

## The Impact of Corporate Governance Structure on Dual Innovation

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### Abstract

**This paper takes the high-end equipment manufacturing listed companies in Shanghai and Shenzhen from 2009 to 2013 as the research object, and adopts the negative binomial stochastic effect regression model to examine the relationship between corporate governance structure and dual innovation. The conclusions of this study have some reference significance on how to enhance the capability of enterprises' dual innovation, and promote the reform and innovation of China's high-end equipment manufacturing industry.**

### Keywords

**Corporate governance structure; dual innovation.**

### 1. Introduction

Technological innovation can help to improve the profitability of enterprises and improve business performance. Lin Ming (2015) divides innovation into exploitative innovation and exploratory innovation based on existing research[1]. Exploratory innovation refers to the firm's commitment to investing in higher-risk, acquiring new knowledge and skills. Exploitative innovative is a gradual innovation who relies on the refinement, integration, enhancement and improvement of existing knowledge. The establishment of enterprise dual innovation mechanism relies on the corporate governance structure, which is mainly composed of the owner, the board of directors and the senior manager. It is an organizational structure that coordinates and balances the behavior and relationships of various stakeholders. Drawing on the existing research results, this paper focuses on the impact of ownership structure, board structure and executive compensation on dual innovation.

### 2. Theoretical analysis and research hypotheses

#### 2.1 Ownership structure and dual innovation

In a company, ownership structure determines the degree of ownership concentration and the position of major shareholders, thereby determining the ownership allocation efficiency, and finally affecting the company's decision-making. Raising the degree of ownership concentration is not conducive to the optimal allocation of technological innovation risk. Therefore, with the enhancement of ownership concentration, enterprise support for innovative efforts decrease, resulting in the simultaneous weakening of exploratory innovation and exploitative innovation.

Therefore, this paper proposes the following assumptions:

H1a: Ownership concentration plays a negative regulatory role in exploitative innovation

H1b: Ownership concentration plays a negative regulatory role in exploratory innovation

#### 2.2 The board structure and dual innovation

CEO duality refers to whether the chairman and the CEO is held by the same person or not. As the representative of the shareholders, the chairman of the board of directors paid more attention to the long-term development of the enterprise and tended to pursue high returns from technological innovation. However, the CEO often pay more attention to personal reputation, work stability and so on. Therefore, CEO duality can make the CEO willing to take more risk, more likely to adopt risky decisions.

Given the high risks and uncertainties of innovation, the board of directors governed by internal members is reluctant to bear high risks in pursuit of innovation. While external directors, by virtue of their own independence, will encourage innovation activities.

Therefore, this paper proposes the following assumptions:

H2a: There is a negative correlation between the CEO duality and the exploitative innovation

H2b: There is a positive correlation between the CEO duality and exploratory innovation

H3a: The proportion of independent directors in the board of directors is positively correlated with exploitative innovation

H3b: The proportion of independent directors in the board of directors is positively correlated with exploratory innovation

### 2.3 Executive incentives and dual innovation

The degree of operator's interest in technological innovation has a great relationship with the degree of managers' incentives. Competitive managers incentives can avoid brain drain and attract more experienced managers, thereby enhancing the company's innovation decision-making. Huafang Liu and Jianjun Yang (2014) conducted an empirical analysis, with the biomedical and electronic information listed companies as the research sample, and concluded that the salary incentive to managers is the key elements to promote the investment in innovation[2].

Therefore, this paper proposes the following assumptions:

H4a: Executive Incentives play a positive regulatory role in exploitative innovation

H4b: Executive incentives play a positive regulatory role in exploratory innovation

## 3. Research design

### 3.1 Sample selection and data source

The initial data include 80 companies listed companies. They have been filtered according to the following principles:

Exclude ST companies and \* ST companies.

Exclude listed companies whose data is incomplete or unavailable.

Exclude listed companies whose R & D process and the final product involves state secrets.

Finally, 45 listed companies were selected as research samples.

### 3.2 Variable measurement

The names, sign and definitions of variables used in this paper are shown in the following table 1.

Exploratory innovation: The first four digits of the patent application for the patent in that year did not appear in the past five years, and then counted  $T_i = 1$ . Otherwise, the number was 0.

Exploitative innovation: The first four digits of the patent application for the patent in that year appeared once in the past five years, and then counted  $M_i = 1$ . Otherwise, the number was 0.

Table 1. Definition and Measurement of Variables

| Type                                 | Name                                  | Sign     | Calculation method   |
|--------------------------------------|---------------------------------------|----------|--|
| Independent variables <sup>[3]</sup> | Ownership structure                   | C5       | Top five shareholders holding divided by all the shares of the company                   |
|                                      | Board structure                       | dum      | If the chairman and general manager is held by the same person, take 1, otherwise take 0 |
|                                      |                                       | ID       | Number of independent directors divided by the total number of board members             |
| Dependent variables <sup>[4]</sup>   | Managers' incentives                  | AP       | Annual average salary remuneration of senior executives                                  |
|                                      | Exploratory innovation                | EI1      | Exploratory innovation performance = $\sum T_i$  |
|                                      | Exploitative innovation               | EI2      | Exploitative innovation performance = $\sum M_i$   |
| Control variables                    | Last year's performance of enterprise | ROAt - 1 | Last's return on assets  |
|                                      | The growth of enterprises             | Growth   | Growth rate of sales revenue   |
|                                      | Enterprise Age                        | Age      | The number of years since the company was founded  |

## 4. Empirical analysis

### 4.1 The model selection

In this paper, dependent variables are nonnegative counting variables. Poisson distribution model is suitable for counting type data modeling, but the restriction that the mean is equal to the variance is difficult to set up. Therefore, this paper chooses the negative binomial regression model which is a generalized Poisson model for empirical analysis.

### 4.2 Empirical results analysis

Table 2. Results of the negative binomial random effects regression model

| Variables     | Model 1a             | Model 1b             | Model 2a             | Model 2b             |
|---------------|----------------------|----------------------|----------------------|----------------------|
|               | EI2                  | EI1                  | EI2                  | EI1                  |
| Constant term | -7.684***<br>(1.440) | 3.635***<br>(0.531)  | 2.852***<br>(0.356)  | -2.555***<br>(0.919) |
| ROAt - 1      | 0.024<br>(0.021)     | 0.040***<br>(0.017)  | 0.040*<br>(0.024)    | 0.426**<br>(0.214)   |
| Growth        | -0.123<br>(0.123)    | -0.126<br>(0.124)    | -0.126<br>(0.155)    | 0.046**<br>(0.018)   |
| Age           | -0.054**<br>(0.024)  | -0.071***<br>(0.021) | -0.061***<br>(0.024) | -0.187<br>(0.118)    |
| C5            | -0.012*<br>(0.006)   | -0.016***<br>(0.006) |                      |                      |
| dum           |                      |                      | -0.804***<br>(0.294) | 1.107***<br>(0.230)  |
| ID            |                      |                      |                      |                      |
| AP            |                      |                      |                      |                      |

Note: \* indicates  $p < 0.10$ , \*\* indicates  $p < 0.05$ , \*\*\* indicates  $p < 0.01$ , the same below

Table 3. Negative binomial random effects regression model results

| Variables     | Model 3a             | Model 3b            | Model 4a                  | Model 4b                 |
|---------------|----------------------|---------------------|---------------------------|--------------------------|
|               | EI2                  | EI1                 | EI2                       | EI1                      |
| Constant term | -6.012***<br>(1.470) | 3.565***<br>(0.712) | 2.215***<br>(0.383)       | 2.140***<br>(0.290)      |
| ROAt - 1      | 0.053**<br>(0.023)   | 0.343**<br>(0.017)  | -0.006<br>(0.023)         | 0.016<br>(0.018)         |
| Growth        | -0.237*<br>(0.140)   | -0.091<br>(1.127)   | -0.103<br>(0.147)         | -0.038<br>(0.123)        |
| Age           | 1.770***<br>(0.280)  | -0.047**<br>(0.019) | -0.039*<br>(0.023)        | -0.041**<br>(0.018)      |
| C5            |                      |                     |                           |                          |
| dum           |                      |                     |                           |                          |
| ID            | 2.685<br>(1.863)     | -2.992<br>(1.598)   |                           |                          |
| AP            |                      |                     | 1.67e-06***<br>(5.78e-07) | 1.18e-06**<br>(4.22e-07) |

The results of the model 1a in the above table show that there is a negative effect between ownership concentration and exploitative innovation. Therefore, assumption H1a is supported. The result of model 1b shows that there is a significant negative effect between ownership concentration and exploratory innovation. Therefore, assumption H1b is supported. The results of model 2a in the above table shows that there is a significant negative effect between the CEO duality and the exploitative innovation. Therefore, assumption H2a is supported. The results of model 2b in the above table show that there is a significant positive effect between the CEO duality and exploratory innovation. Therefore, assumption H2b is supported. The results of model 3a above show that the relationship between independent directors and exploitative innovation is not significant. Therefore, assumption H3a is not supported. The results of model 3b show that the relationship between ownership concentration and exploratory innovation is not significant. Therefore, assumption H3b is not

supported. The result of model 4a above shows that there is a significant negative effect between executive compensation and exploitative innovation. Therefore, assumption H4a is supported. The result of Model 4b in the above table shows that there is a significant positive effect between executive compensation and exploratory innovation. Therefore, assumption H4b is supported.

## 5. Conclusion

Based on the above empirical results analysis, this paper argues that in order to improve the dual innovation capability, the high-end equipment manufacturing listed companies need to take the following measures:

- 1) Moderately reduce the proportion of shares held by the top five shareholders and diversify the ownership concentration;
- 2) Establish and improve the structure of the board of directors, increase the number of independent directors with strong professional competence, and improve the supervisory responsibilities of independent directors;
- 3) Construct a scientific and market-competitive salary incentive system for internal managers.

All in all, only by establishing a governance mechanism that can fully demonstrate innovation for high-end equipment manufacturing listed companies can we effectively promote the sustainable and healthy development of China's high-end equipment manufacturing industry.

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