

Achieving competitive advantage for construction companies: Navigating the realm of corporate social responsibility

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Abstract: This paper aims to ascertain corporate social responsibility (CSR) and competitive advantage relationship with empirical evidence to help achieve competitive advantage of China's construction companies. Using a panel data set of 85 listed Chinese construction companies and 691 firm-year observations over the period from 2010 to 2019, the concurrent and lagged effects of CSR on competitive advantage were tested by using both static and dynamic panel regression models. The empirical analyses discover that there exists a concurrently positive impact of CSR on competitive advantage of China's listed construction companies. Competitive advantage in the prior year has a positive influence on itself in the current year. This empirical finding suggests that companies should engage in CSR activities continuously to sustain their competitive advantage. A competitive contractor is likely able to maintain its competitive position by sustaining its strong financial resources, innovative capabilities, and good corporate image. This study provides Chinese construction business with evidence to develop or fine-tune their CSR programmes for sustaining their competitive advantages.

Key words: corporate social responsibility, competitive advantage, construction companies

1. INTRODUCTION

Business exists to make profits by offering products and services in a market, where multiple firms usually compete against each other for customers. Competition is thus a key component in any marketplace^[1], which refers to a rivalry between individuals (or groups or nations). Vickers^[2] argued that competition arises whenever two or more parties strive for something that all cannot obtain. Proper strategies are needed to compete for success, in other words, to strive for competitive advantage. Becoming an indispensable component of business strategy, corporate social responsibility (CSR) has been successfully mainstreamed to gain competitive advantage^[3]. To strive for competitive advantage by CSR, researchers pointed out that the two parties are not a zero-sum game; rather, companies should "create shared value" – to move CSR issues from peripheral to the core of a business. Since then, a growing number of empirical studies have investigated their relationship. For example, Madueño et al. found that the development of CSR contributes to improved competitive advantage of Spanish small and medium enterprises (SMEs)^[4]. Hadj discovers that CSR plays a role in boosting competitive advantage of North African SMEs^[5]. Similar results have also been described within the Spanish technological sector^[6].

Although the CSR-competitive advantage relationship has been empirically investigated within some types of firms and in different countries, the in-depth exploration for the construction industry is still in its early stage. Researchers have tried to explore the material implications of CSR^[7-8], by providing empirical evidence that CSR practice can bring positive financial returns for construction companies. Also, Loosemore and Lim^[9] found that a series of perceived benefits such as enhanced public image and employee confidence can emerge with the CSR engagement of construction companies in Australia and New Zealand. Regardless the insightfulness of the studies, it is argued that these financial performance

and organizational returns are insufficient to capture the sustainable success of a business. Various indicators need to be taken into consideration in capturing the meaningful CSR-competitive advantage relationship. Moreover, similar to the practices of prior researchers, the relationship is usually to be found in a specific business context. Scholars have suggested it will be more effective to explore CSR in specific contexts rather than a generic way^[3, 10-11].

China's construction industry provides a meaningful context for exploring the CSR-competitive advantage relationship. The industry represents abundant paradoxes for CSR^[12]. Construction, on the one hand, is an important industry in terms of scope and scale^[13], by materializing the built environment, creating many job opportunities, and making a significant contribution to national economies. On the other hand, construction is essentially "irresponsible", for the facts it generates excessive competition, pollution, quality issues, neglect of occupational health and safety (OHS) and well-being, and so on. Under this circumstance, CSR has been increasingly called upon in construction^[14]. However, the prevailing view in China, like it in elsewhere, seems to be that CSR is by and large useless; a concept to which mere lip service is mostly paid. China's construction industry has recently emerged as a competitive force not only in its indigenous market but also in the international arena. Given the nation's ambitious urbanization plans over the next few decades, the impetus is strong for the industry to expand in the foreseeable future. To strive for competitive advantage in both domestic and international market, their construction business managers are reportedly scanning international experiences from other countries to develop or fine-tune their own CSR programmes and competitive strategies^[15].

This paper aims to ascertain the CSR and competitive advantage relationship with empirical evidence to help achieve competitive advantage of China's construction companies. Here, competitive advantage is measured by a series of objective competitive indicators in indicating multifaceted and sustainable business success. Ultimately, the identified relationship shall provide China's construction managers with rich decision-making information to strive for competitive advantage by engaging in CSR.

2. HYPOTHESES DEVELOPMENT

CSR nowadays is much more than just an investment, constraint, or charitable giving. It can be a source of innovation, opportunity, and brand equity, which are all helpful to achieving sustainable competitive advantage and long-term thriving in the market^[3]. Employees are the bloodstream of any business, and employee can decide the success or failure of a firm^[16]. CSR to employees such as training helps them deal with safety issues in the construction site, conduct projects with better quality, which can ultimately help decrease costs. CSR programmes to train employees also help maintain their competitiveness in the job market, since employees feel proud to work in socially responsible firms. In addition, CSR to community is expected to help companies achieve a good corporate image. Strategic charitable giving can add additional value to corporations, with donations made in society resulting in enhanced reputation and increased income.

Good management theory encourages managers of a company to satisfy the expectations of their stakeholders, and to enhance shareholder benefits by seeking sources of competitive advantage^[17]. CSR practice, as a form of good management, can improve a company's relationship to its stakeholders (e.g., clients, suppliers, and communities) by engaging in activities such as training, fair competition scheme, and charitable giving. In doing so, the company will have good internal management and external reputation, which can improve its competitive advantage and thus create improved value for its shareholders. Ways to enhance competitive advantage are continuously searched by good managers of companies. CSR practice with high relation to good management is viewed as a critical means of achieving competitive advantage. In these views, CSR activities are considered to become a source of competitive advantage of companies. Based on the above discussions, companies are expected to obtain competitive advantage from engaging in social activities. The following hypothesis is thus proposed:

Hypothesis 1 (H1): CSP is positively correlated with competitive advantage

A nascent aspect of the CSR-competitive advantage nexus is to consider the time lag. It is suggested that studies should consider the effects of prior, current, and future events when exploring the material returns of CSR. Gradually, researchers have recognized that the CSR-CFP nexus is not static but changing over time. For example, McGuire et al.^[18] and Xiong et al.^[8] hold that current CSP can have an influence on financial performance in the next year. To ascertain the time lag effects will provide businesses executives to avoid the short-termism of embracing CSR^[7]. There may be time lags for the CSR programmes to take effect. Competitive advantage of companies such as financial and market

feedback may appear in later periods of CSR engagement. Therefore, it is hypothesized that there exists one-year and two-year time lags in the relation of CSP and competitive advantage. Through the effect, companies may gain competitive advantage in later periods of CSR engagement. The hypotheses are shown as follows:

Hypothesis 2 (H2): Current term CSP is positively correlated with next term competitive advantage

Hypothesis 3 (H3): Current term CSP is positively correlated with next two term competitive advantage

By casting the time lag view, readers shall understand that *H1* is about the impact of “current term” CSP on “current terms” competitive advantage, while *H2* and *H3* are about the impact of “current term” CSP on “future term” competitive advantage. Moreover, readers shall understand that “current term” can be perceived from a past or present point of time, and “future term” is relative to “current term”. The conceptual model of the CSP-competitive advantage relations based on the three hypotheses is presented in Figure 1. It can be seen from Figure 1 that current term is marked as T while prior term is marked as T-1 and T-2.

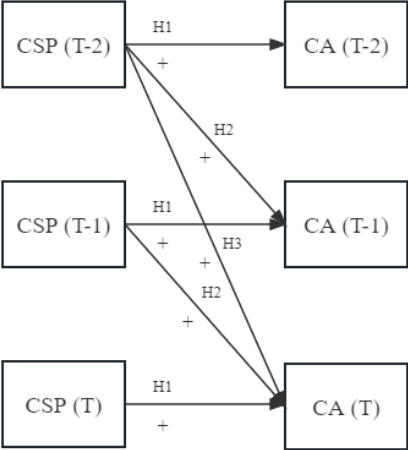


Figure 1. Conceptual model of the CSP-competitive advantage (CA) relation

3. RESEARCH METHODS

3.1. Sample and data

Sample for analysis was selected from the China Securities Regulatory Commission (CSRC). The CSRC publishes listed company directory according to industries each quarter. In the company directory of 2019, 85 listed construction companies are listed. All these companies were selected as sample in this paper. It includes two sets of CSP and competitive advantage data of Chinese listed construction companies for testing and analysing. CSP data were extracted from a CSR assessment database established by *Hexun*. By providing investment information service, *Hexun* has become the paragon in the industry depending on its professional, high-end, and prime-quality financial products. Based on CSR and annual reports provided by companies annually, *Hexun* has launched social performance ratings for Chinese listed companies since 2010. It is now a top institute providing CSR performance of publicly listed companies in China. *Hexun* discloses CSP data of 85 companies on the list during the 10-year time span from 2010 to 2019. Competitive advantage data was also collected from *Hexun* as it publishes listed companies’ historical data annually. Therefore, the final sample for analysis is an unbalanced panel of 85 Chinese listed construction companies from 2010 to 2019 as some companies’ CSP ratings start later than 2010. The sample represents 691 observations. These companies are in the same industry and country, thus their external environment, e.g., cultural customs and legal regulations, is similar.

3.2. Measures

Independent variable. Independent variable is CSP measured by using the database developed by *Hexun*. Based on the database, CSP is evaluated on five pillars: 1) shareholder responsibility, 2) employee responsibility, 3) supplier and consumer responsibility, 4) environmental responsibility, and 5) responsibility to the community. Several sub-categories under each pillar are given with different weights by professions of *Hexun* according to industry characteristics for better capture of CSP. Each year a CSP score is given to companies based on their investment and performance in assuming social responsibility. To avoid overlapping with competitive advantage which includes various indicators of companies' financial and market performance, the CSP measurement used in this research excludes the rating on shareholder responsibility which incorporates some of these indicators as well. Eventually, the CSP scores from 4 pillars (2–5) measured by 19 items are treated as the measurement of CSP.

Dependent variable. The dependent variable is competitive advantage, reflecting the comprehensive performance of companies including their financial performance, market performance, corporate image, and innovation. The data structure from *Hexun* is assessed on five aspects: 1) profitability ratio, 2) solvency ratio, 3) market-based measure, 4) corporate image, and 5) innovation. These aspects are further evaluated by 18 measures.

Control variable. Firm size is selected as the control variable, measured by the natural logarithm of total assets of firms. The description of all variables and their measurements are summarized in Table 1.

Table 1. Variables and measures

Variable type	Variables	Measures
Dependent variable	Competitive advantage (CA)	Profitability ratio (10); solvency ratio (3); Market-based measure (8); Corporate image (5); Innovation (2)
Independent variable	Corporate social responsibility (CSP)	Employee responsibility (15); supplier and consumer responsibility (15); environmental responsibility (20); responsibility to the community (20)
Control variable	Firm size (Size)	Ln (Total assets)

3.3. Estimate methods

Due to the cross-sectional and time-series nature of the datasets, panel data analysis was employed to estimate the relationship. The static panel data regression model of competitive advantage as a function of CSP is estimated first. Further to the static panel data analysis, dynamic effects were also tested in this paper to better capture the dynamic nature of the relationship and verify the results gained from static models. To achieve this, a lagged dependent variable was added in panel data models. However, the inclusion of the lagged dependent variable will cause a problem of endogeneity. To solve this problem, the generalized method of moments (GMM) approach is adopted, which transforms the equation of panel data models into first differences and then introduce instruments using lagged endogenous variables. For instrumental validity, a diagnostic test for first and second-order serial correlation and the Sargan test were conducted.

The analysis has three steps: 1) stationary test, 2) model selection tests, and 3) panel data regression analyses. In the stationary test, an ADF unit root test method was used to verify the stationarity of the datasets. After that, A Lagrange Multiplier Test and a Hausman Test were conducted to compare three basic models for panel data analysis: the pooled regression model, the fixed effects model, and the random effects model. The estimates of the static and dynamic models were obtained by using R.

4. DATA ANALYSIS AND RESULTS

4.1. Stationary test and model selection tests

The results of the stationary test are summarized in Table 2 with the null hypothesis of non-stationarity. From the table, all the indicators receive p-values which are smaller than 0.05. Then further analyses can be conducted as the panel data are considered to be stationary. In this study, the random effects model is selected according to a Lagrange Multiplier Test and a Hausman Test.

Table 2. Stationary test in ADF unit root test model

Indicators	Variables	P-value	Results
CSP lag2 (independent)	CSP lag2	0.000	stationary

CSP lag1 (independent)	CSP lag1	0.000	stationary
CSP (independent)	CSP	0.000	stationary
CA ^a (dependent)	CA	0.000	stationary
Firm size (control)	LnAsset	0.010	stationary

4.2. Descriptive statistics and correlation analysis

Descriptive statistics and correlation coefficients for all variables are presented in Table 3. It can be seen from Table 3 that the positive correlations among variables are significant.

Table 3. Descriptive statistics and correlation coefficients of variables

	Mean	S.D.	CSP lag2	CSP lag1	CSP	CA	LnAsset
CSP lag2	10.809	0.581	1				
CSP lag1	11.060	0.588	0.609 ***	1			
CSP	10.864	0.574	0.441 ***	0.598 ***	1		
CA	13.632	0.211	0.254 ***	0.270 ***	0.333 ***	1	
LnAsset	9.166	0.077	0.360 ***	0.333 ***	0.295 ***	0.305 ***	1

Note: *, **, and *** indicate significance at the 0.05, 0.01, and 0.001 levels, respectively.

4.3. Panel data regression analyses

Static panel data models. Table 4 presents the results of static panel data analysis. In Model 1, both coefficients of CSP and firm size are positive with significant supports. In Model 2, the coefficient of CSP is positive with significant support, while the coefficient of CSP with 1-year time lag is positive but not significant at acceptable levels. In Model 3, the positive correlation between CSP and competitive advantage still receive a strong support. The prior CSP's lag effects are still insignificant. For the control variable, firm size is positively associate with competitive advantage. The static panel data regression results of the three models show that CSP in the current year is positively correlated with competitive advantage in the same year. CSP may also has lagged positive influence on corporate competitiveness, which will be verified through further analysis.

Table 4. Descriptive statistics and correlation coefficients of variables

Dependent CA_{it}	Model 1		Model 2		Model 3	
	Estimate (S.E.) ^a	P-value	Estimate (S.E.)	P-value	Estimate (S.E.)	P-value
Constant	9.308 (1.337) ***	0.000	8.719 (1.437) ***	0.000	8.712 (1.532) ***	0.000
CSP_{it} lag2	-	-	-	-	0.026 (0.015)	0.078
CSP_{it} lag1	-	-	0.023 (0.014)	0.104	0.010 (0.016)	0.526
CSP_{it}	0.088 (0.013) ***	0.000	0.077 (0.014) ***	0.000	0.085 (0.015) ***	0.000
$LnAsset_{it}$	0.397 (0.148) **	0.007	0.447 (0.158) **	0.005	0.431 (0.169) *	0.011
N	691		646		601	
Lagrange Multiplier ^b	0.000		0.000		0.000	
Hausman ^c	0.866		0.997		0.999	
R ²	0.103		0.127		0.165	
Adjusted R ²	0.100		0.123		0.159	
Goodness of Fit	0.000		0.000		0.000	

^a *, **, and *** indicate significance at the 0.05, 0.01, and 0.001 levels, respectively.

^b Lagrange Multiplier is the Lagrange Multiplier test for random models over pooled models.

^c Hausman is the Hausman test for random effects over fixed effects.

Dynamic panel data model. To provide stronger evidence of the CSR-competitive advantage link and further explain the relationship, dynamic panel data analysis is then conducted to incorporate the dynamic nature of the CSR-competitive advantage nexus. A one-year lag of the dependent variable (competitive advantage) is included. For statistical consistency, Table 5 shows that the presence of the first-order serial correlation (in the differenced estimates) is supported but second-order correlation is not so. The Sargan test offers further support for the validity of instrument sets in our model.

Table 5 and Figure 2 show the regression result using dynamic panel data analysis. The results of both static and dynamic panel data regression analysis are largely consistent. As the dynamic model reveals, the estimate of the coefficient of competitive advantage in the 1-year lag is significantly positive. For CSP, the estimate with no time lag is still positive and significant, while the estimates on the first and second lag are not significant at acceptable level. The control variable of firm size is not significant as well. Therefore, *H1* is supported with strong robustness, while *H2* and *H3* are not so. The results suggest that CSP in the current year is positively correlated with competitive advantage in the same year, while we cannot conclude that CSP in the prior years are correlated with competitive advantage in the current year. Also, competitive advantage in the last year can have a significant influence on itself in the current year.

Table 5. Regression result in dynamic panel data analysis

Dependent CA_{it}	Model 4		
Variable	Estimate ^a	Standard error	P-value
CA_{it} lag1	0.387 ***	0.103	0.000
CSP_{it} lag2	-0.001	0.023	0.977
CSP_{it} lag1	-0.055	0.032	0.082
CSP_{it}	0.118 ***	0.028	0.000
$LnAsset_{it}$	-0.312	1.565	0.842
AR(1) ^b			-3.082 ** (p=0.002)
AR(2) ^b			1.007 (p=0.314)
Sargan ^c			76.789 (p=0.959)

^a *, **, and *** indicate significance at the 0.05, 0.01, and 0.001 levels, respectively.

^b AR(1) and AR(2) are tests for first and second-order serial correlation.

^c Sargan stands for Sargan tests of over-identifying restrictions.

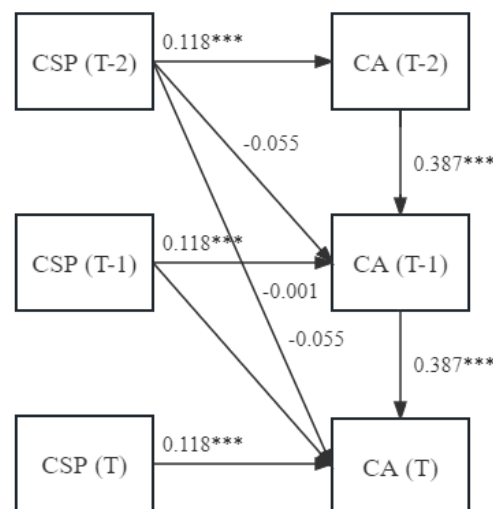


Figure 3. Illustration of the dynamic CSP-competitive advantage (CA) relation

5. DISCUSSIONS

Compared with previous studies on the impact of CSR engagement on its financial returns, competitive advantage works as a more comprehensive indicator indicating multifaceted and sustainable business success. Empirical support is provided for the assertion by Porter and Kramer^[3] that better CSP can

contribute to enhanced competitive advantage. Several research findings are surfaced by using both static and dynamic panel data models, which have several implications. Firstly, the empirical analysis demonstrates that CSR has an immediate or quick impact on competitive advantage of companies. Competitive advantage is a compound index that represents not only current performance but also sustainable capacity to succeed in the long run^[19]. The concurrent effect implies that companies should continuously engage in CSR activities to sustain their competitive advantage. Secondly, a competitive contractor is likely to maintain its competitive position with its strong financial resources, innovative capabilities, positive corporate image, and particularly good management. They tend to mobilize more resources than their counterparts to pursue the advantageous position. Furthermore, although competitive advantage is a complex term, which can be determined by a wide range of indicators, CSR engagement can still be seen as a critical factor in improving competitive advantage. Business executives of Chinese construction companies should not hesitate whether to improve their CSR performance or not, but should focus on how to wisely manage CSR as an ally of competitive advantage.

CSR has a winding development history in China. Chinese companies under the traditional planned economy assumed wide social responsibilities, e.g., by having their own affiliated units such as hospitals, schools, and canteens but these were not sustained by sufficient profitability. After eliminating these counterproductive units, China's companies have gained competitive advantage in the domestic market and now are spreading to the globe^[7-8]. However, CSR seems being forgotten by them as evidenced in the criticisms such as serious adverse environmental impacts, labor exploitation, and unsatisfactory working conditions. To construction companies, bidding means life and death. The prevailing culture of the lowest-price mode pushes business executives to spend more on cost reduction rather than engage in CSR programmes. Chinese contractors, as one of the emerging forces in the international market, seems to receive a negative image worldwide, particularly for their arguable competitive strategies in the developing worlds and the "One Belt One Road" countries. This study presents a harmonious CSR-competitive advantage nexus which implies that Chinese contractors can enhance its CSR engagement without harming their competitive position in the market.

This research can provide Chinese construction companies with useful references in devising responsive CSR strategies. Safety has become a widely accepted issue because injuries on construction sites cause tremendous losses. Construction companies can adopt safety production system, safety training and monetary caring, which are expected to improve employees' professional knowledge and sense of belonging. Construction activities can cause serious adverse environmental impacts such as a huge amount of waste, noise and dust. Green construction strategies, for example, green innovation, green education, and green office adopted by construction companies help them gain green competitive advantage. Chinese international contractors are also criticized for the low participation into the local communities. Local employment and local charity could be the effective ways for gaining trust and corporate image. Moreover, quality management system, fair competition insurance, employee benefits promote companies' relationship with stakeholders. These CSR strategies improve contractors' competitive capabilities in securing contracts and gaining profits. Exploitation of migrant construction workers has been much lessened in recent years. For example, when there is any unpaid wage incident of construction workers, the local officials will be punished so they have tried their best to push clients and contractors to pay on time. Many absenting laws and regulations related to construction workers' wellbeing are put in place, although there is a long way to go for effective implementation and enforcement. The empirical analysis conducted in this study contributes to the CSR understanding for Chinese construction companies. Future qualitative studies, ideally with empirical evidences or cases, are desired to probe into the mechanism through which CSR engagement can be translated into material advantage.

6. CONCLUSION

To achieve competitive advantage by CSR, this study empirically investigated the relationship between CSR and competitive advantage, by focusing on China's construction industry. Using a panel data set of 85 Chinese listed construction companies over the sample period from 2010 to 2019, this research confirmed that current CSP has a positive impact on current competitive advantage, while prior CSP does not have a significant impact on current competitive advantage. In other words, achieving excellence in CSP can have immediate material returns as reflected in companies' competitive advantage. This study adds new empirical evidence to the debate on the CSR-competitive advantage link. Unlike previous research focused on CFP, we see competitive advantage as a more comprehensive

indicator of sustainable business success. Market performance, corporate image, and innovation are added to traditional CFP for exploring the monetary and non-monetary returns of CSR.

Certainly, this study is not free from limitations. First, the CSP-competitive advantage link may differ with different sample size. Future studies covering a larger sample size are encouraged to further explore the relationship. Second, we are not claiming any generality of the research. We carefully maintain many statements within the sample - listed Chinese construction companies, hoping to provide interesting references for researchers and practitioners.

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