

СЕКЦІЯ «БУДІВНИЦТВО ТА ЦИВІЛЬНА ІНЖЕНЕРІЯ»

УДК 69 (075.8)

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ARTIFICIAL INTELLIGENCE AS A MECHANISM FOR CALCULATING THE COST OF CONSTRUCTION PROJECTS

Developing a project estimate necessitates extensive knowledge and experience in the relevant field. The precision of the estimate improves as the project advances and additional information becomes available. The accuracy of the estimate is only established once the project is finalized, and the actual cost is known.

In order to achieve optimal economic outcomes in construction project implementation, emphasis must be placed on cost management. Nevertheless, continuous cost management using human resources increases construction costs and impedes long-term enterprise development [1].

Artificial intelligence application in calculating construction project costs allows for rapid comprehension of the actual level of construction work and analysis of progress deviation. Advantages of utilizing artificial intelligence for cost estimation in construction include:

Increased accuracy: AI algorithms can analyze large amounts of data to estimate costs more accurately than traditional methods. This can help prevent cost overruns and delays;

Faster turnaround time: AI algorithms can quickly process large amounts of data, which can lead to faster turnaround times for cost estimates;

Cost savings: Accurate cost estimates can help prevent unnecessary expenses and reduce overall construction costs;

Improved risk management: AI algorithms can identify potential risks and predict cost variations, allowing construction companies to proactively manage risks and make informed decisions;

Increased productivity: By automating the cost estimation process, construction companies can free up time and resources that can be used for other tasks, which can ultimately increase productivity.

The Dubai Land Department (DLD) has been investigating the potential of artificial intelligence (AI) in the construction industry [2] to enhance and streamline various processes. Specifically, the DLD has been implementing AI in the acquisition of building permits and estimating the cost of construction work. The use of AI algorithms enables the DLD to analyze and process permit applications with greater speed and accuracy than traditional manual methods.

Furthermore, the AI system can identify any errors or inconsistencies in the application, thus reducing the likelihood of delays or rejections. Additionally, the DLD is exploring the use of AI-powered drones for building inspections and monitoring construction sites for compliance with safety regulations. These drones capture high-resolution images and videos that can be analyzed using AI algorithms to detect potential security breaches or hazards. Apart from building permit applications and inspections, the DLD is also exploring the use of AI in other areas of the construction industry such as project management, cost estimation, and resource allocation.

By integrating AI into these processes, the DLD aims to enhance efficiency, minimize expenses, and improve the overall quality and safety of construction. An analysis of the obstacles and factors affecting the impossibility of integrating AI into Ukrainian construction companies is presented in Table 1.

Table 1 – Obstacles to the integration of artificial intelligence in construction

Obstacle/Disadvantage	Difficulty of Implementation/Solution
Lack of data and digitalization	– The lack of standardized and digitized data for construction projects makes it difficult to implement AI.
Resistance to change	– The creation of a centralized database with standardized data would require significant effort and investment.
Cost of implementation	– There is a need to create standards for data collection and management.
Limited availability of skilled professionals	– Many companies and individuals in the construction industry may resist the adoption of AI technology due to fear of job loss or lack of understanding of the technology.
Ethical and legal concerns	– Education and training programs may be necessary to address these concerns and encourage adoption of AI.

The table 1 outlines the disadvantages and obstacles to the integration of artificial intelligence for cost estimation in the construction industry in Ukraine. It highlights the main challenges that need to be addressed for successful implementation. From the analysis, it is evident that lack of data and insufficient knowledge about AI technology are the primary obstacles to the adoption of AI in the construction industry. Also, the high cost of AI systems and limited funding for research and development are other significant barriers that need to be addressed.

Moreover, to ensure the successful implementation of AI in the construction industry, there is a need for collaboration between different stakeholders, including

the government, private sector, and academic institutions. This will help in sharing knowledge and resources and promoting innovation and development in the sector.

The peculiarity of using artificial intelligence to calculate the cost of construction projects is that it allows for more accurate and efficient cost estimation, as well as improved decision-making. By analyzing vast amounts of data and using complex algorithms, AI can provide more accurate and detailed cost estimates for construction projects. This can help to reduce the risk of cost overruns and project delays, which are common problems in the construction industry [3].

Another advantage is that it can help to identify potential cost-saving opportunities. By analyzing data from past projects, AI algorithms can identify patterns and trends that can be used to optimize construction processes and reduce costs. This can include identifying the most cost-effective materials, suppliers, and construction methods, as well as predicting potential cost overruns or delays. Overall, the use of AI in construction cost estimation can help to improve efficiency, reduce costs, and increase the accuracy of project planning and execution.

Artificial intelligence in construction may become an advanced technology, but only in the future. At the moment, the technology is in its infancy phase and is relevant for some operational purposes. It requires additional investment, scientific research and practical testing. But such an approach is possible only with the support of the state and the interest of construction company directors.

In conclusion, despite the challenges, the integration of AI for cost estimation in the construction industry in Ukraine has enormous potential to enhance efficiency, reduce costs, and improve accuracy in estimating construction works. Therefore, it is essential to address the obstacles outlined above and create an enabling environment that promotes the adoption of AI technology in the industry.

REFERENCES

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