BLOCKCHAIN AND THE DIGITALIZATION OF TRADITIONAL INDUSTRIES: NEW TRENDS AND CHALLENGES FOR THE FUTURE OF THE ECONOMY

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Abstract. The article examines the transformational trends determining the digitalization of traditional sectors of the economy, with a special focus on the integration of blockchain technologies. As industries such as finance, logistics, and manufacturing increasingly embrace these innovations, blockchain plays a key role in increasing transparency and security. The paper analyzes how digital technologies are designed to revolutionize processes, from accelerating supply chain management to optimizing smart contracts and asset management. However, this path is not without difficulties. The problems of introducing these technologies into established business models are also discussed and, based on a detailed analysis of various statistical data, a forecast is made regarding the role of blockchain in the future of the digital economy.

Keywords: blockchain technology, digital transformation, financial technology, cryptocurrency, supply chains

JEL Classification: O33, D82, L86, O25

INTRODUCTION

Blockchain technology appeared a few years ago and immediately opened up new perspectives for data exchange. Blockchain technology has led to the emergence of new methods for securing data transactions and increasing transparency in digital systems. The decentralized structure of blockchain ensures that data is protected from external changes, which makes it particularly attractive for various industries. As digitalization continues to transform traditional business processes, blockchain serves as a key enabler of this transition, especially in the fields of finance, logistics, and healthcare. However, blockchain remains an experimental technology — many problems of its use have not yet been solved.

The study examines the digital transformation driven by blockchain, its adoption in various industries, and the challenges and opportunities it presents. Existing literature highlights the essential role of blockchain in reducing transaction costs, increasing operational transparency, and improving data security. However, widespread adoption remains difficult due to technical integration issues, security concerns, and regulatory uncertainty.

The research addresses key questions such as: How does blockchain technology reduce operational costs and stimulate innovation? What barriers do traditional industries face in adopting blockchain and how can these issues be addressed? The study also reflects on the impact of emerging technologies, such as artificial intelligence (AI) and the Internet of Things (IoT), on complementing

blockchain to facilitate further digital transformation. Through a critical analysis of relevant literature, this study makes a new contribution to the transformative role of blockchain in various fields.

MAIN CONTENT

1. Materials and Methods

1. This study used qualitative and quantitative research methodologies to explore the role of blockchain in digital transformations. Primary data was collected through market analyses, industry reports, and case studies from sources such as Statista, PwC, and Deloitte. Interviews were conducted with experts from various sectors, including finance, healthcare, and logistics, to gain insights into real-world blockchain applications.

Secondary data sources included academic articles, government reports, and industry publications from various sectors. The study examines how blockchain is integrated into existing systems and assesses both the challenges and successes encountered during this integration process. The collected data is analyzed using a comparative approach to establish connections between blockchain adoption and the operational efficiencies it provides.

2. Results and Discussion

2.1 Blockchain Adoption Trends. Blockchain adoption has seen significant growth across various industries, particularly in finance, logistics, and healthcare.

The table below highlights the trends in blockchain adoption in the financial sector and demonstrates the reduction in transaction costs over the years.

Table 1: Blockchain Adoption in Financial Transactions

Year	Adoption Rate (%)	Transaction Cost Reduction (%)
2020	45%	30%
2021	50%	35%
2022	60%	40%
2023	70%	50%

Source: *PwC Blockchain Adoption Survey 2023*

This table shows the year-over-year adoption rate and transaction cost reduction in the financial sector due to blockchain implementation. In the financial sector, blockchain is transforming the way transactions are processed by reducing costs and increasing efficiency.

In logistics, blockchain is used to enhance supply chain transparency, streamline operations, and ensure the security of product data. In 2020, only 19% of companies utilized blockchain for supply chain tracking, but by 2023, this figure had increased to 55%. The figure below illustrates this rapid adoption trend in logistics.

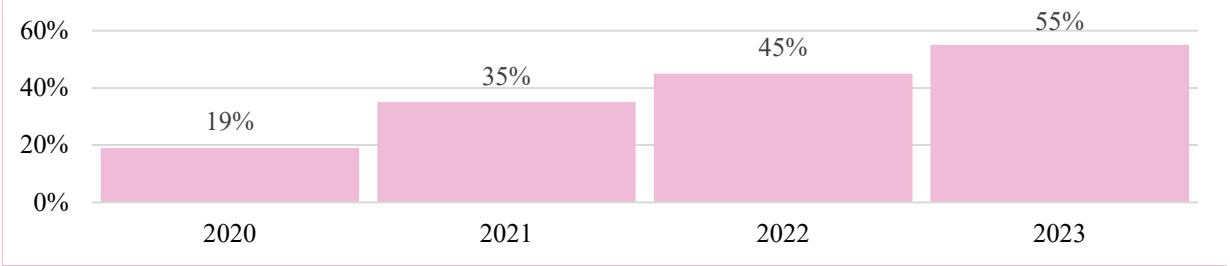

Figure 1: Blockchain Adoption in Supply Chain Management

Source: *Deloitte Supply Chain Survey 2023*

2.2 Advantages of Blockchain Technology. The main advantage of blockchain is its ability to provide decentralized and immutable data storage. In the financial sector, blockchain has significantly reduced transaction costs, which has led to substantial savings for large organizations. By 2025, 95% of financial organizations will use blockchain in their processes.

In the healthcare sector, blockchain has been increasingly implemented for storing patient data. By 2025, over 50% of healthcare institutions are expected to adopt blockchain for managing medical records. The decentralized nature of blockchain ensures that patient data is protected from unauthorized access, while allowing authorized parties to access the information.

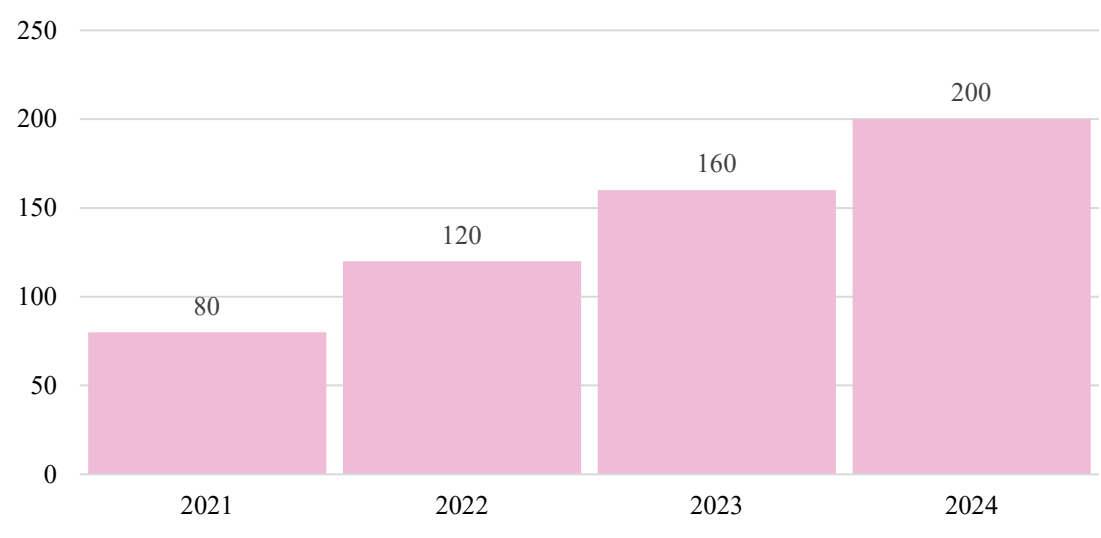

Figure 2: Number of Cyberattacks on Blockchain Platforms (2021-2024)
Source: *CipherTrace Report 2023*

Another challenge is the legal and regulatory framework surrounding blockchain. This figure tracks the increase in cyberattacks on blockchain platforms over the years, illustrating the growing concern over security. While 35% of countries had clear regulations regarding cryptocurrencies in 2021, this figure is expected to rise to 80% by 2025. However, the lack of consistent regulations across jurisdictions creates uncertainty for businesses looking to adopt blockchain technologies. Legal clarity will be essential for fostering a global blockchain ecosystem.

CONCLUSIONS

The research findings indicate that blockchain technology significantly contributes to the digitalization of traditional sectors, especially in the fields of finance, healthcare and logistics. Blockchain technology reduces transaction costs, increases data transparency and security, thereby increasing operational efficiency. However, to ensure the successful adoption of blockchain across industries, challenges related to security risks, regulatory uncertainty and integration with existing systems need to be addressed.

The research concludes that blockchain has enormous potential to revolutionize digital economies, but its large-scale implementation will require overcoming technical, legal and security challenges. Future research should focus on developing solutions to these problems and exploring new areas where blockchain can be integrated, such as education and government services. The synergy of blockchain with other technologies such as artificial intelligence and IoT will further accelerate the digital transformation of industries.

RECOMMENDATIONS

1. **Enhanced Security Measures**: As blockchain adoption grows, especially in the financial sector, companies must prioritize strengthening cybersecurity protocols. Given the rise in attacks on cryptocurrency platforms, businesses should invest in advanced security technologies, regular audits, and real-time monitoring to protect blockchain systems from vulnerabilities.
2. **Development of Global Regulatory Standards**: Governments and regulatory bodies should work together to establish clear and consistent regulations for blockchain and cryptocurrency use. As shown in **Table 1**, only **35% of countries** had blockchain regulations by **2021**, indicating a significant gap in legal frameworks. Creating universal guidelines would foster innovation and ensure the safe and legal application of blockchain technology.
3. **Education and Training**: As blockchain technology continues to disrupt industries, it is crucial to educate and train the workforce on its applications and security considerations. Universities and professional institutions should offer more specialized programs to build a skilled workforce capable of handling the technical, regulatory, and security challenges posed by blockchain adoption.
4. **Investment in Research and Development**: Companies, especially in the healthcare and logistics sectors, should increase investment in blockchain research and development. The potential for blockchain to improve operational efficiency, reduce costs, and enhance data security is immense. Increased investment in R&D will accelerate the adoption of blockchain solutions tailored to specific industry needs.
5. **Cross-Sector Collaboration**: It is essential for businesses in various sectors to collaborate and share best practices for blockchain integration. As blockchain technology matures, cross-industry partnerships can help address shared challenges such as security risks, regulatory uncertainties, and system integration, while maximizing the potential benefits.

In conclusion, while blockchain presents significant opportunities for various industries, strategic actions to address security concerns, regulatory gaps, and skills development are crucial. By implementing these recommendations, businesses and governments can fully leverage blockchain technology to enhance efficiency, transparency, and innovation in the coming years.

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