

The System of Management of Innovation Projects at a Higher Education

Aydar M. Kalimullin

Kazan (Volga region) Federal University, RUSSIA

Valery T. Youngblood

Vyatka State University of Humanities, RUSSIA

Elena A. Khodyreva

Vyatka State University of Humanities, RUSSIA

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The urgency of the issue discussed in this article is caused by the need for development and assessment of new models and mechanisms of management of higher education institutions, which are connected with the development of the system of management of innovation projects and contribute to the development of educational institutions. The aim of the article is to give a theoretical justification and assessment of the system of innovation project management at a higher education institution as well as to assess its efficiency. The leading research methods are pedagogical modeling and project planning, theoretical analysis and compilation of the educational practice in innovation project management, and mathematical methods of statistics which help to make a comprehensive analysis of efficiency of the system of innovation project management. The article reveals the role of the system of innovation project management at a higher education institution as a complex of methodological approaches, principles, and mechanisms which provide for successful implementation of innovations in scientific, international, economic and other activities of an educational institution. The article also describes the peculiarities of innovation project management connected with the specific character of management entities, subjects to management, management processes. Efficiency of the model of development of the system of innovation project management is justified.

Keywords: innovation project; system of innovation project management; higher education institution; management entities.

INTRODUCTION

Urgency of the Problem

The urgency of the issue is determined by the necessity to create a qualitatively new system of university management aimed at its innovative development. The essential peculiarity of innovative activities of a higher education institution is the

Correspondence: Elena A. Khodyreva
Vyatka State University of Humanities, Krasnoarmejskaya str., 26, Kirov 610002,
Russia.
E-mail: hum@vshu.kirov.ru
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fact that they are carried out in the form of projects. In this respect the task to develop the system of innovation project management is of key importance to provide for modernization of the Russian system of higher education in modern times.

Essence and peculiarities of innovation project management at a higher education institution

In psychological and pedagogical research works (Vinogradova, 2012; Kaplunovich & Khovalyg, 2006; Asadullin et al., 2016; Gabdrakhmanova, Kalimullina & Ignatovich, 2016; Lisitzina et al., 2014) the category of “innovation project” is analyzed from several angles. It is seen, firstly, as an activity implying certain actions which help to reach certain aims; secondly, as a system of organizational and legal documents and finance and accounting documents necessary to carry out certain actions; and thirdly, as a process of carrying out innovative activities. Such comprehensive understanding stresses the importance of the fact that an innovation project is regarded as a form of organization and there is a need for purposeful management of innovative activities of an educational institution as a whole. Summarizing the aspects stated above, we support the views of the researchers (Bazhin, 2015; Grashina & Dunkan, 2006; Kalimullin & Masalimova, 2016; Chirkina, Zhukova & Curteva, 2016) who define an innovation project as a complex system of actions, interdependent and interconnected in respect of resources, duration, and performers, and aimed at reaching certain goals in the priority development fields.

The scientists (Vinogradova, 2012; Khodyreva, 2015) define innovation project management as the science and art of management of human and material resources throughout the project life cycle by means of modern management methods and techniques to achieve specific results expected in the project concerning kinds and scope of work, its cost, duration, quality, and satisfaction of its participants. We understand the system of innovation project management as a set of methodological approaches, principles and mechanisms which ensure effective implementation of innovations in educational, scientific, international, economic and other types of activities of an educational organization. The systematic approach is considered to be the fundamental one on the basis of which project management methodology IPMA / SOVNET is developed. Systemic project management methodology is based on the systematized collection of relevant scientific categories, unified models, standards, sources, processes and tools used in project management, which is a significant factor in determining the effectiveness of such activities of an educational organization, taking into account its specific strategic goals and objectives, the content of innovations and their orientation.

It is stated that peculiarities of innovation project management at a higher education institution are connected with the specific characteristics of management entities, subjects to management, and management processes (Fokina, 2008; Voropaev & Sekletova, 1999).

Management entities are all the parties of the project who interact in the decision-making process and in the process of development and implementation of the project. Management entities are traditionally represented by the administrative authorities of the university (rectorate, Scientific Council), as well as by the specialized administrative units (curriculum and instruction department, the department of the education quality control, research and development department, and others). The heads of university units (heads of scientific chairs, deans, and heads of departments) are also members of the management entity. The peculiarities of the management entity, which have a significant impact on the quality of management of innovative projects, is a high educational level of its

members and leaders, the desire of employees, faculty members, and students to continuous improvement, a fairly high level of innovative activity, and readiness to implement innovations.

Subjects to management are represented by a complex of different tasks that must be performed in order to achieve this goal and ensure the achievement of project results. Subjects to management at an educational organization are projects themselves; the phases of the life cycle the subject to management are a concept, planning and designing, implementation and completion; work packages, etc.

Innovation projects as subjects to management are understood as a system of activities of education entities aimed at creation of unique scientific and educational products, services and results. They represent a plan of innovative changes justifying their reasonability for students, the educational organization, and its employees. Innovation projects at educational organizations provide for transformation of social reality and include a complex of interrelated activities designed to achieve the goals within a specified period of time and within a specified budget. It is possible to describe the characteristics of the main types of innovation projects on the basis of poly-criteria approach. The following criteria are taken into consideration: direction, degree of innovation, amount of transformations, duration, source of funding, and ordering party (Table 1).

Project management processes are a system of actions of management entities in respect of subjects to management involving different methods and means. Their selection is determined by the specificity of the functional area of management, stage of the management process, management horizons. Thus, the traditional functional areas of project management according to IPMA / SOVNET are management of subject area of the project, time management of the project, cost management of the project, quality management, risk management, personnel management, management of project communications, contract management, change management, and etc. Project management, depending on the stage of the management process, involves initiation phase, project planning phase, organization and supervision of project activities, analysis and regulation of the progress of the project, project closure phase.

The initiation phase is aimed at ensuring the "start" of the project and involves the formation of its problem field on the basis of analysis of the activity of higher education institutions, creation of the legal and regulatory framework of modern education, which allows to describe a project, including characteristics of its goals and objectives; target criteria and indicators; as well as to develop resources, human and financial support of the project.

Project planning phase is aimed at determining the optimal way to achieve the project objectives consistent with current internal and external conditions. At this phase of the project plans are developed for a calendar year and for the entire duration of the project. They reflect activities, resources, equipment, performers; the network schedule is made; the plan of the communication between the project participants is created; quality control system of the project activities is developed.

Organization and supervision phase is associated with distribution of functions and responsibilities between the project participants; performance of activities included in the project plan; control over the performance.

Analysis and regulation phase provides for a comparison of the implementation plan and the results achieved. When making assessments it is necessary to analyze the accounting year cycle of the educational organization, as well as the possibility of "replication" of the results (diffusion of innovations), specifically, in the framework of scientific and methodical conferences, round table discussions, and further vocational education programs.

Table 1. Project Classifier

Classification criteria	Types of projects	Description of the type of project
Direction	Educational innovation projects	The results of innovative activities are represented as new educational courses, educational program specializations, training and re-training programs, new education technologies.
	Innovative projects in the sphere of science and technology	The results of innovative activities are represented as new technologies, new technical developments, new materials, equipment, scientific and technical services and other high-tech products.
	Innovation projects in the field of management of educational institutions	The results of innovative activities are represented as new technologies of management of business and other activities.
Degree of innovation	Modification innovation projects	They are aimed at improvement or partial modification of some components of the educational system implemented at a university
	Radical innovation projects	They are characterized by innovative ideas and technologies that do not have earlier analogues. They are diverse and multi-level projects characterized by complex and labor-intensive process of development of innovation, complexity of risk prediction.
Amount of transformations	Local innovation projects	They involve minor modifying changes in individual components of the education system, reflecting the specific goals and objectives of the educational organization
	Module innovation projects	They involve entire changes of a subsystem of an educational institution.
	System innovation projects	They involve reconstruction of the entire educational system of an educational institution according to some general idea, or concept.
Duration	Short-term innovation projects	They are aimed at prompt solution of specific urgent tasks. They are carried out over a short period of time (from a few days up to 1 year), which is of higher priority than the project costs.
	Mid-term innovation projects	They are carried out over a longer period of time (from 1 year up to 3 years) and often considered as components of mid-term programs of development of an educational institution.
	Long term innovation projects	They are implemented over a long period of time. They involve substantial systemic reforms of the education system. Development takes into account the long-term prognosis. The long term of projects may be an acquired characteristic depending on whether the results of the project effectively meet the needs of the ordering parties of the project
Source of funding	Innovation projects implemented at the expense of university funds	Projects are implemented at the expense of funds of an educational institution
	Innovation projects financed by budget funds	Projects are implemented at the expense of subsidies from the founders to fulfil educational activities, as well as at the expense of budgets of different levels.
	Innovation projects financed by grant programs, or at the expense of funds of enterprises and companies	Projects are implemented at the expense of different grant programs, as well as at the expense of budgets of different enterprises and companies
	Innovative projects financed by sponsors, donations and charity	Projects are financed by sponsors, donations and charity funds assigned to the educational institution
Ordering Party	Innovation projects ordered by an in-house party	The list of requirements, conditions, objectives, and targets of the project is specified by the university and its structural divisions
	Innovation projects ordered by an external party	The list of requirements, conditions, objectives, and targets of the project is specified by an external party.

Project closure is made when project work is performed, the project results are transferred to the ordering party, and the product is transferred to the project consumers. Closure of the project and its components requires analysis of project results and evaluation of the experience acquired by the project management team.

Management horizons characterizing hierarchy of time periods within which the project management tasks are considered in relation to different management entities and subjects to management; they include strategic (covering the entire life cycle of the project), annual, quarterly, operational levels of management.

Researchers (Borodataya & Ershova, 2013; Mazur et al., 2010; Polovnikov & Dubovik, 2011) have defined several project management systems which can be implemented in the framework of innovation project management at an educational institution:

- linear system of project management, which involves refusal from establishing project job positions and absence of its own organizational structure;
- administrative system of project management, in which the members of the project team continue to be employees of their departments, department managers are appointed to be project managers and project coordination is carried out by a project center which has limited powers of gathering information, preparing draft documents, and doing paperwork;
- matrix system of project management, which is based on the separation of powers between the heads of departments and the head of the project team;
- a system of project management, which implies creation of a specialized project unit, the project manager is invested with broad powers and responsible for the project itself and for the personnel involved in its implementation;
- an autonomous system of project management, when the project is entirely a self-sufficient and independent organization, the project team is autonomous, and the activities of an educational organization are seen as a set of ongoing projects.

Thus, the system of innovation project management at a higher education institution is considered as a complex process of making and implementing management decisions related to setting objectives, deciding on the organizational structure, planning project activities aimed at realization of educational, scientific innovative or management ideas and monitoring their progress. Management quality control is largely determined by the project complexity and duration, number of performers, project scale, project progress, as well as the qualifications of the project curator and the project manager. In addition, management structure depends on the scale and complexity of the project and can vary depending on the phase of its implementation.

MATERIALS AND METHODS

Research goals

1. to summarize the theoretical and methodological approaches to the system of innovation project management at an educational institution;
2. to characterize the peculiarities of innovation project management at a higher education institution;
3. to assess the benefits of the system of innovation project management at an educational institution.

Theoretical and empirical methods

The leading methods of the research are the following ones:

- theoretical methods – retrospective analysis, which allows to identify the peculiarities of project management in the university management system;

pedagogical modeling and instructional design to develop the model of development of the project management system;

- empirical methods – review and analysis of pedagogical experience in the sphere of implementation of innovation projects, documentation learning, pedagogical experiment, and mathematical methods of statistics.

Research premises

The research has been conducted at the premises of the Vyatka State University of Humanities (VSHU).

Stages of the research

The research consisted of three stages:

At the first stage, the methodological basis of the research was established; the main features of innovation project management at a higher education organization were identified.

At the second stage, there were organized activities aimed at the implementation of a systematic methodological approach to innovation project management within the framework of the Program for Strategic Development of the Vyatka State University of Humanities

At the third stage, evaluation of the effectiveness of the suggested innovation project management system was made to ensure implementation of innovative development objectives of the University and performance of its mission.

Assessment Criteria

Assessment of the efficiency of the innovative project management system was carried out by means of analysing the characteristics of the management entities, subjects to management, management processes in the course of implementation of the Strategic Development Program of the Vyatka State University of Humanities. Assessment of the impact of the innovation project management system on the dynamics of performance indicators of university activities has been made.

RESULTS

The research of the project management system at a higher education institution was carried out in the course of implementation of the 2012-2016 Strategic Development Program of the Vyatka State University of Humanities. The system of projects included in the program was aimed at achieving the following strategic objectives:

1. Improving the system of lifelong education through creation and implementation of innovative educational programs and technologies, practical training programs of general, vocational and further education.

2. Optimization of scientific research activities, improvement of innovation infrastructure of VSHU ensuring incorporation of the University in the global research and education network, effective development of innovative entrepreneurship and transformation of scientific knowledge into competitive products and services.

3. Improving the system of management of the university's intellectual resources, creation of conditions for personal and professional self-development of faculty and staff members, formation of the personnel reserve of the university

4. Development of the material and technical base ensuring the university's competitiveness in domestic and international scientific and educational continuum.

5. Increasing university management efficiency by means of optimization of administrative establishments, improving management procedures, developing the system of university in-house communication.

The research results show that the implementation of goal-oriented activities to develop the management entities of the innovation project contributed to the formation of the personnel reserve for senior positions (12 people), as well as the personnel reserve for senior teaching positions at the institutions, faculties, and departments (116 people). Implementation of further education programs in the field of innovation and project management played an essential role in improving the management entities. 100 % of the Program project managers received such training. This allowed to separate powers and responsibilities of the project participants; and to ensure fruitful interaction of all project participants. The analysis of satisfaction of reference groups of VSHU employees with their work at the University on the whole shows that a favorable socio-psychological climate has been created. The level of conformity of the University management structure to the objectives of innovative development was rated by the employees above average.

According to the research data, the innovation projects carried out at the Vyatka State University of Humanities are implemented both locally (the activities of individual departments, student associations), and in an integrated and holistic manner, firstly within the framework of the Strategic Development Program. Their orientation reflects the priorities of the state policy in the sphere of higher education and is aimed at achieving the target performance indicators of the program of Monitoring the Effectiveness of Higher Educational Institutions held by the Russian Federation Ministry of Education and Science.

The analysis shows that 25% of the Program projects have been implemented in the field of education, 55% of the projects - in science and technology, 20% - in the sphere of management. Describing the projects according to the degree of innovation, it should be noted that 44% of the projects are of a radical character, modification innovation projects account for 56%. Assessing the projects in respect of amount of transformations, we can say that 58% of the projects are local, 39% are module projects, and 13% are system innovation projects. As for the duration, 42% are short-term projects, 6% are long-term projects, while medium-term projects amount to 52%. There are 53% of innovation projects financed by university funds while 47% of projects are financed by grant programs, or at the expense of funds of enterprises and companies. The ordering party of 61% of innovation projects is the University, 39 % of innovation projects were ordered by an external party. A few system innovation projects implemented at the premises of the Vyatka State University of Humanities were initiated by the founder of VSHU – the Russian Federation Ministry of Education and Science (Project of Modernization of Teacher Education, Project of Creation of Supporting Universities). Local projects were initiated by structural departments, specialized departments and student self-government bodies and were designed to solve the current tasks to provide for effective activities of certain entities of the University educational environment.

Implementing local innovation projects initiated by the University itself, linear and administrative systems of project management were mainly used, when the project's own structure of management is not determined. In this case the traditional system of University management is more preferable. It plays a favorable role when carrying out short-term modification projects which do not have strict requirements in respect of quality and project duration and which do not require a lot of recourses for their implementation. The administrative system of project management allowed the project team members to continue performing their job responsibilities; heads of university units and specialized departments, student self-government bodies were appointed project managers. In this case the traditional management system of the university was integrated with the project management

system. This fact plays an important role in the process of implementation of short-term modification projects which have a stricter regulation requirement in respect of quality and project duration, and they involve quite diverse resources.

Innovation project management within the framework of the Program for Strategic Development is represented by two levels. Strategic management of innovation projects is carried out by the rector. Operational management is provided by a person who is authorized by the rector and takes a position of vice-rector or head of a department. The strategic management structure is represented by: Head of the Program – Rector of the University; Project coordinators – vice-rectors; project managers, the Scientific Council of VSHU, VSHU Innovation Policy Coordination Council. The matrix management system was mainly used when implementing the projects of the Strategic Development Program. The management team of VSHU innovation projects included the heads of relevant university departments solving the general objectives of the project. The matrix management system ensured effective implementation of modification and radical medium- and long-term projects which have strict regulation requirements in respect of quality and duration of the project, and the resources involved in its implementation are diverse.

The research results demonstrate the impact of the VSHU system of innovation project management on the dynamics of university performance indicators (Table 2).

Table 2. Performance monitoring indicators of the Vyatka State University of Humanities in 2014

№	Performance Indicator	UM	2014	
			University Performance	Threshold parameters
1	Educational activities (Russian State Exam scores)	point	60,37	60,00
2	Scientific research activities (thous. roubles per 1 member of the research and teaching staff)	thousand roubles	53,09	51,28
3	International activity (per cent of the total amount of students)	%	1,73	1.00
4	Financial and economic activity (thous. roubles)	thousand roubles	1753,89	1327,57
5	Salary of the teaching staff (the ratio of the average salary of the academic staff to the average wage for the region's economy, %)	5	174,95	125
6	Infrastructure (per 1 student, sqm)	sqm	-	-
7	Graduate job placement (%)	%	80	80
8	Stray parameter (ea)	ea	3,03	2,78

It is seen that the implementation of innovation projects of the Strategic Development Program helped to equal the key monitoring indicators of performance of higher education institutions of the Ministry of Education and Science of the Russian Federation. Thus, in 2014 according to the results of monitoring of all seven indicators (educational activities, international activities, scientific research activities, financial and economic activities, infrastructure and graduate job placement, stray parameter) VSHU equaled and / or exceeded the threshold parameters.

Thus, the system of innovation project management at a higher education institution realized within the framework of the research, and including management entities, subjects to management and management processes, has proved its effectiveness and has had a significant impact on the performance and activities of the Vyatka State University of Humanities.

DISCUSSION

The problem of innovation project management at higher education institutions is developed within the framework of the general project management theory (Mazur et al., 2010; Voropaev & Sekletova, 1999; Grashina & Dunkan, 2006) as well as in accordance with the requirements of project management standards, including the standards of the International Project Management Association (IPMA / SOVNET)

Although the system methodology of project management, and separate areas of project development in the sphere of education are well described, some issues concerning multi-project management at higher education institutions, involving a transition from individual project management to project management systems integrated into programs, are underinvestigated. These approaches are of particular importance as the number of innovative projects implemented by universities is increasing, they are becoming more complex, and a large number of employees are involved in the process of project development and implementation.

CONCLUSION

The research revealed two groups of problems related to the development of innovation project management system at higher education institutions. The first group is conditioned by the need to improve the methodology of project management by means of standardized approaches to the process of management of their functional areas; development of a set of organizational, methodological, information tools formalizing and supporting project management processes. The second group is related to modernization of infrastructure of project management by means of creation of "the project office" which provides support in the process of implementation of the project at different management levels; introduction of consistent methodology, standards, procedures and templates; consulting and administrative support of project managers, control of multi-project planning process and coordination of projects; paperwork; representation of interests of the employees outside the organisation. Solution of these problems will allow universities to improve the innovative project management system and accomplish a set of current tasks corresponding to the main objectives of modernization and technological development of the Russian Federation.

RECOMMENDATIONS

The materials of this article may be of use to the management bodies and staff of higher educational institutions who are in charge of innovation projects and are team members of innovation projects.

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REFERENCES

- A Guide to the Project Management Body of Knowledge (PMBOK Guide). (2008). Project Management Institute.
- Asadullin, R. M., Teregulov, F. Sh., Koletvinova, N. D. & Egamberdieva, N. M. (2016). Fundamental and Applied Education - A New Look. *Mathematics Education, 11(1)*, 23-33.
- Bazhin, K. S. The principles of project management in higher education institutions. <http://www.forumcis.ru/cat>.
- Borodataya, M. N., Ershova, N. N. (2013). Management of innovative project activities. Kirov: VGGU.
- Chirkina, S. E., Zhukova, E. D. & Curteva, O. V. (2016). The Concept of “Pedagogical Modus” in the System of Pedagogical Culturology Categories. *Mathematics Education, 11(1)*, 191-198.
- Fokina, T. P. [et al] Project management. (2008). Saratov: PAGS.
- Gabdrakhmanova, R. G., Kalimullina, G. I. & Ignatovich, V. G. (2016). Professional Pedagogical Education Quality Management. *Mathematics Education, 11(1)*, 103-112.
- Grashina, M., Dunkan, V. (2006). The principles of project management. St. Petersburg: Peter.
- Kalimullin, A. M. & Masalimova, A. R. (2016). Editorial: Actual Issues of National Education: Theory and Practice. *Mathematics Education, 11(1)*, 1-2.
- Kaplunovich, T. A., Khavylyg, N. K. (2006). Innovation projects as a special form of scientific support to develop education. Academic Journal of the Institute of Adult Education of Russian Academy of Education. *Man and education, 6*, 15–18.
- Khodyreva, E. A. Management of innovative educational projects in modern university (2015). *Koncept, 5*. – ART 15172. – URL: <http://e-koncept.ru/2015/15172.htm>. – ISSN 2304-120X.
- Lisitzina, T. B., Pavlova, A. V., Khanmurzina, R. R., Vlasova, V. N., Chitalin, N. A., Maksimov, I. N. & Zakirova, V. G. (2014). Features of the Professional and Motivating Training Content Design for Students Majoring in “Tourism”, *Asian Social Science, 11 (1)*, 148-153.
- Mazur, I. I., Shapiro, V. D., Olderogge, N. G., Polkovnikov, A. V. (2010). Project management. Moscow: Omega-L.
- Polkovnikov, A. V., Dubovik, M. V. (2011). Project Management. Moscow: Eksmo.
- Project management in accordance with IPMA/ SOVNET requirements. Preparing for the certification. (2012). Moscow: Project PRACTICE.
- Project management: the basics of professional knowledge, national requirements for professionals’ competence. Versions 3.0. (2010). Moscow: Project PRACTICE.
- Vinogradova, V. L. (2012). Team management of innovation projects in an educational institution. *Man and education, 4 (33)*, 157–160.
- Voropaev, V. I., Sekletova, G. I. (1999). System representation of project management: Proceedings of the international symposium on project management ‘East-West – At the Edge of Millennium’. Moscow: SOVNET.