Analysis of the competitiveness of the region based on the utility function

Sergey Yekimov, David Brož, Aleksey Masenko, and Valerii Shchebeteev

1 Czech University of Life Sciences Prague, Kamycka 129, 16500, Praha - Suchdol, Czech Republic
2 Kuban State Agrarian University named after I.T. Trubilin, st. Kalinina, 13, 350044, Krasnodar, Russia

Abstract. Ensuring competitiveness is closely correlated with the quality of goods and services produced in this region. Which, in turn, requires systematic efforts on the part of enterprises and state institutions aimed at improving the quality of everything that is produced in the region. A product or service of high quality attracts more attention of potential consumers. The value of the utility that the buyer receives in case of purchase of this service or product depends on the quality of the product or service. The client predicts the possible result that he can achieve after making a purchase of a service or product.

Regional authorities, in order to increase the competitiveness of the region, in our opinion, should pay priority attention to the compliance of producers with technical, sanitary and environmental standards in the production of products in the region. The production of high-quality products, as a rule, is the production of products with a higher added value, and therefore this is a potential supplement to the budget from the realization of this type of product. The sale of high-quality goods can have a favorable impact on the financial and economic indicators of the enterprise, and therefore this enterprise will be more attractive to potential private investors.

1 Introduction

The processes of globalization contribute to the formation of the region as an independent economic and social entity that carries out activities not only within the state, but also beyond its borders. The role and position of the region is in close correlation with the economic and political processes taking place in the world, the economic potential of the region and its position in the competitive struggle with other regions.

According to [1], the possibilities of economic development of the region can be characterized by its resource base, social needs, the degree of development of the territory and methods of using natural resources.

According to [2] the effective development of economic and social processes taking place in the regions requires the continuous improvement of regional management methods in order to increase their level of competitiveness.

* Corresponding author: rusnauka@email.cz
According to [3], globalization encourages regions to determine their competitive advantages in order to occupy their niche in the system of the global division of labor. This is possible if the optimal factors for competition between regions are chosen correctly.

According to [4], the formation of a favorable regional investment climate, as well as conditions for attracting domestic and foreign investors to the region, is of great importance for the successful economic development of the region. This can be achieved by providing certain tax preferences through the formation of effective tax legislation.

The authors [5] identify the following problems that relate to the effectiveness of regional development (Fig. 1)

![Problems of effective regional development](image)

**Fig. 1. Problems of effective regional development**

According to [6], the most effective idea of regional development is to ensure the stable development of the region on the basis of its stable development of the social and economic sphere, as well as providing conditions for achieving environmental safety.

According to [7], each region has a specific set of competitive advantages. Efficient and rational use of the region's resources can increase the attractiveness of the region among tourists, investors and the population of the region. Quantitative and qualitative assessment of the levels of investment attractiveness and competitiveness of the region can play an important role for this.

According to [8], the competitiveness of a region characterizes its ability to provide services and produce goods that would be competitive on the domestic and international market, and therefore contribute to ensuring the standard of living of the population living in the region.

According to [9], the competitiveness of the region depends on the efficiency of the use of labor, natural resources, attracting investment and the use of new technologies.

According to [10], the competitiveness of the region is determined by social, economic, political, environmental and other factors, the position of the region in the external and internal market and characterized by certain indicators.

According to [11], ensuring the continuous growth of the competitiveness of the region should be one of the main priorities of state policy.

According to [12], the competitiveness of the region is an economic effect formed due to the synergetic interaction of information, production, environmental, financial and other resources of the region based on their effective use in interaction with external factors.

According to [13], the competitiveness of the region is determined by social, economic, political and many other factors.

According to [14], the assessment of the functioning of complex socio-economic systems consists of the following components (Fig. 2)
Components of the assessment of complex socio-economic systems

According to [15], there are three main approaches to assessing the competitiveness of the region:

1) Based on the assessment of innovation processes taking place in the regions
2) Based on the cluster approach
3) Based on the analysis of individual factors reflecting the level of competitiveness of the region

According to the first approach, the availability of advanced innovative technologies allows the region to gain an advantage in the competitive struggle.

According to the second approach, the successful interaction of state institutions and firms within clusters enables regions to achieve competitive success in certain sectors of the economy. In accordance with this approach, the main efforts to increase competitiveness should be directed to improving the efficiency of regional clusters.

According to [16], in order to calculate the competitiveness of the region, it is necessary to make a comparison of individual indicators of the regions, and in accordance with this, to rank them according to individual parameters. Experts from various fields can be involved in the operation raging. However, with this approach, the final result will largely depend on the subjective judgments of experts. Consequently, there is a risk that the results obtained will be completely reliable.

According to [17], the most accurate assessment of the competitiveness of the region can be achieved if quantitative assessment methods are used.

According to [18], when assessing the competitiveness of the region, emphasis should be placed on the study of such parameters as the level of intellectual and human capital, the level of labor migration.

According to [19], the competitiveness of a region largely depends on its investment attractiveness, and therefore, when assessing the competitiveness of a region, the development of its infrastructure and the state of its resource base.

According to [20], the following quantitative methods can be distinguished for assessing the competitiveness of the region:

1) Based on the analysis of indicators of trends in the economic and social development of the region.
2) Based on the analysis of the current main social and economic indicators.
3) Based on the assessment of the standard of living of the population, the investment attractiveness of the region, the efficiency of the functioning of the regional economy.
4) Based on the economic potential of the region, the competitive advantages of the region, the level of regional efficiency
5) Based on the level of development of the economic and social infrastructure of the region.
6) Based on the region's ability to meet the needs of the population living in the region.
The Institute of Management Development (IMD) uses more than 300 different criteria to assess the competitiveness of countries. These criteria can be divided into 4 groups: the effectiveness of public administration, the state of infrastructure, business efficiency, overall economic efficiency.

Meanwhile, in our opinion, the use of an integrated indicator to assess the competitiveness of the region is fraught with difficulties due to the disparity and heterogeneity of different types of data.

2 Methods

When writing this research paper, we used an analytical method by which the problems under study were investigated in their unity and development. Taking into account the tasks, as well as the goals of this study, a structural and functional method of scientific research was used. This allowed us to study a number of problems related to the analysis of the competitiveness of the region based on the utility function.

3 Results

Based on the above, the authors make an assumption that the value of the competitiveness of the region is proportional to the usefulness that the region provides to investors and residents of the region. This utility consists of the following main parts: the usefulness of the provision of educational services, the usefulness of social security services, the usefulness of the availability of transport infrastructure, and so on.

\[ S = \alpha \left( \sum_{i=1}^{n} U_i \right) \]

where \( S \) – competitiveness, \( U_i \) – the usefulness of purchasing goods and services in the region, \( \alpha \) – proportionality coefficient.

Within the framework of this model, we will make the following simplification assumptions.

Public services in the region are provided centrally.

1. Prices for the same goods and services in the region are the same for all suppliers.

2. If the utility \( U_1 \) from the acquisition of the good 1 is greater than the utility utility \( U_2 \) of the acquisition of the good 2 , the utility \( U_3 \) from the acquisition of the good 3 is greater than the utility utility \( U_2 \) of the acquisition of the good 2 , then the utility \( U_3 \) is always greater than the utility \( U_1 \).

3. Utility is the degree of satisfaction from receiving benefits by firms and households.

4. Households and firms always strive to maximize the value of the utility received.

5. The preferences of households and firms regarding utility do not change over time.

Taking into account (1), it is possible to construct indifference curves for a region that determines the same level of competitiveness.
Consider, for example, the provision of municipal transport services to the population.

The utility for households and firms from goods and services purchased in the region depends on the amount of income received in the region.

\[ S_1 = \alpha \left( \sum_{i=1}^{n} U_i \right) \]

\[ S_2 = \alpha \left( \sum_{i=1}^{n} U_i \right) \]

\[ S_3 = \alpha \left( \sum_{i=1}^{n} U_i \right) \]

**Fig. 3.** Indifference curves of the competitiveness of the region

The line of equal utility for households in relation to municipal transport services to the population

where \( U_s \) is the utility of receiving municipal transport services provided to the population and firms \( U_d \) – the costs of the population and firms to receive municipal transport services.

From Fig. 2 it follows that the higher the cost \( U_d \) of municipal transport services provided to the population and firms, the lower their availability for the population and firms, the less the population and firms agree to purchase these services, and therefore the lower their usefulness for the population and firms.

The lower the cost \( U_d \) of municipal transport services provided to the population and firms, the higher their accessibility for the population and firms, the less the population and firms agree to purchase these services, and therefore the higher their usefulness for the population and firms.
There are two possible options for a municipal transport company.

Option 1. A municipal transport company can operate with zero profit and thus maximize the utility provided to households and firms from the sale of transport services, but in this case the municipal transport company will be deprived of the opportunity to update the rolling stock, which means it is not economically profitable.

Option 2. A municipal transport company can inflate the price of its services, in which case it will have an additional profit from which it will be possible to buy additional vehicles. However, this will reduce the purchasing power of households and firms, and therefore reduce their usefulness from receiving transport services.

Thus, both of these options are not acceptable for a municipal transport company.

It is possible to make similar reasoning for other goods and services.

Thus, the following conclusions can be drawn:

The competitiveness of the region depends on the usefulness of goods and services produced in the region for the population and enterprises.

It is possible to increase the competitiveness of the region by increasing the marginal utility of goods and services produced in the region.

4 Discussion

Ensuring competitiveness is inseparable from the quality of goods and services produced in the region. This requires systematic efforts on the part of enterprises and state institutions to ensure the quality of products produced in the region. A product or service of high quality attracts more attention of potential consumers. The level of utility that the buyer acquires in the case of purchasing this product or service depends on the quality of the service or product. The client pre-analyzes the possible result that he can get after making a purchase of a service or product.

The usefulness of the product is influenced by the possible costs of after-sales service, the durability of the product, its ability to meet the requirements of the consumer as much as possible.

Regional authorities, in order to increase the competitiveness of the region, in our opinion, should pay priority attention to the compliance of producers with technical, sanitary and environmental standards in the production of products in the region.

The production of high-quality products, as a rule, is the production of products with a higher added value, which means that these are additional revenues to the budget from the pre-sale of these products.

In order to increase the competitiveness of the region, regional authorities should create conditions for commodity producers so that they can produce high-quality products. This can be achieved, public institutions will provide better services to their customers, namely, they will do it more quickly, using innovative technologies, on the principle of a single window.

The acquisition of public services of higher quality will allow enterprises that are buyers of these public services to produce better goods and services themselves.

5 Conclusions

The competitiveness of the region depends on many factors. But among them, we can highlight the quality of goods and services produced in the region. The degree of customer satisfaction from the purchase of services and goods depends on this quality. The sale of high-quality goods can have a favorable impact on the financial and economic indicators of the enterprise, and therefore this enterprise will be more attractive to potential investors.
References


12. S. Yekimov, et.al., E3S Web of Conf. 389, 05035 (2023) DOI: 10.1051/e3sconf/202338905035.


17. S. Yekimov, et.al., E3S Web of Conf. 381, 02028 (2023) DOI: 10.1051/e3sconf/202338102028.

