PROSPECTS FOR DEVELOPMENT OF BIM TECHNOLOGIES IN UZBEKISTAN

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ABSTRACT

The article discusses the possibilities of application and the need to implement BIM technologies in the field of architecture and construction. The experience of foreign countries is analyzed, the possible benefits and prospects of using BIM technologies are summarized, and the reasons that prevent their implementation are derived.

KEYWORDS: *BIM (Building Information Modeling), Design Technology, Automation Of Design Processes, Autodesk Revit, Architectural Education, Digital Twin.*

INTRODUCTON

The active introduction of BIM technologies, and in general, the process of digitalization of the economy has captured all the CIS countries. The need for digital transformation of the country is recognized and recognized at the state level: by the Decree of the President of the Republic of Uzbekistan No. DP-2946 dated 05/02/2017, the concept of digital transformation "On measures to further improve the activities of design and survey organizations" was approved. One of the points of this Resolution provides for “strengthening the material and technical base of design organizations, the introduction of modern technologies for automated design of facilities using advanced licensed software products” **[1].** Digital transformation is a natural stage in any modern state, which provides an opportunity to adapt the economy to new realities and world standards, guaranteeing the viability of the country's economic prosperity.

BACKGROUND OF THE STUDY

The real start of the implementation of digital technologies in the construction industry of Uzbekistan was laid by the Presidential Decree No. UP-5577 of November 14, 2018 "On additional measures to improve state regulation in the construction sector" **[2].**

The undisputed world leader in the implementation of digital technologies in the field of construction and design is the UK. Among the CIS countries at the state level, this process has been launched in Belarus since 2011, and in 2012 an industry program for the implementation of BIM technologies was adopted, since the technological platform for digital construction is BIM technologies that ensure the country's construction industry reaches a qualitatively new level. **[3].**

Russia and Kazakhstan began their state programs for the implementation of BIM technology in 2014. To date, these countries have approved "road maps", according to which measures are being taken to introduce BIM technologies into construction.

It is already an indisputable fact for everyone that the use of BIM technologies in construction guarantees enormous opportunities at the stages of design, construction, operation and disposal of buildings and structures. Indeed, today investors are concerned about the stage of operation and the demolition of an object no less than the construction itself.

RESULTS AND DISCUSSION

The informatization of the construction sector can hardly be called an innovation. It is believed that the idea of BIM was first formulated by Professor of the Georgia Institute of Technology (USA) Chuck Eastman back in 1975, that is, more than 40 years ago. But the technological level of development of that time did not allow the development and implementation of this idea **[4].**

The foundation of the digitalization process in the construction industry was the automation of architectural design, which was initiated by the Autodesk 2D vector graphics package AutoCAD in 1982, which made it possible to use a computer as an electronic drawing board for quickly and conveniently creating two-dimensional design documents. Then came three-dimensional and parametric modeling programs (ArchiCAD), where the designer was provided with the widest set of necessary tools and operations focused on architectural and construction design and allowing to create virtual models of objects parametrically corresponding to a real prototype. Virtual models allowed architects, builders and customers to view projects from all sides, extracting design and, first of all, visual information necessary for construction in the form of design documentation and demonstration materials: drawings of floor plans, sections and facades; statements, specifications, explications; photorealistic images, animated films. The computer model of a real construction object made it possible to work with closely interconnected elements, due to which all changes made to the model are automatically entered into the design documentation, which guarantees the exact correspondence of all drawings to the project, since the drawings are representations of the same model, but from different angles **[5].**

Revit software was developed in 1998, which, unlike ArchiCAD, could handle complex and more complex projects. Within a couple of years after its first release, Revit was owned by Autodesk. Since then, Autodesk has promoted it under its own brand and popularized this software product and the term BIM itself. Now, thanks to the Revit software, it is possible to enter not only the characteristics of materials and technological processes, but also information on purchases and supplies into the virtual model of the future building during the modeling process.

Thus, already at the design stage, you can:

- calculate and plan the time spent on the construction process (4D-time),
- calculate material and financial costs (5D-cost),
- Accumulate information about the construction object to determine the need for subsequent maintenance (6D-operation), restoration and demolition of the object (7D-disposal).

Thus, BIM is a new scenario for managing all life cycles of a real estate object from the moment of the inception of a project idea to the moment of its disposal.

The relatively small experience of Belarusian, Russian and Kazakh design companies shows that the introduction of BIM technologies already at the design stage makes it possible to shorten the construction period of an object, optimize all construction processes and reduce costs by 20%.

Despite the global trend and the boom in the transition to information modeling of construction projects, in Uzbekistan BIM technologies are practically not represented by local design companies.

There are several reasons for this:

- Lack of interest of industry organizations to switch to new technologies that involve additional costs associated with the purchase of new equipment, software and retraining of employees;

- Shortage of qualified and proactive personnel who own BIM technologies;

- deficiencies in the legislative framework, outdated building codes and regulations, inconsistency of the system of state standards for the implementation of construction projects using modern technologies;

- The lack of awareness of industry organizations about BIM technology and the effectiveness of its use, and therefore the lack of demand for the development and implementation of design and construction work using BIM technology.

The main driving force and the key to the success of the implementation of BIM technologies are qualified personnel. Basically, due to the novelty of BIM technologies, training of specialists capable of implementing, supporting and solving related tasks in one of the largest sectors of the country's economy, construction, is just beginning in Uzbekistan. Undoubtedly, it is worth noting the fact of creation, with the direct support of the Ministry of Construction of the Republic of Uzbekistan, on the basis of TOSHUIZHOILITI JSC, a retraining center for specialists of design organizations (BIM center). Such events will bear fruit in the near future.

But training and retraining of personnel is carried out separately, independently and often spontaneously. Until now, the doctrine is not clear and a unified strategy for the development of BIM technologies has not been concretized. If necessary, it is necessary at the state level to outline the first steps of the participants in the process, to recommend the number and list of required software products.

In turn, the teaching community of architectural and construction educational institutions is faced with the task of developing and introducing new teaching methods into existing educational processes. One of the advantages of BIM technologies is the principle of teamwork through a single information model of the construction object, which implies close interaction of all project participants at all stages of the construction object's life cycle. However, the existing education system, including in Uzbekistan, is aimed at training bachelors only within their own profile, which does not provide the necessary conditions for joint work on a BIM project.

First of all, for the training of specialists with such competencies, pedagogical personnel are needed who are able to develop such educational programs that will provide all the necessary set of knowledge, skills and abilities. Secondly, even despite the practical absence of teachers

capable of introducing BIM disciplines into the educational process, it is necessary to open the specialties of "BIM designers" in educational institutions of all levels. Finally, we need to introduce widespread training in Autodesk Revit for all specialties of architecture and civil engineering universities.

The issue of retraining and advanced training of university teachers should be among the first to be resolved, since after the training of teachers, the first graduates will appear on the labor market no earlier than 5 years later, and personnel who own BIM technologies are needed today.

In December 2018, a group of teachers from the Department of Interior and Landscape Design of the Tashkent Institute of Architecture and Civil Engineering took the first step in mastering BIM technologies and were trained to work with the Autodesk Revit software product in the Republic of Kazakhstan (Autodesk Authorized Training Centers "CAD academy"). This not only expanded the number of programs taught in the already existing Authorized Center ("XLine Education"), but allowed already from the spring 2018-2019 academic semester to start teaching students in the specialty "Design", programs intended for project work using BIM technology. in particular - Autodesk Revit. It is worth noting that on the basis of the center it is possible to undergo training and receive an international certificate from Autodesk Corporation.

CONCLUSION

In general, despite significant advances in the implementation of BIM technologies in the construction industry of Uzbekistan, it is necessary to determine priority research and production, methodological and intellectual activities, as well as create an industry team of qualified specialists in this area. In the plans for the further development of BIM technologies, it is advisable for the Ministry of Construction to create a sectoral work program for the development and application of BIM technologies in order to bring existing developments to the production of products, create a BIM industry for the industry and ensure the competitiveness of the construction industry in the international market.

In the plans for the further promotion of BIM technologies, it is advisable to create an industry program for the development and application of BIM technologies. The creation of a BIM industry will ensure the competitiveness of the construction industry of Uzbekistan in the international market.

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