

APPLICATION OF AI IN PROJECT RISK MANAGEMENT: NEW HORIZONS

V. Plakhov, N. Dotsenko

Kharkiv National University of Urban Economy named after O.M. Beketov, Kharkiv

In today’s dynamic markets and project environments, risk management has become one of the critical components of successful project management. Traditional risk assessment and management methods often fail to account for the dynamics of modern business and may be limited by human errors and subjectivity. Artificial Intelligence (AI) offers new opportunities for forecasting, evaluating, and managing risks, providing greater accuracy and adaptability in this process [1, 2].

One of the key aspects of implementing AI in risk management is its ability to predict potential risks in the early stages of a project. Using machine learning (ML), AI can analyze large volumes of historical project data and uncover hidden patterns and trends that may indicate potential threats. Predictive algorithms enable real-time analysis of current project conditions, identifying anomalies or deviations that may signal risks [3, 4]. For instance, studies show that using AI for risk forecasting in construction projects can reduce unexpected delays by 30% [5]. This approach is also suitable for IT projects, where risks may involve requirement deviations, market changes, or technical issues [6].

AI also enables the automation of risk management processes, including assessment and monitoring. Using cognitive algorithms, AI can continuously evaluate risks, automatically updating information on the project’s status based on new data. This approach significantly reduces the time required for information processing and allows for more rapid responses to changes [7]. AI also facilitates optimizing resource allocation in a project based on risk probability assessments, reducing costs and minimizing losses from risky events [8].

Integrating AI into risk management models, such as the “Three Lines of Defense” (3LoD) model (Fig.), improves the organization’s overall resilience to risks. This model integrates AI into three lines: operational control, risk management, and independent audit [9]. For example, the first line of defense—operational control—utilizes AI to automate operational monitoring and identify potential problems early. The second line—risk management—uses AI to analyze and evaluate threats, while the third line—-independent audit—applies AI to assess risk management effectiveness objectively [10.1].

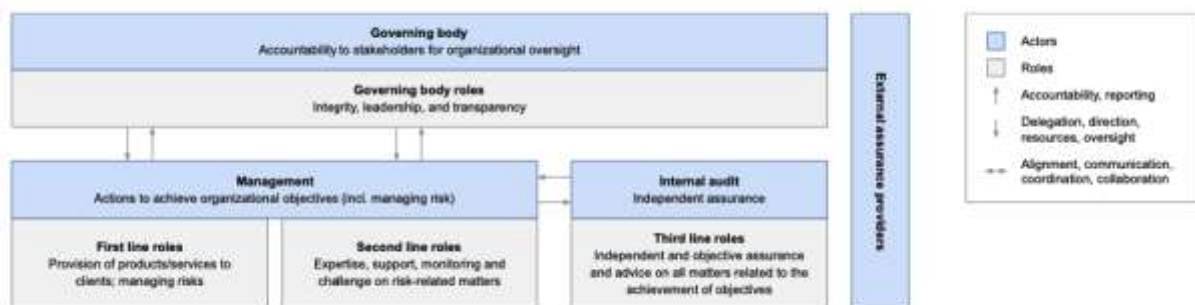


Fig. – Diagram description of the 3LoD model [10.2]

AI significantly enhances risk management efficiency by improving forecast accuracy and automating routine tasks. Applying AI in projects reduces risk management costs by 15-20%, accelerating decision-making through real-time data processing [3, 6]. Additionally, AI helps mitigate human factor impacts, reducing the likelihood of errors arising from subjectivity or insufficient information. Consequently, it ensures a more flexible and adaptive approach to project management, particularly under uncertainty [4, 8].

The further development of AI in project management will focus on advancing predictive algorithms and integrating new technologies for risk management. Implementing innovative solutions, such as Deep Learning and large language models (LLMs), will allow for even more accurate risk predictions and the development of effective prevention strategies [7, 10]. Specifically, combining AI with big data and cloud technologies will create more integrated systems for risk management capable of adapting to changing market and project conditions.

AI offers new opportunities for managing project risks by enhancing forecasting accuracy and automating management processes. This reduces costs, decreases the probability of errors, and improves project resilience to uncertainty. Further research should aim to enhance AI algorithms for risk management and expand their application across various industries.

References: 1. Li, H., Yazdi, M., & others. (2024). Harnessing AI for project risk management: A paradigm shift. In Yazdi, M. (Ed.), *Progressive decision-making tools and applications in project and operation management*. (Vol. 518, *Studies in Systems, Decision and Control*). Springer. https://doi.org/10.1007/978-3-031-51719-8_16. 2. Yazdi, M., Zarei, E., Adumene, S., & Beheshti, A. (2024). Navigating the power of artificial intelligence in risk management: A comparative analysis. *Safety*, 10(42). <https://doi.org/10.3390/safety10020042>. 3. Nenni, M. E., De Felice, F., & De Luca, C. (2024). How artificial intelligence will transform project management in the age of digitization: A systematic literature review. *Management Review Quarterly*. <https://doi.org/10.1007/s11301-024-00418-z>. 4. Haghghi, M. H., & Ashrafi, M. (2024). A novel framework for risk management of software projects by integrating a new COPRAS method under cloud model and machine learning algorithms. *Annals of Operations Research*, 338, 675–708. <https://doi.org/10.1007/s10479-023-05653-3>. 5. Tayal, V., & Kulkarni, P. (2023). Role of artificial intelligence (AI) in risk management. *AIP Conference Proceedings*, 2736(1), 060037. <https://doi.org/10.1063/5.0170689>. 6. Holtz, N., Wittfoth, S., & Gómez, J. M. (2023). AI meets risk management: A literature review on methodologies and application fields. 2023 Portland International Conference on Management of Engineering and Technology (PICMET), Monterrey, Mexico, 1–11. <https://doi.org/10.23919/PICMET59654.2023.10216845>. 7. Kalogiannidis, S., Kalfas, D., Papaevangelou, O., Giannarakis, G., & Chatzitheodoridis, F. (2024). The role of artificial intelligence technology in predictive risk assessment for business continuity: A case study of Greece. *Risks*, 12(19). <https://doi.org/10.3390/risks12020019>. 8. Schuett, J. (2023). Three lines of defense against risks from AI. *AI & Society*. <https://doi.org/10.1007/s00146-023-01811-0>. 9. Cox, L. (2023). *AI-ML for decision and risk analysis*. Springer International Publishing. <https://doi.org/10.1007/978-3-031-32013-2>. 10. NIST. (2023). *Artificial intelligence risk management framework (AI RMF 1.0)*. U.S. Department of Commerce. <https://doi.org/10.6028/NIST.AI.100-1>