KNOWLEDGE – International Journal
Vol. 22.1
Vrnjacka Banja, Serbia, March, 2018

BUSINESS EFFICIENCY – MODELS FOR ANALYSIS AND CONTROL

Lyubomir Todorov
Finance and Accountancy Faculty, UNWE – Sofia, Republic of Bulgaria lyubomirtodorov@abv.bg

Abstract: The paper considers business efficiency as the subject of modern business analysis. The more important theoretical-methodological and practical-applied aspects related to analyzing and controlling the efficiency of the business are clarified. The essence of business efficiency and the difference between business efficiency and business return are also clarified. A classification of profitability indicators is made. Several models for analyzing and controlling business efficiency, with significant practical relevance are presented. The main ways to increase efficiency are explained. Special attention is paid to the relationship between business efficiency and profits, through the proposed developed model of operating profit or EBIT – Earnings before interest and taxes. This model enables managers to plan and control profits, impacting on the two main factors - sales revenue and the return on sales (ROS). Its idea is simple - profits can be increased in two ways: by increasing sales and/or by increasing business efficiency. The main ways to increase business efficiency are described. These are different business decisions, the effect of which is mainly related to the cost of production or services and respectively, to the ratio between operating expenses (including cost of the goods, products and services sold) and sales revenue. Cost-to-sales ratio reduction can be achieved, for example, by increasing labor productivity; by replacing production equipment with a new one that has higher productivity, lower power consumption, lower operating costs; by increasing the level of automation of the production processes, which allows the reduction of the number of workers; by supplies of materials at lower delivery prices, etc. Models of ROS are also presented, which reveal the main factors influencing business efficiency and focus the attention of the management to the search for ways to increase business efficiency by reducing the different types of costs in the full cost of sales and their relative share in sales revenue. The link between business efficiency and value creation is explained through the developed model of popular EVA-concept of Bennet Stewart (EVA - Economic Value Added). This advanced EVA model makes it possible to trace how increasing or decreasing business efficiency impacts not only on the profit but also on the value of the business. The developed model of EVA can be used for the analysis and management of sales, business efficiency and value creation. It allows us to answer the questions as: How will the changes in return on sales (business efficiency) affect value creation?; How will the reduction in direct material costs, salaries and wages, depreciation and amortization, etc. (which are components of the full cost) reflect the cost of sales, operating profit and economic value added; How will the increase or decrease in sales affect operating profit and economic value added? and many other questions.
Keywords: Profitability, Business efficiency, Return on Sales, Value creation, Economic Value Added

1. NATURE OF BUSINESS EFFICIENCY. BASIC INDICATORS

Efficiency is a prerequisite for business success. When business activity of the company as a set of different business operations and processes is sufficiently effective, the desired profits, rate of return and financial stability can be reached. A classification of the profitability indicators is presented in Fig. 1. Business returns are associated with return on invested capital, while business efficiency depends on the cost-to-revenue ratio. Entrepreneurs and managers are interested in less running costs to earn more revenue. This is usually one of the main priorities of management - the constant striving to change the ratio between costs and revenue in favor of revenue. When the cost-to-revenue ratio for a given period changes to revenue, we say that business efficiency is rising.

Business efficiency is typically measured using the ROS – Return on Sales metric, also known as OPM – Operating Profit Margin. It is been calculated as EBIT – Earnings before Interest and Taxes, i.e. Operating Income divided by Sales Revenue:

$$ROS = \frac{\text{Operating Income}}{\text{Sales Revenue}}$$

ROS shows operating profit as a percentage of sales revenue (Fig. 2). It measures business efficiency because it is directly related to the cost-to-sales ratio:

$$ROS = \frac{\text{Operating Income}}{\text{Sales Revenue}} = 1 - \frac{OPEX\ \ incl.\ COGS}{\text{Sales Revenue}} = 1 - CSR \qquad (1)$$

where:
OPEX – Operating Expenses
COGS – Cost of Goods, products and services Sold
CSR – Cost-to-Sales Ratio

Fig. 1: Profitability indicators

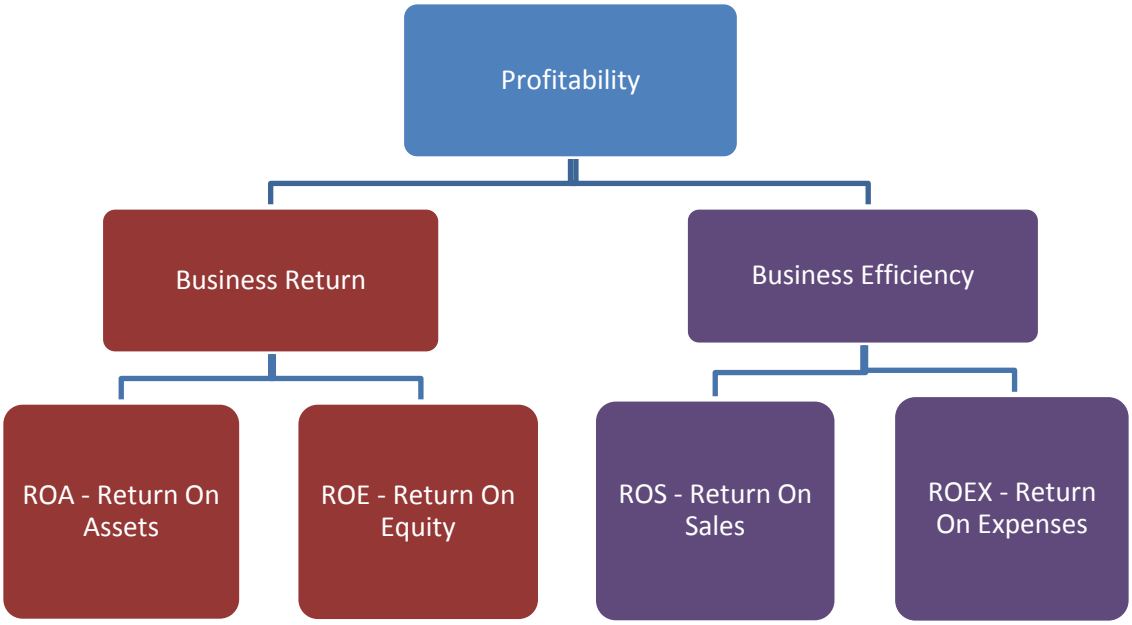
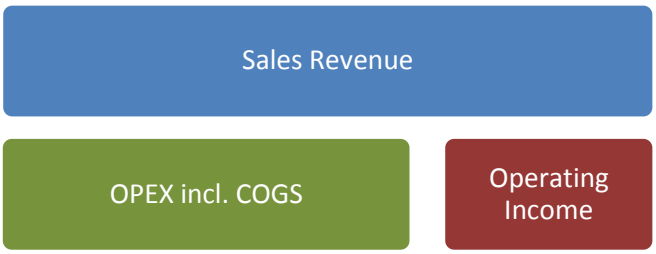


Fig. 2: Interrelationship between costs, profit and revenue



It can be seen (formula 1) that the sum of ROS and CSR is equal to one:

$$\frac{\text{Operating Income}}{\text{Sales Revenue}} + \frac{OPEX\ \ incl.\ COGS}{\text{Sales Revenue}} = ROS + CSR = 1$$

Return on Expenses (ROEX) is another measure of business efficiency, which is a ratio between operating income and operating expenses including cost of goods, products and services sold (COGS) for the period. Similar to ROS, the ROEX indicator also depends on the CSR – Cost-to-Sales ratio.

$$ROEX = \frac{\text{Operating Income}}{OPEX\ \ incl.\ COGS} = \frac{\text{Sales Revenue}}{OPEX\ \ incl.\ COGS} - 1$$

It can be seen that the two indicators of the business efficiency - ROEX and ROS are linked in the following way:

$$ROS = \frac{ROEX}{1 + ROEX} \quad ; \quad ROEX = \frac{ROS}{1 - ROS}$$

Because of this reason, only one of the two indicators is usually used for analysis.

2. BUSINESS EFFICIENCY AND PROFITS

Business efficiency can be analyzed not only as a resultant indicator, such as ROS, but also as a factor on which Operating Income, i.e. Earnings before interest and taxes (EBIT) depend. In this respect, the following model (formula 2) can be extremely useful:

$$\text{Operating Income} = \text{Sales Revenue} \times ROS = \text{Sales Revenue} \times \left(1 - \frac{OPEX\ \ incl.\ COGS}{\text{Sales Revenue}}\right) \qquad (2)$$

Its idea is simple: the operating profit is a function of two primary factors - sales revenue and business efficiency measured by ROS. This means that profits can be increased in two ways - by increasing sales and by increasing the efficiency of the business, i.e. by changing the ratio between revenue and expenses in favor of revenues. Depending on the specific conditions and specific activities, managers can take various actions aimed to increase sales. Here are some of them: attracting new distributors and customers (expansion of the distribution and sales network), advertising campaigns and increasing the efficiency of advertising, updating pricing policy, seeking opportunities for entering new markets including export, finding opportunities to enhance the quality of products and services which could affect the volume of sales, registering or purchasing a brand, developing new products or services, introducing or expanding sales on credit when possible, etc. Naturally, many of these actions require additional investment, but in most cases the effect is worth it.

To increase business efficiency and, consequently, to optimize the ratio between revenues and costs, the following actions can be taken:

- ✓ Searching ways (reserves) to reduce the cost of production and services. Sometimes unexpected opportunities arise such as the supply of materials at lower prices, the improvement of the organization of the production process, technology improvement, reduction of the loss of production waste, reduction of material and energy intensity of production, etc. Some of these actions are related to additional investments in new technologies and equipment which requires additional funding. In most cases, the effect of such investments is worthwhile and they are returned quickly.
- ✓ Closing of unprofitable or low-yield industries, activities and products. In this respect, it is extremely useful to analyze the profitability of individual products and activities. Individual products can be ranked according to various indicators such as Sales revenue, Operating profit, Return on Sales, etc. Some of the products may prove to be highly effective, combining large revenue, operating profit and higher operating margin (return on sales). Other products may have high sales but low profitability and a small profit. Some of the products turn out to be losers. The most common reason for this is the cost that is too high. A major problem in some production companies is the incorrect calculation of the full cost (incl. administrative costs).
- ✓ Evaluating the opportunities for increase in productivity and efficiency. One of the main problems of the business is low labor (workforce) productivity. This increases the production costs and makes products uncompetitive, especially in foreign markets. In some industries and activities, labor costs (salaries, wages, benefits, bonuses, employer portion of social security tax and medicare tax) have the

highest portion in the full cost of production (services). Rising workforce productivity means fewer workers to produce more output. As a result, significant savings from wages and other labor expenditures can be realized, which will directly increase the operating profit and profitability. Moreover, increased productivity reduces the cost of production which allows reduction in selling prices. If the product has a high elasticity of demand, that would increase sales. The main factors affecting labor productivity are the technologies used, the condition of machinery and equipment, organization of the production process, workers' motivation, their qualifications and experience and working conditions.

3. MODELS FOR ANALYSIS AND CONTROL OF BUSINESS EFFICIENCY (ROS-ANALYSIS MODELS)

Business efficiency measured through ROS can be analyzed through different models. Of particular importance is the analysis of the structure of operating costs and the calculation of relative shares of different types of expenditure in sales revenue (different types of costs-to-sales ratios). Here are two of the possible models (formula 3 and formula 4):

$$ROS = \frac{\text{Operating Income}}{\text{Sales Revenue}} = 1 - \frac{OPEX\ \ incl.\ COGS}{\text{Sales Revenue}} = 1 - \frac{MC + EES + DAE + LC + OE}{\text{Sales Revenue}} = \\ = 1 - \left(\frac{MC}{SR} + \frac{EES}{SR} + \frac{DAE}{SR} + \frac{LC}{SR} + \frac{OE}{SR} \right) \quad (3)$$

where:
MC – Material Cost
EES – Expenses for External Services
DAE – Depreciation & Amortization Expense
LC – Labor Cost
OE– Other Expenses
SR – Sales Revenue

$$ROS = \frac{\text{Operating Income}}{\text{Sales Revenue}} = 1 - \frac{OPEX\ \ incl.\ COGS}{\text{Sales Revenue}} = 1 - \frac{COGS + GAE + SE}{\text{Sales Revenue}} = \\ = 1 - \left(\frac{COGS}{SR} + \frac{GAE}{SR} + \frac{SE}{SR} \right) \quad (4)$$

where:
COGS – Cost of Goods, products and services Sold
GAE – General & Administrative Expense
SE – Selling Expense
SR – Sales Revenue

ROS-analysis models (formula 3 and formula 4) provide an opportunity to determine the impact of important factors such as the individual types of costs and their relative share in sales revenue. In this way, managers can reveal the problem areas in the business and find ways to optimize the respective types of costs and their revenue ratios. This would directly increase the value of ROS and EBIT.

4. BUSINESS EFFICIENCY AND VALUE CREATION

The Economic Value Added (EVA) was developed in 1990 and it was registered as a trademark of the consulting company "Stern, Stewart & Co". It was proposed by Bennet Stewart in his book[96]. The model indicates whether the

[96] Stewart, G. Bennet, *The Quest for Value: The EVATM Management Guide*, Harper Business, New York, 1990

company has functioned effectively during the year. It measures the amount which is increased or decreased value of the company during the calendar year. Calculating EVA as IC - Invested Capital (at the end of the previous year) multiplied by the difference between the indicators ROIC - Return On Invested Capital and WACC - Weighted Average Cost of Capital:

$$EVA=\left(ROIC-WACC\right)\times IC \quad ; \qquad ROIC=\frac{NOPAT_n}{IC_{n-1}}=\frac{NI_n+i_n\times\left(1-T\right)}{IBD_{n-1}+E_{n-1}}$$

where:
$NOPAT_n$ – Net Operating Profit After Taxes (for the year)
NI_n – Net Income
i_n – Interest expense (for the year)
T – Income tax rate (for the year)
IBD_{n-1} – Interest Bearing Debt (previous year end)
E_{n-1} – Equity (previous year end)

It is believed that a company operates effectively in terms of investors only when ROIC > WACC. The fulfillment of this condition ensures the company's growth. The problem for many companies is that they have an accounting profit and therefore the return on assets ROA > 0 but at the same time ROIC < WACC and, therefore, EVA < 0. WACC could be regarded as the minimum return required by investors for the particular type of business. When a company systematically has a negative EVA, this inevitably leads to a decline in stock prices and reduced market capitalization. This is because it does not meet the minimum return required by shareholders (ROIC < WACC). The EVA concept, as a measure of business success is a kind of hybrid between traditional and value-based approach, because, on one hand, it is based on accounting profit, but, on the other hand, it takes into account whether a value for the owners has been created during the year in the company. In other words, the model combines the advantages of both approaches, and can be used as an analytical model not only for value creation analysis, but also with regard to the analysis and management of business efficiency. For this purpose, the following modifications in the EVA-model can be performed:

$$EVA=\left(ROIC-WACC\right)\times IC=NOPAT-\left(IC\times WACC\right)$$

$$NOPAT=NI+i\times\left(1-T\right)=EBIT\times\left(1-T\right)=\left(\text{Sales Revenue}\times ROS\right)\times\left(1-T\right)$$

$$\text{Sales Revevenue}=\sum_{i=1}^{m}q_i\times p_i \quad ; \qquad NOPAT=\left(\left(\sum_{i=1}^{m}q_i\times p_i\right)\times\left(1-\frac{OPEX\ \ incl.\ COGS}{\text{Sales Revenue}}\right)\right)\times\left(1-T\right)$$

$$EVA=\left(\left(\sum_{i=1}^{m}q_i\times p_i\right)\cdot\left(1-\frac{OPEX\ \ incl.\ COGS}{\text{Sales Revenue}}\right)\right)\times\left(1-T\right)-\left(IC\times WACC\right) \qquad (5)$$

where:
q_i – quantity of products or services;
p_i – selling price;
m – number of the types of products or services

5. CONCLUSIONS

The presented factor models of the ROS indicator make it possible to reveal the immediate reasons that led to a change in the business efficiency and, respectively, the amount of operating profit for a given period compared to the previous reporting period. This gives signals and directs managers' attention to relevant business issues related to efficiency. Particularly valuable in this respect are the ratios in the brackets of formula 3, the sum of which is equal to Cost-to-Sales Ratio (CSR). For example, If the Material cost-to-sales ratio (MC / SR) for the reporting year is

higher than the previous year or the business plan, this places the attention of the management team to the specific reasons for this negative result. The most frequent reason is the increase of prices of the materials used in production during the reporting period, which is not reflected in the relevant increase in the sales prices of the production. In this case, management should seek other suppliers of materials that offer lower prices or to review the possibilities for increasing sales prices. Another reason could be the non-compliance with the norms of material consumption in the production process. Similar information is given by the other coefficients, forming the CSR. For example, if the Labor cost-to-sales ratio (LC / SR) for the reporting year is higher than the previous year or the business plan, this is mostly due to a fall in labor productivity. In this case, management should take actions to increase labor productivity. Such actions have already been discussed above.

Similar conclusions can also be made with respect to formula 4. For example, if the General & administrative cost-to-sales ratio (GAE / SR) for the reporting year is higher than the previous year or the business plan, the company's business analyst should analyze the structure of administrative costs and make a comparative analysis of the data for the reporting year and the previous year. In such a situation, management should optimize administrative costs by taking action for their reduction.

The model describing the relationship between business efficiency and profit (formula 2) can be used in combination with other models of the ROS indicator, which gives managers the opportunity to modeling profits by influencing business efficiency through full cost of sales and their respective components. It can also be used for planning of sales, business efficiency and profits. In this case, the following factors can be taken into account: quantity of sales, sales prices and different types of CSR:

$$\text{Operating Income} = \text{Sales Revenue} \times ROS = \text{Sales Revenue} \times \left(1 - \frac{OPEX\ \ incl.\ COGS}{\text{Sales Revenue}}\right) =$$

$$= \left(\sum_{i=1}^{m} q_i \times p_i\right) \times 1 - \left(\frac{MC}{SR} + \frac{EES}{SR} + \frac{DAE}{SR} + \frac{LC}{SR} + \frac{OE}{SR}\right)$$

The developed model of EVA (formula 5) can be used for analysis and management of sales, business efficiency and value creation. It allows us to answer the following questions:

- ✓ How will the increase or decrease in sales affect operating profit and economic value added?
- ✓ How will the reduction in direct material costs (which are a component of the full cost) reflect on the cost of sales, operating profit and the economic value added?
- ✓ How will the increase in salaries and wages affect operating profit and value creation?
- ✓ How will the changes in the amount of invested capital reflect on the economic profit for the year?
- ✓ How will the changes in return on sales, i.e. business efficiency affect value creation?
- ✓ How will the changes in WACC reflect on economic profit for the year, etc.

REFERENCES

[1] Stewart, G. Bennet, *The Quest for Value: The EVATM Management Guide*, Harper Business, New York, 1990
[2] Иванова Р, Тодоров Л., *Финансово-стопански анализ*, Тракия-М, София, 2008
[3] (Ivanova. R, Todorov L., *Financial Business Analysis*, Trakia-M, Sofia, 2008)
[4] Тодоров Л., *Съвременни модели за оценка на бизнеса*, Нова звезда, София, 2014
[5] (Todorov L., *Modern methods of Business Valuation*), Nova Zvezda, Sofia, 2014)