



# Research on Top Management Team Trait and Firm Performance

Yinjie Han<sup>(✉)</sup>

Taiyuan University of Technology, Taiyuan, China  
503352480@qq.com

**Abstract.** As the strategic decision-makers of the enterprise, top management team has a profound impact on the efficiency of R&D investment of the enterprise, and even decides whether the enterprise makes plans and decisions on investment. This research focuses on the relationship between the demographic characteristics, cognition level of executives and enterprise investment has become the key to affecting enterprise development.

This paper builds a research theoretical framework based on high-level ladder theory, selects Shanghai and Shenzhen A-share listed companies from 2010 to 2019 as the research object, uses multiple linear regression as the main research method to examine the impact of top management team characteristics on firm performance.

The study found that the age, education level, tenure of the top management team were significantly positively correlated with firm performance, but the level of stock ownership of the top management team had no correlation with firm performance. Second, the stock ownership level of top management team members has a negative moderating effect on firm performance. The reason for this result is the time lag effect of equity incentives and the management risk aversion effect caused by executive stock ownership. Third, after distinguishing property rights, the stock ownership level of the top management team in state-owned enterprises and non-state-owned enterprises does not have a moderating effect on firm performance.

**Keywords:** top management team traits · corporate performance · corporate governance

## 1 Introduction

### 1.1 Research Background

In a highly competitive market, companies must rely on innovation if they want to achieve sustainable development. Building its own core competitiveness through innovative investment has long been a common recognition of all sectors of society. In particular, China's economy has entered a new normal, and innovation has played a leading and important role in economic and social development. With the development of the economy and the advancement of science and technology, the business environment of

enterprises has become more and more complex. Under the constantly changing market and competition of incentives, enterprises must make innovative strategic decisions quickly and accurately. However, in an enterprise, a team with strong overall quality and ability is bound to play a greater advantage than a single manager, and can also enable the enterprise to create greater value. But the truth in most cases is that even if a company has a top management team, it may not be able to maximize the value of the team, but may fall into the situation of “top management pseudo-team”. Therefore, the core issue is to build a team that may really play a driving role in R&D innovation activities in the company and can coordinate the relationship between the top management team and firm performance, which have received extensive attention from academic circles at home and abroad.

## **1.2 Basic Concepts**

### **1.2.1 Top Management Team**

The definition of the top management team is different at home and abroad. According to previous literatures, the top management team is composed of the personnel who formulate the strategic plan of the company, and these managers are responsible for the organization and operation of the company. Since the overall decision-making are controlled by the managers, they have a subtle influence on the operational efficiency and economic benefits of the company. According to the relevant provisions of the “Company Law” in China, the definition of the top management team shall include the company manager, deputy manager, financial director, secretary of the board of supervisors and other personnel specified in the company’s articles of association. Therefore, based on the existing literature, the scope of the top management team selected in this paper is defined as board members, general managers, presidents, deputy general managers, vice presidents, financial directors, chief engineers, chief economists, board secretaries and members of the supervisory board.

### **1.2.2 Qualities of Top Management Team**

According to the review of domestic and foreign literature, scholars have divided many variables that measure the background characteristics of managers into two categories: one is explicit (such as age, gender, etc.); the other is implicit (such as educational level, etc.). Managers with different characteristics have different perspectives and ways of thinking about problems, balancing risks and benefits, and ability to collect, process, and integrate information. These differences will be reflected in all aspects of the company’s daily activities and ultimately affect decision-making and corporate governance.

Based on the above analysis, this paper is based on the “high-level echelon theory”, and measurable variables of the characteristics of the top management team are introduced as follows: age, education level, tenure, stock ownership.

### **1.2.3 Firm Performance**

At present, according to the research results of most scholars, the focus of firm performance is generally on development capacity, profitability, solvency, etc., and is measured

by some financial indicators. Most scholars use Tobin's Q as an evaluation index, and it is better than other indicators for the measurement of enterprise development, and can more objectively reflect the company's current operating status and future development potential. Based on this, this paper considers Tobin's Q value for the selection of firm performance indicators.

### 1.3 Research Purpose

This paper aims to explore the relationship between top management team traits and firm performance. Therefore, combined with the actual situation of listed companies in Shanghai and Shenzhen A-share companies, this paper puts forward theoretical assumptions on the basis of relevant data and data, and analyzes the impact of top management team characteristics on firm performance through empirical research. The article will take the 2010–2019 A-share listed companies in Shanghai and Shenzhen as the main research sample, combine the theory of the high-level ladder, take the characteristics of the top team as the main focus, and focus on how the characteristics of the top management team adjust the relationship between firm performance.

## 2 Literature Review

### 2.1 Literature Review of Top Management Team Traits and Firm Performance

Scholars have obtained a series of fruitful research results on the correlation between top team characteristics and firm performance, but the research results are not the same. The main aspects of most scholars' research revolve around the literature review on the relationship among top team age, education, tenure, occupational background and other dimensions.

#### 2.1.1 Research on the Influence of Top Management Team Age on Firm Performance

The age of top executives can affect how they think about risk. Younger executives tend to tend to pursue risk in many ways, while older executives tend to be more conservative. Scholars such as Flood (1984) believe that older executives can deeply understand the environment and their own conditions of the company, and rationally allocate corporate assets to achieve better performance. Some scholars have found different results in their research. Kilduff (1991) believed that age heterogeneity was negatively correlated with firm performance. The research of Christian (2002) and Niels (2005) on non-state-controlled enterprises shows that the relationship between the age heterogeneity of top team members and the economic interests of enterprises is in an inverted "U" shape.

#### 2.1.2 Research on the Impact of Top Management Team Tenure on Firm Performance

Finkelstein and Hambrick (1993)<sup>②</sup> proposed that the longer the tenure of top management team members, the more prudent they are in making strategic choices, and the more

stable the firm's performance. However, Hambrick believes that the longer the tenure of the executives, the easier it is to form a "small circle", which is not conducive to the complementarity of the demographic characteristics of the members of the team and the improvement of performance.

Irene (2004) and others found through empirical analysis that in companies with a high degree of internationalization, the non-uniformity of management team appointments leads to a negative impact on firm performance.

Top management teams with longer tenures may emphasize stability (Barker and Mueller 2002)<sup>③</sup> and avoid risky strategic actions (Kor 2006). In addition, managers with longer tenures may be more experienced and can identify and eliminate potential risks empirically when investing. As a result, they tend to choose a more conservative capital structure to reduce the financial risk.

### **2.1.3 Research on the Influence of the Education Level of the Top Management Team on the Firm Performance**

Researches such as Bantel, Smith (2003) and Tihanyi (2003)<sup>④</sup> believe that the top management team with higher education level has higher data acquisition ability and problem-solving ability, and can make favorable business choices and improve firm performance. However, there are also studies that suggest that the education level of the top team has no positive impact on firm performance.

Harada (2001) studied 5911 companies in Japan and found that the education level of executives had a negative impact on the economic returns of the company, that is to say, the higher education level of managers did not promote the improvement of firm performance.

Some researchers have suggested that higher education levels are associated with higher cognitive abilities (Wally and Baum 1994), and thus improve the ability to accept new knowledge (Wierseman and Bantel 1992), to master new ideas (Barker and Baum 1992; [3]), to learn new governance behaviors.

Based on this point of view, many studies have shown that more educated CEOs and top managers are better able to solve complex and changing problems, and they are also more receptive to innovation (Kimberly and Evanisko 1981; [3, 4]).

### **2.1.4 Research on the Influence of the Professional Background of the Top Management Team on Enterprise Performance**

Ding (1987) believed that the objective criteria and strategic evaluation of enterprise goals based on differences in professional backgrounds among teams played a correcting role, and the decision-making effect was more ideal. Through empirical research, Hambrick et al. (1998) found that the heterogeneity of occupational background has a positive effect on market share and firm performance.

Based on the perspective of social environment, Carperden (1999) found that occupational background heterogeneity is positively correlated with firm performance in companies with a low degree of internationalization, and negatively correlated in companies with a high degree of internationalization.

### **2.1.5 Research on the Impact of Top Management Team Shareholding on Firm Performance**

[2]<sup>①</sup> put forward a research hypothesis based on the theory of top echelon, they believe that the financial status of top managers will affect their strategic choices in terms of innovation and financial leverage.

Related research based on agency theory suggests that large amounts of high-risk wealth may motivate CEOs and top managers to focus more on long-term development. Because of their diverse composition, risk-averse managers often incentivize them to underleverage the firm (Haugen and Senbet 1981; Berger et al. 1997) and underinvest in R&D (Smith and Watts 1992).

It has also been suggested that higher levels of equity can align management goals with shareholder goals (Chen and Huang 2006) and motivate top managers to make venture capital investments (Wright et al. 2007). Therefore, this can alleviate the problem of insufficient leverage and insufficient investment (Smith and Watts 1992; Nam et al. 2003), and improve the level of business operation.

## **3 Research Methods**

### **3.1 Inductive Analysis Method**

This paper mainly researches, organizes and comments on the theoretical achievements and analysis conclusions related to the characteristics of the top management team and firm performance by searching and reading related articles on the Internet. The viewpoints and existing problems are sorted out and analyzed to provide theoretical support for the research and analysis of this paper. Provide theoretical support for the formulation of research hypotheses.

### **3.2 Comparative Analysis Method**

Collect and sort out relevant literature data, and analyze and compare the research design aspects such as concept definition, method selection, and variable selection in the literature. The research status at home and abroad is reviewed, and on the basis of a large number of existing literature, the research design is determined by the views generally recognized in the academic circles, the relevant theories and concepts of this paper are defined, and the research method with a high degree of matching with the research is selected.

### **3.3 Multiple Linear Regression Method**

This paper mainly uses multiple linear regression to analyze the impact of the characteristics of the top management team of Shanghai and Shenzhen A-share listed companies on the performance of the company, calculates the correlation coefficient and significance between variables, examines the relationship between the characteristics of the top management team and firm performance, and finally determines the model expression. And after the empirical test of the whole sample, the influence of the characteristics of the top management team on the firm performance is tested in the state-owned sample and the non-state-owned sample.

## 4 Research Assumptions

### 4.1 Research Assumption

Since the theory of “High Ladder Team Theory” was put forward by Western scholars in the last century, researchers have started from the demographic characteristics of top management team members to study the impact of managers’ subjective or objective characteristics on strategic decision-making in firm management. In other words, managers’ cognitive ability, way of thinking, skill background, etc. will affect the decision-making process of managers’ management work, which will further affect the operating income of enterprises. At present, there are a large number of research literatures at home and abroad to study the relationship between top management team characteristics and firm performance. The research content mainly focuses on human capital characteristics such as age, gender, education level and tenure of top management team members.

Therefore, the research hypotheses listed are as follows:

- H1a: The age of the top management team is positively correlated with firm performance.
- H1b: The educational level of the top management team is positively correlated with firm performance.
- H1c: Top management team tenure is positively correlated with firm performance.
- H1d: The top management team’s shareholding is positively correlated with firm performance.

## 5 Research Design

### 5.1 Sample Selection and Data Sources

This paper defines the research object as A-share listed companies in Shanghai and Shenzhen, and studies the relationship between the characteristics of the top management team of listed companies and firm performance. This paper excludes ST, PT and companies that cannot obtain effective and comprehensive data from the companies listed in Shanghai and Shenzhen. Consider combining the national technology innovation project and the national medium and long-term scientific and technological talent development plan (2010–2020), the goal is to form and improve a technological innovation system with enterprises as the main body, market-oriented, and the combination of production, education and research, and greatly enhance the independent innovation of enterprises Ability to greatly reduce the external dependence of technology in key fields and key industries, promote enterprises to become the main body of technological innovation, and achieve a closer integration of technology and economy. Since the R&D investment data from 2010 is relatively comprehensive, in order to facilitate the scientificity of the research and the integrity of the data collection. Therefore, the data for a total of ten years from 2010 to 2019 were counted, and the data came from the wind database and the China Stock Market Accounting Research Database (CSMAR) database.

## 5.2 Definition and Description of Variables

### 5.2.1 Firm Performance (Correl)

This paper selects the Tobin Q value (TOBINQ) that reflects the market value in firm performance as a measure. Tobin's Q value is an important indicator reflecting the value of listed companies. The higher the indicator is, the higher the return from investment; the lower the Tobin's Q value, the weaker the profitability of the company's owner's equity. In this article, Tobin's Q is the ratio of market capitalization to total assets.

### 5.2.2 Characteristics of the Top Management Team

The age of the top management team (Mage). Managers of different ages have different cognitive habits, experience and innovation ability. Young managers are more likely to choose investment plans with higher risks but also higher returns, but older people may face the same plan more conservative. The age of the top team refers to the average age of the members.

Top management team education level (Mdegree). Managers with different educational backgrounds have differences in their ability to identify risks and their attitudes towards risks based on their education levels, which will directly affect their preference for investment decisions with certain risks, thereby affecting firm performance. The value is 1 if the top management team member's educational background is higher than the undergraduate degree, otherwise the value is 0.

Top management team tenure (Mtrure). The top management team members have different investment decisions in R&D due to different tenures. Top managers with longer tenures are more familiar with the company's situation and will make appropriate decisions according to the actual situation of the company. The tenure of top management team members is the average tenure, from becoming a member of the top team until December 31 of the statistical year.

Top management team holdings (Mstock). Executive shareholding may increase the company's R&D investment expenditure, alleviate the lack of R&D investment, and improve the company's R&D investment. Whether the executives held the company's stock during the sample period. Set whether members of the top management team hold shares. If so, the value is 1, otherwise the value is 0.

### 5.2.3 Control Variables

Not only the characteristics of the top management team and R&D investment will have an impact on firm performance, but other factors will also affect firm performance. In order to deeply study the relationship between the characteristics of the top management team, R&D investment and firm performance, the control variables are selected as follows.

Liability ratio (LVE). The asset-liability ratio can clearly reflect the efficiency of using liabilities to obtain funds for operating activities when the company faces risks. This paper uses the asset-liability ratio as the ratio of total liabilities to total assets.

GROWTH. Growth rate of total assets = (total assets at the end of the year—total assets at the beginning of the year)/total assets at the beginning of the year.

Company size (SIZE). For the relationship between R&D investment and firm size, many scholars believe that there is a correlation. This paper uses the natural logarithm of the total assets of the company to measure the size of the company.

Year dummy variable (YEAR). Considering that economic fluctuations will have an impact on R&D input, this paper sets dummy variables. The sample interval is from 2010 to 2019. Based on 2010, two dummy variables are set up, which are 1 for that year; otherwise, 0.

Return on Total Assets (ROA). The return on total assets reflects the ability of an enterprise to raise funds, produce and operate in the market performance. Set the return on total assets, which is the ratio of net profit to total assets.

### 5.3 Model Construction

In order to examine the influence of top team characteristics on firm performance, and to verify H1a–H1b, models (1)–(4) were constructed. In this paper, four indicators of shareholding, age, education level and tenure are substituted into the models (1)–(4) for testing.

$$Tobin'Q_{it} = \alpha_0 + \alpha_1 Mage_{it} + \alpha_2 controls_{it} + \varepsilon_{it} \tag{1}$$

$$Tobin'Q_{it} = \alpha_0 + \alpha_1 M deg ree_{it} + \alpha_2 controls_{it} + \varepsilon_{it} \tag{2}$$

$$Tobin'Q_{it} = \alpha_0 + \alpha_1 Mtenure_{it} + \alpha_2 controls_{it} + \varepsilon_{it} \tag{3}$$

$$Tobin'Q_{it} = \alpha_0 + \alpha_1 Mstock_{it} + \alpha_2 controls_{it} + \varepsilon_{it} \tag{4}$$

## 6 Empirical Results and Analysis

### 6.1 Regression Analysis

The regression results of top management team characteristics and firm performance are shown in Table 1. The age of top management team members has passed the significant test, and the regression coefficient is positive. It shows that older top management team members can effectively promote firm performance in the company’s management work. The correctness of hypothesis H1a is supported.

The education level of top management team members was significant at the 1% level, passed the significance test, and the regression coefficient was positive with a coefficient of 0.643. The regression results show that there is a positive correlation between the education level of top management team members and firm performance. Top managers with higher education levels have higher quality and ability to improve the company’s economic benefits. The correctness of hypothesis H1b is supported.

As shown in Table 1, the tenure of top management team members has passed the significance test, which is significant at the 1% level, and the regression coefficient is positive. It shows that there is a positive relationship between the tenure of top management



**Table 1.** Regression analysis

Variable	Model 1	Model 2	Model 3	Model 4
Mage	0.003** (2.15)			
Mdegree		0.643*** (19.37)		
Mtenure			0.004*** (13.90)	
Mstock				0.044* (1.53)
LVE	-0.327*** (-6.07)	-0.319*** (-5.95)	-0.267*** (-4.90)	-0.343*** (-6.34)
GROWTH	-0.088*** (-3.37)	-0.084*** (-3.22)	-0.056** (-2.13)	-0.092*** (-3.51)
ROA	7.945*** (34.21)	8.074*** (34.98)	8.129*** (34.65)	7.888*** (33.84)
SIZE	-0.193*** (-23.05)	-0.201*** (-24.31)	-0.216*** (-25.03)	-0.189*** (-22.60)
YEAR	control			
_cons	5.800*** (32.44)	5.583*** (32.37)	6.207*** (35.19)	5.842*** (33.10)

team members and firm performance. The longer the tenure of top management team members, the more familiarity between team members, the more tacit understanding of work cooperation, and the more acquainted managers with work and environment. For familiarity, it can better improve firm performance. The correctness of H1c is supported.

The regression results of the ownership level of top team members passed the significance test, assuming that H1d passed the support. When managers hold equity, there is a significant effect on the improvement of firm performance.

## 6.2 Robustness Check

In order to test the robustness of the above regression results, this paper adopts the method of replacing, redefining and measuring the variables to test the robustness. First, in order to compare with the definition of firm performance above, based on existing literature and data, we redefine and replace firm performance with ROE. The following are the regression results of each hypothesis model robustness test.

In the robustness results of Table 2, the age, education level and tenure of the top team characteristics have passed the significance test for the regression results of firm performance, and the coefficient is positive. The age, education level, and tenure of top managers in the top management team are positively related to firm performance. The top management team's shareholding also passed the significance test.

**Table 2.** Robustness test results

Variable	Model 1	Model 2	Model 3	Model 4
Mage	0.001*** (3.50)			
Mdegree		-0.002*** (-8.85)		
Mtenure			0.001*** (-4.57)	
Mstock				0.001* (1.41)
LVE	-0.083*** (-211.24)	-0.084*** (-213.47)	-0.083*** (-211.19)	-0.339*** (-6.12)
GROWTH	-0.0004** (-2.32)	-0.001*** (-3.57)	-0.001*** (-4.18)	-0.090*** (-3.66)
ROE	0.604*** (503.27)	0.605*** (508.30)	0.605*** (503.55)	7.902*** (27.62)
SIZE	0.001 (0.93)	0.001** (1.96)	0.001 (1.09)	-0.190*** (-23.12)
YEAR	control			
_cons	0.030*** (20.56)	0.032*** (23.25)	0.031*** (22.65)	5.901*** (34.29)

## 7 Research Conclusions

This paper selects a sample of Shanghai and Shenzhen A-share listed companies for research by the end of 2019. This paper screened 3028 companies, 3028 samples, and 8605 observations. Using empirical methods to explore the relationship between top management team characteristics and firm performance, the following results are summarized.

The characteristics of top management team members of Chinese listed companies in Shanghai and Shenzhen have the following characteristics. The average age of the top management team members of Shanghai and Shenzhen listed companies in China is about 48 years old, with a small age gap and a trend of younger members. Most of the top management team members have a bachelor's degree or above, and the education level of the top management team members is generally high. In terms of term of office, the average term of office is more than 51 months, and the term of office of enterprise managers is generally longer. The increase of term of office strengthens the understanding between members, so the team cooperation is thus consolidated, which is conducive to the efficiency and harmony of work, so the internal structure can be optimized. However, there is still a problem that the term gap is too large. In terms of shareholding, the average value is about 60%, and more than half of the managers hold shares. Holding shares by

managers can mobilize the enthusiasm of work and promote and optimize corporate governance and decision-making.

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