



Research on Impact of Internet Corporate Social Responsibility on Corporate Financial Performance Based on Linear Regression Model

Liangcan Liu, Hang Ren*, Tianhui Chen, Jia Chen

School of Business Administration, Guizhou University of Finance and Economics, Guiyang, China

Email address:

66391409@qq.com (Liangcan Liu), 759179161@qq.com (Hang Ren), 1310592429@qq.com (Tianhui Chen),

1476480517@qq.com (Jia Chen)

*Corresponding author

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Abstract: Since China was fully connected to the Internet, the local Internet has continued to grow along with its economic strength, and Internet companies such as artificial intelligence, e-commerce, big data, block chain and electronic payment have risen rapidly. In the process of development, Internet enterprises realize the importance of social responsibility and take the initiative to shoulder social responsibility, and make a lot of contributions to the society. The relationship between social responsibility and the financial performance of Internet companies has always been the focus of academic and research discussions. Based on the linear regression model, innovation capability was introduced to explore the boundary conditions between social responsibility and the financial performance of the companies. An empirical study was conducted using a research sample of listed Internet companies in China from 2018 to 2020. The results show that (1) social responsibility of the Internet corporate has a positive effect on short-term financial performance, (2) Internet corporate social responsibility has a positive effect on the long-term financial performance of enterprises, (3) innovation capability weakens the impact of Internet corporate social responsibility on short-term financial performance, and (4) the influence of innovation capability on the long-term financial performance of Internet companies in social responsibility. The research conclusion provides Internet enterprises with social responsibility strategies and evaluation of long-term and short-term financial performance.

Keywords: Internet Corporate Social Responsibility, Corporate Financial Performance, Innovation Capability, Linear Regression Model

1. Introduction

Under the background of national policy support and information technology innovation such as artificial intelligence and big data, Internet enterprises as an important force in today's economic development, maintain strong momentum of growth. In the process of booming development, more enterprises realize the importance of social responsibility for their sustainable development and take the initiative to fulfill corporate social responsibility (CSR). During the COVID-19 pandemic, Internet companies have utilized their scientific and technological advantages to quickly mobilize resources and develop efficient and

convenient Internet connection routes for epidemic prevention and control. The fulfillment of CSR by Internet enterprises is not only conducive to the growth of enterprises themselves, but also to the growth of the digital economy to realize the harmonious development of society.

From the perspective of the economic new normal, economic development no longer pursues GDP growth. The value of enterprises to society is becoming diversified. In addition to being responsible for shareholders, employees, and consumers, enterprises also need to burden certain responsibilities as stakeholders of the environment and society [1]. As an economic entity, the primary goal of an enterprise is still to obtain profits for shareholders, so the research on CSR

is inevitably linked to corporate financial performance. Relation between the two have of the Internet enterprises has many differences from traditional enterprises. The study on the relationship between social responsibility and corporate financial performance research is relatively scarce, and the related literature is insufficient. Therefore, we explored the relationship between social responsibility and corporate financial performance for China's listed Internet companies.

2. Theory and Hypothesis

2.1. CSR and Corporate Financial Performance

According to stakeholder theory [2] and signal theory [3], the good performance of enterprises in social responsibility is to convey positive signals to stakeholders, obtain the support of stakeholders, reduce transaction costs, and benefit enterprises' profits [4]. Secondly, a good performance in CSR improves the social reputation of an enterprise [5], the loyalty of consumers [6], the cohesion of the company, the production efficiency of the company, and business value.

When studying traditional industries, scholars believe that CSR has a lag effect on financial performance [7]. Internet enterprises make use of their advantages in the process of information dissemination to make stakeholders respond to the market quickly [8]. They facilitate the influence of CSR to be quickly reflected in the short-term financial performance. At the same time, Internet enterprises attract high social attention. As one of the representatives of advanced productive forces, the public has higher requirements for Internet enterprises than traditional industries and expects them to shoulder more social responsibilities. The fulfillment of their social responsibilities is significant for the survival and development of the company. Good social performance helps enterprises balance and meet the needs of stakeholders [9], effectively improve the efficiency of enterprises in dealing with external demands, obtain more social capital and development opportunities, and promote the improvement of corporate value. Therefore, the following research hypothesis is proposed:

H1: Internet CSR has a positive impact on short-term financial performance

H2: Internet CSR has a positive impact on long-term financial performance

2.2. Moderating Effect of Innovation Capability

The development of innovation capability is related to the survival of Internet enterprises. Although Internet enterprises have unique information dissemination characteristics, which offset the lag of CSR on financial performance [10], enterprises have limited resources. In a short period, the improvement of innovation capability through the inclination of internal resources leads to the unreasonable allocation of resources. From the perspective of long-term development, an enterprise's investment in innovation capability differentiates the level of products and services provided by the enterprise [11], achieves the purpose of promoting the enterprise, obtains

heterogeneous competitive advantages in the market [12], and promotes the improvement of enterprise value. Therefore, the following hypotheses are proposed:

H3: Innovation capability moderates the effect of CSR on corporate financial performance.

H3a: Innovation capability weakens the effect of CSR on short-term financial performance.

H3b: Innovation capability enhances the effect of CSR on long-term financial performance.

Based on the derivation of the above research hypotheses, a conceptual model of the relationship between CSR, financial performance, and innovation capability was constructed as shown in Figure 1.

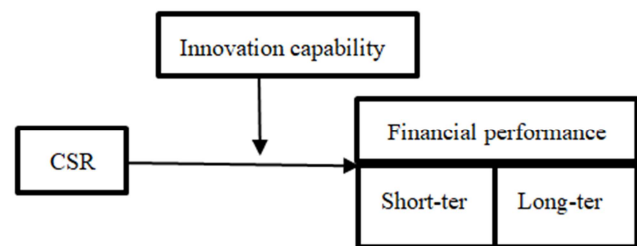


Figure 1. Conceptual model.

3. Research Design

3.1. Sample Selection and Data Sources

We selected Internet companies listed in China's A-share market from 2018 to 2020. In order to ensure the accuracy and representational of empirical research, sample data are selected as follows. (1) Some enterprises with ST and *ST labels that do not meet the requirements are excluded. The data of these enterprises differs greatly from the average level of other enterprises as they affect the stability of the empirical study. (2) Enterprises with serious data deficiency were excluded. On this basis, the 3-year data of 278 Internet listed enterprises were finally selected for the empirical study. The data are mainly from the CSMAR database.

3.2. Variable Definition

The CSR report of Hexun is based on the annual reports and social responsibility reports published by listed companies as information sources and based on the careful and rigorous scientific scoring system [13]. Therefore, the social responsibility score of Hexun is used as the indicator of CSR. Hexun social responsibility evaluation system adopts the percentage system for listed companies from five aspects: shareholder responsibility (30%), employee responsibility (15%), supplier, customer and consumer rights and interests responsibility (15%), environmental responsibility (10%) and social responsibility (30%).

We classify corporate financial performance into two categories: short-term financial performance and long-term financial performance. Return on assets (ROA) reflects the near-term profitability of a company, so ROA is used to measure short-term financial performance. Long-term

financial performance reflects the estimation of an enterprise's comprehensive ability to operate and make profits in the future, which is reflected in its market value. [14] Thus, the publicly released market value of listed companies is used to measure the long-term financial performance of companies.

Innovation capacity is taken as a moderating variable. In most studies involving innovation, research and development cost is commonly used to measure innovation intensity [15].

Therefore, the research and development cost publicly released by listed companies is adopted to measure the innovation capacity of enterprises.

In addition to the above main variables, we selected control variables, including enterprise Size (Size), Debt structure (Debt), Age of listing (Age), and Nature of ownership (Nature). Specific variables and measurement methods are shown in Table 1.

Table 1. Variable definitions.

Variable types	Variable name	Symbol	Variable definitions
Explanatory variables	Corporate social responsibility	CSR	Hexun net evaluation score
	Short-term financial performance	ROA	Return on assets
Explained variable	Long-term financial performance	Value	Market value, take the natural log
Adjust the variable	innovation capability	Inn	Research and development costs, take the natural log
	enterprise scale	Size	Ln (Total assets of the Company)
Control Variables	Debt structure	Debt	Total liabilities/Total assets
	Age of listing	Age	Year of reporting-Year of market +1
	Nature of ownership	Nature	State-owned=1, private=0

3.3. Model Design

In order to test the relationship between CSR and corporate financial performance, the following linear regression model is constructed.

$$roa_{i,t} = \alpha_0 + \alpha_1 CSR_{i,t} + \alpha_2 size_{i,t} + \alpha_3 debt_{i,t} + \alpha_4 age_{i,t} + \alpha_5 nature_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$value_{i,t} = \beta_0 + \beta_1 CSR_{i,t} + \beta_2 size_{i,t} + \beta_3 debt_{i,t} + \beta_4 age_{i,t} + \beta_5 nature_{i,t} + \varepsilon_{i,t} \quad (2)$$

In order to further test the moderating effect of innovation capability, the following linear regression model is constructed.

$$roa_{i,t} = \alpha_0 + \alpha_1 CSR_{i,t} + \alpha_2 size_{i,t} + \alpha_3 debt_{i,t} + \alpha_4 age_{i,t} + \alpha_5 nature_{i,t} + \alpha_6 inn_{i,t} + \alpha_7 CSR_{i,t} * inn_{i,t} + \varepsilon_{i,t} \quad (3)$$

$$value_{i,t} = \beta_0 + \beta_1 CSR_{i,t} + \beta_2 size_{i,t} + \beta_3 debt_{i,t} + \beta_4 age_{i,t} + \beta_5 nature_{i,t} + \beta_6 inn_{i,t} + \beta_7 CSR_{i,t} * inn_{i,t} + \varepsilon_{i,t} \quad (4)$$

4. Analysis Results

4.1. Descriptive Statistics and Correlation Analysis

Descriptive statistics show that the average CSR index is 18.14, indicating that the performance of Domestic Internet companies is still relatively average. There is a large gap between the maximum and minimum value of enterprises' innovation capability, which indicates that different enterprises have different attitudes towards innovation strategies. However, the mean value of innovation capability is 18.15, which indicates that Internet enterprises attach great importance to innovation (Table 2).

Table 2. Descriptive statistics.

Variables	N	Mean	Sd	Min	Max
CSR	834	18.14	9.374	- 14	37.49
ROA	834	0.0223	0.197	4.946	0.295
Value	834	22.34	0.833	20.52	25.69
Inn	834	18.15	1.130	13.44	21.52
Size	834	21.83	1.015	19.42	25.58
Debt	834	0.384	0.306	0.0399	4.724
Age	834	9.083	6.585	1	30
Nature	834	0.183	0.387	0	1

Correlation analysis refers to the correlation between two variables without adding the influence of more variables or control of other fixed effects. Therefore, the relationship between variables can only be preliminarily judged, but it cannot be used as the final regression result. Then, correlation analysis is carried out for preliminary judgment: The correlation coefficients between CSR, ROA and Value are 0.417 and 0.247, respectively.

At the significance level of 1%, the correlation test indicates that the relationship between CSR, ROA and Value presents a positive and significant relationship. That is, there is a significant positive correlation between corporate social responsibility and corporate short-term financial performance and long-term financial performance, which will be further tested in the regression analysis (Table 3 and Table 4).

Table 3. Correlation Analysis.

	CSR	ROA	Value	Inn
CSR	1			
ROA	0.417***	1		
Value	0.247***	0.122***	1	
Inn	0.129***	0.078**	0.724***	1
Size	0.0100	0.0320	0.696***	0.722***
Debt	-0.283***	-0.446***	-0.0280	0.059*
Age	-0.170***	0.0540	0.182***	0.234***
Nature	-0.0270	0.00500	0.121***	0.149***

Note: *, ** and *** are statistically significant at 10%, 5% and 1%, respectively.

Table 4. Correlation Analysis.

	Size	Debt	Age	Nature
CSR				
ROA				
Value				
Inn				
Size	1			
Debt	0.241***	1		
Age	0.460***	0.171***	1	
Nature	0.301***	0.135***	0.534***	1

Note: *, ** and *** are statistically significant at 10%, 5% and 1%, respectively.

4.2. Analysis of Regression Results

To ensure the validity of the regression results, the data were scaled down at the 1% and 99% levels to remove the effects of extreme values. Models 1 and 3 are regressions with only control variables as the basic models. On the basis of models 1 and 3, models 2 and 4 include explanatory variables of CSR. In model 2, the coefficient of CSR on ROA is 0.006 and is significantly positive at the level of 0.01, indicating that the better the performance of Internet CSR, the greater the promotion effect on short-term financial performance. Thus, H1 is proved. In Model 4, the regression coefficient of CSR is 0.016, which is significantly positive at the level of 0.01, indicating that CSR significantly improves the long-term financial performance of the enterprise. The better the performance of CSR, the better the long-term financial performance of the enterprise, H2 is proved.

Table 5. Regression results of CSR and corporate financial performance.

variables	Model 1 ROA	Model 2 ROA	Model 3 Value	Model 4 Value
CSR		0.006*** (9.87)		0.016*** (7.40)
Size	0.032*** (4.72)	0.022*** (3.43)	0.672*** (30.46)	0.648*** (29.94)
Debt	-0.309*** (-15.19)	-0.252*** (-12.50)	-0.536*** (-8.14)	-0.393*** (-5.89)
Age	-0.002** (-2.09)	-0.000 (-0.16)	-0.019*** (-5.07)	-0.014*** (-3.63)
Nature	0.032* (1.73)	0.017 (0.99)	-0.040 (-0.67)	-0.076 (-1.32)
Constant	-0.545*** (-3.79)	-0.488*** (-3.58)	8.060*** (17.31)	8.203*** (18.16)
Observations	834	834	834	834
R-squared	0.224	0.306	0.546	0.574

Robust T-statistics in parentheses, *** P < 0.01, ** P < 0.05, * P < 0.1.

Models 5 and 6 introduce innovation capability and cross term (CSR*Inn) on the basis of models 2 and 4 to verify the moderating effect of innovation capability. From Model 5, the regression coefficient of Inn at the 0.1 level significantly negative, which suggests that innovation capability has a negative effect on an enterprise's short-term financial performance. At the same time, in models 2 and 5, the coefficient is significant at the 0.01 level is positive, and the cross terms of the regression coefficient at the 0.1 level is significantly negative. This indicates that innovation capability weakens the positive effect of CSR on short-term financial performance. Therefore, H3a is proved. In model 6, the Inn of regression coefficient at 0.01 level is significantly positive. Thus, innovation capability has positive effect to the enterprise long-term financial performance. In models 4 and 6, the coefficient of CSR in the two models is significant at the 0.01 level, and the cross-term regression coefficient is significant at the 0.01 level. This indicates that innovation capability can enhance the positive effect of CSR on long-term financial performance. Then, H3b is proved.

Table 6. Regression results of CSR, corporate financial performance and innovation capability.

Variables	Model 2 ROA	Model 5 ROA	Model 4 Value	Model 6 Value
CSR	0.006 *** (9.87)	0.006*** (9.39)	0.016*** (7.40)	0.013*** (6.72)
Inn		-0.014* (-1.88)		0.279*** (12.32)
Size	0.022*** (3.43)	0.045*** (4.72)	0.648*** (29.94)	0.408*** (14.12)
Debt	-0.252*** (-12.50)	-0.355*** (-15.21)	-0.393*** (-5.89)	-0.400*** (-5.53)
Age	-0.000 (-0.16)	-0.000 (-0.42)	-0.014*** (-3.63)	-0.009** (-2.44)
Nature	0.017 (0.99)	0.021 (1.20)	-0.076 (-1.32)	-0.036 (-0.69)
CSRInn		-0.001* (-1.74)		0.012*** (7.35)
Constant	-0.488*** (-3.58)	-0.664*** (-4.89)	8.203*** (18.16)	8.345*** (19.94)
Observations	834	834	834	834
R-squared	0.306	0.366	0.574	0.661

Robust T-statistics in parentheses, *** P < 0.01, ** P < 0.05, * P < 0.1.

5. Conclusions and Prospects

5.1. Research Conclusions

Based on the empirical data of Chinese listed Internet companies from 2018 to 2020, we analyzed the impact of CSR on corporate financial performance, and further studied its boundary conditions. The research results show that the dominant position of Internet enterprises in the field of information dissemination enables the influence of Internet CSR on financial performance to be quickly reflected, and the short-term financial performance of enterprises will be improved. Social responsibility by Internet enterprises promotes the corporate brand, increases the loyalty of the public, forms heterogeneous competitive advantages of

enterprises, and thus promotes the long-term development of enterprises and improves their long-term financial performance. Innovation capability regulates the relationship between CSR and corporate financial performance. In the short term, the improvement of innovation capacity increases the burden of internal resources, thus weakening the impact of CSR on the short-term financial performance of enterprises. In the long run, the improvement of innovation capability increases competitiveness, thus enhancing the impact of CSR on corporate long-term financial performance.

For Internet enterprises, Social responsibility management is a strategic investment behavior for enterprises to seek and obtain heterogeneous resources, which builds a broader and deeper network of contacts between enterprises and stakeholders, and forms competitive advantages that are difficult to be replicated. Corporate charitable giving, for example, can improve Corporate reputation can enhance consumers' loyalty to corporate brands, meet the government's requirements for enterprises to fulfill their social responsibilities, and improve the financial performance of enterprises. For example, enterprises improve the production process and research and development of new products, so that the production of products with more social responsibility or green attributes, and achieve the increase of sales and revenue. Therefore, enterprises should carry out social responsibility management, improve their public image and reputation, and become a differentiated competitive resource for enterprises, so as to improve their financial performance, paying attention to innovation, improving innovation capability, promoting technological progress and industrial development, forming their unique competitive advantages, and ensuring sustainable development.

5.2. Research Prospects

In the research process, considering the timeliness and availability of sample data, this paper adopts the weighted average method of equal weights to calculate CSR performance, and there may be some questions about the scientific nature of its weights. If more scientific weight measurement of CSR can be adopted in the future, the research and demonstration in this paper will be more rigorous and accurate. In addition, this paper only uses innovation capacity input to measure innovation ability, which may not be comprehensive enough. In future research, technological innovation can be measured by comprehensive indicators, such as the combination of innovation costs and the number of patents, so as to make the research and demonstration more comprehensive and objective.

What's more, many large Internet enterprises in China failed to be listed in China due to institutional and policy reasons, but chose to be listed in foreign countries. As a result, the selection of samples is limited, so there may be limitations in the research. With better rules, listed companies abroad may have the willingness and signs of returning. This limitation will be slowly overcome. Then, a sample size, the representative of listed companies, and the relevant empirical

studies will be more in line with the reality and more practical significance.

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