

Цифровая трансформация Казахстана открывает новые горизонты, и важно, чтобы развитие технологий сопровождалось созданием эффективных законодательных и этических норм.

Цифровая трансформация – это процесс, который затрагивает все сферы жизни общества. Внедрение новых технологий, создание инновационных бизнес-моделей и развитие цифровых компетенций открывают перед нами новые возможности, но также требуют от нас гибкости и готовности к переменам. Тот, кто сможет вовремя адаптироваться и освоить цифровые инструменты, будет в выигрыше, а вот те, кто останется в стороне, могут столкнуться с серьёзными трудностями. Важно помнить, что цифровая трансформация – это не только о технологиях, но и о людях, их знаниях, навыках и способности быть готовыми к будущим вызовам.

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Engineering and reengineering of business processes using blockchain technologies: modern approaches and digital transformation in Kazakhstan

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Abstract: The article explores modern approaches to engineering and reengineering business processes using blockchain technologies, which are becoming key tools for digital transformation. The primary advantages of blockchain technologies—such as transparency, security, and efficiency—are highlighted with examples from various sectors, including finance, logistics, public services, and energy. Special attention is given to the application of blockchain technologies in Kazakhstan, where innovative solutions are actively being implemented to modernize business processes and improve the country's international competitiveness. The conclusion emphasizes the pivotal role of blockchain in fostering future economic growth and advancing Kazakhstan's digital economy.

Keywords: blockchain, business process engineering, business process reengineering, digital transformation, smart contracts, data security, Kazakhstan, digital economy, logistics, financial technologies, state program.

Modern businesses are increasingly focused on digital transformation, with blockchain technologies playing a crucial role in this process. These innovative solutions provide new opportunities for enhancing business processes, including engineering and reengineering. Business process engineering involves the design and optimization of internal company operations to achieve maximum efficiency, while reengineering entails significant changes to improve the quality and effectiveness of these processes [1]. Importantly, the application of blockchain technologies can significantly enhance not only the efficiency of these processes but also the security and transparency of operations.

One of the primary drawbacks of traditional engineering and reengineering methods is their reliance on centralized systems, intermediaries, and complex verification procedures. Blockchain eliminates most of these limitations through its decentralized nature, where data is protected and recorded in an open and immutable ledger. This substantially increases the reliability of operations and reduces risks associated with fraud or errors.

The main advantages of blockchain in business include transparency, security, and automation. Every step in a business process, regardless of its complexity, is recorded in the blockchain, ensuring transparency and facilitating the easy identification of changes or issues. Blockchain also guarantees data protection, which is particularly critical given the growing threats to cybersecurity. For example, the use of smart contracts automates the fulfillment of contractual obligations, streamlining processes and reducing reliance on third parties such as notaries or banks.

Digital transformation, which impacts all areas of life and business, necessitates integrating innovative technologies like blockchain into traditional business processes. Reengineering with blockchain technologies offers companies competitive advantages, such as faster transactions, lower infrastructure costs, and improved customer service quality. Additionally, blockchain adoption minimizes human error and optimizes interaction between participants in business processes.

The implementation of blockchain solutions across various industries requires a comprehensive approach. One successful example of blockchain application is the creation of decentralized systems for supply chain management. Companies using blockchain can track every stage of the transportation of goods and services, from the manufacturer to the end consumer. This eliminates the possibility of data falsification and enhances confidence that all stages of delivery were completed accurately and on time. Blockchain also serves as a powerful tool in finance and accounting. With technologies such as cryptocurrencies and asset tokenization, financial companies can conduct transactions without intermediaries, which significantly accelerates processes and reduces transaction costs. Additionally, financial reporting and transactions recorded on the blockchain become more transparent and auditable, reducing the risks of fraud and increasing trust among clients and partners.

Particular attention is given to the application of blockchain technologies in Kazakhstan, a country actively adopting digital solutions for economic modernization. The Kazakh market presents a unique platform for applying innovative technologies due to its strategic location, growing market, and government support. Implementing blockchain solutions in the country will significantly improve supply chain management, increase transparency in the public sector, and ensure data security in areas such as education, healthcare, and finance. Each year, the number of companies using blockchain to create innovative services and products increases. Smart contracts and decentralized applications have become an integral part of modern business, as they offer new opportunities to create more efficient and secure business models. Blockchain adoption in Kazakhstan has already yielded results, especially in areas like banking, finance, government services, and logistics. Kazakhstan is actively developing projects that use blockchain to automate and simplify business processes. One prominent example is the implementation of blockchain technology in the financial sector. Kazakhstan became one of the first countries to propose a government-regulated digital currency—"digital tenge" [2]. This initiative significantly enhances the efficiency of financial transactions by ensuring their transparency, reducing transfer costs, and minimizing risks associated with fraud.

The application of blockchain technologies also supports the development of Kazakhstani logistics and supply chain management. Blockchain helps ensure transparency at all stages of goods transportation, reducing the risk of document falsification and increasing partner trust. Kazakhstan, due to its strategic location at the heart of Eurasia, is actively developing infrastructure for goods transit and utilizing blockchain to ensure the reliability and speed of operations.

Kazakhstan's government is actively exploring blockchain technology to improve the quality of public services. Under the state program "Digital Kazakhstan" [3], various projects are underway to implement blockchain to increase transparency in government finance management, as well as in electronic trading and tender systems. Blockchain, in this context, serves as a tool to combat corruption by ensuring the accessibility and accuracy of data related to government budget expenditures.

One of the crucial steps in digital transformation is the use of blockchain technologies to enhance internal management efficiency within companies. Kazakhstani businesses are starting to apply blockchain to optimize their business processes, improving data management and accounting systems, and accelerating transaction execution. Blockchain-based smart contracts automate numerous operations, such as contract execution, settlement procedures, and dispute resolution.

The Kazakh market is also actively expanding in the direction of using blockchain technologies in the energy sector. Smart contracts are employed to automate energy distribution processes, reducing costs and speeding up settlement between suppliers and consumers. Thus, blockchain not only improves business processes but also promotes sustainable industry development.

A significant aspect of blockchain implementation in Kazakhstan is its educational component. The country is developing educational programs aimed at training specialists in blockchain technologies. New courses are being introduced at Kazakh universities, and various conferences and training sessions are held to upgrade the skills of workers in the digital technology field. This helps create a workforce capable of implementing innovative solutions in business processes.

Furthermore, Kazakhstan is actively collaborating with international organizations and companies, facilitating the exchange of knowledge and the implementation of global best practices in the blockchain space. For instance, Kazakhstan is participating in several international initiatives aimed at developing standards and recommendations for blockchain technology usage in the global economy. This collaboration helps the country integrate into the global digital economy and strengthen its position as a regional leader.

Amid the growing global popularity of blockchain, Kazakhstan recognizes the vast potential it holds for future economic growth. The introduction of blockchain technologies allows for the creation of new business models, improves relationships with both government and private sector partners, and increases public trust. Additionally, blockchain-related startups are thriving in Kazakhstan. These companies are developing innovative solutions for optimizing and digitizing business processes, creating new opportunities for entrepreneurs. The adoption of innovative technologies is becoming a crucial success factor for businesses, and Kazakhstan's economy is positioning itself for long-term development in this direction.

Thus, Kazakhstan is not only actively implementing blockchain in various sectors of its economy but is also creating the necessary conditions for this. The introduction of blockchain technologies into business process engineering and reengineering helps the country modernize existing structures, improve their efficiency and transparency, and accelerate the development of the digital economy. The implementation of these initiatives will contribute to enhancing Kazakhstan's global competitiveness. The introduction of new technologies opens up new markets and opportunities for integration into the global economy. As a result, Kazakhstan could become one of the leaders in digital transformation and the implementation of innovative solutions, which will help it thrive in the modern economy.

However, the introduction of blockchain technologies requires not only technological preparation but also changes in corporate culture. An important aspect is employee training and improving their digital literacy. For successful implementation of blockchain solutions, companies need not only to adopt new technologies but also to establish processes that address new challenges and risks.

In conclusion, the use of blockchain technologies in business process engineering and reengineering represents an important step for Kazakhstan in its pursuit of a digital future. Blockchain helps optimize business processes, enhance security and transparency, and stimulate economic growth. The implementation of this technology will open new horizons for the development of Kazakhstani business and the entire digital sector of the country.

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Экосистемы в цифровой экономике: объединение технологий, моделей и людей

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Аннотация: Современные цифровые экосистемы характеризуются высокой степенью разнообразия, охватывая сразу несколько отраслей и объединяя представителей различных секторов промышленности, партнеров, конкурентов, клиентов и компаний. Это меняет традиционные подходы к ведению бизнеса, поскольку вместо модели, основанной на контроле и централизации, все чаще используется стратегия объединения и сотрудничества. Такой подход обеспечивает успех и делает экосистемы одной из наиболее эффективных инновационных бизнес-моделей. Ключевым фактором развития цифровых экосистем является понимание их зависимости от человеческого участия. Для их функционирования необходима четкая координация различных ролей. В некоторых случаях даже уступка конкуренту более выгодного положения может принести долгосрочную выгоду для всей экосистемы.

Ключевые слова: цифровая экосистема, развитие, базы данных, интернет вещей, цифровые технологии

Цифровая экосистема — это сеть взаимосвязанных цифровых технологий, платформ и сервисов, которые взаимодействуют друг с другом, создавая ценность для бизнеса и потребителей. Она состоит из различных элементов, таких как программное обеспечение, аппаратное обеспечение, данные и люди, которые работают вместе, упрощая цифровые транзакции, коммуникацию и сотрудничество на разных этапах взаимодействия с клиентами. Эти этапы взаимодействия с клиентами могут быть взаимосвязаны, и экосистема может поддерживать различные виды деятельности, такие как электронная коммерция, социальные сети, программные решения, аппаратное обеспечение и цифровые развлечения. В контексте бизнеса цифровая экосистема может также означать набор цифровых платформ и технологий, которые компания использует для взаимодействия со своими клиентами, партнёрами и другими заинтересованными сторонами [1].

Цифровая экосистема ориентирована на повышение ценности для клиентов за счёт оптимизации данных и рабочих процессов в различных внутренних отделах, инструментах и системах, а также у клиентов, поставщиков и внешних партнёров. Она должна устранять препятствия на пути клиента и позволять каждому участнику экосистемы использовать новейшие технологии и системы для удовлетворения своих индивидуальных потребностей.