



# Scientific Econometric Analysis of Blockchain in Digital Economy and Transactions

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**Abstract.** With the progress of science and technology, the economy and transactions are also undergoing digital transformation. As an important technology, blockchain technology has a huge impact on the digital transformation of the economy and transactions. This article discusses the digital economy and transactions under blockchain technology, aiming to draw the main countries, sources, themes, and visualizations of related research based on 332 articles in the Web of Science (WoS) database. This article will provide ideas and suggestions for future research. The results show that the Russian Federation, China, and Ukraine are the main research countries. The research hotspots mainly focus on the digital economy, blockchain technology, digitization, and other aspects. Digital and Industry 4.0 have become new research trends. Blockchain technology currently requires continuous innovation to cope with the rapid development of the digital economy and transactions.

**Keywords:** Digital economy, blockchain technology, digital economy transactions

## 1 Introduction

Blockchain technology has emerged as a game-changer in the digital economy, offering decentralization, transparency, and security. Its potential impact is being widely recognized in various industries[1]. The emergence of cryptocurrencies and blockchain technology has indeed sparked a wave of enthusiasm among early supporters, who see it as a catalyst for a new digital era. Recent data from WoS indicates a wide range of research fields related to blockchain technology in foreign countries, such as healthcare, digital currency, and artificial intelligence. This article focuses on the research field of digital economy and transactions, highlighting the integration of innovative technologies like artificial intelligence and blockchain into economic activities, thereby reshaping traditional business models. The potential of blockchain technology to revolutionize various industries is being recognized and explored on a global scale. [2]. The integration of

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J. Liao et al. (eds.), *Proceedings of the 2024 2nd International Conference on Digital Economy and Management Science (CDEMS 2024)*, Advances in Economics, Business and Management Research 292,

[https://doi.org/10.2991/978-94-6463-488-4\\_46](https://doi.org/10.2991/978-94-6463-488-4_46)

new technologies is pivotal in enhancing social and economic quality and efficiency, as well as in reshaping core competitiveness in the current technological revolution[3]. Its potential impact on trade facilitation and dispute resolution within the WTO system is significant[4]. Blockchain technology is increasingly integrated into the digital economy, offering solutions for trade disputes, multilateral trade promotion, and efficiency improvements. Companies like Nestle are already leveraging blockchain to enhance supply chain transparency and reduce transaction costs[5]. This article offers a thorough analysis of blockchain technology's integration into the digital economy, emphasizing its impact on enterprise strategic goals, labor resource allocation, business process management, organizational management, and transportation and logistics. The research underscores the pivotal role of blockchain in today's globalized and digitized landscape, presenting opportunities for digital transactions, technological innovation, and industrial evolution[6].

## 2 Data and Methods

This article adopts scientific measurement standards for research. Scientific econometric analysis refers to the use of mathematical and statistical methods. To quantitatively analyze the interdisciplinary nature of all knowledge carriers. It is a comprehensive knowledge body that integrates mathematics, statistics, and literature, emphasizing quantification.

To obtain literature on the digital economy and blockchain technology, we used a comprehensive multidisciplinary core journal citation index database, Web of Science (WoS). Under the query design designed by professionals, the search criteria were focused on keywords from 1985 to 2024, with advanced search queries TS=(“digital economy” or “digital transactions”) and TS=(“Blockchain”). As of January 3, 2024, a total of 141 articles (including SCI-EXPANDED and SSCI) were collected.

In the later stages, VOSviewer and Bibliometric software were used for mapping validation, and interpretation of the generated visualization effects.

## 3 Research Findings

This article introduces research trends, main countries, sources, and author keywords related to this topic for data and visual analysis.

### 3.1 Annual Scientific Production and Related Statistics

According to the discount chart created by bibliometric software, there were only a few articles on annual scientific output and related statistical data in 2001. Since 2016, this number has significantly increased year by year, with the largest increase occurring from 2017 to 2020, and this upward trend is expected to continue. Descriptive analysis showed a total of 1708 citations, with an average citation frequency of 5.14 per article, an h-index of 20, and several results found of 332.

### 3.2 Main countries and Sources

This paper will organize and analyze the research article information for this project. The data of figure 1 shows that Russia currently has the largest number of research articles, followed closely by China. The most researched areas after data integration in various countries are digital electronics and artificial intelligence. Then, classify the themes by time to obtain the evolution diagram of the themes, as shown in Figure 2: before 2019, there were many themes, but during the period from 2020 to 2021, many previous themes were summarized as a major theme of the digital economy, which accounted for a large part of the research content during that period. In 2022-2023, Industry 4.0 once again emerged as a major research topic, with a focus on digital themes. So the themes of 4.0 and numbers are highly likely to still hold a significant position in future research.

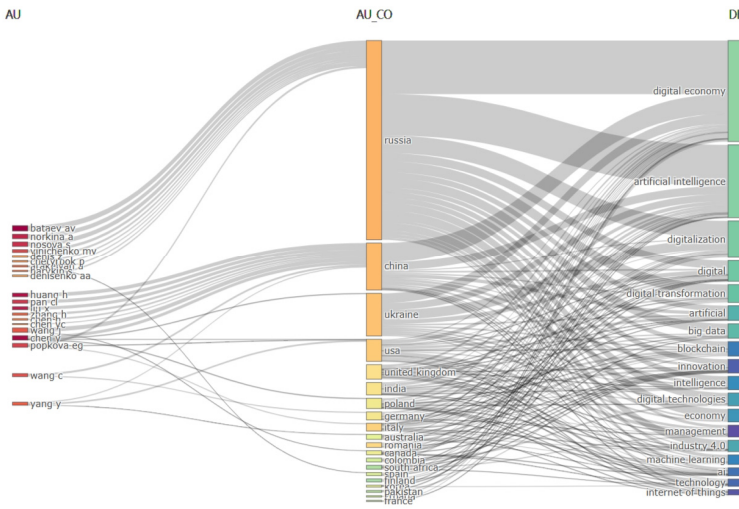


Fig. 1. Three-Fields Plot

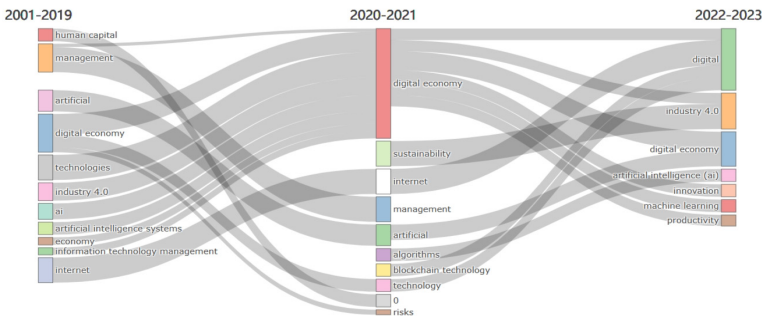


Fig. 2. Thematic evolution map



This exploration explores how the focus and theme are interrelated. Figure 4 shows the co-occurrence network of the author's keywords, and we have identified three clusters. The Red Cluster (Digital Economy) mainly explores how to make significant contributions to the economy through the digital economy[7] in areas such as artificial intelligence, blockchain, and management. The blue cluster (artificial intelligence) consists of technologies, productivity, sustainability, deployment, inequality, and the future. The literature mentions the use of blockchain technology to facilitate and improve efficiency in digital economy trade and conducts case studies on it[2]. Green innovation includes keywords such as digital transformation, internet, and economic information. Three key issues in data transactions[8] are worth paying attention to data rights, data pricing, and privacy calculation.

## 4 Conclusion

Through the integration of the above information, we use data to indicate that research on blockchain in the field of digital economy has been on the rise in recent years, which also indicates the direction of future development. Some applications are also becoming mature, but there is still much room for exploration and improvement in new fields. The focus and themes of research are interconnected to form a huge network, and this network diagram also points out the center of our research: the digital economy. Whether the utilization value of blockchain in the digital economy will shift in the future still needs continuous attention, but it can be seen that related research is just beginning, and there are still many opportunities in the future.

## Acknowledgement

This study is primarily funded by the Education Department of Guangdong Province, with the grant number SJYLKC2003, titled "API, Machine Learning, and Artificial Intelligence." Additionally, support is provided by the Philosophy and Social Science Planning Project of Guangdong Province, with grant number GD23XYJ55, focusing on the "Research on the Formulation and Implementation Issues of Sustainable Disclosure Standards with Chinese Characteristics." Partial responsibility for this research is undertaken by Guangzhou South China University.

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