

transportation and storage of solidified liquid RAW at the SEE CNPP will allow saving up to **16%** of the budget, which amounts to up to **12,1** million UAH.

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MANAGEMENT OF CONSTRUCTION PROJECTS BASED ON BIM TECHNOLOGIES AND APPLICATION OF ARTIFICIAL INTELLIGENCE ON THE DIGITAL PLATFORM

The management of construction projects based on Building Information Modeling (BIM) technologies and the application of Artificial Intelligence (AI) on digital platforms represents a transformative approach to the construction industry. This integrated approach leverages advanced technologies to enhance project planning, execution, and management processes.

Key aspects of this approach include.

Building Information Modeling (BIM). BIM involves the creation and management of digital representations of physical and functional characteristics of construction projects. It enables stakeholders to visualize, simulate, and analyze

various aspects of a project before construction begins, leading to more informed decision-making and improved collaboration.

Integration of Artificial Intelligence (AI). AI technologies, such as machine learning algorithms and predictive analytics, are integrated into BIM platforms to automate tasks, optimize resource allocation, and improve project outcomes. AI can analyze vast amounts of data generated during the project lifecycle to identify patterns, predict potential issues, and optimize construction processes.

Digital Platforms. Digital platforms serve as centralized hubs for managing construction projects, facilitating collaboration among project stakeholders, and integrating BIM and AI technologies. These platforms enable real-time access to project data, communication tools, and project management functionalities, streamlining workflows and improving project efficiency.

Data-driven Decision Making. The combination of BIM and AI enables data-driven decision-making throughout the construction project lifecycle. Project managers can use insights derived from AI-powered analytics to identify risks, optimize schedules, and enhance project performance, leading to more efficient project delivery and cost savings.

Improved Project Performance. By leveraging BIM technologies and AI-driven analytics, construction projects can achieve improved performance in terms of cost, schedule, quality, and sustainability. AI-powered predictive models can anticipate potential delays or cost overruns, allowing project teams to proactively address issues and minimize disruptions.

Enhanced Collaboration. Digital platforms enable seamless collaboration among project stakeholders, including architects, engineers, contractors, and owners. BIM models serve as a common data environment, facilitating interdisciplinary coordination and communication. AI-driven insights further enhance collaboration by providing actionable information to all project participants.

BIM: Building a Digital Twin

BIM creates a digital representation of a building, encompassing its physical and functional characteristics. This 3D model stores information about every element, from walls and doors to MEP systems (mechanical, electrical, and plumbing). BIM offers numerous advantages for construction projects:

Improved Collaboration. All project stakeholders (architects, engineers, contractors) access and share the same data in real-time, fostering collaboration and reducing communication silos.

Clash Detection. BIM software proactively identifies clashes between different building elements before construction begins, saving time and money during the build phase.

Enhanced Visualization. BIM models allow for virtual walkthroughs, enabling stakeholders to visualize the final product and address any design issues early on.

Accurate Cost Estimation. BIM facilitates realistic cost estimation by providing detailed material quantities and labor requirements.

Improved Facility Management. BIM models can be used for ongoing facility management, offering valuable data for maintenance and renovations.

AI: Transforming the Construction Workflow

AI, with its ability to learn, analyze, and automate tasks, adds another layer of power to BIM-based project management. Here's how AI is transforming construction:

Predictive Analytics. AI algorithms can analyze historical project data to predict potential risks, schedule delays, and resource needs, allowing for proactive mitigation strategies.

Automated Workflows. Repetitive and time-consuming tasks like progress tracking, document review, and code compliance checks can be automated by AI, freeing up human resources for more strategic work.

Generative Design. AI can generate and optimize design options based on specific project criteria, leading to more efficient and sustainable solutions.

Site Optimization. AI can analyze real-time data from sensors and cameras on construction sites to optimize material logistics, equipment usage, and worker productivity.

Enhanced Quality Control. AI-powered image recognition can automatically detect defects in construction work, ensuring quality compliance and reducing rework costs.

The Synergy of BIM and AI

When combined on digital platforms, BIM and AI create a powerful ecosystem for construction project management. BIM provides the data foundation, and AI uses it to extract insights, automate tasks, and optimize processes. Here are some key benefits of this synergy:

Increased Efficiency. BIM and AI streamline workflows, reducing time and resource waste throughout the project lifecycle.

Reduced Costs. Proactive risk mitigation, optimized resource allocation, and minimized rework lead to significant cost savings.

Improved Decision-Making. Data-driven insights from AI empower stakeholders to make better decisions at every stage of the project.

Enhanced Safety. AI can be used to identify potential safety hazards on construction sites, promoting a safer work environment.

Increased Innovation. AI can explore design alternatives and predict the performance of various building materials, opening doors for innovation.

The Future of Construction Project Management

The integration of BIM and AI on digital platforms marks a significant leap forward in construction project management. As these technologies continue to evolve,

we can expect even more advanced applications, leading to a future of more efficient, cost-effective, and sustainable construction practices.

The management of construction projects based on BIM technologies and the application of Artificial Intelligence on digital platforms represents a paradigm shift in the construction industry, offering significant opportunities to improve project efficiency, productivity, and outcomes.

Let's look on BIM (Building Information Modeling) and AI (Artificial Intelligence) interfaces represent the integration of two powerful technologies to enhance the efficiency and effectiveness of construction projects. Here's an overview of how these interfaces work:

BIM Interfaces.

BIM interfaces provide users with access to digital models of construction projects, encompassing geometric and non-geometric data about the building or infrastructure.

Users interact with BIM interfaces to visualize, analyze, and manage various aspects of the project, including design, construction, and facility management.

BIM interfaces support collaborative workflows, allowing multiple stakeholders to access and contribute to the digital model throughout the project lifecycle.

These interfaces enable the creation of 3D visualizations, clash detection, quantity takeoffs, scheduling, and other essential project management tasks.

BIM interfaces may include desktop software applications, web-based platforms, or mobile applications, providing flexibility and accessibility to users across different devices and locations.

AI Interfaces.

AI interfaces leverage machine learning algorithms, natural language processing, and other AI techniques to analyze project data and generate insights.

Users interact with AI interfaces to access predictive analytics, anomaly detection, risk assessment, and other AI-driven capabilities that enhance decision-making and project management.

AI interfaces can automate repetitive tasks, such as data processing, documentation management, and schedule optimization, freeing up time for project teams to focus on high-value activities.

These interfaces may integrate with BIM platforms to extract data from digital models and perform advanced analytics, such as identifying construction conflicts, predicting project delays, or optimizing resource allocation.

AI interfaces may be embedded within existing project management software or accessed as standalone tools, depending on the specific use case and requirements of the project.

Integration of BIM and AI Interfaces

The integration of BIM and AI interfaces offers synergistic benefits, combining the rich data environment of BIM with the analytical power of AI.

BIM data serves as input for AI algorithms, enabling AI interfaces to generate insights and recommendations based on the comprehensive information available in the digital model.

AI interfaces enhance BIM workflows by providing advanced analytics and decision support capabilities, enabling project teams to identify risks, optimize schedules, and improve project outcomes.

The seamless integration of BIM and AI interfaces fosters collaboration and innovation, empowering project stakeholders to leverage technology effectively throughout the project lifecycle.

In summary, BIM and AI interfaces represent complementary tools that enable construction professionals to harness the full potential of digital technologies for project management, analysis, and decision-making. The integration of these interfaces

facilitates a data-driven approach to construction project delivery, driving efficiency, productivity, and quality across the industry.

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COMPETENCES IN AGILE SOFTWARE DEVELOPMENT

Abstract. This article delves into the crucial competences required for effective participation in Agile software development. It explores the fundamental aspects of Agile methodologies, emphasizing iterative processes, collaboration, and adaptability. Key roles within Agile teams are examined, alongside the essential skills necessary for each role. The article also discusses methods for assessing and enhancing Agile competences among team members. Through this exploration, the study underscores the significance of competence in Agile software development and its impact on project success within the contemporary IT industry.

Keywords: Competences, agile team roles, competence assessment, project success.

Introduction. Agile software development has revolutionized the way teams approach and execute projects in the IT industry. This methodology, characterized by iterative development, collaboration, and adaptability, places a strong emphasis on the competences of team members. Competence in Agile software development refers to the combination of skills, knowledge, and abilities that enable individuals to effectively contribute to Agile teams and deliver high-quality software solutions [1]. By understanding and cultivating the right competences, Agile teams can navigate complex projects more effectively, deliver value to stakeholders, and achieve sustainable success in today's competitive IT landscape.