

Research on the Impact of Corporate Culture and Innovation Ability on Corporate Core Competitiveness from the Perspective of CSR: Based on the Investigation of Tianjin Agricultural Science and Technology Enterprises

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Abstract

Corporate social responsibility (CSR) is the basic strategy for enterprises to obtain competitive advantages, and reflects the most basic value orientation and development concept of enterprises. The purpose of this study is to explore the relationship between corporate culture, innovation ability and core competitiveness of enterprises from the perspective of corporate social responsibility, and to establish a model and analyze the survey data of 32 agricultural science and technology enterprises in Tianjin by using SPSS23.0. As a result of the study, we found that corporate social responsibility (Ethical responsibility, Philanthropic responsibility) has a significant positive impact on corporate culture and innovation ability, corporate culture has a significant positive impact on innovation ability and corporate core competitiveness, and innovation ability has a significant positive impact on corporate core competitiveness. Therefore, it is suggested that agricultural science and technology enterprises should fulfill their social responsibilities, form a unique corporate culture, serve agriculture with science and technology, and constantly improve the ability of agricultural science and technology innovation, so as to enhance the core competitiveness of enterprises.

Keywords: Corporate Social Responsibility, Corporate Culture, Innovation Ability, Core Competitiveness, Agricultural Science and Technology Enterprise

1. Introduction

Corporate Social Responsibility(CSR) the importance of is always emphasized, because it is the basic strategy for enterprises to obtain competitive advantages [1]. CSR reflects the most basic value orientation and development concept of an enterprise, and an enterprise with a high sense of responsibility is an

important condition for the healthy development of economic society [2]. The impact of CSR on corporate core competitiveness mainly comes into play through some intermediate variables, some of which are components of core competitiveness themselves, and some of which are related to the environment of corporate value creation [3]. At the 19th National Congress of the Communist Party of China, the Central Committee of the Communist Party of China proposed the implementation of the rural revitalization strategy, and agriculture-related enterprises have undertaken the important task of rural industry revitalization, playing an important role in the effective supply of agricultural products, the employment of rural labor force and the increase of farmers' income. The development of agricultural science and technology enterprises has attracted the attention of all sectors of society. The impact of CSR on the core competitiveness of enterprises also applies to agricultural science and technology enterprises. If agricultural science and technology enterprises cannot meet the various needs of farmers or new agricultural operation subjects, their survival and development space will be limited. Therefore, it can be predicted that CSR of agricultural science and technology will be the focus of attention for a long time in the future.

The scope of CSR research has been expanded from customers to employees [4], because most employees of agricultural science and technology enterprises have direct contact with farmers to provide technical guidance services. In order to cultivate the core competitiveness of enterprises, agricultural science and technology enterprises also need to understand the adaptability of employees to enterprise culture and recognition of enterprise innovation ability, understanding the attitude of employees also plays a crucial role in the formulation of enterprise development strategy. On the other hand, some argue that CSR generally has four dimensions: economics, law, ethics, and charity [5], which have been adopted or altered by many studies. With different corporate cultures, employees' perceptions of social responsibility performed by the enterprise will also vary. Existing literature mainly studies the influence of corporate culture and innovation ability on the core competitiveness of enterprises respectively, but few studies on the influence of CSR on the innovation ability of enterprises through the mediating effect of corporate culture, and then the core competitiveness of enterprises. There have been studies on a number of agricultural companies to empirically show the effect of corporate culture, organizational innovation, and technological innovation on the core competitiveness of companies, but there has been no literature on quantitative research on the core competitiveness of agricultural science and technology companies [6].

The purpose of this study is to explore the relationship between corporate culture, innovation ability and corporate core competitiveness from the perspective of CSR, establish a model for statistical analysis of the data obtained from the survey of agricultural science and technology enterprises in Tianjin, and clarify the impact of CSR, corporate culture, innovation ability and corporate core competitiveness. Further put forward the way to enhance the core competitiveness of agricultural science and technology enterprises.

2. Literature Review

2.1 Agricultural Science and Technology Corporate Social Responsibility

Agricultural science and technology enterprises refer to legally established social and economic organizations with independent legal personality based on certain research and development resources, driven by technological innovation, dominated by related industries of agriculture, forestry, animal husbandry and sideline fishery, with modern enterprise operation and management methods as means, and with profit as the purpose [7]. CSR can be said to be the duty of companies to carry out more meaningful activities for modern society. Enterprises with more social responsibilities bring more competitive advantages to enterprises, and competitive advantages based on social responsibilities will inevitably become the strategic goal of enterprises [8]. With the rapid development of high-tech industry, agriculture has entered

the knowledge-based era, especially the restructuring of state-owned agricultural research institutes, which makes China's agricultural science and technology enterprises become the vanguard of agricultural development and an important carrier of agricultural achievements in the future. It plays an important role in promoting farmers to increase production and income, accelerating the construction of a new countryside, promoting the development of agricultural modernization and building a moderately prosperous society in all respects. In recent years, the importance of CSR in agriculture has been increasing, because it is closely related to the realization of sustainable development of agriculture. The fulfillment of social responsibility by agricultural enterprises has a positive impact on corporate performance and corporate reputation [9]. Agricultural science and technology enterprises refer to agriculture-related enterprises whose products have high technological content, take technological innovation as the development power, and mainly engage in the research and development, design, production and sales of high-tech products. Agricultural science and technology enterprises have high technical content of products, high proportion of researchers, strong innovation ability, and high returns and high risks [10]. Compared with ordinary enterprises, technology-based small and medium-sized enterprises have strong growth, strong technology, strong innovation and great influence. Therefore, technology-based enterprises should take increasing independent innovation, developing new products, improving employee benefits and participating in charity as their social responsibilities [11]. It is of practical significance to study the social responsibility of agricultural sci-tech enterprises. First of all, when agricultural technology enterprises implement CSR, farmers or other relevant organizations may hold a positive attitude towards the enterprises. Second, the implementation of CSR activities improves the image and reputation of enterprises, because CSR activities can be understood as the practice of social responsibility. Thirdly, the implementation of CSR activities can improve the loyalty of employees, so that they are more willing to stay in the enterprise. Finally, CSR activities in agricultural science and technology can improve the natural environment, such as soil and water resources, as well as the business environment in the areas they radiate. However, some argue that it is not easy to measure CSR activities because the scope of CSR depends on the specific characteristics of the company, such as the leader's style [12]. Although more and more attention has been paid to CSR, there is little research on agricultural science and technology enterprises.

2.2 The Relationship between Corporate Social Responsibility, Corporate Culture, Innovation Ability and Corporate Core Competitiveness

Enterprise culture is the sum total of the values and concepts with the characteristics of the enterprise and the corresponding organizational structure, institutional code of conduct and moral code, which are observed by the employees of the enterprise through long-term operation practice [13]. CSR is a way for corporate culture to form, strengthen or adapt to the environment to change the strong corporate culture type, so that corporate culture is more conducive to external adaptation and internal integration, but the dominant culture of the enterprise in the short term basically remains stable. Studies show that CSR has a significant positive impact on enterprise innovation capability [2]. Entrepreneurship, creativity, adaptability and corporate culture that emphasizes competition and goal achievement have a significant impact on enterprise innovation capability [14]. Breakthrough technological innovation can help enterprises realize technological leapfrog, directly develop and apply new technologies and products to improve product competitiveness [15]. Innovation is a key factor in the formation of core competitiveness [6]. Organizational innovation has a positive impact on the core competitiveness of enterprises [16]. The technological innovation capability of an enterprise is its core competitiveness [17]. The CSR activity is important as it is a key factor to advance the organizational trust and job performance, which is the company's sustainable management system [18].

Innovation ability is the manifestation of management innovation and technology innovation in enterprises. Improving the organizational management level through management innovation has a positive impact on the core competitiveness of enterprises. It has also become a consensus that technological innovation can improve the technological content of products or services and thus enhance the core competitiveness of enterprises. Based on the above research, the following hypotheses are proposed:

H₁: CSR has a positive impact on corporate culture.

H₁₋₁: Economic responsibility has a positive impact on corporate culture.

H₁₋₂: Legal responsibility has a positive impact on corporate culture.

H₁₋₃: Ethical responsibility has a positive impact on corporate culture.

H₁₋₄: Philanthropic responsibility has a positive impact on corporate culture.

H₂: CSR has a positive impact on innovation ability.

H₂₋₁: Economic responsibility has a positive impact on innovation ability.

H₂₋₂: Legal responsibility has a positive impact on innovation ability.

H₂₋₃: Ethical responsibility has a positive impact on innovation ability.

H₂₋₄: Philanthropic responsibility has a positive impact on innovation ability.

H₃: Corporate culture has a positive impact on innovation ability.

H₄: Corporate culture has a positive impact on the core competitiveness of an enterprise.

H₅: Innovation ability has a positive impact on the core competitiveness of enterprises.

3. Analytical Methods

3.1 Research Model

The purpose of this study is to explore the impact of CSR on innovation capability and corporate core competitiveness. Therefore, the research model and hypothesis are developed on the basis of previous studies [2, 6]. The research model is shown in Figure 1.

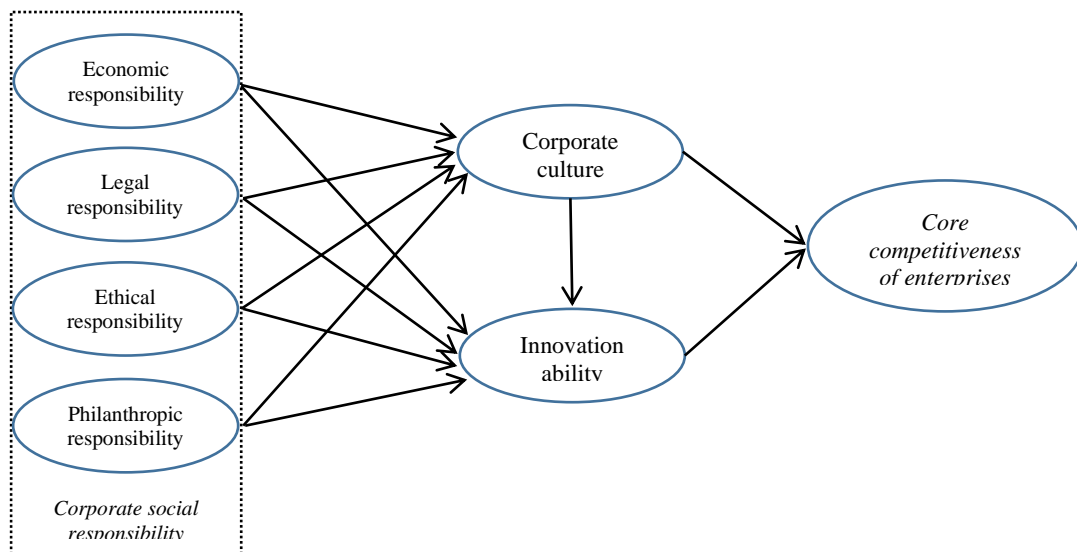


Figure 1. Research model diagram

3.2 Measure

CSR, corporate culture, innovation capacity and corporate core competitiveness scales were measured using scales used in previous studies [14,16,19]. After confirming the validity of the extracted items with relevant scholars, the reliability was confirmed through reliability analysis. All elements were measured on a

5-point Likert scale (1= strongly disagree, 2= disagree, 3= general, 4= agree, 5= strongly agree).

3.3 Data Collection and Analysis

The data of this study were collected from September 1 to December 29, 2021, and were collected from a questionnaire survey of employees of 32 agricultural technology enterprises in Tianjin. In this study, the convenience sampling method was adopted, and 50 agricultural science and technology commissioners of Tianjin Agricultural University stationed in agricultural science and technology enterprises were entrusted to take advantage of the opportunity of technical guidance service of enterprises to issue and collect questionnaires. Among 355 questionnaires collected, 309 valid ones were used for empirical analysis. SPSS 23.0 was used for frequency analysis, exploratory factor analysis and regression analysis.

4. Analysis Results

4.1 Demographic Characteristics of Respondents

Demographic characteristics of interviewees are shown in Table 1. Most interviewees are male (62.5%). the age of respondents was 30-39 years old (36.6%), followed by 20-29 years old (30.1%), 40-49 years old (20.4%), 50-59 years old (11%), 60 years old and above (1.3%), 20 years old and below (0.6%). 6.8% of respondents had a middle school education or below, 28.5% had a junior college education, 51.1% had a bachelor's degree and 13.6% had a master's degree or above. In terms of positions, senior managers account for 13.3%, middle-level managers for 17.8%, Technology R&D personnel for 13.6%, general staff for 30.4%, technology commissioners or consultants for 1%, and others for 23.9%. In terms of monthly income, 27.5 percent of respondents earn less than 4,000 Yuan(RNB), 28.5 percent between 4,000 and 6,000 Yuan(RNB), 18.4 percent between 6,000 and 8,000 Yuan(RNB), and 9.1 percent between 8,000 and 10,000 Yuan(RNB), 16.5% of respondents have a monthly income of more than 10,000 Yuan(RNB).

Table 1. Demographic characteristics of respondents

Category	project	Number of persons	Percentage (%)
Gender	Male	193	62.5
	Female	116	37.5
Age	Under the age of 20 years old	2	0.6
	20-29 years old	93	30.1
	30-39 years old	113	36.6
	40-49 years old	63	20.4
	50-59 years old	34	11
	More than 60 years of age	4	1.3
	Education	Secondary and below	21
Junior College (higher vocational)		88	28.5
University degree		158	51.1
Master degree or above		42	13.6
Job positions	Senior management of the company	41	13.3
	Middle management in the company	55	17.8
	Company technology research and development personnel	42	13.6
	Company staff (excluding r&d personnel)	94	30.4
	Company technology correspondent or consultant	3	1
	other	74	23.9

Monthly income	4000 Yuan of the following	85	27.5
	4000-6000 Yuan	88	28.5
	6000-8000 Yuan	57	18.4
	8000-10000 Yuan	28	9.1
	More than 10000 Yuan	51	16.5
	Total	309	100

4.2 Factor Analysis

The result of factor analysis is shown in Table 2. A basic dimension can be determined according to the three economic variables of CSR with factor load of 0.5 or higher, degree of commonness of 0.4 or higher, characteristic value of 1.0 or above, and *Cronbach's* alpha value of 0.6 or higher. KMO and The Chi-square test of A Babes sphere were 0.716 and 419.212 ($P < 0.001$), respectively. This factor is referred to as "economic responsibility", which explains the characteristic value of 2.32 for 77.33%. According to the four CSR legal variables of factor load 0.5 or higher, common degree 0.4 or higher, eigenvalue 1.0 or above, and *Cronbach's* alpha value 0.6 or higher, a basic dimension can be determined. The KMO and The Barbitan Spherical Chi-square test were 0.851 and 1140.570 ($P < 0.001$), respectively. This factor is referred to as "legal liability", which explains 84.50% of the eigenvalue of 3.38.

Table 2. Factor analysis

Content		λ	<i>C</i>	<i>EV</i>	<i>VE</i>	<i>a</i>
<i>Corporate social responsibility</i>						
<i>Economic responsibility</i>	It has a good operating record in the industry	0.844	0.713			
	It has a long-term plan for profitability	0.904	0.817	2.32	77.33	0.852
	Its financial system is sound and standardized	0.889	0.790			
KMO: 0.716; Bartlett's Test of Sphericity: $\chi^2=419.212(p<0.001)$, Total variance explained: 77.33						
<i>Legal responsibility</i>	Its day-to-day operations are within the legal limits	0.921	0.848			
	It adheres to the principle of fair competition in the industry competition	0.947	0.896			
	It is able to comply with contractual obligations in accordance with the law	0.933	0.871	3.38	84.50	0.937
	It protects the legitimate rights and interests of employees in accordance with the law	0.874	0.764			
KMO: 0.851; Bartlett's Test of Sphericity: $\chi^2=1140.570(p<0.001)$, Total variance explained: 84.50						
<i>Ethical responsibility</i>	Consumers are trusted to get the product or information	0.851	0.724			
	It can quickly deal with consumer complaints and returns	0.931	0.866	2.45	81.55	0.884
	It focuses on environmental governance and protection	0.926	0.857			
KMO: 0.710; Bartlett's Test of Sphericity: $\chi^2=572.212(p<0.001)$, Total variance explained: 81.55						
<i>Philanthropic responsibility</i>	It actively develops and participates in public welfare and charity undertakings	0.915	0.837			
	It focuses on and helps the vulnerable in society	0.932	0.869			
	It actively carries out activities that contribute to society	0.934	0.872	3.29	82.23	0.927
	It actively supports scientific research, environmental protection and cultural development	0.844	0.711			
KMO:0.813; Bartlett's Test of Sphericity: $\chi^2=1060.599(p<0.001)$, Total variance explained: 82.23						
<i>Corporate culture</i>						
	It focuses on teamwork	0.923	0.852	4.75	79.17	0.947

It values talent	0.910	0.827			
It has sound rules and regulations	0.858	0.736			
Its leaders are not afraid to innovate	0.919	0.845			
It is good at gathering market information	0.882	0.779			
Its innovations can eventually be accepted by the public	0.843	0.711			

KMO: 0.901; Bartlett's Test of Sphericity: $\chi^2=1088.760(p<0.001)$, Total variance explained: 79.17

Innovation ability

New technologies enable companies to develop new products (or services)	0.865	0.748			
New technologies are making companies think about new business models	0.835	0.698			
Consumers often have new demands	0.743	0.552	4.24	70.64	0.916
It can be the first to introduce new products (or services) to the market	0.870	0.756			
It has great advantages in research and development	0.863	0.744			
It can explore new management models, marketing methods or supply sources, etc., to achieve other aspects of innovation	0.860	0.739			

KMO: 0.854; Bartlett's Test of Sphericity: $\chi^2=1368.210(p<0.001)$, Total variance explained: 70.64

Core competitiveness of enterprises

Continuous innovation in technology is very important for the development of enterprises	0.900	0.811			
Continuous innovation in management is very important for the development of enterprises	0.922	0.849			
Continuous improvement of marketing ability is very important for the development of enterprises	0.944	0.892	3.40	85.03	0.941
Brand building and maintenance is very important for enterprise development	0.921	0.849			

KMO: 0.858; Bartlett's Test of Sphericity: $\chi^2=1134.824(p<0.001)$, Total variance explained: 85.03

Note: λ is the component matrix; C is the extracted value of common factor variance; EV is the percentage of variance; VE is the eigenvalue; α is Cronbach's alpha.

According to the three CSR ethical variables of factor load 0.5 or higher, common degree 0.4 or higher, eigenvalue 1.0 or above, and Cronbach's alpha value 0.6 or higher, a basic dimension can be determined. The KMO and The Chi-square test of The Barb sphere were 0.710 and 571.212 (P <0.001), respectively. This factor is called "ethical responsibility", which explains the characteristic value of 2.45 of 81.55%. A basic dimension can be determined according to the four CSR philanthropy variables with factor load of 0.5 or higher, degree of commonality of 0.4 or higher, eigenvalue of 1.0 or above, and Cronbach's alpha value of 0.6 or higher. The KMO and The Chi-square Test of *The Baalkenbauer sphere* were 0.813 and 1060.599 (P <0.001), respectively. This factor is referred to as "charitable responsibility", which explains the characteristic value of 3.29 for 82.23%.

A basic dimension can be determined according to the six enterprise culture variables with factor load 0.5 or higher, commonness 0.4 or higher, characteristic value 1.0 or above, and Cronbach's alpha value 0.6 or higher. KMO and The Chi-square test of The Barbitan sphere were 0.901 and 1088.760 (P <0.001), respectively. This factor is called "corporate culture", which explains 79.17% of the eigenvalue of 4.75. A basic dimension can be determined according to the six variables of enterprise innovation capability with factor load of 0.5 or higher, commonness of 0.4 or higher, eigenvalue of 1.0 or above, and Cronbach's alpha value of 0.6 or higher. The KMO and The Barbitan Spherical Chi-square test were 0.854 and 1368.210 (P

<0.001), respectively. This factor is called "innovation ability", which explains the characteristic value of 4.24 for 70.64%. Finally, a basic dimension can be determined according to the four variables of enterprise core competitiveness with factor load of 0.5 or higher, common degree of 0.4 or higher, characteristic value of 1.0 or above, and Cronbach's alpha value of 0.6 or higher. KMO and Barbitan spherical Chi-square test were 0.858 and 1134.824 ($P < 0.001$), respectively. This factor is called "enterprise core competitiveness", which explains the eigenvalue of 3.40 of 85.03%.

4.3 Hypothesis Testing

The regression analysis results of this study are shown in Table 3. The results showed that legal responsibility \rightarrow Corporate culture =0.214, $t=3.067$, $P < 0.01$, Ethical responsibility \rightarrow Corporate culture =0.304, $T=4.394$, $P < 0.001$, and Charitable responsibility \rightarrow Corporate culture =0.424, $t=7.770$, $P < 0.001$) has a significant impact on corporate culture, therefore, H1-2, H1-3 and H1-4 were supported. Ethical responsibility (Ethical responsibility \rightarrow Innovation ability =0.291, $t=4.169$, $P < 0.001$), and charitable responsibility (Charitable responsibility \rightarrow Innovation ability =0.542, $t=9.858$, $P < 0.001$) have significant effects on innovation ability, therefore, H2-3 and H2-4 were supported. Enterprise culture (Enterprise culture \rightarrow Innovation ability =0.871, $t=31.050$, $P < 0.001$) has a significant impact on innovation ability, thus supporting H3. Enterprise culture (Enterprise culture \rightarrow Enterprise core competitiveness =0.725, $T = 18.445$, $P < 0.001$) has a significant influence on enterprise core competitiveness, thus supporting H4. Finally, innovation ability has a significant impact on the core competitiveness of enterprises (Innovation ability \rightarrow Core competitiveness =0.780, $T = 21.823$, $P < 0.001$), thus supporting H5. Economic responsibility has no significant influence on corporate culture and innovation ability, while legal liability has no significant influence on innovation ability.

Table 3. Regression analysis

Model		Unstandardized coefficient		Standardized coefficient	t	Sig.
Independent variables	Dependent variable	B	S.error	β		
H1-1	Economic responsibility	-0.071	0.058	-0.071	-1.207	0.229
H1-2	Legal responsibility	0.214	0.070	0.214	3.067	0.002
H1-3	Ethical responsibility	0.304	0.069	0.304	4.394	0.000
H1-4	Philanthropic responsibility	0.424	0.055	0.424	7.770	0.000
F=135.065(P<0.001), R ² =0.640, Adj. R ² =0.635						
H2-1	Economic responsibility	0.080	0.059	0.080	1.365	0.173
H2-2	Legal responsibility	-0.061	0.070	-0.061	-0.864	0.388
H2-3	Ethical responsibility	0.291	0.070	0.291	4.169	0.000
H2-4	Philanthropic responsibility	0.542	0.055	0.542	9.858	0.000
F=131.945(P<0.001), R ² =0.635, Adj. R ² =0.630						
H3	Corporate culture	0.871	0.028	0.871	31.050	0.000
F=964.093(P<0.001), R ² =0.758, Adj. R ² =0.758						
H4	Corporate culture	0.725	0.039	0.725	18.445	0.000

F=340.215(P<0.001), R ² =0.526, Adj. R ² =0.524							
H ₅	<i>Innovation ability</i>	Core competitiveness of an enterprise	0.780	0.036	0.780	21.823	0.000
F=476.253(P<0.001), R ² =0.608, Adj. R ² =0.607							

5. Conclusions

Agriculture plays a fundamental role in the development of national economy and society. The corporate culture and innovation ability of agricultural enterprises by fulfilling their social responsibilities have been widely concerned. Due to the development of agricultural science and technology, the relationship between agricultural science and technology enterprises and new agricultural operating subjects and farmers is closer, which promotes the rapid development of agriculture and related industries. The products or services provided by agricultural science and technology enterprises are directly related to agriculture. Because of the weak nature of agriculture, the fulfillment of CSR may affect the development of enterprises. Therefore, this study aims to explore the impact of corporate culture and innovation capability on core competitiveness of agricultural science and technology enterprises under the role of social responsibility. The results show that CSR (Ethical responsibility, Philanthropic responsibility) has a significant positive impact on corporate culture and innovation ability, corporate culture has a significant positive impact on innovation ability and corporate core competitiveness, and innovation ability has a significant positive impact on corporate core competitiveness.

In this study, the results confirm that it is important for agricultural science and technology enterprises to fulfill their social responsibility to form a competitive advantage. The theoretical significance of this study is to determine the positive impact of CSR on corporate culture, innovation ability and thus the formation of the core competitiveness of enterprises. The results of this study support the view that CSR affects the core competitiveness of enterprises. The practical significance of this study clearly enterprise bear the social responsibility actively, protecting the interests of all stakeholders, is to resolve various social contradictions caused by the business activity, the basic way of the future enterprise competitiveness, realize the sustainable development of enterprises, building a harmonious socialist society, has important realistic significance. Therefore, agricultural science and technology enterprises through the performance of social responsibility, the formation of a unique corporate culture, science and technology to serve agriculture, constantly improve the ability of agricultural science and technology innovation, so as to enhance the core competitiveness of enterprises.

The limitation of this study is due to the questionnaire survey conducted in agricultural technology enterprises, so it is difficult to generalize the research results to all enterprises. With the research on other types of enterprises or industries, it is of great significance to analyze the impact of CSR on the core competitiveness of enterprises in the future.

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