Foresight In The Higher Education Sector of Uzbekistan: Problems and Ways of Development

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Abstract

This article focuses on the problems and development methods of higher education in the Republic of Uzbekistan. It also substantiates the effectiveness of the application of foresight to identify and analyse factors affecting the future organization of distance education in the leading higher education institutions of the republic. Moreover, it provides suggestions for the development of a roadmap using foresight to organize distance education in higher education institutions in Uzbekistan until 2025.

The purpose, objectives and some of the results of the research work of the World Bank grant for the implementation of theprogramme "Modernization of higher education in the Republic of Uzbekistan" on the topic "Development of a model, technology and software for distance education in universities of the Republic of Uzbekistan" are presented. The first steps to the application of foresight technologies in higher education institutions of the Republic of Uzbekistan; the creation of a foresight centre at the Karshi Engineering and Economics Institute; the definition of the mission, goals and objectives; and the results of forecasting using foresight technologies in the organization of distance education in the leading universities of the republic are considered.

Keywords: higher education institutions, concept, graduate coverage, foresight, distance education, factor, roadmap.

1. INTRODUCTION

Reforming the higher education sector of Uzbekistan is an essential and adequate response to the socio-economic and socio-political changes taking place in the country and on the world stage. On January 24, 2020, the president of Uzbekistan delivered a message to the parliament of the country. In his three-hour speech, the head of state presented a comprehensive, multi-factorial analysis of the situation in the country, touching particularly on the legal and institutional foundations for the development of the state, and proposed significant steps to improve the system of public administration, expand the scale of the social orientation of the economy, ensure internal political stability, and steadily increase people's welfare. Speaking about the goal of entering a number of developed countries, the head of the country emphasized that it can be achieved only through accelerated reforms that rely on science, education and innovation.

"Science and education are of paramount importance for increasing the intellectual and spiritual potential not only of young people, but of our entire society. Where science does not develop, there is regression, backwardness of society in all spheres. The great thinkers of the East said: 'The

greatest wealth is reason and science, the greatest inheritance is a good upbringing, the greatest poverty is the lack of knowledge.' The desire to master modern knowledge, be enlightened and have a high culture should become a vital need for all of us", the head of state of the Republic of Uzbekistan emphasized [1].

In all spheres of life in the Republic of Uzbekistan, the introduction of digital technologies is required. As noted in the message of the president of the Republic of Uzbekistan Sh. M. Mirziyoyev at the meeting of the Oliy Majlis, "... we should develop the National Concept of the Digital Economy, which provides for the updating of all areas of the economy based on digital technologies, and on this basis implement the Digital Uzbekistan-2030 program".

The digital economy refers to forming business models and building business processes based on the capabilities of digital technologies (ICT and the Internet) and big data exchange (Big Data), and this set of relations takes shape in the production, distribution, exchange and consumption processes based on online technologies (ICT and the Internet) and aimed at the high-quality satisfaction of needs for life benefits. It is necessary to create an electronic platform of scientific achievements, a base of domestic and foreign scientific developments, and each higher education and research institution needs to establish cooperation with leading foreign universities and research centres.

The importance of innovative and electronic education is associated with the globalization of education and has most often recently been associated with the prospects for the development of open and distance education (DE) and the use of the Internet. In these conditions, first, we must consider the use of new information and communication technologies. In the world practice of developing the sphere of education, "smart education" has appeared. Owing to "smart education", the "Internet of Things" and other similar smart processes, the educational process is being transferred mainly to the electronic environment, which provides effective training in an interactive environment. The organizational and technological basis of the electronic form of education is expected to enable the dynamics of the rapid formation of widespread advanced and distant forms of education.

The document also presents plans to create technoparks, foresight centres, transfer technology centres, start-ups and accelerators in higher education institutions through attracting foreign investment and introducing five initiatives, including a set of measures to create additional conditions for the training and education of student youths.

The emergence, deployment and development of global changes in the worldwide educational process cannot help but affect the national education system in terms of both form and content. The decree of Sh. Mirziyoyev dated October 9, 2019, "Concept for the Development of the Higher Education System of the Republic of Uzbekistan until 2030", was approved to modernize and systemically reform higher education in the Republic of Uzbekistan, develop the social sphere and sectors of the economy on the basis of advanced educational technologies, and improve the quality of the process of training independent-minded, highly qualified personnel with modern knowledge and high spiritual and moral qualities [3].

In our opinion, to develop in the new conditions, each higher education institution of the country must develop its long-term development strategy or roadmaps that extend to 2030, i.e., radically revise its own strategies, taking into account the tasks set in the Message of the President of the Republic of Uzbekistan to the Oliy Majlis and the "Concept for the Development of the Higher Education System of the Republic of Uzbekistan until 2030" and addressing the abovementioned urgent problems and shortcomings. To achieve this goal, it is necessary to accelerate the processes of studying and introducing into practice the best foreign experience aimed at improving the educational process, i.e., to strive to enter into the free competitive environment of international educational services and abandon directive centralized state planning and management.

Based on the international experience of the higher education institutions of developed countries, the example of Russia shows that foresight technologies should be used to develop a long-term

plan that covers 10-30 years, and strategies for the development of education at the university should aim to modernize higher education and improve the quality of education. Only unique strategic concepts make it possible to adapt to changes without duplicating typical solutions.

The proposed procedure for creating foresight in higher education institutions of Uzbekistan is based on the international experience of higher education institutions in developed countries.

Universities are a special type of strategic "player" that, despite a number of limitations, can creatively use foresight tools to visualize images of a possible future and their targeted implementation.

The experience of higher education institutions in developed countries, based on the example of Russia, shows that foresight technologies should be used to develop a long-term plan that covers 10-30 years, and strategies for the development of education in a university should aim to modernize higher education and improve the quality of education. Only unique strategic concepts make it possible to adapt to changes without duplicating standard solutions [4].

Not a single country, including the United States and Japan, that spends hundreds of millions of dollars a year on science can currently conduct full-scale research in all scientific areas since acquiring new knowledge requires a high level of spending on equipment and specialist training. Under these conditions, they have learned to effectively determine the priorities for their scientific, technical and innovative development while maintaining a leading position in the most promising areas [5]. Therefore, these countries are developing special long-term programmes to define high-priority areas of science and technology using foresight technology.

This article discusses the first steps in the use of foresight technologies in higher education institutions of the Republic of Uzbekistan; the creation of a foresight centre at the Karshi Engineering and Economics Institute; the definition of the mission, goals and objectives; and the results of forecasting using foresight technologies in the organization of distance education in the leading universities of the republic.

First Steps to Foresight in Higher Education Institutions of Uzbekistan.

Universities are a special type of strategic "player" [6] that, despite a number of limitations, can creatively use foresight tools to form images of a possible future and the purposeful implementation of those images [7,8,9]

The analysis of the methodology for developing the long-term strategies of foreign universities showed that the main tool of strategic research is foresight, which is widely used to develop strategies for innovative development at the international, national, regional and local levels.

Our article examines the role of foresight in higher education and the first steps of its application to develop a university strategy that extends to 2030 using the example of the Karshi Engineering and Economics Institute.

The Karshi Engineering and Economics Institute, as the winner of a grant from the World Bank, has started to implement the programme "Modernization of higher education in the Republic of Uzbekistan" on the topic "Development of models, technologies and software for distance education in universities of the Republic of Uzbekistan".

The project consists of the following three closely interrelated main components:

Component 1: Organization of a foresight centre at the Karshi Engineering and Economics Institute, the purpose of which is to conduct research in the field of long-term forecasting and determine the priorities of innovative development and the use of information and communication technologies in the educational process in the universities of the Republic of Uzbekistan using the foresight methodology.

Component 2: Using the foresight methods "delphi", "roadmap" and "expert panels" to review and analyse the current state of the use of modern information and communication technologies in the educational process as well as "electronic education".

Component 3: On the basis of foresight research, forecasting the trajectory of innovative development in the use of ICT in the educational process of higher education institutions of

Uzbekistan, creating a roadmap that extends to 2030 in this direction and developing a platform for distance education at the institute in the future.

The aim of the study is use foresight, based on a long-term forecast, to develop a "technological roadmap for innovative development" for electronic education that extends to 2030 as well as models and technologies of distance education at the Karshi Engineering and Economics Institute.

The study provides solutions for the following tasks:

– Creation of the "foresight centre" at the Karshi Engineering and Economics Institute, defining the functions and directions of the centre;

– Study and analysis of the experience of the foresight centres of foreign universities and definition of the specific foresight methodology used in this study;

– Based on foresight, the development of a long-term development strategy for electronic education in the universities of the republic as well as a roadmap that extends to 2030.

– Determine ways to improve e-education and develop a model and technology of distance education aimed at increasing the coverage of higher education for school graduates.

The object of the research is the state and capabilities of leading universities and the population of the Republic of Uzbekistan to organize distance education.

Based on the experience of a number of foreign higher education and scientific institutions, including the National Research University Higher School of Economics (Russia), a foresight centre was established at the Karshi Engineering and Economics Institute.

The aim of the centre:

Assist in the implementation of the "Concept for the Development of the Higher Education System of the Republic of Uzbekistan until 2030".

Functions of the centre:

• Disseminate information and promote foresight culture in the universities of Uzbekistan;

• Disseminate information on foresight technology and methodology, including the methods of technological forecasting and building road maps;

• Participate in the formation of information resources for the Internet portal on technological foresight;

• Conduct information seminars and training on the methodology and organization of foresight research in the field of higher education in Uzbekistan; and

• Translate materials on foresight methodology into the state language (Uzbek).

2. MATERIALS AND METHODS

An analysis of the methodology for developing the long-term strategies of foreign universities showed that the main tool for strategic research is foresight, which is widely used to develop strategies for innovative development at the international, national, regional and local levels.

The main problems to be solved in the study are identifying the main factors affecting the low level of enrolment in higher education and developing proposals aimed at increasing enrolment.

As a result of our research, we propose 3 main ways to solve this problem:

1. Extend the admission quota for existing universities or enable universities to independently determine the quota, i.e., a gradual transition to academic and financial independence.

2. Open new higher education institutions: branches of foreign universities and branches of leading universities of the republic in the regions.

3. Organize distance education in leading universities and "open universities".

Significant work has been carried out on the first and second proposals in the area of higher education in Uzbekistan since the first days of independence. In 1991-2017, the number of universities in the republic doubled, and in 2017, over 230 thousand students studied at 59 universities and universities as well as 11 branches of the capital's universities [9]. In the past three years, 37 new universities have been organized in the republic, including 6 new universities, 17 branches of the leading universities of the republic and 14 foreign universities. The Message of the President of the Republic of Uzbekistan to the Oliy Majlis precisely indicates that academic and financial independence will be gradually provided to higher education institutions. Ten universities were to switch to self-financing in 2020. In addition, the coverage of higher education for school graduates was planned to increase by at least 25% in 2020 and by 50-60% in the future [10,11].

The graph shows that the number of applicants who did not enter state universities is growing, and the difference is increasing every year. Alarmingly, a large number of non-applicants are annually added to the rapidly growing segment of the population aged 18-24 years. Quotas for additional admission are set based on the potential of the university and the areas of education. However, the number of extra seats is quite small (Fig. 1).

An analysis of these indicators in developed foreign countries shows the following: Serbia – 97.4%, New Zealand – 95.6%, Turkey – 92.3%, Switzerland – 86.9%, Denmark – 85.4%, Belarus – 84.4%, Russia – 84.2%, Japan – 81.1%, Kazakhstan – 69.2%, and Uzbekistan – 9.6% [7]. The indicator calculates the proportion of students who entered universities in 2015 to the total population of an age corresponding to the level of education [12].
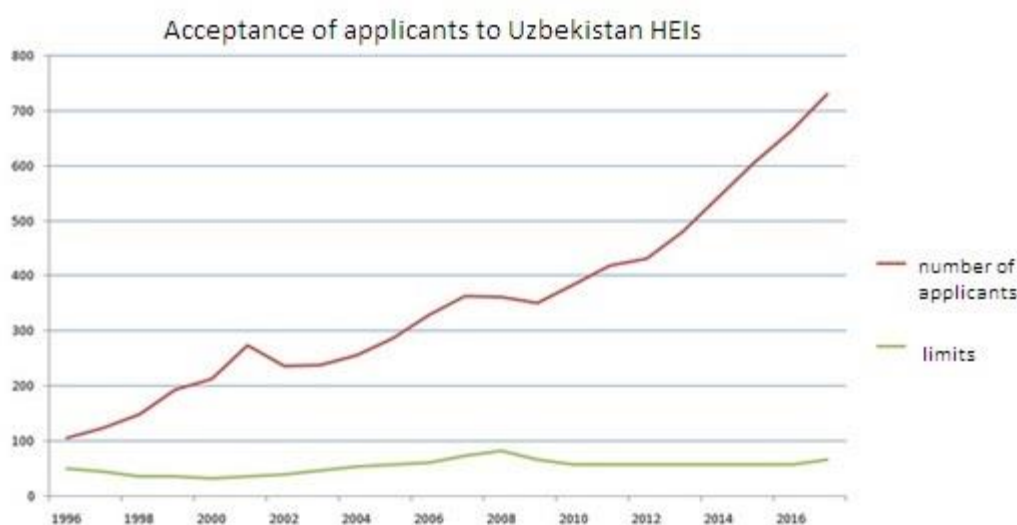
Fig. 1. The dynamics of the growth of quota places and the number of applicants.
Source: Ministry of Higher Education of Uzbekistan.

In recent years, reforms in the field of education have had noticeable effects in Uzbekistan. As a result, the coverage of higher education for school graduates has reached 20%. However, for the deep reform and development of higher education, including the achievement of bringing higher education coverage to the level of developed countries, huge state financial resources are required. In addition, in the higher education system, an increase in the number of study places can lead to negative consequences and problems. However, this does not mean that increasing enrolment in higher education is not one of the most important tasks, since without high-quality personnel with higher education, reforms in the country's economy are impossible. Therefore, increasing enrolment in higher education is an urgent task, but it is of utmost importance to take into account the risks that affect the quality of training and to take appropriate preventive measures.

To conduct foresight studies, the following foresight methods were studied and deeply analysed: delphi, brainstorming, backstage analysis, bibliographic analysis, public panels, mutual impact analysis, source scanning, testing, expert panels, future development, games, highlighting key technologies, reviewing sources of global trends, modelling and simulations, multi-criteria analysis, stage design, SWOT nalysis, and technology mapping. Due to the analysis of the methods of foresight technologies for the further development of the project, the following methods were selected: the delphi method, SWOT analysis, expert panels and bibliographic analysis.

3. RESULTS

The research indicated that one of the promising ways to solve this problem is the organization of distance education in the existing leading universities of the Republic of Uzbekistan.

Distance education has great potential for solving these problems by expanding access to high-quality education to a large number of people, including women, people with disabilities, and students from poor families [13]. The organization of distance education in the universities of the republic could provide access to higher education for many who wish to overcome territorial and time restrictions. In addition, distance learning reduces the cost of educational services, which makes it possible for families with limited financial resources to obtain higher education in their desired specialty [14,15]

In the framework of the World Bank grant "Academic Innovation Fund", on October 30, 2019, a republican training seminar on the topic "Innovation Policy and Foresight in the Higher Education Sector of the Republic of Uzbekistan" was held at the Karshi Engineering and Economics Institute. It was attended by over 60 ICT specialists from leading universities, enterprises and organizations. During the seminar, the task was to determine the factors affecting the organization of distance education in universities of the Republic of Uzbekistan. We used the foresight method "box of the future". This technology is ideologically similar to the scenario approach, with the difference that the scenario approach offers and justifies a set of alternative pictures of the future, and future workshops involve creating a picture of the ideal desired future and a practical plan for its implementation [16,17,18,19].

The specialists were divided into 3 groups to determine social factors, economic factors and information transmission security factors and didactic security. All factors were divided into 2 categories: positive and negative (Table 1).

№	Table 1. Classification of the main factors affecting the organization of continuing education in universities of the Republic of Uzbekistan		
№	**Key factors**	**Factor category**	
	I. Social	positive	negative
1.	Increases coverage of tertiary education	+	
2.	Provides opportunity to obtain higher education for women with young children, people with disabilities, and students from families with limited financial resources	+	
3.	Territorial and temporal restrictions on access to education are being overcome	+	
4.	Opportunity to simultaneously study in several specialties	+	
5.	Opportunity to study at universities without interruption from production	+	
6.	Flexible continuing education opportunities, regardless of age	+	
7.	A wide selection of specialties and areas of education that are competitive in the labour market	+	
8.	Decreased attention to educational work with youth		+
9.	Low level of computer literacy in remote regions of the republic		+
9.	opportunities for other people, not just students, to perform test tasks, independent work and other online tasks		+
10.	No specific legal basis confirming BS diplomas as full-time, part-time and evening education		+
	II. Economic		+

1.	Reduces the cost of educational services by 8-10 times	+	
2.	The contractual amount of students for tuition is reduced by 4-5 times	+	
3.	Adequate level of computer equipment availability at leading universities of the republic	+	
4.	Costs are not related to the number of students, i.e., dramatically reduced overhead	+	
1. 5	Fast return on investment	+	
5.	Insufficient provision of the population with computer equipment in the regions of the republic		+
6.	Low-speed Internet		+
	III. Security of information transfer and didactic security		
1.	Improving the quality and effectiveness of the transfer of teaching materials to students	+	
2.	Increasing possibility of attracting professors from foreign universities in the educational process	+	
3.	Adequate electronic resources in universities of the republic	+	
4.	Creating modular learning opportunities	+	
5.	Creating the widely used educational portal "Ziyonet", which covers all educational and methodological materials in subjects	+	
6.	Information security		+
7.	Possibilities of hacker attacks from competitive educational and other institutions		+
8.	The richness and variety of online learning materials that lead students to confusion about specific topics		+

From the general classification of factors, the main factors were determined. To determine the main factors in relation to the organization in universities of the Republic of Uzbekistan, competent specialists were offered questionnaires and an a priori ranking of factors. Based on the questionnaire data, a ranking matrix was compiled, and a concordance coefficient was determined for the degree of agreement among the opinions of the specialists. Based on a survey study and taking into account the results of a psychological experiment, the following factors were selected for further research (Table 2).

To conduct foresight research, the following foresight methods were studied and deeply analysed: delphi, brainstorming, reverse scripting, bibliographic analysis, public panels, interaction analysis, source scanning, tests, expert panels, future development, games, highlighting key technologies, reviewing sources, analysis of global trends, modelling and simulations, multi-criteria analysis, stage performance, SWOT analysis, and technology mapping. Based on the analysis of foresight technologies for further development of the project, the following methods were selected: the delphi method, SWOT analysis, expert panels and bibliographic analysis [20, 21].

We developed a questionnaire for interviewing specialists that included the above 14 main factors. Using the delphi method and SWOT analysis, we conducted an expert survey of more than 100 specialists, faculty and students of the republic's universities.

After analysing the results obtained, the foresight group identified the following three categories that affect the organization of distance education in the leading universities of the republic:

1. Factors associated with the capabilities of universities of the republic to organize subsidiaries;

2. Factors related to the willingness of the population of the republic to participate in distance education; and

3. Legal and political factors.

The factors were evaluated, taking into account the readiness to organize DL and the importance of developing the use of ICT in the educational process until 2025.

№	Factors	Value, %		
		max	min	med
	Category 1			
1.	Is the material and technical base, including the computer park of universities of the republic, sufficient for organizing subsidiaries?	90	70	80
2.	Is the didactic provision of pre-university education sufficient in universities of the republic?	90	80	85
3.	Is there a platform (software) in universities?	90	60	75
4.	Are ICT staff sufficient in universities?	80	50	65
5.	Are you familiar with models and technologies of DE	80	60	70
6.	How does DE affect the quality of training?	60	40	50
	Category 2			
1.	What is the need, and how does the population of the republic accept DE?	90	60	75
2.	Is the provision of the population with computer equipment sufficient for organizing subsidiaries (taking into account the regions)?	60	20	40
3.	Does the population have the necessary computer and legal literacy for the organization of DL?	60	20	40
4.	Is the Internet speed in the regions of the republic sufficient for the organization of DL?	70	30	50

Table 2. Specialist Survey Results

5.	Would you like to obtain higher education (for example, in a second specialty) through university education in universities of the republic?	90	60	75
	Category 3			
1.	Do you think that at the current stage of the reform of higher education in the republic, distance education is necessary?	80	60	70
2.	How much does higher education enrolment increase after the organization of pre-university education?	90	80	85
3.	Is there a need for a separate legal basis for organizing university education at universities of the republic?	90	70	80

4. DISCUSSION

At the moment, distance education is considered a special form of education along with full-time, part-time and evening education.

In our opinion, to properly organize distance education in universities of the Republic of Uzbekistan using foresight technology, study and in-depth analysis of the following are required:

➢ Using foresight methodology, study and analyse the state of providing universities of the republic with technical means of information and communication technologies (ICT) and forecast the innovative development of the use of ICT in universities of the republic until 2025;

➢ Using the delphi method, study and analyse the degree of use of ICT and electronic education in the current educational process and in the management of the university;

➢ Using the method of expert panels, study and analyse the state of the computer equipment available to the population and people's computer literacy as well as the speed of the Internet in the regions of the republic;

➢ Forecast providing the population of all regions of the republic with improved computer equipment and an improved level of their computer literacy until 2025; and

➢ Develop a distance education model and technology in universities of the republic, taking into account the above factors.

It should be noted here that foresight technologies are needed to correctly develop long-term strategic roadmaps (that extend to 2030) for the innovative development of the application of information and communication technologies in the educational process at universities of the Republic of Uzbekistan and the organization of future distance education.

The research showed that the readiness of universities of the Republic of Uzbekistan to organize distance learning can be considered positive; however, at 85%, the population's readiness for distance learning does not yet meet the requirements, i.e., below 50 % here is no separate legal basis for confirming BS diplomas earned through distance education along with full-time, part-time and evening forms of education.

Fig.2 The average value of factors associated with the capabilities of universities to organize distance education in the Republic of Uzbekistan
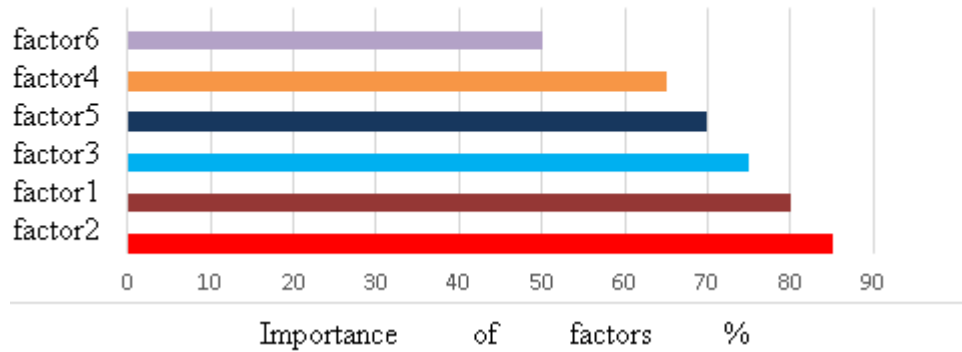
Fig. 3. The average value of the factors determining the population's readiness for distance education in the Republic of Uzbekistan
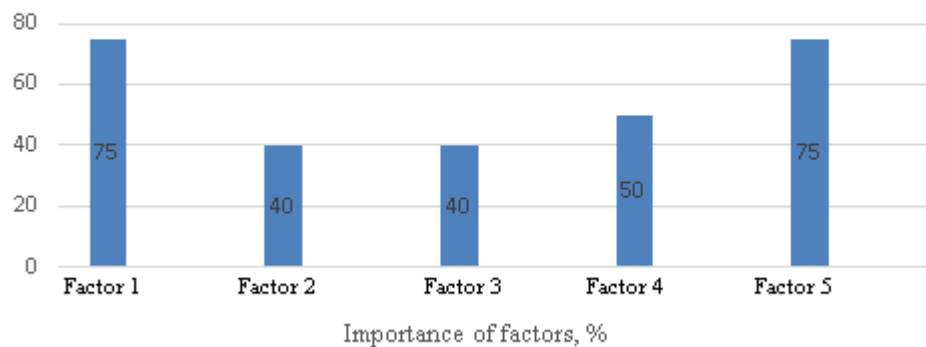
Fig. 4. The average value of legal and political factors affecting the willingness of the population to participate in distance education
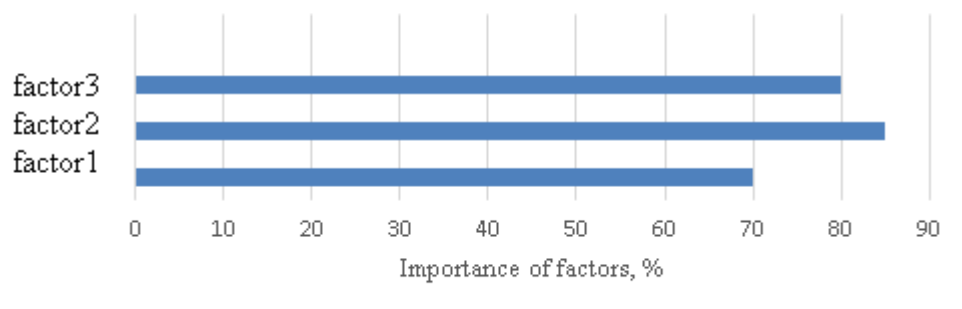
5. CONCLUSIONS AND OFFERS

Based on the research results, a number of scientific conclusions and practical recommendations were developed:

1. The project (ID-3800) of the Decree of the President of the Republic of Uzbekistan, "On the creation of foresight centres in leading higher education institutions of the Republic of

Uzbekistan", which is currently under discussion, should be approved.

2. Using foresight methods, a "Roadmap for creating distance education in leading educational institutions of the Republic of Uzbekistan until 2025" should be developed.

3. The following points must be included in this roadmap:

➢ Expand training for the specialties of "software engineering", "computer engineering" and "information security" and provide standards, qualification requirements and training programmes in these specialties;

➢ Specify the mechanisms and sources of financing to increase the speed of the Internet, to provide the population with computer equipment and to increase people's legal and computer literacy;

➢ Provide the population with computer equipment, possibly to create joint ventures in the republic to produce computer equipment and establish sales through soft loans; and

➢ Develop a regulation or other legal document approved by the Cabinet of Ministers of the Republic of Uzbekistan and granting the right to recognize a diploma of distance education as equivalent to diplomas for full-time, part-time and evening forms of education.

Therefore, at the present stage of the development of foresight technologies in higher education institutions of the Republic of Uzbekistan, there is a need to create an organizational, legal, methodological, technical and technological as a clear and workable basis for the emerging system of distance education. The best examples of international and national experience should be used to contribute to the training in new formations and new quality specialists at the international level.

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