

BLOCKCHAIN TECHNOLOGIES IN DIGITAL ECONOMY: ADVANTAGES AND CHALLENGES

Volodymyr Marchenko¹, Alla Dombrovska²

¹Doctor of Sciences (Law), Professor of the Department of State and Legal Disciplines, Criminal Law and Procedure, Grigory Skovoroda Kharkiv National Pedagogical University, Kharkiv, Ukraine, e-mail: marchenko2210@gmail.com, ORCID: <https://orcid.org/0000-0003-1921-3041>

²Ph.D., Assistant Professor of the Department of Legal Support of Economic Activity, O.M. Beketov National University of Urban Economy in Kharkiv, Kharkiv, Ukraine, e-mail: dombrovskalla@gmail.com, ORCID: <https://orcid.org/0000-0003-4610-8220>

Citation:

Marchenko, V., Dombrovska, A. (2023). Blockchain technologies in digital economy: advantages and challenges. *The development of innovations and financial technology in the digital economy*: monograph. OÜ Scientific Center of Innovative Research. 2023. 230 p. PP. 189-206, <https://doi.org/10.36690/DIFTDE-2023-189-206>



This monograph's chapter is an open access monograph distributed under the terms and conditions of the [Creative Commons Attribution \(CC BY-NC 4.0\) license](https://creativecommons.org/licenses/by-nc/4.0/)



Abstract. Blockchain technology is known as one of the most transformative technologies of recent years, revolutionizing digital transactions and data storage. Originally developed as the underlying technology for Bitcoin, blockchain has since found numerous applications beyond cryptocurrencies, such as in supply chain management, identity verification, and smart contracts. In the digital economy, blockchain has the potential to significantly impact a wide range of industries and business models, from finance to healthcare and e-commerce. Blockchain issues have been developed by researchers who have focused on blockchain as the latest digital technology capable cause profound changes in society and are, to some extent, debatable. In particular, the work examines how blockchain and decentralized platforms have the potential to be powerful tools for managing large-scale social interactions and disrupting traditional power structures. However, it also cautions that the dominance of private interests within these distributed ecosystems could lead to the emergence of a stateless global society, posing significant risks. The purpose of the work is to explore the potential applications and impacts of blockchain technology in the digital economy, and to identify the opportunities and challenges that arise from the adoption of this technology in various sectors such as finance, healthcare, supply chain management, and intellectual property. Additionally, the work aims to provide insights into the role of blockchain technology in promoting digital transformation and innovation, and to assess the potential benefits and risks associated with the use of this technology in the context of the digital economy. It has been established that the use of blockchain in intellectual property can change the way creative works are protected, managed and monetized. It found that blockchain technology can be used to provide secure and transparent ownership records, automate licensing and royalty payments, and facilitate the identification of infringing uses. The main problems and limitations created by the use of blockchain technology are systematized: scalability, compatibility and regulatory regulation. As the technology continues to develop and evolve, it is imperative that these challenges are addressed in order to realize the full potential of blockchain. We believe that while blockchain technology is still in its early stages of development, it has the potential to transform various industries by providing secure, transparent and efficient data management solutions.

Keywords: blockchain, supply chain management, identity verification, smart contracts.

A key innovation of the implementation of distributed ledger technology (DLT) is a new model of trust that does not rely on the organizer's authority or the participants' trust, nor does it depend on the rules of a specific jurisdiction. In contrast to traditional systems, DLT systems generally do not require trusted third parties such as certification centers or timestamp services. Instead, the DLT system aims to act as a universal intermediary that facilitates direct interaction between transaction parties.

Several countries are already utilizing blockchain solutions to ensure the credibility of electronic data and documents independently of the state and specific commercial organizations. Notably, in a Bitcoin-style blockchain system, there is no official owner, jurisdiction, or operator that can be held accountable or accountable for claims and complaints, which can be both beneficial and detrimental depending on the circumstances and objectives.

Such uncertainty can be advantageous when attempting to bypass cross-border cooperation obstacles linked to state sovereignty and limit the ability of individual states to interfere in system management, seize information, and impose sanctions. A blockchain solution can be intentionally established as a neutral trusted intermediary "without citizenship." The absence of an official owner and operator makes it challenging for law enforcement agencies in a particular country to access the confidential information of DLT participants.

The fundamental distribution and decentralization of blockchain solutions make them highly resistant to the influence of certain states, which is why blockchain technology and distributed systems are becoming a vital new field in information technology development. They can be employed in various areas to address a wide range of problems. Blockchain technology, for example, can be adapted to carry out any transactions related to the registration, accounting, or transfer of various assets (financial, tangible, and intangible), regardless of the type, number, or geographic location of participants, potentially altering the model of public administration in the future [4].

One unique aspect of blockchain technology is the possibility of decentralized storage and processing of user and other data, making it an ideal solution for any

voting process. The technology can guarantee a considerably higher degree of security, including effective protection against cyber-attacks and misuse of personal data.

Blockchain technology can also be used in public administration systems, allowing for the maintenance of decentralized state registers, including registers of ownership of land and real estate, and serving as a file storage for massive amounts of information, enabling effective management of any assets or data through high transparency.

Blockchain is a decentralized, distributed ledger technology that provides a tamper-proof and transparent record of transactions. It has gained significant attention in recent years due to its potential applications in various fields, including finance, healthcare, logistics, and intellectual property. The technology enables secure and transparent data sharing among network participants without the need for intermediaries or central authorities.

One of the most significant features of blockchain is its immutability, which ensures that once a transaction is recorded, it cannot be altered or deleted. This makes the technology an ideal solution for applications that require high levels of security and data integrity. Blockchain operates on a peer-to-peer network, where all participants have access to the same data and can verify transactions in real-time, eliminating the need for intermediaries.

One of the key benefits of blockchain technology is its ability to provide a high level of security. Since the data is stored in a decentralized and distributed network, it is very difficult for hackers to tamper with the data. Furthermore, blockchain uses advanced cryptography techniques to ensure that the data is secure and encrypted.

Another benefit of blockchain technology is its transparency. All transactions are recorded on a distributed ledger, which is accessible to all parties. This means that there is a high level of transparency and accountability, as all parties can verify the data on the blockchain.

Blockchain technology has the potential to significantly improve efficiency in the digital economy. Since it eliminates the need for intermediaries, transactions can

be completed faster and at a lower cost. This can lead to increased productivity and lower costs for businesses and consumers.

Blockchain technology is decentralized, which means that it is not controlled by a single entity. This can help to reduce the risk of fraud and corruption, as there is no central authority that can manipulate the data.

Finally, blockchain technology has the potential to foster innovation in the digital economy. It can enable new business models, such as decentralized marketplaces and peer-to-peer lending platforms. It can also facilitate the development of new products and services that were not possible before.

As we see, the potential benefits of blockchain technology in the digital economy are numerous, but it also presents some challenges that need to be addressed.

One of the main challenges facing blockchain technology is scalability. As more users join the network, the number of transactions increases, which can lead to slower transaction times and higher fees. This is a particular challenge for public blockchains, which have many users.

Another challenge facing blockchain technology is regulation. Many countries have yet to develop a clear regulatory framework for blockchain and cryptocurrencies. This can make it difficult for businesses to operate in this space.

Blockchain technology is still in its early stages, and there are many different blockchain platforms and protocols. This can make it difficult for different blockchains to communicate and interact with each other.

Finally, blockchain technology can present challenges for energy consumption. The process of mining cryptocurrency requires a significant amount of computing power, which can be energy-intensive. This can lead to high energy costs and a large carbon footprint.

Considering the advantages and challenges posed by blockchain technology, there exist several domains where it has been actively implemented.

In contemporary business operations, *supply chain management* (SCM) has become a crucial component, encompassing intricate networks of suppliers,

manufacturers, distributors, and retailers. Nevertheless, conventional SCM systems frequently encounter issues of insufficient transparency, accountability, and security, resulting in operational inefficiencies and challenges. As a possible resolution to these problems, blockchain technology has surfaced, providing a decentralized, immutable, and secure platform to document and validate transactions throughout the supply chain. The current scientific work examines the potential advantages and hurdles of incorporating blockchain in SCM, with specific emphasis on its utilization in inventory management, logistics, and product tracking.

Supply chain management has become increasingly complex in the era of globalization, with companies relying on a network of suppliers, manufacturers, distributors, and retailers to deliver products and services to customers. However, traditional SCM systems often suffer from a lack of transparency, accountability, and security, leading to inefficiencies and operational challenges. For instance, inventory management can be hampered by inaccurate data, delayed information flows, and inefficient ordering processes. Logistics can be complicated by bottlenecks, delays, and errors in transportation and delivery. Product tracking can be hindered by counterfeiting, theft, and fraud. Blockchain technology offers a potential solution to these issues by providing a decentralized, immutable, and secure platform for recording and verifying transactions across the supply chain. In this work, we explore the potential benefits and challenges of using blockchain in SCM, with a focus on its applications in inventory management, logistics, and product tracking.

Blockchain is a distributed ledger technology that enables secure and transparent transactions without the need for intermediaries. It uses cryptography and consensus mechanisms to validate and record transactions, creating a tamper-proof and auditable record of all activities. Blockchain has been primarily associated with cryptocurrencies such as Bitcoin, but its potential applications extend far beyond the financial sector. In SCM, blockchain can provide a shared and transparent platform for recording and verifying transactions across the entire supply chain, improving efficiency, reducing costs, and enhancing trust.

One of the main benefits of blockchain in SCM is enhanced transparency and traceability. With a blockchain-based system, all parties in the supply chain can access the same information, creating a single source of truth for all transactions. This can reduce the risk of errors, disputes, and fraud, while also providing greater visibility into inventory levels, production processes, and delivery schedules. Blockchain can also facilitate real-time tracking of products, enabling companies to monitor their location, condition, and authenticity throughout the supply chain. This can improve product safety, reduce the risk of counterfeiting, and enhance customer trust.

Another benefit of blockchain in SCM is increased efficiency and cost savings. By eliminating intermediaries and reducing transaction costs, blockchain can streamline supply chain operations and reduce the time and cost of transferring goods and services. Blockchain can also enable automated and self-executing smart contracts, which can automatically trigger payments and orders based on predefined conditions, reducing the need for manual intervention and reducing the risk of errors.

Despite its potential benefits, blockchain in SCM also faces several challenges. One of the main challenges is the integration with existing systems and processes. Many SCM systems are highly complex and fragmented, making it difficult to integrate blockchain without significant disruption. Moreover, blockchain technology is still relatively nascent, and there is a lack of standardization and interoperability across different platforms and protocols.

Another challenge is the scalability of blockchain in SCM. As the number of transactions and participants in the supply chain grows, blockchain systems can become slower and more expensive to operate, requiring significant computational resources and energy consumption.

Identity verification is a critical process in the modern digital world, and with the advent of blockchain technology, it has become easier and more secure. Blockchain is a distributed ledger technology that enables decentralized verification and management of transactions. The unique characteristics of blockchain, such as

immutability, transparency, and decentralization, make it an ideal platform for identity verification.

Identity verification using blockchain involves creating a digital identity that is stored on the blockchain network. The digital identity consists of a set of attributes that can be verified by multiple parties. These attributes can include personal information such as name, date of birth, and address, as well as other information such as educational qualifications and work experience.

The process of creating a digital identity on the blockchain involves several steps. First, the user creates a digital identity that includes their personal information and other relevant details. This identity is then verified by a trusted third party, such as a government agency or a financial institution. Once the verification is complete, the digital identity is stored on the blockchain, where it can be accessed and verified by authorized parties.

One of the key advantages of using blockchain for identity verification is its immutability. Once a digital identity is stored on the blockchain, it cannot be altered or deleted. This ensures that the identity is secure and cannot be tampered with. Additionally, the decentralized nature of the blockchain means that there is no central authority controlling the identity verification process, which reduces the risk of fraud and ensures greater trust in the system.

Another advantage of using blockchain for identity verification is its transparency. The blockchain provides a public ledger of all transactions, which means that any authorized party can access and verify a user's digital identity. This transparency also enables greater accountability, as all transactions are recorded and can be audited if necessary.

One potential application of blockchain-based identity verification is in the financial industry. Banks and other financial institutions are required to comply with Know Your Customer (KYC) regulations, which require them to verify the identity of their customers. Blockchain-based identity verification can streamline this process, reducing the time and cost required to comply with KYC regulations.

Overall, identity verification using blockchain has the potential to revolutionize the way we verify identity in the digital age. Its unique characteristics of immutability, transparency, and decentralization make it an ideal platform for secure and trustworthy identity verification. As blockchain technology continues to evolve, we can expect to see more applications of this technology in the field of identity verification and beyond.

Smart contracts have emerged as one of the most promising applications of blockchain technology. Smart contracts are self-executing contracts that allow for the automated enforcement and performance of contractual obligations. They are implemented on blockchain technology, which provides a tamper-proof and transparent record of transactions. Smart contracts have the potential to revolutionize the way contracts are executed, as they eliminate the need for intermediaries and provide a faster, more secure, and cost-effective alternative to traditional contract execution. This work provides an overview of smart contracts, including their definition, features, advantages, and challenges. It also explores their potential applications in various sectors, such as finance, healthcare, supply chain management, and real estate.

Contracts are essential to commercial activities and provide the foundation for economic transactions. However, traditional contract execution is often slow, costly, and prone to disputes. The emergence of blockchain technology has led to the development of smart contracts, which offer a faster, more secure, and cost-effective alternative to traditional contract execution. Smart contracts are self-executing contracts that run on blockchain technology and allow for the automated enforcement and performance of contractual obligations. They have the potential to revolutionize the way contracts are executed, as they eliminate the need for intermediaries and provide a transparent and tamper-proof record of transactions.

Smart contracts are computer programs that run on blockchain technology and execute contractual obligations automatically. They are self-executing, which means that once the conditions of the contract are met, the contractual obligations are automatically performed. Smart contracts are also decentralized, which means that

they run on a peer-to-peer network and do not require intermediaries or central authorities to enforce the contract. They are also transparent, as the contract code is visible to all network participants, and tamper-proof, as the blockchain technology ensures that the contract code cannot be modified once it is deployed.

Smart contracts offer several advantages over traditional contract execution. They are faster, as they can be executed automatically once the conditions of the contract are met, without the need for manual intervention. They are also more secure, as they are encrypted and stored on a tamper-proof blockchain, which ensures that the contract code cannot be modified once it is deployed. Smart contracts are also cost-effective, as they eliminate the need for intermediaries and reduce transaction costs. They are also more transparent, as the contract code is visible to all network participants, which reduces the risk of disputes and fraud.

Despite their potential advantages, smart contracts face several challenges. One of the challenges is the complexity of the contract code, which requires specialized knowledge and expertise to develop and deploy. Smart contracts also face regulatory challenges, as they are not yet fully recognized by legal systems, which raises questions about their enforceability and liability. Another challenge is the scalability of blockchain technology, which can limit the number of transactions that can be processed by the network.

Smart contracts have the potential to revolutionize the way contracts are executed in various sectors. In the finance sector, smart contracts can be used for automated payment processing, securities trading, and insurance claims processing. In healthcare, smart contracts can be used for secure and transparent sharing of medical data and automated insurance claim processing. In supply chain management, smart contracts can be used for automated tracking and tracing of goods and automated payment processing. In real estate, smart contracts can be used for automated property transactions and automated escrow services.

Smart contracts offer a faster, more secure, and cost-effective alternative to traditional contract execution. They eliminate the need for intermediaries and provide a transparent and tamper-proof record of transactions. Smart contracts have the

potential to revolutionize the way contracts are executed in various sectors, such as finance, healthcare, supply chain management, and real estate. Despite their potential advantages, smart contracts face several challenges, such as regulatory challenges, complexity of the contract code, and scalability of blockchain technology.

Smart contracts offer several advantages over traditional contracts. First, they eliminate the need for intermediaries such as lawyers, banks, and brokers, which can reduce costs and streamline the contracting process. Second, they increase transparency and trust by providing a verifiable record of all transactions on the blockchain. Finally, they reduce the risk of fraud and errors by automating the execution of contracts.

One of the most common applications of smart contracts is in financial services. Smart contracts can be used to create automated financial instruments such as insurance policies, derivatives, and loans. For example, a smart contract can be programmed to automatically transfer funds to a borrower when certain conditions, such as the repayment of a loan, are met.

Another application of smart contracts is in supply chain management. Smart contracts can be used to track and verify the authenticity of goods as they move through the supply chain. For example, a smart contract can be programmed to automatically release payment to a supplier when a shipment of goods is received and verified as authentic by the buyer.

Smart contracts can also be used around digital identity management. Smart contracts can be used to create decentralized identity systems that are more secure and privacy-preserving than traditional centralized identity systems. For example, a smart contract can be programmed to only release certain personal information to authorized parties, such as employers or government agencies.

Despite the many advantages of smart contracts, there are also several challenges to their widespread adoption. One challenge is the complexity of writing and deploying smart contracts, which requires a high level of technical expertise. Another challenge is the lack of standardization and interoperability between

different blockchain networks, which can make it difficult to create smart contracts that can be executed across multiple platforms.

Blockchain technology has been a game-changer for the financial industry, providing numerous benefits such as increased efficiency, reduced costs, and enhanced security. The technology has disrupted traditional financial systems by enabling decentralized, trustless transactions that can be executed without the need for intermediaries.

The financial sector has witnessed a major implementation of blockchain technology in payment systems. Blockchain-based payment systems have a range of benefits compared to conventional payment systems, including faster transaction processing, lower fees, and increased security. For example, cryptocurrencies such as Bitcoin and Ethereum use blockchain technology to enable peer-to-peer transactions that can be executed without the need for a central authority.

In the field of finance, blockchain technology finds additional application in capital markets, where it can facilitate more streamlined and transparent trading of financial instruments, including stocks and bonds. The utilization of blockchain-based securities can potentially result in greater efficiency and expediency in trade execution. Through the incorporation of smart contracts, trade execution can be automated, decreasing the requirement for intermediaries and enhancing the precision and speed of transactions.

Blockchain technology can also be used to create more efficient and secure record-keeping systems. For example, blockchain-based ledgers can be used to track the ownership and transfer of assets such as real estate, intellectual property, and even art. These ledgers are tamper-proof, transparent, and decentralized, making them more secure and less susceptible to fraud or hacking.

The financial sector has recognized the potential of blockchain technology as a viable solution for identity management. By utilizing blockchain-based identity systems, personal data can be managed in a more secure and private manner, thereby diminishing the risk of fraud, including identity theft. The systems can be leveraged

to authenticate the identity of individuals and organizations, ensuring secure and efficient access to financial services and other related resources.

Despite the many benefits of blockchain technology in finance, there are also several challenges to its widespread adoption. One of the biggest challenges is regulatory uncertainty, as many countries have yet to develop clear guidelines for the use of blockchain technology in finance. Additionally, the technology is still relatively new and complex, requiring a high level of technical expertise to implement and maintain.

As we see blockchain technology has the potential to transform the financial industry by enabling faster, more efficient, and more secure transactions. Its applications in payment systems, capital markets, record-keeping, and identity management offer numerous benefits to individuals and businesses alike. As blockchain technology continues to evolve, we can expect to see more innovative applications and use cases in the financial industry and beyond.

The potential impact of blockchain technology on the healthcare industry is substantial, as it offers a secure, transparent, and efficient means of managing patient data and transactions. Through the creation of decentralized systems, patients, healthcare providers, and other stakeholders can securely access and share health information.

One of the most significant applications of blockchain technology in healthcare pertains to medical records management. The deployment of blockchain-based medical records offers patients more control over their health information and allows healthcare providers to access patient records more efficiently. The use of blockchain-based medical records also has the potential to reduce errors and prevent fraud by providing a tamper-proof and auditable record of patient data.

Furthermore, blockchain technology can facilitate the creation of more efficient and secure systems for managing clinical trials. By implementing blockchain-based clinical trial management systems, the healthcare industry can enhance the security and transparency of patient data management, as well as improve monitoring of trial progress and results. Blockchain-based systems can also potentially reduce the cost

and time required to conduct clinical trials, thereby ultimately improving patient outcomes.

Another application of blockchain technology in healthcare is in the area of supply chain management. Blockchain-based supply chain management systems can enable more efficient tracking and tracing of medical products, such as pharmaceuticals and medical devices. Blockchain-based systems can also help prevent counterfeiting and ensure the authenticity of medical products.

Blockchain technology can also be used to create more efficient and secure systems for managing medical payments and insurance claims. Blockchain-based payment systems can enable faster, more secure, and more cost-effective payment processing, while blockchain-based insurance claims systems can help reduce fraud and improve the accuracy of claims processing.

Despite the many benefits of blockchain technology in healthcare, there are also several challenges to its widespread adoption. One of the biggest challenges is regulatory uncertainty, as many countries have yet to develop clear guidelines for the use of blockchain technology in healthcare. Additionally, the technology is still relatively new and complex, requiring a high level of technical expertise to implement and maintain.

The utilization of blockchain technology presents intriguing and auspicious possibilities for storing, transmitting, and managing data. Several blockchain projects have already been implemented, such as IRYO, a platform for managing electronic medical records using the EOS blockchain. CareX is another project that aims to streamline healthcare payments through its own token, which addresses the growing need for cross-border transfers and reduces reliance on cash transactions. The platform also allows token owners to store their medical information in a secure and private manner, while providing access to a chatbot with artificial intelligence for preliminary diagnoses. Additionally, SmartHealthCareToday is a platform that integrates personal medical data, including electronic medical cards and personal medical cards, with information about a patient's lifestyle and medical parameters such as blood pressure and glucose levels. The platform also allows for customized

access to health data through an in-app feature. According to research conducted by Brdt.pro lab, there are currently over 20 blockchain-based solutions for managing and storing medical data, making it the most popular field of development in the healthcare industry [9].

In conclusion, blockchain technology has the potential to transform the healthcare industry by providing more secure, efficient, and transparent systems for managing patient data, clinical trials, supply chains, and payments. Its applications in healthcare offer numerous benefits to patients, healthcare providers, and other stakeholders. As blockchain technology continues to evolve, we can expect to see more innovative applications and use cases in the healthcare industry and beyond.

The e-commerce industry holds immense potential for transformation through the use of blockchain technology, as it offers a secure, transparent, and efficient way to manage transactions and data. Decentralized systems can be established through blockchain technology, enabling stakeholders such as buyers, sellers, and other entities to securely access and share information.

One of the most notable applications of blockchain technology in e-commerce relates to payment systems. Through the utilization of blockchain-based payment systems, transactions can be processed more securely and efficiently, while also reducing fees and facilitating faster settlement times. Cryptocurrencies such as Bitcoin and Ethereum leverage blockchain technology to facilitate peer-to-peer transactions without the need for a central authority.

In addition, blockchain technology has potential applications in supply chain management within the e-commerce industry. Blockchain-based supply chain management systems can provide more efficient tracking and tracing of products, as well as transparent inventory and shipping management. Such systems also have the potential to prevent counterfeiting and ensure the authenticity of products.

Blockchain technology can also be used to create more efficient and secure systems for managing customer data. Blockchain-based customer data management systems can enable more secure and private management of customer data, reducing the risk of data breaches and other forms of fraud. These systems can also enable

more personalized marketing and customer service, ultimately improving the customer experience.

Another application of blockchain technology in e-commerce is in the area of digital identity management. Blockchain-based identity systems can enable more secure and private management of personal data, reducing the risk of identity theft and other forms of fraud. These systems can also be used to verify the identity of buyers and sellers, enabling more secure and efficient transactions.

Despite the many benefits of blockchain technology in e-commerce, there are also several challenges to its widespread adoption. One of the biggest challenges is regulatory uncertainty, as many countries have yet to develop clear guidelines for the use of blockchain technology in e-commerce. Additionally, the technology is still relatively new and complex, requiring a high level of technical expertise to implement and maintain.

The e-commerce industry holds significant potential for transformation through blockchain technology, as it offers more secure, efficient, and transparent systems for managing transactions and data. The technology's applications in payment systems, supply chain management, customer data management, and digital identity management provide a range of benefits for stakeholders such as buyers, sellers, and other entities.

As blockchain technology advances, the e-commerce industry and other sectors can anticipate more innovative applications and use cases. The transformative potential of blockchain technology in e-commerce and beyond is significant, and its adoption could lead to enhanced security, efficiency, and transparency in various domains [7].

The application of blockchain in intellectual property has been gaining significant attention in recent years. In particular, the technology can be used to verify the authenticity of ownership and store original works. Copyright ownership can be challenging to prove, especially for digital works, and monitoring usage and monetizing creative content can be difficult for authors. With blockchain, copyrights can be created automatically upon the creation of qualifying original work,

eliminating the need for registration. This enables authors to search multiple sources to identify infringing usage and make licensing easier, thus serving as an enforcement tool.

The blockchain has the potential to be utilized for intellectual property (IP) related purposes, particularly in verifying the authenticity of ownership. Proving ownership of a creative work, such as a recorded song or photograph, can be difficult due to the lack of official documentation and the burden of proof falls on the creator. With the prevalence of the internet, copyright enforcement has become even more challenging, as anyone can easily download and use creative content without permission.

In various situations, such as patenting an invention, proving the date of content creation is crucial and requires reliable evidence. Trusted timestamping protocols, which rely on asymmetric cryptography, are often used to demonstrate that data has remained unchanged since a specific point in time [8].

Blockchain can help solve the challenge of verifying copyright ownership and storing original works. It can be challenging for authors to prove ownership of their works and monitor usage, making it difficult to monetize their creations successfully. However, with blockchain, copyrights can be created automatically upon the creation of qualifying original work, eliminating the need for registration. With a blockchain-based registration system, IP owners can search multiple sources to identify infringing usage and make licensing easier, thus serving as an enforcement tool.

Another potential application of blockchain in intellectual property is the use of smart contracts, which are self-executing contracts with the terms of the agreement written into code. Smart contracts can be used to automate various aspects of the copyright process, such as licensing and royalty payments. This can reduce the administrative burden on authors and improve the efficiency of the copyright system.

In conclusion, blockchain technology represents a significant innovation in the field of decentralized and secure data management. By providing a transparent, tamper-proof and immutable ledger of transactions, blockchain has the potential to transform various industries by streamlining processes and improving data security.

The distributed nature of blockchain ensures that transactions are validated by a network of participants, eliminating the need for intermediaries and central authorities.

The potential applications of blockchain are vast and varied, with promising use cases in finance, healthcare, logistics, and intellectual property. In finance, blockchain technology has the potential to revolutionize the traditional banking system by providing a more secure and transparent platform for financial transactions. In healthcare, blockchain can be used to store and manage medical records in a secure and decentralized manner, allowing patients to have greater control over their personal data. In logistics, blockchain can improve supply chain management by providing real-time tracking and transparency.

Furthermore, the use of blockchain in intellectual property has the potential to transform the way creative works are protected, managed, and monetized. Blockchain technology can be used to provide secure and transparent records of copyright ownership, automate licensing and royalty payments, and enable easier identification of infringing usage.

Despite its potential, however, blockchain technology also presents significant challenges and limitations that need to be addressed. These include scalability, interoperability, and regulatory issues. As the technology continues to develop and mature, it is crucial to address these challenges to fully realize the potential of blockchain.

Overall, the emergence of blockchain technology represents an exciting development in the world of decentralized data management. While the technology is still in its early stages of development, it has the potential to transform various industries by providing secure, transparent and efficient data management solutions. As research and development continue to progress, it will be interesting to see how blockchain technology evolves and how it will impact society in the years to come.

References:

1. Atzori, M. (2017). Blockchain Technology and Decentralized Governance: is the State Still Necessary? *Journal of Governance and Regulation*, 6(1), 45-62. https://virtusinterpress.org/IMG/pdf/10.22495_jgr_v6_i1_p5.pdf
2. Swan Melanie. *Blockchain: Blueprint for a New Economy* / Melanie Swan - Sebastopol CA : O'Reilly Media, 2015. – 152 p.
3. D. & A. Tapscott. *Blockchain revolution: How the Technology Behind Bitcoin is Changing Money, Business, and the World*. URL : <http://dontapscott.com/books/blockchain-revolution>
4. Danylchenko O. Blokchein: yuryst yz mashyny // [Blockchain: lawyer from the car] // ЮРИСТ&ЗАКОН. 2017. № 21. June. URL : http://uz.ligazakon.ua/magazine_article/EA010438
5. Kravchenko P. Blokcheyn i detsentralizovannyye sistemyi [Blockchain and decentralized systems]: textbook for students of institutions of higher education: in 3 parts. Part 1 / P. Kravchenko, B. Scriabin, O. Dubinina. - Kharkov: PROMART, 2018. – 408 p. : ill. 185; tab. 13; bibliography: 30 titles. (In Russian).
6. Miriam Stankovich. Is Intellectual Property Ready for Blockchain? - [E-resource]. – Access mode: <https://dai-global-digital.com/is-intellectual-property-ready-for-blockchain.html>
7. Sumit Prasad. The Future of Blockchain in Intellectual Property - [E-resource]. – Access mode: <https://www.automation.com/en-us/articles/january-2021/the-future-of-blockchain-in-intellectual-property>
8. Yuefei Caro, Hajme Nobuhara. A Decentralized Trusted Timestamping Based on Blockchain. - [E-resource]. – Access mode: https://www.researchgate.net/publication/272359313_Decentralized_Trusted_Timestamping_using_the_Crypto_Currency_Bitcoin
9. Blockchain v meditsine. Primeryi ispolzovaniya tehnologii [Blockchain in medicine. Examples of the use of technology]. (In Russian). See at: <https://medium.com/@brdt.pro/blockchain-v-медицине-примеры-использования-технологии-29fae16c5050>
10. *Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction* / Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, Steven Goldfeder: Princeton University Press, 2016. – 304p.
11. Mihus, I. (2022). Evolution of practical use of blockchain technologies by companies. *Economics, Finance and Management Review*, (1), 42–50. <https://doi.org/10.36690/2674-5208-2022-1-42>.