DOI 10.31489/2023Ped1/7-13

МРНТИ 14.35.09

S. Maratkyzy[1*], A.T. Baikenzheyeva[1], A.I. Vishnyakov[2], Sh.B. Abilova[3], A.B. Begenova[3], A.B. Karabalayeva [1]

[1]Korkyt Ata University, Kyzylorda, Kazakhstan;
[2]Orenburg State University, Orenburg, Russian Federation;
[3]Seifullin Kazakh Agrotechnical University, Nur-Sultan, Kazakhstan
(Corresponding author's E-mail: Saniya2903@mail.ru)

ORCID 0000-0002-6076-2061
ORCID 0000-0001-6114-3978

Problems and prospects of commercialization of innovative educational technologies in Kazakhstan

In recent times, Kazakhstan is faced with the task of choosing the right strategy for commercialization in the field of innovation in education, which would ensure the interaction of both knowledge and technology, and capital in the Kazakhstani educational model. The interpenetration of such technologies is primarily necessary to achieve the quality of the needs of the future professional community under the influence of new trends and to benefit from investments in research. The development trajectories of a modern university should provide a complex of global business research and become a strategic resource for economic development in the commercialization process. Research at the university has a fairly wide range of areas, including fundamental and applied works, which, in turn, are the basis for ensuring rapid and effective scientific and technical activities commercialization results. To increase innovation activity, conditions are created for improving the process of commercialization in the field of scientific and industrial innovation, intellectual property, and technical regulation. The authors considered approaches to creating an innovative environment at the university. As the study result, the prospects for the legal framework development for the intellectual activities results (IAR) commercialization were determined. In modern Kazakhstan, mechanisms for the practical application of IAR with the specific business project implementation have been developed to improve the universities promotion and the new technologies market. The research and multifunctional system of innovative scientific and educational infrastructure development of the University has become the higher education system reserve.

Keywords: innovative projects; investments; small innovative enterprises, technology commercialization, budgetary institutions of science and education, intellectual activity results.

Introduction

Currently, the Republic of Kazakhstan requires an effective commercialization policy and infrastructure to guarantee professional administration of intellectual property rights for scientific research. This is essential to satisfy the requirements of the upcoming professional community and to benefit from investing in the realities of scientific research.

The transition to global business will also ensure the formation of an institutional framework for the market mechanism in the intellectual property creation and use field, as well as the creators and / or owners of intellectual property economic interests protection — economic entities. Intellectual property should bring material income, but for this it must be "commercialized" [1].

The infrastructure of universities of Kazakhstan and the commercialization process should provide access to the full range of research related to global business.

The creation of a national innovation system in Kazakhstan is the main task not only to increase the scientific and pedagogical sphere competitiveness, but also of domestic pedagogical education. The commercialization of intellectual property of pedagogical universities is a part of a holistic mechanism for creating and implementing innovations within the national innovation system. This conclusion is confirmed by the definitions of the National Innovation System (NIS).

The steps undertaken in this field contradict the demand absence for educational innovations issue in the economic reforms reconstitution context in the education system, the lack of private businesses interest in the education system high-tech industry sector due to low costs and risks. All this is occurring in terms of undeveloped mechanisms of competition in education, including the pedagogical technologies area [2].

At the same time, in the government direct economic interests sphere, the task should be set to ensure the implementation of IPs (innovative projects) created in budget science and education organizations.

The fact is that many results of public pedagogical research do not reach the market. This is not only due to the market access absence, but at the same time because of the research planning, organization and development [3].

Experimental

The commercialization of the research activities of pedagogical universities as the modern mixed economy appropriate conditions formation brings a connection to the conceptual apparatus system as an instrument of interaction, in which the state is in the position of both a partner and a competitor of higher educational institutions, which is important for the pedagogical production of specific material goods and educational services.

A mixed economy is a type of economic relations based on a market mechanism, which also includes the formation of a system of knowledge about the mechanisms of development of market institutions, a competitive educational environment, stimulating economic growth, social responsibility and structural policy of the educational system with the building of economic relations [4].

On this basis, the process of commercialization in the pedagogical university should be built. There are the following types of economic policy of pedagogical universities:

- the commercialization policy aimed at maintaining a certain pace of development of pedagogical university science;
- the scientific, technical and innovation policy;
- the activities of the university aimed at the science and technology development, ensuring scientific and technological priorities, the results of scientific and technological research implementation in the educational production system;
- the social policy of universities focuses on the formation of effective socio-economic conditions for the future professional pedagogical community, regulating the formation of both economic incentives and relations between student groups for participation in commercial production [4].

This direction is obliged to create a legal basis for the creation of budget educational institutions, business companies (founders, including others), state academies of sciences, budget research institutes established at universities, activities of which are aimed at the practical application of the IAR.

Results and discussion

The world experience of obtaining higher pedagogical education depends on the university importance at the individual's professional development innovative stage as a highly qualified specialist-entrepreneur and the creation of creative products, effective interaction of the higher pedagogical school, academic circles and the employer.

In particular, the success of creating an educated community in Kazakhstan largely depends on improving the quality of professional training of students of pedagogical specialties and their creative development. This is one of the conditions for developing the innovative potential of creative development of young people at the university stage of professional development [5].

Currently, the macro-commercial approach is rapidly developing, in which the question of the individual and his attitude to business work is studied. According to research, today the universities of Kazakhstan are polarized in scientific, technological and commercial terms.

This means that students' opinions about the core values of young people are grouped around two poles of the worldview. This phenomenon is compounded by the widening gap between social and economic polarization, that is, the widening gap between the capacity developments commercialized direction and the vocational training educational paradigms.

The high requirements for a specialist as creative potential and professional qualities in the field of education have repeatedly been tried to solve through the problem of commercialization of activities. Self-development of a person is not limited to any time and occurs throughout a person's life.

There is a scheme of interaction between the structural divisions of the university and student associations in matters of commercialization.

The Student Association for Commercialization is a university voluntary association students working together to improve the student's life quality. This form of self-government allows students to take an active part in improving the university life and use its opportunities for its development and self- realization [6].

The identification and support of the most talented students who are interested in scientific activities, their broad involvement in research work, innovation and grant activities leads to the issues solution related with improving the students' professional training, teaching the self-government practice to innovative knowledge-intensive businesses.

Creating conditions for the scientific and technical developments commercialization in universities is the beginning of effective cooperation between universities and business, research institutes, and other strategic partners in the implementation of innovative projects. This can be facilitated by the formation of business and managerial knowledge and skills among aspiring entrepreneurs-students as participants of a business incubator in the search for investors. For the commercialization of technologies and developments in demand in the educational market, it will ensure the integration of educational and research processes.

Nevertheless, the prevailing legislative and organizational circumstances do not provide the NIS formation consistency due to the insufficient blocking legislation development and do not encourage the practical implementation of IAR. Many solutions contradict the public and private companies' limited opportunities with developing, supporting and cultivating innovative approaches. Circumstantial measures (such as tax and customs benefits) are insufficient and ineffective.

The individual NIS elements effectiveness is legitimate, since their essences and features are not explicitly determined; most of them fulfill only the leaseholders' functions. The participants of the innovation process "Fundamental scientific and applied scientific and pedagogical practice" are non-project development, producing and replicating innovative products. Business incentives are not enough to modernize pedagogical production.

In general, the innovation policy specific measures implementation in the conditions of the Republic of Kazakhstan was mainly reduced to direct financing of R&D (research and development work) at the state expense. R&D (mainly through public procurement, which seeks to include public-private partnership schemes in this mechanism with an emphasis on federal targeted programs) and fragmented support for innovation in the form of financing innovation infrastructure, grants to small high-tech universities, funding for training and retraining, mainly — the innovative small enterprises management [7].

The student scientific society activity has been known as "Technology Commercialization" was built on the domestic education system modernization prospects and directions, put forward by such program documents as "Development Strategy of the Republic of Kazakhstan until 2050", "The third Modernization of Kazakhstan: global competitiveness" and "State Program for the Development of Education and Science until 2020". The University continues to work in the following areas:

- the first, upon the University model development completion as an innovation-oriented complex of an internationally adaptive type;
- the second, on further professional content: structuring education and updating the model of professional educational programs that ensure the formation of a professional competence model of a specialist;
- the third, the focus on the solution of these tasks predetermined the need for the introduction of a single platform and a university management system that integrates the multifunctional activities of the university.

The University requires a unified digital information management creation, which forms the infosphere of end-to-end operational and process management, organization and control of the professional scientific and educational process.

The innovative business formation takes place from the birth of an idea to entering the market, such process can be divided into three expanded stages (Table):

Table

Innovative business formation stages

Stage	Stage name	Content
1.	The birth of an idea	It checks whether this technology or device is working.
2.	Enterprise creation	This is an instrument to draw attention to the concept and, as a result, to receive the first investment.
3.	Investment	The company is already entering the market with a ready-made (albeit not ideal) product.

This innovative business formation styles content in Table is manifested itself as a working step- by-step innovation implementation system. This process is possible only in the professional student teams and developed institutes formation conditions, with the venture (direct) investments availability. There are additional opportunities that allow both increasing the process efficiency and reducing the time, with the university participation in this process [8].

The main university key resources in creating innovations are two following factors:

- a highly educated teaching staff;
- developed research infrastructure of university.

The teaching staff allows the young inventor to get a research clear direction and, based on the senior mentors' experience do not make mistakes and unnecessary steps to achieve the goal. The scientific equipment availability at the university, and sometimes even experimental production, allows for the necessary research.

The presence of a certain commercialization structure increases the chance of the university to receive investments for the student research projects further development [9]. The structure of the process of forming an innovative business project is initiated by the model of innovation generation at the university:

- the supervisor plays the key role in this process, becoming the ideas and research directions source;
- formation of students' creative associations;
- taking into account the modern equipment availability for conducting experiments from researchers, most often a young team needs to pay only for "scarce" supplies;
- young researchers interest in the innovations.

The innovative ideas of students and the appearance of reliable results of the technical feasibility of the idea make it possible to cooperate with business enterprises. The structure of creating a small innovative enterprise on the model of a university has its own peculiarity when receiving direct investment, and thus the university begins to act as a co-executor of innovative developments of independent innovative teams of student scientific associations [10].

In order to implement the model of innovative business of student associations, the following scheme of interaction between the structural divisions of the university and student associations is recommended. Heads of structural divisions of the University, in accordance with the existing regulations on their divisions, interact with students to assist in the implementation of strategic programs for the student association's development within the development of the system of professional adaptation framework, career growth and socio-cultural development of students. In this case, students' research work circles are created in order to improve the organizational level of students' research work at the university, coordinate its forms, including educational and research work, research work and innovative activities of students [11].

The development of an innovation activity plan for the management of innovative projects of scientific circles of the university will be achieved by increasing the effectiveness of specific actions in plans with indefinite deadlines and results.

In plans with indefinite deadlines and results, it is determined.

The purpose of an innovative project is specific actions (works or activities), requirements for their results, deadlines and performers of these actions.

The set of planned actions is a project – a temporary enterprise aimed at creating unique products, services or results, or a program [8].

Thus, planned actions – one of the documents of the project or program defines expectations regarding the time of their implementation, the necessary resources and the results obtained. A well-thought-out and structured program plan for an innovative project largely ensures success. Recommendations for organizing the work that precedes the appearance of the action plan are contained in numerous guidelines for improving business efficiency, among which we can note [9-11] and, as the closest to the topic of our article.

In this article, we will explain how to develop a focused and well-founded action plan, having previously completed the necessary analytical work. To do this, we consider one example from the practice of scientists, in which the use of key performance indicators:

- Events goals and planned dates;
- Activities justification with plans-schedule;
- Requirements for results, taking into account reporting and control.

In general, we can distinguish two components of project innovation activity: providing and managing. The supporting component is aimed at servicing university small enterprises, bringing material, monetary, and information resources to them. The management component is associated with planning, solving organizational and administrative issues, and control. This component is recognized as the leading one, since it gives the business project a stable, manageable character.

In general, the mechanism of university support includes a regulatory framework, information support and assistance in organizing the safety and protection of small businesses.

The small enterprises development in the university is a necessary condition for the existence and functioning of a modern model of market-competitive pedagogical production. Regional experience has proved that without this sector of the economy, it is impossible to develop the economy as a whole in a harmonious way, since it determines the economic growth rate, the structure and quality of up to 40-50 % of the gross national product.

Thus, the modern market economy is characterized by a complex combination of different-scale pedagogical industries that arise in the gray educational system, where significant capital, equipment and cooperation of many research groups are already required. The size of small enterprises in universities depends on the specifics of scientific areas, their technological features, and the effect of the scale effect of research.

There are scientific areas associated with high capital intensity and significant amounts of funds and costs of entrepreneurial activity. The place of universities in this direction is predetermined by objective economic laws, since it is approximately independent of the economic structure peculiarities, the country's development history, the economy sectorial structure and other factors.

International experience shows that the infrastructure created for the intellectual property commercialization is an important part of the national innovation system. Kazakhstan is actively working in this direction, and it will be possible to assess further results by the end of 2020.

Improving the competitiveness of education, the development of human capital by ensuring the availability of quality education should achieve the following key indicators:

- increase in the number of universities in Kazakhstan, marked in the ranking of the best world universities, by 2015-1, 2020-2;
- increase in the share of universities that have passed independent national institutional accreditation according to international standards by 2015-50 %, 2020-65 %;
- increase in the share of young people taking an active part in the implementation of measures in the field of economic policy from the total number of young people by 2015 — 31 %, 2020 — 55 %.

Since gaining independence, Kazakhstan has traditionally been guided by plans: the republic has adopted a number of programs that show what will happen before a certain date. “Kazakhstan-2030” or “Kazakhstan-2050” are major programs – the main direction of the country's development. Most of the programs are designed for 2020.

The Government of the Republic of Kazakhstan predicts that by 2020, 5 % of the country's universities will be able to implement innovative activities “through the integration of education and science through the introduction of the results of domestic research”, a system of material and creative incentives for researchers and students in science. With the assistance of the Embassy of Kazakhstan in Ukraine, an online Memorandum of Cooperation was signed between the National Academy of Education named after I. Altynsarin and the National Academy of Pedagogical Sciences of Ukraine. In this document, the parties agreed to increase the scientific and pedagogical potential, introduce modern pedagogical and psychological technologies into the education system, and study the position of commercialization of education. The share of expenditures on research and development in the Republic of Kazakhstan is only 0.12 % GDP.

Conclusions

The experience of training innovators in higher education institutions of Kazakhstan, which is aimed at the students development who have experience in the commercialization of scientific and technical

developments, speak foreign languages, and understand project financing, suggests that the training of specialists is conducted taking into account the real economy needs in the modernization context.

After the international and national universities activities have been analyzed, it is possible to identify two major trends in the innovative university development as the three-helix model key member and as an innovative personnel forge. Therefore, in the national and international experience of managing universities innovative and commercial activities, a prevailing approach where the management objects are scientific, innovative and educational. In this article, the question of the possibility of organizing innovative and commercial infrastructure of universities as an element of a management system that promotes balanced and effective development of innovative activities of the university in all major areas of science was considered.

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С. Маратқызы, А.Т. Байкенжеева, А.И. Вишняков, Ш.Б. Абилова,
А.Б. Бегенова, А.Б. Карабалаева

Қазақстандағы инновациялық білім беру технологияларын коммерцияландыру: мәселелері мен басымдықтары

Бүгінгі таңда біздің алдымызда білім берудегі инновациялар саласындағы коммерцияландыру стратегиясын дұрыс таңдау міндеті тұр, ол білім беру процесінің қазақстандық моделінде білім мен технологиялардың да, капиталдың да өзара іс-қимылын қамтамасыз етуге мүмкіндік береді. Мұндай технологиялардың өзара енуі, ең алдымен, жаңа тенденциялардың әсері және зерттеуге инвестициялардан пайда алу жағдайында болашақ кәсіби қоғамдастықтың қажеттіліктерінің сапасына қол жеткізу үшін қажет. Қазіргі университеттің даму траекториялары жаһандық бизнесті зерттеу кешенін қамтамасыз етуі және коммерцияландыру процесінде экономикалық дамудың стратегиялық ресурсына айналуы тиіс. Заманауи университеттің даму траекториялары жаһандық бизнес зерттеулерінің кешенін қамтамасыз етіп, коммерцияландыру процесінде экономикалық дамудың стратегиялық ресурсына айналуы тиіс. Университеттегі ғылыми-зерттеу жұмыстарының іргелі және қолданбалы жұмыстарды қоса алғанда, жеткілікті кең ауқымы бар, олар өз кезегінде ғылыми-техникалық қызмет нәтижелерін тез және тиімді коммерцияландыруды қамтамасыз ету үшін негіз болып табылады. Қазақстандық жоғары оқу орындарында инновациялық белсенділікті арттыру мақсатында өндіріс пен инновациялар, зияткерлік меншік және техникалық реттеу саласындағы коммерцияландыру процесін жетілдіру үшін заңнамалық мүмкіндіктер жасалуда. Авторлар университетте инновациялық орта құру тәсілдерін қарастырды. Зерттеу нәтижесінде зияткерлік қызметтің нәтижелерін (ЗҚН) коммерцияландыру үшін құқықтық базаны дамыту перспективалары анықталды. Қазіргі Қазақстанда жоғары оқу орындарының жаңа технологиялар нарығында ілгерілеуін жақсарту жөніндегі нақты бизнес-жобаны іске асыра отырып, ЗҚН-ны

тәжірибелік қолдану тетіктері әзірленді. Университеттің инновациялық ғылыми-білім беру инфрақұрылымының көпфункционалды жүйесін зерттеу және әзірлеу жоғары білім беру жүйесінің резервіне айналды.

Кілт сөздер: инновациялық жобалар, инвестициялар, шағын инновациялық кәсіпорындар, технологияларды коммерцияландыру, бюджеттік ғылым және білім беру мекемелері, зияткерлік қызмет нәтижелері.

С. Мараткызы, А.Т. Байкенжеева, А.И. Вишняков, Ш.Б. Абилова,
А.Б. Бегенова, А.Б. Карабалаева

Коммерциализация инновационных образовательных технологий в Казахстане: проблемы и перспективы

На сегодняшний день перед нами стоит задача правильного выбора стратегии коммерциализации в сфере инноваций в образовании, которая позволила бы обеспечить взаимодействие как знаний и технологий, так и капитала в казахстанской модели образовательного процесса. Взаимопроникновение таких технологий, прежде всего, необходимо для достижения качества потребностей будущего профессионального сообщества в условиях влияния новых тенденций и получения выгоды от инвестиций в исследовании. Траектории развития современного университета должны обеспечить комплекс исследований глобального бизнеса и стать стратегическим ресурсом экономического развития в процессе коммерциализации. Исследования в университете обладают достаточно широким спектром направлений, включая в себя фундаментальные и прикладные работы, которые, в свою очередь, являются основой для обеспечения быстрой и эффективной коммерциализации результатов научно-технической деятельности. В целях повышения инновационной активности в казахстанских вузах создаются законодательные возможности для совершенствования процесса коммерциализации в сфере производства и инноваций, интеллектуальной собственности и технического регулирования. Авторами были рассмотрены подходы к созданию инновационной среды в вузе. В результате исследования определены перспективы развития правовой базы для коммерциализации интеллектуальных результатов деятельности (РИД). В современном Казахстане разработаны механизмы практического применения РИД с реализацией конкретного бизнес-проекта по улучшению продвижения вузов на рынке новых технологий. Проведенные исследования и разработки полифункциональной системы инновационной научно-образовательной инфраструктуры университета стали резервом системы высшего образования.

Ключевые слова: инновационные проекты, инвестиции, малые инновационные предприятия, коммерциализация технологий, бюджетные учреждения науки и образования, результаты интеллектуальной деятельности.

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