratégia em Ação BALANCED SCORECARD", Ed. Campus, São Paulo.
- Martins, Eliseu, 2003, "Contabilidade de Custos", Ed. Atlas, São Paulo.
- McLean, Tom, 1988, "Management accounting education: is theory related to practice?" Management Accounting,
- Macguire, Brian L., Kocakulah, Mehmet C. and Dague, John W., 1997, "Using ABC to Identify Cost Drivers in a Manufacturing Environment", Journal of Cost Management, V. 11, # 5, Warren, Gorham & Lamont, RIA Group,
- Nakagawa, Masayuki, 1995, "ABC Custeio Baseado em Atividades", Ed. Atlas, São Paulo.
- Oliveira, Paulo Renato, 2003, "Raciocínio", [prcoliveira@hotmail.com](mailto:prcoliveira@hotmail.com), October 28<sup>th</sup>.
- Padoveze, Clóvis Luís, 1997, "Contabilidade Gerencial", Ed. Atlas, São Paulo.
- Player, R. Steven and Kramer, Michael B., 1995, "TTI Inc.: Using ABC to Increase Revenues", Journal of Cost Management, V. 9, # 3, Warren, Gorham & Lamont, RIA Group.
- Slack, Nigel, Chambers, Stuart, Harland, Christine and Harrison, Alan, 1997, "Administração da Produção", Ed. Atlas, São Paulo.
- Sakurai, Michiharu, 1995, "Past and Future of Japanese Management Accounting", Journal of Cost Management, V. 9, # 3, Warren, Gorham & Lamont, RIA Group.
- Turney, Peter B.B., 1991, "Common Cents", Ed. OR EUA: Cost Technology Hillsboro.

## 9. Responsibility notice

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