

THE COMPARISON OF CLASSIC MANAGEMENT ACCOUNTING WITH THE LOGIC OF THE THEORY OF CONSTRAINTS

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Received: June 4, 2018

Received revised: July 12, 2018

Accepted for publishing: July 18, 2018

Abstract

Companies and the environment in which they operate are becoming more and more complex. The process of changes in the companies' operations and the evolution of the market environment is a result of a progress. Throughout history, the pace of changes is constantly accelerating. This happens despite the slowing turbulences which are caused by, e.g. wars, natural disasters or changes in the natural environment of man. The changes concern especially an information layer. While conducting the undertaking, everyone tries to achieve information advantages over the competition. The aim of the article is an original comparison of the idea of a management accounting system based on the Theory of Constraints with the classical management accounting. The system based on the Theory of Constraints lets us build competitive advantages by using and focusing on individual elements of the company which are called the weak links. This system is the answer. It is a necessary simplification in the world of progressive concentration of capital, the growing scale of operations resulting in a geometric increase of the amount of information which are taken into account when making management decisions. Managers should focus their efforts on the place (Pareto Principle), where they can achieve the greatest benefit for the entire company. This feature of implementing the Theory of Constraints to the management accounting system determines its attractiveness in the process of company management. On the basis of a literature review, the authors compared the classical approach of the management accounting and the capacity logic which is proposed by E. Goldratt. Nowadays, turbulences result not only from natural causes and market changes, but above all from geopolitical ones, which affect in particular the logistics industry. In the article, the authors pointed out the areas of the logistics industry in

which the solutions offered by the Theory of Constraints can find practical and valuable applications.

Key words: the Theory of Constraints, the management accounting, the capacity logic

1. INTRODUCTION

When running an undertaking, everyone tries to optimise their actions to fulfil them as good as possible. As regards to business activity, its assessment is well established and has a long-term tradition. An owner's prospect (capital donor's prospect) is a basic prospect to assess companies. From the capital donor's view point, the basic measurements are currently generated profit and the investment value that generates it. The mathematical company pricing models established a concept that profit was the most significant measurement. This caused that the profit achieved by a company is its basic value accepted by all shareholders as accompanied by the assumed unlimited duration of the company (Malinowska et al., 2017; Koliński et al., 2016).

As a measurement, profit has been functioning since money was placed on the market. It is no secret for anybody that the profit measurement is as a spontaneous category and it has been applied to assess performed actions. The company's unlimited duration issue is a complex problem and caused the companies to become more and more complex systems with extensive functions. The functions might directly or indirectly contribute to the company unlimited duration. The entire expansion of basic activity supportive functions caused that the decision-making process is currently complicated and dependent on numerous factors. It is beyond doubt that additional functions are also extended in terms of state-made requirements that are not only immortal taxes but also the continuously expending regulatory sphere.

Managers need to make decisions when they have more and more data and parameters at their disposal. Their data obtainment cost is getting much higher and the mutual relations between data and parameters are getting much more complicated. Such a situation might lead to a conviction that one should have much more detailed informational knowledge at their disposal. This is intended to get familiar with the process specifics and make better decisions. It is caused by the changes in the environment which caused that the previously gained competitive advantages get very quickly outdated and it is constantly necessary to make corrections and improvements in order to be able to compete. It is caused by efforts in constant improvements that the company is perceived as a living organism which elements are attempted to correct for the sake of improving the entire organism functioning. At the same time, there is a risk that the introduced changes will contribute to worsening the situation, not improving it (Malinowska et al., 2017; Koliński et al., 2016).

The decision-making process is supported by management accounting. As opposed to tax and reporting accounting, management accounting is oriented to meeting the internal company needs and should be useful in making both current

decisions and decisions that impact the company future development directions. The latter decisions are made with respect to strategic, tactical and operational problems. The accounting classification is rooted in its functions and in their recipients to whom information is addressed (Pawłyszyn, 2017; Zimon, 2016).

The paper was written based on a literature review and authors' experiences. The observations of the authors shows a cognitive gap which is also the purpose of the article. The aim of the article is an original comparison of the idea of a management accounting system based on the Theory of Constraints with the classical management accounting. Due to the fact of the cognitive gap, the aim was achieved by using an expert method (the authors' experience) and a research of secondary sources (the literature review).

2. MANAGEMENT ACCOUNTING EVALUATION

Management accounting as each information system will accurately describe the reality provided their assumptions are fulfilled to the possibly highest level and which were adopted when management accounting was being constructed as an information system.

The management accounting role was played by evidence accounting (these functions were identical) at the very beginning of the system when there were very few economic operations/actions and production processes were very little complicated. The profit/loss on sales determination could take place by subtracting from the obtained proceeds from the sale of expenses for obtaining goods / raw materials needed to run the business (Pawłyszyn, 2017; Zimon, 2016). In the slave system, even work was omitted when the profit/loss on activity was specified. In the case of contractual employment, the profit/loss on activity was a profit and the total payment for the work. While making a decision in a sole trader, it was essential for the expected income to be higher than expenses necessary to be incurred to obtain the results. Evidence accounting provides useful information to make decisions to an ever smaller extent. This is caused by expanding the production process activity scope, expending regulatory functions in controlling economic activities, processes, etc. The information, which is provided by reporting and tax accounting, is too general and does not form any basis to make good decisions. Thus, it was necessary to distinguish a management support function in accounting by collecting more and more detailed information items and keep getting them processed for the sake of the made decisions. The third element is outlays/costs unrelated to the basic activity but absolutely necessary to make the company function as a whole. This element occurs at the evidence level and is accompanied by reporting income/revenues, costs related to their obtainment. Initially, the costs indirectly related to the basic activity/production were a component of minor significance compared to indirect costs and were directly referred to the product. The economic development is accompanied by continuous processes of enlarging the market size, intensifying the competition, enlarging the size of companies and capital concentration, increasing in manufacturing variability and abilities, increasing in the state interference in the company functioning by imposing the allowed activity framework, etc. The

enlargement processes cause that the share of outlays/costs directly related to manufacturing is bigger and bigger and incurred not per one product but per an even higher number of products. The necessity to get the indirect costs connected with the basic activity caused that allocating the indirect costs in products was formed as the dominating idea of accounting type in various systems. In the course of time, the cost allocation process became an axis of entire accounting systems. A continuous development caused that the developed cost allocation systems provide outdated information over time. The systems less and less precisely pattern reality and are, therefore, an even worse and worse basis to make decisions. This phenomenon has been noticed and thus, there occur more and more complicated systems intended to provide good information. Their exploitation involves higher and higher costs of receiving information even with the support IT technology. Furthermore, a large complexity of the system allocation causes recipients of information know and understand the way and mechanism of the information system functioning in a smaller and smaller scope. As a consequence, fewer and fewer people understand the internal rules of the functioning of the information systems that should support the decision-making process. This situation effectively hampers the use of the stored and generated information by the company information systems

3. MANAGEMENT ACCOUNTING AND CONTEMPORARY NEEDS

The significance of allocation-based costs is diminishing. This is the main reason why there is a less and less clear picture provided by management accounting systems based on cost allocation. The effect of the diminishing significance of allocation-based costs is additionally intensified by the increasing significance of costs which can be allocated. Mathematically regarded, it is a situation where the numerator of the fraction (value of costs to be allocated) increases and this is accompanied by the fact that the denominator decreases (value of costs to be media of costs to be allocated). In this case, the result changes or increases unproportionally fast. This means that we have an exponentially increasing value of a numerator per an unit of the denominator. And reversely, we have an exponentially decreasing value comes of the denominator per one unit of the numerator. As a result, an even smaller change of the measure that is a base of allocation might entail such a large change of the allocated factor that this will significantly change the obtained results, i.e. the made decision.

The management accounting as information system based on the above rules is exposed to an excessive reaction as a response to a minimum stimulus. In such a system, a very large change in the obtained results is given by a disturbance that is normal in the economic reality. As a consequence, an unimportant change significantly influences and changes the made decision.

At this point, it is worth mentioning how the media type as an allocation basis have changed. This is classically exemplified by a change in the remuneration type from a piecework system into a lump-sum system with motivational elements. The media type changes cause to soften the relation between the media value and the product value. As to highly developed economies, nobody presently reacts to short-term demand changes caused by the employment change. If demand diminishes, one

does not consider short-term labour cost limitations by dismissing employees/decreasing remunerations. In the reverse situation, there is such a relationship (bonus, overtime work, temporary employment, etc.) but it is not linear as it was in the case of piecework. If one wants keep the comparability of allocating the costs in various time periods based on the labour costs, one should conduct such employment-related actions in the case of smaller demand.

4. TOC-BASED MANAGEMENT ACCOUNTING

The management accounting systems based on Goldratt's Theory of Constraints (TOC) present another approach to the problem of costs/expenses not directly related to the basic company activity and their inclusion in the decision-making process.

TOC-based management accounting is a system that focuses on the weakest component of the company. The weakest company element identification makes it possible to focus the information system interest on the element that specifies the entire system efficiency. The focus on one element as a base of the decision-making process means a tremendous simplification of the entire information system. Such an approach makes it feasible to pay all attention to one problem (Corbett, 2009; Goldratt et al., 2012, Şimşita et al., 2014).

Another feature of management accounting based on the Theory of Constraints is to eliminate the added value in the internal system of the company. The added value appears in sales only which means when a product leaves the company. It is caused by such an approach that it is beyond the interest and specification what profit is included in each semi-finished product or ready-made product. This situation excludes the reality image in the information system to be manipulated or beclouded e.g. by increasing the current profit as a result of accumulating the production process in progress inside the system and ready-made products in the warehouse (Goldratt & Cox, 2007, Şimşita et al., 2014).

In management accounting based on the Theory of Constraints, it is necessary to identify 3 categories on which the entire decision system is based.

The first category of the greatest significance is to identify the value that a company gets from outside for giving their own products to the environment/addressee which is identical with obtained income in the case of commercial companies. The revenue obtained from the environment (revenue value) is reduced by the value of products/costs that the company needed to purchase/obtain at no cost from the environment in order to manufacture their products. The products will be a subject to be transferred (sold) to the environment. In order to take for granted that the product obtained from the environment is necessary to create a product, there has to be a linear relationship between the goods and the product. This means the same goods amount must be always represented by a unit of the product. It is caused by such a restrictive approach that a few costs considered in other systems as variables are of interest. This might be simply exemplified by resources directly used to manufacture the product. The value, which is obtained by decreasing the sales rate by its linearly correlated costs, is called by Goldratt a "Throughput". As to the Polish language, the term "margin" (marża) would be better at conveying its

economic meaning. Another possible equivalent would be an added value to be possibly fulfilled by the company if its functioning costs were zero (Izmailov, 2014; Goldratt, 2007; Goldratt & Cox, 2007; Şimşita et al., 2014).

The second category are all other outlays/costs less closely related to the mere company functioning. These costs are identified as one aggregate. The increase or decrease in the outlays are analysed and considered in terms of the company financial result. This value is called by Goldratt "Operational Outlays" (Izmailov, 2014; Goldratt, 2007; Goldratt & Cox, 2007; Şimşita et al., 2014).

The last category are expenses that are incurred by the company to obtain goods that might be sold in the future. This category is also broad and includes all assets that are purchased in order to be processed in the next place (resources, materials) or possessed/used in an unchanged form (buildings, machines). What Goldratt called "inventory" is purchased or totally or partially processed assets (works in progress, ready-made goods) and assets that are purchased in order to make it possible for the company to run its business or earn money from what it has purchased (machines, licenses, buildings, cars, grounds, stakes). In this case, these categories are often called "Investment" and this term in Polish appears to be more accurate in conveying the economic meaning of this category (Izmailov, 2014; Goldratt, 2007; Goldratt & Cox, 2007; Şimşita et al., 2014).

The profit/loss on conducted activity might be determined by subtracting the operational outlay value from the Throughput. In this way, the net result is obtained which is a classical company functioning assessment measurement. The reference of such a received result to the Investment value lets us obtain the second classical company functioning assessment measurement which is return on investment (ROI).

One might assess each decision and its influence on the company result by means of "Throughput", "Operational Expenses" and "Investments". A good decision is to enlarge the Throughput or to diminish the "Operational Expenses" or decrease in the Investments. It is most desirable to make a decision that will have all these effects at the same time. Only the Throughput and Operational Expenses would be sufficient to make current decisions in terms of the company management and its internal prospect. This is because one might make profit increasing decisions based on the Throughput and Operational Expenses only. Considering the owner's and capital donor's prospect, the efficiency of managing capital involved in running the company and the specification of the return on investment are essential. This prospect made it possible to compare companies, industries and make long-term decisions about allocating capital in more efficient companies.

As regards to the decision-making system based on subtracting 2 values: Throughput and Operational Expenses, it is remarkable that it is sufficient to specify a change in the Throughput and Operational Expenses values to be made a decision in order to determine the decision influence on the company. If the difference in the increases is positive, one might make the decision because it influences the result improvement. The positive effect of the decision on the profitability increase should be additionally analysed if the decision is related to increasing the involvement in the Investments. One should assess the planned decision influence on the return on capital rate to make certain it is not very capital consuming and has not a negative

impact of the return on investment of the entire company (Goldratt et al., 2012, Şimşita et al., 2014).

TOC-based management accounting is not focused on grasping the relationship between production and the Operational Expenses. It is assumed that such a correlation does not exist. The lack of correlation between the production size (Throughput) and the Operational Expenses is by all means a rational assumption. If the production increase or its changes are small, it is downright expected that there will not be an increase in the size of the Operational Expenses. This will be a derivative of using provision in the system. It is assumed that if the production increase or its changes are large, the decision maker determines the decision influence on the quantitative Operational Expenses change. Therefore, the information system does not need to collect and process information to grasp and quantify such a relationship (Klapholz & Klarman 2010; Şimşita et al., 2014).

As to TOC-based management accounting it is essential to appropriately determine whether it is a customer- or manufacturer-led market and what particular relationship is between the market demand and the company abilities to satisfy it.

When the company is able to satisfy each market-induced need - the market poses a limit, the company has large provisions. In this case, it is profitable to manufacture each goods with the price higher than changeable costs provided the Operational Expenses do not change. If the Operational Expenses increase due to the planned sales increase, it is necessary to make certain that the fulfilled "Throughput" as a result of extra sales is higher then the increase in the Operational Expenses (Woepfel, 2007).

If a company is unable to satisfy the market-induced need, the company abilities are limitations and the market is able to absorb each amount of products. Therefore, it is rational to make such choices that will enable obtainment of the largest Throughput in a given time unit. In essence, it is necessary to maximise profit by increasing its value in relation to the time unit. At this point, one might indicate that the TOC application system will always prefer larger amounts of the produced goods with a smaller unit margin (less profitable). This is as long as the added value fulfilled in the goods is higher than in the case of manufacturing goods with a higher unit margin (more profitable) but with a longer throughout period required. As a result, it leads to obtaining a smaller added value per a time unit and obtaining smaller profits (Klapholz & Klarman, 2010; Şimşita et al., 2014).

5. MANAGEMENT ACCOUNTING FOR THESE DAYS

TOC-based management accounting at the level of major aggregates (Throughput and Operational Expenses) is the same decision-making mechanism that is used by a person that is intended to start an economic activity. It is essential to obtain profits larger than expenses to be incurred to get the profits. What an employee gets, is their earnings to be possibly spent on making a living. This is a Throughput for the company that might be devoted to covering its existence costs i.e. to covering the Operational Expenses. What remains after covering the employed person's living costs, is the person's savings made during a given period of time. What remains after

covering the functioning costs of the company, is its profit. In both cases, the employed person's savings and company's profit are a value that might be devoted to fulfilling any objective in the future. The objective might be hard time endurance or investments intended to improve the way of running business or unusual consumption/transfer of profit to the capital donor.

The analogy as described above is a great advantage of the TOC-based decision-making system which becomes an intuitive decision-making method typical of a single human being. This method might be transferred to any large organism as possibly exemplified by presently functioning organisations.

Table 1. Comparison of Full cost accounting, Variable cost accounting and TOC-based cost accounting

| Full cost accounting | Variable cost accounting | TOC-based cost accounting |
|--|---|--|
| Sales income | Sales income | Sales income |
| (-) Direct costs (-) Indirect variable overheads (-) Indirect fixed overheads (+) Initial inventory (-) Final inventory (-) Management costs (-) Sales costs | (-) Direct materials (-) Direct salaries (-) Indirect variable overheads (=) Gross margin (-) Fixed costs | (-) Linear-variable costs of the product according to the TOC – direct materials (=) Throughput value according to the TOC (margin) (-) Operational costs according to the TOC (all remaining costs) |
| (=) Profit/loss on sales | (=) Profit/loss on sales | (=) Profit/loss on sales |

Source: (the authors' own elaboration)

Other accounting systems is accused by TOC-based management accounting that they treat each company element in the same way. This implies the same significance of each element. Therefore, each action, which aims at improving the functioning of a given element, is considered to be desirable. This is independent of whether the action contributes to increasing the efficiency of the company as a whole. Local efficiency has at least the same meaning as global efficiency. The company is treated by the Theory of Constraints as a system that needs to identify its internal resources in terms of their significance and, more precisely, their impact of their functioning on the company as a whole. The priority is the entirety efficiency (Corbett, 2009).

6. THE APPLICATION OF THE THEORY OF CONSTRAINTS IN LOGISTIC PROCESSES

The use of the TOC-based management accounting in the optimization of processes could directly take place in enterprises from the logistics industry. This applies in particular to transport companies and logistic centers where all operations are based on logistic processes. There we can try to optimize the use of resources in

logistic processes based on appropriate managing of bottlenecks. According to the TOC-based management accounting, we should maximize the use of these stages of logistic processes that determine the non-use of the remaining stages of the process.

As an interesting case of the TOC-based management accounting application, one might indicate the entire supply chain from a manufacturer to the final user of chemical substances and other materials/products with aggressive properties (e.g. flammability, toxicity and explosiveness) (Hrušecká et al., 2017; Scholz-Reiter et al., 2011).

The accumulation of a large amount of aggressive substances poses a high risk of emergency that might turn into a large catastrophe due to the accumulated material scale. For the above reasons, the issues of translocating, transshipping, storing and keeping dangerous substances are regulated in detail by particular countries. The above problems are so essential that they are regulated and harmonised by international law (EU directives, ADR agreement). Rigid limitations are imposed on the supply chain functioning by both international and national regulations.

Bottlenecks in terms of the Theory of Constraints are determined by formally and legally defined regulations. If so, it is unnecessary to look for the weakest component but it is imposed in advance. This is opposed to production activities. The (relative and irrelative) quantitative limitations refer both to such obvious things as an amount of ammunition in the hunter's shop and to less perceived cases, for instance, an amount of cosmetics in a shop, e.g. varnishes, or in a warehouse that makes supplies to a greater number druggists (Inman, Lair Sale & Green Jr, 2009).

Taking into account that every third chemical industry product is characterised by dangerous physical and chemical properties, one has to do with large part of the logistic service market with identified bottlenecks. This market might be also managed by TOC-based management accounting.

7. CONCLUSION

The basic objection that is being made to TOC-based management accounting is the focus on what is here and now and the weak cost (Operational Expenses) control. The environment, in which companies function, is getting constantly changed due to continuously accelerating development. In the fast changing environment, it is difficult to make long-term forecasts. In the dynamically changed world, the companies have a relatively smaller reality description information excerpt than in the static environment. Therefore, the companies have smaller chances to create accurate long-term forecasts. At present, several-year periods are an entire epoch in numerous industries. The development might potentially take place much faster but its pace is slowed down by various barriers related to the mobility of both financial and human capitals. In this case, the focus on short-term issues is downright an advantage as there is no waste of resources for inefficient forecasts. If taken for granted that companies are systems where human beings use rationality, it is obvious the human efforts should be directed to areas with the greatest potential for improvement. In the general costs, one might search for reserves. If the company functions rationally, the potential benefits are small, and might be additionally related to the partial functionality loss.

There might be a maximum decrease by 100 percent but this means a complete functionality loss. It is impossible in the functioning company. The benefit increase is almost limitless in the case of all companies presently existing worldwide.

TOC-based management accounting is a kind of the Pareto Principle implementation as it focuses on the most significant problems that might be changed in a short period of time. Matters that do not limit the functioning of the company are given less attention. This means that the present limitations can become of minor significance in the future due to the continuous conducted activity improvement. And reversely, attention will be paid to presently unimportant issues that can become a barrier in the company functioning in the future.

The open questions are effectiveness of applying both methods of management accounting and a level of possible benefits of applying the concept of using the TOC-based management accounting. Both subjects are interesting for future research. The proposed concept of using the theory of constraints in management accounting should to be verify in practice. A practical verification of the management accounting which is based on the TOC requires running for extended period of double accounting - the classic managerial accounting and the TOC-based managerial accounting. Such verification is labor-intensive and cost-intensive. The authors plan to take on it in the next stage of research. Research will be carried out in real conditions or by using the simulations.

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