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Role of Technology Transfer Offices in Modernization Higher Education Institutions in Uzbekistan

Key words: *reforming, technology transfer, innovation, knowledge triangle, entrepreneurship*

Annotation: *the article considers the results of reforming the system of higher education of the Republic of Uzbekistan for the years of independence, as well as its further development on the basis of setting up technology transfer offices at universities.*

Introduction

For many centuries, the ancient land of Uzbekistan remained the center of education and science, one of the centers of world civilization, and the desire for knowledge has always remained an integral part of the mentality of our people.

Known to the whole world for their outstanding discoveries in mathematics, astronomy, geodesy, mineralogy, pharmacology and medicine are our great ancestors such as Muhammad Al Khorezmi, Abu Rayhon Beruni, Abu Ali ibn Sino-Avicenna, Mirzo Ulugbek and many others. Today, when we talk about our great ancestors, we proud of their achievements and do everything in order to be worthy of their followers?

The article reviews the achievements of the education reform and its further modernization taking into account the experience of the countries of the European Union on the basis of the development of technology transfer.

Having entered the path of building a modern state with a developed market economy, ensuring a gradual transition from a strong state to a strong civil society, we have always realized that only people who realize the need for harmony of national and universal values, possessing modern knowledge, intellectual potential and advanced technologies, can achieve the set strategic development goals.

The issues of reforming the educational system - are directly linked, first of all, with the solution of the problems of stable and sustainable economic development of the modern state.

Today there is no need to prove that the twenty-first century, admittedly, is becoming the century of globalization and blurring of borders, information and communication technologies and the Internet, a century of ever increasing competition in world space and the world market.

Under these conditions, only that state can declare itself, which, among the main priorities is always growth of investments in human capital, the preparation of an educated and

intellectually developed generation, which in the modern world is the most important value and decisive force in achieving the goals of democratic development, modernization and updates.

I. From the history of reforming the educational system of the republic of Uzbekistan for the years of independence.

First of all, it is necessary to emphasize that the Education Reform Program, adopted in Uzbekistan 20 years ago, called the National Training Program, is an inseparable part of our own "Uzbek model" of economic and political reforms based on the principle of phased, evolutionary of building a new society in the country.

This program, being a product of serious searches and research, generalization of the experience of the advanced developed countries of the world, was aimed at complete rejection of past stereotypes and dogmas of communist ideology, strengthening of democratic values in the minds of people, especially the younger generation. According to statistics in Uzbekistan, about 35 percent of the population is children under the age of 16, over 60 percent are young people under the age of 30, the role and significance of these reforms are becoming clear and obvious. In short, the goal of the program was the formation of a fully developed and independent thinker who has his own opinion, his choice and firm civic positions. Achieving this goal without radical restructuring and reforming the educational system that has developed over the years was simply impossible.

An important place in the reform of the educational process and the training of highly qualified personnel in demand on the labor market is occupied by higher educational institutions. In Uzbekistan, branches of leading universities in Europe and Asia have been established and successfully operate, with a high international reputation and deep historical roots, such as Westminster University, the Singapore Institute of Management Development, the Turin Polytechnic University, the Russian University of Oil and Gas, the Moscow State University, the Russian Economic University, Korea University of INHA. Within the walls of these universities, bachelors and masters are trained in such specialties as are demanded in the labor market, such as machine building, oil and gas, information technology, economics and business management, financial management, commercial law, and their graduates receive, which is very important for us, diplomas recognized worldwide.

Issues of work with gifted students, development of entrepreneurial qualities among young people, with a view to their further development and effective employment, remain urgent.

Thus, the Academy of Sciences of Uzbekistan, in conjunction with the leading university in the UK - the University of Cambridge, established an educational and experimental High Technology Center. Its main task is to train gifted students, graduate students, young scientists with modern methods of carrying out applied innovative research and development in the field of chemistry, physics, biology, biochemistry, biophysics, geology and geodesy. The Center carries out training of young scientists in the process of realizing specific research works.

At the center of attention of the education system of the Republic of Uzbekistan leave questions of the quality of training specialists and their relevance in the real economy. In general, annual

expenditures on the development and reform of education in Uzbekistan amount to 10-12 percent of GDP, and their share in the state budget expenditures exceeds 35 percent, which in itself is a concrete confirmation of the enormous attention paid to this sphere.

The program implemented in our country is not the repetition or copying of someone's model, it is, first of all, a generalization of the accumulated experience of developed democratic countries and at the same time takes into account the requirements of the rapidly changing modern world.

It is no exaggeration to say that the cardinal reform of the education system has become an important factor and fundamental basis for changing people's consciousness and outlook, increasing their political and civic activity, and confidence in their future.

Despite the continuing global financial and economic crisis, Uzbekistan, according to the estimates of authoritative international financial organizations, maintains a consistently high growth rate of the economy, which amounted to at least 8.5% over the past five years, compared to 2000 the GDP was increased 2.1 times. The current account surplus, low external debt and sufficient foreign exchange reserves are provided, high economic growth rates are forecasted in the medium term. According to the rating of the authoritative World Economic Forum, Uzbekistan is among the five countries with the fastest growing economy in the world according to the results of 2014-2016 and forecast growth for 2017.

It is important to note that these rates are provided primarily by deepening structural changes and diversifying the economy, outstripping the development of new high-tech enterprises and industries, accelerating the modernization and technical upgrading of existing enterprises, and attracting foreign investment. The modernization of higher education in Uzbekistan also contributes to this.

Of course, a lot has been done, certain successes have been achieved, and these reforms of the education system were justified in the first years of independence of the Republic of Uzbekistan. At present, in the context of globalization and the development of information and communication technologies, new problems and shortcomings arise, which are still very many. Some problems of the development of higher education in Uzbekistan are given in the World Bank's analytical report 2014 "Uzbekistan. Modernization of the higher education system" [5]. In particular:

- despite the changes in the structure of the economy of the republic in recent years, the structure of the trained personnel remains unchanged;
- there is a discrepancy between the professional knowledge and skills of cadres in the labor market;
- the economy of Uzbekistan is lagging behind in the issue of innovation, since the Innovation Activity of universities is lagging behind;
- coverage of higher education in Uzbekistan is one of the lowest in the world;
- It is necessary to improve the quality of higher education, the ratio of higher education institutions remains invariable, and the level of public funding for higher education remains low by international standards.

Apparently, the solution of all these problems is connected with the implementation of a set of measures aimed at stimulating innovative approaches in the system of higher education and deepening market ties between science, education and production

New tasks of social development give the university community additional opportunities to realize its intellectual potential. The prevailing concept is the market-oriented modern university, based on the triangle of knowledge, the cooperation of the three forces - higher education institutions, business and government - on three vectors of support - innovation, education and research. Thus, the actualization of modernization of higher education in Uzbekistan and the development of the mechanism of interaction between universities and business acquires a vital character, in this context the "MATcHES" project is timely.

"MATcHES" is a project funded by the EU Commission under the Tempus IV program, which aims to modernize the higher education system in Uzbekistan by raising the level of cooperation of key participants in the Knowledge Triangle with the aim of establishing a long-term partnership. The project is based on the concept of the importance of the role of universities in the development of regions and that this process should involve all stakeholders, including representatives of business and public authorities. The project aims to develop three "Regional Knowledge Platforms", led by higher education institutions, uniting all stakeholders within the "Regional Innovation System".

II. Main directions of activities of knowledge transfer centers for providing services from the party of university in support of business

One of the main criteria of competitiveness is innovative development.

If in the past the role of universities was only in the conduct of scientific and pedagogical activity, today everything has changed, and universities have a mission "to transfer knowledge from science to economics." Technology transfer is one of the ways to diversify the sources of income of higher education institutions, which, in turn, can expand its own capabilities and turn the university into an entrepreneurial subject of the regional economy.

The availability of an appropriate organizational infrastructure that performs the role of a "clipboard" between external customers and departments of the university, its teachers and scientists is of major importance in the effectiveness of knowledge transfer processes. A key element of such an infrastructure is the Knowledge Transfer Office (KTO), whose goal is to disclose the university's commercialized potential for external customers.

The implementation of the project program for the organization of the three KTO was carried out in stages.

At the first stage, an analysis of the needs of the regions was carried out, which made it possible to determine the real situation in which we are in this issue and identify a number of the following problems:

1. The subjects of research of scientific developments do not correspond in most cases to business needs in the regions;
2. Entrepreneurs are not interested in the results of scientific developments;

3. Scientists have weakly developing a desire for entrepreneurship, and entrepreneurs not have a craving for innovative development;
4. Absence of a mechanism for integrating science, education and business;
5. Lack of infrastructure for entrepreneurship support in universities;
6. Weak role of universities in the socio-economic development of regions.

Based on the study of the best world practices in effective integration of the participants in the knowledge triangle of various innovative systems, and taking into account local conditions and potential opportunities, models of the innovation system of the Bukhara, Kashkadarya and Namangan regions were developed, databases of participants in the knowledge triangle from among stakeholders, representing the spheres of education, science, business, supporting business organizations and local authorities.

Within the framework of the project, training seminars were organized on five topics aimed at a better understanding of the interactions and opportunities for cooperation among the participants in the knowledge triangle based on the best examples of European experience. The materials and programs of the training seminars were developed by European partners. Seminars were conducted by Uzbek trainers with the moderation of European partners in three regions of Uzbekistan, in which over 350 representatives of business, education, science, local authorities and business support organizations participated.

Conducted training seminars allowed to increase the awareness of participants and their interest in the triangle of knowledge. We made an important conclusion that the main activators of innovative development of regions and interaction of participants in the knowledge triangle should be higher education institutions through integrated structural units in the form of Technology Transfer Offices (TTOs).

On this basis, in three universities in Uzbekistan, taking into account local conditions, was developed legal provisions on activities and according orders of rectors were created three KTO as structural units.

The regulatory and legal framework of Uzbekistan supports the creation of knowledge transfer units in higher education institutions, which is a strong prerequisite for the modernization of higher education institutions in the country.

The previous stages of the organization in the structure of the institutions of the Knowledge Transfer Offices within the framework of the project was the fulfillment of a number of tasks that combined analysis and organizational development in interrelated areas. Another important result of the project was the formation of a culture of knowledge transfer in higher education institutions through the joint organization of a series of seminars among potential participants in the regional knowledge triangle by representatives of the State Committee for the Coordination of Science and Technology and non-academic Uzbek partners. The seminars examined the opportunities for interaction between the participants in the knowledge triangle, the sources of financing of joint projects, the proposals of stakeholders, the practice and mechanisms of knowledge transfer, in particular, the benefits of this process for business

development in the region, the creation of a regional knowledge platform, the prerequisites for creating technoparks.

The Technology Transfer Offices (TTO) in higher education institutions was, I might say, a regulator, a mechanism, the core of the knowledge triangle, which allows teachers and students to connect to real research and educational services for entrepreneurs. In the process of implementing the project, a knowledge transfer strategy has been developed that has become a new dimension of the strategic plan for the development of universities. In addition, a Manual on the transfer of technology for TTO staff has been developed, detailing the mechanisms and procedures for implementing knowledge transfer activities both in the field of scientific and technical developments and in the field of educational programs designed to meet the needs of external customers.

Technology transfer offices are actually facial offices of future scientific and technological parks (STP), being one of the main steps on the way to their creation.

III. Advantages of regional knowledge platforms and transfer technology offices in activities of universities

Business in Uzbekistan is in dire need of new technologies and creation on their basis of modern productions, the satisfaction of needs of which can be ensured only in the conditions of systematization and formation of integration ties of participants in the knowledge triangle. For the Bukhara, Kashkadarya and Namangan regions of Uzbekistan, the creation of the TTO was the very mechanism for the development and transfer of knowledge, skills that determine new technologies, which creates a process that can meet the needs of society and the economy of the regions.

The Regional Knowledge Platform, regulated by the Office of Technology Transfer (TTO) at the institutes, has been developed during the project implementation. The developed knowledge transfer strategies have become a new dimension of the strategic plan for the development of institutions.

The role of the KTO is as follows:

I. Monitoring, planning and cooperation activities:

- Monitoring of the scientific achievements of the teaching staff of the University.
- Selection of strategic research areas from the point of view of the units.
- Acquiring companies to cooperate in internships employee and student practices as well as places work for students and graduates
- Institutions tied cooperation with the Business Environment.

II. Creating a base and preparing scientific offer:

- Establishing a database of companies cooperating with the University
- Building a research offer including innovative solutions for businesses including several thematic groups (for technology, economics and business, social sciences).
- Creation of an Internet platform for maintaining constant contact with entrepreneurs.

- Placing a database of companies offering internships to students and employee practices and internships.

III. The introduction of the management and protection of intellectual property:

- monitor the current processes and develop new rules management of intellectual property in the form of the Rules of Protection Intellectual Property
- creation of a database of intellectual property WSG, which will be systematically updated, and its resources are monitored regularly,

IV. Building awareness of researchers.

As part of building developed awareness programs and training courses covering:

- commercialization of research results, building contacts with entrepreneurs, management and protection of intellectual property (9).

Additional KTO provide such services as:

- Finding a source of funding;
- Preparing a successful research proposal;
- Examining and drafting contracts;
- Offering comprehensive advice on matters relating to intellectual property.

Knowledge transfer offices are not single units. They are the result of carefully integrated developments throughout the MATCHES project. In three universities of Uzbekistan, Regional Knowledge Platforms have been designed and are functioning, where you can get full information about scientific developments online from anywhere in the world, as well as where you can establish cooperation, make an application for development or knowledge, learn about proposals for research and developed technologies by scientists of institutions (<http://www.matches-project.eu>).

The regional knowledge platform is a communication tool that intensifies efforts to create promising technologies, new products (services), to attract additional resources for research and development based on the participation of all stakeholders (business, science, the state, civil society) in the interests of accelerated, innovative development of the economy of the regions. Their functioning is enshrined in memorandums as agreements of understanding and interaction aimed at achieving the goals and objectives reflected in it, and on a voluntary basis signed by the initiators of the Regional Knowledge Platform and organizations willing to join as participants.

Knowledge Transfer Office (KTO) at university is considered as one of the actors of knowledge triangle. The Knowledge Triangle is understood as a flow of added value between:

- **research** (technology transfer centres, research&development agencies in most cases public funded);
- **education** (higher education units = universities);
- **innovation** (innovation activities of businesses).

Thus, universities engage in technology transfer for five reasons:

1. To promote the application of the results of scientific research for the public good;

2. To recruit, reward and retain faculty interested in seeing their technologies further developed;
3. To provide opportunities for exchanges of information and materials with industry;
4. To promote economic development
5. To generate an income stream for reinvestment into research and teaching.

Conclusion

For companies the most important thing to start cooperation with scientists and research units is to build the common platform, where all information concerning the results of researches, projects, events will be developed and presented. It is necessary to connect the word of business with the universities know-how. The methods how to transfer knowledge from universities to the market, how to enhance companies to cooperation, how to sell the invention is a key role for universities nowadays. They do not play only educational role. Commercialization and communication with business sector as well as effective participation in the innovation ecosystem is their mission.

To do that universities invest in well qualified personnel, in universities of Uzbekistan it is necessary to create the Technology Transfer Offices and allow knowledge brokers to sell the know how worked out at unit.

The created TTOs will continue to make a significant contribution to the stabilization and modernization of the three Uzbek higher education institutions by improving the dialogue between the academic and non-academic worlds and contributing to:

- (1) in ensuring the leading position of universities in the Regional Innovation System and in facilitating cooperation with enterprises and local authorities of the regions;
- (2) formation and consolidation of the knowledge triangle in the regions;
- (3) in finding and implementing solutions in specific priorities in the "knowledge triangle: innovation-education-research", focusing scientists on the innovative needs of the regions.

Thus, organized TTOs are of fundamental importance in the development of higher education in Uzbekistan.

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