INCREASING SUSTAINABILITY OF LIFE DEVELOPMENT ON THE BASIS OF ECONOMICS OF QUALITY

Okrepilov, Vladimir V., *Russian Academy of Sciences & State center «Test-St. Petersburg», St. Petersburg, Russia.*

ABSTRACT

The article considers issues of sustainable development of administrative-territorial units on the basis of economics of quality. The author evaluates its role in scientific and technical progress and justifies economic efficiency of the use of its components, which are metrology, standardization, and quality management, at different levels, in various fields of activity. Factors of sustainable spatial development belong to the area of scientific analysis, where interdisciplinary synthesis dominates. This conceptual approach determines depth of expected and planned changes in the quality of human life.

Keywords: society, strategic planning, sustainable development, quality of life, administrative territorial unit, standardization, economics of quality.

Background. *Over forty years have passed since the famous report of the Club of Rome first designated the idea of sustainable development. Today, the concept of «sustainable development» has become a norm for leading countries of the world and it is recognized by them in strategic planning documents.*

Scientific basis for sustainable development had been evolving long enough for many years before the mentioned report, there were conceptually similar ideas that were born, transformed and as a result passed their considerably long evolutionary way.

Objective. *The objective of the author is to consider economics of quality in terms of sustainable development.*

Methods. *The author uses general scientific methods, economic evaluation, comparative analysis, assessment method.*

Results.

I.

In 1926, a prominent Russian scientist, academician Vladimir Vernadsky introduced into scientific language the concept of ***«sustainability of life»****. Beneath it he understood the ability of life to continue its functions and the ability of human organisms to survive. The academician actually outlined main components of sustainable development:*

– preservation and development of biosphere due to stability of ecological systems;

– achievement of lasting economic growth;

– social development of a man, armed with scientific knowledge.

V. I. Vernadsky emphasized that «there is a problem of reasonable organization of work (production) in order to more fully meet growing material and spiritual needs of the population of the entire planet». Reasonable labor organization just means controlled development, which should replace spontaneous evolution of mankind.

An example of sustainable development planning is demonstrated by five-year plans, used in the Soviet Union.

In the years 1960–1980 in the framework of the Academy of Sciences of the Soviet Union studies were carried out, which aimed to develop scientific foundations for sustainable development, including preparation of regional sections of the complex program of scientific and technological progress and its social consequences.

However, until late 1980s, the management of sustainable development remained at the level of individual projects of regional scope. And only in the late XX century, it became a norm.

In 1987, the report of the International Commission of the United Nations, «Our Common Future», gave the definition of ***sustainable development****. It referred to «development that meets the needs of the present without compromising the ability of future generations to meet their own needs».*

Talking about sustainable development, we must mention the program of the United Nations Human Settlements Programme (UN-Habitat). Its main objectives were to provide for adequate accommodation for all and sustainable urban development. Within the program the concept of sustainable development was formulated.

In particular, it said that sustainable development is a process of change in the environment in which components such as economic activity, exploitation of natural resources, distribution of investments, orientation of technological development, personal development, institutional changes are consistent with each other and reinforce current and future potential to meet human needs and aspirations.

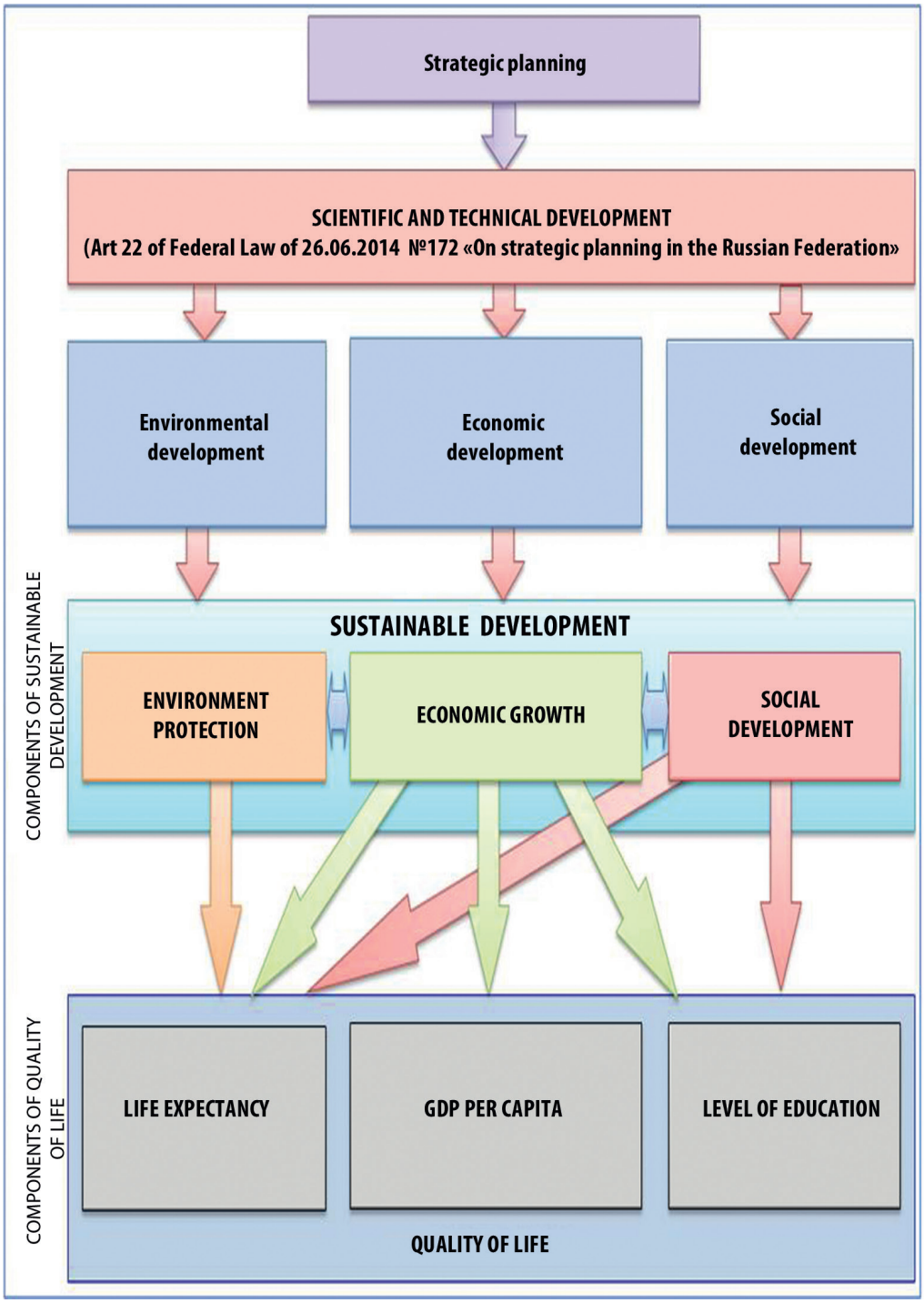
It should be noted that using the term «sustainable development» we are talking mostly about ensuring the quality of life, as one of the main objectives.

In 1990–2000 years in Russia and abroad (e. g. in the EU) a number of fundamental strategic documents in this area was developed.

So, in 1996, was approved the «Concept of the Russian Federation transition to sustainable development». It was noted that such a transition is generally only possible if sustainable development in all regions of the country is provided.

In September 2000 in Hanover European Conference of Ministers responsible for Regional Planning adopted a document «Guiding Principles for Sustainable Spatial Development of the European continent», which emphasized the territorial dimension of human rights and democracy. The document seeks to identify measures of spatial development, the adoption of which would help people in all countries – members of the Council of Europe to achieve acceptable conditions of existence which are necessary to ensure stability of democratic institutions in municipalities and regions [1].

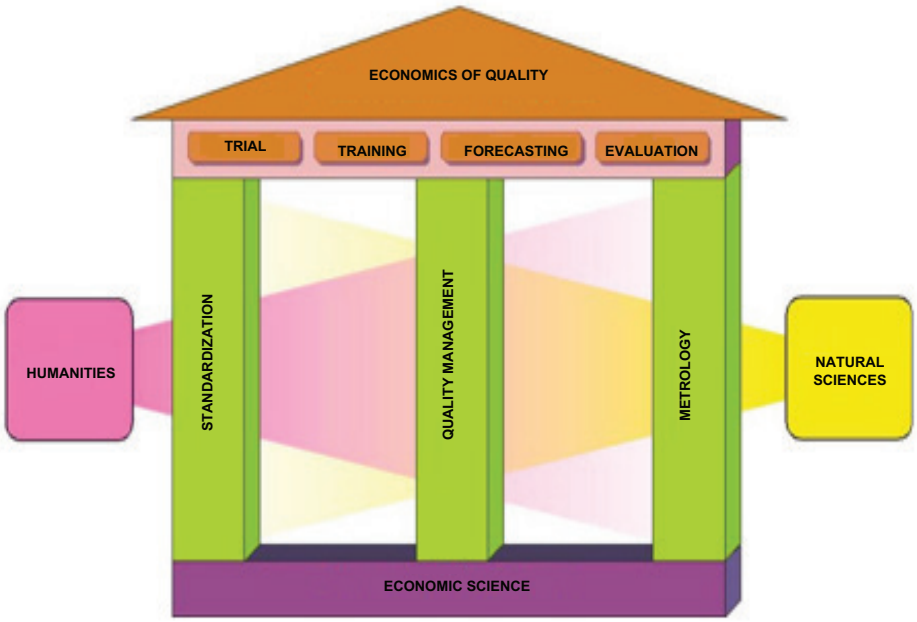
In developing strategic documents in this area it has become evident that sustainable development is an area which is the subject of study for many sciences. Therefore, in November 2008, the Presidium of the Russian Academy of Sciences



Pic. 1. Strategic planning is a basis of sustainable development.

approved research program «Fundamental problems of development of socio-economic space of the Russian Federation: interdisciplinary synthesis», which allows to combine and coordinate efforts of academic institutions in the scientific support of sustainable spatial development.

Of course, achieving sustainable growth is only possible on the basis of strategic planning and its main task is to provide scientific and technological development. Without advanced technologies, new equipment, scientific advances progress is impossible in economic, social and environmental fields that constitute three pillars of sustainable development, affecting the quality of life (Pic. 1). Economic growth affects GDP, life expectancy, and even level of education (in market conditions). Social development impact on life expectancy and level of education and the level of environmental



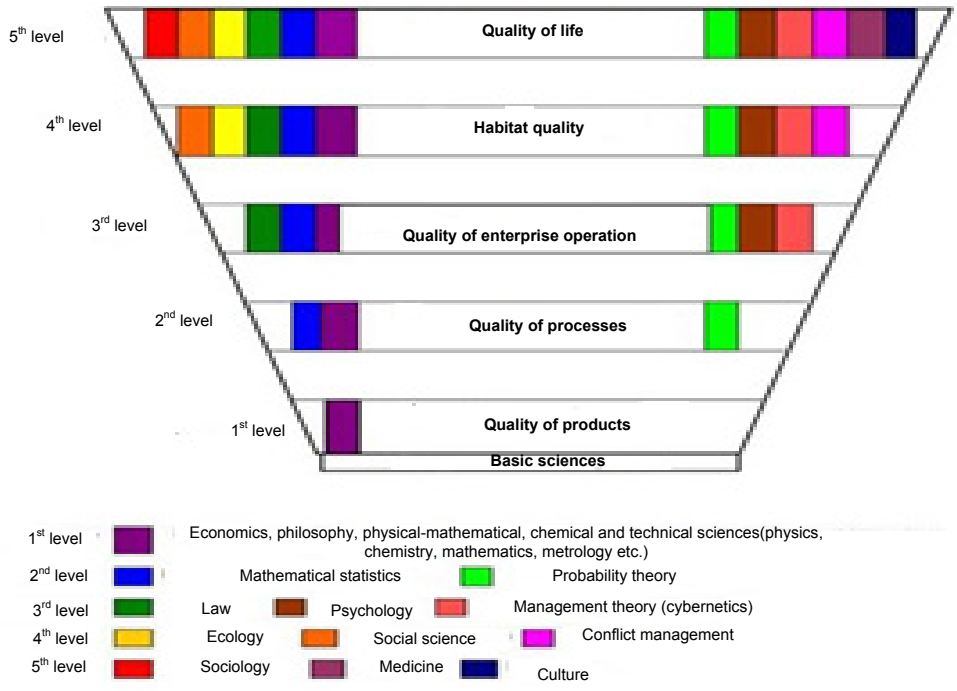
Pic. 2. Components of economics of quality.

protection (environmental conditions) is closely linked to preservation of health and longevity.

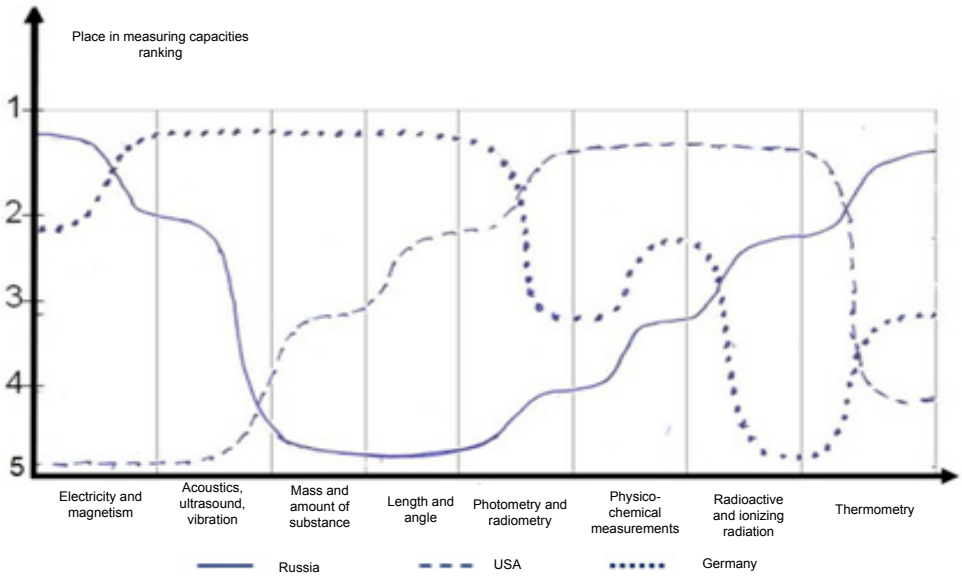
II.

Consistently implemented research program allows to raise a quality perspective to the rank of science, which has not only technical, but also a clear economic orientation. In the current conditions, the quality has evolved from a purely technical into the socio-economic problem and applies to all business entities in all phases of social reproduction.

Thus, the quality is a key factor in achieving business excellence. Therefore, to improve the quality efforts of individual professionals and businesses are not enough. It is necessary to apply a systematic approach in all sectors of economy, regardless of ownership, size and nature of organization.



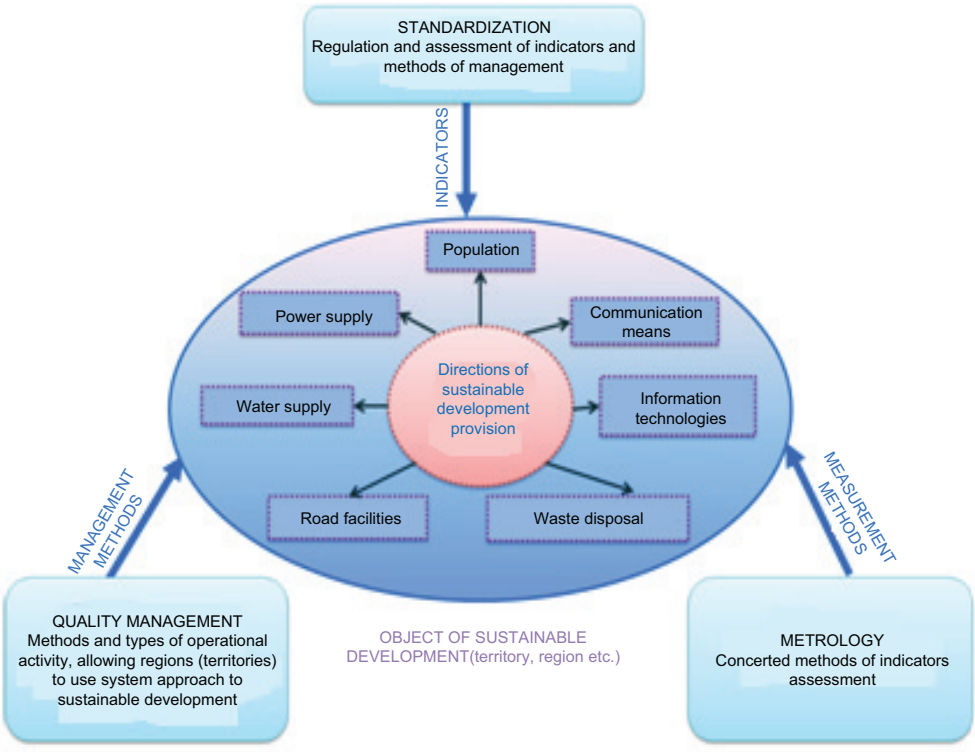
Pic. 3. Interaction of economics of quality with different fields of science and technology.



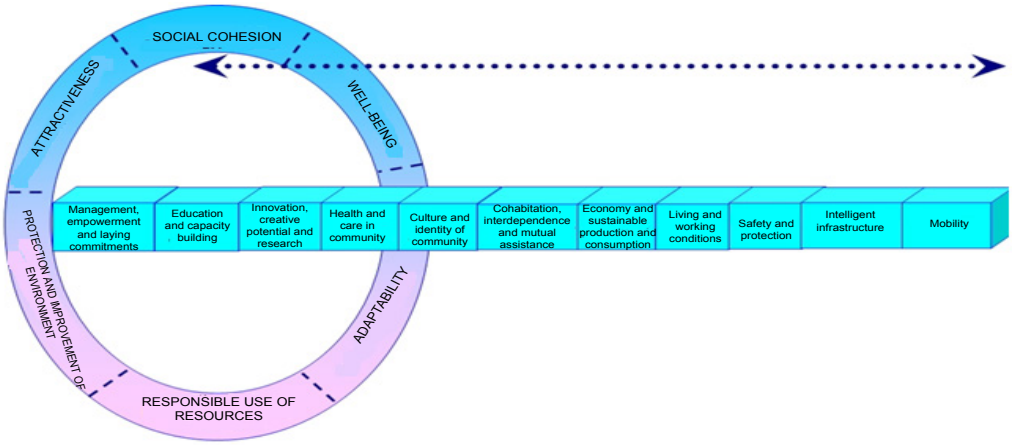
Pic. 4. Measuring capacities of Russia and other countries.

Quality in terms of economy characterizes the relationship between producers and consumers. And the search for optimal balance between required costs and achieved effect should be carried out by economic methods. Such methods are developed within the scientific field called ***economics of quality****.*

The economics of quality is an area of economics that uses tools of standardization, metrology and quality management in solving problems related to sustainable development and improving the quality of life of the population. It studies relationship of qualitative characteristics of objects or phenomena with economic indicators (Pic. 2).



Pic. 5. Influence of elements of economics of quality on sustainable development.



Pic. 6. Cross-analysis of tasks and problematic issues.

As one of economic sectors, the economics of quality is an integral part of many other areas of science and technology. It is based on an interdisciplinary synthesis and integrated use of methods of different disciplines. After all, the more complex is the object, the quality of which should be studied, the more disciplines should be involved (Pic. 3).

The main components of the economics of quality are standardization, metrology and quality management [2].

How do components of the economics of quality affect the overall economic situation?

Metrology provides unity, accuracy, reliability and reproducibility of the measurement of production indicators, allows to achieve a high level of product quality and reliability in its design, serial production and operation.

Economic efficiency of metrology is proved by following figures:

– After the US cholesterol measurement program had been introduced, the economic impact of it for 13 years amounted to $13,5 billion.

– Europe spends annually more than 13 billion euro on measurements in the medical field – and thus every euro invested brings three euro because patients quickly return to the workplace.

– Domestic research shows that the funding of measurements annually increases the gross domestic product of the state by 0,8–1,5%.

By the number of items included in the database of the International Bureau of Weights and Measures and characterizing the internationally recognized calibration and measurement capabilities of national metrology institutes, Russia shares 2–3 places with Germany, second only to the United States (Pic. 4).

Standardization. Without it, scientific and technological development is impossible, since standards:

• establish long-term performance of products, processes of its life cycle, works or services based on the best domestic scientific and technological progress;

• provide requirements harmonized with international best practices (level of harmonization of Russian standards with European standards is 47%).

Standardization provides the following economic advantages:

– GDP growth by an average of 0,8–1%;

– reduction of technical barriers in trade;

– spread of new ideas, products and technologies;

– information foundation for scientific and technological development.

More than 50% of companies say that improving the economic performance of its activities pass through the use of standardization methods.

According to the International Organization for Standardization (ISO) overall benefits of the use of standards for the majority of cases, range from the level of 0,5 to 4% of annual revenue from sales. Application of standards can save up to 6% of the cost of five main business processes: procurement, logistics, production, distribution, service.

Of particular note is the understanding of importance and efficiency of standardization in addressing issues of sustainable development. So, in 2012, ISO established the International technical committee № 268 «Sustainable development in communities». Its activities include the development of standards in the field of sustainable development and improvement of quality of human life.

Quality management is a tool for innovative economic development at all levels referring to enterprise, region and state. This refers to methods and activities of an operational nature, used to meet the quality requirements, as well as referring to development, implementation, maintenance of performance and improvement of management systems that require a systematic approach to sustainable development.

The introduction of quality management systems contributes to:

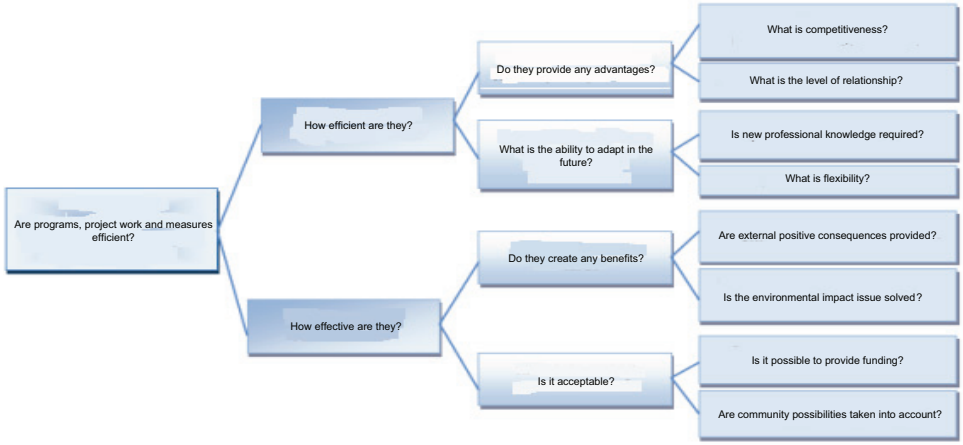
– acceleration of scientific and technological development of the country through better technologies (by up to 6%) and innovation (by up to 4,5%) at enterprises and in organizations;

– improvement of competitiveness on domestic and foreign markets (by up to 7–10%);

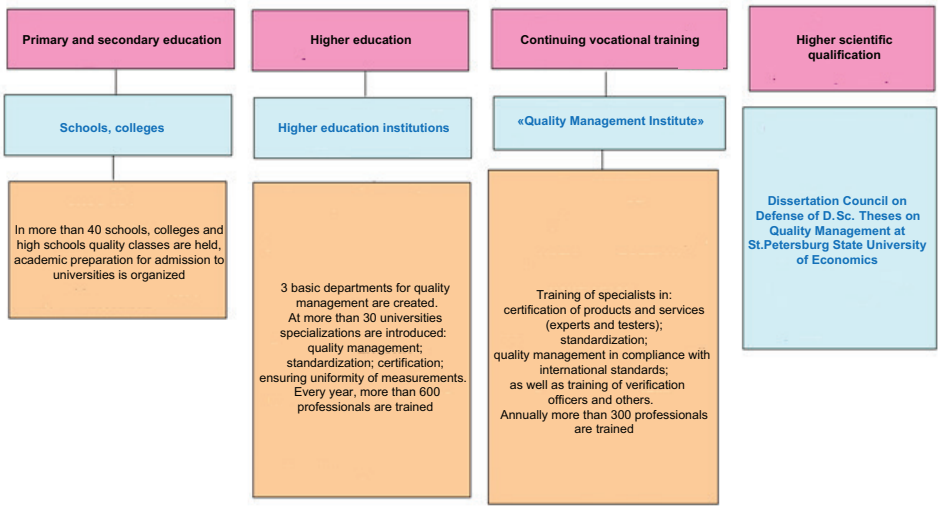
– improvement of consumer confidence (by up to 70%);

– improvement of economic performance of sectors and industries (by up to 30%).

According to foreign studies, up to 90% of firms, that implemented and certified quality management system, consider that it is necessary to maintain high competitiveness, and 73% believe that the system provides a stable income.



Pic. 7. The method for analysis of programs, projects and activities to meet strategic objectives.



Pic. 8. Multi-level system of training specialists in the field of quality management.

It is important to note that components of the economics of quality have a positive impact on economy as a whole and on sustainable development indicators (Pic. 5).

The object of sustainable development is region, area, etc. For each object, there are always several ways in which it is possible to assess sustainability of its development. These areas are, for example, electricity, water, roads, information technology, waste disposal.

III.

All activities focused on three elements of the economics of quality (standardization, metrology, quality management) are reflected in policy documents and activities of socio-economic and scientific and technological development, in the preparation of which the federal budgetary institution State Regional Center for Standardization, Metrology and Testing in St.Petersburg and Leningrad Region («Test – St. Petersburg») participates.

In metrology important aspect of the research conducted by the state center is development of a strategy for ensuring uniformity of measurements in the Russian Federation until 2025, the main directions of development of North-West region.

In the field of standardization a serious site of activities of state center is National Technical Committee on «Sustainable development of administrative-territorial units» (TC115), which is a mirror to the International Committee № 268; this is accompanied by research on sustainable development at various levels: companies, municipalities, public authorities.

The regional investment standard project required theoretical studies and methodological approaches, the basic principles of standardization turned out to be in demand for creation of patterns of final directory of product list for formation of the Registry to implement the program of import substitution.

For the component of quality management, a number of regional strategic documents was developed:

– the concept of development work on the quality of St. Petersburg, including the target complex program «Quality»;

– *the development strategy of the complex «Science – Education – Innovation» for the North-West Federal District;*

– *the concept of socio-economic development of St. Petersburg until 2025;*

– *strategy for economic and social development of St. Petersburg until 2030.*

Especially it is necessary to dwell on activities of TC115. Its purpose is to create an intelligent platform that allows to combine efforts to improve standardization activities for sustainable scientific, technological and socio-economic development. The structure of TC consists of subcommittee «Development of methodology of systematic approach to quality management in administrative-territorial units», subcommittee «Performance indicators and methods of activities assessment» and working group «Intellectual (intelligent) technology». Along with other promising areas the Committee deals with preparation of a glossary of terms and definitions in the field of sustainable development and analysis of existing metrics (quantitative indicators) of infrastructure of smart communities.

Technical Committee, and that for the first time in Russia, developed and approved as national standards: GOST R ISO 37101 «Sustainable development of administrative-territorial units. Management system. General principles and requirements» and GOST R ISO 37120–2015 «Sustainable community development. Indicators of urban services and quality of life».

GOST R ISO 37101 specifies requirements for administrative-territorial units in terms of organization, implementation, provision of efficiency and improvement of management system for sustainable development. Using it, it is possible to manage the development of territories based on their characteristics; evaluate the effectiveness of the community contribution to sustainable development. It allows communities to have comprehensive strategies which meet the needs of stakeholders, to overcome isolationist tendencies, to organize cooperation in all fields of activity.

The standard contains requirements for processes of planning, implementation, monitoring and improvement, for the policy of senior management in the field of sustainable development, strategic goals of community, resources of life support areas.

It sets six priorities: attractiveness, social cohesion, well-being, adaptability, responsible use of resources, protection and improvement of environment.

Each task must be subjected to cross-analysis in accordance with 11 problematic issues (blocks). If necessary, we can consider additional aspects (Pic. 6).

The analysis is to answer questions contained in the blocks.

To find out how programs, projects and activities contribute to implementation of strategic objectives and take into account certain aspects, they are subject to additional analysis in accordance with the objectives' tree shown in Pic. 7.

Standard GOST R ISO 37120–2015 promotes integrated and holistic approach to sustainable development. It contains a set of 46 basic and 54 auxiliary indicators, structured within 17 directions. The standard creates a common approach to measurement. This makes it easier to assess sustainability of development and to draw up ranking of cities. It can help to assess the level of sustainability of the territories on the basis of monitoring of target objectives.

Activities to improve stability of the country, region, or any other object are impossible without appropriate staffing.

Pic. 8 illustrates a unique multi-level system of training in the field of quality management, established in St. Petersburg.

This system covers all levels of education, from schools and colleges in which quality classes are held. Most higher education institutions introduced specialization in standardization, metrology, quality management. Since 1995, St. Petersburg State University of Economics has operated the country's first specialized council for doctoral theses in «Quality Management». In the system of postgraduate education the non-profit organization «Institute for Quality Management» trains experts of various sectors from all regions of Russia.

Another step is planned in the same direction: the question is discussed about creation at St. Petersburg State Polytechnic University n. a. Peter the Great, of the UNESCO academic department «Education quality management for sustainable development».

Conclusion. *The emergence of a scientific school in the country, which took over the study of fundamentals of the economics of quality, conceptual underpinnings of sustainable development of territories allows to be optimistic about the prospects of theories formed for their support, methodology and instrumentation.*

The growing attention to quality issues, including the quality of life is demand of the times. The decision of related problems is seen only through the direct participation of three main components of the economics of quality: metrology, standardization and quality control. It is our deep conviction that it is the economics of quality, which will play in the future a leading role in ensuring sustainable development of Russia and its regions.

REFERENCES

1. Okrepilov, V. V. Spatial development and quality [*Prostranstvennoe razvitie i kachestvo*]. St. Petersburg, Nauka publ., 2011, 293 p.

2. Okrepilov, V. V. Economics of quality [*Ekonomika kachestva*]. St. Petersburg, Nauka publ., 2011, 629 p. ●

Information about the author:
Okrepilov, Vladimir V. – academician of the Russian Academy of Science, CEO of state center «Test – St. Petersburg», St. Petersburg, Russia, okrepilov@rustest.spb.ru.
Article received 05.12.2015, accepted 27.12.2015.

The article is prepared on the basis of a paper presented by the author at the scientific and practical conference «Quality, system and partnership in modern economics, held on the 1st and 2nd of December 2015 in Moscow State University of Railway Engineering (MIIT).