

Models for university sustainable development: overview of international practices

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Abstract. This study focuses on the components of university sustainable development in the way of achieving global competitiveness of the national higher education system. The coordinating role of the university in promoting the principles of sustainable development is due to both its transforming agency as a subject of economic relations and complex activities within the framework of the implementation of the “third mission” in the region. International experience in the development of sustainable development indicators is based on an integrative approach in which subsystems of indicators including economic, environmental, social and institutional ones are distinguished within the framework of a common system. These indicators form the basis of international university ranking systems. The purpose of this study is to analyze the models of sustainable development of participating universities out of the Top 500 global rankings by comparing and systematizing ESG components. The existing classification of sustainable development models is updated by the authors. The concept of “sustainability” is characterized, a description of typical models of sustainable development underlying the activities of Russian and foreign leading universities is presented

1 Introduction

Sustainable development is one of the greatest challenges for universities in the XXI century and an increasing focus of attention in the international academic community [1]. Achieving sustainable development goals formed the basis for the development of the global higher education system about 30 years ago. Today the concept of “sustainability” is on the agenda of more than 1,000 universities that have joined the framework international declarations on the implementation of sustainable development principles [2]. The Talloires Declaration (1990) established the global leadership of higher education institutions in developing, creating, supporting and maintaining sustainability. Later, as part of the 2002 Johannesburg Declaration on Sustainable Development, the Plan of Implementation of the World Summit on Sustainable Development was adopted to strengthen the institutional framework for sustainable development around the world. According to the Declarations, universities are to act an engine of social transformations by initiating new ways of transferring knowledge, training specialists and introducing innovations [3].

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Researchers offer various ways for universities to move towards more sustainable development models. Within the framework of the concept of “internal transformation” they focus on the campus, the interaction of students and university staff; “external transformation” emphasizes the importance of accepting the values of the university by the global educational community, while “academic transformation” is focused on the formation of knowledge, skills, and competencies by students, which will allow them to act as agents of change in the future [4].

At the same time, the models presented in the studies of foreign scientists are tied to specific universities making it difficult to prove their applicability in other contexts, given the different conditions in which universities operate. In this regard, an attempt was made to analyze the international and Russian experience in implementing sustainable development models in order to identify the most effective and universal practices. Thus, the study is focused on the discussion of the following issues:

1. What typical models of sustainable development are applied at universities?
2. How do the components of the model and metrics of sustainable development of international and Russian university ranking systems correlate?

2 Materials and methods

The object of research is university sustainable development model which is to be analyzed on the basis of indicators reflecting the economic, environmental, social and institutional aspects of the sustainable development systems each considered separately. The research subject is the socio-economic relations arising from the implementation of university sustainable development model.

Empirical base of the study consists of 120 reports on the sustainable development of foreign and Russian universities included in the Top 500 international rating agencies: Times Higher Education Impact Rankings, QS World University Rankings: Sustainability, UI GreenMetric World University Ranking. Reports on the sustainability of global initiatives after the transition to Industry 4.0 serve as a checkpoint for organizations moving towards sustainable development [5].

The methodological basis of the study was the methods of system analysis, case studies, economic and statistical data analysis, economic and mathematical modeling.

3 Results

“Sustainable development”, as defined by the Brundtland Commission, is a process and not an ultimate goal. The sustainability concept must ensure that current and future generations can meet their social and environmental needs. According to A.V. Sidorin, the concept of sustainable development is an attempt to solve the problem formulated by the law of T. Malthus, who believed that population increases at an exponential rate and the means of subsistence increase in an arithmetical ratio [6]. The Report of the International Commission on Environment and Development defines “sustainable development” as “a series of actions that meet the needs of the present without compromising the ability of future generations to meet their own needs”. E. Ivanova and I. Rimanosci, authors of the book “Revolutionizing Sustainability Education”, define sustainable development as a way of thinking and being, which are the results of a broader understanding of the ecosystem, susceptibility to social needs and in-depth focus on the higher Self, which is expressed in actions for the common good [7].

The transformation of management experience, research and intellectual leadership, as well as raising public awareness of the sustainable development goals, was enshrined in

2007 by the UN initiative in the Principles for Responsible Management Education (PRME). Today, more than 860 universities from 95 countries have joined the PRME international movement to transform business education.

At the global level, the Association for the Advancement of Sustainability in Higher Education (AASHE), the International Alliance of Research Universities (IARU), the Association of Environmental Universities and Colleges (EAUC), the International Network of University sustainable campuses (ISCN), as well as the national Association of “green” universities in Russia.

International ranking systems, such as Times Higher Education Impact Rankings, QS World University Rankings: Sustainability, UI GreenMetric World University Ranking, allow tracking, promoting and stimulating the activities of universities to achieve the SDGs. These ratings are aimed at demonstrating the progress of universities in solving world environmental and social problems. The evaluation criteria include the academic reputation of the university, the implementation of educational programs on sustainable development, the results of employment of graduates, the availability of peer-reviewed research on the UN Sustainable Development Goals, the gender ratio of the university staff, the existence of a recycling program for the waste produced by the university, etc.

It should be mentioned that the ranking indicators of universities differ in the composition and priority of indicators, but always include three key areas of assessment which are social impact, environmental contribution and economic sustainability policy.

Analysis of reports on sustainable development of foreign and Russian universities showed that universities implement various models of sustainable development, which can be represented in the following classification [8]:

1. **Three pillar model.** It provides three dimensions of sustainable development: environmental, economic and social resources. Sustainable development is achieved in the case of integrated work in three areas.

2. **The prism of sustainable development.** This model was proposed by M. Keiner in 2005 and involves the synthesis of 4 types of capital: economic, natural, human and social. Criticized due to insufficient attention to environmental issues, because it is the environment that is the resource for building human and economic capital [9].

3. **Egg sustainability.** It displays the relationship between man and the ecosystem: the center of the egg (yolk) – symbolizes society, which is surrounded by the components of the ecosystem (raw materials, jobs, health, knowledge and culture). The ecosystem is directly dependent on the social, economic and institutional dimensions.

4. **The “Concentric Circles” model** is similar to the previous one, except that it includes several subsystems: the largest circle is the environment, within which the society is located, which contains the economy.

5. **The “Three-legged Stool” model.** Visualizes the environment, economy and society in the form of three stool legs. A stool can be considered practical and reliable, all legs of which will have the same length, otherwise the balance will be disturbed.

6. **Atkisson’s Pyramid model.** It is a plan for achieving sustainable development and includes five levels:

1. Environment variability indicators.
2. Establishing interdependencies.
3. Innovation potential.
4. Strategy and implementation program.
5. Stakeholders.

Atkisson’s pyramid is more of a visual theoretical guide to action than a proven scheme.

In this way, a typical model of sustainable development of a university necessarily involves environmental, economic and social aspects. ESG programs of universities reflect the transformation of the management system, the intensification of interaction with public

organizations, government bodies and business. The success of an individual university is largely determined by the choice of investment model; funding sources can be endowment funds, government subsidies, sponsorship, grants and the university's own funds [10].

4 Discussion

Modeling is a kind of comparison tool which allows you to evaluate the actual parameters with the predicted ones and make balanced management decisions.

As part of the study, it was found that the “Three Pillar” model has been most effective. This model is applied at the University of Tokyo, the University of Edinburgh, the University of Sydney and at most universities of the Top 20 international rankings.

A striking example of the implementation of this model is the University of California at Berkeley, a world leader in sustainability according to QS World University Rankings: Sustainability, which implements a balanced sustainability action plan involving staff training, training of ESG specialists capable of adapting strategic and operational tasks companies on the transition to a low-carbon economy; campus landscaping; transition to a policy of “zero waste” (zero waste); use of renewable energy sources; minimizing the carbon footprint; contribution to the protection of the environment in the region (preservation of the bee population, a program to reduce the carbon footprint of business flights, a working group on combating climate change, etc.); there is a working group on diversity, equality and inclusiveness in sustainable development.

The second and third models of sustainable development contain the hypothesis that socio-economic development can only occur if the environment offers the necessary resources: raw materials, places for new production sites and jobs, constitutional qualities (recreation, health, etc.). d.). Examples of the use of these models are the University of Sao Paulo, the University of Indonesia, the University of Casertart.

The University of São Paulo generates initiatives that resonate with the City Council. The university considers the integration of scientific, technological, innovative and managerial approaches to solving social and environmental problems to be the advantage of its sustainable development program. In 2009, a law was approved establishing a municipal policy on climate change. In 2014, São Paulo became the second city in Brazil to receive the Sustainable Transport Award, following the implementation of a new cycling infrastructure.

Russian universities which act as direct participants in the economy of transformations in the country form their development program based on the model of three pillars. For example, RUDN University acts as the national coordinator of the UI GreenMetric World University Rankings network and is ranked in the Top 50 “greenest” universities in the world. The university raises awareness of the SDGs, minimizes the negative impact on the environment, uses renewable energy sources, develops a waste collection and recycling system, and contributes to the economic and social activities of the region. Volgograd State University (VolGU) has been in the Top 10 Russian universities for many years according to UI GreenMetric with the highest scores in such indicators as Education and Science, Transport Policy, Green Campus. More recently, the university has announced the transition to a new waste management policy and the widespread introduction of energy-saving technologies.

Experts note the relevance of positively integrating the three sustainable development metrics into one model. However, the lack of a time parameter, which violates the possibility of long-term forecasting of the achievement of the SDGs, is highly criticized.

5 Conclusion

Universities around the world are in a strategic position in the process of transformation towards a sustainable society which is due to the very mission of universities that involves training highly qualified specialists, transmitting the scientific knowledge, youth development, raising public awareness of environmental problems. The universities suggest ways to address these issues. Over the last 20 years, a new concept of universities has been formed which is characterized by the expansion of the influence of universities on society and the maximization of their contribution to the implementation of the UN sustainable development goals.

It seems effective and reasonable to introduce sustainable practices into the daily activities of the university, which will also be reflected in educational programs. The “three pillar” model seems to be the most productive basis for introducing the SDGs into the eco-system of the university. Environmental management tools, as well as monitoring and analysis of indicators related to sustainable development are of particular importance. It is also important that such transformations should take into account the principles of social justice, gender equality, respect for human rights and improving the quality of life.

The overview of sustainable development models of the world’s leading universities made it possible to formulate key features of the typological models of universities which mainly include the balanced integrity of the social, economic and environmental components.

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