Management Input of Variables and its Impact on the Overall Development of Construction Company

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Abstract. Common definition of management accounting can be described with its benefits for effective management and decision making. As this accounting is not regulated in law, its form may differ from company to company. Today's form of management accounting implies the integration of several areas. These areas include cost accounting, financial accounting, controlling, financial plans, financial analysis, price calculations, budgets, etc. Using financial analysis indicators, it is possible to compile the evaluation of the construction company from the perspective of financial stability and its performance. Approaches to measuring business performance have undergone some development. The indicators include a traditional group based on accounting data such as Return on Equity (ROE), Return on Assets (ROA), Return on Investment (ROI), and on indicators based on financial flows for example Cash Flow Return on Investment (CFROI) or Net Present Value (NPV). The last group consists of indicators that, according to the microeconomic theory, are based on economic profit. This group combines both accounting and market data. Indicators include Economic Value Added (EVA) and Market Value Added (MVA). This paper is aimed to evaluation of the construction company using the economic value added of economic index EVA. Due to its compilation this index became a variable evaluation tool in the companies. The EVA indicator, compared to other value indicators, appears to be a simpler benchmark of performance and its economic content is easily understood. The aim of the article is to compare the rating of selected construction companies based on the economic added value indicator. The impact of different inputs on the overall development of the construction company will be monitored. Variables will be controlled by sensitivity analysis. The results of this paper can be used in the future for management of companies through management accounting.

1. Introduction

Management accounting can be generally defined as accounting serving for effective management and correct decision-making. Therefore, the present form of management accounting implies integration of several areas, such as cost accounting, in-house accounting, calculation, budgeting, marketing, financial accounting, controlling and, last but not least, financial analysis which this article is aimed at. [1]
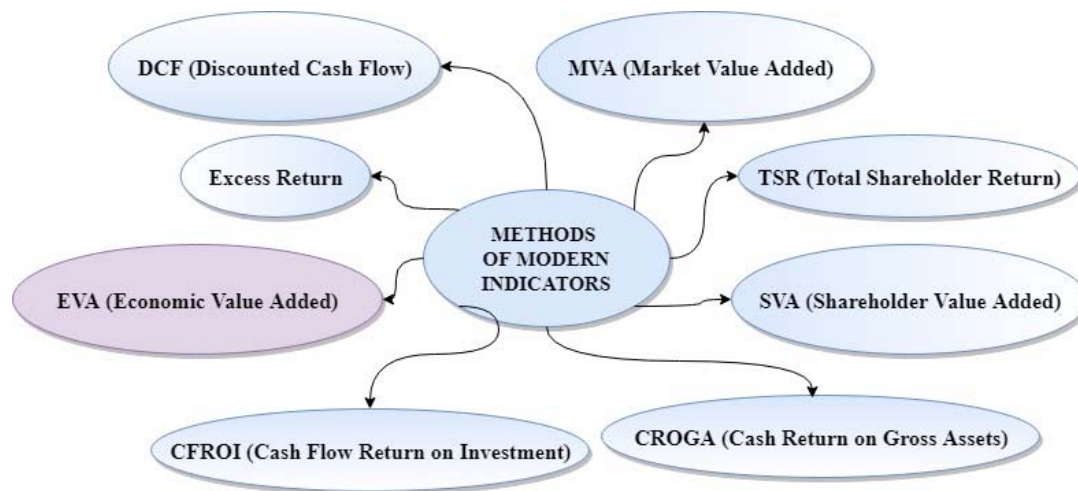
Figure 1. Methods of modern indicators [2]

Figure 1 above shows that the economic added value, which the article deals with in more detail, belongs among the methods of modern indicators that form part of the financial analysis of a company.

The article focuses on performance evaluation of the construction company. For this evaluation, the method of financial analysis has been chosen, namely the method of economic added value, e.g. EVA indicator. The aim of the paper is the comparison of rating of the selected construction companies based on the economic added value indicator. The impact of various input quantities (revenues and costs) on the overall development of the construction company has been monitored. Sensitivity analysis with 5% dispersion has been used to control the input quantities. The conclusion and output of this article can be further used in managing the company through management accounting.

2. Literature review

Management accounting serves directly for effective management of the company and its internal departments (centres). It uses data of financial and cost accounting, calculations, operational records, statistics, makes use of statistical, mathematical and other methods and procedures. Its subject is not only cost but also revenue and sometimes cash flow. [3]

Management accounting is a branch of accounting that produces information for managers and forms an important integral part of the strategic process within an organization. It involves the process of identifying, measuring, accumulating, analysing, preparing, interpreting and communicating information that helps managers fulfil organizational objectives. [4]

Financial analysis involves comparing the company performance to that of other companies in the same industrial field and evaluating trends in the company financial position over time. One rich source of information for financial statement analysis is the audited financial statements. Financial statements are usually part of the annual report. [5]

EVA indicator is one of the few performance measures that integrate growth and profitability objectives into a single indicator. [6] Economic added value is the incremental difference in the rate of return over a company's cost of capital. In essence, it is the value generated from funds invested in a business. If the economic value added measurement turns out to be negative, this means a business is destroying value of the funds invested in it. It is essential to review all of the components of this measurement to see which areas of business can be adjusted to create a higher level of economic added value. [7]

The use of EVA is constantly increasing. It measures the company ability to obtain economic benefits that exceed the "rent" that such a company pays for the use of the owners and lenders resources employed. [8]

Sensitivity analysis is a way of predicting the outcome of a decision, if a situation turns out to be different compared to the key prediction. [9]

There are numerous definitions in the literature for sensitivity analysis. Sensitivity analysis studies the impact of input changes (nature and magnitude) on outputs. Sensitivity analysis performed is related to determining how much investment must be made in order to bring implementation of the scenarios back to the base line values. [10]

3. Methodology

Financial analysis system is not regulated by law in any way. Therefore, some generally accepted analytical approaches and analysis techniques have developed, which have the same goal as accounting, e.g. to give a true picture of the property and financial situation to all users.

Financial analysis can be based on various information sources. For this purpose, external information which directly deals with the company analysed entity and is publicly available at the same time has been used. Financial final statement data has been used for financial analysis.

The paper uses an analysis of the economic added value method, so-called EVA indicator. Thanks to its construction, this indicator has become a variable tool for the company. Next, the sensitivity analysis has been used in the article, for which 5% dispersion has been used to determine the impact of the change of input quantities on the selected indicator. The aim of the article is to compare the changes in selected construction companies based on of the economic added value indicator.

3.1. Economic added value

The model is based on economic profit, which, unlike accounting profit, represents the surplus of revenue remaining to the company after the payment of production factor services, including not only foreign, but also its own capital. The advantage of this indicator is that it provides management with more accurate information on the company performance while motivating it to make decisions that lead to the growth of the market value of the company. Involving the management in the growth of added value fulfils the interest of the company owners at the same time. EVA indicator thus helps to eliminate the conflict of interest between the owners and the managers. [11]

The economic model used to calculate EVA indicator is in the general basic form expressed as follows:

$$EVA = NOPAT - WACC * C \qquad (1)$$

Where:

NOPAT (Net Operating Profit after Taxation) profit from the operative activity after taxation

WACC   (Weighted Average Cost of Capital) weighted average cost of capital including all the capital involved in the business, which is both the capital of the creditors and the capital of the owners

C   (Capital) capital which is bound to the assets used for the operational activity of the company [12]

EVA indicator comes from the so-called economic model based on the accounting model. In order to obtain economic data, it is necessary to convert accounting data from the balance sheet and the profit and loss statement into economic data before calculating the indicator so that it corresponds to the economic reality as much as possible.

Transformation to the economic model is not quite simple and there are many possible partial modifications. A complete list of modifications is a trade secret of Stern Stewart & Co. Company. According to Burger-Schellberg, conversion should include four basic steps - conversion to operational assets, conversion of finance, tax conversion and shareholder conversion. [12]

If the result of the EVA indicator is positive, it means that returns covered the investors' rewards for the risk incurred, and still creates some surplus for the owners. If negative, it marks decrease in the value.

Sensitivity analysis - Sensitivity analysis examines changing and uncertain assumptions and the effect of their changes on the resulting indicator. Some basic input variables are selected and for these

variables a change in the desired dispersion is made, for example 5%. For each such change, the value of the indicators under consideration is recalculated. Finally, for all the input variables changed, the percentage or absolute change of the resulting indicators is calculated.

4. Case study

Four construction companies were selected for the case study. All companies have the same legal form. They have the same focus, i.e. building and road constructions and residential and civil construction.

The impact on the overall development of the construction company was monitored using the selected EVA indicator - the economic added value method. The EVA indicator of economic added value calculator was chosen in its basic variant, also referred to as the EVA entity. For analysis, the input data from the balance sheet and the profit and loss statement has been used. The input year for the analysis was 2016. Three optimistic cases have been then modelled. The first situation considers an increase in sales by 5% for the sale of own products and services. For the second and third situations, a 5% decrease in costs has been considered. In the second situation, these are the cost of material and energy consumption and the cost of services, the third situation includes personal costs. These costs have been selected due to the largest financial volume of the total costs. All values are recorded in Tables 1, 2, 3, 4 below.

Table 1 Input values – Company 1 [source: the company's financial statement]

	2016 [CZK]	Increase in costs by 5% [CZK]	Decrease in costs by 5% [CZK]	
Revenues from sales of own products and services	2,135,588	2,242,367	-	-
Revenue	*2,135,588*	*2,242,367*	**-**	-
Consumption of material and energy	404,911	-	384,665	-
Services	1,511,747	-	1,436,160	-
Personal expenses	282,592	-	-	268,462
Costs	*1,916,658*	**-**	*1,820,825*	*268,462*

1 Euro=25.50 CZK

Table 2 Input values – Company 2 [source: the company's financial statement]

	2016 [CZK]	Increase in costs by 5% [CZK]	Decrease in costs by 5% [CZK]	
Revenues from sales of own products and services	10,161,681	10,669,765	-	-
Revenue	*10,161,681*	*10,669,765*	**-**	-
Consumption of material and energy	2,680,954	-	2,546,906	-
Services	5,927,376	-	5,631,007	-
Personal expenses	1,226,582	-	-	1,165,253
Costs	*8,608,330*	**-**	*8,177,914*	*1,165,253*

1 Euro=25.50 CZK

Table 3 Input values – Company 3 [source: the company's financial statement]

	2016 [CZK]	Increase in costs by 5% [CZK]	Decrease in costs by 5% [CZK]	
Revenues from sales of own products and services	17,559,506	18,437,481	-	-
Revenue	*17,559,506*	*18,437,481*	**-**	-
Consumption of material and energy	12,925,964	-	12,279,666	-
Services	2,697,902	-	2,563,007	-
Personal expenses	2,254,486	-	-	2,141,762
Costs	*15,623,866*	*-*	*14,842,673*	*2,141,762*

1 Euro=25.50 CZK

Table 4 Input values – Company 4 [source: the company's financial statement]

	2016 [CZK]	Increase in costs by 5% [CZK]	Decrease in costs by 5% [CZK]	
Revenues from sales of own products and services	5,094,403	5,349,123	-	-
Revenue	*5,094,403*	*5,349,123*	**-**	-
Consumption of material and energy	3,708,351	-	3,522,933	-
Services	489,604	-	465,124	-
Personal expenses	697,126	-	-	662,270
Costs	*4,197,955*	*-*	*3,988,057*	*662,270*

1 Euro=25.50 CZK

Tables 5, 6, 7, 8 below show the results of the analysis. The column marked 2016 is the result of the analysis for the starting year 2016. The column marked 1 shows revenue growth by 5%, and the columns marked 2 and 3 show a 5% cost reduction to calculate the EVA indicator. Column 1 output shows the difference for increase in revenue by 5% in absolute terms. The column 2 output and column 3 output show the difference in cost reduction by 5% in absolute terms.

Table 5 EVA entity indicator and sensitivity analysis - Company 1 [source: company's financial statements]

	2016	1	2	3	1 output	2 output	3 output
EVA entity	-42,894	70,981	52,975	-28,740	113,875	95,868	14,154

From Table 5 EVA entity indicator and the sensitivity analysis results that the company had a negative value in 2016, i.e. there is a decrease in value. In the case of the first two model situations, the indicator reaches positive values. It is the highest for the increase in sales by 5%. In the case of the latest model situation, where the personal costs have been reduced, the indicator increases but remains still in the negative value.

Table 6 EVA entity indicator and sensitivity analysis - company 2 [source: company's financial statements]

	2016	**1**	**2**	**3**	**1 output**	**2 output**	**3 output**
EVA entity	-120,055	398,111	315,192	-57,380	518,166	435,247	62,674

Table 7 EVA entity indicator and sensitivity analysis - Company 3 [source: company's financial statements]

	2016	**1**	**2**	**3**	**1 output**	**2 output**	**3 output**
EVA entity	-554,747	324,009	227,194	-441,796	878,757	781,941	112,951

Table 8 EVA entity indicator and sensitivity analysis - Company 4 [source: company's financial statements]

	2016	**1**	**2**	**3**	**1 output**	**2 output**	**3 output**
EVA entity	-197,908	67,404	19,504	-160,303	265,312	217,413	37,605

From Tables 6, 7, 8 EVA entity indicators and the sensitivity analysis result that the company had a negative value in 2016, i.e. there is a decrease in value. In the case of the first two model situations, the indicator for all companies reaches positive values. It is the highest for the increase in revenues by 5%. In the case of the last model situation where the personal costs were reduced, the indicator increases but remains in negative values.

5. Results and discussions

Table 9 Summary comparison of absolute model differences [source: company's financial statements, processing: own]

	1 output			
	Company 1	*Company 2*	*Company 3*	*Company 4*
EVA indicator	113,874.64	518,165.68	878,756.61	265,311.83
Value range	16.47%	12.05%	75.18%	2.73%

	2 output			
	Company 1	*Company 2*	*Company 3*	*Company 4*
EVA indicator	95,868.06	435,246.79	781,941.17	217,412.69
Value range	12.29%	9.54%	52.72%	0.79%

	3 output			
	Company 1	*Company 2*	*Company 3*	*Company 4*
EVA indicator	14,154.01	62,674.28	112,950.80	37,605.33
Value range	-6.67%	-1.74%	-102.52%	-6.48%

EVA indicator:
- Revenue increase by 5% (revenue for the sale of own products and services) - there was a significant increase in the indicator for all companies.
- Cost reduction by 5% (consumption of material, energy and services) – there was an increase in the indicator for all companies. The EVA indicator reaches positive values, i.e. company creates value.

- Cost reduction by 5% (personal costs) - there was an increase in the indicator for all companies but the reduction in personal costs is not as significant as in the consumption of material, energy and services, and thus the EVA indicator does not reach negative values.

5.1. Discussion

According to the analysis of four specific construction companies, the research found out that the first two model situations reached a significant increase in the value of the company and the EVA indicator fell in the positive values. A 5% cost reduction has had a less positive impact on all companies than revenue increase by 5%. A 5% reduction in personal costs does not cause such a positive change as a reduction in the cost of material, energy and services. The third company has a significantly larger change in the indicator, due to the fact that the company has the largest financial turnover. It would be recommended to confirm these research findings by further case studies. It is necessary to bear in mind that the case studies have to be based on the same starting year 2016.

6. Conclusion

The purpose of this research was to monitor the impact of input quantities, e.g. sales and costs, on the overall development of the construction company. This impact was monitored using the EVA method of economic added value. Two input quantities were controlled, namely the sales and the costs. For sales it was revenue from own products and services and for costs it was cost of material, energy and services and other cost that was subject to the personal costs. Control of input quantities was processed using a sensitivity analysis where 5% dispersion was used.

Based on the analysis of four specific construction companies, it can be deduced that in the first two model situations there have been a significant increase in the indicator. And it can also be seen that a 5% increase in sales has had a better impact on all companies than a 5% decrease in costs (material, energy, services). The smallest change in the indicator was caused by a 5% reduction in personal costs. The biggest change in the EVA indicator is for the third company, which is due to the fact that it is the company with the largest turnover. These outputs can be further used in managing the company using management accounting where it is possible to respond to a given financial situation by changing the organization of the production process, e.g. by changing the materials used, changing technologies or changing the organization of human resources, etc.

Acknowledgment(s)

References

[1] Hradecký, M., Lanča J., Šiška, L.: *Manažerské účetnictví*. Managerial accounting, Praha: Grada, 2008. Účetnictví a daně. ISBN 978-80-247-2471-3.
[2] Pavelková, D., Knápková, A.: *Výkonnost podniku z pohledu finančního manažera*. Business performance from the point of view of a financial manager, 3th ed. Prague: Linde, 2012. ISBN 978-80-7201-872-7.
[3] Synek, M.: *Manažerská ekonomika*. 4., Managerial Economics 4. Publ. Praha: Grada, 2007. Expert. ISBN 978-80-247-1992-4.
[4] Horngren, C., Sundem, G., Stratton, W., Burgstahler, D. And Schatzberg, J. (2007), *Introduction to Management Accounting*, 14th ed., Pearson Prentice Hall, Upper Saddle River, NJ.
[5] Babalola Y. A., Abiola F. R.: Financial ratio analysis of Firms: A Tool for Decision Making. International Journal of Management Sciences Vol. 1, No. 4; 2013. p. 132-137.
[6] Bluszcz, A., Kijewska, A. And Sojda, A.: Economic Value Added in Metallurgy and Mining Sector in Poland. Croatian Metallurgical Society, 2015. ISSN 0543-5846.
[7] Accounting Tools [online]. ©2018 [cit. 2018-03-10]. Available at: https://www.accountingtools.com/articles/2017/5/13/economic-value-added

[8]   Priester Ch., Wang J., Financial Strategies for the Manager, Springer-Verlag, 2010, p. 118. Available at: http://link.springer.com/chapter/10.1007/978-3-540-70966-4_9

[9]   Moynihan G. P, Jain V, Mcleod R. W., Fonseca D. J.: *An expert system for financial ratio analysis*. Int. J. of Financial Services Management 2006 - Vol. 1, No.2/3; 2006. p. 141 - 154.

[10]   Sakaguchi M, Kodama M.: *Sensitivity analysis of an economic order quantity for dynamic inventory models with discrete demand*. Int. J. of Manufacturing Technology and Management 2009 - Vol. 18, No.4; 2006. p. 438 - 452.

[11]   Sedláček, J.: *Účetní data v rukou manažera – finanční analýza v řízení firmy*. Accounting data in the hands of a manager - financial analysis in company management 2nd ed. Prague: Computer Press, 2001. Praxe manažera. ISBN 80-7226-562-8.

[12]   Maříková, P., Mařík, M.: Moderní metody hodnocení výkonnosti a oceňování podniku: ekonomická přidaná hodnota: tržní přidaná hodnota. Modern Business Performance and Valuation Methods: Economic Value Added: Market Value Added, Prague: Ekopress, 2001. ISBN 80-86119-36-X.

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