

Market Competitive Position of Small and Medium-sized Enterprises and Digital Transformation

Liwei Song

School of Anhui University of Finance and Economics, Bengbu 233000, China

Abstract

Based on the data of small and medium-sized listed companies from 2010 to 2020, this paper empirically explores the relationship between the market competitive position of SMEs and digital transformation and its internal mechanism. The results show that: (1) there is a positive correlation between the market competitive position of small and medium-sized enterprises and the degree of digital transformation. (2) financing constraints and environmental uncertainty play a partial intermediary effect between them, that is, the higher the market competitive position of small and medium-sized enterprises, the lower their financing constraints and environmental uncertainty, and the higher the degree of digital transformation. (3) Executive incentive negatively regulates the relationship between the two, that is, the higher the degree of executive incentive, the weaker the positive correlation between market competitive position and digital transformation.

Keywords

Market Competitive Position; Digital Transformation; Financing Constraints; Environmental Uncertainty; Executive Incentive.

1. Introduction

In 2021, the Central Economic Work Conference of China proposed to vigorously develop the digital economy. With the vigorous development of emerging technologies such as the Internet of Things, artificial intelligence, and big data, as the focus of promoting high-quality development, the development of the digital economy is an inevitable trend, and its importance and necessity are self-evident. In the current situation of digital economy development, it is of great practical significance for individual enterprises to carry out Digital transformation. However, Digital transformation of Chinese enterprises is characterized by unbalanced development. Many enterprises, especially SMEs with relatively weak resources and capabilities, face many obstacles and challenges on the path of Digital transformation. Digital transformation is a whole process from top to bottom. It needs to build a digital platform, rely on the support of digital technology, form digital products and services, and then create value and benefits for enterprises. As an important component of China's economic development, SMEs are greatly affected by the impact of the epidemic, and their Digital transformation has practical significance for promoting China's digital economy development [1]. Therefore, this paper focuses on Digital transformation of SMEs. The importance of Digital transformation for enterprise development has been expressed by many scholars. However, few scholars have explored the influencing factors and path mechanism of enterprise Digital transformation.

Based on this, this paper focuses on SMEs and raises the following questions: Is the degree of Digital transformation affected by the competitive position of enterprises, and what is the impact mechanism? For those small and medium-sized enterprises with low competitiveness, can executive incentive mitigate the negative impact on Digital transformation caused by their low market competitive position?

2. Research Hypothesis

2.1. Impact of Market Competitive Position on Digital Transformation.

Digital transformation is not just subversion or technology, it is a comprehensive product of a series of interdependent behaviors such as digital platform building, digital talent training, digital technology development, digital products or services online, and it is a change at the overall level of enterprises. Therefore, many enterprises face obstacles and difficulties in the path of Digital transformation, especially SMEs. Small and medium-sized enterprises face fierce market competition, and they have inherent vulnerabilities in resource acquisition, innovation ability, risk taking, and other aspects that they cannot escape. The development of China's digital economy shows a significant characteristic of uneven development, which is reflected in the uneven development of regions and industries. [2] From a more microscopic perspective, the degree of Digital transformation of enterprises of different sizes and market competitive positions is also heterogeneous. Enterprises with high competitive position in the market have rich resources and high-quality R&D output by virtue of their incumbent advantages, and are more competitive and resistant to failure risks on the path of Digital transformation. Low competitive enterprises, on the one hand, lack sufficient funding supply themselves, and due to the existence of information asymmetry, they face high financing constraints. Under the dual impact of internal and external resource scarcity, the path of transformation is difficult and bumpy. In summary, Hypothesis 1 is proposed:

H1: There is a positive correlation between the market competitive position of SMEs and Digital transformation.

2.2. The Intermediary Role of Financing Constraints in the Impact of Market Competitive Position on Digital Transformation.

Enterprise Digital transformation should first pay attention to basic research, and build infrastructure to lay the foundation for the development of digital economy. Secondly, it is necessary to build a digital platform, systematically analyze consumer needs from both the production and consumption sides, and adjust enterprise strategies and policies in a timely manner. [3] Therefore, every link of Digital transformation cannot be separated from the supply and support of funds. Although China is constantly improving relevant systems and promoting the healthy and orderly development of the financial market to help enterprises reduce financing costs, the situation of financing difficulties for small and medium-sized enterprises still exists. The financing constraints faced by SMEs in a low market competitive position are particularly obvious. Low competitive enterprises face lower self capital reserves and higher financing constraints. Compared with the Digital transformation path, which requires continuous investment of large amounts of funds and has a high risk of output results, they are more inclined to invest funds in "short and smooth" projects with short operating cycles and low operating risks. [4] The enterprises with higher market competitive position have lower internal capital reserves and external financing constraints, thus helping them to successfully carry out Digital transformation. In summary, Hypothesis 2 is proposed:

H2: Financing constraints play a part of the mesomeric effect in the relationship between market competitive position and Digital transformation.

2.3. The Intermediary Role of Environmental Uncertainty in the Impact of Market Competitive Position on Digital Transformation.

The evolution of economic globalization, the reform of market economy system, and the innovative development of science and technology all remind Chinese enterprises to face a major practical challenge: environmental uncertainty. The higher the environmental uncertainty, the higher the degree of information asymmetry faced by enterprises, the higher

the difficulty of obtaining information and the degree of information distortion, and the greater the difficulty of evaluating the feasibility and accuracy of decision-making plans by enterprises. In other words, high environmental uncertainty is not conducive to effective decision-making; On the other hand, environmental uncertainty increases the probability of enterprise failure. Based on the "principal-agent theory", enterprise decision-makers, as "rational economic people", are more inclined to reduce resource investment and R&D innovation in order to avoid risks as much as possible and reduce their own economic losses, thus impeding the Digital transformation of enterprises. The transformation of the digital economy inevitably faces organizational change. On the one hand, organizational change needs to ensure consistency between organizational structure and enterprise development, and on the other hand, it also needs to adapt to changes in the environment in a timely manner. Therefore, environmental uncertainty increases the difficulty of organizational change, hinders the transformation of the digital economy, and reduces the vitality of enterprise operations. Enterprises with high market competitive position have strong anti risk ability, and the impact of environmental uncertainty on enterprises is lower, that is, enterprises face lower environmental uncertainty, which is conducive to the development of Digital transformation of enterprises. In summary, Hypothesis 3 is proposed:

H3: Environmental uncertainty plays a part of the mesomeric effect in the relationship between market competitive position and Digital transformation.

3. Research Design

3.1. Digital Transformation.

This paper explores the relationship between market competitive position and Digital transformation with the sample of SMEs and GEM enterprises from 2010 to 2020. The data was processed as follows: Firstly, ST and PT data with abnormal financial indicators were deleted; Considering the significant fluctuations in data in the financial industry, excluding the financial industry; Delete samples with missing data; Delete samples with industry changes. After processing, a total of 1192 enterprise samples and 5333 total data were obtained. At the same time, in order to eliminate the impact of outlier on the data results, the data is shrunk by 1%. All the research data in this article comes from the CSMAR database.

3.2. Variable Measurement

3.2.1. Dependent Variable

Digital transformation: previous scholars mainly measured the degree of Digital transformation of enterprises from two aspects: first, through information assets, information system applications and other indicators; The second is to conduct a questionnaire survey. Both have a single dimension and have certain limitations. This paper uses the text analysis method of Yuan Chun et al. to measure the degree of Digital transformation with the frequency of key words mentioned in the enterprise annual report as a proxy variable.

3.2.2. Independent Variable

Market competitive position: The measurement indicators of market competitive position include weighted scoring method, questionnaire survey method, Lerner index method, etc. Based on the objectivity and measurability of the data, this article uses the Enterprise Lerner Index to measure market competitive position. Lerner index reflects the monopoly power of enterprises in the market by measuring the deviation between price and marginal cost. The calculation formula is $L=(P-MC)/P$, and the Lerner index varies between 0 and 1. The larger the value, the higher the competitive position of the enterprise in the market. When the Lerner index is 1, it indicates that the enterprise is in a completely monopolistic position in the market.

3.2.3. Mediating Variable

Financing constraints: The SA index, which takes into account the age and size of the enterprise, has a higher degree of measurement of financing constraints. The higher the SA index, the higher the financing constraints faced by the enterprise.

Environmental uncertainty: Referring to the measurement indicators of scholars such as Shen Huihui, the degree of abnormal fluctuations in enterprise operating income is used to measure environmental uncertainty. The specific calculation value is obtained by dividing the abnormal income of the enterprise in the past five years by the average income of that five years, and then adjusting it by the industry. The larger the value, the greater the uncertainty of the enterprise environment.

3.2.4. Control Variable

Using the research of Chen Qingjiang and other scholars for reference, we selected R&D investment, human resources, asset structure, etc. as the control variables that affect Digital transformation.

3.3. Model Building

Firstly, to validate hypothesis one, construct a model (1).

$$DI_{i,t} = \alpha + \beta PCM_{i,t} + \sum \delta_k Firm_control_{k,i,t} + \varepsilon_{i,t} \quad (1)$$

To verify hypothesis 2, build models (2) and (3) based on model (1).

$$SA_{i,t} = \alpha + \beta PCM_{i,t} + \sum \delta_k Firm_control_{k,i,t} + \varepsilon_{i,t} \quad (2)$$

$$DI_{i,t} = \alpha + \beta PCM_{i,t} + \gamma SA_{i,t} + \sum \delta_k Firm_control_{k,i,t} + \varepsilon_{i,t} \quad (3)$$

To verify hypothesis three, build models (4) and (5) based on model (1).

$$EU_{i,t} = \alpha + \beta PCM_{i,t} + \sum \delta_k Firm_control_{k,i,t} + \varepsilon_{i,t} \quad (4)$$

$$DI_{i,t} = \alpha + \beta PCM_{i,t} + \gamma EU_{i,t} + \sum \delta_k Firm_control_{k,i,t} + \varepsilon_{i,t} \quad (5)$$

In the model, $DI_{i,t}$ is the degree of Digital transformation of the explained variable, which represents the degree of Digital transformation of enterprise i in year t . $PCM_{i,t}$ is the explanatory variable, representing the market competitive position of enterprise i in year t . If the coefficients of $PCM_{i,t}$ in model (1) are significantly positive, then assumption 1 holds. Models (2), (3), (4) and (5) are used to test the mesomeric effect.

4. Empirical Results and Analysis

4.1. Impact of Market Competitive Position on Digital Transformation

Model (1) aims to test the relationship between market competitive position and Digital transformation, and conducts multiple regression analysis with market competitive position as the independent variable and Digital transformation as the dependent variable. The first column of the table did not add control variables, resulting in a positive correlation between DI and PCM at the 1% level; The second column of the table added control variables, resulting in a significant positive correlation between DI and PCM at the 1% level. The research results show

that the higher the market competitive position is, the higher the degree of Digital transformation is. The results support the hypothesis one.

Table 1. Hypothesis 1 Regression Results

variable	DI	
	No adjustment variables	With adjustment variables
PCM	27.44*** (6.434)	21.02*** (3.999)
RD		3.57e-08*** (8.838)
HR		-0.000880*** (-5.223)
L		-2.659 (-0.775)
CS		50.91*** (5.910)
G		0.0656*** (6.023)
Constant	17.40*** (28.13)	11.64*** (5.736)
Observations	5,333	4,252
R-squared	0.15	0.21

Robust t-statistics in parentheses.

*** p<0.01, ** p<0.05, * p<0.1.

4.2. Mesomeric Effect of Financing Constraints

Table 2. Hypothesis 2 Regression Results

variable	(2)	(3)
	SA	DI
PCM	-0.0787** (-2.479)	20.63*** (3.950)
RD	0** (1.977)	3.59e-08*** (8.901)
HR	4.52e-06*** (5.237)	-0.000858*** (-5.066)
L	-0.0602*** (-2.843)	-2.953 (-0.861)
G	-0.000161*** (-2.888)	0.0648*** (5.981)
CS	0.449*** (9.669)	53.11*** (6.036)
SA		-4.885** (-2.100)
Constant	-3.793*** (-285.8)	-6.891 (-0.744)
Observations	4,252	4,252
R-squared	0.042	0.075

Robust t-statistics in parentheses.

*** p<0.01, ** p<0.05, * p<0.1.

Models (2) and (3) test the mesomeric effect of financing constraints between market competitive position and Digital transformation. The regression results of Hypothesis II are shown in Table 2. The PCM coefficient in the first column of the table is negative and significant at the 5% level, indicating a linear correlation between financing constraints and market competitive position. The higher the market competitive position, the smaller the financing constraints. The second column of the table shows the regression results of PCM and SA on DI. The results show that PCM and DI are positively correlated at the level of 1% significance, while SA and DI are negatively correlated at the level of 5% significance. This result confirms the existence of the mesomeric effect. Market competitive status will affect the financing constraints of enterprises, and then affect the Digital transformation of enterprises. Hypothesis 2 is verified.

4.3. Mesomeric Effect of Environmental Uncertainty

Models (4) and (5) test the mesomeric effect of environmental uncertainty between market competitive position and Digital transformation. The regression results of Hypothesis 3 are shown in Table 3. The EU coefficient in the first column of the table is negative and significant at the 5% level, indicating a negative correlation between environmental uncertainty and market competitive position. That is to say, the higher the competitive position in the market, the less uncertainty the enterprise faces in the environment. The second column of the table shows the regression results of PCM and EU on DI. The results show that PCM and DI are positively correlated at the level of 1% significance, while EU and DI are negatively correlated at the level of 1% significance. This result confirms the existence of the mesomeric effect. Market competitive position will affect the environmental uncertainty of enterprises, and then affect the Digital transformation of enterprises. Hypothesis 3 is verified.

Table 3. Hypothesis 3 Regression Results

	(4)	(5)
variable	EU	DI
PCM	-0.457**	21.66***
	(-2.302)	(4.115)
RD	0	3.57e-08***
	(0.465)	(8.767)
CS	0.842***	49.73***
	(2.979)	(5.748)
G	0.000508	0.0648***
	(1.608)	(6.039)
HR	-2.03e-05***	-0.000852***
	(-3.790)	(-5.060)
L	1.044***	-4.121
	(8.624)	(-1.193)
EU		-1.401***
		(2.598)
Constant	0.960***	10.29***
	(12.58)	(5.005)
Observations	4,252	4,252
R-squared	0.034	0.076

Robust t-statistics in parentheses.

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

5. Main Research Conclusions and Inspirations

Based on the current reality of China, this paper studies the relationship between the competitive position of enterprises in the market and the degree of Digital transformation by taking small and medium-sized enterprises in China from 2010 to 2020 as data samples, and draws the following conclusions:

(1) The competitive position of SMEs in the market is positively correlated with the degree of Digital transformation.

(2) Financing constraints and environmental uncertainty play a part of the mesomeric effect between the two.

(3) The negative regulation of executive motivation regulates the relationship between the two. This article conducts in-depth and close research and analysis on the influencing factors and mechanisms of technological innovation based on the current national conditions, and proposes the following suggestions:

(1) The competitive position of SMEs in the market is positively related to the degree of Digital transformation. Small and medium-sized enterprises have greater difficulties and obstacles in the path of Digital transformation. Small and medium-sized enterprises in competitive disadvantage face more intense market competition, transformation pressure, difficulty in employment and technological innovation in Digital transformation. As an important individual that forms the lifeline of the national economy, it is necessary to clarify their position in competition and actively take measures to enhance their competitive strength. Enterprises with comparative competitive advantages should also enhance their sense of hardship. While considering the development of enterprises, they should increase R&D investment, promote the development of enterprise technology innovation, accelerate the process of Digital transformation, and assume the social responsibility of promoting the development of national technology innovation and digital economy.

(2) This paper studies and constructs the impact mechanism of market competitive position financing constraints/environmental uncertainty Digital transformation, and reveals the intermediary role of financing constraints and environmental uncertainty between the two. Firstly, the country should standardize the financing system, designate a scientific and effective information disclosure system, reduce the arbitrariness of enterprise related information disclosure, actively create a good financing environment, and alleviate the financing constraints caused by information asymmetry. Secondly, the government should create a stable development environment for small and medium-sized enterprises through measures such as formulating relevant policies and strengthening supervision, and reduce the environmental uncertainty faced by enterprises. [5].

(3) Executive incentive will also affect the Digital transformation of enterprises. In order to make up for the disadvantages of Digital transformation brought by the low competitive position of enterprises, we will reduce the principal-agent problem and alleviate the "myopia" phenomenon of executives through shareholding incentive for executives. Enterprises should reasonably formulate management performance incentive systems, improve performance appraisal policies, and consider equity incentive as the main incentive means, so as to promote executives to more fully develop the company in the long run, and then continue to promote the development of Digital transformation.

References

- [1] Wu Jing, Zhang Feng, Sun Yi, Zhu Yongbin, Liu Changxin. Anti epidemic situation boosts China's Digital transformation: opportunities and challenges [J]. Journal of the Chinese Academy of Sciences, 2020,35 (03): 306-311.

- [2] Zhang Xiaheng. Obstacles, drivers and path dependence of SMEs' Digital transformation-based on a survey of 377 SMEs in the tertiary industry [J]. China Circulation Economy, 2020,34 (12): 72-82.
- [3] Wang Chunying, Chen Hongmin. Research on Digital transformation of Enterprises in the Context of Digital Economy [J]. Management Modernization, 2021,41 (02):29-31.
- [4] Charles Chang. Networking China: The Digital Transformation of the Chinese Economy[J]. The Journal of Asian Studies,2019,78(3).
- [5] Chen ChunLiang,Lin YaoChin,Chen WeiHung,Chao ChengFu,Pandia Henry. Role of Government to Enhance Digital Transformation in Small Service Business[J]. Sustainability,2021,13(3).