

**Abstract for the PhD dissertation by Vladimir Vladimirovich Yaskevich
«The paradigm of implementation of BIM technologies in the architectural and
construction practice of the Republic of Kazakhstan»
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This dissertation examines the theoretical and practical foundations of implementing Building Information Modeling (BIM) technologies in the architectural-construction sector of the Republic of Kazakhstan within the context of digital transformation and the Industry 4.0 agenda. BIM is interpreted not merely as a technical tool but as the basis for digital management of the entire life cycle of buildings and structures—from architectural concept and urban planning to construction, operation, and renovation—while incorporating the objectives of sustainable development and improved urban environmental quality.

The object of the study is Kazakhstan's architectural-construction sector, including design, construction production, and building operation processes. The subject of the research is the process of BIM implementation across governmental policy, regulatory and institutional frameworks, professional communities, and architectural-construction education systems, as well as educational models that develop BIM competencies among architects and engineers. The purpose of the study is to formulate practice-oriented recommendations for developing a national system of BIM implementation that ensures coordinated interaction between the state, industry, and universities, fostering a sustainable digital transformation of architectural-construction practice.

The research objectives include analyzing the evolution of BIM in the international context, synthesizing best practices in residential and public building projects, identifying regulatory and institutional barriers in countries with transitional economies, and characterizing the current state and future prospects of digitalization in Kazakhstan's architectural-construction sector. A separate set of tasks concerns the role of architectural-construction education in forming BIM competencies and developing an educational trajectory integrating digital models and real-object digital twins.

The methodological framework includes systems analysis, comparative analysis, historical-logical examination of digital technology evolution in architecture and construction, and content analysis of regulatory documents, professional standards, and curricula. The empirical base consists of expert interviews and surveys involving design and construction companies, governmental bodies, and higher education institutions; analysis of completed and pilot BIM projects; and the results of developing and testing educational programs and digital models, including components of the Satbayev University smart campus initiative.

The scientific novelty lies in establishing a holistic model for BIM implementation in Kazakhstan's architectural-construction sector that incorporates architectural-spatial specificity, institutional context, and educational dimensions. The conceptual apparatus of BIM is clarified as an instrument of digital transformation rather than solely a software product; the interaction between the

state, professional community, and universities is structurally defined; and the systemic role of architectural-construction education in ensuring sustainable BIM adoption is articulated. The theoretical significance lies in advancing an interdisciplinary understanding of the digital architectural-construction environment, while the practical significance lies in applying the proposed recommendations to improve regulatory frameworks, industry standards, educational programs, and pilot BIM projects in Kazakhstan.