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Research on the Relationship Between Corporate Social Responsibility and R&D Investment and Enterprise Financial Performance

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Abstract

Chinese listed enterprises from 2015-2019 were selected as samples to study the relationship between enterprise social responsibility, R&D investment and enterprise financial performance. The results show that the performance of internal social responsibility can simultaneously promote the short and long-term financial performance; external social responsibility and R&D investment can affect financial performance in the short term, both can positively affect long-term performance and offset the negative impact of R&D investment on the short-term financial performance; overall, social responsibility performance and R&D investment enhance the positive effect of long-term financial performance. These research conclusions help us to understand the importance of corporate social responsibility and R&D investment to the sustainable development of the enterprise, and have certain enlightenment significance to improve the awareness of innovation and the fulfillment of social responsibility.

Key words: Financial performance; Corporate social responsibility; R&D investment; Social Innovation

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1. THE INTRODUCTION

The theory of "innovation" was first defined by economist Schumpeter in 1912, which summarized innovation activities as a step-by-step single linear process consisting of steps in research and application, design R&D, manufacturing and sales. However, with the development of social economy, a linear combination of single and simple product or production mode change can no longer reasonably explain the development needs of the current innovation behavior, but the independent innovation theory, collaborative innovation theory and open innovation theory combining the feedback mechanism between various factors have emerged at the historic moment. (Chen & Huang, 2014) Independent innovation is the macro concept of the national innovation system; collaborative innovation is the intermediate concept of the national innovation system; open innovation is the micro concept of organizational innovation. The three innovation theories complement each other, and summarize the adaptation to the environment in the complexity of the new era. As an important innovation subject in the innovation chain, enterprises fully mobilize the enthusiasm of innovation and improve the development degree of enterprise innovation system is the premise for the realization of independent innovation and collaborative innovation, the premise for all the subjects within the national innovation system, and the cornerstone of realizing the national strategy of independent innovation. (Ye, et al, 2014) This also means that today's enterprise pursuit of traditional technology innovation path, can not meet the needs of society, government, investors and enterprise own development, so enterprises need to build a more scientific and systematic strategic management mechanism to promote the development of the enterprise itself, which corporate social responsibility (Corporate social responsibility, hereinafter referred to as CSR) as the social innovation, in which plays an increasingly important role. (Shi, Hu, & Fu, 2009) Corporate social innovation is a new innovation mode with corporate social responsibility as the core. It is committed to realizing the deep integration of the enterprise itself'core

business and social responsibility while integrating corporate social responsibility into the value creation of the enterprise itself, so as to promote the development of the enterprise itself (Wu & Ye, 2019). From the perspective of brand competition, the performance of corporate social responsibility can enhance the brand evaluation of society and consumers to enterprises from three dimensions: charity behavior, public welfare practice and product design, and enhance the performance of enterprises' own market competitiveness. (Tian, Li, & Xiao, 2014) Enterprise research and development investment can be converted into enterprise technological innovation output, which also helps to improve the market competitiveness of enterprises. (Zou & Xie, 2020) Both can improve the market share by enhancing their own brand competitiveness, and thus accelerate the development of the enterprise itself. Moreover, enterprises focusing on technological innovation can meet the needs of more corporate stakeholders, such as obtaining scarce government resources and investor investment: social responsibility to shareholders and creditors helps improve research and development funding support; social responsibility for employees can gain greater technological resources advantage, social environmental issues can also encourage technological innovation, and thus can improve their innovation ability. (Zhou & Wang, 2013) Mcwilliams A believes that corporate social responsibility and technological innovation can be a complementary strategic investment to help their own development (McWilliams & Siegel, 2000). Therefore, when we study the enterprise financial performance, the inclusion of innovation input and CSR into the research model will help to improve the interpretation and scientific nature of the overall model.

At present, there are many theoretical and empirical studies on corporate social responsibility and enterprise R&D investment and enterprise performance. However, the research conclusions are still quite controversial due to the differences between the research methods and the selection of research models. After sorting out 109 articles on the impact of CSR on corporate financial performance, Walsh M found that only 54 literature studies found that CSR had a positive impact on the company's financial performance, while the rest had a negative impact or no significant relationship (Walsh, 2003). The results of the Orlitzky M literature analysis were similar to Walsh M, and no generalizable conclusions between them were obtained (Orlitzky, Schmidt, & Rynes, 2008). Mcwilliams A and Barnett M L believe that the failure to introduce control variables in technology research and development is one of the factors affecting imperfect past research. (Barnett, 2007). Secondly, the performance mode of corporate social responsibility is more complex and changeable, and is greatly subjective by information disclosure, which makes the fragmentation and multiple change of relevant information. At present, there are many measurement methods such as entropy power method, content analysis method, index measurement method and Gaussian mixed model. Some of the research methods are not objective, and the failure to reasonably quantify corporate social responsibility is one of the reasons for the large differences in the research results. (Dong, Wang, & Yu, 2017; Ji, Kan, & Wu, 2016; Qian, 2013; Zhang, Jin, & Li, 2013) Finally, according to Zhang Zhaoguo's understanding of corporate social responsibility according to the stakeholder theory, corporate social responsibility is not a single individual corporate activity, but a diversified and complex activity for creditors, customers, suppliers, communities, the public, government and employees and the natural environment (Zhang, 2008). However, the failure of the overall discussion of corporate social responsibility in the past research into CSR may also be an obstacle for scholars to further discuss the relationship between corporate social responsibility and financial performance. Therefore, this paper intends to divide corporate social responsibility into internal and external social responsibility and investigate the impact of R&D investment and CSR on enterprise financial performance from the long-term financial performance and short-term financial performance, and use the third party and the database to measure the performance of corporate social responsibility performance, in order to better explain the complex relationship between the three.

2. THEORETICAL ANALYSIS AND ASSUMPTIONS ARE PROPOSED

2.1 R&D Investment and Enterprise Performance

Today, the proportion of enterprise investment in R&D investment has become an important indicator to measure enterprise innovation ability, but the resources that enterprises can control in the process of production and operation activities are limited. R&D investment itself has the characteristics of long investment return cycle and difficult to transform results.Therefore, some scholars believe that the enterprise R&D investment itself will occupy a large amount of capital of the enterprises, which is not conducive to the own expansion of reproduction and the development of emerging markets, so as to reduce the short-term financial performance of the enterprises. (Yu, 2014) Increasing their own investment in R&D will encourage enterprises to improve the advanced nature of their own products, and help enterprises to constantly attract new customers and expand their market share. At the same time, long-term research and development activities will also improve enterprises to improve their technological innovation ability, and then improve their innovation output, and finally improve their long-term financial performance. (Li, & Liu, 2017) So this paper

believes that R&D investment will not immediately bring economic gains, but in the long term enterprise investment in research and development activities will bring advanced technology, make the enterprise under the same market conditions to master better quality innovation technology resources to obtain excess profits, and then play a positive role in enterprise long-term financial performance. Put forward hypothesis 1 based on the above analysis with hypothesis 2.

hypothesis 1: R&D investment will inhibit short-term financial performance.

Hypothesis 2: R&D investment will promote the enterprise long-term financial performance improvement.

2.2 Corporate Social Responsibility and Corporate Performance

With the competitiveness of enterprises becoming more and fiercer, the brand value that traditional product technology innovation can bring to enterprises themselves is becoming more and more limited, and the society and consumers put more emphasis on the expectation of public opinion and the assumption of corporate social responsibility. According to Zhang Zhaoguo's theory based on stakeholders, the development of the enterprise itself not only needs to bear the corresponding responsibility to shareholders but also to bear the corresponding responsibility obligations of creditors, dealers, government customers, employees and the employee ecology and environment. (Zhang, Zhang, & Bao, 2020) Among them, we divide the shareholder responsibility and employee responsibility closely related to the enterprise into the internal corporate social responsibility, and the dealer and consumer rights responsibility, environmental respon sibility and social responsibility are accordingly divided into the external social responsibility of the enterprise. Among them, enterprises can often perform social responsibility obligations to internal stakeholders, such as raising dividends and paying attention to employees 'rights and interests, with timely feedback, so as to attract investment from shareholders and potential investors, enhance employees' sense of trust and work enthusiasm for the enterprise, and then continue to improve the financial performance of the enterprise (Xu & Yi, 2014). But corresponding to the internal social responsibility, enterprise external social responsibility behavior such as reduce dealer transaction costs, reduce carbon emissions, support public welfare development generally have longer return cycle and time, also more complexity, in the short term is scarce resources of the enterprise occupy, apply to obtain profit resources for social activities unrelated to production activities, will inhibit the growth of enterprise financial performance in the short term (Ji, Kan, & Wu, 2016). But in the long term, external social responsibility can create added value in the enterprise brand value, contribute to the enterprise culture export, its brand promotion and good social public relations, above good social signal will shape a responsible corporate image, to help enterprises to create market value to improve enterprise performance. (Wang, 2020). On the whole, the corporate social responsibility can perform the enterprise manufacturing differentiation advantages, enhance the enterprise credibility, help to maintain the friendly cooperative relations of the stakeholders, enhance the enterprise market competitiveness and maintain or enhance the enterprise market share, and always can play a positive role in the financial performance of the enterprise. (Zhu & Guo, 2004) Based on the above studies, hypotheses 3 to hypotheses 8.

Hypothesis 3: Corporate social responsibility promotes corporate short-term financial performance.

Hypothesis 4: Internal social responsibility can promote the short-term financial performance.

Hypothesis 5: Corporate external social responsibility plays a restraining role on the short-term financial performance of enterprises.

Hypothesis 6: Corporate social responsibility promotes corporate long-term financial performance.

Hypothesis 7: Internal social responsibility can promote its long-term financial performance.

Hypothesis 8: External social responsibility can promote its long-term financial performance.

2.3 R&D Investment, Corporate Social Responsibility, and Corporate Financial Performance

And the innovative application of new products and new technologies in the actual enterprise management is always closely related to the performance of corporate social responsibility. Enterprises can only meet the changing social needs, and provide corresponding product feedback according to the social needs, so as to carry out product innovation and technological innovation, and improve the enterprise value. Technical innovation and social responsibility, is not only for the performance of social responsibility in the enterprise practice, but also the incentive for their own technological innovation, such as through technological innovation to reduce pollution emissions or new products meet the requirements of low carbon environmental protection, achieve the enterprise itself in social environmental protection and enterprise value to achieve multi-dimensional promotion, shows that the innovation plays an important role in corporate social responsibility performance activities.Mcwilliams A believes that investment in R&D and innovation can be used as a complementary strategic resource for enterprises to seek to help enterprises develop competitive advantages. (Mcwilliams, Siegel, & Wright, 2006). The research of Guo Anping and Ye Chunming believes that enterprise innovation and social responsibility performance jointly promote the synergistic effect of "1 + 1> 2", and the two are an overall enterprise strategic management decision. (Guo & Ye, 2017) Zhu Naiping research that corporate

social responsibility investment to some extent helped the enterprise stakeholders in enterprise research and development investment of intangible assets, and research and development investment also for the enterprise social responsibility investment produced the same effect, namely enterprise R&D investment and enterprise social responsibility investment in each other influence the process of enterprise value realization played a regulatory role (Zhu, et al, 2014).

To be specific, research and development and innovation on the basis of the social responsibility of internal stakeholders is conducive to the harmony and stability within the organization and the improvement of the core competitiveness of the enterprise. When shareholders get the corresponding capital return and fair dividends will improve the investment bias of shareholders or potential investors in the enterprise, actively add capital for the enterprise to obtain more financing to improve the investment in research and development and innovation, further ensure the sustainability of technological innovation activities, and improve the improvement of enterprise financial performance. The consideration of employees' rights and interests can enhance their sense of enterprise trust, reduce the turnover rate of enterprise employees, improve the work enthusiasm of employees, help to improve the efficiency of innovation activities, and promote the growth of enterprise business income. Not only that, such as Gree companies will enterprise social responsibility concept into the enterprise own culture construction, is conducive to coordinate the enterprise internal staff work philosophy and business quality, improve the management concept of management personnel and incentive compensation system optimization can promote the formation of enterprise collaborative innovation mechanism. (Sheng & Jiang, 2020; Xie & Xu, 2014)

The relative social responsibility of the external stakeholders should also be combined with the promotion of technological innovation. The company assuming social responsibility will give suppliers a better social image and enhance their sense of trust and recognition of the enterprise, which is conducive to the generation and maintenance of mutually beneficial cooperative relations. While ensuring the stability of sales channels, it will also obtain a high-quality innovation source for cooperative research and development. The corresponding personalized product research and development and corresponding service upgrade will not only win the recognition of customers to improve their market competitiveness, but also improve the technological innovation level of their own. For the society and the environment, in the process of technological innovation to reduce pollution emissions and environmental pollution, enterprises have met the requirements of the corresponding environmental indicators of the government and gained the goodwill of the government, which has also stimulated the improvement of their own technological innovation ability, which can also have a positive impact on financial performance (Fu & Liu, 2013). In general, the performance of external social responsibilities can achieve external stakeholders 'benefits through product or process innovation, but also help to improve the enterprise's own financial performance (Wang & Xie, 2020). The following assumptions are therefore made:

Assume 9: CS R and R&D investment regulate each other to enhance their respective role in corporate short-term financial performance.

Assume 10: Corporate social responsibility and R&D investment regulate each other to enhance their long-term financial performance.

3. RESEARCH DESIGN

3.1 Sample Selection and Data Sources

Research on the relationship between enterprise social responsibility, R&D investment and enterprise performance based on annual data analysis. Panel data from 335 Chinese listed companies in Shanghai and Shenzhen from 2015 to 2019 were selected as samples for empirical study.Among them, corporate social responsibility data comes from the network database and other indicators are from the wind database. In order to obtain company data with sufficient reference value, non-ST listed companies with selected financial data stability were selected, and enterprises with extreme or missing values in terms of no access to R&D input and other financial data were excluded. Eventually, 1,085 observations were obtained.

3.2 Variable Definition

The dependent variable is the enterprise performance. In the past studies of financial performance relations, these measures can probably be divided into two categories: accounting indicators and market indicators. Accounting indicators are mainly based on historical data of enterprise financial situation, such as return rate of total assets (ROA), return rate of net assets (ROE); market indicators mainly come from the evaluation of financial institutions, reflecting the evaluation of the enterprise from the perspective of investors, such as TobinQ value, Z-score value, price-to-city rate, etc. The two indicators have their own advantages and disadvantages for the measurement of enterprise performance, and the accounting indicators are more stable, but the market indicators can more reflect the enterprise value. Referring to Wang Zhengjun and Yang Wansu respectively, this paper chose the total assets remuneration rate (ROA) and Tobin Q value respectively to measure the short-term and long-term financial performance (Wang & Xie, 2020; Yang & Yang, 2016).

The independent variables are R&D and CSR. This paper divides the proportion of corporate social responsibility in the corporate social responsibility

database, and divides it into five aspects: shareholder responsibility, employee responsibility, supplier responsibility, consumer responsibility, environmental responsibility and social responsibility. This article refers to the division of Qian Shuang on corporate social responsibility according to the influence of its own behavior, and successively gives different weights to each responsibility, namely 30%, 15%, 15%, 10%, 30%, 10%, respectively, and comprehensively divides the enterprise stakeholders into internal stakeholders (INCSR) and external stakeholders (EXCSR) as described above. (Qian, 2017) Among them, the corporate social responsibility of internal stakeholders is the social responsibility of shareholders and employees, the total sum ratio is 45%, and the corporate social responsibility of external stakeholders is the external supplier customers, consumer, social and environmental responsibility score, accounting for 55%.

The control variables are enterprise size (SIZE), asset-liability ratio (ASSEST) enterprise age (AGE), and enterprise growth (GROW). Affected by the economy of scale, the change of the enterprise's own scale will cause a change in the difficulty of enterprise capital availability, and the corresponding social responsibility level will be greater. Enterprise financial leverage level will affect the enterprise financial ability to resist risks, and then change the investment in corporate social responsibility and research and development. The number of enterprises will also lead to the difference between the cognitive level of social responsibility and technological innovation. This article measures the scale of Liu Yanhua and Wang Zhengjun, the level of financial leverage, and the annual profit growth rate by the natural logarithm of the total assets of the enterprise respectively. (Wang & Xie, 2020; Liu, Zhang, & Li, 2020) See Table 1 for specific definitions of variables and Table 1.

Table 1
Variable definitions and data sources

Variables	Name	The code	Variable definition
Cause variable	Return rate of total assets	ROA	Net profit / total assets
	Tobin Q	Q	The ratio of the enterprise market value to its reset cost
	Corporate Social Responsibility	CSR	Comprehensive score from five aspects of shareholder responsibility, employee responsibility, supplier responsibility, consumer responsibility, environmental responsibility and social responsibility
Independent variable	Corporate internal social responsibility	INCSR	Shareholders liability, employee liability weighted score
	Corporate external social responsibility	EXCSR	Companies are weighted by supplier responsibility, consumer responsibility, environmental responsibility and social responsibility
	R&D intensity	RD	R&D investment / operating income
	Enterprise size	SIZE	Log of the total assets
Control variable	Asset-liability ratio	ASSET	Total annual average liabilities / total annual average assets
	Corporate age	AGE	Listed company for years of listing
	Growth sex	GROW	Net profit growth rate

3.3 Model Setting

This paper selects the financial data of Chinese listed companies from 2015 to 2019 to study the impact of CSR and R&D investment and enterprise performance. To study the relationship between variables, panel fixed effect models were constructed to estimate ROA and Q values as dependent variables to estimate the effect of independent and other relevant control variables on it.

According to the previous analysis and assumptions, we plan to build empirical models from short-term and long-term financial performance, respectively, and first build a short-term financial performance model with ROA as the dependent variable.Firstly, this paper will establish a model 1 and model 2 for overall enterprise R&D investment, CSR and short-term financial performance respectively; secondly, build a detailed model of internal and external corporate social responsibility for enterprise short-term performance 3. Then the enterprise R&D investment and corporate social responsibility are included into model 4 to compare the impact of two factors on enterprise short-term performance. Finally, add internal, external and overall CSR and enterprise R&D input into the model to explore their influence on enterprise financial performance.

The proposed model is as follows:

model 1: $\mathrm{ROA}=\mathrm{c}+b_0 RD+b_1 SIZE+b_2 ASSET+b_3 AGE+b_4 GROW$

model 2: $\mathrm{ROA}=\mathrm{c}+b_0 \mathrm{CSR}+b_1 SIZE+b_2 ASSET+b_3 AGE+b_4 GROW$

model 3: $\mathrm{ROA}=c+b_0 INCSR+b_1 EXCSR+b_2 SIZE+b_3 ASSET+b_4 AGE+b_5 GROW$

model 4: $\mathrm{ROA}=c+b_0 RD+b_1 CSR+b_2 SIZE+b_3 ASSET+b_4 AGE+b_5 GROW$

model5: $\mathrm{ROA}=c+b_0 RD+b_1 INCSR+b_2 RD*INCSR+b_3 SIZE+b_4 ASSET+b_5 AGE+b_6 GROW$

model 6: $\mathrm{ROA}=c+b_0 RD+b_1 EXCSR+b_2 RD*EXCSR+b_3 SIZE+b_4 ASSET+b_5 AGE+b_6 GROW$

model 7: $\mathrm{ROA}=c+b_0 RD+b_1 CSR+b_2 RD*CSR+b_3 SIZE+b_4 ASSET+b_5 AGE+b_6 GROW$

Then construct the enterprise long-term financial performance model with Tobin Q as the dependent variable, where models 8 to model 10 explore the impact of R&D investment, overall enterprise and internal and external social responsibility on enterprise long-term financial performance respectively. Moreover, CSR and R&D input were incorporated into model 11 and compared with the aforementioned model. Finally, each interaction item is added to observe the impact mechanism of R&D investment and corporate social responsibility on the enterprise long-term financial performance.

model 8: $Q=c+b_0 RD+b_1 SIZE+b_2 ASSET+b_3 AGE+b_4 GROW$

model 9: $Q=c+b_0 CSR+b_1 SIZE+b_2 ASSET+b_3 AGE+b_4 GROW$

model 10: $Q=c+b_0 INCSR+b_1 EXCSR+b_2 SIZE+b_3 ASSET+b_4 AGE+b_5 GROW$

model 11: $Q=c+b_0 RD+b_1 CSR+b_2 SIZE+b_3 ASSET+b_4 AGE+b_5 GROW$

model 12: $Q=c+b_0 RD+b_1 INCSR+b_2 RD*INCSR+b_3 SIZE+b_4 ASSET+b_5 AGE+b_6 GROW$

model 13: $Q=c+b_0 RD+b_1 EXCSR+b_2 RD*EXCSR+b_3 SIZE+b_4 ASSET+b_5 AGE+b_6 GROW$

model 14: $Q=c+b_0 RD+b_1 CSR+b_2 RD*CSR+b_3 SIZE+b_4 ASSET+b_5 AGE+b_6 GROW$

4. EMPIRICAL ANALYSIS

4.1 Descriptive Statistics

Table 2 lists the descriptive statistics of the variables in the model. From Table 2, the median data of CSR and its related variables are greater than the mean, which can be seen that the development of social responsibility of listed enterprises in China is unbalanced and not hierarchical. The median asset-liability ratio of listed enterprises in China has a large gap between the average and a large standard deviation, which shows that the operating level of listed enterprises in China varies greatly. From the perspective of corporate social responsibility, the vast majority of Chinese listed enterprises pay more attention to the corporate external responsibility for the sake of corporate internal responsibility, and their value is generally low. At the same time, the score difference in corporate social responsibility is also large, which means that Chinese enterprises have different cognition level of corporate and social responsibility. In terms of R&D

investment, the average and median of Chinese enterprises are relatively high, which means that the current R&D investment has generally become a common enterprise investment behavior for listed companies, but the gap between the two is also large, and the intensity of research and development investment shows a state of polarization.

Table 2
Descriptive statistical results

Variables	Q	ROA	INCSR	EXCSR	CSR	RD	ASSET	GROW	AGE	SIZE
Minimum value	0.46	-3.23	1.50	-0.52	1.50	0.40	6.83	-5.62	3	4.54
median	1.65	12.73	4.72	1.06	5.78	4.79	37.89	0.22	13	6.69
mean	2.26	14.32	4.54	1.03	5.58	6.42	40.20	0.39	13.64	6.88
Maximum value	13.99	47.39	7.03	2.24	8.24	28.48	83.87	8.88	28	11.96
Standard error	0.11	0.30	0.30	0.18	0.37	0.17	0.59	0.29	0.17	0.39

4.2 Correlation Analysis

To test the correlation between the variables, a correlation analysis was performed for each variable as shown in Table 3. The results show that there was no serious collinearity problem between the variables. Among them, the R&D input showed a significant positive correlation with the Q value, initially consistent with hypothesis 1. Corporate social responsibility-related variables are all proportional to the enterprise's own performance except EXCSR, and all are significant at the 1% level, which is basically in line with our hypothesis on the relationship between corporate social responsibility and enterprise performance. Not only that, but R&D investment is also strongly related to corporate external social responsibility, meaning that there is also a certain connection between them.In addition, we also found that the scale of the enterprise is significantly negatively related to the enterprise assets and liabilities and the enterprise performance, while the good enterprise growth has a significant positive relationship with the long-term enterprise life and the short-term financial performance and long-term financial performance, respectively.

Table 3
Correlation analysis

Variables	Q	ROA	CSR	INCSR	EXCSR	RD	Size	Asset	Grow	Age
Q	1.000									
ROA	0.098***	1.000								
	(0.001)									
CSR	0.188***	0.346***	1.000							
	(0.000)	(0.000)								
INCSR	0.228***	0.365***	0.884***	1.000						
	(0.000)	(0.000)	(0.000)							
EXCSR	0.006	0.107***	0.600***	0.156***	1.000					
	(0.831)	(0.000)	(0.000)	(0.000)						
RD	0.099***	0.041	-0.047	0.040	-0.167***	1.000				
	(0.001)	(0.177)	(0.126)	(0.185)	(0.000)					
SIZE	-0.002	-0.310***	0.041	0.026	0.042	-0.360***	1.000			
	(0.949)	(0.000)	(0.182)	(0.399)	(0.169)	(0.000)				
ASSET	-0.393***	-0.277***	-0.240***	-0.305***	0.013	-0.232***	0.224***	1.000		
	(0.000)	(0.000)	(0.000)	(0.000)	(0.657)	(0.000)	(0.000)			
GROW	0.006	0.196***	0.142***	0.150***	0.044	0.078**	-0.070**	-0.017	1.000	
	(0.846)	(0.000)	(0.000)	(0.000)	(0.149)	(0.010)	(0.020)	(0.585)		
AGE	0.064**	-0.069**	0.089***	0.119***	-0.014	-0.123***	0.174***	-0.161***	-0.059*	1.000
	(0.035)	(0.024)	(0.003)	(0.000)	(0.640)	(0.000)	(0.000)	(0.000)	(0.052)	

Note: *, * *, * * * are indicated as significant at the 10%, 5%, and 1% levels, respectively

4.3 Regression Analysis

Influence of 1. technology innovation investment and corporate social responsibility on enterprise short-term financial performance

Table 4 lists the regression model results between each explanatory variable and the enterprise short-term financial performance. Model 1 measures a direct relationship between R&D investment and enterprise short-term performance, in which it shows a significant

negative correlation between R&D investment and enterprise short-term financial performance, consistent with hypothesis 1. Model 2 shows that the overall impact of CSR on the current financial performance of the current period of CSR has a significant positive relationship, in line with hypothesis 3. Model 3 refines the CSR as the internal social responsibility and the external social responsibility of the enterprise. It is not difficult to see the internal social responsibility of the enterprise, which has a significant positive relationship between the short-term financial performance, while the external corporate social responsibility is significantly correlated to the current financial performance, in line with hypothesis 4 and hypothesis 5. From the return results, we can also conclude that enterprises with higher years and better growth generally have better profitability. Enterprises with too high asset-liability ratio and large-scale enterprises are easier to lead to financial difficulties because they bear high financial leverage.

In addition, other models are extended on the basis of models 1,2 and 3. Model 4 adds both corporate R&D input and corporate social responsibility variables to the model, which can see that the influence of corporate social responsibility on the performance of enterprise increased (1.540> 1.198). Then, the interaction term model 5, model 6 and model 7 of R&D input and each corporate social responsibility variable are introduced respectively. It can be seen that the interaction term coefficient is significant, so the corporate social responsibility variable has a regulatory effect on R&D investment, which means that corporate social responsibility can reduce the negative impact of R&D investment on corporate short-term performance, among which the negative adjustment effect of corporate internal social responsibility is stronger than the external social responsibility (-0.251 <-0.250), in line with hypothesis 9. The research results at this stage are basically consistent with Guo Anping's study on the threeIn the external social responsibility coefficient and zheng-jun wang research slightly, the possible reason for its research sample for listed manufacturing companies, manufacturing enterprises compared with other industry enterprises to suppliers and consumer evaluation, product sales chain is correspondingly short, so to a certain extent can reduce the enterprise external social responsibility performance feedback path and return cycle, so can achieve positive returns in short-term financial performance.

Table 4
Influence of R&D investment and internal and external social responsibility on enterprise short-term performance

Variables	Model1	Model2	Model3	Model4	Model5	Model6	Model7
Constant	37.112*** (8.54)	24.053*** (6.13)	22.171*** (5.73)	33.221*** (7.67)	33.029*** (7.76)	38.093*** (8.75)	34.99*** (8.04)
Age	0.456* (1.91)	0.415* (1.74)	0.253* (1.07)	.428* (1.82)	0.313* (1.36)	0.477** (1.99)	0.482** (2.04)
Grow	0.173*** (6.87)	0.157*** (6.19)	0.14*** (5.56)	0.159*** (6.37)	0.142*** (5.76)	0.171*** (6.79)	0.16*** (6.42)
Asset	-0.102*** (-4.64)	-0.082*** (-3.72)	-0.068*** (-3.09)	-.088*** (-4.03)	-0.072*** (-3.34)	-0.098*** (-4.43)	-0.087*** (-3.95)
Size	-3.271*** (-4.22)	-2.618*** (-3.50)	-2.808*** (-3.81)	-3.948*** (-5.12)	-4.114*** (-5.45)	-3.359*** (-4.32)	-3.849*** (-4.99)
RD	-0.354*** (-4.54)			-0.388*** (-5.05)	-0.495*** (-6.27)	-0.379*** (-4.80)	-0.453*** (-5.62)
INCSR			2.538*** (6.76)		2.567*** (6.97)		
EXCSR			-1.088** (-2.18)			-1.431** (-2.41)	
CSR		1.198*** (4.06)		1.540*** （5.57）			1.137*** (3.84)
INCSR*RD					-0.251*** (-4.00)		
EXCSR*RD						-00*.25 (-1.96)	
CSR*RD							-0.157*** (-3.03)
The F value	5.37***	4.62***	4.71***	4.73***	4.90***	5.41***	4.78***

Note: *, * *, * * * are indicated as significant at the 10%, 5%, and 1% levels, respectively

Impact of technology innovation investment and corporate social responsibility on enterprise long-term financial performance

Table 5 lists the regression model system for each explanatory variable and the enterprise long-term financial performance. It is not difficult to see from model 8 to see an obvious positive relationship between enterprise R&D investment and enterprise long-term performance finance, so hypothesis 2 is established. In model 9, we can see that CSR significantly promotes corporate long-

term financial performance (P <0.05, b=0.251), assuming 6 holds. More specific, it can also be seen that the internal social responsibility of the enterprise obviously promotes the long-term financial performance, while the enterprise external responsibility is not significant, in line with hypothesis 7, and inconsistent with hypothesis 8.Model 11 The model of enterprise R&D investment and enterprise social responsibility still have a significant role in promoting long-term performance.

On this basis, the model 13 and model 14 are further introduced to build an extended model 12 for R&D input and internal and external social responsibility. After the introduction of the internal social responsibility and enterprise R&D input, the interaction variable itself is significant and the enterprise R&D input coefficient increases (0.150> 0.139). In the model of introducing the external social responsibility, the external social responsibility coefficient becomes significant and the coefficient of both increases (0.156> 0.139), It can be seen that the external social responsibility can indirectly promote the positive growth of the long-term performance. In model 14, the coefficient of CSR and R&D input is greater than in model 11 (0.161> 0.134,0.252> 0.236), while the interaction term is positive and significant, so they can adjust each other to enhance the positive effect on the enterprise long-term financial performance, consistent with hypothesis 10.

The above data can see that the interaction between corporate social responsibility and technological innovation investment affects the long-term financial performance of enterprises. Among them, enterprise internal social responsibility and R&D investment can directly enhance the positive effect on enterprise long-term financial performance. Although the external responsibility of the enterprise is not directly related to the long-term financial performance of the enterprise, it can still have a positive impact on the long-term performance under the interaction with the enterprise R&D investment. On the whole, corporate social responsibility and R&D investment jointly promote the positive impact on corporate long-term financial performance. The empirical results at this stage are basically consistent with Zhu Naiping's study on the three.

Table 5
Influence of R&D investment and enterprise internal and external social responsibility on enterprise long-term performance

Variables	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14
Constant	-16.685*** (-8.11)	-13.716*** (-2.63)	-13.863*** (-7.45)	-17.282*** (-8.30)	-17.373*** (-8.37)	-17.035*** (-8.24)	-17.534*** (-8.43)
age	-0.325*** (-2.88)	-0.325 (-1.64)	-0.336*** (-2.92)	-0.329*** (-2.92)	-0.346*** (-3.06)	.34-02*** (-3.00)	-0.347*** (-3.08)
grow	0.011 (0.95)	0.012 (0.96)	0.011 (0.87)	0.009 (0.76)	0.010 (0.80)	0.011 (0.91)	0.010 (0.85)
asset	-0.052*** (-4.97)	-0.053*** (-3.55)	-0.052*** (-4.91)	-0.05*** (-4.74)	-.05*** (-4.74)	-0.054*** (-5.15)	-0.052*** (-4.93)
size	3.568*** (9.73)	3.092*** (2.67)	3.058*** (8.57)	3.464*** (9.34)	3.474*** (9.37)	3.616*** (9.80)	3.513*** (9.47)
RD	0.139*** (3.77)			0.134*** (3.62)	0.150*** (3.87)	0.156*** (4.11)	0.161*** (4.12)
INCSR			0.354** (1.96)		0.325* (1.85)		
EXCSR			0.127 (0.48)			0.275* (1.07)	
CSR		0.251** (2.02)		0.236* (1.78)			0.252* (1.89)
INCSR*RD					0.045 (1.53)		
EXCSR*RD						0.089** (1.97)	
CSR*RD							0.047** (2.11)
The F value	1.83 ***	1.73***	1.70 ***	1.79***	1.75***	1.85 ***	1.77 ***

Note: *, * *, * * * are indicated as significant at the 10%, 5%, and 1% levels, respectively

4.4 Robustness Analysis

To demonstrate the effectiveness of the empirical results, a stability analysis was further performed. Random reuse of the empirical analysis with 80% of the total sample size still supports the test results, so we can consider the empirical study as good robustness.

Table 6
Robustness test of short-term financial performance

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Constant	40.293*** (8.55)	24.051*** (5.40)	23.93*** (5.82)	22.704*** (5.14)	36.105*** (7.71)	41.693*** (8.88)	36.951*** (7.78)
age	0.613** (2.39)	0.523*** (1.99)	0.518 (1.99)	0.346** (1.32)	0.457* (1.80)	0.645*** (2.51)	0.606** (2.38)
grow	0.116*** (4.44)	0.116*** (4.36)	0.129*** (5.01)	0.102*** (3.83)	0.096*** (3.71)	0.11*** (4.27)	0.106*** (4.08)
asset	-0.113*** (-4.81)	-0.11*** (-4.57)	-0.098*** (-4.12)	-0.105*** (-4.51)	-0.094*** (-4.03)	-0.106*** (-4.53)	-0.102*** (-4.35)
size	-3.707*** (-4.44)	-2.559*** (-3.10)	-2.541*** (-3.12)	-4.083*** (-4.89)	-4.222*** (-5.11)	-3.851*** (-4.62)	-4.155*** (-4.98)
RD	-0.649*** (-6.30)			-0.662*** (-6.56)	-0.712*** (-7.05)	.67-00*** (-6.60)	-.693*** (-6.78)
INCSR			2.092*** (4.94)		2.115*** (5.24)		
EXCSR			-1.276** (-2.51)			-1.883*** (-3.35)	
CSR		0.986*** (3.09)		1.111*** (3.58)			1.136*** (3.67)
INCSR*RD					-00*.12 (-1.84)		
EXCSR*RD						-0.335** (-2.57)	
CSR*RD							-00*.09 (-1.83)
The F value	5.46 ***	4.83***	4.64 ***	4.76 ***	4.94***	5.40***	4.92***

Note: *, * *, * * * are indicated as significant at the 10%, 5%, and 1% levels, respectively

Table 7
Robustness test of long-term financial performance

Variables	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14
Constant	-11.454*** (-6.40)	-10.622*** (-6.41)	-10.681*** (-6.44)	-12.342*** (-6.79)	-12.147*** (-6.72)	-11.782*** (-6.55)	-12.301*** (-6.79)
age	-0.222** (-2.88)	-0.227** (-2.32)	-0.238** (-2.41)	-0.233** (-2.40)	-0.253*** (-2.59)	-0.237** (-2.41)	-0.25** (-2.57)
grow	0.010 (1.00)	0.006 (0.57)	0.005 (0.49)	0.007 (0.71)	0.006 (0.61)	0.010 (1.14)	0.007 (0.71)
asset	-0.047*** (-5.33)	-0.045*** (-5.02)	-0.044*** (-4.90)	-0.045*** (-5.09)	-0.045*** (-5.06)	-0.049*** (-5.53)	-0.047*** (-5.28)
size	2.585*** (8.13)	2.281*** (7.42)	2.279*** (7.41)	2.482*** (7.78)	2.488*** (7.81)	2.622** (8.22)	2.517 (7.90)
RD	0.094** (2.43)			0.088** (2.27)	0.094** (2.41)	0.106*** (2.72)	0.102*** (2.63)
INCSR			0.397** (2.53)		.3700** (2.38)		
EXCSR			0.182 (0.83)			0.295 (1.36)	
CSR		0.32*** (2.70)		0.303** (2.56)			0.291** (2.46)
INCSR*RD					0.045* (1.79)		
EXCSR*RD						0.079** (2.04)	
CSR*RD							0.043** (2.28)
The F value	1.73***	1.64***	1.63***	1.69 ***	1.68***	1.67***	1.63***

Note: *, * *, * * * are indicated as significant at the 10%, 5%, and 1% levels, respectively

5. CONCLUSIONS AND ENLIGHTENMENT

After the above theoretical analysis and empirical research, the following research conclusions can be roughly drawn:

Enterprise R&D investment has a negative impact on enterprise short-term financial performance. The research and development activities of enterprises will occupy their scarce resources to a certain extent, resulting in a short decline in financial performance. However, in the long

term, the cumulative technological progress will enhance the market performance and core competitiveness of the enterprise, thus promoting the long-term value creation of the enterprise itself.

Corporate social responsibility, social responsibility of enterprise social responsibility in short-term financial performance can have a positive impact on enterprise financial performance, enterprise internal social responsibility is mainly employees and shareholders, they are directly related to enterprise management, so enterprise internal social responsibility can often be mentioned in short-term financial performance can improve the effect of financial performance. The social environment of external social responsibility has a certain lag, which requires some time to create a good enterprise image to the outside world, so as to obtain the support of the public. Therefore, the external social responsibility of the enterprise will consume the disposable resources of the enterprise in the short term, and have a negative impact on the short-term performance. However, from the perspective of enterprise long-term performance, although the external social responsibility of the enterprise does not directly affect the financial performance of the enterprise itself, but after the introduction of research and development investment, it can indirectly promote the improvement of enterprise long-term financial performance. On the whole, corporate social responsibility plays a positive role in promoting the development of the enterprise itself, both in its short-term financial performance and long-term financial performance.

The impact of enterprise R&D investment and corporate social responsibility on adjusting each other on corporate financial performance. In the short term, corporate social responsibility investment will reduce the negative impact of R&D investment on enterprise short-term financial performance, and in the long-term financial performance, enterprise R&D investment and corporate social responsibility jointly promote the positive effect on the development of enterprises, which shows that the impact of R&D investment and corporate social responsibility on enterprise long-term financial performance has a synergistic effect. The society will generally pay more attention to enterprises with high level of corporate social responsibility and technological innovation ability. Such enterprises will also pay more attention to the development orientation of public opinion, and enterprise activities are easier to commit to the needs of the public, so as to have strong enterprise value creation ability and sustainable development ability.

The research enlightenment is mainly reflected in the following two aspects:

Enhance the awareness of corporate social responsibility performance in the reality of enterprise management. At present, many enterprises believe that the performance of corporate social responsibility or only the performance of external corporate responsibility is a kind of consumption to the enterprise's own resources. However, research shows that the performance of corporate social responsibility plays a good role in promoting the development of the enterprise itself, and the performance of external corporate responsibility also has a positive impact on the development of the enterprise itself. In actual management, enterprises often regard the performance of social responsibility as a crisis public relations means to repair the enterprise image after the damaged image, rather than a necessary link of management with long attention in enterprise management. In the future development of the enterprise, should improve the consciousness of corporate social responsibility, it is not only a kind of responsibility for the society and the public, but also to the enterprise own culture and its own development strategy of a cultural output, help to improve the transparency of public supervision and enterprise brand promotion, so as to promote the win-win situation of enterprise and society.

Enterprises should correctly understand the strategic complementary relationship between corporate social responsibility and R&D investment in enterprise development. Both corporate social responsibility and R&D investment have a long cycle, large capital consumption and uncertainty in the results, resulting in many enterprises regard the performance of social responsibility and R&D investment as an unmediable contradiction in the management process, and often trade and trade between the two. However, from the perspective of enterprise strategic management, the enterprise R&D investment helps to improve the quality of its own products and services, enhance the core competitiveness of the enterprise; the enterprise social responsibility performance can improve the public attention to the enterprise, know the needs of the public, and thus enhance the pertinence of its own product design. The two complement each other to jointly promote the sustainable development of enterprises. In short, enterprise R&D investment and the performance of corporate social responsibility are very important to both the society and the enterprise itself. Enterprises cannot view one aspect of it in isolation, thus ignoring the value creation to the enterprise on the other hand. Strategic decisions should be made from the perspective of overall development of enterprises, integrate the benign role in promoting the development of two aspects, and enhance the comprehensive strength of enterprises.

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