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Research on the influence of executive power distribution on R&D investment of listed companies

Xiaohong Lai[1,2], Vincent Wee[1]

[1]Universiti Tun Abdul Razak, Kuala Lumpur, 50400, Malaysia
[2]Unittec, CO., LTD, Hangzhou, 310052, Zhejiang, China
laixiaohong2023@163.com

Abstract: *The power distribution of senior executives will have an important impact on the R&D investment of enterprises. Based on the data of A-share listed companies from 2009 to 2019, this paper takes an A-share listed company as the research object, and discusses the impact of the size of executive power on enterprise R&D investment from the perspective of the distribution of executive power. The study found that there is a significant positive correlation between executive power and enterprise R&D investment, that is, the greater executive power is, the more likely it is to bring more R&D investment to enterprises. At the same time, it is found that compared with state-owned enterprises and listed companies with small scale, poor profitability, high equity concentration and low institutional shareholding ratio, the distribution of executive power has a more significant impact on enterprise R&D investment. In addition, the study also found that industry characteristics also have a certain degree of impact on the relationship between the distribution of executive rights and enterprise R&D investment.*

Keywords: *Senior management; Exclusive power; Non-executive power; R&D investment*

1. Introduction

As an important part of corporate governance structure, executive power distribution has a significant impact on R&D investment. It can not only promote continuous innovation, but also affect the efficiency of R&D expenditure. Under new circumstances, our country should accelerate the pace of building a country of innovation and strong science and technology, while enterprises, as the main body of scientific and technological innovation, are the important force to promote innovation. Therefore, it is of great significance to discuss the issue of enterprise R&D investment [1]. It is worth studying what kind of relationship exists between the rights owned by senior executives and the R&D investment of listed enterprises. The research in this paper has certain theoretical and practical significance [2-3]. However, most of the existing literatures only study from the aspects of executive compensation structure and ownership structure, and there is little reference to how executive power affects corporate R&D investment and its mechanism. Based on this, on the basis of previous research results, this paper takes the relationship between executive power and R&D investment as the research object, and analyzes the influence of executive power on enterprises' R&D investment.

2. Literature review and theoretical assumptions

2.1. Literature review

In the era of knowledge economy, the core of enterprise competition is technological competition, and enterprise R&D investment is an important carrier and foundation of technological competition. In recent years, China has attached great importance to scientific and technological innovation, and has successively issued a series of policy documents such as the "13th Five-Year Plan for National Scientific and Technological Innovation", "Several Opinions on Deepening the Reform of System and Mechanism and Accelerating the Implementation of the Innovation-driven Development Strategy". At the same time, as the main body of innovation, enterprises are also facing increasingly complex and severe external environment [4]. Because of the changes in the internal and external environment, enterprises face greater risks and uncertainties, and their core competitiveness is mainly reflected in research and development. This requires enterprises to: first, ensure that R&D investment matches the

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power distribution of senior executives [5]. The power distribution of senior executives should be fully considered to enable them to play an important role in R&D investment. Therefore, when formulating strategies and determining objectives, enterprises need to fully consider the distribution of senior executives' rights and ensure that R&D investment matches the distribution of senior executives' rights. Second, we should ensure the effectiveness and rationality of the internal governance structure of enterprises. The internal governance structure of listed companies is of great significance to the development of enterprises [6]. Therefore, it is necessary to ensure the effectiveness and rationality of the internal governance structure of listed companies and ensure that listed companies can effectively carry out R&D investment.

2.2. Theoretical Hypothesis

The Chinese economy has entered a new normal, shifting from a stage of high-speed growth to a stage of high-quality development. If enterprises want to develop sustainably and healthily, it is essential to increase their R&D investment, because R&D investment can bring continuous innovation power to enterprises. However, research and development investment of listed companies is still at the low level, and there are still some problems. First, the government's guidance and incentive on R&D investment is insufficient. Secondly, the internal governance structure of listed companies is unreasonable. Some senior managers occupy the senior management positions of the company for a long time and do not participate in the management work [7]. Finally, China's current legal system has not made clear provisions on the behavior of senior executives, leading to senior executives may make false reports or exaggerate reports for their own interests.In view of the above problems, this paper takes the listed companies in the manufacturing industry of Shanghai and Shenzhen as the research sample to conduct empirical research [8]. First, review and sort out the relevant research literature at home and abroad; Secondly, this paper attempts to analyze the impact of the rights of senior executives on their behavior decisions and how this impact is reflected from the perspective of property rights; Finally, this paper will empirically test the impact of executive rights on enterprise R&D investment. On this basis, on the one hand, it provides suggestions for Chinese listed companies to increase their R&D investment; On the other hand, it can also provide reference for our government and enterprises to improve relevant systems.

Specific theoretical assumptions are as follows:

(1) Agency theory holds that senior executives, as the main decision-makers of enterprises, tend to set a goal for themselves, that is, how to make themselves get more remuneration in the process of achieving the goal. Executives have two motivations for making decisions: one is to create wealth; The second is to avoid loss. After the executive achieves the goal, in order to avoid being punished by the enterprise, he/she will use the residual claim and residual control right to re-control the enterprise. If shareholders suffer, executives will be required to compensate; If the interests of shareholders are not damaged, then executives may increase their own compensation to compensate for the performance of their duties. Therefore, from this perspective, the more powerful the executive is, the more likely it is to bring more R&D investment to the enterprise [9].

(2) Ownership structure theory holds that, compared with individual ownership, institutional ownership is more likely to motivate management to engage in R&D activities.

3. Research design

(1) Sample selection and data sources. This paper selected China's A-share listed companies from 2009 to 2019 as the research object, collected the R&D investment data of China's A-share listed companies from 2009 to 2019, and the relevant data of the proportion of executive shareholding and executive compensation in the total investment, and finally obtained the data of 793 listed companies.

(2) Variable definition and model construction. According to the needs of empirical research, this paper defines the following variables:

Where, TFP is the proportion of total R&D investment in total assets, and totally is the annual fixed effect during the sample period. In this paper, adjusting variables such as enterprise size and growth are added into the model to investigate the influence of enterprise size, growth and business risk on TFP and totally. At the same time, control variables were added into the model, including the proportion of executive shareholding (holder), the proportion of executive compensation in total investment (income) and the return on total assets (ROA), to investigate the influence of executive compensation structure

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on TFP and totally. In addition, two types of control variables are added: the first type is equity concentration (stock), and the second type is company size (size).

4. Empirical results and analysis

In order to verify hypothesis 1, TobinQ was used in this paper to perform panel fixed effect regression on the data, and in the obtained results, there is a significant positive correlation between the executive shareholding ratio (COW) and executive compensation in the total investment (TAX) of the enterprise and the enterprise's R&D investment, the coefficient of COW is 0.78, and the coefficient of TAX is 0.12, indicating that the greater the executive shareholding ratio and executive compensation in the total investment of the enterprise, the more the enterprise's R&D investment. The study also found that the coefficients of COW and TAX were significantly positively correlated. This shows that the higher the proportion of senior executives' shareholding and senior executives' compensation in the total investment of the enterprise, the stronger the incentive effect on R&D investment.

The statistical results show that, compared with state-owned enterprises and larger listed companies, small and medium-sized listed companies with poor profitability and low institutional shareholding ratio have higher R&D input, which is consistent with the theoretical analysis results. At the same time, the proportion of R&D investment in total assets is higher in small and medium-sized listed companies and those with poor profitability. At the same time, it can be found that the proportion of R&D investment of listed companies with low institutional shareholding ratio is significantly lower than that of listed companies with high institutional shareholding ratio. In addition, industry characteristics have a certain impact on the relationship between executive power distribution and R&D investment. The statistical results show that the sample companies in the service industry are significantly higher than those in the manufacturing industry. Industry characteristics determine to a large extent whether the enterprise can produce the maximum economic benefits, and then affect the relationship between the distribution of executive power and the enterprise's R&D investment. In addition, listed companies with greater executive power will have higher requirements and attention on R&D investment; Secondly, in the industry characteristics, we find that private listed companies, smaller and less profitable listed companies have lower R&D investment than listed companies with high institutional shareholding ratio.

4.1. Robustness test

Other robustness tests are also carried out in this paper, mainly including:

(1) The index of corporate governance level is used to replace the index of enterprise size for robustness test. Because the scale of an enterprise can better reflect the scale of its operation, in addition to the total scale of assets, it also includes financial indicators such as operating income, total assets, current assets and liabilities. Therefore, this paper uses the indicator of total assets to replace the indicator of company size.

(2) Adopt different measurement methods of power distribution of senior executives to conduct robustness test. This paper uses two different measurement methods to test the robustness.

(3) The time series data of enterprise R&D investment are tested for robustness by time periods. The results show that the proportion of executive compensation in the total investment of the enterprise is also an important control variable in the results of the robustness test, which can restrain this volatility to a certain extent.

4.2. Further analysis

This part first discusses the influence of the proportion of senior executives' shareholding on R&D input, then discusses the influence of the proportion of senior executives' compensation in the total investment on R&D input, and finally analyzes the moderating effect of the proportion of senior executives' shareholding and executive compensation on R&D input.

Firstly, by analyzing the process of enterprise R&D investment, it is found that the process of enterprise R&D investment can be divided into research stage and development stage, but in reality, most enterprises have completed their R&D work and entered the development stage. Therefore, many costs are involved in the process of R&D investment, and it is difficult for enterprises to accurately measure and evaluate all costs in practice. In this case, the higher the proportion of executive

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ownership and the greater the proportion of executive compensation in the total investment of the enterprise are more likely to invest more in R&D activities.

Secondly, by analyzing the relationship between executive shareholding ratio, executive compensation and enterprise R&D investment, it is found that there is a significant positive correlation between executive shareholding ratio and enterprise R&D investment; There is a significant negative correlation between executive compensation and enterprise R&D investment; There is a significant positive relationship between the shareholding ratio of senior executives and the level of enterprise R&D investment.

5. Research conclusions and policy implications

Based on the data of A-share listed companies from 2009 to 2019, this paper studies the impact of executive power distribution on enterprise R&D investment. The results show that the relationship between executive shareholding ratio and R&D investment is U-shaped; There is a positive correlation between the proportion of senior executives' shareholding and the proportion of senior executives' compensation in the total R&D investment of enterprises and the R&D investment of enterprises; The proportion of executive compensation in the total R&D investment of enterprises is negatively correlated with the R&D investment. The research conclusions of this paper have certain policy implications for understanding the high-tech attributes of listed companies in China, improving the governance level of state-owned listed companies, promoting the transformation of scientific and technological achievements and encouraging innovative talents. Specific suggestions are as follows: First, state-owned listed companies should further strengthen corporate governance, enhance the ability of senior executives to connect with the market, and then improve the efficiency of innovation output and the level of independent innovation. Second, increase the equity incentive for scientific research institutions and high-tech talents, and use the equity incentive to stabilize the R&D talent team. Third, according to the enterprise life cycle theory, reasonable choice of investment scale and direction to maximize the effectiveness of R&D capital. Fourth, improve the information disclosure system of listed companies, improve the transparency of enterprises and the quality of information disclosure. Fifth, accelerate the marketization process and industry development speed. Sixth, listed companies should improve the performance evaluation index system and salary incentive mechanism. Seventh, the government should improve the capital market system, expand the enterprise equity financing channels.

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