Assessing competitiveness of innovational systems

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Abstract. Russian economy is undergoing the most difficult and perhaps most dramatic stage of its development after the period of market relations formation. This situation creates respective competitiveness imperatives thus drawing increased attention to competition not only on the international level but also between national regions. This work studies an approach to assessing competitiveness of innovative socioeconomic systems based on I. Adizes’ methodology. For assessing competitiveness of innovational systems, the authors suggest to apply the integral index of socioeconomic system innovational competitiveness and individual indexes of innovation competitiveness in short-term and long-term perspectives.

1. Introduction

Russian economy is currently undergoing the most difficult and perhaps most dramatic stage of its development after the period of market relations formation. Difficulties in most economic areas are caused directly by sanctions imposed by leading Western countries or by their consequences. As a result, certain complications related to promoting products on international markets and maintaining high level of competitiveness on the internal market arise only due to the impossibility to use the resource potential of Western economies. All these processes create respective competitiveness imperatives and consequently draw increased attention to competition not only on the international level but also between national regions.

Existing economic practices indicate insufficient stability of Russian economy that is mostly focused on using natural resources. This determines the relevance of invigorating innovational activities in all spheres of national economy. Innovational development of Russia should become the main condition for national economic growth and increase of economic stability and competitiveness. All these factors make achieving high competitiveness level of various economic systems the primary objective. Its fulfillment requires innovational development and reforms of the national economy.

2. Methods

This work studies a methodological approach to assessing competitiveness of innovational socioeconomic systems (hereinafter – systems) of different levels or, to be more precise, competitiveness of systems in relation to their innovational development. Innovation-based competitiveness can be defined as innovational competitiveness [1]. Thus, this work provides an approach to assessing innovational competitiveness. The method’s objectivity makes it universally applicable for assessing innovational competitiveness of enterprises, industries and regions.

Several works involving the authors of this article offer to implement the method for assessing competitiveness of socioeconomic systems [2, 3] based on I. Adizes’ methodology [4].

In order to assess competitiveness of socioeconomic systems, these works offer to apply the integral competitiveness index. It includes individual indexes of innovation competitiveness in short-term and long-term perspectives. The index is estimated using four values demonstrating the level of functionality, systematicity, proactivity and harmony.

Individual index of socioeconomic system competitiveness in short-term perspective is formed by two indicators estimating levels of functionality, and systematicity.
Individual index of competitiveness in long-term perspective is also formed by two indicators estimating levels of socioeconomic system’s proactivity and harmony.

Integral and individual competitiveness indexes are suggested to be assessed as the geometric means of the product of specific indicators comprising these indexes [5].

3. Result and Discussion

First of all, it must be pointed out that the notion of innovational system is relative because it is applicable not only to specific systems and is not opposed to other, “non-innovational” systems. The notion of innovational system is applicable to all socioeconomic systems involved in entrepreneurial activities because all of these systems are innovational to a certain extent. According to J. Schumpeter, entrepreneurship always includes innovation that could be aimed at designing new products, applying new production technologies, creating new types of organizations, exploring new raw materials and market opportunities. Thus, socioeconomic systems must be distinguished not according to the principle “Is this system innovational or not?” but to the principles like “To what extent is this system innovational?” or “How much is this system more innovational than others?”

We may assume when comparing two systems that the system with a higher competitiveness level could have lower levels of innovation perception and implementation and, consequently, has a lower innovational level [6,7].

Table 1 lists indicators of functionality, systematicity, proactivity and harmony of socioeconomic systems and gives examples of economic values that could be used for interpreting these indicators.

**Table 1.** Indicators forming system competitiveness indexes.

| Indicator       | Methodological content of assessment indicator                                      | Economic values interpreting the indicator                                      |
|-----------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Functionality indicator | Short-term efficiency, meeting customers’ demands.                               | Sales volume. Organizations’ turnover. Organizations’ turnover depending on economic activity type. |
| Systematicity indicator | Short-term efficiency – economic efficiency of resources supply.                     | Gross value added in relation to the employment. Gross value added in relation to the population number. |
| Proactivity indicator  | Provision of innovational activities, initiation of changes, adaptation to new challenges and opportunities. | Innovational products volume. Volume of scientific developments funding. Capital assets investments. |
| Harmony indicator   | Provision of integrational cooperation. Integrational interrelation level.            | Personnel number. The number of enterprises and organizations depending on economic activity type. The number of regional enterprises and organizations. |

Functionality indicator demonstrate short-term efficiency of the socioeconomic system meaning mostly the customers’ satisfaction. The most applicable economic values for this indicator are related to the sales. High sales volume indicates attractiveness of products, i.e. their competitive advantages determined by customers’ attractiveness conditions. Higher sales indicate higher efficiency and functionality of the system due to its ability to successfully perform its functions. Economic values
enabling to interpret this indicator include sales volume, organizations’ turnover and organizations’ turnover depending on economic activity type.

Systematicity indicator should demonstrate the systems’ short-term efficiency as well, meaning primarily its economic efficiency in relation to usage of various resources and factors during the production process. The most applicable values for interpreting this indicator determine traditional production efficiency. The more systematized the production process is, the more efficiently it uses resources and factors, thus demonstrating that this product has cost-related competitive. The general systematicity level is maintained in the socioeconomic system by implementation of management, budget, audit, analysis, control and other procedures during production. In our opinion, economic values enabling to interpret this indicator to a certain extent may include gross value added in relation to the employment or gross value added in relation to population number.

Traditionally, gross value added is understood as output of products and services minus intermediate consumption. It seems evident that high total cost of the system’s products and services combined with low cost of used resources could be the cause of high organizational systematicity level [8].

Thus, individual index of socioeconomic system competitiveness in the short-term perspective defined as the geometric mean of the product of functionality and systematicity indicators reflects efficiency of production and market sales of products and services, i.e. consumer- and cost-related attractiveness of the system.

Proactivity indicator is supposed to demonstrate the systems’ long-term efficiency meaning mostly provision. The most applicable economic values for this indicator define the system’s activities on proactive provision of innovative advantages for their product in full accordance with system’s entrepreneurial behavior in the market environment. Such economic values enabling the indicator’s interpretation may include innovational products volume, volume of scientific developments funding and investments in capital assets for systems of different levels.

Harmony indicator is supposed to demonstrate the socioeconomic systems’ long-term efficiency meaning mostly provision of integrational cooperation within the system and cooperation between its structural elements. The most applicable values for this indicator demonstrate integrity between the system’s elements. Harmony of the system is determined by integrative attributes of its elements understood as their willingness to form coalitions [9].

The integrity of the system meaning the interrelation of its elements increases its organic ability to adapt to external and internal changes. High adaptive quality allows the system to give to its products competitive advantages attracting consumers. These advantages can be consumer-, cost-, innovation related, etc. Comparing two systems functioning with the same efficiency, the one that is more differentiated, internally and externally interrelated and has higher number of internal elements has higher harmony level. High structural differentiation of the system’s economy enables to minimize the negative impact of crisis factors. In our opinion, economic values that allow to interpret this indicator to a certain extent include the number of the enterprise’s personnel, the number of enterprises and depending on economic activity type and the number of regional enterprises and organizations.

Thus, individual index of competitiveness in the short-term perspective can be estimated as the geometric mean of the product of proactivity and harmony indicators. The index demonstrates the socioeconomic system’s ability for proactive provision of innovational advantages and the integrity of its elements.

The integral index of socioeconomic system competitiveness is estimated basing on all four indicators. Comparing systems using this index enables to provide the integral assessment of their competitiveness.

This work recommends to use an approach to assessing innovational systems’ competitiveness or assessing systems depending on their innovational activities. This approach is based on methodology developed by I. Adizes.

The algorithm of this approach is demonstrated in Figure 1.
Figure 1. Formation of integral indexes of innovational competitiveness of socioeconomic systems

The principal difference of this competitiveness assessment method from approaches studied in other works is that final indexes of innovational competitiveness are estimated basing on changes in “traditional” competitiveness indexes.

This approach has a classical mechanics analogy. A body moves with a certain velocity. But in case of non-uniform motion, in order to estimate the velocity and the distance we need to know not only the object’s initial speed, but also its acceleration defined as change of speed with time [10].

4. Conclusion
For analyzing the socioeconomic systems’ innovational competitiveness, we recommend to estimate it using parameters (competitiveness indexes) assessing its initial competitiveness.
Indeed, in the market economy it is possible for a company that initially has lower competitiveness compared to another one to eventually overcome this distance and hold leading positions. Higher speed of competitiveness growth has a more important role than competitiveness value itself. Such speed can be determined by better perception to innovations and consequently to innovational development. Thus, socioeconomic systems can be assessed according to their competitiveness level and their innovational competitiveness level.

Individual indexes of innovational competitiveness of socioeconomic system in short-term and long-term perspectives are assessed basing on the increase (or decrease) of its respective individual indexes of competitiveness. The final index of innovational competitiveness is estimated basing on the increase (or decrease) of respective competitiveness index.

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