

Identification of Efficiency as an Economic Category: Theoretical Aspect of the Study

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Abstract: Efficiency is an economic category which for a long time is a pressing issue for the study of its essence, the measurements, the most optimal application for making various management decisions. This study presents, a summary of approaches to definition of essence of efficiency, the researchers vision of the properties of efficiency which allow the observed economic category to differentiate from others and methodically researched criteria-based approach to the measurement of efficiency as the most widespread in practice. A number raised in the study are debatable, the researcher hopes that the publication will contribute to their further development.

Key words: Attributive characteristics categories efficiency, performance measurement, economic category, efficiency, management decisions

INTRODUCTION

At all stages of historical development of society were interested in the question: Which costs achieved at the cost of the end result? One of the categories, through the analysis of which can be answered is efficiency. Efficiency is one of the basic concepts of economic science which focuses on a permanent account both economic theory and practice. It refers to the interdisciplinary, multi-faceted and contextual categories used in describing phenomena and objects of different nature. The apt remark Lebas and Euske (2007), the term efficiency represents one of the word of suitcases, inside which each of the places suitable to him the idea, shifting care about the definition in context. In physics, there is the concept of effective mass, effective current in mathematics-powerful and effective evidence in the management-effectiveness of the organization and others consider the evolution of substantial characteristics of the category of efficiency.

THE CONTENT OF EFFICIENCY IN THE SOVIET ECONOMIC SCIENCE

The term efficiency has evolved from one socio-economic system to another, dependent on institutional

structures, technical base of the economy, etc. Soviet economic science when there was a Soviet Union was considered to be an effective quantify the impact. Efficiency was defined, as a scientific and economic term that characterized the integral characteristics of operation of the economic system in general and any its part, reflected the quantitative relationship between the actions of the collective of employees (total employee) and the flow of products and services that address public needs. The general formula economic socio-economic efficiency of production was assumed to maximize the growth of national income on a predetermined ratio between the consumption and the accumulation fund with the full cost of the past and living labor. This approach to understanding the effectiveness as a development indicator, due to the fact that in the Soviet planned economy ultimate goal of production is the satisfaction of those or other public needs had to be at saving of labor and materials. The planning was based on this postulate. Predetermining further the research, researchers note that this postulate is not lost their relevance today. In this statement, researchers believe that the effectiveness largely characterized through consumption of resources, i.e., the cost of labor, materialized in the consumed resources and means of production.

It should be noted that the evolution of the content of the term efficiency in Soviet and Russian science is

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Table 1: The evolution of the interpretation of the concept of efficiency

Stage of development of society	The name of the new economic school and of course	Researchers	Interpretation of the term of efficiency	Indicator
Initial accumulation of capital the capitalism of free competition (the beginning of 18 century)	Early classical bourgeois political economy, school of physiocrats	Francois Quesnay, William Petty	Effectiveness	Absolute indicator (in currency units) profits
The capitalism of free competition-monopolistic capitalism (the end of 19 century)	Classical bourgeois political economy	David Ricardo	Efficiency	Relative (the ratio of result to cost)
The capitalism of free competition-monopolistic capitalism (19 century)	Neoclassical the direction of political economy	Alfred Marshall, Marie-esprit-Leon Walras	The balance on the micro and macro levels	The graphic model of equilibrium points aggregate demand and supply (cost parameters)
Monopoly capitalism (19-early 20 century)	Ordinality school (margin direction)	Vilfredo Pareto	Optimality	The balance between customer and manufacturer on the micro and macro levels
Monopoly capitalism (the beginning 20 century)	The scientific school of management, theory of convergence	Harrington Emerson, Frederick Winslow Taylor	Productivity, rationality	The most favorable ratio between the total costs and economic results
Socialism (20-90 years of 20 century)	The political economy of socialism	V. Lenin, L. Abalkin	Effectiveness	Social productivity

correlated with the interpretation of this term and in the world science. Table 1 is presented overview of substantial evolution of the interpretation of the concept.

ATTRIBUTIVE CHARACTERISTICS CATEGORIES EFFICIENCY: A MODERN ASPECT

Linguists considered etymologically the term efficiency, as derived from the concept of effective (lat. *effektivus*-productive) which means giving the effect that leads to the desired results, effective.

What makes any entity treated, as a system operating in certain socio-economic and natural conditions in the most general terms, through the implementation of the employment and industrial processes (which are also usually accompanied by presence of a man, so as the cost of living labor) is reduced to the transformation of some types of resources (input) to results (output). As inputs are considered used in the production of resources (as a rule, industrial, natural, human, financial, scientific-technological, information and others), administrative effects, contributing to change of the results of functioning of the object. The results (outputs) are traditionally the properties of the object expressed in physical or value, quantitative or qualitative form (production volume, revenue, profit, etc.). These are the result of the objectification of living labor.

Modern Russian researchers and economists interpret efficiency (Raizberg *et al.*, 2007) as the relative effect, the effectiveness of the process, the operation of the project, defined as the ratio of the effect of the cost, expenses, caused, provided the receiving it. Formalized efficiency can be identified as follows:

$$\text{Efficiency} = \text{Relation}(\text{Output}, \text{Input})$$

Thus, attributive characteristics of the concept of efficiency are the terms, effect, result and costs. Absolutely logical is the establishment of relationship and demarcation between such economic categories as effect and efficiency. A.I. Makhmudova said that the effect is kind of the activity of a particular economic system. You can be aware and predictable results and planned and desired and achieved. And then she writes that the cause of effect can serve any changes occurring in the organization, the result of which is improvement, i.e., a certain result. Effect reflects the result of activity, the result of any changes (Makhmudova, 2010). Naumov (2009) said that under the effect in many areas of science implies the desired result of any deliberate process which is absolute quantitative characteristic of the process of achieving the desired result. The difference between these approaches is that in the opinion of the researchers, the effect is due to the fact that the object must first have some desire, expressed quantitatively (the desired result). The effect is that this desire was realized the magnitude of this effect shows a measure of how desire implemented. The first researcher says about the effect as any result.

S.N. Rastvortseva believes that the category of the in its content broader than the category effect, although their common attribute characteristic is total. The researchers believes that the result could be any outcome while the effect implies the rejection of the result in positive or negative direction. In relation to economic activities, researchers can determine the result as a result of the economic system, therefore the effect of economic activity can be defined in comparison with the previous period, targets and so on (Rastvortseva, 2014). The effect

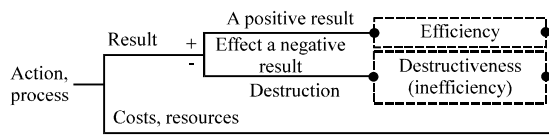


Fig. 1: The content description of the categories of efficiency and inefficiency

can be measured and relatively performance indicators (e.g., growth of profitability, growth of productivity and the like).

The effect characterizes resulting from any changes, both positive and negative results. In this case, researchers speak of a positive or negative effect. When defining a negative effect might be used the term destruction. It means the result characterizing negative trends. The level of efficiency gives an idea of the price which expenses result. If the result can be described as a negative effect, it is necessary to speak about inefficiency or destructiveness. Clearly the essential content of the concept of efficiency is presented in Fig. 1.

PROPERTIES OF EFFICIENCY

Received recognition and dissemination approach to the interpretation of efficiency as the ratio of results to costs and provides a basis for us to mark the first property of efficiency of relativity.

This property can be manifested both literally the ratio of output and inputs, as well as the evaluation result of the made expenses, actions (process, technology used) of a specific subject on:

- Possible (the best desired) of the functioning of the same subject
- Possible (the best desired) actions (process, technology used) the same subject
- Possible (the best desired) costs of functioning of the same subject
- The result of the operation of another subject
- Actions (process technology used other subject
- The volume of manufactured to produce similar expenses other entity

Any other suggestions on which will be evaluated parameters of functioning of a specific subject. The first property of efficiency makes the possibility and the activity of the application in written and spoken language of expressions, such as enterprise and more efficient company B, technology (mode of production) X more efficient technologies (production method) Y,

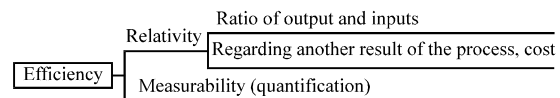


Fig. 2: Effectiveness of 2 properties

organization operates more efficiently than in the previous period, the company operates less efficiently than they would, etc.

Further note that attitude, as the essence of efficiency is one of the main logical and philosophical categories. In a broader sense, it reflects the way of life and knowledge and is a comparison/matching of 2 or more objects, subjects, events on the selected/a specified basis or grounds. The attitude may have additive or rational form. This allows us to state the following conjecture that the difference between results and costs, as their private are the performance indicators stated in an additive or rational form.

Additive estimation of efficiency describe the degree of deviation, expressed in physical units (is practical when making managerial decisions) and relative show how many times you can change the indicator to be effective (used for the comparative analysis of efficiency of activity of multiple objects).

Made a conclusion in particular acts, as an argument for why the rate of profit is included, as estimated in any method of estimation of economic efficiency. However, note that only the absolute amount of profit and its growth is impossible to judge about the level of efficiency of company, their size has an impact both intensive and extensive nature use of production resources. Therefore, to characterize the efficiency of the total amount of profit it is recommended to use and the relative index of profitability (or margin).

Used in the calculation of the efficiency of mathematical operations such as subtraction (add) and division (ratio) which can be committed only with the numerical parameters that provide the basis for the formulation of the 2nd properties efficiency-measurability (quantitative expression) (Fig. 2). This property of efficiency:

- On the one hand, is derived from the first property when evaluated against the effects and costs which as a rule have a numeric expression
- On the other hand, is a necessary condition for overcoming bias in assessment of the efficiency of the characteristics of the subject about something

If the performance indicator is not measured that is expressed by the value that enables the comparison of

different objects according to numerical scale, the evaluation of efficiency of such judgments like better or worse that is to be subjective.

EFFICIENCY, EFFECTIVENESS, PRODUCTIVITY: GENERAL, SPECIAL, PRIVATE

Researcher think that the essential definition of productivity and effectiveness, their correlation with the category of efficiency are necessary elements in this study.

The comparison of the categories of efficiency and productivity refers to the analysis of work. An introduction to efficiency and productivity analysis (Coelli *et al.*, 2005). Introduction to productivity and efficiency, definition importance and determinants of productivity parham, in which productivity is mainly measured as the ratio (a weighted) outputs for measured (weighted) inputs:

$$\text{Productivity} = \frac{\text{Weight} - \text{Output}}{\text{Weight} - \text{Input}}$$

Productivity can be described, as the ratio of output (output) as release results of operations (production volume) to present at the input costs.

Russian researchers (Datsko, 2006) clarify the approach of American scientists in part measure, calling productivity is the ratio between the volume of output in physical terms and quantitative cost of production factors, etc. Depending on kinds of production factors distinguish the productivity of labor, capital, etc. According to this interpretation, the productivity can be measured in physical terms (number of cars produced per employee; crop productivity per unit area of crop), either in money terms (production volume in rubles per 1 h of work, the amount of revenue per one employee).

Productivity is the indication of the ratio of production and costs, gives an idea of how efficiently it operates. Management of productivity involves the implementation of the 3 alternatives:

- Increase output with the same amount of resources expended
- Reducing the cost of resources for a constant volume of sales
- Provision of conditions for accelerated growth in the volume of products over the growth of cost of resources

Explicit property of relativity and inherent quality to characterize a certain ratio of results to costs allow us to conclude that productivity is one of the faces of efficiency, its particular case. Next comparable definitions

of efficiency and effectiveness. The earlier considered approach to explaining the category effect through its correlation with the result are common in traditional studies that in the opinion is one of the reasons of the lack of clear demarcation between efficiency and effectiveness. Lexically they are derived from the word effect and result, respectively.

Proving the lack of identity between efficiency and effectiveness, the researchers of the study posted in the English version of the electronic encyclopedia Wikipedia, emphasize that the effectiveness, unlike efficiency which is measurable, relatively undetectable, non-quantitative category that detect the degree of achievement of the purpose and interest in this. The Russian authors of battle for efficiency, clarify the approach of foreign researchers say that the results may also have quantitative measurement. It is measured by the percent goal. The rate of direct: The more the better (Fedoseev and Karabanov, 2013).

Enough picture of the interdependence of the definition of efficiency and effectiveness under the existing differences can be created out of works by Peter F. Drucker. Performance Drucker is a consequence of the fact that doing the right things that is the activities towards achieving the goal but the result is the consequence of the fact that doing things right, then there is a cost-effective use of resources by increasing the release. Performance is judged on whether it should cost, and performance-about their payback.

However, my research shows that there are works, which reflect the demarcation of these english terms. G.I. Shishlov noted that efficiency is usually refers to the use of the means (resources) while effectiveness is related to organizational goals, behavior and development (Asaul *et al.*, 2008). Krom (2005) notes that:

For the description of a number of aspects related to the efficiency in the Russian language is not enough terms, for example abroad it is customary to distinguish between efficiency and operating efficiency which implies an optimal balance between the costs and results within existing production capacity and effectiveness and management efficiency, i.e., the company's ability to achieve its goals (Krom, 2005)

I share the position of these researchers, claiming that the efficiency and effectiveness characterize various aspects of enterprise activity, complementing each other. Efficiency is described as characteristics of the process of production, operation and effectiveness as a product feature activities in the context of relating with the expectations and targets and plans, how were the objectives achieved.

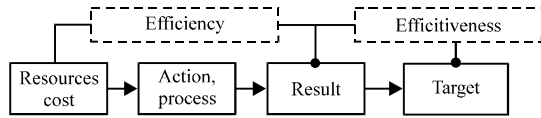


Fig. 3: Allocation categories of efficiency and effectiveness

In my opinion, the identity of the use in Russian the word efficiency and effectiveness in addition to this also explains:

- From a theoretical point of view, the costs of translation of foreign works when the English terms efficiency and effectiveness are considered dictionary equivalents same concepts such as efficiency
- From the empirical point of view, established practice their active use in describing the activities of enterprises or organizations when using the term effectiveness

Comparison of categories efficiency and effectiveness is in Fig. 3.

MEASUREMENT OF EFFICIENCY: CRITERIA-BASED APPROACH

The process of efficiency measurement is to receive a fairly accurate values of the level of efficiency of activity of the investigated object in accordance with sound manner and context of the study. Ways to measure the efficiency proposed by various researchers, can be divided into 2 groups: Criteria and econometrics. In this study, I will focus on the 1st group. As for the other group of methods, it will make only one comment.

The econometric approach to efficiency measurement intensified since the mid 20th century, the conceptual framework is based G. Debreu and M. Farrell. Conceptually, efficiency measurement is based on the methods of approximation of efficiency frontier or assessment of the model, average condition, relative to which the efficiency measurement object of observation. This gradation of efficiency vary depending on the type of inputs and outputs, accepted calculation terms used metrics, etc. The original idea of the concept of performance measurement in the framework of the econometric approach is the idea that the effectiveness or ineffectiveness of the companys activity is the result of individual decisions, its assessment regarding the aggregate comparable objects (deterministic approach) and the influence of random factors (stochastic approach). The use of econometric approach allows to

take into account the difference of the effects of enlargement of the scope of activity with the correctness of the initial data and the implementation of the adopted terms (assumptions used in the methodology) allows to obtain the integral evaluation of the efficiency and minimum of subjectivity, from the point of view of the practice of management allows to assess the major indicators. International practice of application of these methods showed their efficiency in solving problems of identifying the role of socio-economic and technological factors in performance, group of enterprises on the efficiency, evaluation of reserves of increase of income and savings. The group econometric methods requires some study and description.

Criteria approach in modern research combines several different methods involving the use to assess the effectiveness of the aggregate criterial indicators reflecting various aspects of the issue. For a long time, the theory and practice developed and adapted many of the performance indicators. Their calculation is applied to specific business entity for a certain time period from particular situation assessment and interests and objectives of the subject of evaluation, look at them. As noted earlier, attributive characteristics of efficiency is the result (output) and costs (input). The result of the activities of individual companies over a certain time period (year, quarter, month, day) the resultant variable is expressed:

- The amount of production that can be assessed using natural, semi-natural indicators and in terms of value. Among the products, the volume of which is used at calculation of parameters of efficiency of production, allocate gross, trade and implemented
- Financial indicators, such as gross income, net income, revenue and profit. The second variable used in the calculation of indicators of efficiency are the resources costs. This is the so-called input variable

A resource is an aggregate of elements of the potential of enterprises to create (or sadagyat to maintain and to have in order for it to function. Spent part of the resources referred to as cost. As the results, the costs are calculated for a specific period of time. The reference to mathematics enables to build various constructions ratio of result and effectiveness input variables, such as:

$$\text{Efficiency Add} = \text{Output} - \text{Input} \quad (1)$$

$$\text{Efficiency Ratio} = \frac{\text{Output}}{\text{Input}} \quad (2)$$

Table 2: Some measure of efficiency criteria-based approach

			Criteria indicators of efficiency	
Output	Input	Output-Input	Output/Input	Input/Output
Quantity of product	Resources		Production per one employee in production; labour productivity; the yield of agricultural products with 1 ha of land; the milk yield per 1 head	Labour input
	Costs		Production per one RUB of expenses	Labor costs per one RUB of made production
Financial indicators	Resources		Resursoemkie; capital productivity; material attach	
	Costs	Profit; the volume increase of the capital	Profitability; the payback	The capital ratio; capacity; capital intensity

Constructions of the correlation of the result and the input variables

$$\text{Efficiency Ratio} = \frac{\text{Input}}{\text{Output}} \quad (3)$$

All of them are equally valid and from different sides characterize a comprehensive notion of efficiency, allows to solve different tasks and meet different goals for their solution. The ratio of results and costs, calculated in accordance with the design (Eq. 1) reflects the concept of effect. In the calculation of this indicator, it is important that output and input were expressed in a common unit of measurement, usually cost, roubles. For other designs, this requirement shall not be binding. The measures of efficiency, calculated according to the principle (Eq. 2) characterize the result obtained with unit costs and form a group of indicators resource Africa and on the principle of (Eq. 3) indicators of resource intensity, indicating the specific value of cost per unit of the achieved result. Sometimes apply alternative names resource and cost, respectively.

Also, there may be other (mixed) construction of correlation of results and costs of formalizing approaches to the assessment of effectiveness, such as:

$$\text{Efficiency Add and Ratio} = \frac{\text{Output} - \text{Input}}{\text{Output}} \quad (4)$$

$$\text{Efficiency Add and Ratio} = \frac{\text{Output} - \text{Input}}{\text{Input}} \quad (5)$$

The authors of the monograph economic efficiency: Indicators, assessment methods believe that indicators type (Eq. 4 and 5) should be considered as characteristics of the effect of share (Eq. 4) and relative (Eq. 5) (Astakhov, 1984). Meanwhile, it is not so. If output to mean volume of sales and under input-operating costs (output-input) will make a profit and the ratio: Output-input/input-profitability is calculated relative to cost. In the modern economic science profitability is the most common criteria-based indicator of efficiency.

Variants of correlation of results and costs form the different gauges effektivnosti found quite widely used in economic and financial calculations and estimates. In Table 2 presents incomplete list of criteria-based performance indicators.

In publications can be found and other measures of efficiency, the selection of which is determined by the researchers approach to the study of different aspects of enterprise activity, directly by the context of the work itself, the availability of required information, the specifics used for the analysis of databases and other factors.

CONCLUSION

Efficiency is an economic category which for a long time is a pressing issue for the study of its essence, the measurements, the most optimal application for making various management decisions. This study, presents a summary of approaches to definition of essence of efficiency, the researchers vision of the properties of efficiency which allow the observed economic category to differentiate from others and methodically researched criteria-based approach to the measurement of efficiency as the most widespread in practice. A number raised in the study are debatable, the researchers hopes that the publication will contribute to their further development.

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