

# ***Research on Financialization, Digital Transformation, and Financing Constraints of Construction Enterprises***

Hu Qi<sup>1,a,\*</sup>

<sup>1</sup>*School of Business Administration, Liulin Campus, Southwest University of Finance and Economics, No. 555 Liutai Avenue, Wenjiang District, Chengdu City, Sichuan Province, China*  
*a. 3069542856@qq.com*

*\*corresponding author*

**Abstract:** In the past, scholars mainly studied the relationship between corporate financialization and digital transformation of the entire economy, without specifically analyzing individual industries. At present, Chinese construction enterprises have encountered development bottlenecks and further research is needed. Against the backdrop of the significant trend of financialization in Chinese enterprises and the new strategic deployment proposed by the Chinese government in 2023, the task of digital transformation for construction enterprises is urgent. This article chooses to use panel data of Chinese construction industry listed companies from 2012 to 2022 for empirical testing to investigate the relationship between financialization and digital transformation of construction enterprises. Research has found that: (1) Corporate financialization can make positive effect on digital transformation activities of construction enterprises; (2) Financialization of construction enterprises can alleviate financing constraints; (3) Financialization of construction enterprises weakens the inhibitory effect of financing constraints on enterprise digitization.

**Keywords:** digital transformation, enterprise financialization, financing constraints, internal control.

## **1. Introduction**

The construction industry is a pillar industry of China's national economy, providing tens of thousands of job opportunities. Its characteristic is a high debt ratio, and the development of the entire industry is easily influenced by social financing and national monetary policy. Therefore, the financing status of the construction industry has attracted much attention. In recent years, with the development of the global new round of technological revolution and industrial revolution, the country has emphasized the need to accelerate the digital transformation and upgrading of traditional industries and build digital industry clusters with international competitiveness. At present, the digital development of construction enterprises is defined as the process of high-quality development of enterprises based on informatization, using digital technology inputs such as BIM, the Internet and cloud computing, integrating internal and external resources of enterprises, building information interaction and collaboration platforms, and carrying out comprehensive transformation and governance of technology, organization and management in the whole life cycle of buildings, so as to achieve project refinement, construction industrialization and process digital output. Digital transformation and

upgrading have become a key way for the supply side structural reform, innovative business models, and improved productivity in the construction industry. Therefore, accelerating the digitalization of construction enterprises is urgent. As a high-density labor production industry, construction enterprises generally rely on fixed investment assets, leading to excessive competition and low profit margins. Therefore, this study takes whether moderate financialization of construction enterprises can effectively suppress financing constraints and promote digital transformation of construction enterprises as the research object, and explores its mechanism of action.

## **2. Literature Review**

### **2.1. Financialization and Digitalization**

Corporate financialization is the process of allocating assets to financial investments to obtain more non-productive business investments and capital operations [1]. There have been many empirical studies in recent years on the impact of corporate financialization on digital transformation. Huang Dayu et al. [2] found through web crawling technology that the financialization of enterprises will have significant adverse effects on their financial behavior, financing status, production input, and innovation output, thereby inhibiting digital transformation. However, Yin Xianan and Zhan Ximing and other scholars have found that there is an inverted U-shaped relationship between corporate financialization and digital transformation[3]. It means moderate allocation of financial assets is conducive to corporate digital transformation, while excessive allocation of financial assets is not conducive to corporate digital transformation. In summary, scholars currently have inconsistent discussions on the relationship between corporate financialization and digitization, and this article will focus on the construction industry to study the impact of financialization on digital transformation.

### **2.2. Financing constraints and digitalization**

The tightening of the global financial environment has increased the pressure on corporate financing, bringing negative impacts to corporate financing. Meanwhile, due to issues such as information asymmetry and moral hazard in different corporate innovation activities, corporate innovation is more constrained by financing constraints [4]. Most scholars believe that financing constraints have a suppressive effect on innovation of different kinds of companies. Zhang Jie et al. [5] found that the suppressive characteristics of China's financial system and the lagging development of finance have caused significant negative impacts on innovation investment due to financing constraints of private enterprises. The topic of the impact mechanism of corporate financialization, financing constraints, and corporate innovation has been widely studied in recent years. The research by Li Huirong and Zhao Xiaoke [6] shows that moderate financialization of enterprises can promote the improvement of innovation capabilities to a great extent; Financing constraints have a partial mediating effect on the impact of corporate financialization on innovation, and corporate financialization promotes innovation by alleviating financing constraints. In the research and analysis of digital transformation innovation activities, most literature is about the alleviating effect of enterprise digitization on financing constraints, but there is no research on the impact of financing constraints on digital transformation in different industries, nor on the relationship mechanism between financialization, digital transformation, and financing constraints. Therefore, this article takes the construction industry as an example to conduct research on this issue.

### **3. Theoretical analysis and research hypotheses**

#### **3.1. Financialization and digital transformation of construction enterprises**

The digital transformation of construction enterprises is a continuous and lengthy investment process, requiring high costs for professional equipment and digital technology personnel. Enterprises need to maintain stable and sustained investment. If the funds are insufficient to support the digital project expenses of the construction company, the company will prioritize daily engineering projects. In addition, the process of obtaining research and development results for digital projects is uncertain, so external financing institutions pay more attention to the risk level of project research and development, which may increase the company's financing costs. According to research on financial asset allocation, financialization of enterprises has a reservoir effect, which helps to activate idle funds, enrich cash flow, alleviate financing constraints and insufficient investment, ensure the sustainability of R&D and innovation capital investment, serve the business strategy of physical enterprises, and effectively promote digital transformation of enterprises. Therefore, the following hypothesis H1 is proposed:

H1: Corporate financialization can promote digital transformation activities of enterprises

#### **3.2. Financialization and Financing Constraints of Construction Enterprises**

In recent years, construction enterprises in China have still developed through self financing. At present, due to bank credit discrimination and serious mortgage phenomena, lack of guarantee system, low credit rating and small scale of construction enterprises, and lack of core competitiveness, the financing methods of construction enterprises are narrow, the direct financing effect is poor, and indirect financing is difficult. Therefore, the most prominent problem faced by construction enterprises is financing difficulty. In this context, holding cash at low cost and allocating financial assets with strong liquidity and liquidity has become an important way for construction companies to reserve funds. This approach can strengthen communication and cooperation with financial institutions, broaden their own financing methods and channels, and effectively alleviate the financing constraints faced by construction enterprises. Therefore, the following hypothesis H2 is proposed:

H2: Financialization of construction enterprises has a relieving effect on financing constraints

#### **3.3. Financialization, Financing Constraints, Digital Transformation of Construction Enterprises**

External financing plays an important role in promoting the digital transformation of construction enterprises. The alleviation of financing constraints can help companies adopt proactive competitive strategies and provide sustained financial support for digital transformation projects that enhance enterprise value. Therefore, under the financialization conditions of construction enterprises, financing constraints have an impact on the digitalization of enterprises through their resource allocation strategies. The financialization of enterprises gives them liquidity advantages, thereby smoothing out digital transformation risks and indirectly stabilizing management's expectations for digital transformation. This has a long-term incentive effect on enterprises' investment in digital transformation. Therefore, the hypothesis H3 is proposed:

H3: The financialization of construction enterprises weakens the inhibitory effect of financing constraints on digitalization of enterprises

## 4. Research Design

The research data is sourced from A-share listed companies in Shanghai and Shenzhen from 2012 to 2022. Process the initial sample as follows: (1) Exclude ST listed companies; (2) Exclude samples with missing values in variables. After the above processing, this article finally obtained 461 observation values. The financial data of the sample companies in this article is sourced from the CSMAR Guotai An database.

### 4.1. Variables

Asset financialization (FIN): Drawing on the research of Hu Haifeng et al., the degree of financialization of corporate assets is defined as the ratio of corporate financial assets to total corporate assets multiplied by 100%. Financial assets include net held to maturity investments, trading financial assets, net available for sale financial assets, net investment property, and long-term equity investments.[7]

Digital Transformation of Construction Enterprises (DIG): Drawing on the method of Wu Fei et al. [8], the frequency of digital technology words in the annual reports of listed companies is used as a proxy indicator for the degree of digital transformation.

Financing constraint (Lev): This article uses the asset liability ratio to represent it. The extensive development model of borrowing for development and profit for scale was prevalent among construction enterprises, so it is believed that it can be represented by a single indicator asset liability ratio.

This article selects the following indicators as control variables: Return on Assets (ROA), Return on Equity (ROE), and the shareholding ratio of the top ten shareholders (Cr10). Companies with relatively high returns on total assets and net assets tend to operate their equity capital more quickly, with high profit margins and less financing constraints. As a result, their investment in digital transformation is also increased. The more concentrated the equity structure, the faster and more centralized the decision-making, which is conducive to enterprises responding quickly to market changes and making digital attempts.

### 4.2. models

$$DIG_{i,t} = \alpha_0 + \alpha_1 FIN_{i,t} + \alpha_2 ROA_{i,t} + \alpha_3 ROE_{i,t} + \alpha_4 Cr10_{i,t} + \varepsilon_i,$$

$$Lev_{i,t} = \beta_0 + \beta_1 FIN_{i,t} + \beta_2 ROA_{i,t} + \beta_3 ROE_{i,t} + \beta_4 Cr10_{i,t} + \varepsilon_i$$

$$DIG_{i,t} = \gamma_0 + \gamma_1 FIN_{i,t} + \gamma_2 Lev_{i,t} + \gamma_3 ROA_{i,t} + \gamma_4 ROE_{i,t} + \gamma_5 Cr10_{i,t} + \varepsilon_i$$

Among them,  $i$  represents the enterprise, and  $t$  represents the year. DIG is the dependent variable, representing the digital transformation of construction industry enterprises; Lev represents the degree of financing constraints for construction enterprises; FIN stands for the Financialization Index of Construction Enterprises; ROA, ROE, and Cr10 are control variables,  $\alpha$ ,  $\beta$ , and  $\gamma$  are regression coefficients, and  $\varepsilon$  represents the random error term.

## 5. Empirical analysis

### 5.1. Descriptive statistics

Table 1 shows the descriptive statistical results of the variables, with a total of 462 observations obtained. The statistical information includes observations, mean, standard deviation, minimum value, and maximum value. The standard deviation of enterprise digital transformation (DIG) is 91.5%, indicating a significant difference in innovation levels between companies and therefore a large distribution of data. The standard deviation of enterprise financialization (FIN) is 6.81%, indicating

that the differences in enterprise financialization are relatively small. The standard deviation of financing constraint (Lev) is 17.0%, indicating relatively large differences in data distribution. The operating efficiency of a company's equity capital is measured by controlling for the return on equity (ROA) and return on equity (ROE) as variables, with standard deviations of 6.87% and 0.203, respectively, indicating a significant difference in sample data between the two. The average shareholding ratio (Cr10) of the top ten shareholders is 61.03%, with the highest shareholding ratio reaching 97.50%, demonstrating the centralized nature of the company's equity structure.

Table 1: Descriptive statistics

|           | (1) | (2)     | (3)    | (4)      | (5)   |
|-----------|-----|---------|--------|----------|-------|
| VARIABLES | N   | mean    | sd     | min      | max   |
| FIN       | 462 | 0.0489  | 0.0681 | 8.40e-07 | 0.773 |
| DIG       | 462 | 1.751   | 0.915  | 0.693    | 5.829 |
| ROE       | 462 | 0.0402  | 0.203  | -1.731   | 0.491 |
| ROA       | 462 | 0.00856 | 0.0687 | -0.797   | 0.117 |
| Lev       | 462 | 0.664   | 0.170  | 0.0478   | 0.994 |
| Cr10      | 462 | 61.03   | 14.33  | 26.20    | 97.50 |

## 5.2. Correlation analysis

The Pearson coefficient in the correlation analysis of Table 2 indicates a positive correlation between enterprise digital transformation and enterprise financialization, and a negative correlation with financing constraints, which is consistent with the previous hypothesis. However, correlation analysis can only briefly describe the correlation between two individual variables, without considering the overall impact of other factors, so further regression analysis is needed.

Table 2: Correlation analysis

| DIG  | FIN                 | Lev                | ROE               | ROA          | Cr10         |
|------|---------------------|--------------------|-------------------|--------------|--------------|
| DIG  | 1                   |                    |                   |              |              |
| FIN  | 0.0921*<br>0.0479   | 1                  |                   |              |              |
| Lev  | -0.1220*<br>0.00870 | -0.2700*<br>0      | 1                 |              |              |
| ROE  | -0.00250<br>0.957   | -0.0961*<br>0.0389 | -0.0502<br>0.282  | 1            |              |
| ROA  | 0.0346<br>0.458     | -0.2734*<br>0      | -0.0411<br>0.379  | 0.8195*<br>0 | 1            |
| Cr10 | 0.0522<br>0.263     | -0.2177*<br>0      | 0.1138*<br>0.0144 | 0.2350*<br>0 | 0.2156*<br>0 |

### 5.3. Regression analysis

According to the regression results of model 1 in Table 3, it can be concluded that enterprise financialization promotes digital transformation of enterprises ( $\beta=2.097$ ,  $p<0.01$ ). When the degree of enterprise financialization increases by one unit, the digital transformation of enterprises increases by 2.097%. The reason is that enterprises can obtain higher profits through financialization, which in turn provides more research and development funds and enhances the company's digital transformation capabilities. Hypothesis 1 has been verified. From model 2, it can be seen that corporate financialization significantly alleviates financing constraints. An increase of one unit in corporate financialization will reduce financing constraints by 0.670 units. This indicates that companies have increased their profits and cash flow through financialization. The improvement in profits helps companies gain a good reputation, leading to more external capital investment, effectively alleviating financing constraints, and to some extent solving the problem of insufficient research and development funds. Hypothesis 2 is also verified. From the regression results of model 3, it was found that when enterprise financialization and the financing constraints faced by enterprises were placed in the same model, enterprise financialization had a significant positive promoting effect on enterprise digital transformation, while financing constraints had a significant negative inhibitory effect on enterprise digital transformation. As the coefficient values before the enterprise financialization variable in model 1 and model 2 were 2.097 and -0.670, respectively, and both were significant at the 1% level, and the regression coefficients of enterprise financialization and financing constraint variables were significant in model 3, it was concluded that enterprise financialization had a positive impact on enterprise digital transformation, and financing constraints played a partial mediating role in it. Enterprise financialization promoted enterprise digital transformation by alleviating financing constraints. Assumption 3 is validated

Table 3: Regression analysis

| VARIABLES         | (1)<br>DIG         | (2)<br>Lev           | (3)<br>DIG          |
|-------------------|--------------------|----------------------|---------------------|
| FIN               | 2.097***<br>(2.73) | -0.670***<br>(-4.87) | 1.717**<br>(2.19)   |
| Lev               |                    |                      | -0.567**<br>(-2.18) |
| ROA               | 2.380**<br>(2.11)  | -0.335*<br>(-1.66)   | 2.189*<br>(1.94)    |
| ROE               | -0.681*<br>(-1.83) | 0.015<br>(0.22)      | -0.673*<br>(-1.81)  |
| Cr10              | 0.005*<br>(1.65)   | 0.001*<br>(1.66)     | 0.006*<br>(1.82)    |
| Constant          | 1.344***<br>(6.65) | 0.643***<br>(17.76)  | 1.708***<br>(6.53)  |
| Observations      | 461                | 461                  | 461                 |
| R-squared         | 0.023              | 0.064                | 0.033               |
| F test            | 0.0292             | 4.08e-06             | 0.00842             |
| r <sup>2</sup> _a | 0.0147             | 0.0561               | 0.0228              |
| F                 | 2.719              | 7.839                | 3.143               |

t-statistics in parentheses

\*\*\*  $p<0.01$ , \*\*  $p<0.05$ , \*  $p<0.1$

## 6. Conclusion and Suggestions

### 6.1. Conclusion

The financialization of construction enterprises promotes their digital transformation. The financialization of construction enterprises has reduced cost losses, minimized economic expenditures, diversified development, and diversified risks, ultimately increasing corporate profits and enhancing the company's digital transformation capabilities. However, financing constraints have led to a lack of research and development funds, hindering the digital transformation of construction enterprises. Financing constraints play a partial mediating role in the impact of financialization on the digital transformation of construction enterprises. Financialization of construction enterprises promotes digital transformation by alleviating financing constraints. The financialization of construction enterprises significantly improves their cash flow, alleviates financing constraints, enables them to invest more research and development funds, and effectively enhances their digital transformation capabilities.

### 6.2. Suggestions

Reasonably guide the financialization of construction enterprises and effectively integrate enterprise and financial capital. Construction companies should effectively integrate the capital of physical and financial enterprises to promote digital transformation and sustainable development. At present, the financialization level of many construction enterprises in China is not high, and they only consider investment profits, and cannot quickly and effectively convert financial capital into construction capital. Therefore, construction enterprises should improve their financialization level on the basis of stabilizing their nuclear business, play a positive role in financialization, and serve the company's digital transformation strategy.

Encourage financial institutions to carry out financial innovation for digital transformation projects of construction enterprises. Promote diversified credit products and financial services to broaden the financing channels for enterprise research and development activities, promote the development of intermediary service institutions that provide guarantees for the digital transformation and innovation of construction enterprises, and provide more effective financial intermediary services for the digital transformation of construction enterprises.

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