
Mathematical Essence of the Efficiency of the Enterprise in the Conditions of Limited Economic Resources and Analysis of Operational Activities

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Abstract: In the context of globalization, meeting human needs can only be achieved through efficient production. But what should be produced by businesses? What product should be produced? How much to produce? Can this product comply with market laws? were asked. Therefore, there is a need to analyze the operational activities of enterprises, which are the main source of income. Through operational performance analysis, the organization can make a profit on how many products it can produce, make efficient use of production resources, and make the necessary management decisions.

Keywords: Needs, economic resources, profitability, goods and services, production, operation activity, investment activity, financial activity, profit, profitability, total revenue, total cost, variable cost, fixed cost, break-even point, cost-volume-profit analysis, management decision.

Introduction

We have to satisfy our needs in order to live. And our needs are different. These needs can be economic, political, social and cultural. Socio-economic needs play an important role in this. This is because social needs are a set of services that a person needs to live, work and live. Of course, meeting such needs is closely linked to economic resources. However, the question of how to fully meet the infinite needs of society in the face of limited economic resources has always been a topical issue. (Opportunities and resources that can be used in the production of goods, services, their delivery to the consumer and in consumer processes.) It is precisely this issue that is considered to be the main problem of the economy. Many economists who have studied this problem have proposed a number of solutions and suggested a number of optimal solutions to the problem. These are:

- increasing the amount of economic resources;
- increasing resource productivity;
- selection of the most effective from the various options for the use of resources, etc.

Putting such solutions into practice will certainly have a positive effect and, in a sense, will meet the needs. But we all know that the satisfaction of one need leads to the emergence of another need. For example. Satisfying our need to buy a computer also requires learning how to use computer-related software. That is why economists have to focus on meeting the infinite needs to the maximum using the limited resources available to society. This will require finding ways to use available resources wisely and efficiently. How do economists define "efficiency"? One of the main conditions for the emergence and development of any form of management in a particular socio-economic system is determined by its level of efficiency. Effective management is one of the main factors determining the survival and

development of the economy in a competitive market environment. At the same time, the economic resources used in the production process (land, capital, labor, etc.) are of a limited nature, which requires their most efficient and effective use. The concept of efficiency is also used in technical or technological fields and is used to evaluate the results of any action or work performed. The concept of “economic efficiency” refers to the ratio of “costs (costs) - results (products). More precisely, the product obtained per unit of resources spent on production, profitability determines the level of economic efficiency. Society strives to produce as much goods and services as possible through the efficient use of its limited resources.

Methods: Comparing, Grouping, Math, Graphic.

Discussion

We can meet the ever-growing needs of society more fully through production alone. Man-made goods and services go through different stages of reproduction. They are a unit of production, exchange, distribution and consumption. The most important of these is the production process. Because all goods and services are created at the same stage. If it is not produced, there will be no distribution, no exchange, and no consumption. Production is a part of our society, it is formed first of all in each family, that is, each family chooses the most alternative option of management and manifests itself in the economic, social and environmental strata. It is here that mathematical methods help us to study the problems of economic theory production in order to achieve positive goals.

We are familiar with economic indicators such as commodity, money, price, profit, loss, interest in our daily lives, and we know almost perfectly how to do calculations with them.

We all know that if any production process is not profitable, it will be stopped. Revenue is the total revenue from the sale of all goods and services produced over a period of time, the efficiency of which is expressed in economic terms called **profit**. For an organization to be profitable, it needs to organize and run its operations effectively. There are 3 types of business activities. Operating activities, investment activities and financial activities. The organization benefits from these activities. Among them, the main income-generating activity in the organization is operating activity. For this reason, it is important to analyze this type of activity of the organization. **Operational analysis** is an analysis of the principal income-generating activities of an entity. Operational analysis is a type of analysis in which the financial performance of an entity depends on its production costs and revenue.

The following sources of information are used in the analysis of operational activities:

- ✓ amount of working capital;
- ✓ Ways to mobilize resources;
- ✓ Ways of efficient use of financial resources;
- ✓ Information on sales and profitability growth, etc.

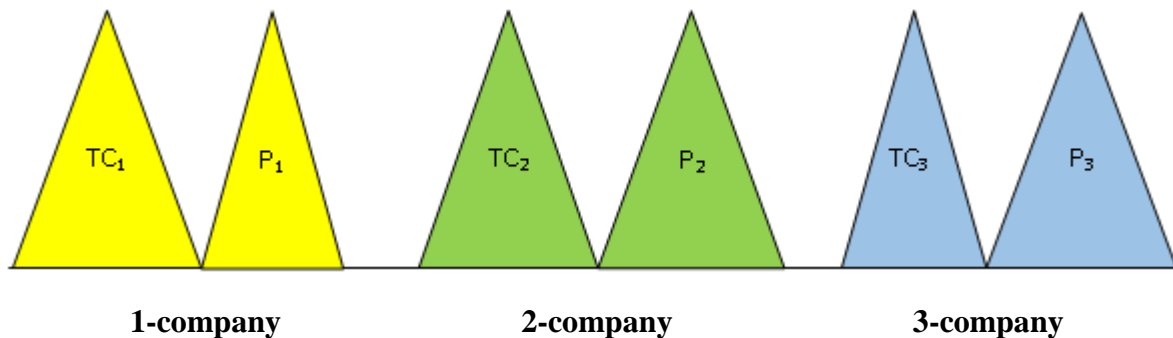
The most complex process in this analysis is the assessment of the operational efficiency of the enterprise (labor productivity, capacity utilization, innovative products, export volumes). The level of resource utilization in operational efficiency is assessed. The overall measure of operating efficiency is calculated by dividing sales revenue by the cost of the product.

If we define the revenue from production as TR and the cost of production as TC, then the profit is

$$P = TR - TC$$

We have to evaluate production not only by its profits, but also by its costs.

Example:



If we analyze the activities of these companies, their income is the same, but there is a difference in profit and cost. The profit of firm 1 is less than the cost, the profit of firm 2 is equal to the cost, and the profit of firm 3 is higher than the cost. From the above, it can be seen that the activities of the third firm are more efficient than those of the first and second firms. In this case, the mass of profit on equal terms of capital depends on the level of profitability.

Profitability is a measure of profitability, called profitability, and stems from the very essence of the concept of profitability used in economic activity. “**Profitability**” means “profitable” in German. What is profitability? Profitability is the extent to which a business benefits from its investment. Profitability is a summary of the final financial results of an enterprise, but it is not only the results, but also the cost to them.

Profitability is an important indicator used to know the financial results of an enterprise. Where there is a loss instead of a profit, there is no profitability. Profitability refers to what is derived from costs at the enterprise level.

In a market economy, there are the following types of profitability in the economy:

- production profitability;
- return on fixed assets;
- sales profitability;
- return on current assets;
- return on equity, etc.

If we look at the profitability of production. If we denote profitability by “**r**”, then: $r = \frac{P}{TC}$ or

$r = \frac{TR - TC}{TC}$. In other words, we consider profitability as the ratio of profit to expenditure. IF

$\frac{P}{TC} > 1$ (ratio) more one, if that is $P > TC$, then production is efficient. Revenues are increasing in part, in addition to covering all expenses. So it works. If, in contrast to the ratio

$\frac{P}{TC} < 1$, the production is operating at a loss. It must either cease operations or make appropriate management decisions to improve its operations.

In general, profitability or profitability is usually expressed as a percentage, ie

$$r = \frac{P}{TC} * 100\%$$

We know that there is a relationship between the volume of product created in the production process, the cost incurred, and the price of the product produced. Ensuring the efficient organization of production requires a simultaneous analysis of the above indicators. This analysis is called “cost-benefit-production” analysis.

Let's look at the relationship between "cost-profit-volume" through a practical example.

Example: An organization produces footwear products. The variable cost of producing a single pair of shoes is \$ 120. The organization’s fixed costs are \$ 2,000. The volume of products produced by the organization is 40 units and the price of one unit is \$ 200.

We are asked to find the volume of the product at the break-even point and to graph the results and draw conclusions.

Solution: First of all, let's enter the following definitions:

Variable cost per unit of product - VC (per unit);

Fixed costs-FC;

Product unit produced-Q;

Variable costs-VC;

Unit price-P (per unit).

VC (per unit) = \$ 120, Q = 40, FC = \$ 2,000, P (per unit) = \$ 200;

1. Find the amount of total variable costs. To do this, we multiply the variable costs per unit of output by the volume of output produced.

$$VC = VC(\text{per unit}) * Q = 120\$ * 40 = 4\ 800\$$$

2. We find the total cost. To do this, we combine fixed and variable costs.

$$TC = FC + VC = 2\ 000\$ + 4\ 800\$ = 6\ 800\$$$

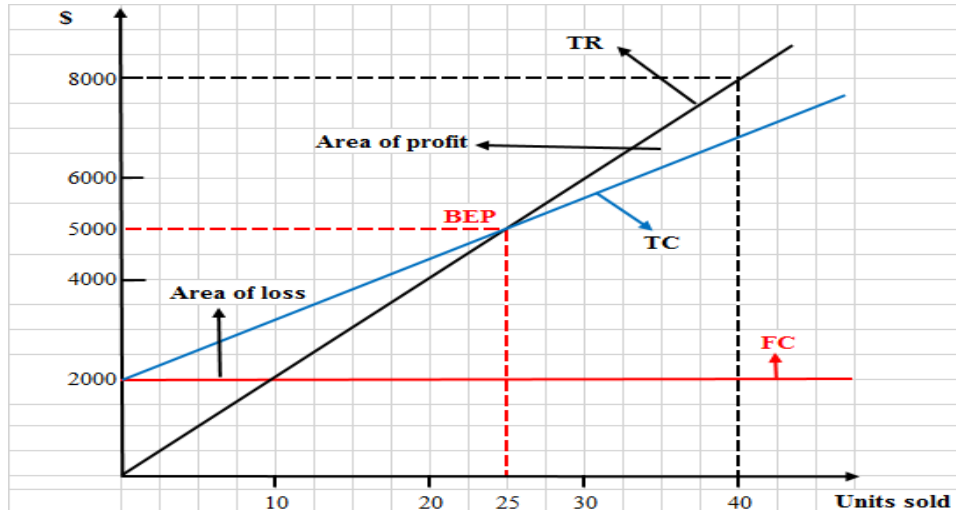
3. We calculate the revenue from sales. To do this, we multiply the unit price by the product volume.

$$TR = P(\text{per unit}) * Q = 200\$ * 40 = 8\ 000\$$$

4. We find the amount of product at the break-even point. To do this, we use the following formula.

$$\text{Break even point} = \frac{FC}{P(\text{per unit}) - VC(\text{per unit})} = \frac{2\ 000}{200 - 120} = \frac{2\ 000}{80} = 25$$

We graph all of these results.



Picture 1. Determining the product unit at the break-even point¹

From the sample data given above, it can be seen that the unit of product at the break-even point is 25 conventional units. The organization benefits from each unit of output produced after that unit. But at this point, the organization is neither profitable nor unprofitable. If the organization sells 40 units of the planned product for \$ 200, it will earn a total of \$ 8,000 in sales. The variable cost here is \$ 4,800.

Expected economic effect.

CVP analysis can help us solve many problems. The main advantages of CVP analysis are the following:

1. The main advantage of CVP analysis is that it aids in decision-making. It helps firms determine how many units of their product they should be producing, how they should manage scarce resources to maximize profit and whether they should manufacture a product themselves or buy them from another company.
2. Cost-Volume-Profit analysis is suitable for businesses of all sizes, including very small businesses.
3. It allows managers to control costs to achieve a target level of profit.
4. It allows managers to determine the ideal selling price they should set to achieve a target level of profit.

Cost-Volume-Profit analysis is a systematic approach to analyzing any manufacturing or distribution business and is designed to provide a clear picture of the business and assist in making decisions. A cost-volume-profit analysis shows a detailed picture of how the firm is spending money and which parts of the business are most profitable. It reveals how much the firm should be earning, and how much it is losing. It can pinpoint problems, problems in production, in marketing, in sales.

Conclusion:

The main goal of the production process is to make a profit, and there is no firm or enterprise that does not seek to maximize it. A firm can be satisfied with a small profit in the short term, but in the long run, it seeks to maximize profits, that is, to get as much as possible. A firm that does not strive for this cannot grow and prosper quickly.

¹ Prepared by the author on the basis of data.

Maximizing profits requires increasing its norm, ie profitability, and increasing production by increasing capital. Hence, the development of production activities always brings the systematic analysis of the operational activities of the organization to the level of necessity.

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