Research on the Impact of CSR on Innovation Performance
Empirical Analysis Based on Pharmaceutical Enterprises

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Abstract. Innovation is the foundation of enterprise development. More and more enterprises pay attention to technological innovation, and the impact of CSR on innovation is worth exploring. This paper selects the relevant data of A-share pharmaceutical enterprises from 2016 to 2021 as a sample to explore the relationship between pharmaceutical corporate CSR and innovation performance, and introduces internal control as a regulating variable. The results show that the fulfillment of CSR is positively correlated with innovation performance; Internal control positively regulates CSR and innovation performance. This paper puts forward some management suggestions: pharmaceutical enterprises should actively undertake social responsibilities; Strengthen the internal control system; further strengthen the ability of technological innovation; Promote digital construction.

Keywords: CSR · innovation performance · internal control · pharmaceutical enterprises

1 Introduction

With the transformation of traditional economy and the arrival of the Internet era, innovation has become the most critical issue in this era. Innovation is the source of economic growth, the foundation of industrial development, and the fundamental guarantee for enterprises to maintain long-term core competitiveness. Corporate social responsibility (CSR) is an important factor affecting corporate innovation. On the one hand, while making profits, enterprises also need to consider their obligations. On the other hand, enterprises that conscientiously fulfill their social responsibilities are unlikely to have financial problems [2]. Nowadays, corporate social responsibility has even become an important standard to measure an enterprise. Bansal first proposed that there is a link between corporate social responsibility and RD innovation.

Pharmaceutical enterprises are technology, knowledge and capital intensive high-tech industries. Technological innovation ability is the embodiment of the core competitiveness of pharmaceutical enterprises. Pharmaceutical enterprises need to continuously develop new drugs to deal with new problems. They also need to continuously improve

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their original products to improve medical effects, which reflects the characteristics of high difficulty and sustainability of RD and innovation of pharmaceutical enterprises. Under the international and domestic epidemic situation, the scandals of pharmaceutical enterprises emerge one after another. However, pharmaceutical enterprises bear social responsibilities that cannot be replaced by other enterprises. They need to bear major social responsibilities in terms of epidemic prevention and control, resumption of work and production. In the long run, the development of pharmaceutical enterprises is inseparable from the commitment to social responsibility.

In the post epidemic era, pharmaceutical enterprises are closely related to the situation in China. Through this article, it is expected that pharmaceutical enterprises will actively fulfill their social responsibilities and enhance their competitive advantages. Pharmaceutical enterprises should also pay attention to internal control to better strengthen the role of social responsibility performance in promoting innovation performance.

2 Related Concepts

2.1 CSR

The concept of corporate social responsibility (CSR) was first put forward by Oliver Sheldon in 1923. He believes that CSR means that managers of enterprises should meet the needs of internal and external personnel. He emphasizes that they should not only focus on the economic benefits of enterprises, but also pay more attention to corporate social responsibility. At present, scholars generally agree that CSR means that on the basis of creating economic benefits, enterprises also need to undertake other responsibilities, including environmental protection obligations, production safety, product quality assurance, social ethics and other aspects related to social public interests [4].

2.2 Innovation Performance

In 1912, Schumpeter put forward the concept of technological innovation in the theory of economic development. He believed that RD is one of the basic motivations for enterprises to obtain sustainable growth ability, which can enable enterprises to obtain competitive advantages. Han (2015) [1] pointed out that after high-tech enterprises successfully invest in innovation, they will obtain relevant innovation outputs, such as patent rights, technological intangible assets, new product development and new processes. Domestic and foreign scholars study the influencing factors of innovation performance, mainly from the internal and external aspects of the enterprise organization. In terms of external environment, scholars believe that government policies, market demand and financial environment have a significant impact. Scholars believe that internally, the resources owned by enterprises and the performance of CSR also affect the innovation performance of enterprises.

2.3 Internal Control

Internal control refers to the organization, plans, procedures and methods of various constraints and adjustments set up within the enterprise in order to achieve its development goals. Internal control includes pre prevention, in-process control and post supervision.

3 Research Hypothesis

3.1 CSR Actively Promotes Innovation Performance

By reviewing the rks data from 2009 to 2018 and the patent data of the State Intellectual Property Office, Tian Tian (2020) [5] found that when the industry is highly competitive or in a high-tech intensive industry, CSR has a significant positive effect on innovation. Pharmaceutical enterprises are high-tech intensive industries. By fulfilling its CSR, the enterprise enhances its reputation and optimizes its brand image, thereby enhancing investor confidence, making it more likely to obtain external funds and attract innovative talents, so as to improve its innovation performance. Based on this, this paper proposes hypothesis 1.

H1: CSR of pharmaceutical enterprises is positively correlated with innovation performance.

3.2 Regulatory Role of Internal Control

The role of internal control runs through the whole process of RD input and innovation output. In the RD investment stage, effective internal control can help enterprises evaluate projects, screen appropriate projects and select the best projects, so as to make efficient use of existing resources. In the innovation output stage, effective internal control adjusts the RD innovation scheme according to the market demand, coordinates the efficient cooperation of various departments, and protects the innovation achievements, such as intellectual property rights, patents, etc. On the other hand, internal control will also affect the performance of corporate social responsibility. Young sang Kim et al. (2017) [6] found that enterprises which performing CSR efficiently are more likely to have effective internal control through various measurement methods and a series of robust regression analysis of corporate social responsibility (CSR) from 2004 to 2012. Based on this, this paper proposes hypothesis 2.

H2: Internal control positively regulates CSR and innovation performance of pharmaceutical enterprises.

4 Research Design

4.1 Data Source and Sample Selection

The research object of this paper is pharmaceutical enterprises, and the research sample is A-share pharmaceutical enterprises in China from 2016 to 2021. In order to ensure the reliability of samples, st, st* enterprises and enterprises with missing relevant data are excluded, and 1067 samples are finally obtained.

4.2 Variable Definition

4.2.1 Explained Variables

Innovation performance (RD). Due to the relative particularity of pharmaceutical enterprises, the level of patent output can better measure the innovation ability of different pharmaceutical enterprises.

4.2.2 Explanatory Variables

CSR. This study adopts the calculation method of social contribution value per share of enterprises: CSR input intensity = (net profit + total tax payment + employee expenses + interest expenses + total public welfare investment − social cost)/main business income. These data can be found in the enterprise annual report.

4.2.3 Adjusting Variables

Internal control (Lnlc). For the measurement of enterprise internal control, this paper selects the domestic commonly used Dibo internal control index. The better the internal control of the enterprise, the higher the internal control index of Dibo.

4.2.4 Control Variables

Controls. Including: enterprise size (SIZE), fixed asset intensity (CAP), asset liability ratio (LEV), enterprise growth (GROWTH).

4.3 Model Building

Build the model (1) according to hypothesis 1; Build the model (2) according to hypothesis 2.The specific model is as follows:

$$RD_{i,t} = \alpha_0 + \beta_1 CSR_{i,t} + \beta_2 Controls_{i,t} + \mu_{i,t} \tag{1}$$

$$RD_{i,t} = \alpha_0 + \beta_1 CSR_{i,t} + \beta_2 LnIC_{i,t} + \beta_3 CSR \times LnIC_{i,t}\mu_{i,t} \tag{2}$$

5 Empirical Analysis

5.1 Descriptive Statistics

As shown in Table 1, the minimum value of CSR is −3.314 and the maximum value is 3.504. Some enterprises do not perform their corporate social responsibilities, so they have negative values. At the same time, Chinese pharmaceutical enterprises do not perform their CSR well, and there are many problems. The minimum value of RD is 0, the maximum value is 7.774, and the average value is 2.682. It can be seen that the innovation performance gap of Chinese pharmaceutical enterprises is very large, and even some pharmaceutical enterprises have innovation performance of 0. The minimum value of Lnlc is 4.875, the maximum value is 6.732, the average value is 6.464, and the standard deviation is 0.146. Therefore, there is little difference in internal control between different pharmaceutical enterprises.

5.2 Correlation Analysis

As shown in Table 2, there is a significant positive correlation between CSR and RD of pharmaceutical enterprises ($P < 0.01$). There was a significant positive correlation between RD and Lnlc ($P < 0.05$). Therefore, hypothesis 1 and hypothesis 2 are preliminarily confirmed.

Table 1. Results of descriptive analysis

VARIABLES	N	Mean	Sd	Min	Max
CSR	1067	0.127	0.298	−3.314	3.504
RD	1067	2.682	1.669	0	7.774
LnIc	1067	6.464	0.146	4.875	6.732
SIZE	1067	22.10	0.963	18.93	25.15
CAP	1067	0.205	0.119	0.00296	0.708
LEV	1067	0.330	0.175	0.0143	1.352
GROWTH	1067	0.343	2.342	−0.989	40.92

Table 2. Results of correlation analysis

	RD	CSR	LnIc	LnIc × SCR	SIZE	cap	lev	growth
RD	1							
CSR	0.176***	1						
LnIc	0.067**	0.218***	1					
LnIc × SCR	0.804***	0.999***	0.062**	1				
SIZE	0.200**	0.0120	0.164***	0.0200	1			
CAP	0.00300	−0.127*	−0.0370	−0.128**	−0.126*	1		
LEV	0.0280	−0.248**	−0.114*	−0.257***	0.181***	0.147*	1	
GROETH	−0.0300	0.0470	−0.0490	0.0410	−0.153***	−0.00900	0.00600	1

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

5.3 Regression Analysis

According to the regression analysis results, model (1) shows that there is a significant positive correlation between CSR and RD, and the regression coefficient is 0.389, hypothesis 1 is true. Model (2) shows that internal control has a positive regulating effect between CSR and innovation performance. Hypothesis 2 is true.

5.4 Robustness Test

In order to ensure the robustness of the research results, this paper tests: CSR is replaced by social contribution per share (REP), and the samples with negative social contribution per share are excluded, and the regression results are still robust. Therefore, the empirical results of this paper are generally robust.

6 Conclusions and Suggestions

6.1 Research Conclusion

The results show that the fulfillment of CSR by pharmaceutical enterprises is positively related to innovation performance; Internal control positively regulates the relationship between CSR and innovation performance.

6.2 Management Recommendations

6.2.1 Actively Undertake Social Responsibilities

Pharmaceutical enterprises have a bearing on people's livelihood. Therefore, as a pharmaceutical enterprise, it should perform its corporate social responsibility more actively than other enterprises, and should not ignore the performance of corporate social responsibility for short-term profits, let alone the health and safety problems of consumers. Pharmaceutical enterprises should pay more attention to the RD, innovation and use safety of important medical products such as drugs and medical devices, so as to avoid medical accidents and drug hazard accidents caused by medical devices.

6.2.2 Strengthen Internal Control System

The management level should establish a correct internal management concept and clarify the responsibilities of each department. In addition, managers will also complete the key work of internal control and management to maximize the value of the enterprise [3].

To carry out reasonable internal control in pharmaceutical enterprises, first of all, in the pre prevention stage, enterprises should set up a strict internal control system, and the establishment and implementation of internal control should implement the principle of incompatible job division. Before the implementation of internal control, the specific responsibility for internal control shall be assigned to the head of each department. Secondly, in the aspect of in-process control, pharmaceutical enterprises should further improve the corporate governance structure and strengthen the supervision of internal audit departments.

6.2.3 Further Strengthen Technological Innovation Capability

The technological innovation capability of pharmaceutical enterprises can be improved from many aspects. First, encourage outstanding talents to innovate in RD, formulate an incentive mechanism for RD personnel, increase RD investment, and improve the working environment and treatment of RD personnel. Second, cooperate with universities and new RD institutions in industry, University and research, or carry out cross regional collaborative innovation cooperation, so as to master intellectual property rights, so as to gather the scientific factor resources needed by enterprises. The third is to guide the internal employees of the enterprise to cultivate innovation spirit, improve technological innovation ability, improve innovation performance output, and improve the overall innovation level of pharmaceutical enterprises.

6.2.4 Promoting Digital Construction

Pharmaceutical enterprises should accelerate the construction of digital platforms. On the one hand, through digital management, scientific management and reasonable incentives for employees' innovation performance are conducive to promoting the mastery of intellectual property rights and sorting out other innovation performance materials, and stimulating employees' innovation enthusiasm. On the other hand, through digital construction, the performance of CSR can be refined, which is conducive to enterprises' analysis of their own social responsibility performance and continuous adjustment. It can also use digital means to optimize the industry university research cooperation mode, manage all cooperation objects of pharmaceutical enterprises and control the cooperation process, which is conducive to regional collaborative cooperation and innovation of pharmaceutical enterprises.

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