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METHODICAL PRINCIPLES OF ESTIMATION OF INTELLECTUAL LEADERSHIP OF THE GLOBAL ECONOMY ACTORS

The study of the economic aspects of leadership is a topical issue both in practical applications or management theories and in general economic science for understanding the issues of entrepreneurship, competitiveness, international economics, globalization. The phenomenon of leadership is interest in the context of determining its essence, mechanisms, role in the processes of world economic development and evaluation. The separation of this kind of leadership as an intellectual is caused by the increasing importance of human resources in general and their intellectual components, in particular, in supporting the development of a modern economy. Intellectual factors, directly or indirectly, due to the influence on other factors, are becoming key in ensuring high positions in today's highly competitive environment. Identifying the influence and role of intellectual factors in achieving leadership positions in the global economy is enabled by the analysis of the intellectual component in different approaches to determining leadership positions. Methodical approaches for estimation of the intellectual leadership of multilevel entities in the global economy are offered. The presented methodology is based on the identification of the three levels of intellectual leadership implementation: the level of resources, the level of results and the level of final results. Each of these levels is characterized by an appropriate system of indicators for different subjects, which allows them to determine their positions according to different criteria at different levels of competition. This research can be used by economists, management specialists.

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Introduction

Changing general conditions of economic activity, formation of qualitatively new trends of networking and technology are accompanied by the aggravation of competitive struggle at all levels, rapid change of competitive positions, significant stratification of the competitive environment, change of rules and methods of competition. Given the increasing interdependence and interpenetration of national economies, these new trends require the attention of diverse actors in the global economy to new phenomena and many economic and managerial processes.

In such highly competitive conditions, an important task for different actors is not merely the achievement of economic development, but, first of all, the achievement of leadership positions. Leadership is becoming a competitive advantage and not only a goal but also an instrument of competition that can bring even greater gains. Identification of leadership becomes relevant for actors of different levels: as individuals (in politics, business and other circles), as well as companies, universities, regions, national economies. The necessity of identifying the key factors for achieving intellectual leadership and forming a method for its evaluation is emerging. It is worth highlighting the main levels at which subjects can realize their leadership ambitions. All these dynamic processes require thorough analysis and identification of common trends in the development of mechanisms for the achievement and assessment of intellectual leadership of multilevel entities in the global economy.

Data and methodology

The content of this study, scientific findings, conclusion and recommendations are based on the broad application of the systematic approach to the study of the phenomena. The proposed work is based on a synthesis of existing approaches to understanding the essence of intellectual leadership. In order to achieve the research goal, a methodological approach is proposed that involves a multilevel assessment of the intellectual leadership of various subjects of the global economy. The complex of indicators for the estimation of intellectual leadership at each level is substantiated. The main sources of information for this study are reports from international organizations (UN, WEF, World Bank, Bloomberg, etc.).

The purpose of this research

The aim of the work is to develop a methodological approach to assessing the intellectual leadership of various actors in the global economy.

Literature review

Intellectual leadership is the subject of research by a large number of scholars. Mostert M. (2014) in the paperwork research of the preconditions of the company's leadership are

investigated, and the necessary resources for it are determined, taking into account the further intellectualization of global economic processes.

The leadership of intelligence-based companies is the subject of research of Tichy N. (2002). These works consider the approaches of companies to achieve leadership positions in the context of constant market transformation, taking into account the latest knowledge and using them as a prerequisite for ensuring the competitiveness of the company.

In paperworks of Boydell T. et al. (1991) issues of the development of leading companies in the context of the transition to a knowledge economy are considered, these issues are rising at the end of the twentieth century, with the formation of a modern stage of world economic development.

The intellectual leadership of organizations is also studied in the works of Senge P., Kleiner A., Roberts C., Ross R., Smith B. (1994). The basis of these works is the idea of determining the prerequisites for leadership in the formation of new markets for high-tech products, innovative products, etc.

The transformation of society and the need to form a new paradigm of leadership are considered in the works of Pongpeachan P. (2015). Determine the preconditions for achieving leadership positions of individual companies, and even retain these positions by existing leaders. The role of intelligence and knowledge in managing a company to provide leadership and competitiveness is grounded in the article of Frost A. (2010). However, it focuses more on internal management processes in the company, not taking into account environmental factors.

The essence of transformational leadership is explored in the article Chris Roche (2016), where the necessity of transformation of the company in response to the transformation of the external environment is grounded, taking into account the key trends of strengthening the influence of the intellectual component on the formation of market conditions. The practice of implementing intellectual leadership for business entities is covered in the work of Senge, P. M. (1990). Studying a new paradigm of leadership in companies is a prerequisite for its provision. The role of intelligence in achieving leadership positions is studied by Mostert M. (2014). His work expresses the idea of the exceptional role of intelligence to ensure the leadership of companies and economies as a whole.

The research of intellectual leadership is the basis of scientific research of Macfarlane B. (2010.). However, he concentrates only on the leadership of scientific and educational institutions, not taking into account other subjects of economic activity. A similar subject is also explored in the works of a whole group of scholars Wepner S.B., D'Onofrio A., Wilhite S.C. (2008) but these studies do not take into account the opportunities of other subjects of the economy for the implementation of intellectual leadership.

Global innovative space became the subject of study in a large number of research papers of both domestic and foreign scientists. B. Klinger and D. Lederman (2006) explore the empirical relationship between economic development and innovations inside the Global Technological Frontier. Boutellier, Gassmann et al (2008) explore the challenges and main trends in the formation of a GIS, analyze the key areas for the accumulation of innovation and the formation of intra-industry networks. Cooke (2017) identifies opportunities for the

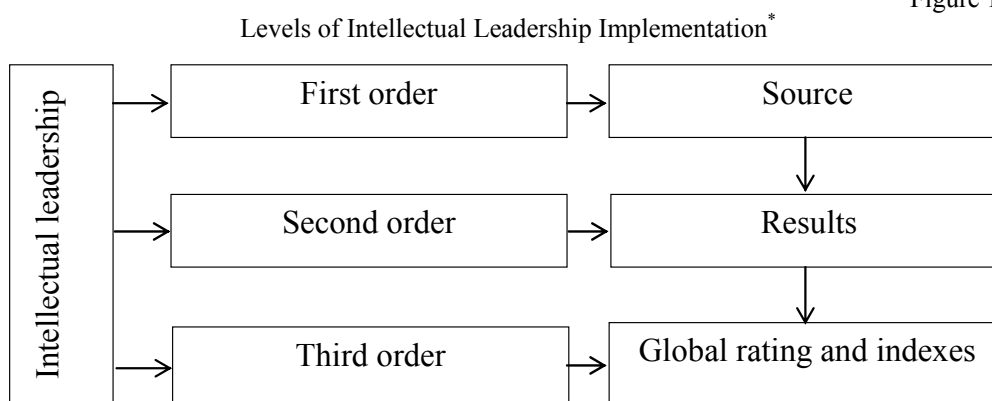
creation of global innovation networks and territorial ICT-based innovation systems. Jensen (2017) explores the role of global innovation in the global dynamic environment, the opportunities for collaboration to shape global innovation and global knowledge flows.

Results

The phenomenon of intellectual leadership is quite complex in terms of definition and structure; thus, its evaluation requires a systematic approach, based on the consideration of peculiarities of intellectual activity. The author's approach is that intellectual leadership in the modern environment needs to be determined by levels that characterize certain stages of intellectual activity and have their own peculiarities. Such stages are represented by three levels: the level of resources, the level of results of intellectual activity, the level of final results. As for the subject, in this study, we will consider, for the simplicity of analysis, only a country or a national economy among the whole variety of entities (country, region, industry, institution, corporation, etc.).

The level of resources is in fact, characterized by the presence of basic intellectual resources. Their presence and potential characterize in general the ability of the country (or any other subject) to intellectual activity. At the same time, the availability of intellectual resources is an important precondition for leadership but does not yet mean actual leadership. More realistically, it can manifest itself at the next level, which characterizes the results obtained by this subject. The level of results of intellectual activity involves evaluating specific results: patents, licenses, know-how, publications, etc. The final results should be those that relate not only to purely intellectual activity but also to the whole economy or society as a whole. The next step in the assessment should be the determination of key indicators at each of these levels (Figure 1).

Figure 1



* systematized by the authors

In our view, only such a systematic approach to assessing each of these levels with a variety of indicators you to characterize the intellectual activity and evaluate the overall competitive position of different parties. All indicators of the assessment of intellectual leadership, thus, take into account either the potential of intellectual resources or the results of the implementation of intellectual activity.

The leadership of the first order can be defined as resourceful. At this level, the country's ability to achieve intellectual leadership is determined through the formation of intellectual potential and mechanisms for its growth. The key development resources are divided into financial, human and, in fact, intellectual.

An assessment of the intellectual potential of human resources can be carried out using indicators such as: the number (proportion) of people with higher education (according to different age estimates); number of students (at different levels of training); the share of the population covered by education; level of literacy of the population; the share of the population employed in the high-tech sectors of the economy; the share of workers who increased their qualification. The ability of countries to actively participate in the development of knowledge economy is estimated through the definition: the number of Internet users; the number of users by mobile phones; the level of export of high-tech products; information transfer rate, Kb/s per user; readiness for change.

In addition, at the national level, state participation in the development of intellectual potential is manifested through:

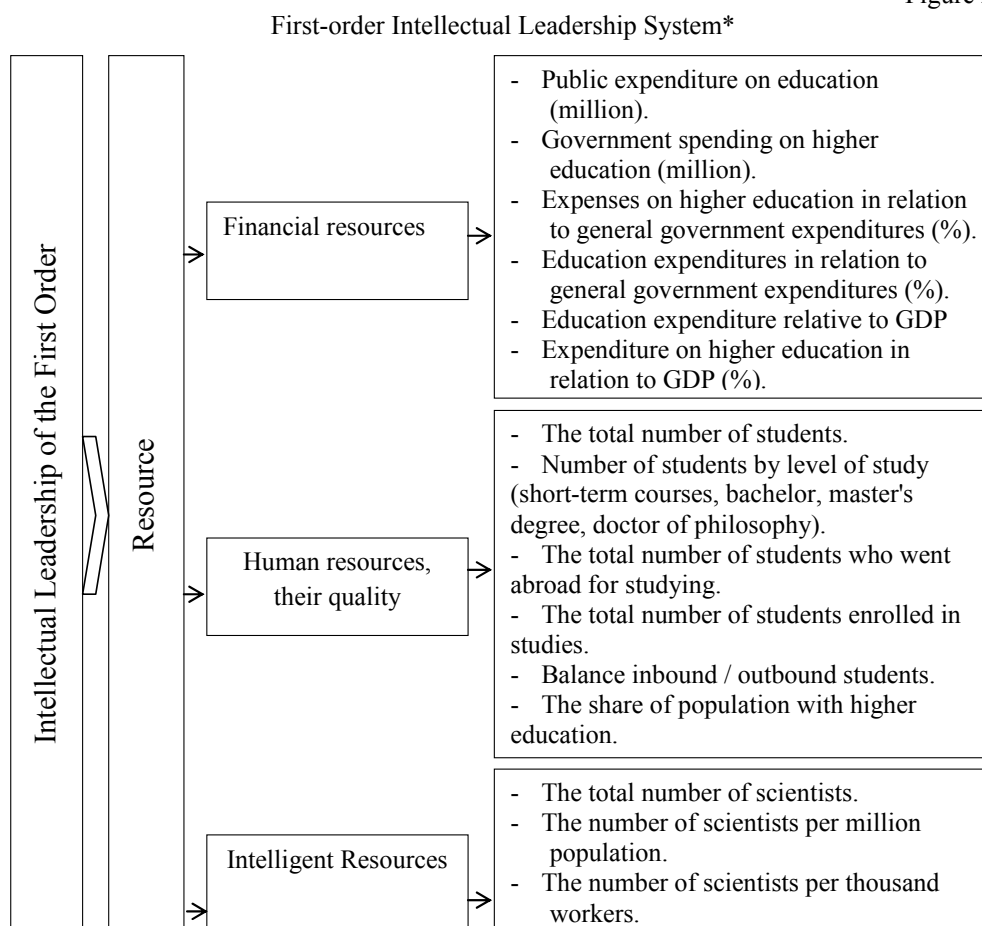
- the level of R & D expenditures;
- the cost of education and higher education, in particular;
- level (share) of education expenses per student;
- the share of enterprises introducing innovations.

In addition to the above indicators, leadership should be considered depending on the sector of its implementation. It may be productive, factor, trade, financial, socio-economic, informational, scientific and technical, technological leadership, etc.

Thus, the development of a comprehensive system of indicators for intellectual leadership of countries still has a considerable scope for revision, to take into account all potential components and reserves of this type of leadership. The intellectualization of the economy in the transition to a "knowledge economy" becomes an objective necessity, which necessitates the development of a system of indicators and development benchmarks. This allows us to assess the current state of accumulation of intellectual resources, the dynamics of their development, the prospects of implementation; to highlight the main directions of increasing the efficiency of their implementation and further intellectualization of the economic system.

The following diagram illustrates the whole set of indicators characterizing intellectual resources. With such a set of indicators, one can estimate the potential of each country or any other entity (Fig. 2.).

Figure 2



* systematized by the authors

An assessment of the intellectual potential of human resources can be carried out using indicators such as: the number (proportion) of people with higher education (according to different age estimates); number of students (at different attainment levels); the share of the population in education; level of literacy of the population; the share of the population employed in the high-tech sectors of the economy; the share of workers who increased their qualifications (Sedlyar, 2014).

The financial resources allocated by the country to increase intellectual potential should also be characterized by the following system of indicators: public expenditures on education (million); government expenditure on higher education (million); higher education expenditure as a share of general government expenditures (%); education expenses relative as a share of total public expenditures (%); education expenditures

relative to GDP (%); higher education expenditure relative to GDP (%); the level of education expenses per student in absolute terms and in relation to GDP per capita; share of enterprises implementing innovations.

Actually, intellectual resources are a set of resources that can professionally carry out the intellectual activity: the total number of scientists; the number of scientists per million population; the number of scientists per thousand workers.

In general, the development of a comprehensive system of indicators for intellectual leadership of countries still has a significant scope for further elaboration, to take into account all potential components and reserves of this type of leadership. The intellectualization of the economy in the transition to a "knowledge economy" becomes an objective necessity, which necessitates the development of a system of indicators and development benchmarks. This allows to assess the current state of accumulation of intellectual resources, the dynamics of their development, the prospects of implementation; to highlight the main directions of increasing the efficiency of their implementation and further intellectualization of the economic system.

Assessment of resource potential is only the first stage because further, intellectual leadership is also manifested through the results of activities. Second-order intellectual leadership is formed on the basis of the results of intellectual activity and includes indicators that reflect the infrastructure, educational, scientific and technological readiness for the implementation of innovations and the implementation of intellectual potential. In part, these indicators may indicate both the results of intellectual activity and in turn, serve as a resource or a necessary basis for the formation of new results of intellectual activity.

Educational and scientific indicators at the same time serve both resources and results, but as resources based on results. These include the number of world-class universities, the number of scientific publications in general and in science-editions, the number of Nobel laureates. Infrastructure indicators primarily include opportunities for using technologies for innovation development, in particular: the number of Internet users (% of population); number of mobile telephony users (persons); number of mobile telephony users (per 100 people); number of fixed telephone users (persons); secured Internet servers (per million of population). The last group of indicators includes technological indicators, in particular: the number of technical staff in R&D; technical staff in R&D (per 1 million of population); registration of trademarks (residents, non-residents and total number); high-tech exports (in millions of dollars and as a percentage of exports); ICT products and services (export and import); applications for industrial designs (residents and non-residents); patent applications (residents and non-residents).

In addition to resource potential, intellectual leadership is also manifested through the results of activities. In the system of structural and functional characteristics of the global intellectual space, it becomes an expression as a second-order leadership. Second-order intellectual leadership is formed on the basis of the results of intellectual activity and includes indicators that reflect the infrastructure, educational, scientific and technological readiness for the implementation of innovations and the implementation of intellectual potential. In part, these indicators may indicate both the results of intellectual activity and

in turn, serve as a resource or a necessary basis for the formation of new results of intellectual activity.

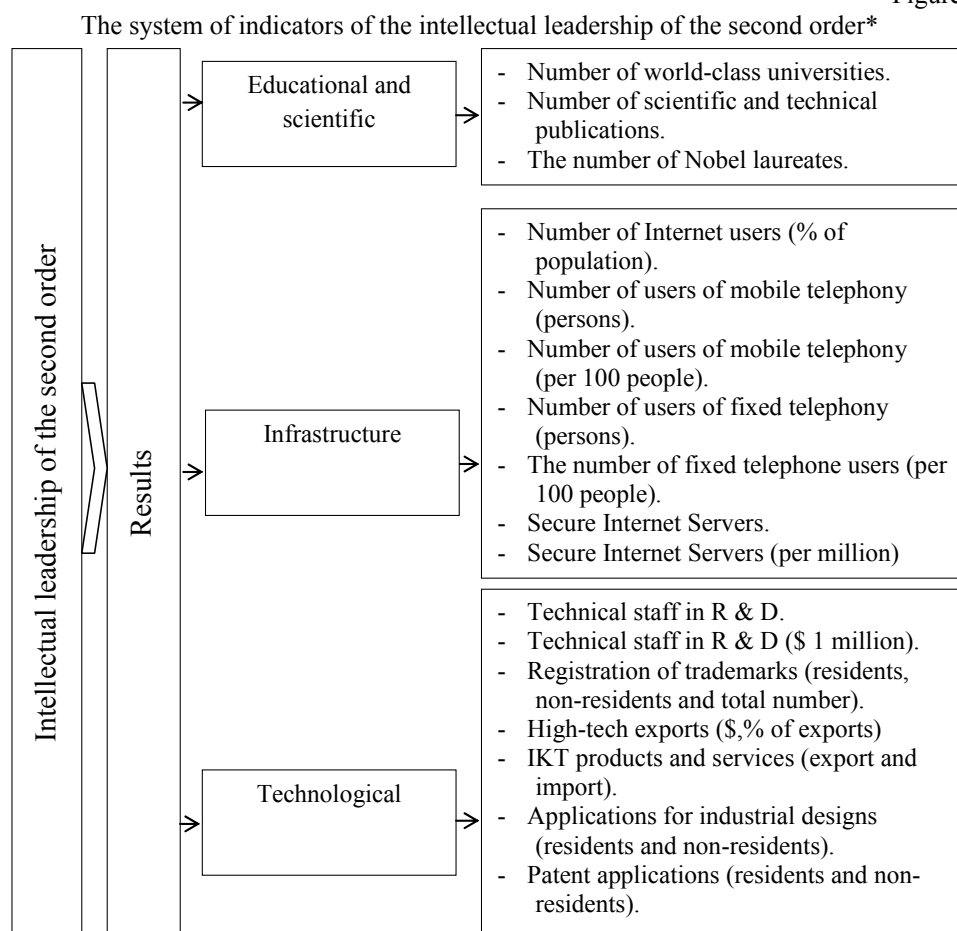
Educational and scientific indicators at the same time, serve both resources and results, but as a resource based on results. These include the number of world-class universities, the number of scientific and technical publications, the number of Nobel laureates. Infrastructure indicators primarily include opportunities for using technologies for innovation development, in particular: the number of Internet users (% of population); number of mobile telephony users (persons); number of mobile telephony users (per 100 people); number of fixed telephone users (persons); number of fixed telephone users (per 100 people); secured Internet servers; secured Internet servers (per million). The last group of indicators includes technological indicators, in particular: the number of technical staff in R & D; technical staff in R & D (1 million USD); registration of trademarks (residents, non-residents and total number); high-tech exports (\$,% of exports); IKT products and services (export and import); applications for industrial designs (residents and non-residents); Patent applications (residents and non-residents) (Fig. 3).

As stated above, the third level of intellectual leadership is the level of final results, which are manifested not only by themselves but also in relation to general economic indicators. Most often, this is manifested in a variety of indexes, rankings, and so on. At the global level, partial assessment of individual leadership in its generalized format and confirmation of its necessity for the growth of the economy are found in the well-known world indices. In particular, the Global Innovation Index contains an analysis of the role of human capital in the growth of economic performance, in particular, indicators of innovation. Another index that takes into account the individual component of leadership is the Global Talent Competitiveness Index, which is based entirely on the study of the state of human capital in the country (INSEAD...). Of course, these indices only generalize the existing trends, rather than consider individual leadership as a separate element of the economic system.

The problem of leadership becomes relevant not only for business organizations. The intensification of competition on a global scale raises the issue of reaching leadership positions and in other areas of activities, which specifics require their own leaders and professionals. One of such spheres is the sphere of intellectual activity – the system of education and science. There are numerous university rankings, ratings and indices of innovation, which become tools for ranking and identifying leaders in a highly competitive intellectual environment. The emergence of leadership issues in its modern sense to a higher level makes it possible to assert the existence of new leadership formations in the geopolitical environment and understanding of the international economy.

In recent years, the issue of leadership of countries and regions, its objective basis in the framework of global trends, is intensifying. For example, at the World Economic Forum in Latin America in 2017, the preconditions for regional leadership and its key criteria were identified. These include labour productivity and migration policy, which is based on the development of education and skills; security; competitiveness. Competitiveness for a given region is determined by the need to develop leadership in renewable energy sources (Thomson St., 2017).

Figure 3



* systematized by the authors

Confirmation of the importance of intellectual factors in achieving leadership at the global level can be the discovery of this component in the world ranking. Table 1 summarizes the main world rankings and analyzes the share of indicators that characterize intellectual activity, the components of human capital in manifestations (Table 1).

Table 1

Global ratings and indexes

| | Global ratings and indexes | Organization that calculates the indicator | Indicator | Weight |
|-------------------------------------------|-----------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| Intellectual component of human resources | Human Development Index, HDI | UN | – Literacy level indicator | 1 subindex from 3 5 indicator from 21 |
| | Index of education level in the world | UN | – Literacy level indicator – The share of those who study | 2/3 1/3 in total weight |
| | The Social Progress Index | Project The Social Progress Imperative | – Availability of basic knowledge and literacy of the population – Duration of women training – Duration of studies at university – Global University Ranking – Inequality in the availability of education | 5 indicator from 48 |
| | The Global Innovation Index | WIPO | – Human capital and research in the subindex of innovation costs | 1 indicator from 6 |
| | The Bloomberg Innovation Index | Bloomberg Rankings | – Tertiary efficiency (5%) (coverage rate for all subjects for students) | 1 indicator from 7 |
| | The Global Competitiveness Index, GCI | WEF | – Health and elementary education – Higher education and vocational education | 2 groups of indicators from 12 |
| | The Legatum Prosperity Index | Legatum Institute | – Indicator of quality of education | 1 subindex from 8 |
| | Satisfaction with Life Index, SWL | OECD | – Indicator of accessibility of education | in 1 subindex |
| | Academic Ranking of World Universities (ARWU) | Higher Education Institution of Shanghai Jiaotong University | – Takes into account the activities of leading universities and their scale | 100% |
| | Webometrics ranking of world's universities | Cybermetrics Lab Spanish National Research Council, CSIC | – Takes into account the activities of leading universities in the Internet and their scale | 100% |
| | Report of the World Trade Organization | WTO | – Includes primary and secondary education coverage | 2 indicators from 8 |
| Results of intellectual activity | The Global Innovation Index | WIPO | – Sub-index of innovation costs – Sub-index of innovative results | 100% |
| | The Bloomberg | Bloomberg Rankings | – Intensity in research and | 5 indicators |

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| | Global ratings and indexes | Organization that calculates the indicator | Indicator | Weight |
|--|---------------------------------------------------------------|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| | Innovation Index | | development (20%) – High-tech density (20%) – Concentration of researchers (20%) – Patent activity (5%) – Technological opportunities (10%) | from 7 |
| | Country rating by number of patents | WIPO | – Takes into account the specific indicators of the results of intellectual activity | 100% |
| | Country ranking by number of Internet users | It is based on statistics | – Takes into account the specific indicators of the results of intellectual activity | 100% |
| | Country rating by number of users by mobile phones | It is based on statistics | – Takes into account the specific indicators of the results of intellectual activity | 100% |
| | Ranking of countries by level of export of high-tech products | It is based on statistics | – Takes into account the specific indicators of the results of intellectual activity | 100% |
| | The Global Competitiveness Index, GCI | WEF | – The level of technological development – Innovation potential | 2 groups of indicators from 12 |

* systematized by authors

Of course, the list provided above is not exhaustive, but it represents the most weighty and popular world rankings. All of them reflect the processes of increasing the role of the human factor and its transition to a new level of leadership. The world's leading countries are demonstrating a creative transformation, which becomes a platform for the formation of a successful society and a prosperous nation. This is confirmed in the Human Development Index study, which examines three components: health and longevity; education and access to it; living standard, estimated through GNI per capita based on purchasing power parity in US dollars.

Even such generalizing rating systems as the Global Competitiveness Index, the Social Progress Index, the Prosperity Index, the World Trade Organization report, etc., in different ways, include indicators that characterize the performance of the country's intellectual activity. For instance, one of the important indicators that is defined in the World Development Indicators study, is the export rating of high-tech products. According to generally accepted standards, high-tech products include products in which the share of research and development works is not less than 3.5%. The volumes of trade in high-tech products thus serve as an indicative effective indicator of the level of intellectual activity of each country.

Trends in the sales of high-tech products show the potential accumulated in countries and the future trends of further development. Thus, not only the structure of trade but also the

internal reserves of the state play a significant role in determining the place of the state in the world arena, in order to maintain leadership in the future among the countries that trade high-tech goods. This is reflected in the World Intellectual Property Organization report, which analyzes the patent activity of countries and the number of patent applications from both residents and non-residents. Thus, both internal capabilities and external sources of intellectualization of the economy are studied.

The level of implementation of the potential of countries, their structure of trade, the direction of development are reflected in global rankings that take into account the above indicators. For example, they are reflected in the definition of the Global Intellectual Property Indicators, which explores the innovative costs of the world and their innovative efficiency.

A consolidated analysis of the indicators of various world rankings allows to conclude that the countries with the highest indicators of development of human potential, financing of research works, trade in high-tech products and services become, respectively, the world's engines of development. It the new technologies, the effectiveness of their implementation, human potential that determine pace and results of development, the country's place on the world stage. With it, the relationship between the general level of the country's development, the level of efficiency of intellectual activity and social development of countries, is identified. The leaders in ratings of education or social progress are countries that are in a group of key innovators (World, 2015).

The presented method allows to confirm and analyze the dynamics of the key trend of modern world economic development – the broad intellectualization of production and trade, the priority development of science, the spread of complex mental labour (Lukyanenko, 2013). That is what forms the centres of development of world civilization and becomes a prerequisite for the formation of a knowledge-based society.

The leading countries of the world form a rather harmonious policy of supporting the intellectual component of the economy and ensuring its innovation. At the same time, the analysis of these indicators by regions shows a rather significant gap. For instance, in the countries of Africa, Latin America and Western Asia, the indicators of innovation are rather low. However, in order to increase the effectiveness of such activities, it is necessary to adhere to the basic principles: innovation policy should be aimed at maximizing innovations in all branches of industry; innovation policy should support all types and stages of innovation; creative destruction; low prices for import of information and communication technologies; support for the creation of key innovations; development of a national innovation strategy and organizations of its support (Global, 2015).

In recent decades, the state policy of the leading countries of the world is aimed at a significant increase in the level of intellectual component of economic activity. Most government programs are aimed at stimulating innovation through increased funding, investor engagement, patent promotion, increase of population's education levels, and the return of scientists who have migrated. Intellectualization of the economy is the basis of the major state programs of a large number of countries. The success of such a program is beyond doubt, and experience requires further study of all methods and tools used in its implementation.

Conclusions and suggestions

In general, the assessment of intellectual leadership can be done on the basis of a system of indicators, which are summarized in three key levels: resource, results and final results. Each of these levels involves taking into account its subsystem of indicators that detail the resources, results of intellectual activity and their combined impact on the final results of the country's economy.

In the vast majority of scientific works, intellectual leadership is understood only as part of the activity of educational institutions or is implemented on an individual level. However, in our opinion, in today's conditions, intelligence-led leadership becomes a prerequisite for ensuring the competitiveness of any economic entity: the individual, enterprises, the economy, the region, etc. The approach taken to the assessment of intellectual leadership in our work can mainly be used to determine the prerequisites for leadership in countries and regions, assess their competitiveness and development prospects.

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