

Methods of the Evaluation of the Potential of the Region Pedagogical Universities on the Basis of Benchmarking

Métodos de Evaluación del Potencial de las Universidades Pedagógicas Regionales sobre la Base del Benchmarking

Ekaterina Viktorovna GNATYSHINA [1](#); Pavel Georgievich RYABCHUK [2](#); Ekaterina Viktorovna EVPLOVA [3](#); and Ekaterina Vladimirovna RYABININA [4](#)

Received: 09/03/2017 • Approved: 15/04/2017

Content

- [1. Introduction](#)
 - [2. Methodology and methods](#)
 - [3. The results of the study](#)
 - [4. Discussion of the results](#)
 - [5. Conclusion](#)
- [References](#)

ABSTRACT:

In the process of choosing a strong university by regional authorities in order to achieve the strategic objectives of improving the quality of higher pedagogical education and accumulating financial resources in that context, the problem of the correct choice of the leader between universities from the selection of candidates emerges. The basis for the comparison of universities can become the potential of a pedagogical university. A number of variant factors of external and internal environment, as well as indicators of the activity of a university, influence the size and dynamics of the potential. This raises the question of the creation of a methodical approach to the evaluation of the potential of a pedagogical university. The article analyzes the factors that affect the potential and their classification is shown. The algorithm and methodology of substantive potential evaluation using benchmarking, which make it possible to take as a basis the results of

RESUMEN:

En el proceso de selección de una universidad fuerte por parte de las autoridades regionales para alcanzar los objetivos estratégicos de mejorar la calidad de la educación pedagógica superior y acumular recursos financieros en ese contexto, el problema de la elección correcta del líder entre universidades de la selección de candidatos emerge. La base para la comparación de las universidades puede convertirse en el potencial de una universidad pedagógica. Una serie de factores variantes del entorno externo e interno, así como indicadores de la actividad de una universidad, influyen en el tamaño y la dinámica del potencial. Esto plantea la cuestión de la creación de un enfoque metódico para la evaluación del potencial de una universidad pedagógica. El artículo analiza los factores que afectan al potencial y se muestra su clasificación. Se propone el algoritmo y la metodología de evaluación potencial sustantiva mediante benchmarking, que permiten tomar como

the universities, the leaders of the region, are proposed. The proposed approach produces a comparable assessment of the factors of the external environment and internal processes, and forms a resulting criterion – a complex potential of a pedagogical university, based on which the rating of pedagogical universities of the region is formed. The practical significance of the study results can serve as a tool for designing the development strategy by the management of the university, as well as by regional and federal authorities for the formation of strategic and tactical managerial decisions for the development of pedagogical education.

Keywords: professional education, potential, benchmarking, potential factors, potential of university, university renting, pedagogical university, competitiveness.

base los resultados de las universidades, los líderes de la región. El enfoque propuesto produce una evaluación comparable de los factores del entorno externo y de los procesos internos y forma un criterio resultante -un potencial complejo de una universidad pedagógica, a partir de la cual se forma la calificación de las universidades pedagógicas de la región. La importancia práctica de los resultados del estudio puede servir como herramienta para diseñar la estrategia de desarrollo por parte de la administración de la universidad, así como por las autoridades regionales y federales para la formación de decisiones estratégicas y tácticas de gestión para el desarrollo de la educación pedagógica.

Palabras clave: educación profesional, potencial, benchmarking, factores potenciales, potencial de universidad, alquiler universitario, universidad pedagógica, competitividad.

1. Introduction

Higher education in Russia is currently characterized by sustained growth in the level of competition. At the All-Russian Pedagogical Council held on August 19, 2016 in Moscow, higher requirements to the system of basic general education and to teacher training institutions – pedagogical universities of Russia were discussed. The need of various authorities for assessing the effectiveness of higher professional education organizations, which includes the rationality of budget financing, has increased in recent years. The number of pedagogical universities in the country has decreased significantly. The reason was a general tendency to reduce the number of universities against the background of the optimization budget spending, negative demographic situation that reduced the number of students in some regional universities, and the procedures of merger with classical and technical universities.

The program for the creation of strong universities, conducted by the Ministry of Education and Science, is focused on the concentration of the resources of higher education and on improving the competitiveness of both educational institutions and their graduates. All this indicates the need for a balanced theoretical and methodological basis of the evaluation of educational institutions in order to assess the effectiveness of the activities with regard to their potential using a widespread tool – benchmarking. This approach will increase the capacity of the Ministry of Education and Science to form strong educational organizations based on the rating of pedagogical universities, and to accumulate budget allocations to achieve the objectives of the system as a whole. The ability to predict the potential of assessment gives managers new horizons for strategic planning, as well as gives public authorities the vector of development of higher pedagogical education and well-considered management decisions in the medium and long term.

The purpose of the study presented in this article is the development of a methodological approach to the formation of the rating of pedagogical universities of a region based on a comprehensive assessment of their potential using benchmarking techniques.

Objectives of the research:

- explore the experience gained in modern science and practice on the evaluation of the potential of universities with the identification of the most advanced approaches and trends;
- identify and introduce into scientific use the notion of "the potential of a pedagogical university";
- consider benchmarking as a tool for the management of the potential of a pedagogical university and increasing the quality of its activity;
- explore the university potential factors and identify the most effective ones among them;
- develop a methodological approach of the ranking score based on the complex potential of a pedagogical university.

2. Methodology and methods

Modern science has accumulated extensive experience in potential assessment (Huggins & Cooke 1997; Huggins & Cooke 1997; Lujan 2001; Kreysing 2002; Park & Park 2007; Piper 2002; Dealtry, 2000) of foreign universities, as well as Russian classic (Karamurzov 2014; Chvanova 2004) and research ones (Kortov 2004; Maksimov, et. al. 2004). However, there is a methodological gap of the assessment of pedagogical universities potential as human resource basis of secondary general and vocational education.

Approaches to the evaluation of the potential of higher education institutions.

The modern research of the potential of universities is aimed at its innovative (Belousov 2011; Emelyanov, et. al. 2006; Kortov 2004; Krakovetskaya 2009; Maksimov, et. al. 2004; Nacharkin 2005a; Chvanova 2004; Chistyakova, et. al. 2013; Chistyakova, et. al. 2013a; Chistyakova, et. al. 2013b), personnel (Gal'dikas 2012; Kirillov 2007; Hodakevich 2007) or scientific-research (Kortov 2004; Shukshunov, et. al. 2002) components. So, a group of authors (Chistyakova, et. al. 2013; Chistyakova, et. al. 2013a; Chistyakova, et. al. 2013b) built the innovative component with the ability of the university to generate innovation, having the possibility of commercialization into the potential of university. Scientific interest in the methodological project of TACIS FINRUS 9804 Innovation Centers and Science Cities in Russia (TACIS.FINRUS 9804) is aroused, which implies the assessment of a university from the standpoint of commercial maturity and the stage of development of an innovative product. In the works of Russian experts (Shukshunov, et. al. 2002) the potential of the higher school organizations took into account the state of innovative potential, the state of the property complex and the level of scientific research. The information base for the study served as the university questionnaire survey based on the results of their activities. On the basis of the data obtained, the ranking score of the potential of a university was formed. The Ministry of Education and Science of the Russian Federation also conducted a large-scale study of the innovative potential, within the framework of which the degree of correlation between the effectiveness of innovative activity of scientific infrastructure of universities and innovative component of the region was revealed. Continuing this research area, a number of Russian scientists focused on the integration of qualitative innovation indicators (Maksimov, et. al. 2004) of a university. The innovative potential of the university on the basis of its scientific research activity is reviewed by Kortov (Kortov 2004), who took as a basis the innovative activity of higher education institutions of the Ural Federal District, their potency to generate new knowledge and scientific infrastructure that characterizes this approach as rather one-sided and does not include other aspects of the activity that are so important for our purposes. A systematic approach in assessing the potential is presented in the works of Nacharkin (Nacharkin 2005; Nacharkin 2005a), who considered the potential in each of the three components of the work of the university: administrative and managerial, scientific and educational. The same disadvantage is presented in the works of the group of authors (Emelyanov, et. al. 2006) revealing the ranking of higher education institutions based on the innovation component of educational programs. The interest in the integral evaluation of the potential of the university, which is based on a systematic approach taking into account the results of the different fields of activity (education, research, infrastructure and university management) and integration of environmental factors (Belousov 2011; Emelyanov, et. al. 2006; Krakovetskaya et. al. 2008) is aroused. A feature of the approach is the expert assessment based on the formation of a logical matrix by the university management allowing to evaluate the stability of the potential and prospects of its change in the conditions of variant factors of the environment, which means the regional infrastructure of innovation. A systematic approach to evaluating the potential of universities is also used by other experts (Krakovetskaya, et. al. 2008). Methodological approaches to the evaluation of the innovative potential of universities are reflected in the work of the researchers from Tomsk: Vorob'eva, Krakovetskaya, Monastyrniy, and Chistyakova (Krakovetskaya, et. al. 2008; Chistyakova, et. al. 2013; Chistyakova, et. al. 2013a; Chistyakova, et. al. 2013b).

The existing methodological approaches to the evaluation of the potential of the university have, in our opinion, the following disadvantages:

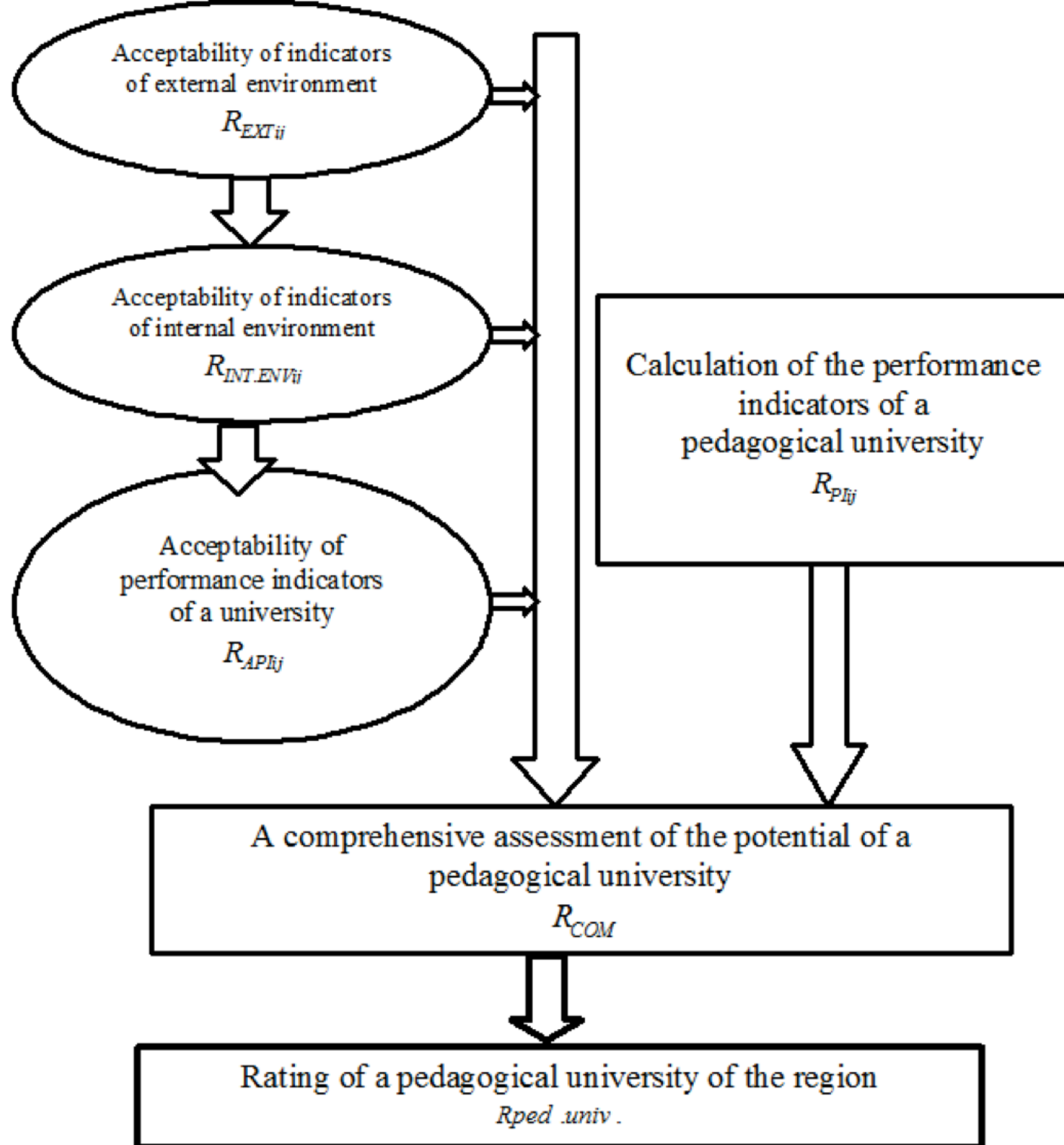
- the use of a limited range of factors that influence the potential of the university and, as a consequence, its competitiveness, which leads to a decrease in the reliability of evaluation;
- the use of the method of expert estimations, which gives methodological approaches a high degree of subjectivity;
- the absence of a dynamic assessment of the potential indicator, which gives static results to the study and does not contribute to the formation of projections for the development of an educational institution;
- lack of consideration of environmental factors (national and regional level).

At the same time, despite the fact that the existing Russian approaches to assessing the potential of higher education institutions are largely different from each other, in the end, they are focused on getting the overall performance which determines the rank of the university in the rating (Chistyakova, et. al. 2013a). The ranking score based on a comprehensive assessment of the potential of the university contains both strengths and weaknesses. On the one hand, this tool makes it possible to calculate the ranking of universities in the region and to find leaders between universities, and on the other hand, it is unable to assess the internal and external environment of each educational institution. With its unique model and development strategy, each university forms the prerequisites for the formation of its potential. The above-specified information indicates the need to develop an objective assessment based on a set of indicators of internal and external environment and the indicators of performance allowing to take into account the vector of the development of the higher education institution and its uniqueness. A special feature of our study is that the base of the research is the pedagogical universities, the objective of which is substantially different from the purpose of scientific research, profession-oriented (agricultural, medical, etc.) and classic universities.

3. The results of the study.

Figure 1 shows us the logic of the concept of the rating of pedagogical universities *Rped.univ.* on the basis of a comprehensive assessment of their potential , which is based on the concept of acceptability of factors. The term "acceptability of factors" refers to the compliance of the relevant factors of internal and external environment with the conditions of the party that forms the rating – the Ministry of Education and Science of the region or Russian Federation.

Figure 1. Methodology of formation of pedagogical universities rankings based on a comprehensive assessment of the potential



In this connection, we face the task of developing a methodology for assessing the pedagogical potential of a university, characterized by the dynamic tracking of the factors of external and internal environment, taking into account the characteristics of benchmarking as a long-term approach as. *At the present stage, benchmarking not only increases the efficiency of an educational institution, but it is also a method connecting the university with customers, suppliers and other third parties.*

Benchmarking is the process of identifying, studying and adapting best practices and experience of other organizations to improve one's own organization (organizations with similar processes in the industry, regardless of the sector profile, in one's country or abroad) (Scelton 2002).

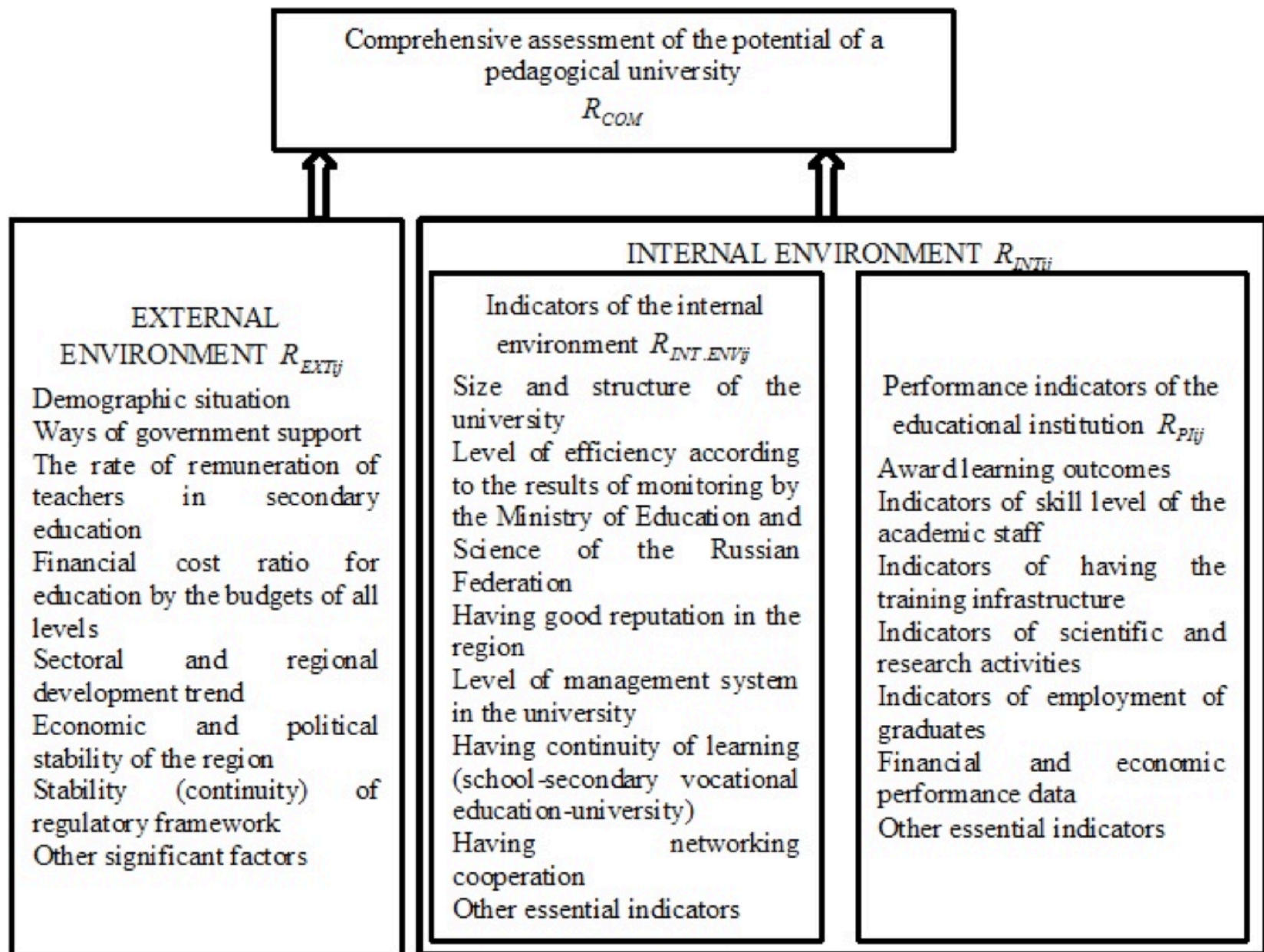
It is worth noting that "to be under the tutelage of the best masters" is not new. Competitive intelligence as a basis for benchmarking has been known since ancient times; it has gained momentum to the development while activating market relations. There is evidence that the merchants and traders of the ancient Mediterranean collected information on the competing sides, which contributed to achieving commercial success (Doronin 2003, p. 230). Gradually, benchmarking has been used in many management spheres. The first use of benchmarking techniques in higher education was documented in the United States (Alstete 1995) at the end of the 20th century – beginning of the 21st century. Studies on the use of benchmarking in

higher education were conducted in Canada (Farquhar 2008), the UK (Jackson & Lund 2006) and a number of other developed EU Member States (Garlick & Pryor 2004).

For the purposes of this study taking as a basis the principle of benchmarking, we will consider the best achievements in sampling of pedagogical universities according to each individual indicator.

To improve the quality of the study, it is necessary to identify and introduce into scientific use the concept of "the potential of a pedagogical university" which refers to *the ability of a university to adequately meet the present and future requirements of secondary and special education systems in the conditions of variant factors of internal and external environment*. The authors' definition is devoid of cumbersome, has the dynamism and highlights the essence of pedagogical high school activities. We offer to view a comprehensive assessment of the potential of a pedagogical university as a key indicator of the potential evaluation (). To improve the adequacy of the proposed indicator a comprehensive approach not limited to the analysis of the current performance of the university is required. The complex of factors of internal and external environment, as well as the indicators of educational organization activity, influences the value of the given indicator.

Figure 2. Set of factors of complex potential of pedagogical university



It would be hard to overestimate the significant influence of environmental factors () on the size and dynamics of the potential. The demographic situation in the region affects the possible student body at the university, and the needs of the region in the teaching staff. The rate of remuneration of academic staff allows engaging people in university, or vice versa filtering them out of higher vocational education. The amount of current and additional financing of pedagogical universities by their founder affects all aspects of their life: material and technical

resources, scientific and educational infrastructure, and personnel aspect. Regional programs supported by the federal center to optimize the number of universities and to create strong universities form a regional trend of development and the direction of their strategic development. The general state of economy of a region affects the opportunities and quality of financing by the budget of the regional system of general and specialized secondary education and, consequently, it affects the entire educational system in the region including the federal universities. The continuity of the vector of development of higher pedagogical education shows the progressive development of the educational sector in the framework of the strategic plan for the development of the industry.

Internal environmental factors have strong influence on the potential of a pedagogical university. The size of an educational institution, the availability of a wide range of faculties and institutes, laboratories and research centers in its organizational structure, indicate the concentration of resources to perform the tasks of the university concerning personnel training for the popular schooling system. The degree of effectiveness of the results of monitoring conducted by the Ministry of Education and Science, talks about the adequacy of resources and the capacity of the institution to fulfill the tasks set by its founder; it indicates the weak capacity of parties and the need to develop appropriate management decisions. The reputation of the university in the region formed on the basis of education of generations of students, has an impact both on the success of entering students and on the attitude of households, employers of graduates, regional and federal authorities towards the university. The presence of a certified quality management system, continuous work on the improvement and optimization of processes taking place at the pedagogical university show an increase in the value of the potential in terms of its management and organizational component. Having a continuous education system in the university complex (preschool facility, school, college, and post-graduate education structures) indicate the integrated activity of the educational institution and the presence of a base for testing of pedagogical innovations and research. Networking with other university institutions of higher education has a positive effect in terms of industry associations, occupational financial resources for the implementation of large-scale projects and research work. Networking with schools and preschools helps to give opportunities for pedagogical and technological practices for the university students.

Converting the external environment and its factors (Figure 2) in measurable, quantitative evaluations taking into account all their diversity is difficult and not always rational. Each individual environmental factor in the same conditions for different users takes a different value when decision-making, which indicates the impossibility of any gradation. The above-mentioned indicates that it is necessary to use an evaluation in the form of the acceptability of each single factor of their comprehensive list for each user having two statuses: "acceptable" or "unacceptable". Similarly, it is proposed to evaluate the factors of the internal environment of a pedagogical university in a binary way.

The indicators of activity of the educational institution are presented by a wide range of relative and absolute indicators characterizing the activity of the educational institution from the perspective of different aspects (Table 1). All the indicators that determine the quality of the activity of the educational institution are divided into two groups (Risen & Zakharova 2014): potential indicator as such and operational performance indicators (including the process indicators). We classified the following indicators as belonging to the first group: the indicators of the skill level of scientific-pedagogical staff, indicators of educational and scientific infrastructure and the inventory and logistics management of the educational and scientific process. The second group of indicators included the indicators of educational and research activities, indicators of employment of graduates and indicators of financial and economic performance.

In Table 1, the indicators of educational institution performance are shown.

Table 1. Performance indicators of and educational institution



Characteristic	Elements characteristics (group of indicators)	Performance indicators
Indicators of the actual potential of an educational institution	Indicators of the skill level of academic staff (A)	<ul style="list-style-type: none"> - academic degree rate of academic staff (NPR), % - the number of full-time Candidates of Sciences per 100 students - the number of full-time Doctor of Science per 100 students - the average number of upgraded qualifications in 5 years per one full-time person of academic staff - the average number of full-time academic staff with state awards - the average age of Candidates of Sciences, years - the average age of Doctors of Science, years - the percentage of academic staff in the overall manpower of university, % - the proportion of Academic staff under 40, %
	Indicators of the availability of educational and scientific infrastructure (B)	<ul style="list-style-type: none"> - the floor area of the educational institution, sq. m. - classrooms floor area, sq. m. - university laboratories floor area, sq. m. - sports and drill halls floor area, sq. m. - availability of dorm rooms for nonresident students, % - meal sites floor area, sq. m. - floor area per one student, sq. m./person - educational laboratories floor area per one student, sq. m./person
	Inventory and logistics management of educational and scientific process (V)	<ul style="list-style-type: none"> - residual cost of basic assets per one member of academic staff as of the last accounting date, thous. rub. - coefficient of renewal of basic assets, % - the number of multimedia classrooms, units - library stock of the university, thousands - the number of computers per 100 students, units
	Indicators of class activities (G)	<ul style="list-style-type: none"> - combined cumulative grade point average, % - average quality performance, % - coefficient of safety of personnel, % - the total number of students, persons - the number of new student body, persons - Cumulative Grade Point Average of Uniform state exam of enrollees

		<ul style="list-style-type: none"> - the number of students enrolled at the first course on the conditions of special entrance, persons - the number of students, winners of Olympiads, enrolled at the first course out of competition, persons
<p>Indicators of the process of an educational institution</p>	<p>Indicators of scientific and research activities (D)</p>	<ul style="list-style-type: none"> - the number of citations of publications issued in past five years, indexable in the Web of Science information and analytical system of scientific citation per 100 members of academic staff, units - the number of citations of publications issued in past five years, indexable in the Scopus information and analytical system of scientific citation per 100 members of academic staff, units - the number of citations of publications issued in past five years, indexable in the RINTS informational and analytical system of scientific citation per 100 members of academic staff, units - the number of publications indexable in the Scopus informational and analytical system of scientific citation per 100 members of academic staff, units - the number of citations of publications indexable in the RINTS informational and analytical system of scientific citation per 100 members of academic staff, units - volume of research and development, thous. rub. - the fraction of income from research and development in the institution revenue structure, % - the number of learned periodicals published by university, units - the number of Dissertation Councils of university, units - the number of grants per 100 members of academic staff, units - revenue from research and development per one member of academic staff, thous. rub./person - the number of postgraduates and doctoral students, persons - the average Hirsch Index per one member of academic staff
	<p>Graduates employment indicators (E)</p>	<ul style="list-style-type: none"> - percentage of university graduates who found employment in the first year after graduation, % - percentage of university graduates who found employment in the first year after graduation according to their specialization, %
		<ul style="list-style-type: none"> - revenue from educational activities per one

	<p>Figures of financial-economic activities (Z)</p>	<p>member of academic staff, thous. rub. /person</p> <ul style="list-style-type: none"> - extrabudgetary income from all sources and budgetary financing ratio, % - average monthly salary of academic staff, rub. - compiled receipts related to one new student, thous. rub./person - the average wage of academic staff and the average wage in the region ratio, %
--	---	--

Let us show the calculation of separate indicators.

Academic degree holders rate:

$$A_1 = \frac{N_{HEPtotal}}{N_{HEPdegree(title)}} \times 100\%;$$

where $N_{HEPtotal}$ is the number of higher-education teaching personnel, persons.

$N_{HEPdegree(title)}$ is the number of higher-education teaching personnel having scientific degrees and scientific titles, persons.

The number of full-time Candidates of Sciences per 100 students:

$$A_2 = \frac{N_{can.sc.}^{full-time}}{N_{stud.}^{new}} \times 100;$$

where $N_{can.sc.}^{full-time}$ is the number of full-time Candidates of Sciences, persons.

$N_{stud.}^{new}$ is the number of new students, persons.

The number of full-time Doctor of Sciences per 100 students:

$$A_3 = \frac{N_{DS}^{full-time}}{N_{stud.}^{new}} \times 100;$$

where $N_{DS}^{full-time}$ is the number of full-time Doctors of Sciences, persons.

$N_{stud.}^{new}$ is the number of new students, persons.

The average number of upgraded qualifications in 5 years per one member of academic staff:

$$A_4 = \frac{\sum Q_{SPS}^{5years}}{N_{SPS}};$$

where $\sum Q_{SPS}^{5years}$ is the total number of upgraded qualifications of scientific and pedagogical staff in the past 5 years, unit.

N_{SPS} is the number of scientific and pedagogical staff, persons.

The percentage of academic staff in the overall manpower of university, %

where $R.C._{received}$ is the cost of payments received in the fiscal period to the balance of educational institution, thous. rub.

$R.C._{beg}$ is the value of fixed assets as of the beginning of the accounting period, thous. rub.

The number of personal computers per 100 students:

$$V_5 = \frac{M}{N_{stud}^{new}};$$

where M is the number of personal computers, units.

The overall average performance:

$$G_1 = \frac{N_{suc}}{N_{total}};$$

where N_{suc} is the number of students who successfully passed the session, persons.

N_{total} is the total number of students, persons.

Average quality grades:

$$G_2 = \frac{N_{grade}^{qual.}}{N_{total}}$$

G_3 is the coefficient of safety personnel, %

$N_{grade}^{qual.}$ is the number of students who had "good" and "excellent" for the last session.

Cumulative Grade Point Average of the Uniform State Exam of enrollees:

$$G_6 = \frac{\sum_{n=1}^N N_{1course} \times B_{USE_s}}{N_{1course}};$$

where B_{USE_s} is a point of the Uniform State Exam of a student.

$N_{1course}$ is the number of students enrolled in the first course, persons.

The number of citations of publications issued in past five years, indexable in the Web of Science information and analytical system of scientific citation per 100 members of academic staff:

$$D_1 = \frac{C_{5years}^{Web\ of\ Science}}{N_{SPS}^{full-time}} \times 100;$$

where $C_{5years}^{Web\ of\ Science}$ is the number of citations of publications issued in past five years, indexable in Web of Science information and analytical system of scientific citation per 100 members of academic staff, units.

The number of citations of publications issued in past five years, indexable in the Scopus information and analytical system of scientific citation per 100 members of academic staff:

$$D_2 = \frac{C_{5years}^{Scopus}}{N_{SPS}^{full-time}} \times 100;$$

where C_{5years}^{Scopus} is the number of citations of publications issued in past five years, indexable in the Scopus information and analytical system of scientific citation, units.

The number of citations of publications issued in past five years, indexable in the RINTS informational and analytical system of scientific citation per 100 members of academic staff:

$$D_3 = \frac{C_{5years}^{RINTS}}{N_{SPS}^{full-time}} \times 100;$$

where C_{5years}^{RINTS} is the number of citations of publications issued in past five years, indexable in the RINTS informational and analytical system of scientific citation, units.

The number of publications indexable in the Scopus informational and analytical system of scientific citation per 100 members of academic staff, unit.

$$D_4 = \frac{P^{Scopus}}{N_{SPS}^{full-time}} \times 100;$$

where P^{Scopus} is the number of publications indexable in the Scopus informational and analytical system of scientific citation, units.

The number of publications issued indexable in the RINTS informational and analytical system of scientific citation per 100 members of academic staff:

$$D_5 = \frac{P^{RINTS}}{N_{SPS}^{full-time}} \times 100;$$

where P^{RINTS} is the number of publications indexable in the RINTS informational and analytical system of scientific citation, units.

The fraction of income from research and development in the institution revenue structure:

$$D_7 = \frac{V_{R\&D}}{V_{total}} \times 100\%;$$

where $V_{R\&D}$ is research and development revenue, thous. rub.

V_{total} is the total revenue (extra-budgetary), thous. rub.

Revenue from research and development per one member of academic staff, thous. rub.

$$D_{11} = \frac{V_{R\&D}}{N_{SPS}} \times 100;$$

Percentage of university graduates who found employment in the first year after graduation:

$$E_1 = \frac{N_{empl}^{full-time}}{N_{grad}^{full-time}} \times 100\%;$$

where $N_{empl}^{full-time}$ is the number of university graduates of full-time education who found employment during the first year after graduation, persons.

$N_{grad}^{full-time}$ is the total number of graduates of full-time education, persons.

Percentage of university graduates who found employment in the first year after graduation according to their specialization:

$$E_2 = \frac{N_{empl.spec.}^{full-time}}{N_{grad.}^{full-time}} \times 100\%;$$

where $N_{empl.spec.}^{full-time}$ is the number of university graduates who found employment in the first year after graduation according to their specialization, persons.

Revenue from educational activities per one member of academic staff:

$$Z_1 = \frac{V_{edu}}{N_{SPS}} \times 100;$$

where V_{edu} is extra-budgetary revenue from educational activities, thous. rub.

Extra-budgetary income from all sources and budgetary financing ratio:

$$Z_2 = \frac{V_{extra}^{total}}{V_{budget}} \times 100\%;$$

where V_{extra}^{total} is the total extra-budgetary income of university, thous. rub.

V_{budget} is the volume of budgetary allocations, thous. rub.

Compiled receipts related to one new student.

$$Z_4 = \frac{V_{budget} + V_{extra}^{total}}{N_{stud}^{new}};$$

where $V_{budget} + V_{extra}^{total}$ is the total revenue of university, thous. rub.

The average wage of academic staff and the average wage in the region ratio:

$$Z_5 = \frac{W_{av}^{SPS}}{W_{av}^{region}} \times 100\%;$$

where W_{av}^{SPS} is the average wage of academic staff, rub.

W_{av}^{region} is the average wage in the region, rub.

Methodology of formation of pedagogical university rating $R_{ped.univ}$ involves the application of the proposed selection methods in terms of external R_{EXTij} and internal environment $R_{INT.ENVIj}$ and acceptability of university activity indicators R_{PIij} , the method of calculation of university activity indicators R_{PIij} and the method of calculation of the complex evaluation of the pedagogical potential of the university R_{COM} itself.

Folding of environment indicators of the j -th university is based on a binary approach when an acceptable indicator gets 1, and a non-acceptable one gets 0. The sum of all b indexes of the environment is compared to the benchmarkable indicator of the leader university:

$$I_j^b = \frac{\sum b}{b_{max}};$$

where $\sum b$ is the total score of acceptability of environmental factors of the j -th university.

b_{max} is the overall assessment of the acceptability of environmental factors of the leader university according to b indicators.

Measurable evaluation of the factors of the internal environment of the j -th university is proposed to carry out using the technique of acceptability with a binary approach. The sum of all d parameters of the external environment is compared to the benchmarkable indicator of the leader university:

$$I_j^d = \frac{\sum d}{d_{max}};$$

where $\sum d$ is the overall estimate of the acceptability of external environmental factors of the j -th university.

d_{max} is the overall estimate of the acceptability of external environmental factors of the leader university according to d indicators.

Applying the method of benchmarking when estimating indicators of the university activity, let us evaluate the value of each of the indicators of the j -th university:

$$I_{ij}^m = \frac{i_j - i_{min}}{i_{max} - i_{min}};$$

where i_{min} is the minimum value of the i -th sample index of j universities.

i_{max} is the maximum value of the i -th indicator of the university leader in sampling of j universities in the region.

The plurality of the received indicators of the university activity, varying from 0 to 1, it is proposed to define their geometric mean value of the j -th university according to m parameters:

$$I_j^m = \sqrt[m]{I_m \times I_{m+1} \times I_{m+2} \times \dots \times I_{mn}};$$

Putting different variants having a different value of the number of recorded indicators is ensured by adding of a correction factor equal to the number of parameters taken into account (Kuvshinov 2007). With the increasing acceptability of indicators of the

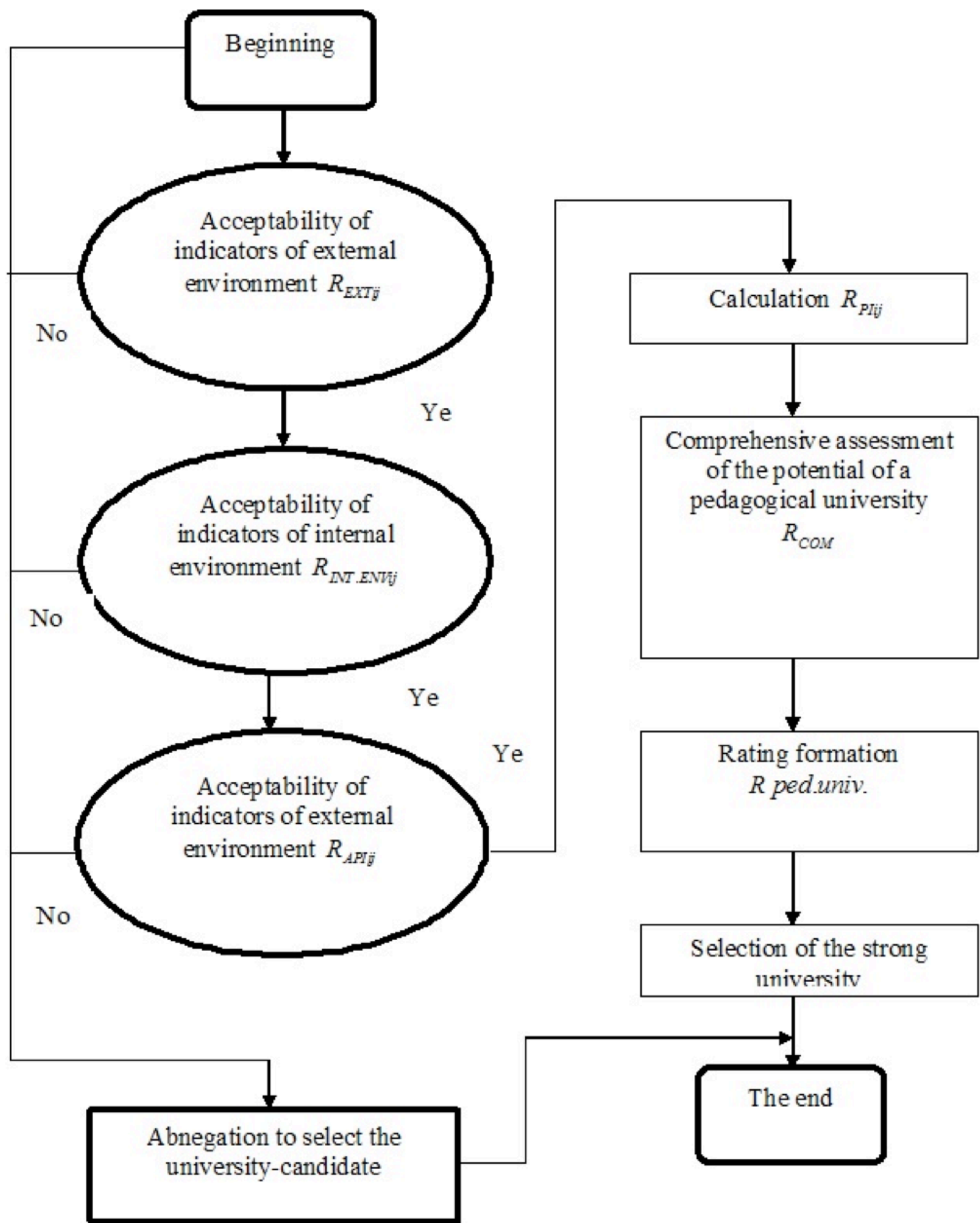
external environment b_j , internal environment d_j and indicators of university activity m_j that are essential for higher education institution, the lower the risk of unaccounted factors and higher accuracy of the evaluation of pedagogical university potential.

Overall assessment R_{COM} is determined as follows:

$$R_{COM} = (b + d + m) \times I_j^b \times I_j^d \times I_j^m.$$

The resulting criteria R_{COM} are the basis for the formation of the rating of a pedagogical university $R_{ped.univ.}$ in order to select the strong university in the region from among other universities. The algorithm for the selection of the strong university in the region is shown in Figure 3. The proposed flow chart of potential assessment and rating of pedagogical universities in the region with the modern software makes it possible to receive the evaluation results for past periods on the basis of data provided by the universities. Also the model makes it possible to foresee the resulting criterion change of the educational institution R_{COM} on the basis of historical data and pedagogical university rating $R_{ped.univ.}$ on its basis. That prediction is of particular value of the proposed model for the regional Ministry of Education and Science, in justifying the choice of the vector in terms of variant factors of external and internal environment.

Figure 3. Algorithm for selection of the strong pedagogical university in the region based on the assessment of its potential



4. Discussion of the results

An important advantage of the proposed methodological approach is the ability to track changes in the dynamics of pedagogical university potential, which is important for the realization of strategic objectives of the educational institution management. Despite the complexity, or inability to measure a number of indicators of external and internal environment, we proposed an approach for the evaluation using the binary way.

The proposed methodological approach of evaluating the complex potential of a pedagogical university makes it possible to take into account the unique modes of all spheres of their life on the basis of resource provision in the face of changing factors, internal and external environment. The method of integrated assessment underlying the implementation of the system approach via logical reasoning makes it possible to generate the final evaluation of the

5. Conclusion

The tools used in the evaluation of the potential are presented by the dynamic characteristics of a wide range of university activities. The technique makes it possible to reflect the specific features of a pedagogical university and especially its activity in contrast to other categories of universities. The proposed approach makes it possible to identify the strengths and weaknesses of the educational institution and the separate lines of its activity. The value for the university management is the opportunity for the extrapolation of the potential indicator based on the data of previous periods, as well as in the development strategy of the educational complex. The proposed method allows for the regional authorities and the Ministry of Education and Science, in particular, to select the strong university from among the candidates with the aim of focusing efforts on improving the quality of higher pedagogical education and the strategic objectives.

References

- Alstete, J.W. (1995). *Benchmarking in Higher Education: Adapting Best Practices to Improve Quality*. Washington: ERIC Clearinghouse on Higher Education.
- Belousov, I.V. (2011). *Metodicheskie osnovy otsenki nauchno-innovatsionnogo potentsiala vuza i strategiya aktivizatsii ego razvitiya: avtoreferat diss. ... kand. ekon. nauk* [Methodical Foundations of the Estimation of Scientific and Innovative Potential of the University and Enhancing Its Development Strategy (Ph.D. Thesis Abstract)]. St. Petersburg.
- Chvanova, M. (2004). Innovatsionniy potentsial klassicheskogo regionalnogo universiteta [Innovative Potential of Classic Regional University]. *Vysshee obrazovanie v Rossii, 12*: 86-88.
- Chistyakova, N.O., Krakovetskaya, I.V., & Vorob'eva, E.S. (2013). Otsenka potentsiala universiteta kak elementa innovatsionnoy sredy regiona [Evaluation of Potential of the University as a Part of the Region's Innovation Environment]. *Kreativnaya ekonomika, 7(79)*: 109-118.
- Chistyakova, N.O., Krakovetskaya, I.V., & Vorob'eva, E.S. (2013a). Otsenka potentsiala universiteta kak elementa innovatsionnoy sredy regiona [Evaluation of Potential of the University as a Part of the Region's Innovation Environment]. *Kreativnaya ekonomika, 8(80)*: 44-51.
- Chistyakova, N.O., Krakovetskaya, I.V., & Vorob'eva, E.S. (2013b). Otsenka potentsiala universiteta kak elementa innovatsionnoy sredy regiona [Evaluation of Potential of the University as a Part of the Region's Innovation Environment]. *Kreativnaya ekonomika, 9(81)*: 105-113.
- Doronin, A.I. (2003). *Biznes-razvedka* [Business Intelligence] (2nd ed., updated and revised). Moscow: Os'-89.
- Dealtry, R. (2000). As for Appraising the Strategic Potential of the Corporate University. *Journal of Workplace Learning, 12(5)*: 217-224.
- Emelyanov, S.G. Borisoglebskaya, L.N., & Tsukanov, N.E. (2006). Integrirovannaya otsenka innovatsionnogo potentsiala vuza [Integrated Assessment of the Innovative Potential of a University]. *Innovatsii, 6*: 93-98.
- Farquhar, R. (2008). Higher Education Benchmarking in Canada and the United States in America. In A. Schofield (Ed.), *Benchmarking in Higher Education: An International Review* (pp. 21-32). London: CHEMS; Paris: UNESCO.
- Gal'dikas, V.A. (2012). *Otsenka realizatsii kadrovogo potentsiala v sisteme upravleniya obrazovatelnyimi uslugami vuza: diss. ... kand. ekon. nauk* [Evaluation of the Implementation of Personnel Potential in the System of Educational Services Management of University (Ph.D.

Thesis)]. St. Petersburg State Engineering and Economic University, St. Petersburg.

Garlick, S., & Pryor, G. (2004). *Benchmarking the University: Learning about Improvement. A Report for the Department of Education, Science and Training*. Canberra: Dept. of Education, Science and Training.

Hodakevich, A.N. (2007). *Formirovanie i razvitie kadrovogo potentsiala organizatsii: diss. ... kand. ped. nauk* [Formation and Development of Personnel of the Organization (Ph.D. Thesis Abstract)]. St. Petersburg University of the State Fire Service, Saint Petersburg.

Huggins, R. & Cooke, Ph. (1997). The Economic Impact of Cardiff University: Innovation Learning and Job Generation. *GeoJournal*, 41(4): 325-337.

Jackson, N., & Lund, H. (Eds.). (2006). *Benchmarking in Higher Education*. Buckingham: Society for Research into Higher Education & Open University Press.

Karamurzov, B.S. (2014). Potentsial klassicheskogo universiteta [Potential of Classical University]. *Akkreditatsiya v obrazovanii*, 6(74): 55.

Kirillov, A.V. (2007). *Razvitie nauchno-pedagogicheskogo kadrovogo potentsiala voennykh vuzov: avtoreferat diss. ... kand. ped. nauk* [Development of Scientific and Pedagogical Personnel Potential of Military Schools (Ph.D. Thesis Abstract)]. Law and Management Academy, Ryazan.

Kortov, S.V. (2004). Innovatsionniy potentsial i innovatsionnaya aktivnost vuzov URFO [Innovative Potential and Innovative Activity of Universities of Ural Federal District]. *Universitetskoe upravlenie: praktika i analiz*, 1: 61-68.

Krakovetskaya, I.V., Monastyryni, E.A., & Chistyakova, N.O. (2008). Kompleksnaya otsenka potentsiala universiteta kak klyuchevogo elementa innovatsionnoy systemy regiona [Comprehensive Assessment of the Potential of a University as a Key Element in the Innovation System of the Region]. *Ekonomika i upravlenie*, 2: 216-222.

Krakovetskaya, I.V. (2009). *Otsenka innovatsionnogo potentsiala universitetskogo kompleksa regiona: avtoreferat diss. ... kand. ekon. nauk* [Estimation of Innovative Potential of the Region's University Complex (Ph.D. Thesis Abstract)]. Tomsk State University, Tomsk.

Kreysing, M. (2002). Autonomy, Accountability, and Organizational Complexity in Higher Education: The Goettingen Model of University Reform. *Journal of Educational Administration*, 40(6): 552-560.

Kuvshinov, M.S. (2007). Algoritmy otsenki investitsionnogo obraza organizatsii [Algorithms of Estimation of Investment Reputation of the Organization]. *Vestnik YuUrGU. Seriya Ekonomika i menedzhment*, 5: 60-69.

Lujan, W.L. (2001). *Internationalization of State Universities and Land-Grant Colleges: A Response to the Enhancement of Global Economic Competitiveness in the next Millennium*. Mexico: New Mexico State University.

Maksimov, Yu., Mityakov, S., & Mityakova, O. (2004). Metodika otsenki innovatsionnogo potentsiala UNIK mnogoprofil'nogo tekhnicheskogo universiteta [Methods of Estimation of Innovative Potential of Educational, Research and Innovation Complex of Multidisciplinary Technical University]. *Obrazovanie i innovatsii*, 2: 28.

Nacharkin, V.A. (2005). Analiz formirovaniya i otsenki innovatsionnogo potentsiala vysshey shkoly [Analysis of the Formation and Evaluation of the Innovative Potential of Higher Education]. *Produktivnoe obrazovanie: proekty v produktivnom obrazovanii*, 5: 103-109.

Nacharkin, V.A. (2005a). *Otsenka innovatsionnogo potentsiala vysshey shkoly i analiz ego sootvetstviya potrebnostyam ekonomiki: avtoreferat diss. ... kand. ekon. nauk* [Evaluation of the Innovation Potential of Higher Education and the Analysis of Its Compliance to the Needs of the Economy (Ph.D. Thesis Abstract)]. Saratov State Technical University, Saratov.

Park, J., & Park, Ju. (2007). Multichannel Retailing Potential for University-Licensed Apparel

Effects of University Identification. *Clothing and Textiles Research Journal*, 25(1): 58-73.

Piper, S.P. (2002). *The Revolutionary Potential of the University*. Sydney: **University** of New South Wales Press.

Proekt TACIS.FINRUS 9804 "Innovatsionnye tseny i naukoigrady v Rossii". Innovatsii dlya ekonomicheskogo razvitiya regionov [TACIS.FINRUS 9804 Innovation Centers and Science Cities in Russia Project. Innovations for the Economic Development of Regions]. (2002). Moscow.

Risen, Yu.S., & Zakharova, A.A. (2014). Funktsionaly otsenki pokazateley potentsiala vuza [Functional Assessment of Potential Indicators of University]. *Problemy sovremennoy nauki i obrazovaniya*, 11(29): 5-12.

Shukshunov, V.E., Nyrkov, E.A., & Varyukha, A.M. (2002). *Innovatsionniy potentsial vysshey shkoly Rossii* [Innovative Potential of High School of Russia]. Novocheboksaysk: YRGU (NPI).

Scelton, M. (2002). *The Continuing Value of Benchmarking*. APQC.

1. South Ural State Humanitarian Pedagogical University, 454080, Russia, Chelyabinsk, Lenin Ave., 69. Email: gnyatshinaev@cspu.ru

2. South Ural State Humanitarian Pedagogical University, 454080, Russia, Chelyabinsk, Lenin Ave., 69

3. South Ural State Humanitarian Pedagogical University, 454080, Russia, Chelyabinsk, Lenin Ave., 69

4. South Ural State Humanitarian Pedagogical University, 454080, Russia, Chelyabinsk, Lenin Ave., 69

Revista ESPACIOS. ISSN 0798 1015
Vol. 38 (Nº 25) Año 2017

[Índice]

[En caso de encontrar algún error en este website favor enviar email a webmaster]

©2017. revistaESPACIOS.com • Derechos Reservados