
Improving Scoring System of Performance Indicators of Industrial Systems at the Meso-Level

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Abstract:

In this article we examine assessment aspects of the performance efficiency of the fishing industry at the meso-level. The authors have justified the need to improve existing approaches to the efficiency assessment of industrial systems. The proposed set of indicators is based on the balanced system of indices, the modern approaches to assessment of industrial systems performance efficiency, and authors' developments.

The authors' approach allows carrying out comprehensive assessment of industrial systems efficiency at the meso-level considering retrospective results and sectoral characteristics. Another advantage of the authors' scoring system is the simplicity of its application due to the processing of statistical reporting data that provides in turn the reliability of the initial data and the results obtained.

The application of the refined scoring system will allow implementing comprehensive approach to the concerned research problem and comprehensively assess at the meso-level the performance effectiveness of industrial systems.

In this study, the authors used scientific research methods such as the study and analysis of scientific, educational publications and articles, as well as analytical method.

The results of the study can be used in the financial activities of the fishing industry enterprises as well as in teaching practice at higher education institutions.

Key words: *effectiveness, approach, criterion, indicator, meso-level, fishing industry, profit, income.*

JEL Classification: *O10, L50, L52.*

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1. Introduction

Improving the fishing industry effectiveness is one of the most important economic problems of Russia and priority objective of the Primorye Territory. The solution of this problem largely influences the level of regional economy development, and hence the increase in the living standard of the population, food security, and investment attractiveness. The problem of assessing the industry effectiveness is becoming especially relevant in the conditions of a highly concentrated market of fishery ventures and economic crisis-like phenomena. Measuring the effectiveness of industrial complexes requires its qualitative and quantitative assessment, that is, the definition of criteria and a set of indicators. Today, there are a number of criteria, which are used in practice for assessing industrial systems with due consideration of industry specifics. Properly formulated and defined criterion should most fully express the essence of the industrial complexes effectiveness and be the same for all phases and aspects of its activities (Oktyabersky, 1985; Bashmakov *et al.*, 2015; Bondarenko *et al.*, 2017).

Among foreign and domestic researchers of the theory of effectiveness there is no clear view on universal indicator, which would allow comprehensively assessing the effectiveness of the industry, given the industry peculiarities. When studying methodical approaches to the assessment of effectiveness, we used the works of Russian and foreign authors, namely Kaplan and Norton (2001), Yalunina (2014), and Morganiya (2009). The opinions of scholars diverge depending on commitment to the approaches of performance assessment. Analytical overview of existing methodical approaches to the assessment of effectiveness of industrial structures allows emphasizing their standard-based nature and the lack of gradation of indicators by hierarchy levels - from the micro- to the macro-level. It is also noted that the methodological approaches in assessing the effectiveness of industrial ventures at the meso-level, as a type of economic activity, are studied insufficiently.

The choice of the Primorye Territory as a base for empirical research is explained due to several factors. Firstly, the fishing industry is of strategic importance for economic development of the Primorye Territory. Secondly, being able and having rich aquatic biological resources, the Primorye Territory is inferior to the leadership of the Kamchatka Territory since 2008. Thirdly, in 2014 there is a decrease in the main performance indicators. Consequently, it is necessary to take urgent measures to reduce the impact of disincentives and the development of fishing industry in the region. So, insufficient theoretical and practical development of the issues related to the definition of criteria and indicators to assess at the meso-level the effectiveness of the fishing industry determined the choice of the present research topic.

2. Materials and Methods

Having studied the conceptual framework of the effectiveness theory, we note that it is quite agile and is systematically supplemented and specified. Assessment of the

effectiveness of industrial systems is considered in many works, and the attention of many contemporary scientists is focused toward studying the problem of effectiveness at the meso-level.

According to the authors, the meso-level should be defined as the effectiveness of economic activity type in the regional aspect. This approach will allow, firstly, considering features and chronological results of regional development of the industrial systems, and secondly, the specificity of the analyzed business profile (Levkina, 2017; Theriou, 2015; Sibirskaya *et al.*, 2016). Considering contemporary approaches to the assessment of industrial systems effectiveness, we can note both the ambiguity of the interpretation of the meso-level itself, and the lack of a common set of relevant indicators and criteria.

Yachmeneva and Smitskikh (2014) in his scientific study considers the meso-level in terms of inter-regional effectiveness, which is assessed using the integral indicators of commercial, financial, budgetary, and social efficiency of business activities. The authors share the technique proposed by Marganiya (2009), namely, the use of a balanced indicators of individual enterprises and their integration into a coherent system that includes the indicators of industry, region, and country. Along with the lack of a common understanding of the meso-level in terms of an independent level of entrepreneurial activity, the issue of determining criteria and indicators to assess effectiveness of industrial systems at concerned level of the economy is understudied and quite controversial.

Standard approaches to the assessment of effectiveness are based on the use of profitability indicators and the benefit-cost ratio (BCR) as key indicators. However, this approach does not reveal fully the essence of comprehensive category of effectiveness. According to the authors, assessment of the fishing industry effectiveness should be carried out comprehensively, considering all the factors of the meso-level.

3. Results

In addition to the existing principles to assess industrial systems effectiveness, the authors have elaborated the basic assessment principles, presented in Table 1, which will be used to develop the scoring system reflecting functioning effectiveness of the fishing industry at the meso-level.

Table 1. *Assessment principles of the fishing industry performance effectiveness*

Principle	Subject matter
Consistency	The system contains both outcome indicators achieved, and indicators characterizing the main factors affecting the achievement of results.
Target focus	The calculation results of indicators should reflect the tactical and strategic goals of the fishing industry.

Optimality	Indicators should be objective and useful for the fishing industry actors.
Coherence	There should be coherence between the parameters of effectiveness of the fishing industry for strategic development.
Simplicity and flexibility	The indicators should be rather simple for calculations and have the database necessary for calculations, allowing their automation.
Commonality	The indicators should be unambiguous.
Dynamicity	The dynamicity is characterized by the ability of the indicators system to display the current status of the fishing industry in an expeditious manner.
Range of applicability	The performance indicators of the regional industrial systems should be able to assess the results in the internal and external environment.

Source: compiled by the authors.

Given the multisidedness of effectiveness, currently, there are various approaches to the definition of its criteria. In the scientific study of Filobokova (2015), criteria for assessing the effectiveness of entrepreneurship at the meso-level are divided into legal, expert, social, and economic ones. Other authors propose relevant indicators for each criterial characteristic (Erastova, 2016; Okunev *et al.*, 2016). The same approach is used by Yalunina (2014), when considering the criterion of effectiveness. Exploring the effectiveness of the food industry, Yalunina singles out the following criteria:

- the development of territorial-economic complex given the impact of food industry on agriculture, trade, transport, etc.;
- an increase in food production, including products produced using raw materials from local producers;
- an increase in the number of jobs at food industry enterprises.

In this study the authors share the ideas of Filibokova (2015) and Yalunina (2014) regarding the separation of criteria, as qualitative characteristics, and the definition of groups of indicators to assess each criterion a based characteristic. Updating existing approaches to assessment of industrial systems effectiveness, the authors propose to assess the effectiveness of the fishing industry at the meso-level in the following areas:

- technological (industrial) effectiveness;
- financial effectiveness;
- budget effectiveness;
- market effectiveness,
- investment effectiveness;
- innovative effectiveness (Levkina *et al.*, 2014; Breckova, 2016);
- social effectiveness;
- labor effectiveness.

For each mentioned area, the authors have defined and grouped the indicators reflecting the effectiveness of the fishing industry, presented in Table 2.

Table 2. *Indicators reflecting the effectiveness of the fishing industry at the meso-level*

Effectiveness of the fishing industry	Indicator
Production effectiveness	Level of disbursement of industrial quotas
	Integration factor
	Coefficient of the production volumes variation
	Coefficient of renewal of fish products assortment
	Coefficient of change in capital productivity of fixed assets of the fishing industry
	Coefficient of change of profitability of fixed assets
	Coefficient of renewal of fixed assets, %
Market effectiveness	Specialization ratio, %
	Concentration ratio, %
	Fishing industry extension index
	Proportion of fishing industry in the regional and federal GDP
	Share of turnover of maritime fishery ventures on the market, %
	Coefficient of attractiveness for small businesses in physical and monetary terms
	The coefficient of dependence on imports
	Coefficient of change in per capita consumption of fish products
Financial effectiveness	Coefficient of profitability of fishing industry ventures in the market
	Sales profitability ratio
	Coefficient of change in the per capita income in the fishing industry
Investment effectiveness	Coefficient of change in investments profitability
	The ratio between the investment in the fishing industry and the total regional investments
Innovation effectiveness	Level of innovation activity, %
	The proportion of innovative products volume in the total production, %
	Percentage of fishing industry ventures implementing technology innovations (deep processing), %
Social effectiveness	Employee recruitment ratio
	Coefficient of change in the social payments in the fishing industry per employee
	The level of social stability in industrial systems (the Gini coefficient)
Labor effectiveness	Coefficient of change in the average annual salary in the fishing industry
	Coefficient of change in the average annual number of

	employees in the fishing industry
	Coefficient of change in labor productivity in the fishing industry
	Wage advancing coefficient in the fishing industry with regard to the average salary in the Primorye Territory
Budget effectiveness	The level of tax revenues from fishing industry ventures into the regional and federal budget
	Taxation efficiency coefficient of the fishing industry

The proposed set of indicators is targeted to all parties in interest, and allows objectively and comprehensively measuring the results achieved. The next step consists in determining the criterions values for each indicator.

4. Discussion of Results

The analysis of works on the studied issues has led to the conclusion that the authors, examining issues of industrial systems effectiveness at the meso-level, propose to compare the performance indicators of different industries. This approach is universal and applies to all sectors of the national economy. The disadvantage of this approach is a certain disregard to geographical characteristics and industry specificity within a region.

Assessment of the entrepreneurship effectiveness on a practical level can be carried out using a method of evaluating the achieved level of performance indicators by comparison with the parameters of other regions and industries, numerical scoring technique, hierarchy analysis, determining the arithmetic mean values as well as determining the level of effectiveness based on deviations from the ideal point (reference value). The comparison may be performed for different time periods, branches of activity, economy sectors, planned and actual values, as well as deviation of achieved values comparing to the accepted standards. Normative values are typically defined according to research of statistical authorities, assessment results of consulting and rating agencies, as well as the related statistical data reviews for previous periods. According to the authors, the use of common normative values is the most straightforward way to compare data. However, there is a probability of distortion of results of the information received and the lack of accounting for the industry specificity. Therefore, it is necessary to determine the criterial values for each direction of activity considering industry-specific features.

In addition, to assess the fishing industry effectiveness, it is inappropriate to apply the definition of the criteria values of indicators based only on the arithmetic mean value, because the achieved results of the fishing industry do not always reflect a positive trend. According to some indicators (production volume and size of catch of fish and hydrobionts, the amount of supply for domestic market, the number of employees in fisheries, the amount of tax payments, financial results, etc.) we observe both positive trend and decrease of noted indicators. This will distort the

objectivity of the criteria based on arithmetic mean values. The method of determining effectiveness, based on the deviation from the ideal point, proposed by Tsarev (2010), is more appropriate since it allows considering not only positive trend of the indicators, but also their decline. The application of this method is based on the choice of comparative base, which may be the best criterial value for the analyzed period.

The authors in this study have followed the idea of Skrypnyk *et al.*, (2011) regarding the definition of recommended values using the criterion "good" for the maximum values, the criterion "unsatisfactory" – for the minimum values, and the criterion "satisfactory" – for average values. Considering the above described approaches, we propose to assess the effectiveness of the fishing industry according to four criteria. We propose to assign the maximum value of the indicators to the criterion of "high efficiency", the average of the maximum – to the criterion of "average efficiency", the maximum value among all minimums – to the criterion of "critical efficiency", and the minimum value – to the criterion of "low efficiency" (Nazvanova, 2015).

This approach to the definition of criteria is universal, and will allow assessing current results of industrial systems considering both geographic and sectoral characteristics.

5. Conclusion

The proposed scoring system provides a comprehensive assessment of the fishing industry status. Assessment of the effectiveness according to eight blocs (production, market, financial, investment, innovation, labor, social, and budget) allows expanding the boundaries of the studied aspects of the concerned categories and increases the horizon for planning and developing managerial decisions.

Independent assessment of the fishing industry performance at the meso-level enhances the possibility of obtaining accurate results by eliminating from the analysis the indicators, which can characterize simultaneously different directions. Besides, this approach will allow considering the influence of individual factors on the performance results of industrial systems, and timely taking smoothing measures against the deterrent effect. The proposed authors' approach is recommended for use by state government bodies, fishermen's associations, other public authorities, and various organizations to define the development concept of fishing industry in the Primorye Territory, as well as to develop strategic plans.

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