The Impact of CEO Risk Preference on Enterprise Digital Transformation

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ABSTRACT

This paper selects A-share listed companies from 2017 to 2020 as a sample to theoretically analyze and empirically test the impact of CEO risk preference on digital transformation of enterprises and its internal mechanism. The study found that the risk preference of CEO has significantly improved the level of digital transformation of the company. After a series of robustness tests, the conclusion remains unchanged. An IT background reinforces the role of CEO risk preference in promoting digital transformation. The findings not only enrich the research on the driving factors of enterprise digital transformation, but also provide an action guide for enterprises to use CEO risk preference to promote the level of enterprise digital transformation.

Keywords: enterprise digital transformation; STATA statistical analysis; CEO risk preference; CEO IT background

1. INTRODUCTION

Today, underlying digital technologies such as artificial intelligence, blockchain, cloud computing, and big data drive the rise of the digital economy. This means that society has entered the era of digital economy. In order to realize the deep integration of digital and real economy as soon as possible, my country put forward the development strategy of "accelerating digital development and building a digital China" in 2021.

To a large extent, the Chief Executive Officers (hereinafter referred to as the CEOs) determine the allocation mode of the limited resources of the enterprise and the strategic orientation of the enterprise. Their different attitudes towards risk preference will inevitably affect the behavior of enterprises [2]. Digital transformation is a process of continuous trial and error and difficult organizational evolution. The outcome of the transformation is accompanied by high risk and high uncertainty [1]. It can be seen that investing in digital transformation is a risky decision for the CEO. Therefore, it is necessary to deeply study the relationship between CEO risk preference and enterprise digital transformation.

With the rapid development of the digital economy, the role of IT background characteristics is prominent [8]. First of all, the characteristics of IT background will make a deep imprint on the CEO, profoundly affect his behavioral decision-making, and then have an important impact on the digital transformation of the enterprise. Secondly, CEOs with IT-related expertise and experience can not only help organizations improve their understanding and grasp of the value creation path, key tasks and future directions of digital innovation, but also help companies use digital technology to promote corporate innovation and enhance competitiveness.

In view of this, this paper selects A-share listed companies from 2017 to 2020 as a sample to explore the relationship between CEO risk preference, CEO IT background and enterprise digital transformation. The theoretical contributions of this paper: First of all, taking the CEO risk preference and IT background as the driving factors of enterprise digital transformation enriches the driving factor system of enterprise digital transformation. Secondly, the results of this paper provide action guidelines for companies to promote digital transformation.

2. LITERATURE REVIEW AND RESEARCH HYPOTHESES

2.1 CEO Risk Preferences and Enterprise Digital Transformation

In the context of the rise of the digital economy mediated by digital technology, digitalization will become one of the important trends that will change the operation of the entire society and business in the future [7]. Enterprises that rely on digital technology to drive development are ushering in breakthrough development and innovation through digital transformation. However, the outcome of the transformation is accompanied by high risk and high uncertainty. According to the data in the 2020 Accenture "Win-Win Cooperation" report, in actual business practice, nearly half of the Chinese companies surveyed were unable to obtain benefits from digital transformation, causing the "IT paradox"[3]. This not only directly negatively affects the current performance level of the company, but also increases the CEO's performance pressure, and may even threaten the CEO's job security and future reputation. Therefore, investing in the digital transformation of enterprises is a risky decision for the CEO.

According to Barnard, the individual is always the fundamental strategic factor in an organization. Based on Upper Echelons Perspective, business managers tend to influence the formulation and implementation of business strategies based on their own knowledge and experience. As a key member of the enterprise management team, the CEO's personal characteristics, especially his attitude towards risk preference, profoundly affect the strategic decision-making of the enterprise, which in turn affects the digital transformation of the enterprise. The higher risk preference of senior executives, the higher their risk tolerance and failure tolerance [6]. They will also be more optimistic in the face of adverse factors, so they are more inclined to pursue and engage in high-risk and high-return digital transformation investment projects. Risk-averse executives prefer relatively conservative decisions to reduce corporate risk. At the same time, because of their own characteristics of risk absorption and crisis identification, the higher risk preference of CEO tends to invest more actively in digital innovation of the company. When they face the difficult situation of digital transformation, they will also grasp the opportunities behind the risks [9]. Therefore, they can maintain relatively more digital transformation investment than risk-averse executives. Accordingly, the research hypothesis is put forward:

H1: There is a significant positive correlation between CEO risk preference and enterprise digital transformation.

2.2 Moderating Role of CEO IT Background

Firstly, executives with IT background traits tend to be more prominent in digital leadership. CEO with IT backgrounds have rich IT knowledge and experience, and have great advantages in using digital technology for data mining and information processing, and can more accurately grasp the direction of digital innovation. This will reduce the risk that CEO take in the digital transformation process and increase their confidence in the success of their digital transformation [10]. Secondly, CEO with IT background characteristics have a strong ability to carry out digital innovation cooperation. CEO with IT background characteristics can not only use digital technology to quickly exchange knowledge and technology with external partners, but also share digital innovation resources with partners through the network system built by digital technology, thereby improving the speed of digital transformation of the enterprise [5]. Thirdly, there is a shortage of talents in the process of digital transformation of enterprises. Executives with IT background characteristics can often gain the attention of enterprises, which improves the board's tolerance for executives' decision-making failures and ensures the safety of the CEO's position. Therefore, the CEO IT background will strengthen the role of risk preferences in promoting the digital transformation of enterprises. This leads to the following hypothesis:

H2: The CEO IT background positively moderates the relationship between risk preferences and enterprise digital transformation.

3. RESEARCH DESIGN

3.1 Sample Selection and Data Sources

This paper selects A-share listed companies from 2017 to 2020 as the research object. The sample data comes from the database of China Stock Market Accounting Research and the company's annual financial statements. This article deals with the sample as follows: excluding listed companies in finance and insurance related industries; excluding listed companies with incomplete disclosure of relevant data such as digital transformation and risk preference; excluding ST, PT companies; excluding listed companies whose property rights have changed during the study period. In order to eliminate the influence of extreme values, the continuous variables are processed with extreme values of the upper and lower 1%, and finally 5,737 observations of 1,434 sample companies are obtained.

3.2 Variable Measurement

3.2.1 Digital Transformation

Digital transformation reflects the degree of integration of digital technology and enterprise management. This paper calculates the total frequency of enterprise application of artificial intelligence technology, blockchain technology, cloud computing technology, big data technology, and digital technology subdivision indicators in enterprise reports to measure the digital transformation level of enterprises. And this indicator is logarithmically processed to obtain the indicator of the digital transformation of the enterprise.

3.2.2 CEO Risk Preference

Risk preference refers to the psychological characteristics and attitudes of managers when facing uncertain risks in strategic decision-making. There are four main measurement methods for the measurement of risk preference: risk aversion coefficient method, scale method, risk preference influencing factors and self-defined variable method. This paper uses the proportion of risk assets to total assets to measure CEO risk preference. These risk assets include: held-for-trading financial assets, accounts receivable, debt investments, other debt investments, other equity investment vehicles and investment properties [4].

3.2.3 CEO IT Background

The CEO IT background means that the CEO has IT-related expertise and experience. Based on this, a dummy variable of CEO IT background was constructed. When the CEO has IT-related expertise and experience, the CEO IT background variable takes the value 1, otherwise 0. Therefore, this paper identifies the following situations as CEO with IT background: (1) The professional background of the CEO is related to IT, mainly including software development, computer science and technology, information and computer science, electronics and computers, computer application software, signal and information processing, etc.; (2) The previous positions of the CEO are related to IT, mainly including IT engineers, hardware engineers, network maintenance engineers, system analysts, etc.; (3) The former department of the CEO was the IT department, mainly including the software business department, the information technology business department, the network service department, the application software department, etc.; (4) The CEO has served in IT associations or institutions, mainly including software industry associations, electronic information industry associations, IT research institutes, automation research institutes, etc.

3.2.4 Control Variable

In order to make the test more accurate, according to relevant research, this paper controls the following variables: enterprise scale, enterprise age, debt to asset ratio, shareholding ratio of the largest shareholder, enterprise nature, and enterprise industry. The definition of each variable is shown in Table 1.

3.2.5 Model Building

Build a model to verify the impact of CEO risk preference on enterprise digital transformation (1):

$$DT_{i,t} = \alpha + \beta \times MRIP_{i,t} + \gamma \times Control_{i,t}$$
$$+ \sum Industry + \sum Year + \varepsilon_{i,t} \qquad (1)$$

To examine the impact of the CEO's IT background, this paper constructs a moderating effect model that includes the cross-product term of CEO risk preference and its IT background (2):

$$DT_{i,t} = \alpha + \beta \times MRIP_{i,t} + \delta \times PRECEO\_IT_{i,t}$$
$$+ \lambda \times MRIP_{i,t} \times PRECEO\_IT_{i,t} + \gamma \times Control_{i,t}$$
$$+ \sum Industry + \sum Year + \varepsilon_{i,t} \qquad (2)$$

In this model, $control_{i,t}$ is a series of control variables;

$\sum Industry$ and $\sum Year$ are the industry and year fixed effects, respectively.

Table 1: definition of variables

Variable name	Variable symbol	Variable description
Digital transformation	DT	See above for measurement method
CEO risk preference	MRIP	See above for measurement method
CEO IT background	PRECEO_IT	See above for measurement method
Enterprise size	Size	Take the natural logarithm of the total assets of the enterprise at the end of the period
Enterprise age	Age	The length of time from the date of establishment of the enterprise to

		the current year of statistics
Debt to asset ratio	Lev	Ratio of total liabilities to total assets
Ownership concentration	Large	Shareholding ratio of the largest shareholder
Enterprise nature	Soe	State-owned enterprise, denoted as 1, otherwise 0
Industry	Industry	dummy variable
Year	Year	dummy variable

4. EMPIRICAL ANALYSIS AND RESULTS

4.1 Descriptive Statistics

Before regression analysis, descriptive statistics and correlation analysis were performed on each variable. The results are shown in Table 2. The maximum value of the degree of digital transformation is 179, the mean is 21.2, and the standard deviation is 31.86. This not only shows that the level of digital transformation of listed companies in my country is generally low, but also that the level of digital transformation is uneven, with obvious differences. The mean value of the CEO risk preference level is 0.198, the maximum value is 0.596, and the standard deviation is 0.124. It shows that the overall risk preference of CEO is relatively low, and there are large differences among individuals.

4.2 Correlation Analysis

According to Table 2, the level of digital transformation of enterprises is significantly positively correlated with CEO risk preference at the 5% level, this preliminarily proves Hypothesis 1. The CEO IT background is significantly positively correlated with the level of enterprise digital transformation and the CEO risk preference at the 5% level, which preliminarily validates Hypothesis 2. It can be seen from Table 2 that most of the control variables are significantly related to the level of digital transformation of the explained variables, indicating that the selection of control variables in this study is reasonable. In order to ensure the reliability of further research, this paper tests the variable variance inflation factor. The results show that the maximum value of VIF is 1. 53, which is much less than 10, and the absolute value of the correlation coefficient

between variables is less than 0.5. Therefore, there is no multicollinearity problem for the variables.

4.3 Regression Analysis

Before analyzing the regression results, this paper first centralizes the independent variable CEO risk preference and the moderating variable CEO IT background. Then construct the interaction term between CEO risk preference and CEO IT background, and then conduct regression analysis. The regression results are shown in Table 3.

It can be seen from Model 1 in Table 3 that the correlation coefficient between CEO risk preference and enterprise digital transformation is significantly positive, which means that risk-loving CEO will be more active in digital transformation than risk-averse CEO. From the regression results of Model 3, it can be seen that the interaction items of CEO IT background and CEO risk preference are both significantly and positively related to the degree of digital transformation. This suggests that the CEO IT background has a positive moderating effect between the CEO risk preference and the level of enterprise digital transformation, hypothesis H2 is confirmed.

5. CONCLUSIONS

By exploring the influence of CEO risk preference on the level of digital transformation of enterprises and the moderating role of CEO IT background, the following conclusions are drawn: Firstly, the risk preference of the CEO will promote the degree of digital transformation of the enterprise. Secondly, the study found that the CEO IT background can effectively strengthen the impact of the CEO risk preference on the level of enterprise digital transformation.

Based on the above research conclusions, this paper puts forward the following three policy suggestions for further promoting the digital innovation-driven development strategy of enterprises in the new era of digital economy:(1) When appointing a CEO, companies should hire CEOs with different types of risk preference based on their own digital transformation needs. At the same time, enterprises may prefer to hire people whose majors are related to the direction of IT or have relevant experience as the CEO. Because the digital leadership capabilities of CEOs with IT background traits tend to have more prominent digital leadership capabilities and can accurately grasp the direction of digital innovation. This can reduce the risks borne by enterprises in the process of digital transformation, increase the digital benefits of enterprises, and facilitate the healthy and sustainable development of enterprises. (2) To improve the internal governance system of the enterprise. Enterprises should pay attention to the rational use of internal and external supervision systems, encourage all

stakeholders to participate in corporate governance, and then promote the digital transformation of enterprises. (3) The government should provide matching supervision and incentives for the digital transformation of enterprises to reduce the deviations caused by the pursuit of profit.

Table 2. descriptive statistics and correlation analysis of variables

Variables	DT	MRIP	PRECEO_IT	Soe	Lev	Size	Age	Large
DT	1							
MRIP	0.153**	1						
PRECEO_IT	0.287**	0.163**	1					
Soe	-0.093**	-0.152**	-0.056**	1				
Lev	-0.049**	-0.025	-0.086**	0.235**	1			
Size	-0.021	-0.220**	-0.105**	0.384**	0.481**	1		
Age	-0.068**	-0.068**	-0.059**	0.268**	0.126**	0.181**	1	
Large	-0.171**	-0.123**	-0.104**	0.186**	0.024	0.153**	0.001	1
Mean	21.2	0.198	0.183	0.266	0.413	22.3	20.59	33
Standard deviation	31.86	0.124	0.363	0.442	0.197	1.3	6.088	14.26
Maximum value	179	0.596	1	1	3.119	28.42	120	89.09
Minimum value	1	0.004	0	0	0.028	18.49	8	2.87

Note: N= 5736; *** $p<0.01$; ** $p<0.05$; *$p<0.1$. Same below.

Table 3. Regression analysis results

Variables	(1)	(2)	(3)
MRIP	1.391***	1.177***	1.186***
	(10.74)	(9.23)	(9.30)
PRECEO _IT		0.679***	0.709***
		(16.08)	(16.32)
MRIP*PRECEO_IT			0.889**
			(2.89)
Controls	Yes	Yes	Yes
_Cons	-1.374***	-0.629***	-1.284***
	(-4.06)	(-1.89)	(-3.88)
Year	Yes	Yes	Yes
Ind	Yes	Yes	Yes
R2	0.2428	0.2755	0.2766
F	131.02	145.03	136.66

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