# Female Executives, Corporate Performance and Social Responsibility in Big Data

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**Abstract.** In today's society, the development of Internet big data technology has brought new opportunities and development direction to enterprises. With the improvement of women social status, global women continue to break through the "career development ceiling", break the stereotype of "gender discrimination", and the proportion of becoming enterprise executives continues to rise. More and more female executives participate in enterprise management, and their relationship with corporate performance and corporate social responsibility has become the focus of social attention. Under the background of the development of big data science and technology, this paper analyzes the relationship between the three based on high-level echelon theory, resource based theory, stakeholder theory and feminist ethical theory, and makes an empirical test based on the panel data of A-share small and medium-sized listed companies in Shanghai and Shenzhen from 2013 to 2020. The results show that the proportion of female executives has a positive impact on corporate social responsibility and corporate performance. Actively fulfilling corporate social responsibility plays a positive role in improving corporate performance. Corporate social responsibility has an intermediary effect between the proportion of female executives and corporate performance.

**Keywords:** female executives · social responsibility · corporate performance · big data

## 1 Introduction

The rapid emergence and development of big data technology has changed the original business process, provided more high-quality and convenient products and services, and innovated the original way of value creation of enterprises. In this social environment, the rapid economic development and the awakening of gender equality consciousness also promote more and more women to play the role of senior managers and the society also pays more attention to women career development. Many unique personality traits of women make some domestic and foreign scholars believe that they will have a positive impact on enterprise performance, and some scholars raise objections that they will have a negative impact. Will female executives affect corporate social responsibility and corporate performance? Can corporate social responsibility improve corporate performance? Can female executives further affect corporate performance by influencing corporate social responsibility? This paper takes the panel data of A-share small

and medium-sized listed companies in Shanghai and Shenzhen from 2013 to 2020 as a sample to empirically test the relationship between the three factors.

## 2 Theoretical Analysis and Research Assumptions

### 2.1 Resource Based Theory

With the developing support of emerging technologies such as Internet of things and cloud computing, big data resources began to become an important key force affecting the effectiveness of enterprise strategic resource integration. It also creates favorable conditions and environment for female executives to fulfill corporate social responsibility. Big data technology is a new opportunity and challenge for enterprise performance improvement. Enterprises can integrate basic resources with the help of big data technology, and provide more value support for the development of the whole enterprise through the analysis and utilization of these basic resources, so as to comprehensively improve the performance level of enterprises.

### 2.2 High-Level Echelon Theory

The high-level echelon theory believes that human rationality is bounded rationality and it holds that executives' values and outlook on life are closely related to their personal traits, and their preferences at work and even corporate strategy choices are determined by their basic characteristics. Incorporating the characteristics of senior managers into the high-level theoretical model can better understand the impact of managers on enterprise performance. Female executives also gives full play to the leading role of role models, has a strong incentive effect on subordinate employees, and can stimulate all members of the enterprise to give full play to their potential and pursue the realization of personal goals. Women tend to be more conservative and cautious than men, which may reduce excessive investment in enterprises and improve corporate performance. Therefore, hypothesis 1 is proposed:

H1: Female executives have a positive impact on corporate performance.

### 2.3 Stakeholder Theory

Stakeholder theory requires enterprises to connect themselves with the social environment, pay attention to the interests of social groups, corporate social responsibility may help enterprises cultivate a sense of responsibility culture internally, improve the image of enterprises in the public mind, so as to convert potential customers into actual customers and bring substantial improvement to the company's performance. To sum up, this paper puts forward hypothesis 2:

H2: Corporate social responsibility has a positive impact on corporate performance.

## 2.4 Feminist Ethical Theory

Feminist ethical theory holds that men prefer fairness and justice, while women prefer care and responsibility. They are often more willing to sympathize and care for people in difficulties, and are more willing to establish relationships and assume responsibility. Therefore, enterprises with a high proportion of female executives have a democratic and cohesive atmosphere and strong team spirit at the same time. Corporate social responsibility decision-making is the result of risk assessment by corporate managers from their own preference. Compared with male executives, female executives are more risk-averse, and they are more willing to choose low-risk projects in the face of investment choices with different risks. Female executives were more conservative and cautious in their financial decisions than their male counterparts, and the companies they worked for were more profitable. Therefore, hypothesis 3 is proposed:

H3: Female executives have a positive impact on corporate social responsibility.

## 2.5 Female Executives, Corporate Social Responsibility and Corporate Performance

In real life, women are generally considered to be caring and kind, so female executives will promote the performance of corporate social responsibility. At the same time, the emergence of female executives will make the executive team more heterogeneous and differentiated, so as to bring better performance. To sum up, this paper puts forward hypothesis 4:

H4: Corporate social responsibility plays an intermediary role between female executives and corporate performance.

# 3 Research Design

## 3.1 Samples and Data Sources

This paper takes the listed companies of A-share small and medium-sized enterprises in Shanghai and Shenzhen from 2013 to 2020 as the sample. At the same time, in order to obtain more reliable data, the data of ST and * ST listed companies are excluded from the research sample, and 582 data observations of 56 cultural media listed companies are screened and sorted out. The data used in this study are mainly from CSMAR database, Runling global social responsibility report rating database and 2013–2020 global gender gap report.

## 3.2 Variable Definition

1) Explanatory variable: Female executive (Fem)
Female executives referred to in this paper include the proportion of women in the number of board of directors, board of supervisors and senior managers (Fem) is used as the explanatory variable.

**Table 1.**  Variable definition

| Variable type | Variable | Variable name | Definition |
|---|---|---|---|
| Independent variable | Fem | Female executives | Number of female executives/total executives |
| Dependent variable | Eps | Corporate performance | Net profit/total share capital |
| Mediating variable | Csr | Corporate Social Responsibility | If Runling rating report is A or above, it is 3, B is 2, C is 1, and none is 0 |
| Control variable | Size | Enterprise scale | Natural logarithm of total assets at the end of the year |
| | Lev | Capital structure | Total liabilities at the end of the year/total assets at the end of the year |
| | Eps | Ownership concentration | Shareholding ratio of the largest shareholder |

2) Explained variable: Corporate performance (Eps)

For listed companies, earnings per share (Eps) is an important indicator to measure corporate performance, because it not only reflects the profitability of enterprises, but also affects the investment decisions of investors. Therefore, this paper selects earnings per share (Eps) as the index to measure the company's performance. It means Net profit/total share capital.

3) Intermediary variable: Corporate social responsibility (Csr)

There are many evaluation methods of corporate social responsibility. This paper uses the scoring data obtained from the Csr three-level evaluation system developed by runling global responsibility rating to measure corporate social responsibility.

4) Control variable

Based on previous studies, this paper adds the following control variables to the regression model: enterprise size (Size), capital structure (Lev), ownership concentration (Pcs). The type, name, symbol and measurement method of each variable are shown in Table 1.

### 3.3   Model Construction

Model (1) tests the relationship between female executives and corporate performance, in which Eps is corporate performance, Fem is female executives, and the control variables are expressed by controls. When coefficient of female executives $\alpha_{11}$ is greater than 0 and significant, it is assumed that H1 is supported.

$$Eps = \alpha_0 + \alpha_{11} Fem + \alpha \, Controls + \varepsilon \tag{1}$$

Model (2) tests the relationship between corporate social responsibility and corporate performance, where Csr is corporate social responsibility and Eps is corporate performance. When coefficient of corporate social responsibility $\alpha_{21}$ is greater than 0 and significant, it is assumed that H2 is supported.

$$Eps = \alpha_0 + \alpha_{21}Csr + \alpha Controls + \varepsilon \qquad (2)$$

Model (3) tests the relationship between female executives and corporate social responsibility, in which Csr is corporate social responsibility and Fem is female executives. When coefficient of female executives $\alpha_{31}$ is greater than 0 and significant, H3 is supported.

$$Csr = \alpha_0 + \alpha_{31}Fem + \alpha \, Controls + \varepsilon \qquad (3)$$

Model (4) incorporates female executives and corporate social responsibility into the model at the same time to test the mediating variable role of corporate social responsibility between female executives and corporate performance.

$$Eps = \alpha_0 + \alpha_{41}Fem + \alpha_{42}Csr + \alpha Controls + \varepsilon \qquad (4)$$

## 4    Research Results

### 4.1    Descriptive Statistical Analysis

The results of descriptive statistical analysis are shown in Table 2. The selected female executives of listed companies generally account for a low proportion of all executives of the company, with an average of about 14%, a minimum of 0 and a maximum of about 50%. There is a great difference. Some companies do not have female executives. In addition, the social responsibility score of the surveyed companies is relatively low, and the enterprise performance difference is relatively large, the minimum is negative, and the average level is only 0.64.

**Table 2.** Descriptive statistical analysis

| Vars | Max | Min | Med | Mean | Std. | n |
|------|-----|-----|-----|------|------|---|
| Fem | 0.50 | 0 | 0.13 | 0.14 | 0.1 | 582 |
| Csr | 81.88 | 32.14 | 34.12 | 33.89 | 12 | 582 |
| Eps | 3.18 | −0.47 | 0.53 | 0.64 | 0.67 | 582 |
| Size | 26.45 | 12.88 | 22.64 | 23.54 | 1.21 | 582 |
| Lev | 1.08 | 0.06 | 0.36 | 0.42 | 0.22 | 582 |
| Pcs | 104 | 8.21 | 38.67 | 42,99 | 22.35 | 582 |

**Table 3.** Pearson correlation analysis

|  | Fem | Csr | Eps | Size | Lev | Pcs |
|---|---|---|---|---|---|---|
| Fem | 1 | | | | | |
| Csr | 0.132** | 1 | | | | |
| Eps | 0.145** | 0.33** | 1 | | | |
| Size | −0.021 | 0.360** | 0.260** | 1 | | |
| Lev | −0.124** | −0.160** | −0.145** | 0.013 | 1 | |
| Pcs | −0.175** | 0.027 | 0.238** | 0.256** | 0.017 | 1 |

**Table 4.** Regression analysis between female executives and corporate performance

| Variables | Model (1): Eps | |
|---|---|---|
| | Coefficent | T-value |
| Fem | 0.182** | 3.047 |
| Size | 0.266** | 4.176 |
| Lev | −0.029 | −0.398 |
| Pcs | 0.254** | 3.635 |
| Adj $R^2$ | 0.184 | |
| F value | 11.253** | |
| n | 582 | |
| Mean VIF | 1.395 | |

## 4.2 Correlation Analysis

In Table 3, female executives are positively correlated with corporate social responsibility and corporate performance, and corporate social responsibility is also positively correlated with corporate performance. The correlation coefficient between all control variables is less than 0.5, and there is no serious multicollinearity problem. In addition, there is a positive correlation between enterprise scale and corporate social responsibility and corporate performance, indicating that large-scale enterprises not only have high corporate performance, but also are willing to undertake more corporate social responsibility.

## 4.3 Regression Analysis

1) Regression analysis of female executives and corporate performance

The regression analysis results show that the regression coefficient of female executives is 0.182, which is significantly correlated with the corporate performance at the level of 5%, indicating that the higher the proportion of female executives, the better the

**Table 5.** Regression Analysis of corporate social responsibility and corporate performance

| Variables | Model (2): Eps | |
|---|---|---|
| | Coefficent | T-value |
| Csr | 0.266** | 5.279 |
| Size | 0.221** | 2.777 |
| Lev | −0.041 | −0.085 |
| Pcs | 0.233** | 4.0 |
| Adj $R^2$ | 0.226 | |
| F value | 15.8** | |
| n | 582 | |
| Mean VIF | 1.264 | |

corporate performance, and H1 is established. VIF is the variance inflation factor used to judge the multicollinearity of the model. The mean values of VIF are 1 and 1.395 respectively, indicating that there is no multicollinearity in model (1).

2) Regression analysis of corporate social responsibility and corporate performance

Since the mean value of VIF is less than 10, it shows that there is no multicollinearity in model (2). The regression analysis results of corporate social responsibility and corporate performance in Table 5 show that the regression coefficient of corporate social responsibility is 0.266, which is significantly correlated with corporate performance at the level of 5%, indicating that the better the performance of corporate social responsibility, the better the corporate performance, and H2 is established.

3) Regression analysis of female executives and corporate social responsibility

The mean value of VIF is less than 10, indicating that there is no multicollinearity between the variables in the regression model. The regression coefficient of female executives of Table 6 is 0.141, which is significantly correlated with corporate social responsibility at the level of 5%, indicating that the higher the proportion of female executives, the better the corporate social responsibility, and H3 is established.

4) Intermediary effect of corporate social responsibility

Adj.$R^2 = 0.263$, the data fit well. Coefficient of corporate social responsibility ($\alpha_{42} = 0.283$, $P < 0.05$) was significantly positive, the coefficient of female executives ($\alpha_{41} = 0.142$, $P < 0.05$) is significantly positive, so corporate social responsibility plays an intermediary role in female executives and corporate performance, and H4 is supported.

**Table 6.** Regression analysis between female executives and corporate social responsibility

| Variables | Model (3): Csr | |
|---|---|---|
| | Coefficient | T-value |
| Fem | 0.141** | 2.164 |
| Size | 0.341** | 5.980 |
| Lev | −0.129** | −2.407 |
| Pcs | −0.046 | −0.610 |
| Adj $R^2$ | 0.183 | |
| F value | 9.465** | |
| n | 582 | |
| Mean VIF | 1.327 | |

**Table 7.** Regression analysis of female executives, corporate social responsibility and corporate performance

| Variables | Model (4): Eps | |
|---|---|---|
| | Coefficient | T-value |
| Fem | 0.142** | 2.663 |
| Csr | 0.283* | 5.137 |
| Size | 0.173** | 2.654 |
| Lev | 0.008 | 0.084 |
| Pcs | 0.281** | 4.475 |
| Adj $R^2$ | 0.263 | |
| F value | 14.258** | |
| n | 582 | |
| Mean VIF | 1.259 | |

## 5   Conclusion

Based on the Shanghai and shenzhen A shares small and medium-sized enterprises in China in 2013–2020 data of listed companies as samples, under the background of the current big data related to the development of technology, we explored the relationship between female executives, corporate social responsibility and corporate performance, and we draw the following conclusions: First, the female executives the higher the ratio, the better the implementation of corporate social responsibility. Second, the higher the proportion of female executives in an enterprise, the better the performance of the enterprise will be promoted. Third, cultural and media enterprises actively undertake social responsibilities, which is conducive to improving corporate performance. Fourth,

corporate social responsibility plays an intermediary role between female executives and corporate performance in companies.

The empirical analysis results of this paper show that female executives significantly promote the performance of corporate social responsibility and corporate performance. The higher the proportion of women in the senior management team is, the more influence and voice they have. Due to the gender role difference of women, they are more oriented towards social responsibility. By fulfilling social responsibility, they can improve the satisfaction of all parties and thus promote the improvement of corporate performance. But in reality, many companies have a small proportion of women, and some companies even have no female executives, which shows that discrimination against women still exists in the workplace.

The research results of this paper have some practical implications for the management of enterprises. First of all, corporate managers should change their ideas and actively fulfill corporate social responsibility. Enterprises attach importance to the performance of social responsibility, which can help enterprises establish a good interactive relationship with customers, suppliers, employees and other stakeholders, so as to achieve better corporate performance. Second, A certain proportion of female executives will affect the enterprise's decision-making, and they can bring the positive influence for enterprises, so enterprises should optimize its management sex ratio. For some management groups that lack or have a low proportion of female executives, they should dare to hire female executives, trust them, and give them a bigger platform for career development so that they can hold up "half the sky for women". Enterprises should focus on the role of female executives in companies and provide more opportunities for women in the workplace. Enterprises should take the initiative to break the traditional bias, actively improve the degree of gender differentiation among senior executives, establish a reasonable corporate governance structure, and encourage competent female middle managers to move into senior managers positions. Coordinating gender differences in a team can not only improve team efficiency, but also help both male and female managers to give full play to their talents. Finally, when setting promotion assessment goals, the differences between male and female managers should be considered to avoid unconscious gender discrimination and the loss of excellent female managers.

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