

Foresight Strategic Forecasting Technology in Higher Education

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ABSTRACT

The article considers Foresight as a systematic interdisciplinary tool for forecasting and comprehensive expert assessment, which is used today in many areas of social activity. The authors of the article analyse the essence and key features of Foresight, as well as the history of its development as a planning technology, which was manifested in the organization of expert platforms for developing a unified view of the future and its gradual implementation. Special emphasis is placed on the future application of Foresight technology in predicting the future of higher education. One of the most significant conditions to create the Foresight successful scenarios and options is to attract students, teachers and graduates to expert community.

Keywords: *Foresight, Forecasting, Planning, Future, Expert groups, Higher education, Scenario method, Delphi method, Road maps.*

1. INTRODUCTION

At the present stage of the development of the world, the speed of changes in all spheres of society, politics, economy, and technology is constantly growing. This process does not bypass the higher education system, which is dependent on many factors in the socio-political, economic and technological spheres. Higher education is a system of knowledge and a set of relevant practices, teaching competencies, supported at the legislative level by a variety of orders and regulations that ensure its functioning as one of the social institutions. Higher education is always a paradigm that seems relevant up to a certain point in time. The paradigm of higher education is always strongly dependent on political orientation and influence and on the economic sphere, it is related to the labour market and cultural factors. These

positions are key in shaping the features of the higher education system, and the educational paradigm correlates with them.

Modern trends, such as the globalization of economic, political and cultural processes, the digitalization of public life, coupled with rapidly growing technological progress, are also testing the strength of the higher education system. At the same time, the labour market requires competent and highly qualified personnel who are able to flexibly adapt to modern problems that arise in view of the above-mentioned trends. Therefore, the question of what higher education should be like in the modern era and what it can or should become in the future in connection with innovations remains the most important. "The formation of a highly effective system of higher professional education that corresponds to modern conditions is now considered as a fundamental problem in all developed countries. This problem is relevant in Russia as well." [1] Thus, the system of higher education should develop inseparably from the

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strategy of sustainable development of the state. At the same time, there is a need for expert assessment methods and strategic modelling of the ways to develop the image of the future of the education system in a rapidly changing world. Foresight, as an innovative and comprehensive tool, is one of the most relevant predictive practices that are suitable for such tasks. This ensures the relevance of the study of the essence of Foresight, the methodology included in it, and the history of the origin of this technology in research and social and humanitarian activities.

2. THE ORIGIN AND STAGES OF FORESIGHT FORMATION

Originally, the term "foresight" was first mentioned by the British science fiction writer Herbert Wells. In one of his BBC radio interviews, H.G. Wells proposed the introduction of a special position called "professor of foresight." The main task of such a specialist is predictive activity. This specialist must find ways to apply new technologies in the future.

The "Foresight" technique itself was developed only in the post-war period. The experience of the Second World War showed that research and military design bureaus are essential in defeating the enemy. Consolidation of specialists from different fields of science makes it possible to effectively implement innovative breakthroughs in science and technology. It is with the aim of providing advantages in the fields of science and technological progress in the United States, on the basis of the Douglas Aircraft Company, they create the RAND project, which in 1964 grew into a corporation and became an independent organization. It was at the RAND Corporation that one of the first Foresight forecasting methods, the Delphi method, was first developed.

In the history of the use of the system of Foresight tool, the following development stages can be distinguished. The first is related to the military sphere. In the 1950s, some Foresight research techniques were used in the area of US military security and defence research. In 1971, in Japan, the Science and Technology Foresight Center applied with some efficiency the elements of this predictive technology while implementing the project "Future Technology in Japan toward the Year 2030" developed by the National Institute of Science and Technology Policy (NISTEP) "[1]. Thus, in Japan, since 1971, with a regularity of five year, scientists have been producing and publishing

forecasts in the field of scientific and technological development and achievements that are planned to be implemented in the next thirty years, that is, the Foresight technology has taken root in the research environment of Japan and has become systematic. For example, in Japan, Foresight "is widely used by the developers of the country's scientific and technical policy, by research institutes and laboratories, educational institutions, as well as in the business sphere". [2]

The next, the second stage in the development of Foresight practice is associated with its transition to the state level. Here it focuses on the area of development in the field of market orientation. Foresight in this form was first used at the state level by British researchers and experts. The Foresight program in the UK was formed in 1993 and a budget of £ 1 million was spent on creating it.

"Also in the 1990s Foresight began to be used by the governments of the United States, Japan and Australia. The practice of using Foresight has developed significantly in Ireland as well. This state has set a goal for itself - by 2010, to bring the level of spending on research and development to 2.5% of GDP. In the context of its implementation, the government and civil institutions of the country turned to the experience of using Foresight.

The first pilot Foresight project was carried out in Ireland in 1998, and in 2003, after evaluating its results, it was decided to organize a nationwide Foresight process on an ongoing basis. The Irish experience of using Foresight as a factor of national growth is based on the identification of new and adjustment of existing strategic technological directions, or platforms (STP)". [2]

Proceeding from the fact that at the second stage Foresight began to be used most of all in the field of market orientation, where there was an assessment of the socio-cultural consequences of the emergence and introduction of new technologies, for example, the influence of the Internet on political, labour and family institutions, the term "technological Foresight" started to become obsolete and appeared in literature less and less frequently. Here Foresight practice concentrated on more important and complex problems which were often difficult to eliminate. Foresight began to be used in projects to solve the problems associated with hunger, poverty, reduction of unemployment, and ensuring security.

At the third stage, Foresight takes shape as a process and tool for reaching public consensus.

Here Foresight turns into a technology for the negotiations of elites from various spheres of society, such as from politics, science, economy and business structures. As part of this, a consensus and a working network of participants is created that shape the future for the entire society. Within this framework, Foresight is conceived as “a systemic instrument of influencing the formation of the future, which allows taking into account possible changes in all spheres of social activity - science and technology, economy, social and public relations, and culture. In modern conditions, we can talk about the changes in Foresight status at the international, national, regional, municipal levels and in the areas of business development, each of which has a certain specificity. At the third stage of its development, Foresight began to occupy a special place in the national innovative development of states.

It should be noted that the Foresight technology appears in the second half of the XX century in the American corporation "RAND" in the post-war period. The emergence of Foresight technology was preceded by the successful experience of scientists and other people involved in the military and technological breakthrough, where the efforts of various structures were combined into a single whole to defeat rivals in World War II. This experience served as the basis for the creation of Foresight technology and its methodology for the successful control of socio-economic, military and managerial potential, as well as for the development of a common vision for the future for all participants in this process.

3. ATTEMPTS TO DEFINE THE ESSENCE OF FORESIGHT AS A PREDICTIVE ACTIVITY

Foresight is actively used in many countries and scientific circles, but the phenomenon of Foresight has not yet been given an accurate definition. Each research group gives its own definition of Foresight, having some of its qualities or traits, which the researchers focus more on, as their basis.

The Foreign Guide defines Foresight as "a systematic, collaborative process of building an image of the future in the medium and long term, aimed at improving the quality of current decisions and coordinating joint actions" [3]. In the "Foresight Technology Centre" at the Asia-Pacific Economic Cooperation, the Foresight phenomenon is presented as "systematic attempts to look into the future of science, technology, society and the

economy in order to ensure the prosperity of society, the economy and the environment" [3].

The "Technology and Innovation Foresight for Bulgaria and Romania" defines Foresight as a natural human activity, which has been performed before. Now it is formalized in the framework of a special methodology and is used to determine the long-term consequences of decision-making in the field of science and technology. Foresight can be used to develop strategies and long-term planning for the development of countries, regions, municipalities and other types of territorial entities [3].

The UNIDO Corporation sees Foresight as a systematic method of expert assessment in innovative strategic directions of social and economic development, as well as the search and identification of points of innovative breakthroughs in technological development that can affect the economic and social sectors in the medium and long term perspectives. American scientist Ben Martin from the University of Sussex gives his definition of Foresight technology, "...which consists in attempts to systematically assess the scientific prospects, technologies, society, and the economic sector of development, in order to identify priority areas in scientific research and new technologies, which in turn contribute to improvements in socio-economic terms" [4]. Foresight is not just a method of forecasting, where the task is to predict future events, which can often be determined by such factors, proceeding from which a person is not able to make any decisions leading to the desired result.

Taking into account the above attempts to determine the essence of the phenomenon, we will give our own, as capacious as possible, definition: Foresight is a natural human activity carried out in the early periods of the development of human society ("foresight"), which today has taken shape and formalized into a complex systemic tool for the development of promising medium and long-term scenarios, models, projects and strategies for active and purposeful impact on the future by reaching an agreement between the expert participants and socio-political organizations involved in this activity in the vision of the desired future.

4. APPLICATION OF FORESIGHT IN EDUCATIONAL ACTIVITIES

The term "Foresight" is spreading in such spheres of human activity as science, political

science, the economy and in the military sphere, in particular. It should be especially noted that Foresight is not just a method for predicting future events, but a tool that involves the active formation of options for the desired development of the future society in a particular area. Today Foresight is becoming a popular tool in the practice of predicting the future of education. Doctor of Economics, Professor S. V. Kryukov writes that this method "from the English "foresight", has established itself as one of the most effective tools for choosing priorities in the field of science and technology, and later - in relation to a wider range of problems of socio-economic development. Today Foresight is increasingly used as a systematic tool for shaping the future, allowing for possible changes in all spheres of social activity ..."[3]. Of the existing strategic planning and forecasting tools, only Foresight makes it possible to ensure that all variants of the development of events are taken into account in their relationship with the measures of educational policy, possible scenarios of economic development [5]. Digitalization, globalization and the labour market dictate their own conditions on which the higher education system with its educational programs can be reformed. The trend of a rapidly changing world inevitably leads to "the formation and development of competencies of a completely new type, the so-called competencies of the future. To a large extent, the understanding of these requirements is facilitated by the concept of Foresight of education, i.e., the concept that defines a new method of building the future. Foresight provides for the involvement in the process of creating the future of those who are most interested in it, as well as complex modelling of the main factors and forces that influence this future"[6].

Foresight as a comprehensive tool for shaping the future makes it possible to assess differently the problems of higher education that arise in our time. Foresight in educational activities allows you to formulate the answers to such questions as: what should be the model of competencies for the digital economy in the framework of continuous learning; what is the professional teacher in the context of digital education; what impact and how do the digital educational technologies of the modern world have on the formation of a new paradigm of higher education, and in the end, is it even possible to achieve an optimal balance between digital and professional skills? All of the above questions are most frequently asked today when it comes to the future of higher education. These issues are

particularly relevant because of the recent social isolation in countries around the world due to the pandemic, where every educational system has been forced to switch to online education. Thus, there is an urgent need to use Foresight, which allows you to shape the future and adjust it during the implementation of the built scenario.

The key uniqueness of Foresight in educational activities lies precisely in the fact that the analysis of the future of educational programs or the model of education as a whole is based on the close interaction of experts from various fields of public activity. Foresight is not just an extensive database of expert assessment methods. Foresight is primarily about connecting participants and creating a common, and coherent view of the future. This approach in the practice of Foresight makes it unique in the construction of social reality and is emphasized by all researchers of the history of this interdisciplinary tool. However, Foresight is often understood as the activity of only highly qualified experts. Of course, the final scenarios and roadmaps of the future are based on their final opinion. But, as mentioned above, the participation of all interested parties is important in conducting Foresight sessions. Thus, in order to successfully create the most complete scenarios and options for the image of the future of higher education, it is also necessary to attract senior students, and graduates. This measure will help to form a more comprehensive view of the problems that exist within education and determine what is important in the opinion of students in accordance with modernity [7]. "Senior students will help you understand what is missing in modern education, what aspects are missing, to what extent the expectations from universities have not been met. The involvement of students in this matter is simply necessary... they shape the country's economy, they are responsible for our future and their vision of the education system is very important and extremely necessary. A group of graduates will help you understand what skills, abilities and competencies were acquired while studying, and which had to be developed and obtained directly in practice. Moreover, it is the opinion of students and graduates that will help to create the most complete map to systematize the existing knowledge".[8] Thus, students and graduates should become one of the expert groups in conducting Foresight.

Another expert group should be the teachers. Conducting Foresight in educational activities is impossible without this group, since teachers clearly represent the learning process, as well as its

formats. In addition, in Foresight, the opinion of teachers is important because teachers are the carriers of invaluable experience gained within the system. The need to systematize the educational process, teaching materials and equipment of universities directly depends on the expert opinion of teachers [9]. This distinguishes them from other representatives of the expert groups. In these groups, expert links with economists and employers - representatives of the business environment, as well as experts from the Ministry of Education, without whose participation Foresight is impossible, seem to be important. Thus, with such an extensive and versatile interaction and by complementing each other of expert groups, it is possible to identify the main ways of solving educational problems and, using forecasting methods included in the Foresight practice, to draw up scenarios or roadmaps for the future of the higher education system in the short-term (up to 5 years) or medium-term (10-15 years) perspectives.

5. METHODS OF FORESIGHT EXPERT ASSESSMENT

Foresight's goal is not simply to prepare an "analytical forecast document" within the framework of problem areas, detailed scenarios and models of the future, but to consolidate efforts and bring the actors of the process of shaping the future into a state of coherence. Foresight is "a methodology for organizing a process aimed at creating a common vision of the future among the participants, which they seek to support with their current actions" [10]. An important aspect of Foresight is the formation of networks of interested and highly qualified individuals - representatives of state authorities, civil society, social institutions, public organizations, scientists and representatives of the business sector, who can offer worthy options for implementing changes and form a set of measures capable of responding to social challenges.

The approaches that are actively used in Foresight projects include the synthesis of various methods widely known in forecasting: the Delphi method, Swot analysis, scenario building (quantitative scenarios, scenario workshops), extrapolation method, creation of strategic roadmaps, brainstorming, the method of morphological analysis, etc. Let us consider the most popular methods:

- a specially developed method for Foresight sessions is the already mentioned Delphi

method. To build the necessary and sufficiently correct scenarios and their subsequent implementation in reality, it is necessary to involve a wide range of actors in the analysis and assessment in order to create a truly objective consensus. In this regard, the Delphi method was specially created in Foresight for such expert interaction. In the past, the method was tested in terms of the accuracy and reliability of research in the corporation "RAND" by T. Gordan and O. Helmer. Foresight studies based on the Delphi method are suitable for solving almost any problem. The method can be used for building strategies and practical actions in the field of political decisions, in introducing technological innovations and improving the quality of life in cities and regions, and of course in education. Foresight projects usually represent fairly promising medium-term and long-term strategies for the development of the future in various fields [11];

- the scenario method in Foresight is based, as in strategic forecasting, on the creation of special scenarios. These scripts make use of the creativity of the participants relying on the hypotheses, facts and another information that researchers have prepared for processing and writing the scripts. One way or another, no Foresight session is complete without scripting. After using certain methods selected for Foresight research, in general, Foresight scenarios are prepared, which should be taken into account in order to achieve the desired result. There can be several scenarios in Foresight research, depending on how high the level of uncertainty is. Over time, untenable scenarios are discarded and only those scenarios remain that have the most acceptable level in the eyes of consensus.
- roadmaps are as popular in Foresight research as Delphi methods and scripting. It essentially consists in the development and visual presentation of short- and medium-term strategies, within the framework of which the situation development is simulated. Experts build a model, for example, of an updated educational system that will replace the past and build a schematic "route" for performing intermediate tasks that are important for the implementation of the main goal.

Foresight is not limited to the above methods. Its methodological base is broad enough to approach problem solving from different angles. However, the volume of the article will not cover the entire methodological arsenal. In this regard, in the analysis of Foresight methods, first of all, it is necessary to consider the most frequently used and universal ones.

6. CONCLUSION

Having analysed the characteristics and features of the Foresight predictive technology, we can conclude that this is the most appropriate tool in the strategic planning of the future in various spheres of social activity today. One of these areas is higher education. Foresight is notable for predicting the future of higher education in the fact that this practice is a consolidation of efforts of participants from different social strata and from different fields of activity. It is the wide range of participants that allows us to develop the broadest view of the problem of the future of higher education. We conclude that expert groups should be composed not only of representatives of the Ministry of education and senior university officials, but also of teachers and students. Such an expert platform will provide two points of view on the problems of education - from the inside and a view from the outside. Foresight is, first of all, thinking about the future; therefore, it is the social activity of various expert groups that is most important here. The next feature of Foresight, which is no less relevant for strategic changes and transformations in the higher education environment, is that this technology is based on a wide range of analysis methods that allow us to work out most of the risks and negative factors. Skillful implementation of Foresight using its unique features will enable to develop a unified thinking about the future and, most importantly, the future, which is formed from the actions carried out in the present.

AUTHORS' CONTRIBUTIONS

Dmitriy Utkin: Made a significant contribution to the design and development of the study design; participated in writing and editing a draft version of the article; approved the final version of the article for publication; agreed to be responsible for all aspects of the study that may raise questions related to its accuracy, integrity and credibility.

Nonna Bagramyants: Made a significant contribution to the collection, analysis and

interpretation of data; participated in editing a draft version of the article; approved the final version of the article for publication; agreed to be responsible for all aspects of the study that may raise questions related to its accuracy, integrity and credibility.

Vladimir Safyanov: Made a significant contribution to the collection, analysis and interpretation of data; participated in writing a draft version of the article; approved the final version of the article for publication; agreed to be responsible for all aspects of the study that may raise questions related to its accuracy, integrity and credibility.

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