

Assessment of the University’s Contribution to Regional Development

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Abstract—The results of many years of research in the field of assessing the mutual influence of regions and entities operating within the region are presented. In this article, the authors presented a fragment of a unique development - a methodology for assessing the contribution of a university to regional development. Considering the importance of the Strategic Academic Leadership Program announced for the implementation of the Strategic Academic Leadership Program for the development of science, education, technology in the Russian Federation, the authors offer a practical toolkit for determining quantitative assessments of the impact of educational institutions of higher education on progress in different spheres of life of the regional environment and society. The classification and ranking of indicators, economic assessments of the contribution of the Yaroslav-the-Wise Novgorod State University to the economic development of the Novgorod region, examples of projects implemented by the university aimed at increasing the intellectual potential of the region are presented. Methodological recommendations can be useful both for the authorities regulating the modernization of higher education in the country and for regional authorities in the development of mechanisms that provide a synergistic effect from the “university-region” collaboration, as well as for heads of universities who are currently formulating programs for the development of universities to receive grants of Strategic Academic Leadership Programs.

Keywords—university, region, contribution assessment, indicators

I. INTRODUCTION

The relevance of the topic is due to the rethinking of the role of the university and its impact on economic development. For example, the Strategic Academic Leadership Program developed by the Ministry of Science and Higher Education of the Russian Federation is aimed at increasing the contribution of universities to the implementation of national development goals and federal national projects. The authors reviewed key studies devoted to the study of the effects of the higher

education system on the development of regions and countries [1-36]. For example, a doubling of the number of universities leads to an increase in the gross domestic product by 4%, and the efficiency of regional educational systems has a positive effect on the gross regional product (GRP).

In the process of developing the methodology, the authors studied the main models of the influence of universities on the processes of regional and urban development. The approach proposed by R. Florax is presented, which assumes the division of the total contribution of the university into eight subsystems. Within the framework of this approach, educational, social, economic, cultural, image, and political components are assessed. The OECD model was studied, which is based on an assessment of the relationship between university activities and requests from the region. Particular attention was paid to the concept of “Civic University” by D. Goddard and the concept of “responsible university”. Within the framework of this concept, universities are called responsible, in which educational and scientific activities are directly related to the current tasks of a region, city or country.

In addition, the authors examined the mechanisms of the university's influence on regional development. In the context of economic development, the importance of budget replenishment was noted, since the university is usually a large regional taxpayer, and the relationship between the development of educational institutions and the growth of consumption in the region was studied. Attention is paid to the growth of the quality of human capital and the role of interregional educational migration.

II. RESULTS

The purpose of developing a methodology for assessing a university in the development of a region: analytical, that is, presenting a map of the university’s contribution to regional development.

When developing the methodology, the authors took into account the draft Decree of the Government of the Russian Federation “On measures of state support for Russian educational organizations of higher education for the purpose of scientific, technological and personnel support of the economy and social sphere, increasing the global competitiveness of the higher education system and promoting regional development” (PSAL), the federal project “Development of integration processes in science, higher education and industry” of the national project “Science and Universities”, the federal project “Personnel for the digital economy” of the national program “Digital Economy of the Russian Federation”, the model of F. Pellenberg [37]. The model proposed by F. Pellenberg analyzes the role of the university from three sides: the effects of entry, exit and effects associated with the external environment. The model involves identifying the economic effects of universities in the following groups: employment at the university; university income; university expenses; income and expenses of university employees; impact on the labor market; creating a new business; knowledge commercialization.

The authors divided the indicators for assessing the contribution of the university to regional development into groups, the groups are ranked according to their importance for the region. So, the contribution to the economy of the region, to

the demographic development of the region, the contribution to the integration, investment processes and technological development of the region are of critical importance. Contribution to the social development of the region and to the labor market is essential. And the contribution to the innovative development of the region, to the intellectual potential of the region and its infrastructure are important for the region.

In addition, the indicators include output (indicators of efficiency (effectiveness) of the university) and outcome (indicators of the university’s contribution to the development of the region). Indicators include short-term (allowing to assess the university’s contribution as the effect of the university’s activities, which manifests itself within 1-2 years) and long-term (allowing to assess the university’s contribution as the effect from the university’s activities, which manifests itself in 5-7 years).

Here we present the short-term indicators of the contribution to the regional economy (Table I).

Table II presents long-term indicators of the contribution to the demographic development of the region.

Table III presents indicators (short-term) assessments of the contribution to the social development of the region.

TABLE I. SHORT-TERM INDICATORS OF THE CONTRIBUTION TO THE REGIONAL ECONOMY

Output (Indicators of Efficiency (Effectiveness) of the University)	Outcome (Indicators of the University’s Contribution to the Development of the Region)
The amount of university funds received from all sources during the year, rubles Increase in the volume of university funds received during the year from all sources, % to the level of the last year	Ratio of university expenditures received from all sources during the year to GRP, %
The amount of university funds from R&D performance under contracts with organizations of the real sector of the region’s economy The share of university funds from R&D performance under contracts with organizations of the real sector of the regional economy, in the turnover of organizations of the real sector of the regional economy, % Share of university purchases from enterprises and organizations in the region, %	Regional GRP growth Labor productivity growth at the enterprises of the region Growth in the volume of shipped goods of own production of manufacturing industries in the region
Average salary of faculty members in relation to the average salary in the region, %	The ratio of the expenses of employees and the faculty members of the university (the product of the average expenses of one member of the household in the region by the number of employees and the teaching staff of the university) to the total expenses of the inhabitants of the region (the product of the average expenses of one member of the household in the region by the number of inhabitants of the region), %
Number of full-time students, people Increase in the number of full-time students, % to the level of the previous year Proportion of internal students with full tuition reimbursement (proportion of internal students with full tuition reimbursement to total student population)	The ratio of students’ expenses per year (the number of students multiplied by the average student expenses (70% is the conditional amount of students’ expenses from the average expenses of one household member in the region) to the total expenses of the residents of the region (the product of the average expenses of one household member in the region by the number of residents of the region), %
The amount of university funds received from all sources during the year, rubles	The share of taxes paid by the university, university staff, to the regional and city budgets, % (the share of the university in the amount of land tax received by the region and the city, tax on personal income, transport tax, income tax, corporate property tax) The share of taxes paid by the university, university staff, to the regional budget to the income of the consolidated budget of the region, % Reducing the regional budget deficit
The amount of university funds received from all sources during the year, rubles Increase in the volume of university funds received during the year from all sources, % to the level of the last year	Share of university purchases from enterprises and organizations in the region, % The ratio of the amount of university purchases from enterprises and organizations in the region to the amount of turnover of organizations in the region of manufacturing, %
Growth in the number of students and employees	The ratio of the volume of goods, works and services sold on the campus of the university for students and employees to the volume of turnover of enterprises and organizations in the region (retail trade, public catering, paid services to the population)

TABLE II. LONG-TERM INDICATORS OF THE CONTRIBUTION TO THE DEMOGRAPHIC DEVELOPMENT OF THE REGION

Output (Indicators of Efficiency (Effectiveness) of the University)	Outcome (Indicators of the University's Contribution to the Development of the Region)
Employment of graduates in the region – the share of employed graduates in the region (of the total number of employed), %	Population growth at “student, postgraduate” age Change in the age structure of the population – an increase in the population aged 16 to 29, %
Image, fame, reputation, brand awareness, place in ratings, assessment by employers of the university The proportion of students enrolled in 1 course from other regions, %	Population growth at “student, postgraduate” age Change in the age structure of the population – an increase in the population aged 16 to 29, % Migration gain
The ratio of average monthly cash payments to students, graduate students, residents, assistant trainees to the average salary in the region's economy Average earnings of graduates who completed their studies on educational programs of higher education of the university in relation to the average earnings in the region	Population growth at “student, postgraduate” age Change in the age structure of the population – an increase in the population aged 16 to 29, %
The contribution of the university to the development of general, secondary vocational education, additional vocational education for schoolchildren in the region is a qualitative indicator The share of university research and faculty members working on a part-time basis in secondary specialized education organizations located in the region The share of scientific and pedagogical universities participating in the functioning of organizations with highly equipped student places located on the territory of the subject of the Russian Federation where the university is located as mentors, tutors, experts	Population growth at “student, postgraduate” age Change in the age structure of the population – an increase in the population aged 16 to 29, % Migration gain

TABLE III. INDICATORS (SHORT-TERM) ASSESSMENTS OF THE CONTRIBUTION TO THE SOCIAL DEVELOPMENT OF THE REGION

Output (Indicators of Efficiency (Effectiveness) of the University)	Outcome (Indicators of the University's Contribution to the Development of the Region)
The ratio of average monthly cash payments to students, postgraduates, residents, assistants to the average salary in the region's economy (only payments of the university are considered)	Reducing poverty in the region
Contribution to socio-cultural development in the region – the number of social projects implemented by the university Contribution to the development of the environment (improvement of the ecological situation in the region) – the number of environmental projects implemented by the university	Improving the social well-being of residents of the region

The contribution of Yaroslavl-the-Wise Novgorod State University to the development of the Novgorod region is due to the implementation of many projects. So, the House of Scientific Collaboration named after S.V. Kovalevskaya was created. Additional professional programs for teachers have been organized and are being implemented, training programs for schoolchildren are being implemented, the “Small Academy” is operating, within the framework of which training programs for schoolchildren from 10 to 11 grades and students of secondary vocational education institutions are being implemented.

The Process Factory was established on the basis of the Institute of Economics, Management and Law of the Yaroslavl-the-Wise Novgorod State University. The activities of the Process Factory are aimed at teaching the principles and methods of lean production, their practical application in work processes in the executive authorities of the Novgorod region and their subordinate institutions. In 2020, 15 representatives of medical institutions and 65 students at the university's medical institute were trained at the “Lean Polyclinic” training, 13 deputy heads of executive authorities of the Novgorod region took part in the “Administrative Processes” training. In 2020, within the framework of the Process Factory, work was carried out on the material and technical equipment of the Process Factory premises for conducting practical training in the format of simulation games, the organization of two educational processes: “Lean Polyclinic” and “Administrative Processes”, interaction with the executive authorities of the Novgorod

region to organize the filling of groups of students.

The university has developed new educational programs designed to train demanded and highly qualified personnel, in particular, “Technical and digital systems in the agro-industrial complex”, “Biomedicine”, “Development of applied software for mobile platforms”, “Artificial intelligence and data mining”, “Information technology in the design of electronic means”, “Mechatronics and industrial robotics”, “IT infrastructure and business cybernetics”.

The University staff is implementing the project “Survey of the registration of the intensity of pedestrian and car traffic”. More than 10 surveys were carried out, 35 employees and students were involved in the framework of the project “Creation of a unified automated information system for monitoring and accounting for transport work in various sectors of transport at the level of municipalities in the Novgorod region”. Technical inspection of building structures is being carried out (JSC “Akron”, JSC “Transvit”, etc.)

The support of the Russian Foundation for Basic Research was received by scientific projects that have important applied significance for the regional economy, in particular, “Modeling of code sequences for information transmission systems”, “Investigation of the physical principles of using magnetoelectric elements in secondary power supplies with increased efficiency”, “Development of physical foundations of creating piezoelectric current and voltage converters”, “The problem of preserving the authenticity and identifying the

historical and cultural potential of the architectural environment of Veliky Novgorod in terms of effective urban development”, “Potential opportunities for using the ethno-cultural heritage of Veliky Novgorod in the patriotic education of the younger generation”, “Threats and socially-economic consequences of technogenic air pollution for the population of the Novgorod region”.

In addition, innovative projects have been developed and are being implemented. In particular, “GLASS – A Platform for

Dialogue between the State and Citizens”, “Formation of a digital innovative educational environment based on additive technologies of 3D modeling and prototyping”, “A system for working with PlanWay project teams”, “Creation of a segment of a regional system for monitoring the psychological state of students and pupils”.

Table IV shows estimates of the university’s contribution to the region’s economy.

TABLE IV. UNIVERSITY’S CONTRIBUTION TO THE REGION’S ECONOMY

Indicators	Years				
	2015	2016	2017	2018	2019
The amount of university funds received during the year from all sources, thousand rubles (output)	1179477.6	1077325.6	1087468.3	1207343.5	1464385.2
GRP of the region, thousand rubles	234075785	243392900	252650200	262008000	270568600
Ratio of university expenditures received from all sources during the year to GRP, % (outcome)	0.5	0.4	0.43	0.46	0.54
Average salary of faculty members in relation to the average salary in the region, % (output)	162.42	194.32	187.53	218.5	204.14
The ratio of expenses of staff and teaching staff of the university to the total amount of expenses of residents of the region, % (outcome)	0.32	0.31	0.29	0.26	0.25
The share of the university in personal income tax, % (outcome)	0.8	0.7	0.7	0.7	0.8
The share of taxes paid by the university to the regional budget (income tax and corporate property tax), % (outcome)	0.16	0.14	0.14	0.13	0.15
The contribution of higher education to the economic development of the region (the amount of added value that an employee with higher education can create to the GRP of the region) (outcome)	0.4253	0.3699	0.3032	0.2942	0.3161

III. CONCLUSION

The relevance of the presented results, their scientific and practical significance is due to the need to modernize the university development model to ensure the balance of the regional economy and meet the needs of its promising economic structure, as well as create a mechanism for the effective use of the university in regional development. The scientific results presented in the article are important for organizational science – from the point of view of studying the features of the practices of managing interactions of participants in regional ecosystems “University-Region”; for the economy – from the point of view of analyzing the economic component of the modernization of interaction between universities and regions, as well as an increase in the third role and responsibility of flagship universities for the development of the region.

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