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Environmental Protection Experience, Cost and Performance

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Abstract

Along with rapid global economic development, people are slowly becoming environmentally aware and green development is increasingly a vital topic of social concern. Academic circles are currently focusing on environmental protection and economic growth to explore the coordinated development of both and to achieve a win-win solution between them. To study the relationship between environmental protection experience and both cost and performance, this study empirically analyzes companies listing on the Shenzhen A-share market from 2014 to 2018. The results show that senior executives' environmental protection experience is negatively correlated with corporate costs, whereas it is positively correlated with business performance. These results provide empirical evidence of the importance of enterprises introducing and cultivating environmental personnel and insisting on sustainable development.

Keywords: *green financial management; green transformation; senior executives; environmental protection experience; cost; performance.*

1. Introduction

In the 1990s, as green awareness gradually became the main trend of economic development, the idea of green management came into being. The term "green management" became popular among Western entrepreneurs. Green financial management was also rising quietly. Earlier, the Miller-Green Financial Group in the United States implemented the green financial management mechanism, which provided a practical basis for academic research. China began to study green financial management at the end of the 1990s. Because of the relatively short period of time that the subject has been under examination, it is still in the exploration stage.

Zhang (1997) believes that green financial management refers to the introduction of environmental factors in the management process of the raising, use, consumption, recovery, and distribution of funds in the course of business operations, as well as the integration of environmental ideas into the financial management of enterprises.

Green financial management is a comprehensive financial management approach that considers the limitations of resources, benefits of society, protection of the environment, and profitability of enterprises.

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Lu (2005) holds that green financial management aims to maximize the comprehensive value of economic, social, and ecological benefits based on the premise of maintaining and improving ecological resources and the environment, in accordance with the principle of achieving the sustainable development of enterprises and society, with a focus on maximizing corporate value.

According to Wu (2007), green financial management integrates the principles of ecological and social benefits, following the laws and regulations of the ecological environment to seek the coordination of economic, social, and ecological benefits, on the basis of traditional financial management.

The definitions of green financial management in the studies mentioned above share the same essence, although they are described differently in domestic academia. They can be summarized as green financial management being the combination of profitability and environmental protection in the course of business management, attempting to maximize the value of benefits and achieve sustainable development. It also “greens” traditional financial management under the guidance of sustainable development and promotes the green transformation of enterprises through effective management and application of corporate funds.

The green transformation of enterprises has been a global issue and an inevitable requirement for sustainable economic and social development in China. Because of the protracted and complex environmental issues in the process of corporate green transformation, Han (2012) believes that the biggest obstacles are cost and technology; however, senior executives’ environmental protection experience (EPE) can alleviate such issues (Bi et al., 2019). In terms of corporate environmental sustainability, the more EPE directors have, the more powerful their decision-making process. In other words, directors’ EPE plays an important role in decision-making about corporate environmental behaviors (Walls and Hoffman, 2013). Directors with environmental expertise play a crucial role in the development of corporate environmental strategies, especially in shaping the company’s environmental performance (Homroy and Slechten, 2017). The environmental protection experience of senior executives is conducive to enterprise value creation and environmental investment (Guo, 2019) and their green cognition drives technological innovation and production by influencing corporate green behaviors; thus improving business performance (Zou et al., 2019).

Based on the above literature, studying the role of environmental protection experience is of great practical significance. Most of the previous literature focuses on the macro perspective of national policies. From the enterprise micro perspective, this study empirically analyzes the effectiveness of senior executives’ environmental protection experience on the cost and performance of the enterprise against the background of the Chinese institution. It furthermore provides references for promoting environmental personnel construction, green transformation and development, and the sustainable economic development of enterprises.

2. Theoretical background

2.1 Theory of sustainable development

The concept of “sustainable development” was first proposed in 1972 at the United Nations Conference on the Human Environment in Stockholm. In 1989, the Standing Committee of the National People’s Congress promulgated the Environmental Protection Law of the People’s Republic of China. The 15th National Congress of the Communist Party of China further defined sustainable development as one of China’s economic development strategies in 1997.

Niu (2012) emphasizes that sustainable development should balance and coordinate the relationship between “man and nature,” and correctly deal with the relationship between “man and man,” which is fundamentally the overall coordination of the relationship between “man and nature” and “man and man.” Wu (2014) points out that, on the premise of respecting the laws of nature and social development, sustainable

development focuses on the development of man and society, and harmony between man and nature, except for the development of the economy. Meet the current development needs of people should not damage future generations. In other words, development must pay attention to the horizontal harmony between economy, society, and man and the vertical sustainability of the overall development of the human species.

2.2 Upper echelons theory

Peng (2016) proposes that in the absence of a regulatory mechanism and less equity for managers, managers would excessively engage in socially responsible activities for personal gain. If the owner of the enterprise were also the manager of the enterprise, the interests would coincide, and there would be no principal-agent problem; however, when the manager of the enterprise is not the shareholder but a professional, the interests are not the same. The owner's goal is to obtain residual income from the production and operation of the enterprise. The manager's goal is to meet the individual's economic needs, such as on-the-job consumption, in addition to fulfilling fiduciary responsibility and increasing the enterprise's capital.

According to the theory of CSR agency, charitable acts bring not only a good public image to the company, but also benefits and reputation to managers, such as recognition, proximity to celebrities, and new relationships. The more the CSR activities, the more personal benefits managers can obtain. The absence of a regulatory mechanism and less equity, interest, and reputation drive managers to over-invest in CSR activities. If the cost of fulfilling social responsibility exceeds the benefits of CSR activities, CSR hurts shareholder wealth and becomes a new agency problem.

3. Research questions and hypotheses

In the tide of the green economy, with the increasingly fierce competition among enterprises, reducing costs and improving performance have become key factors for gaining competitive advantage. Senior executives have absolute power in resource allocation and decision-making as core figures of enterprise operation. Therefore, scholars usually study their effect on enterprise cost and performance.

Whereas enterprises may face the great adjustment cost of investment expenditure (Cooper and Haltiwanger, 2006), comparatively longer business history and richer market experience will ensure a smaller adjustment cost (Liu and Yin, 2018). The simultaneous implementation of development and management of environmental technology will increase enterprise costs accordingly (Aroui et al., 2012). Therefore, control of environmental costs is a key factor in achieving sustainable development, which can be accomplished through green accounting (Xie, 2018). Green enterprise management may bring down operating costs (Hart, 1997; Yakhou and Dorweiler, 2004). Environmental technology improvement helps lower corporate emission reduction costs, thereby reducing corporate environmental costs (Chen, 2019). Costs and time spent increase accordingly when enterprises undergo green transformation; however, the environmental protection experience of senior executives can help break these barriers (Bi et al., 2019).

In summary, this study believes that senior executives' EPE provides enterprises with professional environmental protection knowledge, skills, and rich practical experience that effectively reduce enterprise costs. Therefore, the following hypothesis is proposed:

H1: A greater wealth of green experience among senior executives ensures lower corporate costs.

An increasing number of enterprises are realizing that they can maximize profits while reducing pollution and internalizing environmental protection, thereby "going green."

Homroy and Slechten (2017) believe that directors' professional environmental knowledge is beneficial to

the development of corporate environmental strategies, especially in terms of corporate environmental performance. Zou et al. (2019) believe that senior executives' green cognition can improve corporate green performance by influencing corporate green behaviors. From the capital structure perspective, the rich EPE of corporate executives facilitates comprehensive analysis of the pros and cons of environmental investment decisions, and the establishment of an awareness of the optimal capital structure, thereby maximizing corporate interests and increasing corporate value. In conclusion, this study believes that senior executives' EPE is conducive to improving business performance. Therefore, the following hypothesis is proposed:

H2: A greater wealth of green experience among senior executives ensures higher business performance.

4. Study methodology

4.1 Sample selection and data sources

This study examines A-share companies listing on the Shenzhen Stock Exchange based on values observed for 2014-2018. The initial samples were screened according to the following principles:

- A) Discounting observations from the financial sector
- B) Discounting ST and *ST observations
- C) Discounting observations with missing data

After screening, the sample data of 1377 listed companies were finally retained, with a total of 6885 valid observations. The EPE data of senior executives were collected and collated by hand. The data was taken from the annual reports of the sample companies, and other data were collected mainly from the CSMAR database. To eliminate the influence of extreme values, this study Winsorized some variables within a quantile of $\pm 1\%$ and conducted an empirical analysis using SAS9.4.

4.2 Variable definitions

(A) Dependent variables

Enterprise cost and performance are the dependent variables in this regression analysis. Enterprise cost is measured by the administration expense (COST) and business performance is measured by the basic financial index, return on total assets (ROA) (Zhang and Qian, 2014).

(B) Independent variables

Senior executives' EPE is an independent variable that takes the value of one if senior executives have EPE and zero if not.

Senior executives are the core figures of enterprise operations. According to Zhou's (2017) proposed definition of the scope of enterprise executives, they are composed of senior managers directly involved in business decision-making, with the exception of members of the board of directors and the board of supervisors. Based on the availability and accuracy of data, this study defines executives as senior managers and members of the board of directors and board of supervisors.

EPE includes environmental education experience, reward and punishment experience, work experience, project experience, job experience, and other relevant EPE.

(C) Control variables

To control for the enterprise cost, performance, and environmental protection experience of senior executives, and considering the factors affecting the development of enterprises, enterprise scale (SCA), leverage ratio (LEV), size of the board of directors (BOD), duality (DUAL), and senior executives' remuneration (PAY) are used as control variables in this study, together with the dummy variables of industry (IND) and year (YEAR) to control their fixed effects. Detailed variable definitions are shown in Table 1.

Table 1. List of variable definitions

Type	Name	Code	Method of measurement
Dependent variable	Enterprise cost	Cost	Natural logarithm of administration expense
	Business performance	ROA	ROA = net profit / total assets
Independent variable	Senior executives' EPE	EPE	Directors, supervisors, and senior executives, 1 with EPE, 0 otherwise
Control variable	Enterprise scale	SCA	Natural logarithm of total assets
	Leverage ratio	LEV	Total liabilities/total assets
	Size of the board of directors	BOD	Number of board members
	Duality	DUAL	Chairman of the board and general manager, 1 for duality, 0 otherwise
	Senior executives' remuneration	PAY	Total remuneration of the top three executives / 10000
	Industry	IND	Dummy variable
	Year	YEAR	Dummy variable

To study the EPE effect on cost and performance, we establish regression models to verify the hypotheses above. The models built are as follows:

Model (1) studies the relationship between senior executives' EPE and enterprise costs. The model controls factors such as enterprise scale, leverage ratio, size of the board of directors, duality, and senior executives' remuneration. It verifies that senior executives' EPE is negatively correlated with enterprise costs. $\beta_1 > 0$ indicates a positive correlation between senior executives' EPE and enterprise costs; $\beta_1 < 0$ indicates a negative correlation between the two.

$$\text{COST} = \beta_0 + \beta_1 \text{EPE} + \beta_2 \text{SCA} + \beta_3 \text{LEV} + \beta_4 \text{BOD} + \beta_5 \text{DUAL} + \beta_6 \text{PAY} + \sum \text{IND} + \sum \text{YEAR} + \varepsilon \quad (1)$$

Model (2) studies the relationship between senior executives' EPE and business performance. The model controls factors such as enterprise scale, leverage ratio, size of the board of directors, duality, and senior executives' remuneration. It verifies that senior executives' EPE is positively correlated with business performance. $\beta_1 > 0$ indicates a positive correlation between senior executives' EPE and business performance; $\beta_1 < 0$ indicates a negative correlation between the two.

$$\text{ROA} = \beta_0 + \beta_1 \text{EPE} + \beta_2 \text{SCA} + \beta_3 \text{LEV} + \beta_4 \text{BOD} + \beta_5 \text{DUAL} + \beta_6 \text{PAY} + \sum \text{IND} + \sum \text{YEAR} + \varepsilon \quad (2)$$

5. Analysis of empirical results

Table 2. Descriptive statistics of variables

Variable	N	Mean	Median	Standard deviation	Minimum value	Maximum value
ROA	6885	0.034	0.035	0.084	-1.909	0.384
EPE	6885	0.218	0.000	0.413	0.000	1.000
COST	6885	18.919	18.835	0.991	16.424	22.738
SCA	6885	22.076	21.953	1.103	14.942	26.440
LEV	6885	0.398	0.386	0.198	0.009	1.685
BOD	6885	8.345	9.000	1.613	4.000	18.000
DUAL	6885	0.315	0.000	0.465	0.000	1.000
PAY	6885	220.553	166.500	195.068	32.750	1595.000

ROA is a key business performance indicator. Its mean value is 0.034 and the median is 0.035, indicating a low average performance.

The mean value of senior executives' EPE in sample companies is 0.218, and the median is 0, indicating that 21.8% of directors, supervisors, and senior managers have EPE.

The average cost of the sample companies is 18.919, the minimum value is 16.424, and the maximum value is 22.738, indicating a small cost difference.

Among the control variables, the average size of sample companies is 22.076, and the standard deviation is 1.103, indicating a large gap in asset scale. The average leverage ratio of sample companies is 39.8%, indicating a reasonable capital structure, but the value of some companies is as high as 168.5%, far higher than the warning line for financial risk. The standard deviation of board size is 1.613, and that of duality is 0.465, indicating a small and stable fluctuation range. The average total remuneration of the top three executives in the sample companies is 220.553, the minimum value is 32.750, and the maximum value is 1595.000, indicating a large remuneration gap among the top three executives.

Table 3. Regression analysis results

	Model 1	Model 2
Intercept	2.7589***	-0.3944***
	(16.42)	(-14.97)
EPE	-0.0242*	0.0039*
	(-1.65)	(1.69)

SCA	0.7132***	0.0205***
	(96.12)	(17.57)
LEV	0.0194	-0.1815***
	(0.53)	(-31.58)
BOD	0.0222***	0.0020***
	(5.79)	(3.38)
DUAL	-0.01628	0.00278
	(-1.25)	(1.36)
PAY	0.0008***	0.0000***
	(23.29)	(4.40)
Year & Ind	YES	YES
Adj. R2	0.7570	0.1677
N	6885	6885

Note: *, **, and *** denote significance levels of 10%, 5%, and 1%, respectively.

Table 3 shows the regression analysis results of Models 1 and 2.

Regression analysis 1 shows a negative correlation between corporate senior executives' EPE and cost. The regression coefficient is -1.65, which passes the significance test at 10%, indicating that the more EPE senior executives have, the lower the cost, supporting hypothesis H1.

Regression analysis 2 shows that the regression coefficient of senior executives' EPE is 1.69, which is significant at the 10% level, indicating that executives' EPE has a significant positive effect on performance, supporting hypothesis H2.

6. Conclusions and suggestions

6.1 Research conclusions

With green development becoming the main theme of the new era, an increasing number of companies are attaching importance to environmental protection, and including the green development concept in corporate "values." This study examines companies listing on the Shenzhen A-share market between 2014 and 2018 based on the sustainable development and upper echelons theories against the background of the Chinese institution. It explores the EPE effect on cost and performance on the basis of senior executives' EPE data collected by hand. The study's results suggest the following:

First, there is a significant negative correlation between senior executives' EPE and enterprise cost, that is, senior executives' EPE effectively reduces enterprise costs.

Second, there is a significant positive correlation between senior executives' EPE and business performance, that is, executives' EPE effectively improves business performance.

The conclusion of this paper has important theoretical and practical significance. In terms of enterprise cost, the increase of environmental protection cost will naturally lead to the increase of production cost, while the enterprise can help the enterprise reduce unnecessary expenditure, accelerate the pace of enterprise technological innovation, realize energy conservation and emission reduction from the perspective of environmental protection specialty, so as to further reduce enterprise cost; in terms of enterprise performance, environmental protection experience makes executives accumulate A large number of customer resources and first-hand business information can more comprehensively judge the direction of the enterprise, reduce the uncertainty and risk in the strategic decision-making of the enterprise, so as to maximize the rational use of various resources and create more wealth for the enterprise; as far as the literature is concerned, this paper enriches the existing literature of environmental protection experience of senior executives from the micro perspective.

In conclusion, this study believes that from the long-term interest perspective, senior executives' EPE provides enterprises with professional environmental protection knowledge and experience. With this core advantage, they can seize the commanding height of green development quickly, bring down costs, improve performance, and maximize corporate profits. In addition, this study brings some insight into the sustainable development of Chinese enterprises as well as the selection and employment of senior environmental personnel.

6.2 Policies and suggestions

With the Chinese government's promulgation of a series of environmental protection laws and regulations such as the Environmental Protection Law, the environmental regulation effect on the environmental investment of enterprises forms a "threshold effect" (Tang, 2013). Environmental protection is not only a social responsibility, but also an opportunity for enterprise development. It is necessary to transform "passive environmental protection" into "active environmental protection." Based on this study's research conclusions, the following suggestions are put forward:

First, regarding human resources, enterprises should cultivate "environmental professionals" internally according to their own actual conditions and development needs, while introducing high-end environmental personnel, and encouraging further outside study, to improve the cultivation of green personnel.

Second, regarding innovation and development, enterprises should make the best use of resources available. Executives with EPE should strengthen their "environmental friendly" knowledge reserve, apply what has been learned, keep pace with the times, keep environmental protection technology and continue innovation, and thus maximize the advantages and resources of EPE.

Third, regarding performance appraisal, enterprises should adhere to the principle of priority, including environmental protection into the overall development plan, and taking EPE as an important basis for the evaluation and selection of senior executives. Under the same conditions, enterprises should give priority to the appointment of senior executives with EPE to improve the decision-making efficiency, quality, and the ability to invest in the environment.

6.3 Research limitations and future prospects

Although this study has carried out theoretical and data analysis and empirical research in accordance with the standard method, but due to the lack of experience and other objective factors, there are still many defects. This paper makes a reflection and summary, hoping to further improve in the future research.

There are some limitations in the selection of samples in this paper. This paper selects the observation value of A-share listed companies in Shenzhen Stock Exchange from 2014 to 2018 as the initial sample, and does

not collect and inspect the data of other years and other stock exchanges. Therefore, in order to strengthen the reliability of the research conclusion, we can further improve and update the data and increase the sample size in the future research.

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