

# Model of the management system of a higher educational institution

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**Abstract.** The effective management mechanisms of university development through the stimulation and motivation of the activities of university employees, in particular representatives of the teaching staff, to achieve the strategic development goals are considered. The object of the study was many higher educational institutions, including those in the agrarian sector, which train students in agricultural specialties. It also describes the decision-making mechanism of competitive and elective procedures based on the university personnel commission recommendations and assessing the effectiveness and efficiency of employees using a three-pronged incentive mechanism.

## 1 Introduction

Effective management of the university's development cannot be carried out without a comprehensive assessment of its activities [1]. This task is carried out both by external structures, such as the Ministry of Education and Science of the Russian Federation, Rosobrnadzor and other state authorities, as well as by various agencies that carry out rating studies, and by the organization itself, which conducts an internal assessment of the effectiveness and efficiency of activities, including an internal assessment of the quality of education. In order to make managerial decisions and internal assessment of the university's activities as a whole, it is necessary to assess the activities of individual structural units (departments, faculties, administrative services, etc.) and their leaders [2]. In this regard, the task arises to correctly and objectively assess the effectiveness of the work of both the structural divisions of the university and their employees [3].

The purpose of the study is to develop such a mechanism for stimulating and motivating university employees, which would increase the effectiveness and efficiency of not only individual personalities and structural units, but also bring the university to a new level, diversify not only the target audience, but also sources of funding, and also allow solving strategic tasks facing the organization [4]. One of the tools of the The mechanism is an effective contract, which, through the incentive mechanism, encourages employees, through the performance of their job duties, to ensure the positive dynamics of indicators

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characterizing the efficiency, effectiveness and quality of the institution's work [5]. But such a tool alone is not enough, it is necessary to additionally stimulate employees and provoke them to carry out their activities, taking into account the goals and objectives of the university. This study proposes a three-pronged mechanism for stimulating employees of higher education institutions, which includes individual elements, such as an effective contract, employee rating, and additional performance-based bonuses [5].

On the example of Voronezh State Technical University (hereinafter VSTU), one can see the effectiveness of the introduction of a three-pronged mechanism for stimulating employees on the example of employees of administrative and managerial departments, including the effectiveness and efficiency of the vice-rector's corps. One of the elements of this mechanism is an effective contract that has been implemented for more than 5 years, both for faculty and for administrative and support services. Such a mechanism, on the one hand, allows you to stimulate and motivate employees, and on the other hand, to identify ineffective personnel and shows the need for their rotation. In particular, it becomes obvious that a number of administrative, managerial and supporting structural units can be liquidated or merged with more effective ones with similar functionality, which in turn will increase the efficiency of management of the educational organization as a whole. An effective contract predominantly increases the scope of core obligations and does not always take into account the full range of work performed or activities that could be carried out by employees, which in turn would have a positive impact on the effectiveness of the entire organization. Therefore, it was decided to add other tools to stimulate and motivate employees in addition to the effective contract [6].

## **2 Materials and Methods**

A system of incentive payments and bonuses (hereinafter referred to as bonuses) exists in all organizations, but it is usually in the nature of incentives for the intensity and high results of work, the quality of work performed and payments based on the results of work. Of course, such payments can be made with different frequency, as a rule, for a month, quarter, semester, year or as a lump sum. But, in turn, they cannot have a systemic impact on the effectiveness and efficiency of employees. Nevertheless, the use of such an element of incentives is necessary [7,8].

Another tool of the above-mentioned mechanism is individual ratings of employees: teachers, employees and heads of structural units (vice-rectors, deans, heads of departments, heads of departments, departments, centers, etc.), and ratings of individual structural units (faculties and institutes, departments, departments, departments, centers, etc.). Particular attention is paid to the rating of teaching staff - an individual assessment of the work of employees from among the teaching staff, carried out in order to stimulate the professional and personal development of personnel and motivation of work, as well as to reward teaching staff for achievements in educational, training and methodological, research and other activities.

But it must be admitted that without appropriate incentives, in particular, bonuses based on the results of the above-mentioned ratings, this mechanism will have almost zero result. It is also necessary to understand the importance of the time factor, since employees will need a certain period of time to understand the mechanism and structure of such ratings [9].

In recent years, most universities have been using the mechanism of employee rating to some extent [10-14]. In each university, such a system is individual and takes into account internal tasks and strategic directions of development, but, of course, also includes indicators, the assessment of which is carried out when monitoring the activities of educational institutions of higher education. Based on the results of the above-mentioned

monitoring, any university can assess its position in the educational space, competitive advantages and determine promising areas and ways of further development Development.

The methodological base of the study is focused on generally accepted scientific methods that ensure the consistency, consistency and reliability of the research results. To substantiate the provisions put forward in the work, the methods of logical-a priori, comparative, empirical, systemic, economic analysis, economic-mathematical and graphical modeling, methods of expert and comparative assessments, etc., were used.:

- the first group consists of 24 (including 9 branches) regional universities (the Voronezh Region is represented in this study);
- Second group: 33 flagship universities;
- the third group: 29 research universities (hereinafter referred to as NRU);
- fourth group: 10 federal universities (hereinafter referred to as FU)[15].

So in Table. Figure 1 presents a comparative characteristic representing a sample of 4 universities in each separate group of organizations. The names of the universities are indicated using the short name. This comparison includes only a part of the indicators characterizing the quantitative characteristics of organizations, including the number of students and faculty, financial, economic and research activities of universities. More emphasis is placed on research activities. This is due to the fact that educational activities are the basic direction of the university, and not all organizations can form their consolidated budget at the expense of other areas of activity. The implementation of research and development (hereinafter referred to as R&D) allows not only to increase the overall budget of the university, but also to occupy a new niche, move to a new level and be competitive.

From the above comparison, it can be concluded that large universities with a recognized reputation, including those in higher positions in various Russian and international rankings, have higher indicators characterizing, in particular, their research activities. At the same time, all represented universities receive at least 50% of their total revenues from the federal budget, and their share of income from educational activities also prevails. Basically, in those organizations where the share of R&D is more than 10%, and these are mainly NRUs and FIs, there is a significant gap in the values of such indicators as publication activity (the total number of publications per 100 academic staff) and grant activity (the number of grants received per 100 academic staff) compared to other universities. But there are exceptions, such as the Voronezh State Forestry Technical University (VSUSTU), with a relatively small share of income from R&D (5.87%), publication activity (the total number of publications per 100 academic staff is 1,117.77 units) is even higher than that of the National Research University and the Federal University. It can be assumed that the university has organized an appropriate system of stimulation and motivation of the publication activity of employees[16,17].

**Table 1.** Comparative Characteristics of Educational Institutions of Higher Education

Name of the educational institution of higher education	Number of students (all forms of education)	Average Unified State Exam score, score	Number of academic staff, people (essential workers)	Salary of teaching staff, %	Income of the university from all sources, thousand rubles.	Income of the university per 1 academic staff, thousand rubles
<i>Voronezhskie:</i>						
VSU	17 495	69,82	1 236	210,45	2 844 801,20	2 188,98

Name of the educational institution of higher education	Number of students (all forms of education)	Average Unified State Exam score, score	Number of academic staff, people (essential workers)	Salary of teaching staff, %	Income of the university from all sources, thousand rubles.	Income of the university per 1 academic staff, thousand rubles
VSTU	15 768	65,08	885	199,50	2 463 737,40	2 446,25
VSGLTU	6 797	64,38	246	211,32	731 580,60	2 410,08
VSUIT	6 318	63,47	319	196,92	848 032,80	2 831,50
<b>Reference:</b>						
Vyatka State University	16 231	67,16	696	215,67	2 132 891,10	3 041,56
Novosibirsk GTU	14 567	68,25	960	210,30	3 811 758,50	4 187,83
Volgograd GTU	13 033	64,87	721	216,45	2 200 981,90	3 267,25
Belgorod State Technical University named after V. G. Shukhov	12 382	67,66	650	202,99	2 317 403,70	2 916,99
<b>Federal:</b>						
Southern Federal University	23 300	75,49	2 243	212,24	6 350 895,30	2 829,66
North-Caucasian Federal University	17 300	67,06	868	193,89	2 964 559,10	2 918,73
North-Eastern Federal University	14 804	63,58	1 234	202,57	6 024 791,20	4 482,23
Immanuel Kant Baltic Federal University	8 318	81,41	549	239,12	2 444 098,00	4 713,33
<b>National Research:</b>						
Peter the Great SPbPU	29 347	79,88	1 756	237,25	11 562 405,20	6 192,71
Belgorod State University	18 020	65,86	1 008	206,21	4 818 089,00	4 577,76
MGSU	12 080	70,99	820	197,32	5 291 354,40	6 637,01
Samara National Research University	15 517	71,91	1 110	242,31	3 625 104,10	3 549,33

Name of the educational institution of higher education	Total R&D, thousand rubles	Scope of R&D by 1 NID, thousand rubles.	Total number of publications per 100 academic staff, units.	Number of grants received per 100 academic staff, units	Share of income from extra-budgetary sources, %	Share of revenues from the federal budget, %	Share of income from educational activities, %	Share of R&D revenues, %
<b>Voronezhskie:</b>								
VSU	265 943,80	204,64	381,43	4,77	38,99	60,81	69,43	9,35
VSTU	119 843,50	125,44	503,70	1,47	25,68	74,32	71,28	4,86
VSUIT	72 429,90	248,35	489,15	2,06	29,94	70,06	89,07	8,55
VSGLTU	42 927,80	141,42	1 117,77	3,29	49,21	50,55	87,79	5,87
<b>Reference:</b>								
Volgograd GTU	530 409,40	787,37	714,02	12,02	42,62	57,34	67,06	27,27
Novosibirsk GTU	390 152,60	481,67	316,08	9,26	25,97	73,95	52,55	10,24
Belgorod GTU named after V. G. Shukhov	334 136,60	431,12	686,39	16,77	34,41	65,04	64,19	14,42
Vyatka State University	120 080,10	177,12	416,54	1,77	33,35	66,36	90,55	5,98
<b>Federal:</b>								
Southern Federal University	1 604 527,00	731,88	444,93	0,00	40,78	59,22	62,19	31,37
Immanuel Kant Baltic Federal University	436 160,40	875,91	423,68	11,25	33,42	65,88	54,25	17,85
North-Eastern Federal University	388 748,8 0	298,89	199,31	2,77	19,01	80,31	64,59	6,45
North-Caucasian Federal University	263 110,1 0	259,04	493,26	8,37	41,79	58,21	59,18	8,88
<b>National Research:</b>								
SPbPU Peter the Great	2 357 703,70	1 262,76	948,26	16,55	50,15	49,69	63,33	20,46
National Research University BelSU	1 063 284,50	1 078,60	959,52	7,10	49,41	50,20	62,50	22,07
NRU MGSU	929 685,30	1 253,79	589,02	0,81	37,04	62,96	58,48	17,57
Samara National Research University	632 027,9 0	652,79	269,06	8,78	32,38	65,53	62,16	18,32

### 3 Research and results

On the basis of the above study of the indicators of effectiveness and efficiency of VSTU activities and a comparative analysis with other educational institutions of higher education, the university administration decided to introduce an additional incentive tool - rating in order to form a unified motivation system, which was called a triune mechanism for stimulating employees. At the moment, the university is introducing the third element of such a system for faculty members - the rating of teaching staff, which includes the assessment of teachers in the following types of activities:

- Educational and Methodological Activities;
- organizational and methodical work;
- Scientific and research work;
- Educational Work;
- additional areas of activity (for example, the defense of a PhD thesis for non-degree teachers or scientific supervision for postgraduate teachers)).

Each type of activity includes a finite list of indicators and a certain number of points are awarded for each completed indicator, the amount of which is approved by the expert group on the basis of internal tasks and strategic development plans, as well as external challenges and requirements facing the university. The amount of the incentive payment depends on the number of points scored based on the results of the rating assessment [18]. For example, medians are determined for each job rating, and employees who score less than the median do not participate in the distribution of incentive payments. Based on the results of the ranking of the points scored, interval groups of teaching staff for each position are allocated, calculated as a percentage of the maximum score scored in their group, in accordance with which an incentive payment is assigned:

- ✓ The first group (90 - 100%) is the maximum payout;
- ✓ The second group (70 - 90%) is the average payout;
- ✓ The third group (50 - 70%) – the minimum amount of payment;
- ✓ Fourth group (less than 50%) – incentive payment is not assigned.

It should be noted that it is not enough only to develop such a mechanism for rating performance, but also to regularly assess the effectiveness of the implementation of such a system. To do this, it is advisable to conduct a study of the opinion of university employees and the level of their acceptance of the rating assessment mechanism, the validity of the criteria and methods for calculating indicators, the objectivity of the results obtained. Understanding and approving the need for rating increases the effectiveness of the implementation of such a system. In this study, the emphasis is on harmonizing the university's performance indicators, and the rating mechanism allows you to evenly and progressively achieve the set goals [19].

At VSTU, a comprehensive assessment of the activities of the teaching staff, including the heads of departments and deans, as well as the structural divisions entrusted to them, is carried out by the personnel commission. The Personnel Commission conducts a regular analysis of the personnel situation at the departments and faculties, evaluates the efficiency and effectiveness of their activities; makes recommendations for the academic councils of the faculties and vice-rectors to improve the effectiveness of the implementation of personnel policy, including the involvement of third-party candidates in the election of the head of the department or the dean of the faculty and on the announcement of a competitive selection of teaching staff depending on the personnel situation at the department or departments of the faculty and the results of ratings; makes recommendations for the academic councils of the faculties and vice-rectors on the formation of the personnel reserve of the faculty, including the preparation of the reserve for filling the positions of heads of departments and deans of faculties; provides the Rector with an analysis and

forecast of the possible development of the personnel situation at the departments and at the university as a whole for the short, medium and long term. The commission evaluates the performance of the head of the department, the dean of the faculty or the representative of the teaching staff based on the analysis of the following documents and characteristics: fulfillment of the mandatory terms of the employment contract, indicators of an effective contract, indicators of ratings. The commission evaluates the candidate's professional level through interviews, attending open classes and other forms of interaction with the candidate [20].

## 4 Conclusion

Within the framework of election and competitive procedures based on the method of expert assessment (discussion), as well as on the basis of the assessment of the performance indicators and efficiency of departments, faculties, heads of structural divisions and individual teachers, the personnel commission makes positive or negative recommendations for the academic councils of the faculties and the academic council of the university.

Thus, as a result of the study, it can be concluded that the considered mechanism, which includes the work of the personnel commission and the triune mechanism of employee incentives, will ensure the achievement of the university's goals and will effectively manage the development of the university.

## References

1. Kudryavtseva I.S., Kozorez D.A., Rumakina A.V., *Quality and Life*. 2023. No. **2 (38)**. pp. 10-14. DOI: 10.34214/2312-5209-2023-38-2-10-14
2. Gurov, V., Deniskina, A., Kudryavtseva, I., Kostyshak, M. *E3S Web of Conferences*, 2023, **383**, 05011
3. Zolotareva Yu.Yu., Kudryavtseva I.S., Sergeeva S.I., *FES: Finance. Economy. Strategy*. 2020. T. **17**. No. 1. P. 55-61.
4. Vasetskaya N.O., *Components of Scientific and Technological Progress*. 2022. № 8 (**74**). 60-63.
5. Bekebayeva M.O., Kelesbayev D.N., Agabekova Sh.N., *Bulletin of Karaganda University. Economy Series*. 2022. **106**. 2. 34-40.
6. Skachko G., Surkova E., Ermolaeva E., Potsebneva I.V., *Adoption of management decisions on the basis of the risk management model*, *E3S Web of Conferences*. 22. "22nd International Scientific Conference on Energy Management of Municipal Facilities and Sustainable Energy Technologies, EMMFT 2020" 2021. C. 11008. DOI: 10.1051/e3sconf/202124411008
7. Antonov A.V., Smith N.L., *Services in Russia and Abroad*. 2023. **17**. 2 (104). 153-163. DOI: 10.5281/zenodo.8119199
8. Pryadko S.N., Demyanov I.A., *Symbol of Science: international scientific journal*. 2022. No. **8-1**. pp. 29-31.
9. Bakhodurova S.A., *Questioning students as a tool for managing the professional activities of university teaching staff*, In the collection: *Digital transformation as the main factor in the development of Russia within the EAEU. Materials of the international scientific and practical conference*. Ed. Corresponding member RAS V.A. Tsvetkova, Ph.D., Associate Professor K.Kh. Zoidova., 2022. pp. 21-26.

10. Gamzaeva M.V., Temaev Z.B., Approaches to assessing the quality of the educational process at a university as a pedagogical category and an object of management, In the collection: Vocational pedagogical education. status and prospects. Moscow-Berlin, 2022. pp. 120-126.
11. Batievskaya V.B., Sokolovsky M.V., Bulletin of Samara University. Economics and Management. 2022. **13**. 2. 149-158. DOI: 10.18287/2542-0461-2022-13-2-149-158
12. Serebryansky S., Safoklov B., Potsebneva I.V., Kolosov A.I., Model of information support of the quality management system, In the collection: Conference "INTERAGROMASH 2021". Precision Agriculture and Agricultural Machinery Industry, Volume 2. Conference proceedings. "Lecture Notes in Networks and Systems 247" 2022. C. 993-1003.
13. Alaverdov A.R., Problems of theory and practice of management. 2022. No. **1**. P. 151-162. DOI: 10.46486/0234-4505-2022-01-152-163
14. Zhidkikh N., Smolyaninov A., Deniskin Y., Polity V., Mangushev I., E3S Web of Conferences, 2023, **376**, 01100
15. Gudkova S.A., Malashchenko M.V., Yakusheva T.S., Bulletin of Volga University. V.N. Tatishcheva. 2023. T. **2**. No. 3 (52). pp. 34-45.
16. Korchagin, A., Deniskin, Y., Pocebneva, I., & Vasilyeva, O. (2022). Transportation Research Procedia, **63** 1521-1533. doi:10.1016/j.trpro.2022.06.164
17. Yurin, D., Deniskina, A., Boytsov, B., & Karpovich, M. (2021). E3S Web of Conferences, **244** doi:10.1051/e3sconf/202124411010
18. Tambiev A.Kh., Economics and Entrepreneurship. 2022. No. 5 (142). pp. 254-258. DOI: 10.34925/EIP.2022.142.5.048
19. Tavbulatova Z.K., Chaplaev H.G., Vestnik GGNTU. Humanities and socio-economic sciences. 2022. T. 18. No. **2 (28)**. pp. 24-31. DOI: 10.34708/GSTOU.2022.14.69.003
20. Glukhova L.V., Syrotyuk S.D., Palferova S.Sh., Bulletin of the Volga University. V.N. Tatishcheva. 2022. T. **2**. No. 3 (50). pp. 40-50. DOI: 10.51965/20767919\_2022\_2\_3\_40