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The Impact of Blockchain Technology Implementation on Project Management Efficiency in Kazakhstan's Financial Sector

Karina Smagulova

Astana IT University, Kazakhstan

A B S T R A C T

This paper examines the impact of Blockchain technology on project management processes in the financial sector of Kazakhstan. The purpose of the study is to identify the potential and barriers to the implementation of this technology to improve the efficiency of project activities. The literature review analyzes existing models and international experience in using Blockchain in project management. An empirical study based on a survey of representatives of financial organizations in Kazakhstan allowed us to assess the level of awareness, readiness to implement and perception of the benefits of the technology. The results showed interest and potential benefits, but at the same time, key barriers were identified, such as lack of knowledge and lack of regulatory framework. The conclusion emphasizes the need for a systematic approach to digital transformation, including training specialists and implementing pilot projects.

Keywords: Blockchain Technology, Project Management, Financial Sector, Kazakhstan

Introduction

In the context of rapid digital transformation of the financial sector, distributed ledger technologies, in particular Blockchain, are becoming increasingly important in the context of increasing transparency, security and efficiency of business processes. The implementation of such solutions is becoming increasingly relevant for developing economies, including Kazakhstan, where financial institutions are striving for modernization and sustainable growth. Kazakhstan is actively implementing digitalization initiatives, especially in the financial sector, to increase financial inclusion, improve the regulatory framework and stimulate innovation. The financial services sector in the country is actively implementing innovative technologies, but project management processes often face problems of late execution, insufficient transparency and limited risk control.

Blockchain, due to its decentralized nature, ensures immutability of records, automation of processes through smart contracts and a high degree of data reliability.

The aim of this study is to examine the impact of Blockchain technology implementation on project management processes within financial sector organizations in Kazakhstan. The study is aimed at forming an understanding of the extent and way in which the use of Blockchain technologies can contribute to the improvement of project activities.

To achieve this goal, a quantitative methodology was chosen, based on a survey conducted among professionals working in project management and/or in financial organizations in Kazakhstan. This approach allows collecting empirical data on the level of awareness, experience of application, perception of the benefits and existing barriers to the implementation of blockchain technologies in the practice of project management.

Literature Review

The implementation of blockchain technology in project management is increasingly seen as an effective way to make processes more transparent, secure and efficient. Orazgaliyeva and Tazhiyeva (2025) highlight that blockchain is among the key IT trends recognized internationally (according to Gartner). Amoah and Oh (2021) highlight that blockchain enables decentralization and automation of key project functions such as contract execution, budget tracking and task verification using smart contracts. Their pilot prototype on the EOSIO platform demonstrated real-time accountability and transparency without the need for third-party verification. Similarly, Orazgaliyeva and Tazhiyeva (2025) highlight the potential of blockchain in improving management efficiency in Kazakhstan, especially through transparent registries and simplified document workflows. However, these studies highlight significant barriers to adoption, including legal ambiguity, high costs, and a shortage of qualified specialists (Amoa and Oh, 2021; Orazgaliyeva and Tazhiyeva, 2025).

Tukibayev (2019) provides an overview of global and Kazakh trends in blockchain implementation, highlighting its key advantages - decentralization, data immutability, and reduced human error. He cites the example of successful use of the technology in Estonia (the Guardtime project in healthcare) as

evidence of its scalability. In Kazakhstan, early initiatives such as the National Bank's Invest Online and IBM's securities trading project demonstrate the financial sector's interest in blockchain applications.

The integration of blockchain with tax and accounting information systems (e.g., within the framework of a “virtual warehouse” and “electronic invoices”) is already being implemented within the framework of the state program “Digital Kazakhstan” and serves as an example of automation of financial flow management processes at the macro level (Shaidulov and Kenzhegalieva, 2022).

One of the key functions of blockchain is to eliminate the need for a third party in transactions. This significantly reduces transaction costs and reduces the risks of errors and abuses. In the context of project management, this means the ability to implement direct, transparent and trustworthy interactions between project participants - customers, contractors and government agencies (Ikeda & Hamid, 2018). Smart contracts based on blockchain technology allow parties to enter into legally binding financial agreements that are automatically executed when pre-agreed conditions are met (Javaid, Haleem, Singh, Suman, & Khan, 2022).

In addition, the implementation of blockchain in project information management systems (PMIS) allows for efficient tracking of resources, deliverables and compliance with deadlines, which significantly increases the level of control and planning accuracy. Such approaches strengthen the position of project offices in terms of compliance with budget, schedule and scope of work. Therefore, blockchain is not only an enabling IT technology but also a potentially transformative solution for systemically improving project management efficiency, especially in the context of digitalization of the financial sector (Perera, Wickramarachchi & Rajapakse, 2023). In the procurement and supply chain management domain, smart contracts have demonstrated the ability to automate payment processes after delivery verification, thereby reducing administrative burden and operational inefficiencies (Sonmez et al., 2021). In the context of Kazakhstan’s financial sector, the implementation of smart contracts can streamline approval procedures by replacing traditional paper-based workflows with real-time digital verification. This shift can improve financial transparency, speed up project delivery, and reduce risks associated with bureaucratic delays and corruption. Several studies, including Alam et al. (2021), indicate that the use of blockchain-based smart contracts can reduce costs and operational risks by automating key processes. Such solutions allow financial agreements to be executed without the involvement of third parties, which simplifies procedures and reduces the likelihood of fraud. This is especially relevant for the financial sector of Kazakhstan in the context of the desire to increase transparency and speed up approval and execution processes. However, the full integration of blockchain technologies into the management of financial projects faces a number of challenges. One of the most discussed is the lack of a clear regulatory framework, which makes it difficult to make decisions in the face of uncertainty (Jin, 2024). Kazakhstan does not yet have a specific policy on digital assets, smart contracts and decentralized finance (DeFi), which hinders the transition to new models of interaction. In addition, the technical side remains problematic: many financial institutions rely on outdated IT infrastructures that are poorly compatible with modern decentralized networks (Mosteanu & Faccia, 2020).

An analysis of scientific sources shows that blockchain technologies have high potential to transform project management, especially in the financial sector. The most promising areas are contract automation, risk reduction, control over deadlines and budgets, and increased transparency through smart contracts and decentralized solutions. International cases demonstrate successful pilots in various fields, while in Kazakhstan, blockchain is just beginning to be implemented in government and financial processes. However, studies also point to barriers to technology implementation, such as the lack of a clear legal framework, outdated IT infrastructure and a lack of qualified personnel. These barriers hinder the large-scale integration of the technology into project practice. Thus, to improve the efficiency of project management using blockchain, a comprehensive effort, both technological and institutional, is needed.

Research Methodology

Data Collection Method

The purpose of this study is to analyze the impact of blockchain technology implementation on the efficiency of project management in the financial sector of Kazakhstan. To achieve this goal, a quantitative research method was chosen, allowing for the collection and interpretation of empirical data based on respondents’ perception, experience, and level of awareness.

Data was collected using an online questionnaire developed in Google Forms. The questionnaire consisted of three structured sections:

- General information about respondents (field of activity, position, work experience);
- Knowledge and perception of blockchain technology (awareness level, assessment of effectiveness, perception of advantages and barriers);
- Application of technology, prospects, and expectations (experience of participation in projects, assessment of potential, readiness for implementation in organizations).

The survey included multiple-choice questions, scale questions (including the Likert scale), and separate open fields in which participants could provide more detailed comments. This approach provided both quantitative and qualitative components of the analysis, allowing for a more complete understanding of the attitude of specialists to the technology in question.

The data were analyzed using descriptive statistics methods. Frequency distributions, mean values, and structural differences in responses were assessed for key parameters: level of knowledge, experience of use, perception of benefits and barriers to implementation, and assessment of the future potential of the technology in project activities.

Target Audience and Sampling

As part of this study, a quantitative survey was conducted to obtain empirical data reflecting the perception and assessment of the impact of blockchain technology implementation on the effectiveness of project management in the financial sector of Kazakhstan. Particular attention was paid to the target audience directly related to this topic when forming the sample. The survey included representatives of financial organizations such as banks, insurance companies, fintech companies, as well as project management consultants with professional expertise in the field of project activities. In addition, the sample included master's degree students in IT fields as potential participants in digital transformation with knowledge of modern information technologies and project management methodologies.

The survey involved 50 respondents representing these groups. This approach to selecting participants made it possible to focus on expert opinions and practical experience, which contributes to a more accurate and relevant assessment of the applicability and effectiveness of blockchain technologies in project management implemented in the financial sector of Kazakhstan.

Survey Results and Analysis

This section presents the results of the survey and offers an analytical interpretation of the data. The analysis is divided into three thematic areas corresponding to the structure of the questionnaire: general information about respondent, knowledge and perception of blockchain and practical applicability and expected impact on project management efficiency.

Section 1 – General Information

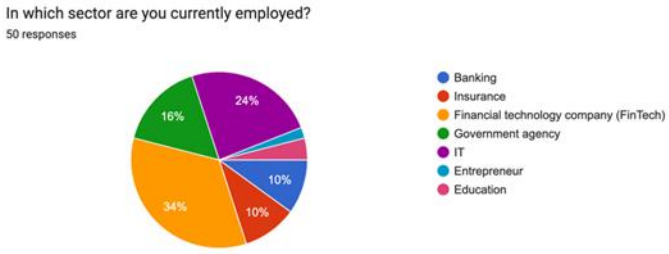

Figure 1: Professional Background

The majority of respondents represent the FinTech companies (34%) and IT master's students (24%), followed by government agencies (16%), banking sector (10%), insurance companies (10%), education and entrepreneurs. This distribution ensures a balanced perspective from both industry professionals and tech-savvy future specialists.

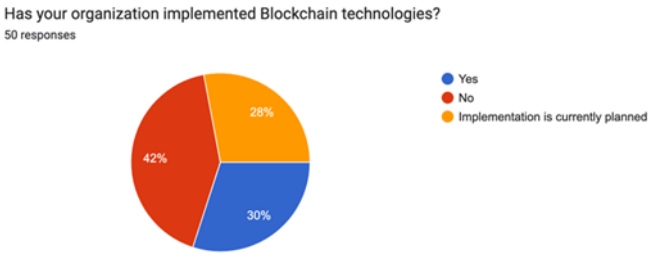

Figure 2: Experience with Blockchain technologies

Only 30% of respondents reported that their organizations have implemented Blockchain, while 28% are planning implementation. The largest portion (42%**)** have not adopted it yet, indicating that Blockchain integration is still in early stages across many organizations.

Section 2 - Knowledge and Perception of Blockchain Technology

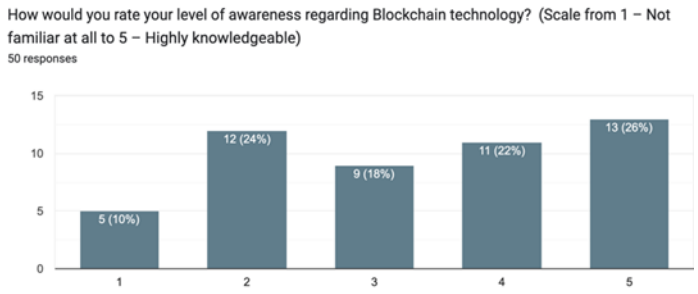

Figure 3: Level of Knowledge About Blockchain Technology

The average self-assessed awareness level is 3.30, showing a moderate understanding among respondents. While 48% rated their knowledge at level 4 or 5, a significant portion (34%) rated themselves at level 1 or 2, suggesting uneven familiarity across professionals.

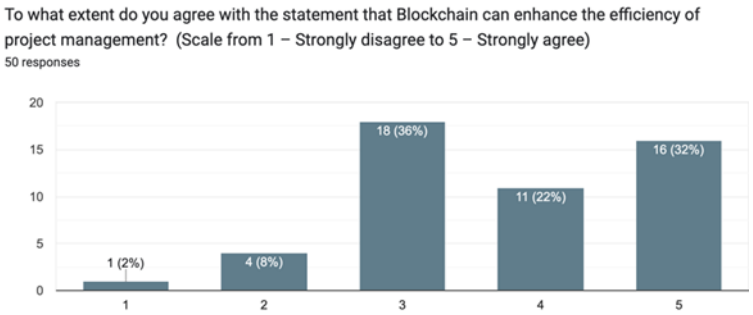

Figure 4: Perceived Usefulness of Blockchain in Project Management

The mean score of 3.74 (on a 5-point Likert scale) indicates that the majority of respondents generally agree that blockchain technology can enhance project management efficiency, although the strength of agreement is moderate. A combined 54% of respondents either agree or strongly agree with the statement, while only 10% expressed disagreement, indicating strong belief in the potential benefits of Blockchain.

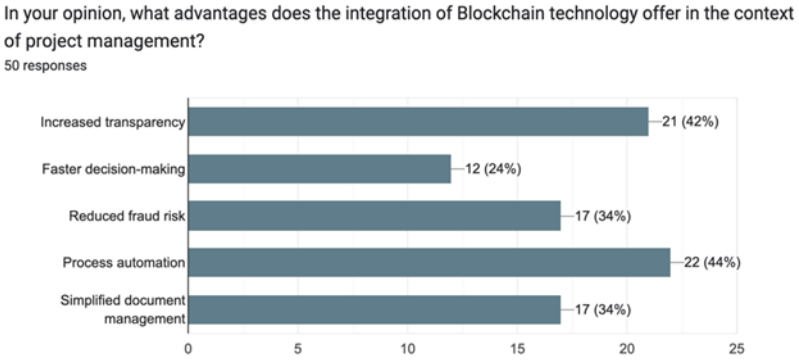

Figure 5: Advantages of Blockchain Technology

The most recognized benefits were process automation (44%) and increased transparency (42%), followed by reduced fraud risk (34%) and simplified document management (34%). These results highlight expectations around operational efficiency and trust-building.

Section 3 - Application, Future Potential, and Expectations

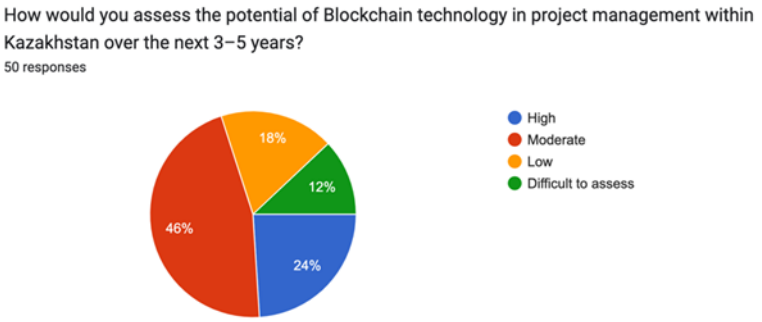

Figure 6: Level of Blockchain Application in Kazakhstan in the next 3-5 years

A majority of respondents see either moderate (46%) or high (24%) potential, indicating optimism about Blockchain's future in Kazakhstan's project management practices. However, 12% still find it difficult to assess, reflecting lingering uncertainty.

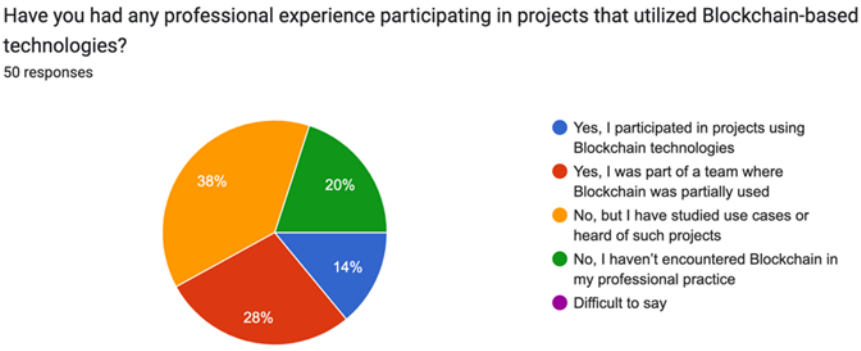

Figure 7: Professional Experience

Only 14% have used blockchain in their projects, 28% were involved in a team that worked with Blockchain, 38% have studied use cases related to Blockchain but have not use it, indicating that the technology is still at an early stage of adoption in Kazakhstan's financial sector. This implies growing interest but limited practical exposure in the field.

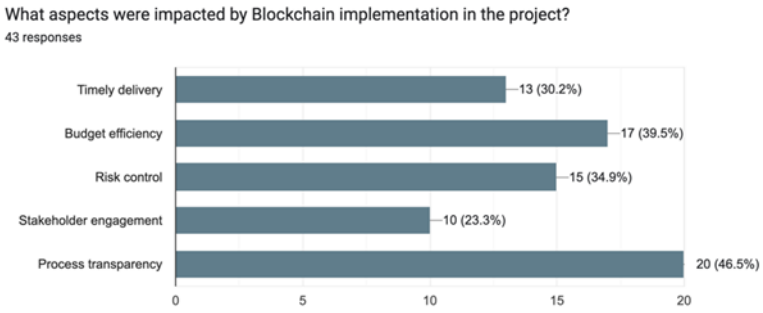

Figure 8: Aspects where Blockchain was Useful

Among those with experience, process transparency (46.5%) and budget efficiency (39.5%) were the most positively impacted areas, followed by risk control (34.9%). This supports the perception that Blockchain enhances accountability and financial discipline in projects.

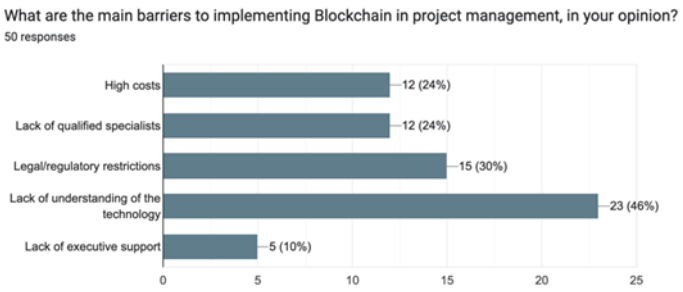

Figure 9: Main Barriers to Blockchain Adoption

The biggest barrier identified was a lack of understanding (46%), followed by legal/regulatory restrictions (30%) and shortage of qualified specialists (24%). These results underline the need for education, clearer regulations, and workforce development.

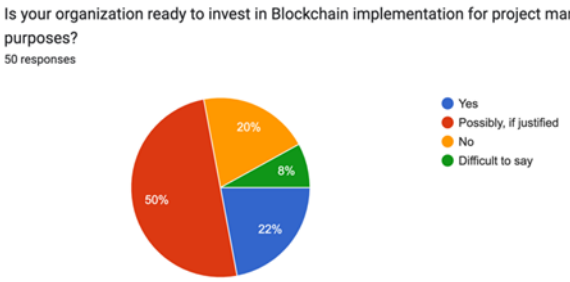

Figure 10: Readiness to Use

The results show that while only 22% of respondents report full readiness to invest in Blockchain for project management, a significant 50% would consider it if justified. This indicates a strong potential for adoption, provided there is clear evidence of benefits. Meanwhile, 20% are not ready, and 8% remain uncertain, highlighting the need for further education and clarity on the technology's value.

4. Results and Discussion

The survey, which involved 50 respondents mainly from the financial sector of Kazakhstan, including specialists from fintech companies, banks, insurance companies, government agencies and master's students in IT, provides real information on the current status, awareness and expected potential of blockchain technology in improving project management efficiency. The professional breakdown shows that the majority were from fintech companies (34%) and IT masters (24%), followed by government agencies (16%), banks (10%), insurance companies (10%) and a smaller number from the education and business sectors. This sample offers a diverse yet relevant perspective, combining practitioners with practical experience and future professionals familiar with technology trends and project methodologies. In terms of blockchain implementation, only 30% of organizations have already implemented the technology, while 28% are planning to do so. The remaining 42% have not yet begun implementation, reflecting the early stage of adoption in the financial sector.

Respondents rated their awareness of blockchain technology at an average of 3.3 out of 5, suggesting a moderate level of understanding. Of those, nearly half (48%) considered themselves knowledgeable (levels 4 and 5), more than a third rated their awareness as low (levels 1 and 2), indicating that knowledge is unevenly distributed, even among professionals in technology-related fields. When asked about the potential of blockchain to improve project management efficiency, the average score was 3.74, indicating a generally positive perception. Respondents highlighted process automation (44%) and transparency (42%) as the top expected benefits, followed by reduced fraud (34%) and simplified document management (34%). These preferences reflect a belief that blockchain can solve key project challenges such as inefficiencies, lack of trust, and manual processes.

Despite the growing interest, only 14% of respondents had worked directly on blockchain-based projects. A significant proportion (38%) reported learning about blockchain from research or case studies, but without practical experience. This also indicates a strong interest in knowledge but limited practical experience. For those with implementation experience, process transparency, budget efficiency, and risk control were highlighted as the most positive impacts of blockchain. These results indicate that even partial blockchain implementation can bring tangible benefits in key areas of project management performance.

As for the potential of blockchain in the financial sector of Kazakhstan over the next 3-5 years, the outlook is quite optimistic, with 24% seeing high potential and 46% rating it as moderate.

When assessing barriers to implementation, the most important issue was lack of understanding (46%), followed by regulatory uncertainty (30%) and a shortage of qualified specialists (24%). These results highlight the importance of education, policy development, and capacity building to support wider adoption.

Finally, when asked whether their organization would be willing to invest in blockchain, only 22% said yes, while 50% would consider it if there was a clear rationale. This suggests that while direct commitment remains low, there is a lot of interest in piloting or exploring the technology, provided it can demonstrate value.

This research has shown us that while blockchain adoption in the financial sector in Kazakhstan is still in its early stages, interest and belief in its potential are significant. Awareness varies, but many professionals see real value in blockchain's ability to improve project transparency, efficiency, and risk management. However, limited experience, knowledge gaps, and regulatory issues remain key barriers. Addressing these gaps through pilot programs, training, and regulatory support can enable broader adoption and help realize the technology's full potential in project management.

5. Conclusion

This study aimed to examine the impact of Blockchain technology on project management processes in the financial sector of Kazakhstan. During the analysis of theoretical sources and empirical data, it became clear that despite the limited use of the technology in Kazakhstan, interest in it is steadily growing. Blockchain has significant potential to increase transparency, automate processes, strengthen control over budgets and reduce the level of the human factor in project management.

Literature analysis showed that the technology is already being used worldwide in a number of areas, including document flow, supply chain management, quality control and smart contracts. Kazakhstan is also taking steps in this direction, namely the introduction of electronic invoices, virtual warehouses and the use of Blockchain in certain products of the National Bank indicate readiness for digital transformation. However, the implementation of technology in project management is still limited by a number of barriers, among which the key ones are lack of knowledge, shortage of qualified specialists and the absence of a clear regulatory framework.

The survey results showed that the level of awareness among the participants is generally average, but there is also a high interest in learning and applying the technology. Only a small part of respondents have practical experience with Blockchain, which indicates an early stage of implementation. However, most participants see significant potential in the technology and are willing to consider investing in its implementation if there are clear benefits and successful cases.

To summarize, we can conclude that a comprehensive approach is needed for more active implementation of Blockchain in project management of financial organizations in Kazakhstan. Increasing the level of competence of specialists, creating a favorable regulatory environment, as well as launching pilot projects that could serve as examples of successful application of the technology. In the future, subject to systemic support, Blockchain can become an important tool for digital transformation of project management and increase the efficiency of the entire industry.

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