Integration of Education System to the National Innovative Complex

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Abstract

Socially significant programs, in particular education quality improvement, are with an increased focus in Kazakhstan. The role of modern education system goes up in the human capital development as a base unit of measurement for the society living standards to recognize Kazakhstan among more comparative countries. Meanwhile the national education system can’t be improved without any integration with the tendencies of the world educational space. In the Republic the legal platform is created to perform multi-tier training of specialists providing sufficiently distinct practice for the knowledge gained, ministrant to diversify education methodology and methods at the different levels of training. To improve the education content the following issues are considered: improvement of its state compulsory standards at all levels, amendments to the curriculum and academic program in recognition of the innovative educational technology adoption. Nowadays it may be legitimately declared that Kazakhstan’s higher education system reform has taken the place. Kazakhstan successfully entered the world educational space and became its full member. Higher education system of Kazakhstan adequately complies with the main procedures of the Bologna process. The
next development stage of the Republican education system is to be the improvement of its activity in the context of the training quality improvement.

Keywords: Higher Education System Management; State Educational Grant; Education; Science And Industry; Business-Structure Integration; Academic Mobility; Intellectual Property; Education Methods Modernization; HEI Research Potential

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INTRODUCTION

Education is one of the main socio-economic priorities influencing all spheres of the public life that largely determine the efficiency of the economy and the opportunities for integration processes. National higher education had been developing for a long time making an orientation to the domestic requirements. The globalization processes have brought Kazakhstan’s engagement forward to the international educational sphere and identified the inconsistency of qualitative characteristics of education results with the new requirements for the staff training [1,2]. The higher education at the current stage of the economy development is characterized by a continuous structure, modernization based on national traditions and global tendencies, by equality of the access to all levels, the unity of the elements and requirements, the continuity of all levels of education. With the purpose of entering into the international educational unit Kazakhstan high school supported the integration of the Bologna process (member-country since 2010), whose main objectives are to promote mobility in education and employment, and to improve the international competitiveness of higher education [3]. However, there are structural problems, pointing to make some organizational and economic changes at the education system. The higher education system in Kazakhstan should be fastest growing and adequately able to respond to the accelerating world processes of globalization. Today such new requirements come to the forefront: innovative education integrated with the intensive research activities, education and research interdisciplinarity, training close relationship with industry and economy consumers. The role of higher education at the present stage of Kazakhstan development is determined by the objectives of the market economy, the need to overcome the country’s backwardness risks from global tendencies for economic and social development.

METHODS

The higher education’s current state in Kazakhstan and its tasks were analyzed. The results are the following: actual soft spots have been revealed in the modern national education system, the higher education development strategy and the integration of Kazakhstan higher education to the European educational space have been considered, where this integration is provided by the successful introduction of
mandatory and recommendatory parameters of the Bologna Process [4]. Therefore, this adoption is helpful in the transition to the international educational standards and Kazakh high school reformation, taking into account the global tendencies. Moreover, the conscious effort on the creation of innovative platforms, advantages of credit technology, ways of improving the national higher education system were demonstrated. It was found that the innovative process would actuate such new mechanisms of integration as the establishment of academic and scientific-industrial consortiums [5]. Their activity base is to introduce the scientific and technological developments to the enterprise being created in the laboratories of universities and research institutes. During such process the targeted training of specialists and students is held simultaneously. As a result, the integration of education, science and industry should become one of the main factors of Kazakhstan’s development. The monitoring of printed and electronic materials of specialized publications, data of statistical and departmental authorities at the national and regional levels, the study of authorship works and other sources were undertaken to complete the tasks assigned.

RESULTS

Nowadays in the Republic there are 127 educational institutions providing educational services by the programs of higher and postgraduate education, where 44% are private ones. In 2014, the student body at high schools of the Republic was amounted to 477,387 people. 48.3% of the total number of students studied in public universities, 50.3% - in private educational institutions, 1.3% - abroad. In accordance with the international standards, the level model of multilingual education for the young generation is introduced in Kazakhstan. Special departments are opened at 42 HEIs (6 national, 1 international, 26 state, 7 corporatized, 2 private) for multilingual personnel training in engineering and technical, scientific and pedagogical sphere. The typical age of students enrolled for higher education is 17-24 years [6].

In 2014, Kazakhstan high school qualified 177,678 people for the labor market. The graduating experience in the context of specialty occupation indicates the predominance of such professional areas among young specialists as “Education” (25.7%), “Social Science and Business” (23.6%), “Engineering and Technology” (20.3%). In this respect, specialists training at universities does not meet the needs of the national economy and the labor market. Most private universities are focused on preparing students for low-cost financial, economic and legal profiles, whereas the relative share of graduates in “Agriculture” is only 1.2% of the total one. In the Republic a large number of graduates of pedagogical specialties - 122 888 people [7] were qualified for education in three years.

The quality of specialists training directly depends on the formation and consolidation of the practical skills, the knowledge gained in the process of work experience internship at enterprises. The business incubators receive a large development. They identify, develop and protect intellectual property, establish international contacts, contribute to the creation of new enterprises [8]. Such practice is popular in the Great Britain,
Germany, Australia, Canada, India, China, Singapore, and Saudi Arabia [9].

Today the main trend for the development of academic science in the world is to re-focus on the development of innovative “ecosystem” and to receive a particular commercial result. It also positively effect on the development of scientific research.

In 2010 «Kazakhstan-Japan Innovation Centre» was established at the Kazakh National Agrarian University with a new type of laboratories: “Electron Microscopy”, “Food and Environmental Safety”, the commercialization of scientific developments. Academic researchers offer their perspectives regarding the agricultural sector development of the region. The following developments find place in the crop production sector: innovative technology for green conveyor system, grapes growing in accordance with the adapted European model. Technologists of animal husbandry and academic veterinarians developed innovative methods for mutton production, vaccine against salmonellosis of sheep and lambs, new technologies for functional products from camel milk. Concerning the agroengineering issues and new technologies the researchers developed new technology solutions and mechanization for pasture water supply, for irrigation canals care, for fruit and berry drying, for vegetables with the use of effective environmental control methods, mobile laboratories for water and soil quality assessment.

In Kazakhstan international organizations give a significant support for the integration of education, science and innovation [10]. 21 groups of advanced technologies, whereof 9 ones operate at the premises of HEIs, are financed in the framework of the World Bank’s project called “Technology Commercialization” at the amount of 75 million USD. One of the project streams is to establish International Center for Material Science as a part of Karaganda State Technical University, where the modern model of the laboratory center will operate, and maintenance services will be developed in the field of science. According to the results of the rank order comparison, the top-group includes 55 high institutions, among them 9 national, 1 international, 9 corporatized and 11 private ones. The analysis carried out shows that most high-quality academic programs are presented in national, state and corporatized institutions.

Besides there is a unique opportunity to get higher and postgraduate education at Nazarbayev University, which provides academic knowledge of international standard, contributing to the formation of the intellectual nation. Nazarbayev University is a “growth point’ for the national system of higher education, its research and academic experience has been transforming into the leading universities of the country.

In 2014 in HEIs 129,335 students studied at the expense of the state educational grants, 335 516 students - by the purchase of educational services, 12 536 people – by the public contract [11].

The higher education system is going through a transformational period. Governments and higher education institutions of the world are making substantial efforts to cope with the increasing pressures associated with international competitiveness. This leads to
the development of new strategies providing the states and universities an opportunity to develop science, to introduce innovative technologies, to increase the attractiveness of the national education systems.

Despite the arising difficulties, the strategy of higher school development is effectively implemented in Kazakhstan. Integration of Kazakhstan higher education to the European educational space is provided by the successful introduction of mandatory, recommendatory and facultative parameters of Bologna process.

The purposeful work is planned for the creation of innovative platforms. The centers of research results commercialization are opened in 13 HEIs. The objectives of such centers are to establish contacts with business structures, to search for potential investors, to solve the issues regarding intellectual property protection, to license technologies and to develop business models of new high-tech enterprises. The student business incubators are established in 4 higher education institutions. In addition to the Research Institutes, the innovative structures operate managing the intellectual property portfolio. They identify, develop and protect intellectual property, establish international contacts, contribute to the creation of new enterprises.

To improve the academic mobility, in 2014 the HEIs sent 805 students to get foreign education for the period no less than 1 Semester, where 740 people went to European universities, 52 to the USA, 12 to the Eastern Asia, 1 to the Russia Federation. 616 undergraduates and 189 postgraduates studied abroad at the expense of the state budget in 2014. Generally, 1520 undergraduates and 1043 postgraduates have completed their study by different specialties abroad during the academic mobility program since 2011.

In the near future, we need to strengthen the research capacity of HEIs and Research Institutes, to attract foreign scientists for the implementation of joint research projects, to establish conditions for the development of research universities. Such measures will increase the efficiency and economic benefits of Kazakhstan science to increase the competitiveness of the country [12,13].

The Education Law of the Republic of Kazakhstan disclosures the following tasks:

- Higher education is to be oriented to meet current and future demands of the national economy for the specialists at the fullest degree so that it could solve the problem of employment to a large extent;
- Higher education institutions should not be limited to educational functions only, scientific and research activities are necessary too;
- To develop a multilevel system for educational grants;
- To create the system of the specialized educational institutions for research and applied education, taking in account regional specialization;
- To regularize mandatory work experience internship at the enterprises;
- To upgrade the education methods;
• To introduce innovative methods, solutions and implements to the national education system at an intensive rate, including distance learning and online learning;
• To change the focus and emphasis of higher education curriculum, involving programs to train practical skills and to obtain practical qualification;
• By today the most effective form of integration is the consolidation of universities and research institutes [14].

The new policy for innovative research development is the transfer of technology necessary for the country and the training of specialists for its future use. EXPO-2017 will assist in the selection of new technologies for the development of future energy, active participation in large-scale international research projects. Therefore, it will give an opportunity to integrate the national scientists’ efforts with foreign research organizations on the strategic innovative approaches, science and business cooperation.

In the long view, the competition between higher education institutions in the country will increase, because such issues will have a significant impact: strategic priorities for improving access to and quality of education, integration tendencies in the international educational space, in particular, stimulated by the Bologna agreement by Kazakhstan's accession to the WTO.

By the way, notwithstanding the attempts to modernize national high schools during the last decade, the competitiveness of Kazakhstan HEIs is still with low level.

Consequently it is impossible for the modern HIE to function successfully without establishing high-performance management system with its purpose to increase the competitiveness of HIE. To solve the problems raised it is important to form new approaches for management. In the first instance, it is the transfer of higher education system to the state characterized by high resistance, high performance and effectiveness [15].

Nowadays development of the modern national education system is supported by international standards. Presently many Kazakhstan universities actively study and use international practices of education system modernization. Specifically higher education develops from the cost-intensive sphere to the most powerful factor for the economy development that allows replacement of the determinative recourse of society development – human capital. Moreover, such responsible mission can be implemented only by increasing the quality of higher education.

In addition to the positive part of the Kazakhstan higher education system there is a wide range of unsolved problems:

• Staffing requirements are not strategically researched for a long-run period;
• Social partnership is underdeveloped;
Tenuous relationship between science and industry;
Legislative framework should be improved to attract recruiters for specialists training;
Poor material and technical facilities at HEIs, low percentage of modern equipment in laboratories [16].

Today there is a pressing issue regarding highly qualified specialists in many economy sectors in Kazakhstan. It is a paradox that the reason for the shortage of qualified specialists is not a lack of human resources or institutions involved in the training of these specialists. To the contrary, it is a high percentage of education institutions. Percentage index of the institutions as to the total number of the population is one of the highest in the world, and goes beyond this figure in European countries multi-fold. The main reason for the shortage of qualified specialists is insufficient level of graduates’ completeness at the country’s educational institutions.

The integration of education system to the national innovative complex with an immediate effect can help to solve this problem. Innovative activity of higher education institutions are based on integration of education, science and industry. And the economic basis of such integration is represented by the combination of recourses and mechanisms of educational, scientific and industrial complexes to get macro economical and commercial effects.

National higher education system is improved in accordance with the State Program for Education Development 2011-2020 in the Republic of Kazakhstan. Its objective is to come up to the high quality standard at higher education meeting the labor market’s requirements, tasks of the industrial and innovative development of the country and corresponding to the best world practice in education sphere [17].

In this regard, the following tips are required: to provide the specialists with higher and postgraduate education meeting the needs of industrial and innovative development of the country; to provide integration to the European higher education zone; to reach high effectiveness of the quality assessment system in higher education; to develop the material and technical facilities at HEIs; to provide integration of education, science and industry; to provide conditions for commercialization of intellectual creation and technology.

Realization of the education development program aimed to upgrade the education content, the new level for the development of university training and science, the formation of HEI’s innovative model oriented to the market’s demands allow to put up the education system ensuring that competitive high-level human capital takes place.

To make the higher school function under the conditions of the market economy effectively, we need to improve the management of research, scientific and technical activities oriented to the market and consumer, where it requires to strengthen the role of marketing, the demands at the market for educational services and, consequently,
the rapid adaptation of the university’s management system to the high technology products, technology and specialists’ services.

According to the Education Law of the Republic of Kazakhstan, education services are provided in the form of full-time, distance and part-time education. Full-time students in the Republic constitute 75.5% of the total amount of students in higher education institutions. In 2014 the student body was increased up to 6.3%. The typical age of the students enrolled to higher education is 17-24 years. And this is confirmed by the comparative statistical data of the age group.

The relationship between HEIs and industry is aligned as well by undertaking internship as by the branches of the academic departments at enterprises and organizations, corresponding to the profile for specialists training, attracting manufacturers to teaching. In 2014 Kazakhstan high school prepared 177,678 people for the labor market.

Modernization of the contemporary Kazakhstan education system started with Kazakhstan’s accession to the Bologna Process, which emphasized the problem for creating European region of higher education as a key point for the development of citizens’ mobility and their demand. Therefore, Kazakhstan needs to reform the higher education considerably and to introduce to the own educational space the credit educational technology, educational system aimed to improve the development of knowledge, based on the electiveness of the educational direction in the framework of the educational process, and to control knowledge in the form of credits [18,19].

The conventional benefits of credit technology are compliance with international standards for general education, decision making for education documents recognition, unification of educational programs taking into account global tendencies, academic freedom and variety of training programs.

The prerequisites for the transition to the credit system are the following:

*The need to improve the quality of training and education;
*Requirement strengthening at the labor market.

Kazakhstan’s accession to the Bologna Declaration considers accession to the European educational integrated space based on a number of mandatory principles:

- Multilevel high education system;
- Academic mobility for students and teachers;
- Control over the quality of higher education, etc.
- The main tasks for the education process using credit technology are the following:
  - To unify knowledge;
  - To provide conditions for maximum individualization of training;
  - To strengthen the role and effectiveness for individual students work;
To use effective methods to control educational achievements of students;
To use interactive teaching methods;
To use point-rating system for the evaluation of educational achievements for each academic discipline;
To introduce the technical equipment, automated management system, significantly saving time to collect and process information, which increases the efficiency for management decisions and its effectiveness.

Now education is result-oriented. It requires competitiveness from specialists, ability to adapt to the market conditions [20]. Modular training is a technology that allows switching to a subjective learning, and provides students to develop their motivational sphere, intelligence, self-support and self-management skills to carry out academic activities. Modular training requires clear structuring from education content, it gives positive motivation to learn due to the originality of its content, arrangement for educational research, the overcoming of negative aspects of the cognitive process. An important element of modular training is control system, intensifying its importance at the credit system. Modular training is a necessary part at the distance learning technology. It becomes too popular in Kazakhstan. Distance education is task-oriented and methodically organized management of the training and cognitive activity by electronic means for people who are away from the institutions’ placement.

As the modern means of communication are developed in the Republic of Kazakhstan, all the necessary conditions appear to form the common informational educational space, as well to realize ideas for continuous education.

Intensification of information learning process, knowledge and professional competency control can greatly improve the efficiency and quality of qualified specialists' training, can target the creative activity of any person.

Principally, innovative development vector of the intellectual and educational potential of Kazakhstan is innovativeness of social and economic development, which implies the ability of the high school for innovations, innovative projects, breakthrough academic and technological areas, stimulating the development of radically new research, organizational, managerial, economic approaches that can improve the welfare and to strengthen the competitiveness of education and science of the Republic of Kazakhstan [21].

Kazakhstan high school becomes an active initiator and organizer of the new organizational forms of training for the innovative economy such as industrial parks at universities, university education centers, corporate training centers, educational structures for small businesses, business incubators, etc.

Constitutive importance for the specialists’ training is the interrelation between the learning stage and the imminent functional participation of the specialists in the workflow. The conditions for regional scientific and technological cooperation of
Educational institutions and enterprises are provided to implement joint innovative projects. Direct interaction of enterprises and universities has a positive effect on the quality of students' training [22].

The communicative and information networks of HEIs, enterprises, government authorities are formed for the rapid information exchange that is necessary for the continuous monitoring of the innovative sectors at the economy. The result of the measures taken should be deep integration of research work at universities, industry institutes, institutions of development for real result achievement in the field of innovative design and the creation of conditions for the development of innovative economy.

The concept for science and education integration, the targeted program for preparation and attestation of highly qualified academic personnel with the long-term perspective and other educational programs are created and realized to make the complex solution for the above-mentioned problems. In this context, the developers try to take into account the innovative aspect of the problem. For instance, it is necessary to determine which target public support is essential to the universities arranging trainings for such specialists, also the development of international cooperation, and the organization of trainings at educational institutions engaged in innovative activities. In this formulation, the establishment of the multilevel system for training and retraining of specialists is actual for scientific and innovative entrepreneurship, besides the making decision regarding involvement of young people to science and innovation sphere. The innovation process could bring into action such new mechanisms as academic, scientific and industrial consortiums. The fundamental for their activity is to introduce to the enterprises scientific and industrial elaborations designed at HEI academic departments and Research Laboratories, where the target training of the manufacture specialists and students takes place in the meantime. Finally, the real integration of education, science and industry is to become one of the main factors for Kazakhstan's development.

Evaluation. Thereby, following the study it was found that Kazakhstan system of higher education has a wide range of unresolved issues. In this regard, the State Program for Education Development 2011-2020 in the Republic of Kazakhstan was developed. The main goal was set in the field of higher education - to achieve a high quality level that meets the needs of the labor market, problems of industrial-innovative development of the country corresponding to the best world practices in the field of education.

Nowadays there is a lack of interaction between universities and the labor market, mechanisms of graduates employment and flexible response of the educational programs at HEIs are not regulated for the labor market needs.

Interaction between education and business, identification of ways how to improve the correlation of the higher education market and the labor market become a key indicator for the effectiveness of higher education and training quality.
The prerequisite for the successful development of HEI, increase of its competitiveness, modernization in accordance with the requirements of the labor market is mechanism of the institution’s inclusion to the process of innovation and future integration associations.

Strategic management of HEI is the introduction of strategic marketing, the development of modern financial management.

The interaction with the labor market, the consumer satisfaction related to the future work, and as a result, the training of the graduates in demand, received academic training and practical skills, are relevant when addressing to the social demands in accordance with the requirements of the modern labor market of Kazakhstan to obtain qualitative and practically applicable education.

**CONCLUSION**

The tendency of the society development in Kazakhstan indicates the increasing importance of education as a tool for the creation of the intellectual potential of the state and the resource that ensures the welfare, and as a factor of the competitiveness of higher education institutions and the state as a whole.

Education system turns to the priority, leading sphere of social and economic policy; it becomes an indicator and a catalyzer for the country’s development.

The mechanism for the management of higher education institutions in Kazakhstan does not fully realize the potential to ensure priority development of the national economy due to many objective and subjective reasons.

To solve the existing problems with graduating specialists we need to perform work directed to improve the competence and motivation of teachers, to improve the material and technical facilities of the educational institutions, to use international experience, modern educational technologies and information resources to the great extent, to improve educational programs, to introduce the effective mechanisms for their implementation.

The national education needs estimable brands that can compete on a worldwide basis. In this situation, we need to improve the interaction between higher education and labor market, the training of qualified personnel. This requires forms and institutes of cooperation suitable to the time factor, taking into account the mutual interests of the parties.

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