

IMPROVING PROJECT RISK MANAGEMENT IN THE CONTEXT OF ORGANIZATIONAL DIGITAL TRANSFORMATION

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Abstract. Digital transformation is significantly changing the conditions under which projects are implemented and the approaches used to manage project risks. The use of data analytics, digital platforms, automated systems, and artificial intelligence expands the possibilities for early risk identification and assessment, while simultaneously creating new technological, informational, and organizational threats. The purpose of this study is to develop conceptual proposals for improving project risk management through the integration of digital monitoring, data analytics, and professional managerial judgment. The methodological basis of the study includes analysis and synthesis of scientific literature, comparative analysis, systematization, and conceptual modelling. As a result, an adaptive digital mechanism for project risk management is proposed, based on the continuous interaction of data, risk assessment, forecasting, managerial decision-making, monitoring, and subsequent adjustment. The study concludes that project risk management should move from predominantly periodic control towards a more dynamic and proactive approach while preserving the decisive role of professional judgment by the project manager.

Keywords: project management, project risk, risk management, digital transformation, artificial intelligence, digital monitoring, managerial decision-making.

Annotatsiya. Raqamli transformatsiya loyihalarni amalga oshirish shartlari va loyiha xatarlarini boshqarish yondashuvlarini sezilarli darajada o'zgartirmoqda. Ma'lumotlar tahlili, raqamli platformalar, avtomatlashtirilgan tizimlar va sun'iy intellektdan foydalanish xatarlarni erta aniqlash va baholash imkoniyatlarini kengaytirish bilan birga, yangi texnologik, axborotga oid va tashkiliy tahdidlarni ham yuzaga keltirmoqda. Tadqiqotning maqsadi raqamli monitoring, ma'lumotlar tahlili va professional boshqaruv mulohazalarini integratsiyalash orqali loyiha xatarlarini boshqarishni takomillashtirishga doir konseptual takliflarni ishlab chiqishdan iborat. Tadqiqotning metodologik asosini ilmiy adabiyotlarni tahlil qilish va sintezlash, qiyosiy tahlil, tizimlashtirish hamda konseptual modellashtirish usullari tashkil etadi. Tadqiqot natijasida ma'lumotlar, xatarlarni baholash, prognozlash, boshqaruv qarorlarini qabul qilish, monitoring va keyingi tuzatishlarning uzluksiz o'zaro ta'siriga asoslangan loyihalar xatarlarini boshqarishning adaptiv raqamli mexanizmi taklif etildi. Tadqiqot xulosasiga ko'ra, loyiha xatarlarini boshqarish asosan davriy nazoratga asoslangan yondashuvdan yanada dinamik va proaktiv yondashuvga o'tishi, bunda loyiha menejerining professional mulohazasi hal qiluvchi ahamiyatini saqlab qolishi lozim.

***Kalit soʻzlar:** loyiha boshqaruvi, loyiha xatarlari, xatarlarni boshqarish, raqamli transformatsiya, sunʼiy intellekt, raqamli monitoring, boshqaruv qarorlarini qabul qilish.*

Modern projects are implemented under conditions of high uncertainty, rapid technological development, and increasing volumes of information used in managerial decision-making. Organizational digital transformation intensifies these processes through the adoption of cloud solutions, information platforms, data analytics, machine learning, and artificial intelligence.

On the one hand, digital technologies create opportunities to improve the quality of project management. On the other hand, their implementation generates new risks related to data quality, technological failures, information security, system integration, insufficient digital competencies, and the dependence of managerial decisions on algorithmic models. Therefore, improving existing project risk management mechanisms has become an increasingly relevant task.

ISO 31000:2018 treats risk management as an integrated process that includes risk identification, analysis, evaluation, treatment, monitoring, and communication [1]. The 2024 guide issued by the Project Management Institute systematizes practical principles, processes, and tools for risk management across projects, programs, and portfolios [2].

The purpose of the study is to develop conceptual proposals for improving the project risk management mechanism in the context of organizational digital transformation.

To achieve this purpose, the study addresses the following objectives: to identify how project risks are changing in the digital environment; to analyse the potential of modern digital technologies for risk identification and assessment; to compare traditional and digital approaches to risk management; and to propose an adaptive mechanism for project risk management.

Research methods include analysis and synthesis of scientific literature, comparative analysis, systematization, and conceptual modelling. No empirical survey or experiment was conducted within this study; the conclusions are based on the analysis of international standards, professional guidelines, and recent scientific publications.

Risk management is one of the key elements of project management because uncertain events can affect project duration, cost, quality, and the achievement of other project objectives. Effective risk management should ensure not only a response to problems that have already occurred, but also the earliest possible identification of potential deviations.

The traditional process includes identifying risks, analysing and assessing them, selecting response measures, and conducting subsequent monitoring. This approach remains fundamental. However, the rapid pace of change in the digital environment increases the need for timely information acquisition and processing. A risk register prepared at a particular stage of a project may quickly become outdated if information about the project status is not updated regularly.

Digital tools can partially address this limitation. Information on schedules, costs, resources, changes, and the completion of project tasks can be systematically obtained from different information systems. This creates the conditions for more dynamic risk assessment and earlier identification of deviations.

Artificial intelligence is becoming particularly important. A systematic review by M.E. Nenni et al., covering 215 scientific publications, demonstrates the considerable potential of AI in project management, including the processing of large volumes of data, event forecasting, and decision support [3]. At the same time, the use of AI is accompanied by the challenge of algorithm

interpretability: a forecast may be technically accurate but insufficiently transparent for accountable managerial decision-making.

B. Badhon et al. examine this issue in the context of Explainable Artificial Intelligence and propose an approach to improving the transparency of forecasts in project risk management [4]. This supports the need to combine digital analytics with professional managerial judgment.

Table 1.

Comparison of Traditional and Digital Approaches to Project Risk Management

Criterion	Traditional approach	Digital approach
Identification	Periodic risk identification	More continuous identification based on updated data
Information sources	Reports, meetings, expert assessments	Digital data and expert information
Assessment	Conducted at established intervals	Can be updated dynamically
Monitoring	Periodic	More continuous
Forecasting	Predominantly expert-based	Data analytics, AI/ML, and expert judgment
Response	After a significant change is identified	Possibility of earlier warning
Main limitations	Potential delays in information	Data quality, algorithm transparency, and staff competencies

Source: developed by the author based on [1–4].

The comparison shows that the main advantage of the digital approach lies not in the complete automation of risk management, but in reducing the time gap between a change in project status, risk identification, and managerial decision-making.

Based on the analysis, an adaptive digital mechanism for project risk management is proposed: Risk identification → collection of current project data → dynamic assessment → prioritization → forecasting → selection of a response strategy → managerial decision → digital monitoring → adjustment.

Unlike a linear sequence, the proposed mechanism forms a closed management cycle. Monitoring results are fed back into the analysis stage, allowing the probability and potential impact of a risk to be reassessed as the project situation changes.

The proposed mechanism is based on three principles. The principle of continuity requires regular updating of risk assessments as new relevant information becomes available. The principle of proactivity directs the system towards identifying early signs of possible deviation rather than merely recording a problem that has already occurred. The principle of human-centredness means that digital and AI tools are used to support decisions, while responsibility for interpreting information and making the final managerial decision remains with competent professionals.

This approach is consistent with research on trustworthy AI. E. Vyhmeister and G.G. Castane emphasize the need to combine artificial intelligence technologies with requirements for transparency, reliability, human oversight, and risk management [5].

Element of Scientific Novelty and Practical Significance

The element of scientific novelty lies in the conceptual systematization of an adaptive digital mechanism for project risk management that integrates traditional risk management processes with continuous digital monitoring, predictive analytics, and professional managerial judgment.

Data → Risk → Forecast → Decision → Monitoring → Adjustment

Under the proposed approach, the digitalization of risk management is not limited to converting registers and reports into electronic form. The main effect is achieved through continuous feedback between changes in project data and the decision-making process.

The practical significance of the study lies in the possibility of gradually applying the proposed approach in organizations with different levels of digital maturity. At the initial stage, organizations may use an electronic risk register and automated monitoring of key indicators. At more mature stages, predictive analytics and AI tools may be integrated when sufficient high-quality data, appropriate infrastructure, and relevant staff competencies are available.

Implementation Framework and Study Limitations

For practical implementation, the proposed mechanism can be introduced gradually in accordance with an organization’s digital maturity. A phased approach is preferable because advanced analytics cannot generate reliable managerial value unless the organization first establishes consistent risk data, clear responsibility for risk ownership, and regular updating of project information. In this respect, digital maturity in project risk management may be viewed as a progression from basic electronic registration of risks to integrated monitoring and, subsequently, to predictive decision support.

Table 2.

Stages of Digital Maturity in Project Risk Management

Level	Core tools	Primary management focus
Basic	Electronic risk register, standard risk indicators	Data discipline, clear risk ownership, regular review
Integrated	Connected project systems, dashboards, automated alerts	Continuous monitoring, coordination, faster response
Predictive	Predictive analytics, AI/ML, explainability tools	Early warning, scenario analysis, human oversight

Source: developed by the author based on the conceptual analysis of [1–5].

The transition between these levels should not be treated as a purely technological upgrade. The effectiveness of digital risk management depends on the quality and comparability of project data, the transparency of analytical models, the availability of competent staff, and the existence of procedures for human review of automated recommendations. If these conditions are absent, digitalization may accelerate the circulation of poor-quality information rather than improve managerial decisions. Therefore, governance arrangements, documentation of assumptions, and traceability of decisions remain essential even when sophisticated AI tools are used.

The present study has a conceptual and literature-based character and therefore does not claim empirical validation of the proposed mechanism in a specific organization or industry. This limitation also defines directions for future research. The mechanism may be tested through case studies, expert interviews, or comparative analysis of projects with different levels of digital maturity. Particular attention may be given to the relationship between the use of predictive tools and measurable project outcomes such as schedule adherence, cost performance, quality, and the frequency of realized risks. Such empirical work would make it possible to assess which elements of the proposed mechanism provide the greatest practical value in different organizational contexts.

CONCLUSION

Digital transformation has a significant impact on project risk management. Traditional methods of risk identification, analysis, assessment, and response remain important; however, a dynamic project environment requires faster information updates and earlier identification of potential deviations. Modern digital technologies make it possible to organize systematic collection of project data, automate selected elements of monitoring, and use analytical tools to support forecasting. At the same time, digitalization creates additional risks related to data quality, information security, algorithm transparency, and staff competencies. The study proposes an adaptive digital mechanism for project risk management built around the continuous cycle “data – risk – forecast – decision – monitoring – adjustment”. Its key feature is maintaining a balance between technological capabilities and professional managerial judgment. Thus, improving project risk management in the context of digital transformation involves moving from predominantly periodic and reactive control towards a more dynamic, proactive, and information-integrated management system.

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