Analysing the theoretical connotation and practical path of blockchain technology affecting the digital economy——Evidence from China

Zongting Li [1*], Xiaowen Zou [2,a], Yanran Ge [1,b]

[1]School of Economics, Wuhan University of Technology, Wuhan, 430070, Hubei, China
[2]School of Finance, Zhongnan University of Economics and Law, Wuhan, 430073, Hubei, China

*Corresponding authors: 582260733@qq.com; [a]2756166615@qq.com; [b]hzcmtxyy123@126.com

Abstract. By exploring the impact of blockchain technology on the digital economy, this paper demonstrates the theoretical connotation and practical path of blockchain technology in promoting the development of the digital economy. The study focuses on how blockchain can promote the growth of the digital economy by solving the problem of data property rights attribution, facilitating information flow and transactions, and supporting the construction of new digital infrastructure. The article employs panel data from 30 provinces and cities in China from 2011 to 2022, and verifies the positive impact of blockchain technology on the digital economy by constructing a regression model. The findings show that blockchain technology effectively reduces transaction costs and improves market efficiency through its decentralised, tamper-proof and highly transparent characteristics, thus providing solid technical support for the healthy development of the digital economy. The innovation of this paper is that it systematically analyses how blockchain technology can comprehensively solve the key problems in the digital economy, and puts forward corresponding policy recommendations to support the research, development and application of blockchain technology. This not only provides a new perspective for theoretical research, but also provides guidance for practical application.

Keywords: blockchain; digital economy; technology risk

1 INTRODUCTION

The idea of the digital economy was first introduced by Don Tapscott in his 2014 book[1], The Digital Economy: Opportunities and Challenges in the Age of Smart Connectivity. However, the concept of the digital economy didn't really begin to take shape until 1998, when the U.S. Department of Commerce released the report "The Emerging Digital Economy," which noted that one-third of the U.S.'s three consecutive years of economic growth up to 1998 had come from the digital economy. This report marked the formal establishment of the concept of digital economy.

A. Haldorai et al. (eds.), *Proceedings of the 2024 3rd International Conference on Artificial Intelligence, Internet and Digital Economy (ICAID 2024)*, Atlantis Highlights in Intelligent Systems 11,
https://doi.org/10.2991/978-94-6463-490-7_58

In the G20 Initiative on Digital Economy Development and Cooperation released by China in 2017, the Initiative defines the digital economy as a new economic form with science and technology as the core driving force, data as the fifth factor of production, and the construction of information systems and the development of networks as the carrier to promote the integration of the digital economy with the real economy and accelerate the digital penetration rate of industries.2021 The May 2021 release of the National Bureau of Statistics (NBS) of the Digital Economy and its Core Industry Statistical Classification (2021) was further refined. It states that the digital economy is a series of economic activities in which data resources are used as key production factors, modern information networks are used as important carriers, and the effective application of ICT is used to promote efficiency improvement and optimisation of conomic structure. This constantly enriched and clear definition shows that the digital economy is constantly evolving and becoming more abstract and generic[2].

In the era of digital economy, data has become the fifth factor after land, labour, capital and technology, and it plays an important role in the cost structure of enterprises and national economic accounting. Taking data as the core element, supplemented by digital technology, and using the Internet as the carrier, digital economy combines the theory of economics and the existing achievements of the real economy, which promotes the sustained, steady and healthy development of China's economy, improves the competitiveness of China's economy, and opens up a new space for the development of the economy.

Blockchain is a decentralised distributed ledger technology for recording and verifying transaction data[3]. Its core idea is to link data together in the form of blocks to form a tamper-proof chain that contains multiple transaction records, and each new block contains information from the previous block, forming a continuous, time-stamped chain of records. This makes blockchain ideal for recording transactions, data or information securely and transparently[4].

The main features of blockchain include:

1. Decentralisation: instead of relying on a single central authority, blockchain eliminates the possibility of a single point of failure by having a multitude of nodes on the network working together to maintain and verify data.

2. Non-tamperability: once data is recorded on the blockchain, it is virtually impossible to tamper with it. Because to tamper with a block, you need to modify all subsequent blocks on the entire chain at the same time, which is extremely difficult in practice.

3. Transparency: Blockchain data is publicly available and anyone can view transaction records on the chain, which increases trust and transparency.

4. Security: Blockchain uses cryptography to secure data, ensuring that only authorised users can access and modify it.

5. Smart Contracts: Blockchain can support smart contracts, which are self-executing contracts that automatically perform predetermined actions when specific conditions are met.

2 MECHANISM ANALYSIS AND RESEARCH HYPOTHESIS

2.1 Blockchain technology and the development of the digital economy

Game theory is particularly important in analysing how individuals make decisions in an environment of incomplete information or distrust[5]. Blockchain technology provides an untamperable and fully transparent environment that reduces the likelihood of fraudulent behaviour and improves the game scenarios for both parties to a transaction. This helps to understand how blockchain can reduce distrust and uncertainty in the digital economy, thereby facilitating more efficient and secure transactions[6].

In recent years, with the rapid development of many disruptive technologies, traditional industries have suffered a profound impact, forcing industrial economies to transform to digitalization[7]. For traditional enterprises, due to technological constraints, they are usually only able to digitally transform in certain aspects, such as moving their traditional businesses to online platforms and using big data and cloud computing technologies to analyse markets and enhance marketing capabilities. However, the core advantage of blockchain technology as a bottom-layer technology is that it can comprehensively improve the operational efficiency of the industrial chain. Blockchain technology can effectively solve the problems of imperfect information disclosure and high trust costs within the industry chain and across industries, fundamentally break the information barriers between traditional industries, and establish a digital system of data interoperability and sharing.

The blockchain's untamperability, distributed ledger structure, and traceability features provide a framework of trust for business interactions between enterprises[8]. In a game-theoretic perspective, these features greatly reduce the uncertainty and potential risk of fraud for each participant. Each participant knows that any cheating behaviour will be instantly recorded and exposed by the system, and thus is more inclined to maintain cooperation than betrayal, driven by maximising their own interests. This mechanism not only reduces the cost of regulation and mediation, but also improves the quality of co-operation between participants, thus making the entire digital economy system run more efficiently and transparently.

In addition, blockchain technology enables automatic execution of transactions through smart contracts, further reducing the possibility of human intervention and errors in the transaction process, which is the ideal state of co-operation in game theory - i.e., it ensures that all participants abide by the predetermined rules, effectively preventing unfair trading practices caused by information asymmetry. Therefore, blockchain technology is not only a tool for digital transformation, but also a key technology for reshaping market norms and enhancing transaction transparency, providing a solid foundation for the healthy development of the digital economy[9].

In summary, this paper proposes the following hypotheses:

H1: Blockchain technology promotes the development of digital economy

2.2 Blockchain technology to help the digital economy intrinsic mechanism

2.2.1. Analysis of the mechanism of data property rights

Property rights economics is a theory that studies the interaction of law and economics and how the allocation of property rights affects resource allocation and economic efficiency[10]. In the context of the digital economy, this theory is particularly important because data is both a key economic resource and the core of modern business activities. Property rights define the rights of individuals or firms to control, use, benefit and transfer resources. Clear property rights not only increase the efficiency of resource use, but also facilitate the proper functioning of markets. If property rights are unclear or unenforceable, they can lead to inefficient or incorrect use of resources, thereby reducing the overall effectiveness of economic activity.

China's digital economy is booming and data and information has become a core element of economic and social progress, but at the same time, disputes over the ownership and use of data are rising[11]. One of the complexities of the data ownership issue is that raw, untechnologically processed data is often difficult to consider as an asset and therefore cannot be included in financial statements. Therefore, for data to become a real asset, it must be integrated into the day-to-day operations and projects of a business. However, under the digital economy model, digital assets can be easily copied and are usually not exclusive or consistent. China's current system of laws and regulations does not clearly define the attribution of data property rights. It is practically difficult for existing regulations to ensure the collection, storage, misuse or leakage of personal information data.

The blockchain system's distributed storage and non-tamperability can, to a certain extent, solve the security problem of personal data information[12]. Specifically, firstly, the data in the blockchain system is recorded in a shared ledger, and the ownership information is stored on the chain and cannot be easily modified. Even in the event of data misuse, the difficulty of forensics is greatly reduced. Secondly, data information in a blockchain system is tamper-proof and has a complete life cycle record, from data generation, transmission to re-creation, all of which are recorded in detail within the system. Therefore, the ownership of the data is established from the moment it is generated and can be accessed by the relevant authorities at any time. Thirdly, the blockchain system adopts asymmetric encryption technology to ensure the security of the data and information on the chain, which reduces the risk of data leakage and provides a higher level of security. In conclusion, the blockchain system has great potential in dealing with the security and ownership of data, providing strong support for the sustainable development of the digital economy.

In summary, this paper makes the following assumptions:

H2: Blockchain technology contributes to the development of the digital economy by facilitating the resolution of property rights issues and thus the development of the digital economy

2.2.2. Analysis of information flows and trading mechanisms

Transaction cost theory is an economic theory proposed by economist Ronald Coase and further developed by Oliver Williamson. This theory focuses on analysing the costs of conducting economic transactions under different governance structures and tries to explain why firms and markets exist and their boundaries. Transaction costs include all costs associated with transactions, such as the cost of finding a trading partner, the cost of negotiating and making a contract, and the cost of monitoring and enforcing the transaction. The core idea of transaction cost theory is that these costs largely determine whether a transaction should be completed in the market or within the firm.

At present, there are still some problems in the development of China's digital economy that constrain the flow and transaction of digital information[13]. Firstly, there are many categories of data subjects, data quality varies, and the transaction process is complicated. When different data subjects conduct transactions, their powers and obligations are intersected, and problems continue to emerge in the transaction process. Second, there is the problem of data information silos, i.e., the flow of digital information is impeded. Due to differences in the degree and quality of digital transformation, the lack of conversion standards between different data restricts the flow of data. At the same time, a lot of data information is the core secrets of enterprises, and in the actual transaction process, enterprises tend to protect the core data rather than trading, which also causes the problem of information silos. Thirdly, data security is difficult to guarantee and easy to be copied and disseminated, making many enterprises lack the will for digital transformation.

With the empowerment of blockchain technology, the problem of digital information transaction and flow can be effectively solved[14]. First, the blockchain system can establish a standardised transaction system or ecosystem. The blockchain system is decentralised and has exactly the same rights and obligations between all nodes. This means that the blockchain system is jointly maintained by all participating nodes, and even if one node has problems, it will not affect the stability of the whole system. Secondly, the data of the blockchain system is tamper-proof, highly transparent and secure. For reading, writing and rewriting of data, it can only be achieved after a consensus is reached by more than 51% of the nodes. Therefore, the blockchain system has data consistency and uniqueness. Finally, the data within the blockchain system is traceable, so the data quality is high and naturally has a strong trust endorsement function, which can effectively solve the problem of data silos.

In summary, this paper makes the following assumptions:

H3: Blockchain technology promotes the development of digital economy by facilitating the flow of information and transactions and thus the development of digital economy

2.2.3. Analysis of the "new infrastructure" mechanism

"New infrastructure" refers to the concept of large-scale information technology infrastructure construction in the era of the digital economy, which includes projects such as 5G infrastructure, industrial Internet of Things and big data centres[15]. However, these digital new infrastructures face a number of problems, such as inconsistent data standards and difficulty in forming ecosystems....

Blockchain technology has wide applicability and the ability to connect and apply on a large scale, which can build a valuable network ecosystem and promote the rapid development of the digital economy[16]. When blockchain technology is combined with the Internet of Things, it can ensure the trustworthiness, security, and tamperability of data, thus protecting private data while ensuring the quality of data and achieving the full sharing of data. The immutability and traceability of blockchain technology can provide high-quality authentication for enterprises or entire ecosystems, which helps to improve the quality of IoT modelling and enhance the efficiency of services.

In addition, blockchain technology has the capability of asymmetric dynamic encryption, which can provide quality services to industries that have high requirements for data security. Therefore, blockchain technology is considered as one of the key technologies to drive the rapid development of the digital economy, especially when it has the potential to play an important role in addressing the various challenges faced in digitalisation new infrastructure projects.

In summary, this paper makes the following hypotheses:

H4: Blockchain technology contributes to the development of the digital economy by facilitating "new infrastructure".

3 EXPERIMENTAL DESIGN

3.1 Sample selection and data processing

In this paper, we select the panel data of thirty provinces, municipalities and autonomous regions in China from 2011 to 2022 (30 provinces in China excluding Hong Kong, Macao, Taiwan and Tibet). The digital economy index is represented in this dataset as the word frequency sum of digital economy policies in the government work report. For the missing values of the variables in individual years, the interpolation method is adopted to make up for them. The final unbalanced panel data containing 330 sample observations from 2011 to 2022 is obtained. The data used in this paper are from China Statistical Yearbook, National Bureau of Statistics.

3.2 Variables

Explained variable: digital economydig

Currently, there is no international agreement on the concepts and measurement methods regarding the digital economy. The text draws on the methods of previous authors to measure the level of digital economy development in terms of digital infrastructure, digital industrialisation and industrial digitisation.

Explanatory Variable: Blockchain Blkc

Referring to the methodology of previous authors, this paper manually compiles the Baidu search index of blockchain-related keywords in each province from 2011 to 2022 and summarises them. After collecting all the Baidu search indices for each of the above keywords, the indices are summarised according to the technology perspective, capital payment perspective, intermediary service, model perspective and direct address perspective, and the entropy method is used to determine the weights, and multiple indices are synthesised into a comprehensive index. Finally, the index synthesised by the entropy value method is divided by the number of resident population in each province, so as to measure the blockchain variables in each province.

Control variables:

Referring to the methods of previous authors, this paper adopts regional GDP per capita (avg_gdp), average years of education per capita (avg_gy), the digitisation level of enterprises (dt) The number of Internet broadband access subscribers (NIBAC) as the control variables in this paper.

3.3 Modelling

To measure the impact of blockchain on the regional digital economy, this paper constructs the following model:

$$dig_{it} = \alpha + \beta Blkc_{it} + \gamma X_{it} + \lambda_t + \mu_i + \varepsilon_{it} \tag{1}$$

Where the explanatory variable dig is the regional digital economy development index, which represents the degree of digital economy development of region i in year t. Blkc is the core explanatory variable of the paper, Xit represents a set of control variables, λt represents time fixed effects, μi represents region fixed effects, and εit is the random error term, and i and t denote region and year, respectively. To attenuate the effect of inter-sample correlation, standard errors are clustered to the provincial level in the model.

4 EMPIRICAL ANALYSIS

4.1 Descriptive statistical analyses

Table 1 shows the mean, standard deviation, minimum and maximum values of the main variables. The mean value of the explanatory variables is 27.26 with minimum value of 1 and maximum value of 95. The minimum value of the core explanatory variables is 0 and maximum value is 2911.All the other variables are within the reasonable range.

Table 1. Descriptive statistics

Variable	N	Mean	p50	SD	Min	Max
dig	330	27.26	24	18.89	1	95
Blkc	330	224.5	121.5	343.2	0	2911
avg_gdp	330	0.00400	0.00300	0.00400	0.00100	0.0220
avg_gy	330	9.869	9.926	0.747	6.361	12.59
dt	330	7517	1669	19370	50	175652
NIBAC	330	1154	866.9	976.6	17.10	4629

4.2 Regression results and analyses

Table 2 shows the regression results for the impact of blockchain on the regional digital economy. Column (1) represents the average impact of blockchain on regional digital economy without adding control variables after controlling for region and time fixed effects, and the OLS estimation results show that the coefficient estimate is 0.020 and significantly positive at the 1% level, indicating that blockchain has an obvious promotion effect on regional digital economy. With the gradual addition of control variables thereafter, the OLS estimates are all significantly negative, indicating that the impact of blockchain on the regional digital economy has a significant and stable facilitating effect.

Table 2. OLS Regression results

	(1) m1	(2) m2	(3) m3	(4) m4
Blkc	0.020***	0.013***	0.013***	0.011***
	(0.003)	(0.003)	(0.003)	(0.003)
gdp		0.000***	0.000	-0.001***
		(0.000)	(0.000)	(0.000)
avg_gy		-1.444	-1.690	-2.321*
		(1.343)	(1.338)	(1.233)
dt			0.000**	0.000***
			(0.000)	(0.000)
NIBAC				0.018***
				(0.002)
_cons	22.390***	34.621***	38.066***	42.781***
	(1.161)	(13.294)	(13.295)	(12.232)
N	330	330	330	330
r2	0.137	0.152	0.165	0.297
F	53.842	19.463	16.093	27.411

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4.3 Robustness Tests

Table 3. Endogeneity Test

	(1) LDDE	(2) GDP
Blkc	0.008***	4.427***
	(0.000)	(1.573)
N	330	330
r2	0.654	0.880
F	122.560	473.250

Note: Standard errors clustered at the industry level are shown in parentheses. ***, **, *indicate significance at the 1%, 5%, and 10% levels, respectively. The Control variables are controlled.

To ensure that the regression results are robust, we replaced the explanatory variables. We choose the level of regional digital economy development (LDDE) and regional GDP (GDP) as the replaced explanatory variables. Table 3 shows the regression results after replacing variables. The results are shown in columns (1) and (2). After replacing the explanatory variables, the results of blockchain on the new explanatory variables are still significantly positive at the 0.1% level, indicating that blockchain has a significant and stable contribution to the impact of regional digital economy.

4.4 Heterogeneity analysis

Table 4. Regression results by region differences

	(1) eastern	(2) Central	(3) westward
Blkc	0.0059**	0.0097	0.0392**
	(2.1351)	(1.3943)	(2.3347)
N	121	88	121
Adj. R2	0.4598	0.5358	0.1765

Note: Standard errors clustered at the industry level are shown in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively. The Control variables are controlled.

Because of the differences in the degree of economic development, resource endowment and policy implementation in different regions, blockchain has different promotion effects on the level of digital economic development in different regions. Table 4 presents the results of heterogeneity regression analysis by region. The regression results show that blockchain significantly improves the level of digital economy development in the eastern and western regions, and the level of promotion in the central region is significantly higher.

5 EXAMINATION OF THE ROLE OF THE MECHANISM

According to the previous analysis, blockchain technology significantly promotes the development of local digital economy, so is it true, as we hypothesise, that blockchain technology promotes the development of local digital economy through the mechanism of data property rights, the mechanism of information flow and transaction and the mechanism of new infrastructure? Therefore, with reference to the method of mechanism testing by Dinkelman (2011) and Cameronetal. (2021), the following mechanism testing model (2) is set:

$$Mechnism_{it} = \alpha + \beta HPE_i \times Post_t + \rho X_{it} + \sigma_t + \mu_i + \varepsilon_{it} \tag{2}$$

Where Mechnism represents the mechanism variable, and other variables are set the same as formula (1).

5.1 Tests of data ownership mechanisms

According to the previous analysis, blockchain technology promotes the development of digital economy by facilitating the resolution of property rights issues. In order to verify this mechanism, this paper chooses the number of applied patent authorisations as a proxy variable for property rights issues to observe the impact of blockchain effect. The results are shown in column (1) of the table below, and it is easy to see that the coefficient of column (1) is significantly positive, indicating that blockchain significantly solves the property right problem and thus significantly promotes the development of digital economy. Therefore, the data property rights mechanism is an important internal mechanism for blockchain to promote the development of regional digital economy.

5.2 Information flow and trading mechanism tests

According to the previous analysis, blockchain technology promotes the development of digital economy by facilitating information flow. To verify this mechanism, this paper chooses the total amount of technology contract turnover as a proxy variable to observe the impact of blockchain effect. The results are shown in column (2) of the table below, and it is not difficult to see that the coefficient of column (2) is significantly positive, indicating that blockchain significantly promotes the flow of information and thus significantly promotes the development of digital economy. Therefore, the information flow and transaction mechanism is an important internal mechanism for blockchain to promote the development of regional digital economy.

5.3 New infrastructure mechanism test

According to the previous analysis, blockchain technology promotes the development of digital economy by facilitating the construction of new infrastructure and thus promoting the development of digital economy. To verify this mechanism, table 5 shows the regression results for mechanism effects, and it is easy to see that the coefficient of column (3) is significantly positive, indicating that blockchain significantly promotes the construction of new infrastructures and thus significantly promotes the development of digital economy. Therefore, the new infrastructure mechanism is an important internal mechanism for blockchain to promote the development of regional digital economy.

Table 5. Regression results for mechanism effects

	(1) patent	(2) contracts	(3) NI
Blkc	19.8276**	7.2e+03***	0.0763***
	(2.0009)	(5.5234)	(13.4024)

N	330	330	330
Adj.R2	0.8133	0.6203	0.7406

Note: Standard errors clustered at the industry level are shown in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively. The Control variables are controlled.

6 CONCLUSIONS

In general, the development of blockchain has opportunities for the digital economy. As the underlying technology of the digital economy, blockchain plays a prominent role in accelerating the process of economic digitisation, changing the transaction mode of the digital economy, reshaping the market norms, and reshaping the business model of the digital economy, which can promote the development of the digital economy. Blockchain can promote the development of digital economy by providing ideas and methods to solve the problem of data property ownership, facilitating the flow and transaction of digital information, and solving the intrinsic mechanism of "new infrastructure" barriers in digital economy[17].

In this regard, we hope that the government can strengthen the top-level design and introduce relevant policies to support the research, development and application of blockchain technology. Encourage enterprises, universities and research institutes to carry out research on blockchain technology, and cultivate a number of blockchain technology enterprises and solution providers with core competitiveness. Promote the application of blockchain technology in digital economy fields, such as supply chain management, financial services, and intelligent manufacturing. Accelerate the large-scale application of blockchain technology in key areas, and give full play to its role in the attribution of data property rights and information flow. Establish a sound data property right protection system and provide solutions for data property right attribution in combination with blockchain technology. Promote the application of blockchain technology in the data transaction market to facilitate the efficient use of data resources. Strengthen the construction of blockchain infrastructure and enhance the level of "new infrastructure" for the development of digital economy. Increase investment, improve the underlying technology platform of blockchain, and enhance data storage, calculation and analysis capabilities. Strengthen talent cultivation and exchange, and enhance the level of blockchain technical talents. Strengthen the training and education of blockchain technology talents, encourage cooperation between enterprises and universities, and establish a talent training system integrating production, learning and research. Strengthen international cooperation and promote the development of global blockchain technology. Actively participate in the formulation of international blockchain technology standards and promote the application and development of blockchain technology in line with international standards.

REFERENCES

1. Wood G. Dapps: What Web 3.0 looks like [EB/OL]. (2014-04-17)[2023-03-https://gavwood.com/dappsweb3.html
2. Li Zhenli. Research on new ways to protect data privacy under the high-quality development of digital economy[J]. Macro Quality Research,2022,(1):107-126.
3. Jia Yuanyuan. The construction of credit rule of law model driven by blockchain convergence[J]. Hunan Social Science,2021,(4):101-113.
4. Yang J. Blockchain, Internet Trust and Institutional Design[J]. Shanghai Economic Research,2021,(6):27-38.
5. SHANG Jie,CHEN Ximing. Integration of blockchain and agricultural industry chain in the context of comprehensively promoting rural revitalization[J]. Theory Exploration,2022,(1):159-164.
6. dong chunyu,li shouwei,zhang ruibin. Research on the integration of blockchain and supply chain finance based on knowledge graph[J]. Finance and Accounting Monthly,2022,(4):149-154.
7. Zhao Yueqiang. Trends, Contingent Risks and Regulatory Considerations of Digital Currencies in Public and Private Sectors[J]. The Economist,2020,(8):110-119.
8. Xia Zemin. Blockchain technology in the construction of digital government:institutional functions, application boundaries and implementation barriers[J]. Journal of East China University of Science and Technology (Social Science Edition),2022,(3):108-117.
9. LIU Zhiyang,CHEN Yongchang. All-digital technology-a new paradigm for society:the example of blockchain social innovation[J]. Dongyue Lunshu, 2020,(8):113-124+191-192.
10. Zhou shaofu,chen yahui. Research on the Impact of Digital Economy on the High Quality Development of Economy---Based on the Perspective of Structural Upgrading of Service Industry[J]. Industrial Technology Economy,2022,(5):111-121.
11. CHEN Yongwei,CHENG Hua. Meta-universe economy:a comparison with real economy[J]. Research on Financial Issues,2022,(5):3-16.
12. Lin Hongwei,Shao Peiji. Research on the influencing factors of blockchain on the high-quality development of digital economy[J]. Guizhou social science,2019,(12):112-121.
13. Ning Zhaoshan. Research on the multidimensional impact of digital economy on the high-quality development of economy based on the three-dimensional perspective of quality, efficiency and power[J]. Guizhou Social Science,2020,(4):129-135.
14. Zheng Jialin,Xu Wenhua. Research on the role mechanism of digital economy in promoting China's economic high-quality development--an analysis based on the perspective of regional heterogeneity[J]. Price Theory and Practice,2020,(8):148-151.
15. XU Jun, JIANG Li, JIANG Yuchen. Research on targeting countermeasures of digital innovation to drive the high-quality development of China's economy[J]. Qinghai Social Science,2022,(1):98-105.
16. Xu Xiaohui. Digital economy and high-quality economic development:Empirical evidence based on the perspective of industrial structure upgrading[J]. Statistics and Decision Making,2022,(1):95-99.
17. ZHANG Xun,WAN Guanghua,WU Haitao. Bridging the digital divide: digital financial development with Chinese characteristics[J]. China Social Science,2021,(8).35-51.