

Digital Transformation, Corporate Performance and ESG: Evidence from A-Share Listed Companies

Zhiyu Li *

Department of Economic Management, Northeast Agricultural University, Harbin, China, 150000

* Corresponding author: Zhiyu Li Li_20021001@163.com

Abstract. Based on the background of the rapid development of the digital economy, panel data of China's A-share listed companies from 2014 to 2021 are selected to explore the impact of digital transformation on enterprise performance and the logical relationship between digital transformation, enterprise performance and ESG. The results show that enterprise digital transformation can improve enterprise performance, and ESG performance plays an intermediary role in the improvement path of enterprise digital transformation to enterprise performance. Further, the results are still valid after Sobel and Bootstrap tests, variable substitution and time lag method. The conclusion of this study provides a theoretical basis for clarifying the influence path of enterprise digital transformation on enterprise performance, improving enterprise ESG performance, and promoting high-quality economic development.

Keywords: Digital Transformation, Corporate Performance, ESG Performance, Intermediary Mechanism.

1. Introduction

In recent years, the rapid development of the digital economy has become a key driving force supporting China's macro-economic growth. In 2021, the scale of China's digital economy will reach 45.5 trillion yuan, with a year-on-year growth of 16.2%. Digital transformation is an all-around transformation of enterprise elements such as organization, business, market, marketing, product research and development, supply chain, finance etc., by utilizing new generation information technologies such as artificial intelligence, big data, blockchain, and 5G. It can improve quality, reduce cost, increase efficiency, and enhance enterprise economic benefits. At the same time, as high-quality economic development, how to accelerate the strategy of "double carbon target" and guide enterprises to achieve sustainable development has been widely concerned by society. ESG (Environment Social and Governance) is a kind of considering the environment, social responsibility and corporate governance evaluation enterprise sustainable development ability of new development concept. The emergence of ESG makes enterprises pay more attention to the environment, social responsibility and corporate governance. By 2021, the investment scale of ESGs has reached nearly 40 trillion dollars, accounting for 1/3 of the total global assets under management, and it is expected to exceed 5 billion yuan in 2025. At present, the impact of enterprise digital transformation on corporate financial performance and non-financial performance has been studied to a certain extent, but few scholars have explored the logical mechanism between the three. This paper takes China's A-share listed companies from 2014 to 2021 as the research object to explore the internal mechanisms of enterprise digital transformation, ESG performance and enterprise performance.

2. Literature Review

2.1. Digital Transformation

The Digital economy has gradually become a research hotspot in academia in recent years. A large number of studies show that, as a new economic form, the digital economy can promote inclusive growth (Zhang Xun et al., 2019) [1], drive industrial efficiency improvement (Xiao Xu and Qi Yudong, 2019) [2], strengthen the development of the real economy (Hu Xijuan et al., 2022) [3], thus providing strong theoretical support for digital economy to drive high-quality economic development.

As the micro subject of market economy and an important carrier of the wide application of digital technology, enterprises should accelerate the promotion of digital transformation, enhance their potential competitiveness and realize the quality and efficiency of enterprise value under the background of high-quality development of the macroeconomy. From the perspective of enterprise economy, this paper reviews the existing literature on the driving factors and micro impacts of multi-focus and digital transformation. Enterprise digital transformation is characterized by long-term, complexity and uncertainty (Mattc, 2015) [4]. Dynamic capability will also drive enterprise digital transformation by promoting employees' innovative behavior. On the micro level, on the one hand, digital transformation can promote the growth of enterprise financial performance from multiple dimensions, such as improving enterprise market power (Wang Rongji et al., 2022) [5], improving total factor productivity (Huang Xinggong et al., 2022) [6], On the other hand, digital transformation will also have an impact on the non-financial performance of enterprises, such as improving ESG performance by easing financing constraints and expanding analysts' attention, and driving enterprises to fulfill more social responsibilities by improving overall innovation, green innovation ability and service awareness (Zhao Chengyu, 2022) [7].

2.2. ESG

ESG refers to the performance of enterprises in Environment, Social responsibility and Governance. It is the concept and practice method to measure the sustainable development ability and long-term value of enterprises. The research on ESG mainly focuses on three aspects: ESG rating, ESG promotion path and ESG influence effect.

Studies on ESG rating mainly focus on theoretical exploration, including the construction of ESG rating and the comparison of the status quo (Wang Kai and Zhang Zhiwei, 2022) [8]. At present, ESG is developing rapidly in our country, but it is still in the early stage of development, and there exist some problems such as low availability of data and subjective evaluation methods. Therefore, it is of great significance to establish a reasonable ESG evaluation system based on our national conditions.

As for the research on the path of ESG improvement, information infrastructure (Li Guolong and Zhu Peihua, 2022) [9] and digital technology have obvious enabling effect on enterprise ESG performance, among which blockchain technology is more prominent (Hu Jie et al., 2022) [10]. Co-institutional investors can enhance corporate ESG performance by exerting governance effect and synergy effect (He Qing and Zhuang Pengtao, 2023) [11].

As for the research on the impact of ESG, domestic and foreign literature mainly focus on the relationship between ESG, enterprise value and financial performance, but no unified conclusion has been reached. Most scholars believe that ESG can promote the improvement of enterprise performance. By easing financing constraints, increasing innovation input and improving profitability, ESG performance can enhance the investment willingness of market players and thus improve enterprise performance. However, a few scholars still believe that ESG inhibits the improvement of corporate performance, and corporate social responsibility will increase the operating burden and reduce market competitiveness (Li Zheng, 2006) [12].

To sum up, existing literature on enterprise digital transformation mainly focuses on the impact of digital transformation on macro and micro economy. In contrast ESG literature studies mostly focus on its internal promotion path and micro impact on enterprises, and few scholars have empirically expounded the logical relationship between enterprise digital transformation and ESG performance. As for the internal logic of enterprise digital transformation, ESG responsibility performance, and enterprise performance -- whether enterprise digital transformation can improve ESG performance, and then the two work together to improve enterprise performance, there are few relevant kinds of literature to answer.

3. Theoretical Analysis and Model Hypothesis

3.1. Digital transformation and enterprise performance

Digital transformation means that an enterprise changes its path of value creation through the application of digital technologies such as big data and the Internet of Things, so as to improve its internal operating efficiency and organizational performance (Vial, 2019) [13]. Enterprise digital transformation can improve enterprise performance by improving production, circulation and management efficiency, reducing production and transaction costs, driving enterprise technology and management model innovation (Liu Donghui et al., 2022) [14]. The resource-based theory holds that tangible and intangible resources owned by enterprises can be transformed into unique capabilities to enhance their lasting competitive advantages. In the process of digital transformation of enterprises, digital elements such as big data and blockchain are further transformed into strategic elements of sustainable competition. On the one hand, they are combined with traditional elements to accelerate the upgrading of product technology and improve production efficiency. On the other hand, enterprise digital technology builds management decision-making systems, optimizes internal business processes and external supply chain management, and improves collaboration efficiency. According to the transaction cost theory, digital transformation accelerates the frequency of interaction between internal and external information, reduces the cost of information search, negotiation and contract signing, and performance supervision in the process of enterprise transactions, which reduces the transaction cost and thus improves enterprise performance. From the perspective of innovation, the embedding of digital technology greatly improves the speed of product and service innovation, promotes the cooperation and coordination among heterogeneous innovation participants, changes the process of providing value of products and services, and thus promotes the improvement of enterprise economic benefits. Based on the above analysis, the following hypotheses are proposed:

H1: Enterprise digital transformation has a significant positive impact on the improvement of enterprise performance.

3.2. Digital transformation and corporate ESG responsibility performance

The industrial structure optimization effect, technological progress and green innovation effect, resource allocation and energy structure effect brought by digital transformation will promote energy conservation and emission reduction (Yu Chang et al., 2023) [15]. From the perspective of enterprises, digital transformation will not only improve the economic performance of enterprises, but also have a positive impact on the environment, society and governance of enterprises. In terms of environmental performance, digital transformation improves the cash holding level of enterprises, which is conducive to enterprises' investment in other non-economic aspects. In addition, according to the stakeholder theory, digital transformation arouses the attention of more stakeholders through a broader range of information sources, so that enterprises can actively fulfill more obligations at the level of environmental governance. At the level of social responsibility, enterprises' digital transformation can enhance their fulfillment of social responsibility by improving the quality of internal control and financial stability, and increasing innovation input and output (Shen Minghao et al., 2022) [16]. At the level of corporate governance, the application of big data, blockchain technology, etc., makes the transaction activities of enterprises open and transparent, improves the transparency of internal information of enterprises, reduces the degree of information asymmetry among stakeholders, and improves the internal governance of enterprises, which is consistent with the logic of transaction cost theory. Based on this, the following hypothesis is proposed:

H2: Enterprise digital transformation has a significant positive impact on enterprise ESG responsibility performance.

3.3. The mediating role of enterprise ESG performance

The digital transformation of enterprises can help enterprises to practice environmental responsibility by improving their green technology level. Improve corporate governance by enhancing

internal information transparency; By improving the efficiency of corporate decision-making and operational management, enterprises are encouraged to fulfill their social responsibilities more efficiently (Hu Jie et al., 2022) [10], thus improving corporate ESG performance. ESG has value effect. In terms of environmental performance, according to the resource-based theory, enterprises' investment in environmental management and environmental protection technology will be transformed into critical strategic resources for enterprises and help to improve enterprise performance. In terms of social performance, according to stakeholder theory and signal transmission theory, corporate social responsibility to shareholders, creditors, employees, etc., helps to alleviate the degree of information asymmetry between enterprises and stakeholders, improve corporate social capital and corporate transparency, reduce potential risks and adverse selection risks in the future, and improve corporate performance. In terms of governance performance, based on the principal-agent theory and transaction cost theory, good corporate governance performance can help reduce enterprise transaction costs, alleviate the uncertainty and opportunism in the decision-making process of enterprise managers, and thus improve enterprise performance.

In this paper, the intermediary variable is ESG performance. On the premise of ensuring that digital transformation can improve enterprise performance, the following tests are conducted: First, digital transformation affects enterprise ESG responsibility performance; Secondly, after adding the mediating variables of digital transformation and enterprise ESG performance, ESG performance can still have a significant impact on enterprise performance. Based on this, hypothesis is proposed:

H3: Corporate ESG responsibility plays an intermediary role between the application of blockchain technology and corporate performance.

4. Research Design

4.1. Data Sources

This paper takes Chinese A-share listed companies from 2014 to 2021 as research samples, and preprocesses the sample data: (1) Remove ST and *ST listed companies; (2) Eliminate the samples of listed companies with more missing financial data; (3) The tail reduction of 1% quantile for the upper and lower parts of the continuous variable was carried out. A total of 965 sample observations were obtained. The digital transformation data in this paper is obtained through text analysis and word frequency statistics of the annual reports of listed companies. The annual reports of listed companies come from the Jutide Information network. Other financial data from CSMAR data. The data processing software is Stata.

4.2. Variable Design

1. Explained variables

Business performance (TobinQ). After reviewing the existing literature, this paper uses TobinQ value to measure the financial performance of enterprises, and selects the net profit rate of total assets, that is, the proportion of net profit in total assets, as the substitute variable of enterprise performance in the robustness test.

2. Explain variables

Digital transformation. According to the measurement methods of digital transformation indicators adopted by Zhao Chenyu et al. (2021) [17] and Wu Fei et al. (2021) [18], text retrieval and word frequency statistics are conducted on the annual reports of listed companies in the empirical test of this paper. Referring to the research of Wu Fei et al. (2021) [18], word frequency statistics are carried out from 76 digital keyword construction dictionaries from five dimensions of "artificial intelligence technology", "big data technology", "cloud computing technology", "blockchain technology" and "digital technology application". Finally, the total word frequency +1 post-logarithm processing is taken as the measurement index of digital transformation in this paper.

3. Control variables

In order to improve the accuracy of the study, this paper introduced a series of control variables into the model by referring to the practice of Hu Jie et al. (2022) [10], including enterprise Size (Size), asset-liability ratio (Lever), years of establishment (Age), ownership concentration (Top1), enterprise nature (SOE) and proportion of independent directors (Indep).

The main specific definitions of variables in this paper are shown in Table 1.

Table 1. Primary Variable Definition

| Variable Type | Variable Name | Variable Symbol | Variable Specification |
|----------------------|-------------------------------------|-----------------|--|
| Explained Variable | Enterprise performance | TobinQ | Market value/Total assets of the company |
| | | ROA | Net profit/Average balance of total assets |
| Explanatory Variable | Explanatory variable | Digital | During the sample period, the key words frequency of the annual report of the listed company is added 1 after logarithmic processing |
| Mechanism Variable | ESG performance | ESG | Hua Zheng ESG rating |
| Control Variable | Age of establishment of enterprise | Age | Ln (years of establishment +1) |
| | Proportion of independent directors | Indep | Number of independent directors/Number of directors |
| | Asset-liability ratio | Lever | Total liabilities/Total assets |
| | Nature of enterprise | SOE | The value is 1 for state-owned enterprises and 0 for non-state-owned enterprises |
| | Revenue growth rate | Growth | (Current period operating revenue - Previous period operating revenue)/Previous period operating revenue |
| | Enterprise scale | Size | Ln (ending total assets) |
| | Ownership concentration | Top1 | Number of shares held by the largest shareholder/Total number of shares |

4.3. Descriptive statistical analysis

Table 2. Descriptive statistical results

| Variable | Sample Size | Mean Value | Standard Deviation | Min | Max | VIF |
|----------|-------------|------------|--------------------|---------|-------|------|
| Age | 7720 | 19.86 | 5.449 | 4 | 40.33 | 1.13 |
| Indep | 7720 | 37.51 | 5.892 | 16.67 | 80 | 1.02 |
| Lever | 7720 | 0.446 | 0.197 | 0.00906 | 0.979 | 1.50 |
| SOE | 7720 | 0.475 | 0.499 | 0 | 1 | 1.29 |
| Growth | 7720 | 0.117 | 0.248 | -0.627 | 5.270 | 1.04 |
| Size | 7720 | 22.78 | 1.319 | 19.14 | 28.50 | 1.91 |
| TOP1 | 7720 | 33.85 | 14.59 | 2.430 | 87.70 | 1.15 |
| ESG | 7720 | 6.751 | 1.186 | 1 | 9 | 1.28 |
| Digital | 7720 | 1.458 | 1.586 | 0 | 6.576 | 1.20 |
| TobinQ | 7720 | 2.025 | 1.550 | 0.688 | 31.40 | 1.06 |

As shown in Table 2, the maximum value of explained variable TobinQ is 31.40, and the minimum value is 0.688. It can be seen that the enterprise performance of sample variables selected by A-share listed companies differs greatly. The mean value of ESG score of mechanism variable is 6.751, the minimum value is 1, and the maximum value is 9, indicating that there are some differences in the performance of ESGs of different enterprises, but the overall performance is good. After logarithmic processing, the maximum value of the explanatory variable Digital is 31,40, and the minimum value is 0. It can be seen that there are still enterprises that have not carried out digital transformation, and

the degree of development is quite different. In addition, the VIF value ranges from 1.02 to 1.91, which is less than the reference standard value of 5. Therefore, there are no serious multicollinearity problems with the data.

4.4. Model Design

$$Tobin_{it} = \beta_0 + \beta_1 Digital_{it} + \sum_j \beta_j Controls_{it} + \varepsilon_{it} \quad (1)$$

$$ESG_{it} = \beta_0 + \beta_1 Digital_{it} + \sum_j \beta_j Controls_{it} + \varepsilon_{it} \quad (2)$$

$$Tobin_{it} = \beta_0 + \beta_1 Digital_{it} + \beta_2 ESG_{it} + \sum_j \beta_j Controls_{it} + \varepsilon_{it} \quad (3)$$

Where, β represents the parameter value to be estimated of the independent variable and control variable, Controls is the aforementioned control variable, ε is the random error term in the benchmark model, t is the year, and i is the enterprise individual. Formula (1) Verify the influence of digitalization level on enterprise performance; Formula (2) verifies the influence of digitalization level on enterprise ESG performance; Formula (3) verifies the mediating role of institutional variable ESG in influencing enterprise performance at the digitalization level.

5. Analysis of empirical results

5.1. Baseline regression result

Table 3 shows the test results of the benchmark regression model in this paper. As can be seen from column (1) in Table 3, the correlation coefficient between digital transformation and enterprise performance is 0.031 and significant at the 1% level, indicating that H1 has been verified. Column (2) verifies the relationship between digital transformation and ESG performance. The correlation coefficient between the two is 0.0818, which is significant at the 1% level, indicating that enterprise digital transformation promotes the improvement of ESG performance, and H2 is verified. Column (3) verifies the mediating mechanism role of enterprise ESG in improving enterprise performance through digital transformation. The results show that the regression coefficient of ESG is significantly positive, the coefficient of digital transformation is significantly positive, and the coefficient of digital transformation is decreased by 0.008 compared with column (1). Therefore, the declining influence of digital transformation on enterprise performance indicates that enterprise ESG performance plays a role as an intermediary mechanism, and H3 is verified.

Table 3. Descriptive Statistical Results

| Variable | (1) | (2) | (3) |
|----------|-----------------------|---------------------|-----------------------|
| | TobinQ | ESG | TobinQ |
| Digital | 0.151*** (5.48) | 0.0818*** (3.75) | 0.143*** (5.07) |
| ESG | | | 0.0919** (3.01) |
| Size | -0.331*** (-10.05) | 0.316*** (10.21) | -0.360*** (-10.40) |
| Lever | -1.034*** (-5.61) | -0.603** (-3.15) | -0.981*** (-5.31) |
| Age | 0.00716 (1.07) | 0.00857 (1.17) | 0.00594 (0.88) |
| Growth | 0.225 (1.26) | -0.0728 (-0.44) | 0.236 (1.31) |
| Top1 | 0.00169 (0.84) | -0.00222 (-0.97) | 0.00192 (0.95) |
| SOE | 0.151* (2.05) | 0.366*** (4.93) | 0.119 (1.59) |
| Indep | 0.00902 (1.70) | 0.00363 (0.57) | 0.00871 (1.65) |
| _cons | 9.150*** (13.15) | -0.495 (-0.72) | 9.195*** (13.17) |
| N | 965 | 964 | 964 |
| R2 | 0.2843 | 0.1668 | 0.2906 |

5.2. Robustness test

1. Intermediate effect test 1. Intermediate effect test

In order to verify the mediating role of enterprise ESGs between digital transformation and enterprise performance, Bootstrap and Sobel tests are supplemented in this paper, and the results are shown in Table 4 and Table 5.

Table 4. Sobel Test

| | Coef | Std Err | Z | P>Z |
|---|------------|------------|--------|-------|
| Sobel | 0.00585743 | 0.00148337 | 3.949 | 0.000 |
| Goodman-1 | 0.00585743 | 0.00149419 | 3.920 | 0.000 |
| Goodman-2 | 0.00585743 | 0.00147248 | 3.978 | 0.000 |
| Proportion of total effect that is mediated | | | 5.674% | |
| Ratio of indirect to direct effect | | | 0.060 | |

As shown in the table, Sobel's Z value is 3.946 and p value is less than 0.05, which rejects the null hypothesis and tests the mediating effect. Enterprise digital transformation will promote the improvement of enterprise performance by improving enterprise ESG performance.

Table 5. Bootstrap Test

| Category | Effect value | Standard Error | Lower limit | Upper Limit |
|-----------------|--------------|----------------|-------------|-------------|
| Total Effect | 0.1033 | 0.0111 | 0.0771 | 0.1208 |
| Direct Effect | 0.0059 | 0.0168 | 0.0034 | 0.0092 |
| Indirect Effect | 0.0974 | 0.0015 | 0.0667 | 0.1315 |

In order to guarantee the reliability of the results, Bootstrap was used for further testing. As shown in Table 5, indirect effects of the direct campus of digital transformation and ESG do not include 0 in

the upper and lower limits of Bootstrap 95% confidence interval, so there is an indirect effect on the performance of ESG.

2. Robustness test

Considering that the effect of enterprise digital transformation may have a lag effect, it is reestimated based on the benchmark model with a lag of two periods and three periods respectively. The lag regression results are basically consistent with the above, so the core conclusion of this paper is robust and reliable. In the above test, TobinQ is used to measure enterprise performance, and the method of Wu Fei et al. (2021) [18] is used to measure digital transformation. In this paper, the alternative variable method is used to test robustness again, the profit rate on total assets (ROA) is used to measure enterprise performance, the method of Zhao Chenyu et al. (2021) [17] is used to measure digital transformation, and the regression analysis is conducted again. The results agree with the above results, and the conclusions obtained in this paper are objective and credible.

6. Conclusion and Suggestion

Based on the panel data of China's A-share listed companies from 2014 to 2021, this paper conducts an in-depth study on the mechanism of corporate digital transformation on corporate performance. Research shows that enterprise digital transformation can improve enterprise performance, and in the path of enterprise digital transformation to improve enterprise performance, ESG performance plays an intermediary role.

This paper makes the following suggestions:

First, based on the role of digital transformation in improving enterprise performance, enterprises should increase investment in big data, cloud computing, blockchain technology and other digital technologies, give full play to the enabling role of digital technology in enterprise production and operation, and improve the digital level of enterprise operation and development. The government and relevant departments should vigorously support the integrated development of the digital economy and the real economy, at the same time improve the corresponding policies and strategies, promote the deepening reform of digital transformation, and create a good market environment for enterprises' digital transformation.

Secondly, based on the intermediary mechanism of ESG, in the process of digital transformation, enterprises should not only pay attention to its role in improving financial performance, but also pay attention to the performance of corporate environmental responsibility, social responsibility and corporate governance, so as to give full play to the intermediary role of ESG and contribute to sustainable development. The government should accelerate the improvement of ESG top-level design, establish excellent information disclosure standards, and actively advocate the concept of ESG. Enterprises should take the initiative to disclose relevant information timely and thoroughly, seize the tide of digitalization, realize the automation of ESG information management, improve the performance of enterprise ESG, and further improve enterprise performance.

Although this paper empirically tests the tripartite logical relationship among enterprise digital transformation, ESG performance and enterprise performance, there are still some limitations. On the one hand, this paper constructs panel data of listed companies, but the research individuals are not subdivided into industry types, so the status quo of each industry cannot be observed more accurately. In addition, the analysis of digital transformation in this paper is not classified into big data, cloud computing, blockchain and other specific technologies, and the impact of specific technologies cannot be measured. The paper can be improved on these two aspects in the future.

References

- [1] Zhang Xun, Wan Guanghua, Zhang Jiajia, He Zongyue. Digital economy, inclusive finance and inclusive growth [J]. *Economic Research Journal*, 2019, 54 (08): 71 - 86.
- [2] Xiao Xu, Qi Yudong The value dimension and theoretical logic of industrial digital transformation [J]. *Reform*, 2019 (08): 61 - 70.

- [3] Hu Xijuan, Shi Bo, Yang Jianfei. The driving factors and regional differentiation of the integrated development of digital economy and real economy in China [J]. Learning and Practice, 2022 (12): 91 – 101.
- [4] Mattc, Hesst, Benliana. Digitaltransformationstrategies [J]. Business&InformationSystemsEngineering, 2015 (5): 339 - 343.
- [5] Wang Rongji, Wang Jue, Bai Dongbei. Digital transformation and firm market power: Theoretical mechanism and experience identification [J]. Modern Management Science, 2022 (06): 157 - 166.
- [6] Huang Xinggang, Hou Bao-sheng, Ye Shu-jian, LI Ying-shuai. Research on the Relationship between digital transformation and Total Factor Productivity of Enterprises: A test based on resource allocation perspective [J]. Price Theory and Practice, 2022 (11): 107 - 111.
- [7] Zhao Chenyu. Research on the impact of digital transformation on corporate social responsibility [J]. Contemporary Economic Science, 2022 (02): 109 - 116.
- [8] Wang Kai, Zhang Zhiwei. Status, comparison and outlook of ESG rating at home and abroad [J]. Finance and Accounting Monthly, 2022 (02): 137 - 143.
- [9] Li Guolong, Zhu Peihua. Does information infrastructure improve enterprise ESG performance? [J]. Finance and Economics, 2022 (09): 52 - 61.
- [10] Hu Jie, Han Yiming, Zhong Yong. How enterprise digital transformation affects enterprise ESG performance: Evidence from Chinese listed companies [J/OL]. Industrial Economics Review, 2023 (01): 105 - 123.
- [11] He Qing, Zhuang Pengtao. How do co-institutional investors influence corporate ESG performance? [J]. Securities Market Review, 2023: 1 - 11.
- [12] Li Zheng. Correlation between Corporate Social responsibility and corporate value -- Empirical evidence from Shanghai Listed Companies [J]. China Industrial Economy, 2006 (02): 77 - 83.
- [13] VialG. UnderstandingDigitalTransformation: AReviewandaResearchAgenda [J]. TheJournalofStrategicInformationSystems, 2019 (2): 11 8 - 144.
- [14] Liu Donghui, Bai Fuping, Dong Kaiyun. Research on the influence mechanism of digital transformation on Enterprise Performance [J]. Finance and Accounting Communication, 2022 (16): 120 - 124.
- [15] Yu Chang, Ma Luyao, Zeng Xiangang, Ma Dongyan. Can Digital Transformation of Industrial Enterprises Promote energy conservation and emission Reduction? [J]. Environmental Science in China, 2023: 1 - 12.
- [16] Shen Minghao, Tan Weijie, Zhang Wenbo. Does Digital Transformation Improve CSR Performance? [J]. Western Forum, 2022 (03): 63 - 80.
- [17] Zhao Chenyu, Wang Wenchun, Li Xuesong. How does digital transformation affect total factor productivity of enterprises [J]. Finance and Trade Economics, 2021 (07): 114 - 129.
- [18] Wu Fei, Hu Huizhi, Lin Huiyan, Ren Xiaoyi. Corporate Digital Transformation and Capital Market Performance: Empirical Evidence from Stock Liquidity [J]. Management World, 2021 (07): 130 - 144+10.