



Does the Proportion of Female Executives Have an Impact on the Digital Transformation of Enterprises Based on the ESG Perspective?

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Abstract. When the concept of sustainable development has become a global consensus, more and more companies have started to pay attention to the ESG concept, and female executives are attracting attention as an important indicator of G (Governance) in ESG. This research adopts the data of A-share listed companies in China from 2011 to 2021 as the research sample, focuses on the digital transformation of listed companies based on ESG perspective, and explores the influence of the proportion of female executives on the digital transformation of listed companies, in which the comprehensive score of the digital transformation of companies is calculated by the entropy method. The results of the study show that the higher the ratio of female executives in listed companies, the more significant the effect of corporate digital transformation. The conclusions and insights are that the current low proportion of female executives in listed companies still needs to be improved, and companies should appropriately increase the proportion of female executives and pay attention to ESG corporate governance scores, and the government should accelerate the introduction of policies related to female employed persons, so as to promote better development of enterprises.

Keywords: Female executives · Enterprise digital transformation · ESG · Governance

1 Introduction

ESG (Environmental, Social and Governance), as an investment concept of corporate non-financial information disclosure and evaluation [1], represents the self-evident importance of environmental development, social responsibility and corporate governance in the sustainable development of enterprises. Therefore, ESG content fulfillment

not only enables companies to receive higher ESG rating scores, but also helps companies to make strategic adjustments in the first instance when they encounter major issues of digital transformation (Tarmuji et al., 2016) [12]. The proportion of female executives, as an important part of the governance aspect of listed companies, can effectively influence the development of corporate ESG ratings and the process of digital transformation, and is receiving increasing attention from listed companies worldwide. In addition, with the inclusion of digital technologies such as blockchain, cloud computing, and big data in China's 14th Five-Year Plan, enterprises have begun to pay more attention to digital transformation to reduce costs and increase efficiency. In this process, the gender balance of executives can help companies reduce the risk of transformation and better manage their businesses [2].

So far, most of the academic studies on female executives have focused on the relationship between female executives and corporate financial performance, corporate social responsibility, and corporate performance reporting. In terms of female executives' impact on and corporate financial performance, Chen, Wenting, and Qu, Yi (2022) [3] studied the impact of female executives on family business finance with entrepreneurial orientation, and the results of the study showed that female executives with blood ties to control value have a stronger contribution to corporate financial performance than independent female executives, and the effect is more significant in family businesses with internal entrepreneurial orientation, which can significantly compensate for the deficiencies in corporate governance. In terms of female executives and CSR, Ying Lu et al. (2021) [4] explored the impact of female directors on CSR based on group dynamics and synergy theory and found that there is a significant positive impact of female executives and directors on CSR governance, and there is a certain complementary and alternative relationship between female executives and female directors on CSR governance. In terms of female executives and corporate performance reporting, an empirical study by Chao Dou et al. (2022) [5] found that female executives help to improve the truthfulness and accuracy of performance reporting of listed companies, and the heterogeneity analysis of this research showed that the higher the proportion of female executives, the more valid the above findings.

Based on the above analysis, the research results of female executives on the governance of listed companies in China are relatively fruitful, but confined to the differences in research perspectives and the rapid development of the times: the research of female executives on the digital transformation of enterprises is still relatively small. Therefore, this paper takes A-share listed companies in China from 2011–2021 as the research sample, and conducts an in-depth research and discussion on the impact of female executive ratio on this issue of digital transformation of listed companies. Among them, the comprehensive score of corporate digital transformation is obtained by calculating the entropy value method. The final results of this research show that the higher the proportion of female executives in listed companies, the more significant the effect of corporate digital transformation. The conclusion of this research fills a certain gap in this area of research and provides feasible ideas and references for subsequent scholars in this area of research.

The possible contributions of this paper are: First, this paper is the first to explore the impact of female executives on corporate digital transformation based on ESG perspective, which fills some of the gaps in existing research and serves as a reference for future research. Secondly, the entropy value method is used to evaluate the digital indicators of enterprises, which reduces the influence of subjective factors on the results and makes the results more accurate. Thirdly, the results were tested for robustness, which confirmed the reliability of the findings and provided references for further policy formulation.

2 Theoretical Analysis and Hypothesis Formulation

In recent years, with the emergence of ESG concept, gender equality, as an important issue in sustainable development, has been paid more and more attention by listed companies in various countries. Currently, more and more scholars are aware of the important relationship between company executive structure and company development environment. Along with the increasing number of female employees entering companies and gradually developing into top managers, a large number of companies have conducted detailed investigations to verify whether women as managers can really help companies increase value and reduce business management risks. Numerous studies have shown that women managers can have a positive impact on business operations and growth. Further, a McKinsey & Company report suggests that a higher percentage of female executives in management can set a company-wide example of gender equality and diversity, leading to greater employee loyalty, which in turn increases company innovation and improves company performance. A study published by the Harvard Business Review also shows that female board members can provide different perspectives and perspectives on board decision making and improve the quality of board deliberations and decisions.

Further, academic studies have also shown that the proportion of female executives shows a significant positive relationship with corporate performance. A study by Sun, Liang, and Zhou, Lin (2016) [6] demonstrated that female executives can significantly reduce the risk appetite of firms, which in turn reduces the likelihood of overinvestment in firms. Pan, Zhen et al. (2019) [7] study concluded that women are able to provide different perspectives and thinking to the company in strategic decision making, which helps the team to improve their decision making. Ting Liu and Qifang Yang (2019) [8] showed that an increase in the proportion of female executives can promote an increase in corporate innovation investment.

Finally, the digital transformation of enterprises makes enterprises adopt digital technologies such as artificial intelligence, big data, cloud computing, and blockchain to apply to many aspects of enterprise production and operation, which can help enterprises achieve effective interaction of information within the enterprise and with investors, thus helping enterprises improve corporate value and corporate performance [9]. As an important aspect of corporate governance, it requires not only a high level of attention from the corporate executive team, but also proper decision making and implementation by corporate executives [10]. It has been shown that the cognitive and various characteristics of executive attributes incorporated into corporate decision making will greatly influence the strategic direction and strategic decisions of the company, which in turn will affect the development of many aspects of corporate value and corporate performance [11].

Based on the above analysis, this research argues that the proportion of female executives is strategically important to the digital transformation of enterprises for the corporate governance of listed companies, which will not only improve the overall ESG scores and digital transformation of listed companies, but will also promote the formulation and in-depth implementation of the ESG strategic goals of enterprises, and is an important proposition that listed companies around the world need to pay attention to. Based on the above analysis, this research proposes the following hypotheses.

H1: The proportion of female executives in a company's executive team can positively contribute to the digital transformation of the company.

3 Research Design

3.1 Sample Selection and Data Source

This research uses A-share market listed companies in China from 2011–2021 as the research object, and the research data used are from the CSMAR database. To ensure the availability and accuracy of data, the samples used in this research were processed as follows: (1) excluding the sample data of financial industry; (2) excluding the sample data of ST and *ST during the study period of this research; (3) excluding the sample of companies with missing data; (4) Winsorize the sample data of the studied study, and finally 25,436 samples were obtained.

3.2 Variable Setting

The explanatory variable in this research is the comprehensive score of enterprise digital transformation, which is calculated by referring to the research method of Chinese Liu et al. (2022) [11], selected, and then the entropy value method is used to calculate the comprehensive score of enterprise digital transformation as the final evaluation result of enterprise digital transformation of listed companies. The explanatory variable for this research is the percentage of female executives, and the data source is from the CSMAR database.

Table 1. Comprehensive scoring system for enterprise digital transformation

Tier 1 Indicators	Secondary indicators
Corporate Governance	Strategic Leadership Score
	Organizational Empowerment Score
	Technology Driven Scoring
External Environment	Environmental support score
Digital Transformation	Scoring of digital results
	Digital Application Score
	Digital Transformation Index

3.3 Model Construction

Based on the review and research theoretical hypotheses presented in the previous section of this research, the regression model was developed in this research as follows:

$$Dcg = \alpha + \beta Female_{i,t} + \gamma Control_{i,t} + \epsilon_{i,t}$$

4 Analysis of Empirical Results

4.1 Descriptive Statistics

The descriptive statistical analysis of the full sample of this research shows that the mean value of the comprehensive score of enterprise digital transformation calculated by using the entropy value method is 36.20, the standard deviation is 10.30, the minimum value is 20.27, and the maximum value is 83.45, which is more volatile overall and greater than other variables, that is, the digital transformation of China's listed companies varies greatly. The mean value of female executive ratio is 0.17, the standard deviation is 0.16, the minimum value is 0, and the maximum value is 1.00, which indicates that the proportion of female executives in China's listed companies is still low at present and there is more room for improvement.

4.2 Correlation Analysis

The results of the correlation test between the variables obtained from the Pearson correlation coefficient correlation test were used in this research. From the test results, the composite score of enterprise digital transformation and the proportion of female executives showed a significant positive correlation at the chosen 1% significance level, which verified the view of hypothesis 1. The correlation coefficients between other variables are not significant, and it can be basically determined that the model is more appropriate and there is no multicollinearity between the control variables and the explanatory variables.

4.3 Basic Regression

The data used in this research were panel data, and a fixed-effects model was chosen to be used by the Hausman test. This research first conducted a linear regression analysis, and the p-value for the proportion of female executives in the regression results was 0.007, indicating that the proportion of female executives has a significant effect on the overall score of digital transformation of enterprises, i.e., the higher the proportion of female executives the more significant the effect of digital transformation of enterprises, which is consistent with the previous theoretical hypothesis of this research.

4.4 Robustness Tests

In order to enhance the persuasiveness of the empirical results of this research, the explanatory variable is replaced with female director ratio in this research. The test obtained that the result after the substitution is still significant and positive, which indicates to some extent that the underlying regression results of this research are robust.

5 Conclusions

This research takes A-share listed companies in China from 2011–2021 as the research object, and evaluates the digital transformation of A-share listed companies in China by constructing a comprehensive evaluation system of enterprise digital transformation. It is found that the proportion of female executives is positively correlated with the digital transformation of enterprises, and the higher the proportion of female executives, the more significant the effect of digital transformation of enterprises. However, since the overall proportion of female executives in A-share listed companies in China is still low, the proportion of female executives and the effect of digital transformation of enterprises in China still need to be improved.

Based on the findings of this research, the following insights were also obtained from this research: based on the level of business managers, it is necessary to recruit female executives for companies where female executives do not exist at the moment, not only to improve the effectiveness of the digital transformation of the company, but also to practice the concept of gender equality in sustainable development. In addition, some companies may be concerned about the ability of female employees to work, in this regard companies can set the entry criteria for employees to enter the company. For companies with a low ratio of female executives, they can consider appropriately increasing the number of female executives and raising the ratio of female executives, so as to improve the effect of digital transformation and the overall ESG score of the company. Based on the level of government policy makers, it is necessary to propose employment incentive policies for appointing female employees. It not only accelerates the implementation of the sustainable development concept of gender equality, but also accelerates the improvement of ESG system construction in China.

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