

Project Management in the Higher Education Institution Activity in Terms of Digital Economy

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Abstract—The article is devoted to the relevant issues of the digital management of research activity in university.

Keywords: *research activity, digital automated control systems, research group leader and members selection process model*

members selection process within NRU. The developed model will not only lead to the research group activity effectiveness, yet it will lead to the effectiveness of NRU as a whole and will lead to NRU competitiveness and contribute to the strategic goal achievement.

I. INTRODUCTION

The article is devoted to the relevant issues of the digital management of research activity in university. Last years Russian economy directs to create the necessary conditions for the emergence of new breakthrough and promising digital technologies. [1] The programme "Digital economy in the Russian Federation" (was approved by Government Order № 1632-p from 28.07.2017) reflects basic methods of digitalisation, that include human resources and education, normative regulation, information infrastructure and information security, formation of research competence and early technical means.

The purpose of the study was to develop a digital model of an automated control system for the research activity in National Research University. The research was based on the example of the National Research University "Moscow Power Engineering Institute" that will celebrate 90 years since foundation in 2020. As a part of the research authors have analyzed modern local and international tendencies in an education system and have developed a portrait of a "digital generation teacher" considering mastery of skills associated with IT. Authors have expanded modern Automated Control Systems of research activity subjects with additional subsystems and developed a model of a leader and group

II. RESEARCH METHODS

Basic methods include: dialectic scientific knowledge and special knowledge (analysis, synthesis, comparison, logical and systemic structural analysis, formalisation, local regulations), modeling.

III. PURPOSE OF THE RESEARCH

The development of the research group leader and members selection process model on the basis of a developed digital model of an ACS for the research activity in university.

IV. THE RESEARCH

Human activity is the key for the world economy. Recruiting highly qualified workers is one of the most important issues for all countries worldwide. Struggle for the human capital escalates and a cost of human capital permanently increases. [2] Due to the transition to the digital economy requirements for personnel increase, thereby key conditions for the digital economy personnel preparation are to be created. In addition to this, education system that prepares competent personnel for the digital economy is also to be improved; As well as motivation system for learning the

competencies associated with information technologies is to be created. [3]

In the NRU special emphasis is made on the development of teaching staff through qualification training, retraining courses, participation in conferences, seminars, forums, webinars etc. The approach to teaching has changed due to the amount of information human obtain externally.[3]

Modern university needs a teacher of a new digital generation [4], portrait of which is represented on a fig. 1. This kind of teacher possesses different foreign languages, has special knowledge of a subject (be a professional in a field of study), knowledge of psychology and pedagogics, be social and know how to deliver an information and interest and keep an attention of an interlocutor. Additionally, new digital generation teacher should have an experience of work with computer programs (presentation and video creation etc.) [5] and be capable to work with office equipment, internet (make video content, work in social media, make video-conferences etc.); also, a type of a new digital generation teacher should use an individual approach to teaching, have a healthy lifestyle, complete tasks quickly and on time, valuing time, be mobile and have analytical skills.[6]

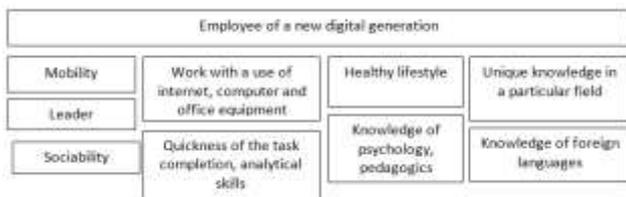


Fig. 1. New digital generation teacher portrait (Source: developed by authors)

Labor market changes rapidly in terms of the processes complexity growth, new technologies emergence, artificial intelligence emergence and global internet space development. [7] The existing system of personnel training does not have enough time to catch up with rapid change and adapt to it as a result it can not fulfil growing needs of a new formation personnel for the business. [8]

The formation of human resource capital in any country should provide the economy with the personnel. It means that enterprises, productions, organizations of any form of labor must have an opportunity to find employees to complete arising for these companies tasks.[9] Thus, these workers should possess the required knowledge and competencies required by employers. [10] At the same time, as countries move to the digital economy, one of the main problems on the labor market become an impossibility to find a sufficient amount of personnel with a required qualification. In the world this problem is known as a skills gap.

Modern trend of standardization of education and centralized education and labor market control leads to a mass personnel preparation with standardized knowledge and skills who enter the labor market with no possession of required competencies and as a result get into skills mismatch. [11]

Only significant change of education system is able to deal with the problem of skills mismatch. [12] To make this

change, education system must be an intermediary between the needs of the employer, state and personality and form a complete personalized tool kit for education throughout a human lifetime. Employer’s target-is to select employees based on their real skills, but not formally by their education, take into account their personal qualities and offer an opportunity for the self-actualisation at a workplace. [13]

Thus, education system must keep the concept of human centricity, according to which everyone should get the skills of the future both – cognitive and non-cognitive skills needed for work in terms of high uncertainty and permanent changes on a labor market. Professional development must be permanent and continuous and be personalized during the lifetime of a human. [14]

The concept of human centricity suggests that employees consciously and independently come to the processes of choosing skills that they are to be taught, the amount of knowledge they are to receive and the amount of time they are ready to spend on it. [15]

The concept of human centricity suggests barriers-free labor market meaning the employment is competency based rather than formal education status and it suggests a maximum opportunity information on a labor market. Competency mobility – creation of a favorable conditions for labor mobility, including adaptive work performance; labor market inclusiveness – equal opportunities for the successful employment regardless of life situation or social status and also a respect for everyone’s values as a competitive advantage for personal and professional growth of all potential employees. [16]

The use of a human centricity concept is able to decrease skills gap, increase labor productivity, lower costs for employee training and search and also suggests personal potential disclosure without damage to others. [17] The following principles lay down as a part of given concept: future skills acquisition, culture of continuous improvement, conscious independence in terms of professional way, labor market transparency, competence mobility, labor market inclusiveness and employee values respect. [18]

In the future leader will be not the one who has the most perfect infrastructure, the fastest transport or the most powerful energy, thus the one who can more effectively and coordinated manage the complex of opportunities. [19]

The analysis of the structure of modern automated control systems of informational interaction between research subjects (RS) allows to supplement it with automated subsystems on the basis of developed methods of ACS creation. [20] Augmented structure of adaptive ACS allows to highlight and foresee program realization of the following modules: directory administration, collection of information from other universities and partner companies, data transmission using ACS, also subsystems of information protection against unauthorized access.[21] The structure of an adaptive ACS of a university research activity is represented on a fig. 2. To automate this system, special software must be developed that will maintain coordinated operation of all subsystems.

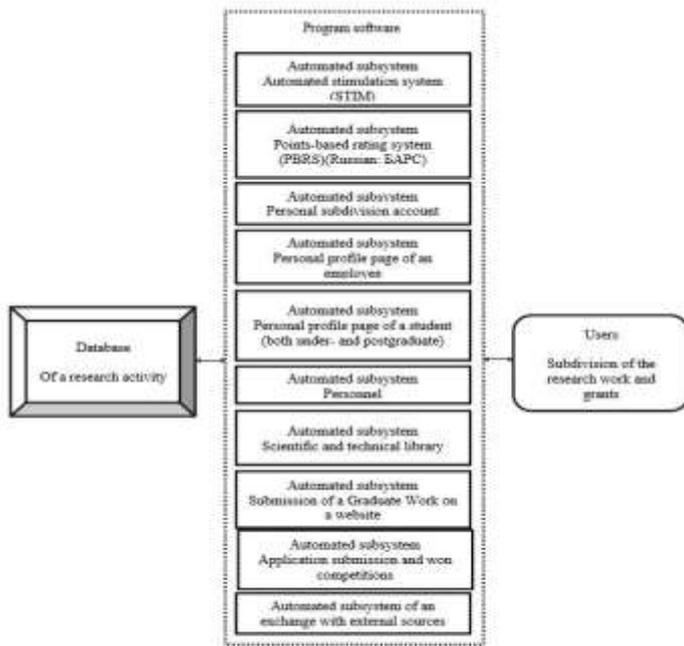


Fig. 2. Digital model of ACS for the research activity in university (Source: developed by authors based on [22])

Consider every automated subsystem separately.

Stimulation system. This subsystem identifies employees whose scientific research and development works match with areas of announced project competitions, publication and competition application activity of the candidate etc.

Points-based rating system. With the use of this subsystem undergraduate and postgraduate students who match with the area of study, course and a form of study, and also who have publishing activity and who are of a high activity in research projects participation.

Personal account of a subdivision. This subsystem identifies the relation of a student or a staff member to a particular university subdivision etc.

Personal profile page of an employee. This subsystem evaluates an additional professional education of an employee, participation at committees, psychological features that can be used to form a psychogram etc.

Personal profile page of a student (both under- and postgraduate). Evaluates additional student achievements, psychological features that can be used to form a psychogram etc.

Personnel. This subsystem identifies the relation of employees to the university, education base, position, degree and rank, labor relations with the university etc.

Scientific and technical library. It helps to identify the research-methodological base for the competition application

formation process, also project’s completion for other types of the research activity.

Submission of a Graduate Work on a website. This subsystem analyses subjects and scientific constituencies of graduate and research works to attract students for further projects completion. Also, attraction of students to project work may interest bachelors to apply for a master’s degree course and masters to apply for a PhD course.

Application submission and won competitions. This subsystem identifies employees and students who participate (or participated last 3 years) in project competitions or who are the supervisors of such projects.

Exchange with external sources. This subsystem requests the information about partners’ and other universities employees, including international.

To note, some subsystems may have the same information that will not be duplicated as the same information is mutually exclusive. Fig. 3 reflects the data represented by each subsystem described above:

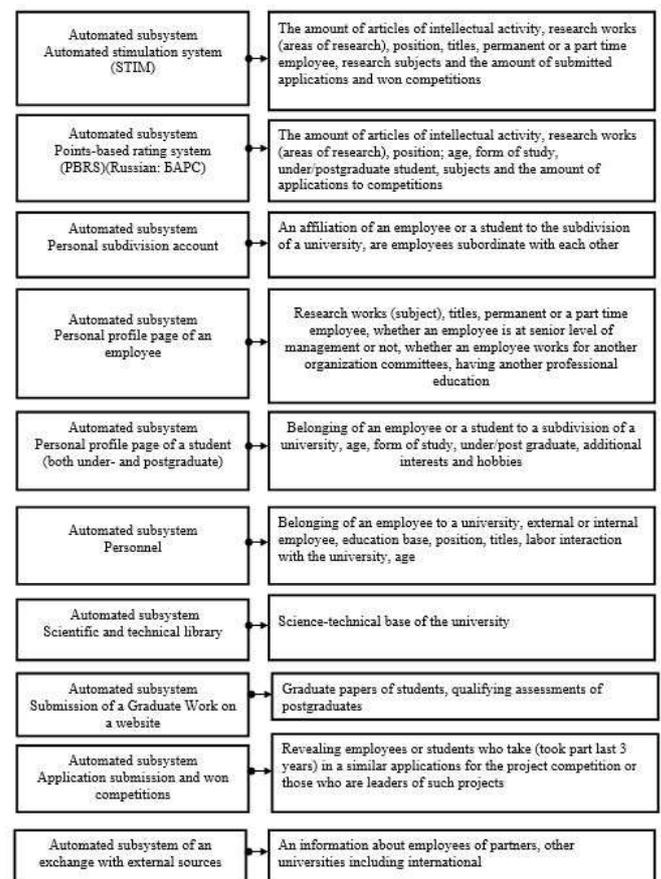


Fig. 3. Functional research university evaluation system (Source: Developed by authors)

Based on the processed data in the ACS of the research activities of the National Research University, there is a need to develop a model for the selection of the leader and members of the scientific group, which, under given conditions, could

form possible options for selecting managers and members of scientific groups for submitting applications for participation in competitions and project implementation. The information for a developed model of leader and group members will be processed and formed by an ACS of a research university represented above. The structure of a leader and members selection process model is represented on a fig. 4.



Fig. 4. Model of a leader and group members selection process (Source: developed by authors)

This model of a leader and group members selection process builds on the basis of the following principles:

1. Orientate on a research group member who is able to make a research, able to make experiments, research and development and as a result project realization that go with prioritized areas of science development and technological development of Russian Federation and the university itself. Thus the selection of a group member include a set of competencies that are oriented to fulfill promising needs of the state.
2. Regular monitoring of the grant competitions' conditions and a correction of a leader and group members model will provide an increase of application activity and the whole university research activity.

V. CONCLUSION

Thus, the suggested model of leader and group members selection process characterizes by a dynamic adaptive model of leading research studies, developments and human resources for the specific direction of country's economy. With the use of the model, the chosen member of a research group will meet all requirements to join research group and to complete such research project. The model will:

- Strengthen the financial sustainability of a NRU, also it will expand the opportunity to attract budget resources from the state and private sources.
- Used to make strategic NRU development decisions.
- Increase application activity of the research groups.
- Increase the research work in order to strengthen rating position among universities.

- Optimize managing the research activity and make changes to the existing local regulations of the university.

Based on the foregoing, the purpose of the study achieved.

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