# Empirical Analysis of The Relationship Between Enterprise Digital Transformation and Enterprise Internal Control Quality

Feier Chen[a]

School of Accounting, Hangzhou Dianzi University, Hangzhou 310000, China;

[a]feierchen11@163.com

**Abstract.** This paper takes a-share listed companies in Shanghai and Shenzhen stock markets from 2009 to 2019 as research samples, adopts text recognition method of big data to measure the degree of enterprise digital transformation, and studies its impact on the quality of enterprise internal control. The empirical results show that digital transformation significantly improves the quality of internal control, and this conclusion is still valid after the robust test. From the analysis of intermediary model, it can be seen that digital transformation can improve the quality of internal control by reducing agency cost. Based on heterogeneity analysis, this paper finds that digital transformation plays a more positive role in the improvement of internal quality control in non-state-owned enterprises, non-high-tech enterprises and enterprises in the decline period. The research conclusion of this paper is helpful to improve the understanding of enterprises' internal control quality research in digital transformation, and provide reference for the improvement of internal quality control of different enterprises.

**Keywords:** Digital transformation; Internal control; Agency costs

## 1. Introduction

Digital economy ushered in a new era of comprehensive development, and the overall maturity of enterprise digital transformation has been greatly improved. Digital transformation has become a necessary option for more industries and enterprises from the choice of some leading enterprises, and has become an important measure to promote enterprise development and revitalize the industry. Moreover, in the context of the current COVID-19 epidemic and the "dynamic zero clearance" policy, digital transformation has played an important role in enterprise management and internal control, further attracting the attention of the business community, political circle, academia and other important fields to digital transformation, and has also become a hot issue in academic research.

At present most scholars study the influence of the digital transformation of enterprises, mainly from the macro to micro, enterprise internal and external this research, a few terms in the external macro research including digital transformation caused by the extension of the traditional organizational boundaries, and the positive role in the aspect of value creating (Xing Xiaoqiang etc., 2021) [1], Studies on the internal macro impact of enterprises mainly focus on operation, knowledge management, innovation, performance, etc. (Yi Luxia et al., 2021) [2], while the micro impact mainly focuses on employee management, organizational structure, leadership style, etc. It can be found that there are few studies on the impact of internal control quality of enterprises, while internal control quality of enterprises plays a very special and important role in protecting the interests of the majority of investors (Jiang Ling et al. 2021) [3]. Since the 1990s, China has introduced relevant policies and formally entered the improvement stage of the internal control system. In recent years, it has also been constantly improving the relevant policies and systems and strengthening supervision. In 2020, the CSRC inspected 20 illegal cases, and 13 cases were caused by internal control defects. The construction and improvement of enterprise internal control system plays an important role in the healthy development of enterprises and the good operation of the industry.

## 2. Theoretical analysis and research hypothesis

Compared with traditional technological innovation, in the era of Industry 4.0, enterprise digital transformation is not a simple innovative application of new technology, but a comprehensive

transformation of development concept, organization mode, business model and operation means. It is not only a strategic transformation, but also a system engineering, which needs to be promoted systematically. And related research shows that the enterprise can by improving the digital information transparency makes management more rational decision-making and make effective decisions, improve the level of corporate governance (Qi HuaiJin etc., 2020) [4], also can effectively improve enterprise in the process of financial management and internal control information transparency, to reduce agency costs, most of these studies mentioned that enterprise digitization can improve enterprise information transparency, reduce the degree of information asymmetry, reduce agency cost and improve operation efficiency.

Combined with the influencing factors of enterprise internal control, including the enterprise organization structure, human resources and enterprise culture and internal environment and external environment factors such as external supervision, the auditor (Qiu Hai-yan, 2018) [5], one of the most critical is the internal environment complexity, the more economic item enterprises face the more risk factors will also will happen, the greater the likelihood. Internal control defects and the enterprises in the digital transition, or after the completion of level reaches a certain degree of digital transformation, by the use of digital technology improve the efficiency of enterprise internal information processing and information disclosure (Jiang Ling and Wang Yanjie, 2021) [3], reducing the degree of opaque internal environment.

Therefore, based on the above analysis, this paper puts forward the core hypothesis:

H1: Under the condition that other conditions remain unchanged, digital transformation of enterprises can promote the improvement of internal control quality by reducing agency cost.

## 3. Study design

### 3.1 Sample selection and data sources

In this paper, relevant data of Chinese A-share listed companies from 2009 to 2019 are selected as the initial research samples, and the data are derived from CSMAR and Wind databases. The relevant data of enterprise digital transformation are obtained by Python program from the annual reports of listed companies (annual reports are obtained from Shanghai Stock Exchange and Shenzhen Stock Exchange). At the same time, in order to improve the data quality, the data are sorted out as follows :(1) excluding ST and *ST with abnormal financial data and samples of financial enterprises (banks, securities, insurance, etc.); (2) Remove samples with missing key indicators; (3) All continuous variables are tail-tailed at the upper and lower 1% level to weaken the influence of outliers. Finally, 11663 observations were obtained.

### 3.2 Specification of variables

#### 3.2.1 Explained variables

Enterprise internal control quality ( $Control$ ). Reference Zhang Chuancai and Chen Han-wen (2017) [6], Zhu Hongxing (2022) [7] for internal control measure methods, this paper adopts the CSMAR database index to measure the internal control of enterprise internal control quality, the higher the quality of internal control, the greater the numerical said at the same time considering the index with digital index difference is too big, so it divided by 100, So it's distributed between 1 and 10.

#### 3.2.2 Core explanatory variables

Enterprise digital transformation ( $Digital$ ). Due to the complexity of measurement of this variable, most current studies mainly focus on theoretical and qualitative analysis, and there are few quantitative studies. At present, there are mainly the following quantitative measures for the digital transformation of enterprises. One is simplification, that is, digital transformation is regarded as a virtual variable (He Fan and Liu Hongxia, 2019) [8]. The second is to measure the digitization of

enterprises by the proportion of digital-transformation-related items in the year-end intangible assets details disclosed in the notes to the financial reports of listed companies to the total intangible assets (Zhang Yongshen et al., 2021; Qi Huaijin et al., 2020) [4, 9]. The third is text analysis method, which uses Python technology to judge the degree of digital transformation of listed companies according to word frequency by capturing corresponding keywords in annual reports (Wu Fei et al., 2021; Yi Luxia et al., 2021) [2, 10]. Combined with this paper, the influence of enterprise digital transformation on the quality of internal control needs to be measured, so this paper adopts the third method for analysis.

Meanwhile, when constructing thesaurus of digital transformation, this paper refers to existing literature (Wu Fei et al., 2021; Yi Luxia et al. 2021), the 14th Five-year Plan for Digital Economy Development, FinTech Development Plan (2019-2021) and other relevant important news and conferences follow the existing mainstream views and divide digital transformation into a two-tier architecture (Wu Fei et al. 2021). The first layer is the underlying technical architecture of artificial intelligence, blockchain, cloud computing, big data and other technologies as the core of enterprise digital transformation (Qi Yudong, Xiao Xu, 2020), and the second layer is technical practice and application. To sum up, this paper summarizes the terms related to digital transformation (see Table 1).

**Table 1.** Vocabulary related to digital transformation

| | | |
|---|---|---|
| Core underlying technology architecture | artificial intelligence | Artificial Intelligence, Business Intelligence, Image understanding, Investment decision support systems, Intelligent data analysis, Intelligent robotics, machine learning, deep learning, semantic search, biometrics, Face recognition, speech recognition, authentication, autonomous driving, natural language processing |
| | blockchain | Big data, data mining, text mining, data visualization, heterogeneous data, credit investigation, augmented reality, mixed reality, virtual reality |
| | cloud computing | Cloud computing, streaming computing, graph computing, memory computing, multi-party secure computing, brain-like computing, green computing, cognitive computing, converged architecture, billion level concurrency, EB-level storage, Internet of Things, information physical systems |
| | data technology | Big data, data mining, text mining, data visualization, heterogeneous data, credit investigation, augmented reality, mixed reality, virtual reality |
| Technical practice application | Application of digital technology | The mobile Internet, Internet, mobile Internet, Internet medical, e-commerce, mobile payment, the third party payment, NFC payment, intelligent energy, B2B, B2C, C2B, C2C, O2O, snatched, intelligence, wisdom, dressing agriculture, intelligent transportation, intelligent medical, intelligent, smart home, intelligent service interest, smart, intelligent, environmental protection, intelligent Power grid, smart marketing, digital marketing, unmanned retail, Internet finance, digital finance, Fintech, Fintech, quantitative finance, open banking |

### 3.2.3 Intervening variable

The digital transformation of enterprises has multidimensional approaches to the quality of internal control. Combined with the viewpoints of some scholars, this paper argues that the digital transformation of enterprises can improve the quality of internal information disclosure, reduce agency costs, and then improve the quality of internal control. Referring to Ge Bangliang, Jiang

Meifang (2008), Geng Min (2016) and other research methods, the intermediary variable total asset turnover ($TATO$) was selected to measure agency cost for further analysis.

### 3.2.4 Control variable

In order to improve the research accuracy, a series of control variables are included in the regression. From the perspective of corporate governance, corporate operation and financial condition, control variables including property rights ($SOE$), establishment years ($Estage$), board size ($lnboard$), proportion of independent directors ($Indenp$), financial leverage level ($Lev$), corporate growth ($Growth$), cash flow ($Cashdire$) and so on are selected. In addition, industry dummy variables and year dummy variables are also set in this paper. See Table 2 for specific variable descriptions.

**Table 2.** Definition and meaning of variables

| Variable type | Variable name | Variable symbol | Variable definition |
|---|---|---|---|
| Explained variables | Internal control quality | Control | Take the natural log of the internal control index and divide it by 100 |
| Explanatory variables | Digital transformation | Digital | Keyword frequency of digital transformation in annual reports of listed companies |
| Intervening variable | Turnover of total capital | $TATO$ | Total sales revenue/total average assets |
| Control variable | Nature of enterprise property rights | $SOE$ | According to the final controller to determine whether state-owned, state-owned value is 1, other values are 0 |
| | Enterprise establishment years | $Estage$ | The natural log of the number of years the company has been established plus 1 |
| | Board size | $lnboard$ | The size of the board takes the natural log |
| | Proportion of independent directors | $Indenp$ | Proportion of independent directors |
| | Financial leverage level | $Lev$ | Ratio of total liabilities to total assets |
| | Enterprise growth | $Growth$ | Increase rate of business revenue |
| | Cash flow | $Cashdire$ | Cash flow ratio calculated by direct method |
| | Industry | $Ind$ | Dummy variable |
| | Year | $Year$ | Dummy variable |

### 3.3 Model construction

Referring to existing research methods, this paper constructs the following model to explain the influence of enterprise digitization on enterprise internal control quality.

$$Control_{i,t}=\alpha_0+\alpha_1 Digital_{i,t}+\alpha_2 CV_{i,t}+\alpha_3 Ind_i+\alpha_4 Year_t+\varepsilon_{i,t} \quad (1)$$

Among them, the explained variable in the regression model is the quality of internal control of the enterprise ($Control$), the core explanatory variable is the degree of digital transformation of the enterprise ($Digital$), $CV$ is the control variable listed above, and $\varepsilon$ is the random error term of the model. In addition, in order to improve the research accuracy and enhance the reliability of results,

the model controls the dummy variables of industry ($Ind$) and year ($Year$) to reduce their fixed effects.

## 4. Empirical results and analysis

### 4.1 Descriptive statistics

Table 3 describes the statistical characteristics of the main study variables. The total number of samples is 11,663. The mean value, variance, median and maximum value of enterprise digital transformation indicators are 1.139, 1.228, 0.693 and 4.595. It can be seen that there is a great difference between individuals in enterprise digital transformation, and the two-level transformation is obvious, and the intermediate level of the industry is far from reaching the average level. The mean value of internal control quality of enterprises is 6.301, variance is 1.568, median is 6.673, and maximum is 8.401. It can be seen that although some enterprises still have a large difference, the intermediate level of internal control quality of the industry is slightly higher than the average value, and the overall internal control quality of the industry is relatively balanced.

**Table 3.** Variable descriptive statistical results

| *Variable* | *N* | *Mean* | *Sd* | *P50* | *Min* | *Max* |
|---|---|---|---|---|---|---|
| *Digital* | 11663 | 1.139 | 1.228 | 0.693 | 0 | 4.595 |
| *Control* | 11663 | 6.301 | 1.568 | 6.673 | 0 | 8.401 |
| *Lev* | 11663 | 0.422 | 0.205 | 0.411 | 0.0550 | 0.925 |
| *Growth* | 11663 | 0.163 | 0.434 | 0.100 | -0.668 | 2.694 |
| *Estage* | 11663 | 2.847 | 0.343 | 2.890 | 1.792 | 3.497 |
| *Cashdire* | 11663 | 0.0810 | 0.188 | 0.0750 | -0.738 | 0.700 |
| *SOE* | 11663 | 0.309 | 0.462 | 0 | 0 | 1 |
| *Inboard* | 11663 | 2.118 | 0.199 | 2.197 | 1.609 | 2.639 |
| *Indenp* | 11663 | 0.378 | 0.0550 | 0.364 | 0.333 | 0.571 |

Note: ***, ** and * are significant at 1%, 5% and 10% levels respectively, with T values in brackets.

### 4.2 Basic model regression results

Table 4 shows the regression results of the relationship between enterprise digital transformation and internal control quality. In regression (1), fixed effects and system variables are not controlled. It can be seen that the results are significant, with t value of 2.690 and regression coefficient of 0.029. In regression (2), when system variables are controlled, t value increases and the coefficient also increases significantly. In regression (3), when fixed effects and system variables are controlled at the same time, the results also change, and both T value and correlation coefficient increase significantly. The above core results show that, when other conditions remain unchanged, enterprise digital transformation has a significant positive effect on the quality of enterprise internal control, that is, enterprise digital transformation can improve the quality of enterprise internal control, which preliminarily proves the logical correctness of this paper.

At the same time, the regression results also show that the quality of internal control is significantly correlated with the level of corporate financial leverage, corporate growth, years of establishment, cash flow, property rights, board size and proportion of independent directors, all of which are significant at the level of 1%. It can be seen from the positive and negative coefficients that the quality of internal control is negatively and significantly correlated with the financial leverage and the establishment year of the enterprise, while the others are positively and significantly correlated.

**Table 4.** Regression results of basic mode

| *Variable* | (1) | (2) | (3) |
|---|---|---|---|
| | Control | Control | Control |
| *D*igital | 0.029***<br>(2.690) | 0.031***<br>(2.958) | 0.099***<br>(7.363) |
| *Controls* | *Yes* | *Yes* | *Yes* |
| *I*nd&*Y*ear | *No* | *No* | *Yes* |
| *N* | 11,663 | 11,663 | 11,663 |

Note: ***, ** and * are significant at 1%, 5% and 10% levels respectively, with T values in brackets.

### 4.3 Robustness test

In order to further improve the robustness of research results, this paper adopts the methods of replacing explanatory variables, sample size and control variables to test the robustness according to existing literatures. For the replacement of explanatory variables, according to the viewpoints of some scholars, it is believed that digital technology is one of the core elements of digital transformation. In this paper, digital technology is used to proxy the degree of digital transformation of enterprises. According to the regression results, there is still a positive correlation, and the conclusion is correct. On sample selection, according to People's Daily, issued the enterprise digital development connotation interpretation ", the total number of mentioned 2013 mobile phone users in China, more than 1 billion for the first time, preliminary build digital industry ecology, so in order to improve the results accuracy, reduce industrial development factors, selected from 2013 to 2019 samples again, This time, the sample size is 10,422, and the measurement result is still significant, and the significance is improved, indicating that in the period of rapid technological development, digital transformation has a more obvious impact on enterprises. As for the replacement of control variables, this paper adopts the variables with increased environmental uncertainty (without industry adjustment) and financing constraints to carry out regression, and the results are still significant at 1% level. The results of the robustness test above are consistent with the previous regression results, and the conclusion is verified again to be correct and the results are relatively robust.

**Table 5.** Robustness test results

| *Variable* | Control | Control | Control | Control |
|---|---|---|---|---|
| *D*igital | 0.099***<br>(7.363) | | 0.105***<br>(7.218) | 0.070***<br>(5.043) |
| *DigitalTech* | | 0.064***<br>(4.567) | | |
| *ENUN* | | | | -1.468***<br>(-10.582) |
| KZindex | | | | -0.256***<br>(-17.853) |
| *Controls*&*I*nd&*Y*ear | *Yes* | *Yes* | *Yes* | *Yes* |
| *N* | 11,663 | 11,663 | 10,411 | 8,626 |

Note: ***, ** and * are significant at 1%, 5% and 10% levels respectively ,with T values in brackets

### 4.4 Mechanism of inspection

Combined with geng Min (2016) [11] et al., this paper puts forward the hypothesis that enterprise digitization can improve operation efficiency, reduce agency cost and improve the quality of

enterprise internal control. To verify this hypothesis, referring to the mediation effect testing procedure of Wen Zhonglin et al. (2014) [12], the total asset turnover ( $TATO$ ) is set as the intermediary variable, and the specific model is set as (2) and (3). The regression results show that enterprise digitization and total asset turnover are significant at 1%, and so are total asset turnover and enterprise control quality. In other words, enterprise digital transformation can indeed improve total asset turnover, reduce agency cost and improve the quality of enterprise internal control. The regression results support the above hypothesis.

$$TATO_{i,t}=\phi_0+\phi_1 Digital_{i,t}+\phi_2 CV_{i,t}+\phi_3 Ind_i+\phi_4 Year_t+\varepsilon_{i,t} \quad \text{.....(2)}$$

$$Control_{i,t}=\varphi_0+\varphi_1 Digital_{i,t}+\varphi_2 TATO_{i,t}+\varphi_3 CV_{i,t}+\varphi_4 Ind_i+\varphi_5 Year_t+\varepsilon_{i,t} \quad \text{.....(3)}$$

**Table 6.** Mechanism test results

| *Variable* | *TATO* | Control |
|---|---|---|
| *D*igital | 0.013***<br>(2.967) | 0.093***<br>(7.048) |
| *TATO* | | 0.459***<br>(9.681) |
| *Controls*&Ind&Year | *Yes* | *Yes* |
| *N* | 11,663 | 11,663 |

Note: ***, ** and * are significant at 1%, 5% and 10% levels respectively, with T values in brackets.

## 5. Further analysis

Although the above analysis confirms that the hypothesis is logical and empirical, it has limited reference value for specific application of the industry. Therefore, in order to focus on the research results, this paper conducts heterogeneity analysis from three perspectives: property rights nature, enterprise life cycle, and whether a high-tech enterprise is a high-tech enterprise.

With the development of digital economy, the present most enterprises are facing the digital transformation of the problem, and the property of the different nature of often lead to different decisions, because of the effect of adopting a state-owned enterprises, management of risk aversion, such as personal interests into consideration, may avoid such as enterprise innovation, the digital transformation of such long-term investment activity (Yan Zhiping, Zhang zhao-guo, 2016) [13], while the non-state-owned enterprises, the severity of market competition and performance needs managers tend to make the enterprise innovation, moreover, studies have shown that in non-state-owned enterprises, the digital transformation of enterprises to explore the promoting effect of r&d spending more (such as Li Feifei 2022) [14], digital transformation by improving the financing environment, Reduce the financing constraints of non-state-owned enterprises, promote the innovation ability of enterprises, and then improve the quality of internal control of enterprises significantly, forming a virtuous cycle.

Whether digital transformation is also closely related and the enterprise life cycle, the reference for the contemporary study of many scholars, mostly from the Angle of the stages are digital transformation, the enterprise shall, in accordance with the growth period, mature period, decline phase to classification, and based on the characteristics of various periods, think enterprise digital technology for growth is most favorable, solving the mismatch of financial resources alleviates financing constraints, and the effect is least obvious in recession. From the perspective of enterprise affordability and development potential, the digital transformation of enterprises in the growth and mature stage is indeed the most favorable, but from the perspective of the urgency of demand, the

declining enterprises should be the most urgent, because their market shrinkage, financial deterioration, organizational rigidity and many other problems lead them into recession. At this point, the digital transformation is actually beneficial to revitalize the enterprise.

In addition, a high and new technology enterprise and the high and new technology enterprises after the digital transition effects to the improvement of the quality of internal control is also a point, this article focuses on the part of the research that high and new technology enterprise with congenital advantage, digital transformation effect would be better in the internal control, but this paper argues that the effect after the transformation, after non-high-tech enterprises transform from traditional technology to digital technology, the improvement of internal control will be greater.

Therefore, this paper believes that the improvement of enterprise internal control quality through digital transformation is more significant in non-state-owned, non-high-tech and declining enterprises.

Table 7 shows the regression results. Columns (1) and (2) show that the results of the two types of enterprises are significant at 1% level. The correlation coefficient between digital transformation and internal control quality of state-owned enterprises is 0.076, while that of non-state-owned enterprises is 0.108, indicating that digital transformation has a more obvious effect on improving internal control quality in non-state-owned enterprises. Columns (3) and (4) show that there is a significant positive correlation between enterprise digital transformation and internal control quality in both recession and non-recession periods. The correlation coefficient of enterprises in recession period is 0.122, and the T value is 5.793, which is significantly higher than that in non-recession period. The results show that the improvement of internal control quality by digital transformation is more significant in the declining enterprises. Columns (5) and (6) show that both results are significant at the level of 1%, while the coefficient of non-high-tech enterprises is 0.123, which is much higher than that of high-tech enterprises, indicating that the application of enterprise digital transformation in non-high-tech enterprises can improve the quality of enterprise internal control. In summary, the above regression results are consistent with the hypothesis of this paper.

**Table 7.** Heterogeneity test results

| *Variable* | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | *Control* | *Control* | *Control* | *Control* | *Control* | *Control* |
| | state-owned | non-state | recession | Non-recession | new high-tech | Non-high-tech |
| *Digital* | 0.076*** (2.680) | 0.108*** (7.066) | 0.122*** (5.793) | 0.074*** (3.287) | 0.086*** (6.081) | 0.123*** (4.273) |
| *Controls&Ind&Year* | *Yes* | *Yes* | *Yes* | *Yes* | *Yes* | *Yes* |
| *N* | 3,606 | 8,057 | 5,078 | 3,735 | 7,268 | 4,340 |

Note: ***, ** and * are significant at 1%, 5% and 10% levels respectively, with T values in brackets.

## 6. Summary

In the context of the rapid development of digital economy and the reconstruction of the world economic landscape, the wave of digital transformation is sweeping in. This paper takes a-share listed companies in Shanghai and Shenzhen stock Markets from 2009 to 2019 as research samples, uses big data text recognition method to measure the degree of enterprise digital transformation, and studies its impact on the quality of enterprise internal control. The main conclusions are as follows :(1) the empirical results show that there is a significant positive correlation between enterprise digital transformation and internal control quality, which indicates that enterprise digital transformation can improve the quality of enterprise internal control, and this conclusion is still valid after the robust test. (2) Through the analysis of intermediary model, this paper finds that digital transformation can reduce agency cost and improve the quality of enterprise internal control. (3) Through heterogeneity analysis,

this paper finds that digital transformation plays a more positive role in the improvement of internal quality control in non-state-owned enterprises, non-high-tech enterprises and enterprises in the recession period. The research conclusion of this paper is helpful to improve the understanding of enterprises' internal control quality research in digital transformation, and provide reference for the improvement of internal quality control of different enterprises.

## References

[1] Xing Xiaoqiang, Tang Xinhui, Wang Jue, et al. Digital platform accountability and shared value creation -- a case study based on Bytedance's poverty alleviation [J]. Management World, 201,37(12):152-176.]

[2] Yi Luxia, Wu Fei, Xu Siyang. Research on the performance driving effect of enterprise digital transformation [J]. Securities Market Review, 2021(8):15-25, 69.

[3] Jiang Ling, Wang Yanjie. Corporate governance, corporate economic characteristics and internal control defects: A Clear set qualitative Comparative Analysis based on 30 Cases [J]. Finance and Accounting Communications, 2021(16):79-83.]

[4] Qi Huaijin, CaoXiuqin, Liu Yanxia. The impact of digital economy on corporate governance: From the perspective of information asymmetry and managers' irrational behavior [J]. Reform, 2020 (04) : 50-64.

[5] Qiu Haiyan. Research on the Influencing factors of internal control defects of enterprises [J]. Time Finance, 2018(18):125-126.

[6] Zhang Chuancai, Chen Hanwen. Accounting Research, 2017(05):75-82. (in Chinese)

[7] Zhu Hongxing. The influence of equity incentive on internal control quality of core employees: An empirical Study based on high-tech enterprises [J]. Shopping Mall Modernization, 2022(06)

[8] He Fan, Liu Hongxia. Evaluation of the performance improvement effect of real enterprises' digital transformation from the perspective of digital economy [J]. Reform, 2019(04):137-148.

[9] Zhang Yongshen, Li Xiaobo, Xing Mingqiang. Audit Research, 2021(03):62-71.]

[10] Wu Fei, Hu Huizhi, Lin Huiyan, et al. Corporate digital Transformation and capital market performance: Empirical evidence from stock liquidity [J]. Management World, 201,37(07):130-144.]