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Exploring the effect of corporate environmental management responsibility on firm performance

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ABSTRACT

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Business executives and scholars are increasingly interested in learning how corporate environmental responsibility (CER) and firm success are related. However, prior research in this field requires consistent and contradictory findings. This study fills this gap by suggesting and verifying a moderated mediation theory that better explains the association between CER and company performance by considering organizational slack and strategy similarity. From 2015 to 2017, 260 listed Chinese companies provided the data for this study, yielding 780 firm-year observations. According to the multivariate analysis findings, the association between CER and company effectiveness is mediated by strategic similarity. The relation between CER and strategic identity and the direct effect of CER on organizational value via strategic similarity are both moderated by organizational slack. These findings imply that CER efforts and pursuing strategic similarities are crucial for coping with stakeholder pressure and being competitive in the market. They offer useful insights for corporate managers looking to make educated decisions regarding CER.

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1. Introduction

Both academics and business management are interested in the significant subject of corporate environmental responsibility (CER). A company's dedication to long-term social and ecological well-being is called CER (Bisschop, 2010; Serra-Cantalops, Peña-Miranda, Ramón-Cardona, & Martorell-Cunill, 2018). Despite the increased interest in CER, the investigation into its connection to company performance has shown inconsistent and conflicting results. By putting out and confirming a moderated mediation model that incorporates the ideas of strategic complementarity and administrative slack, this study seeks to advance our understanding of this connection. The study will utilize information from a sample of China's listed companies collected over three years to examine the relationship between CER and business performance. The results of this study will add to the body of knowledge on CER and viability in emerging and emerging markets. They will be helpful for company managers looking to make educated decisions on CER.

Managing a company's ecological impact and advancing sustainability is referred to as CER (Gangi, D'Angelo, Daniele, & Varrone, 2021; Omer, 2008). This might involve cutting greenhouse gas emissions, protecting natural resources, and using eco-friendly procedures for manufacturing and delivering goods and services. CER also covers the obligation of the business to interact with surrounding people, consumers, and workers to solve environmental and social problems. CER is growing increasingly as stakeholders require greater transparency and responsibility from businesses, and society becomes more conscious of how business impacts the environment. Many businesses are undertaking CER efforts to improve their image, draw clients and investors, and adhere to rules and laws.

The capacity of a business or society to satisfy its current demands without jeopardizing the potential of future generations to fulfill their requirements is known as sustainability (Watson, Boudreau, Chen, & Huber, 2008). This covers social, economic,

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and environmental factors. By employing environmentally friendly techniques, treating workers and society fairly, and considering the organization's long-term financial health, businesses may work sustainably. The level to which businesses use comparable environmental management methods is referred to as strategic similarity. According to this theory, businesses will likely use similar tactics to address stakeholder demands and environmental issues. This may occur in reaction to pressure from rivals and authorities, or it may be done to boost credibility and gain an edge over rivals. Similar approaches may help businesses operate better by lowering risks, boosting efficiency, and opening new opportunities.

A corporation's capabilities available but not used in its current activities are referred to as organizational slack (Lin, Cheng, & Liu, 2009; Zhu, Gao, Tang, & Tian, 2022). These resources may be monetary, human, or physical, such as cash on hand, unoccupied workers, or underutilized machinery. A corporation might benefit from organizational slack because it allows it to react to unforeseen events or opportunities. It can also be utilized to promote new programs or financial commitments that help the business expand and advance. However, having too much organizational wiggle room can hurt a business since it can result in inefficiencies and lost opportunities. In order to succeed, organizations must strike the correct balance between having enough wiggle room to adapt to unforeseen developments and having enough resources devoted to ongoing operations. In the context of CER, organizational slack may offer organizations more assets to assist CER initiatives while enhancing firms' capacity to trail rivals in the marketplace. Organizations with administrative slack can enhance their business results by pursuing a high degree of CER and planned similarity (Dang, Nguyen, Bu, & Wang, 2019; D. Li et al., 2017).

A statistical technique called a moderated mediation model enables researchers to examine the intricate connections between many factors. To better understand the link between company environmental stewardship (CER) and business performance, this study suggests a moderated mediation model that incorporates the ideas of strategic congruence and institutional slack. Managerial vacancy refers to the resources a corporation has available but still needs to be employed in its operations. In contrast, strategic similarity refers to the degree to which companies embrace comparable environmental management strategies. The investigation of the relationship between CER and business performance will use data collected over three years from a sample of Chinese-listed companies. The impact of CER on organizational value and the contributions of organizational flexibility and tactical resemblance will be examined using the moderated mediation model. The results of this study will add to the body of knowledge on CER and durability in emerging and developing economies and will be helpful for company managers looking to make educated decisions on CER.

The remainder of this article is provided as follows. Theoretical Background and Hypotheses are presented in Section 2. The proposed models are shown in Section 3. The findings and discussion are shown in Section 4. The conclusion, limits, and directions for further study are given in Section 5.

2. Theoretical Background and Hypotheses

• Theoretical Background

Due to its possible effect on business performance, corporate social and environmental responsibility (CER) has drawn attention in the literature. CER is the term used to describe a company's efforts and promises to lessen the adverse effects of its activities on the environment and society. A growing amount of research indicates that businesses may benefit from CER practices regarding their financial success, reputational, and stakeholder engagement (Holtbrügge & Dögl, 2012).

• Hypotheses

CER is positively correlated with organizational effectiveness because organizations that prioritize environmental sustainability and preservation may have a competitive edge in their industry. Strategic similarity moderates the link with CER and firm success, making it possible for companies in similar companies or with related business strategies to see a higher positive correlation between CER and profitability (Jo, Kim, & Park, 2015). Organizational slack moderates the link between CER and company performance. Thus, businesses with greater resources may be better equipped to invest in and execute CER techniques, resulting in a larger significant link between CER and effectiveness.

2.1 Firm Performance

Recent years have seen a substantial increase in interest in CER as a result of rising worries about climate change and ecological degradation (Karassin & Bar-Haim, 2016). CER includes an organization's commitment to reducing the effects of its activities on the environment and society, as well as initiatives to improve ecological integrity (Graafland & Noorderhaven, 2018).

As society has grown more aware of how corporate activities affect the environment and society, CER has gained importance in recent years. CER describes a company's initiatives and pledges to lessen the detrimental effects of its activities on society and the environment and to improve environmental quality. Adopting CER procedures may enhance a company's standing, relationships with stakeholders, and economic condition (Dögl & Holtbrügge, 2014; Elsayed & Paton, 2005).

Research on the connection between CER and business success has produced conflicting findings, with some research revealing a clear correlation and others revealing no appreciable connection. However, subsequent research has indicated that

several variables may influence the association between CER and company success, including organizational slack, strategy similarity, and others. By assessing the link between CER and business performance and investigating any potential mediating impact of strategic coherence and organizational slack, this study seeks to further the field (Flammer, 2015).

Scholars have disagreed on the connection between CER and company performance (Darnall & Kim, 2012; Surroca, Tribó, & Waddock, 2010). Some contend that CER has a detrimental impact on company performance since it may be viewed as an indicator of wasteful resource usage and may increase business expenses, placing them at a disadvantage from an economic standpoint. Others contend that CER may boost a company's reputation and image among stakeholders, boost product competitiveness, and provide reputation protection, all of which can enhance organizational performance.

Albertini (30) conducted a meta-analysis of 52 research spanning 35 years and discovered a beneficial relationship between environmental performance and corporate financial success. According to Albertini, businesses should engage in CER primarily for some advantages: cost and differentiation. By lowering pollution, conserving energy, and increasing production efficiency, businesses that use CER to enhance their processes may benefit financially. They may also gain a competitive edge by creating environmentally friendly goods. Additionally, CER aids companies in gaining credibility and resources, as well as the backing of the community and government. CER may also assist businesses in developing green capabilities, new skill sets, and improved manufacturing processes. Considering this, the following theory is put forth:

Hypothesis 1. *CER will invariably be connected to firm performance.*

Hypothesis 1: CER will have a positive relationship with firm performance. This hypothesis posits that companies that prioritize environmental protection and sustainability through CER practices may have a competitive advantage in the market, leading to improved financial performance. This could be due to cost advantage and differentiation advantage, improved reputation and image among stakeholders, increased product competitiveness, and provision of reputation insurance.

2.2. Strategic Similarity Roles

Strategic similarity is the degree to which two or more organizations have similar strategic orientations, such as similar goals, values, and plans (Ruekert, 1992). It can also refer to the extent to which two or more organizations have similar resource endowments and capabilities. Strategic similarity can have a mediating role in the relationship between organizations, as it can influence how they interact and compete. For example, organizations with high strategic similarity may be more likely to collaborate, while those with low strategic similarity may be more likely to compete. Additionally, strategic similarity can also affect how organizations respond to changes in their environment.

The authors of this study contend that Corporate Environment Responsibility (CER) affects the degree of strategic similarity across businesses, which in turn impacts the effectiveness of those businesses. CER and company performance are moderated by a factor called strategic similarity. According to the study, businesses frequently adopt identical strategies to their rivals due to the primary driving forces in a competing environment. The degree to which a firm's strategic stance coincides with that of its rivals in the market is referred to as strategic similarity in the research. The degree to which a firm's strategic decisions at a given period mirror those of its rivals may be considered a firm-level construction. Strategic similarity essentially represents the degree of consistency across businesses in the same sector at a certain moment.

According to studies on resource dependency and institutional theory, corporations can achieve legitimacy and secure resources under stakeholders' control by adopting comparable strategic approaches. According to this point of view, businesses are open systems that engage with numerous stakeholders through social networks, and the success of an organization depends on its interactions with various stakeholders both internally and outside. In this setting, a company's strategy is justified if it is endorsed by its stakeholders and adheres to the consensus within the sector. In a complicated and unpredictable environment, businesses may adopt mimetic behavior to lower the chance of failure. This results in a comparable collection of businesses building a network that creates its own rules, establishing a legitimate range. Firms follow comparable techniques to other businesses in the same sector to achieve credibility and resources because if they behave outside of this range, their legitimacy and dependability may be questioned. Strategic similarity, then, aids businesses in winning over stakeholders and securing crucial resources under their control.

CER symbolizes a company's dedication to the lengthy period of sustainability for business and society. High awareness of the environmental businesses is eager to participate in CER initiatives, putting long-term sustainability ahead of immediate financial gain. These businesses frequently consider the interests of the stockholders and those of other stakeholders, including consumers, suppliers, governments, and the environment. Due to consumer demands and industry competitiveness, businesses are pressured to provide ecologically friendly products. By doing this, a business may effectively improve its reputation and gain the support of consumers. In order to obtain legitimacy and secure resources under the control of stakeholders, corporations feel driven to adopt tactics similar to those of their rivals as CER becomes a generally recognized standard, value, and belief among stakeholders. This aids businesses in meeting stakeholder expectations and preserving their market share in comparison to rivals. Therefore, the findings say that CER encourages businesses to embrace strategic similarities in a sector with high environmental pressure to operate by industry consensus, improving performance.

Hypothesis 2. *The association of CER and business effectiveness is mediated by strategic similarity.*

Hypothesis 2: The second hypothesis proposed in the study is that strategic similarity acts as a mediating factor between Corporate Environmental Responsibility (CER) and firm performance. It suggests that the relationship between CER and firm performance is influenced by the degree of similarity in the strategic positions of firms in the same industry.

2.3 Organizational Slack Roles

A moderator is an output factor that may significantly affect how the initial variable relates to one another. This implies that depending on the moderator's levels, the influence of the independent variable on the dependent variables may differ. Organizational slack, according to the study's authors, would lessen the relationship between CER and planned similarity as well as the indirect effects of CER on firm performance because of strategic similarity. They assert that the degree of strategic resemblance across firms may affect how CER affects that degree of similarity. The next part will discuss how organizational slack controls how closely CER and tactical similarity are related.

The additional resources that an organization has at its disposal, such as money, people, and physical assets, are referred to as organizational slack. These resources can be applied to seize opportunities or mitigate the consequences of dangers and unfavorable circumstances. The link between CER and strategy similarity, as well as the direct effect of CER on firm effectiveness through strategic similarity, are moderated in this context by organizational slack. According to the theory, businesses with a lot of organizational wiggle room may be better equipped to invest in CER initiatives and are consequently more likely to use CER tactics comparable to those of their rivals, leading to higher levels of strategic similarity. On the other hand, firms with low levels of organizational slack may be less able to invest in CER activities and therefore be less likely to adopt similar CER strategies to their competitors, resulting in lower levels of strategic similarity.

Companies with a lot of organization slack and low levels of leisure may see different effects of CER on strategic similarity. This indicates that managerial slack can affect how CER and strategic similarity interact and how CER indirectly affects company performance via strategic similarity. Therefore, it is possible to consider organizational slack as a mediator of the association among CER and conceptual similarity.

Organizational slack has received much attention in the literature on organizational theory and organizational strategy. Although there is not a single universally agreed upon definition, available, recoverable, and prospective slack is sometimes included. These three elements of organizational slack are frequently viewed as extra resources that serve as a "buffer" between companies and outside circumstances. An organization may be more prepared to invest and conduct CER activities if it has more economic, intellectual, and social resources. Businesses have flexibility in response to environmental changes thanks to organizational slack, which managers may employ to respond to unanticipated needs and adapt to demands from both internal and external factors.

A company's competitive edge cannot be properly safeguarded in a highly unstable, uncertain, and complicated market because its goods and services are readily duplicated. As a result of operating in a highly unpredictable and intensely competitive market, businesses must continually develop new values to gain a competitive edge. Some businesses may imitate other successful businesses to stay competitive; this is known as the "similarity strategy," which depicts the habit of copying competitors in a dynamic environment. However, imitation of the strategic orientation of leading firms is expensive, and believers frequently require extra resources to help and create a stable comparative position in the market to obtain optimal solutions to those of leading firms. Therefore, strategic resemblance frequently necessitates a wealth of resources.

Firms are being pushed to develop and market environmentally friendly goods in today's very tough and unpredictably changing market. Firms might employ spare assets as inventive assets to enhance their CER operations and carry out the strategic similarity in response to this demand. High amounts of extra resources will allow businesses to participate in CER activities and catch up to their competitors. However, businesses with little to no resources are unable to commit enough time to CER operations to meet stakeholder needs and may be unable to keep up with their rivals' rapid pace. As a result, organizational slack is essential for improving a company's participation in CER activities and executing strategic similarities to counter rivals.

Hypothesis 3. *Strategic similarity and CER have a moderated connection that strengthens the link whenever the organization's laxity is significant.*

Hypothesis 3: The third hypothesis put out in the study is that the amount of organizational slack affects the link of CER and strategic similarity. Conflict theorists contend that the association is greater when organizational slack is considerable. In other words, companies with high organizational slack are much more prone than companies with little organizational slack to experience a large correlation between CER and strategic similarity.

Hypothesis 4. *Strategic similarity centrists' organizational slack so that when organizational slack is large, the indirect impact of CER on firm performance is considerable.*

Hypothesis 4: The study's hypothesis tested is that organizational slack affects the indirect impact of CER on organizational effectiveness by way of strategic similarity. In particular, the theory contends that the indirect impact is more pronounced when organizational slack is considerable. In other words, organizations with high organizational slack are more likely than

firms with little organizational slack to have a substantial indirect influence of CER on organizational effectiveness through tactical similarity.

The association between CER and company performance is mediated by strategic similarity and controlled by organizational slack in this study's complete model, which is shown in Fig. 1. According to the theory, companies with high organizational slack would have a higher indirect impact of CER on firm performance through strategic similarity than companies with low organizational slack. As a result, the study suggests the following: When organizational slack is considerable, the indirect impact of CER on firm performance via strategic complementarity is higher.

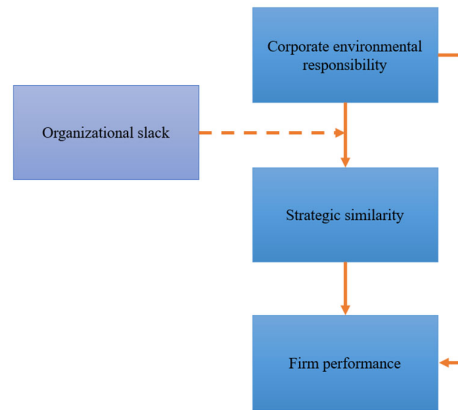


Fig. 1. The proposed research models.

3. Method

CER refers to a company's commitment to reducing its environmental impact and promoting sustainability. The relationship between CER and firm performance is a topic of ongoing research and debate. Some studies suggest that companies that prioritize CER may experience positive financial outcomes, while others find no significant correlation. The proposed method for examining this relationship may involve analyzing financial details and sustainability reports of companies, as well as conducting surveys or interviews with stakeholders. Additionally, the proposed method may include controlling other variables that may impact firm performance, such as industry and market conditions.

3.1 Sample and Data Collection

In order to investigate the connection between corporate environment protection and firm performance across Chinese enterprises, this study used data from the RKS-Ratings and CSMAR databases. The CSMAR database supplied financial information for these companies, while the RKS-Ratings database gave details and evaluation scores for each listed Chinese company's social and environmental commitments. These databases were selected due to their dependability and capacity to deliver useful data. After excluding records with missing values, the final sample utilized in the study, which covered the years 2015 to 2017, had 780 observations.

3.2 Measures

3.2.1 CER

Corporate environmental responsibility (CER) can be measured in a variety of ways. One common method is to use a composite index, which combines multiple indicators of environmental performance into a single score.

One example of a composite index that can be used to measure CER is the Environmental Performance Index (EPI). The EPI is a composite index that measures the environmental performance of countries based on various environmental indicators, such as air and water quality, biodiversity and habitat, and climate change. The EPI can be calculated as follows:

$$EPI = w1I1 + w2I2 + \dots + wn \times In \quad (1)$$

where EPI is the Environmental Performance Index, $(w1, w2, \dots, wn)$ are the weighting factors for each indicator, and $(I1, I2, \dots, In)$ are the values of each indicator. Another example of a composite index that can be used to measure CER is the Community Environmental Responsibility Index (CERI). CERI is a composite index that measures a firm's environmental performance by analyzing its impact on the community, where:

$$CERI = w1I1 + w2I2 + \dots + wn \times In \quad (2)$$

where $CERI$ is the Community Environmental Responsibility Index, $(w1, w2, \dots, wn)$ are the weighting factors for each indicator, and $(I1, I2, \dots, In)$ are the values of each indicator.

In both examples, the indicators and weighting factors used in the composite index can be tailored to the specific research question and data availability. It is important to note that the calculation of *CER* composite index may vary depending on the study and the data availability.

Previous research commonly gathered Corporate Environmental Responsibility (*CER*) information from sources such as Kinder, Lydenberg, some examples are the toxic Release Inventory, Domini Research and Analytics, and the Council on Economic Priorities. These databases do not, however, include Chinese businesses. The only source with thorough *CER* analyses for listed Chinese corporations is RKS-Ratings. Therefore, the present study used RKS-Ratings' *CER* indices as a substitute for *CER*.

3.2.2 Strategic Similarity

This paper utilized value-added per employee as a low-cost strategy indicator. In contrast, the ratios of advertising costs to sales and R&D spending to revenues were used as indicators of marketing and technological differentiation strategies, respectively, as per references (Garcia-Pont & Nohria, 1999; Porter, 1997, 2011; Spanos, Zaralis, & Lioukas, 2004). Additionally, it used the equation outlined by Deephouse (1999) and Finkelstein and Hambrick (1990) to evaluate the given strategic similarity.

The Strategic Similarity measure is a metric used to quantify the similarity of strategies between two or more agents in a game theoretic setting. The measure is based on the concept of best response correspondence, which describes the mapping of strategies between agents in a game. The formal definition of the Strategic Similarity measure is as follows:

Given a game G with players $(1, 2, \dots, n)$ and strategies (s_1, s_2, \dots, s_n) , the Strategic Similarity measure between two players i and j is given by:

$$SSim(i, j) = 1 - d(BR(i), BR(j)), \quad (3)$$

where $BR(i)$ is the best response correspondence of player i , and $d(BR(i), BR(j))$ is a distance metric between the best response correspondences of players i and j .

The best response correspondence of a player i is a mapping from the strategies of all other players to the best response strategy of player i . It can be represented as a matrix, where the element at row i and column j is the best response strategy of player i when the strategy of player j is s_j .

The distance metric $d(BR(i), BR(j))$ can be any appropriate measure of distance between two matrices, such as the Euclidean distance or the normalized Hamming distance. In summary, the Strategic Similarity measure compares the best response strategy of two players in a game and uses a distance metric to quantify the similarity between the two players' strategies.

Scores on strategic similarity range from zero and above, with a score of zero indicating that the strategies of two firms are identical and scores greater than zero indicating the degree of dissimilarity in the strategies of two firms.

3.2.3 Organizational Slack

This study used the methods outlined in Bourgeois and Singh (1983) and Voss et al. (2008) to measure three forms of organizational slack: available, recoverable, and potential. Available slack was estimated by subtracting current assets from current obligations. The ratio of revenues to general administration costs was used to compute recoverable slack, while the ratio of equity to debt was used to calculate potential slack. The average of these three categories of slack's standardized scores was then used to construct the composite index of organizational slack. Organizational slack refers to the resources that an organization has available to it that can be used to respond to unexpected opportunities or threats. It can be measured in a variety of ways, but some common methods include:

- Available slack: This is calculated by taking the ratio of current assets to current liabilities. It measures the number of resources that an organization has available to it that can be used to respond to unexpected opportunities or threats. Mathematically it is represented as:

$$\text{Available slack} = \text{Current Assets} / \text{Current Liabilities} \quad (4)$$

- Recoverable slack: This is calculated by taking the ratio of sales to general administrative expenses. It measures the degree to which an organization can reduce its expenses in order to respond to unexpected opportunities or threats. Mathematically it is represented as:

$$\text{Recoverable slack} = \text{Sales} / \text{General Administrative Expenses} \quad (5)$$

- Potential slack: This is calculated by taking the ratio of equity to debt. It measures the extent to which an organization can raise additional funds in order to respond to unexpected opportunities or threats. Mathematically it is represented as:

$$\text{Potential slack} = \text{Equity} / \text{Debt} \quad (6)$$

- Composite index of organizational slack: The average of these three categories of slack's standardized scores may be used to create a comprehensive set of administrative slack. In mathematics, it is denoted as follows.

$$\text{Composite index of organizational slack} = (\text{Standardized score of Available slack} + \text{Standardized score of Recoverable slack} + \text{Standardized score of Potential slack}) / 3 \quad (7)$$

It is important to note that the above-mentioned methods are one of the way to measure Organizational slack, there are other methods as well which can be used to measure slack.

3.2.4 Firm Performance

There are many different measures of firm performance, each with its own advantages and limitations. Some common measures include:

- Return on equity (ROE): Slack was assessed by the ratio of sales to general administration costs, recoverable slack by dividing current assets by current debts, and prospective slack by the equity-to-debt ratio. Then, the composite index of organizational leeway was established by averaging the standardized scores of these three categories of slack. It is calculated as follows.

$$ROE = \text{Net Income} / \text{Shareholder Equity} \quad (8)$$

- Return on assets (ROA): This gauge how much profit a business makes in comparison to the value of its assets. It is determined by dividing net income by total assets. It is calculated as follows.

$$ROA = \text{Net Income} / \text{Total Assets} \quad (9)$$

- Return on investment (ROI): This gauges an investment's effectiveness and is computed as the gain or loss from the transaction divided by the transaction cost. It is calculated as follows.

$$ROI = (\text{Gain from Investment} - \text{Cost of Investment}) / \text{Cost of Investment} \quad (10)$$

- Economic Value Added (EVA): This gauges a company's economic gain, computed as the gap between its operational profit after taxes and its capital cost. It is calculated as follows.

$$EVA = \text{Net Operating Profit After Tax} - (\text{Cost of Capital} \times \text{Capital Employed}) \quad (11)$$

- Market value added (MVA): This calculates the gap between a company's market price and the money put in it. It is calculated as follows.

$$MVA = \text{Market Capitalization} - \text{Shareholder's Equity} \quad (12)$$

- DuPont Analysis: By dissecting a firm's equity return into three sections, margins, asset turnover, and leverage ratio techniques may be used to assess the organization's performance. It is calculated as follows.

$$ROE = (\text{Net Profit Margin} \times \text{Asset Turnover} \times \text{Financial Leverage}) \quad (13)$$

- Z-Score: This is a measure of the financial health of a company. It is calculated using a combination of balance sheet and income statement items and is used to predict the likelihood of bankruptcy. The Z-Score formula is a bit more complex and typically involves multiple variables such as working capital, retained earnings, market value of equity, and total liabilities.

It's worth noting that some of the mentioned measures may have variations in the way they are calculated, depending on the company and the industry it belongs to. Also, these measures are not always mutually exclusive, you can use more than one of them to evaluate the firm's performance. These are just a few examples of the many different measures of firm performance. The choice of which measure to use will depend on the specific context and the information that is available. This study assessed firm performance using return on asset (ROA), return on equity (ROE), and return on sales (ROS) as per the method outlined by Spanos et al. (2004). The standardized scores of these three factors were averaged to produce a composite index, which was then utilized as a gauge of business success. Using Cronbach's alpha, it was established that this measure's dependability was 0.86.

3.2.5 Control Variables

In this study, variables that could impact the performance of the firm were taken into account. Factors such as the size, age, and past performance of the firm were used as key controls, as previously noted by Boeker (1997) and Russo and Fouts (1997). Control variables are used in statistical models to account for factors that may influence the relationship between the independent and dependent variables. They are also known as covariates or confounding variables.

In terms of measurement, control variables are typically quantified using numerical values, such as continuous variables (e.g. firm size measured in number of employees) or categorical variables (e.g. firm age measured in years). In a mathematical

notation, a control variable (X) can be represented as a predictor variable in a linear regression model, along with the independent variable (Y) and the coefficient (b) representing the relationship between X and Y :

$$Y = b_0 + b_1X + e \tag{14}$$

where Y is the dependent variable, X is the control variable, b_0 is the y-intercept, b_1 is the coefficient of X and e is the error term. In a multiple regression model, the control variables are added in the same way as above, but with more than one independent variable.

$$Y = b_0 + b_1X_1 + b_2X_2 + \dots + b_nX_n + e \tag{15}$$

where X_1, X_2, \dots, X_n are the control variables and b_1, b_2, \dots, b_n are the coefficients associated with each control variable.

It is crucial to understand that introducing control variables compensates for any confounding factors affecting the connection rather than implying that the link between the independent and dependent variables is causal.

3.3 Analysis Method

A multiple regression model was utilized in this paper to investigate the suggested possibilities. The program PROCESS v3.1 created by Hayes was used to test the hypotheses, and the procedures stated by Preacher, Rucker, and Hayes were adhered (Boeker, 1997; Hayes, 2017). The independent variable must be significantly correlated with the predictor variables in the first model and the mediation factor in the second one to prove the mediating effect. In the third model, the mediation variable must be significantly correlated with the predictor variables. Mediation is supported if the predictor variables lose statistical significance or have a smaller effect than the first model. The study's mediating impact of strategic similarity was examined using the two formulas. One thousand re-samples were used in bootstrapping with a 95% confidence level to assess the moderating effect.

Model 1: $Firm\ performance = \beta_0 + \beta_1Firm\ size + \beta_2Firm\ age + \beta_3PriorP + \beta_4CER + d1$ (16)

Model 2: $Strategic\ similarity = \beta_0 + \beta_1Firm\ size + \beta_2Firm\ age + \beta_3PriorP + \beta_4CER + d2$ (17)

Model 3: $Firm\ performance = \beta_0 + \beta_1Firm\ size + \beta_2Firm\ age + \beta_3PriorP + \beta_4Strategic\ similarity + \beta_5CER + d3$ (18)

Additionally, to establish the moderating effect of organizational slack, the fourth model must show a statistically significant interaction between CER and organizational slack. The following equation was used to test this relationship:

Model 4: $Strategic\ similarity = \beta_0 + \beta_1Firm\ size + \beta_2Firm\ age + \beta_3PriorP + \beta_4CER + \beta_5Organizational\ slack + \beta_6CER * Organizational\ slack + d4$ (19)

Some researchers have raised questions about how endogeneity may impact the link between CER and company performance. This study used information gathered at various times and a one-year time lag between the independent, mediator, and dependent variables to solve this problem. The mediator was gained during the second period (2016), the dependent variable was gathered during the third period (2015), and the independent variable was gathered during the first period (2015). (2017).

4. Results

4.1 Descriptive Statistics

The descriptive data for the study's variables, including their means, standard deviations (SD), and Pearson correlations (r), are shown in Table 1. The findings show that CER and strategic similarity have a favorable relationship ($r = 0.12, p < 0.01$) and firm performance ($r = 0.11, p < 0.01$). In addition, strategic similarity had a positive relationship with firm performance ($r = 0.49, p < 0.01$). The results also mentioned that organizational slack was positively related to both strategic similarity ($r = 0.22, p < 0.01$) and firm performance ($r = 0.24, p < 0.01$) but there was no correlation between organizational slack and CER ($r = -0.02, p > 0.05$).

Table 1
Summary of Descriptive Statistics and Correlation Coefficients for the study variables.

No.	Variables	Mean	SD	1	2	3	4	5	6	7
1	Firm size	00.964	00.781	1						
2	age	30.227	13.521	-0.61**	1					
3	Prior performance	10.983	20.612	0.22**	-0.23**	1				
4	CER	40.012	15.735	0.17**	-0.41**	0.12	1			
5	Strategic similarity	13.891	8.412	0.29**	-0.35**	0.12**	0.13**	1		
6	Organizational slack	15.234	13.534	0.16	-0.12	0.09	-0.21	0.24**	1	
7	Firm performance	06.498	11.432	0.32**	-0.341**	0.51**	0.12**	0.52**	0.25**	1

Note: n = 780, ** p < 0.01.

4.2 Hypothesis Testing

The outcomes of the multiple regression test are shown in Table 2. The association of CER and company effectiveness was investigated using the study in Model 2. The findings demonstrated no evidence of a significant relationship between CER and company performance ($\beta = 0.01$, $p > 0.05$). As a result, the evidence did not support Hypothesis 1.

Model 4 showed that CER and strategic similarity had a statistically significant and positive connection ($\beta = 0.03$, $p 0.05$). Additionally, Model 3 discovered a substantial and favorable relationship between strategy similarity and firm success ($r = 0.56$, $p 0.001$). With a range of [0.026, 0.148] and 1000 re-samples, bootstrapping was carried out at a 95% confidence level to confirm the indirect influence of CER on organizational effectiveness through strategic similarity. The bias-corrected confidence interval did not contain zero, supporting Hypothesis 2. Hence the indirect impact was deemed statistically significant.

Model 4 showed a statistically significant and favorable connection between strategic similarity and the interaction of CER and organizational slack ($\beta = 0.03$, $p 0.001$). By Aiken and West's recommendations (Aiken, West, & Reno, 1991), To depict the interaction, the slopes were calculated one standard deviation above and below the organizational slack mean. The interaction pattern was discovered to be consistent with the hypothesis, as shown in Figure 2. Particularly, when organizational slack was considerable ($\beta = 0.08$, $p 0.001$) as opposed to low ($\beta = 0.04$, $p 0.01$), CER exhibited a higher positive correlation with strategic similarity. Consequently, the evidence supported Hypothesis 3.

Table 2

Outcomes of the Regression analysis

Variables	M1	M2	M3	M4
Constant	10.674	11.412	0.32	2.527
Used Variables				
Firm size	0.17***	0.17***	0.16***	0.16***
Firm age	-0.26***	-0.27***	-0.24***	-0.23***
Prior performance	0.33***	0.33***	0.32***	0.32***
Independent variable				
CER		0.02	0.02	0.05*
Mediator				
Strategic similarity			0.57***	
Moderator				
Organizational slack				-0.08***
Interaction				
CER × organizational slack				0.04***
F	40.781***	40.523***	354.233***	72.832***
ΔF		0.193	313.723***	32.123***
R2	0.141	0.137	0.912	0.221
ΔR2	0.142	0.133	0.772	0.084
Typical error	0.994	0.993	0.997	0.998
Durbin-Watson	2.063	2.076	2.037	2.058
F	.265	.578	6.476***	6.576***

"Note: n = 780, * p < 0.05, *** p < 0.001"

The outcomes of Model 1, which employs control variables in regression analysis, are shown in Table 5. The F value does not show a significant linear association between Firm performance. Strategic similarity innovation is included in Model 2 as an independent variable, although it has no discernible effect on performance. On the other hand, model 3, which incorporates the Firm performance, discovers that it significantly affects performance. Regarding Strategic similarity, the results of Model 4's comprehensive model—which considers the control variables, independent variables, and the effects of their interactions—are comparable to those of Model 3. We tested the mediating effect assumption using the bootstrapping methods described by Preacher et al. (2007). The strategic similarity-based indirect effect of CER on firm performance is shown in Table 3. This effect was statistically significant and favorably different from zero, ranging from low [0.021, 0.135] to high [0.005, 0.176] organizational slack. The bias-corrected standard error did not include zero. Hence the indirect impact was deemed to be statistically significant. As a result, the evidence supported Hypothesis 4.

Table 3

Outcomes of the Moderated Mediation Analysis

Moderator	Indirect Effect	BootSE	BootLLCI	BootULCI
Low slack	0.081	0.029	0.022	0.141
High slack	0.132	0.046	0.008	0.182

The model's findings demonstrated that the independent variable (CER) and the dependent variable have a meaningful connection (firm performance). Furthermore, the findings confirmed that the mediator variable (strategic similarity) mediated the association between CER and business performance. The findings also showed that the connection between CER and firm performance was significantly moderated by the moderating variable (organizational slack). Overall, the study's findings show how crucial it is to consider mediating and moderating factors when attempting to comprehend the connection between CER and business success.

5. Discussion and Implications

In order to resolve the divergent results in past studies on the link of CER and firm revenue, this study provides a mediating effect model that looks at the influence of strategic resemblance and organizational slack. The findings of this research provide managers with useful takeaways that shed fresh light on scholarly inquiry.

5.1 Theoretical Implications

Previous research has reported both positive and negative direct effects of CER on firm performance (Babiak & Trendafilova, 2011; Gregory, Tharyan, & Whittaker, 2014; W. Li & Zhang, 2010; McWilliams & Siegel, 2001). However, this study's findings reveal that CER does not have a direct impact on firm performance. This shows that there may be more complexity in the link between CER and company success than what the findings of much earlier research revealed. The results of this study further suggest that the relationship between CER and company performance may lack a mediator or moderator. Therefore, a comprehensive model that considers moderation and mediation is required to completely comprehend CER's impact on business performance.

Secondly, the research has found conflicting results, suggesting the complexity of this correlation, even though many hypotheses have been used to explain the connection among CER and company success (Clarkson, Li, Richardson, & Vasvari, 2011; Meng, Zeng, Shi, Qi, & Zhang, 2014). There is a large knowledge gap in this connection, as evidenced by earlier studies' conflicting and contradictory results. This study fills this gap by putting forth a mediating effect model that considers organizational slack and strategic similarity when examining the relationship between CER and business performance. The results of this study give a more thorough understanding of the connection between CER and company performance and shed light on the complicated and inconsistent link previously documented in the field.

Third, we discovered that strategic similarity allows CER to affect firm performance indirectly. In several ways, this result conflicts with Albertini's finding (Albertini, 2013) that environmental management practices lead to differentiation advantage. This discrepancy may be explained by the fact that many Chinese businesses have already embraced environmental measures in response to pressure from clients, investors, and rival businesses. To match stakeholder expectations and keep up with their rivals in the market, different companies have been compelled by this tendency to embrace strategic similarity. Therefore, by establishing credibility and preserving a competitive edge in a challenging context, strategic similarity may aid businesses in addressing CER challenges. Since environmental concerns are a key public concern and buyers frequently expect high-quality and economically priced items, the strategic similarity benefits China's commercial climate. In this context, strategic similarity not only aids businesses in responding to environmental constraints but also improves their capacity to compete with market leaders and create value for customers.

Organizational laxity, according to Lastly, Li et al. (2017), undermines the link between CER and business performance. Our results, nevertheless, differ from those of other researchers who asserted that organizational laxity strengthens the link between CER and planned resemblance and the impact of CER on firm performance through strategic similarity. According to this study, organizational slack acts as a "buffer" to aid businesses in adapting to climate conditions. Organizational slack, in particular, increases organizations' capacity to support CER programs while keeping up with the competition in the market. Therefore, organizational slack enables businesses to seek a high degree of CER and strategy similarity, enhancing their business results (Jalilvand & Kim, 2013).

5.2 Practical Implications

The results of this study provide useful management insights. The connection between CER and company performance is more intricate than a simple one-to-one connection. Through strategic similarity, CER indirectly impacts company performance; this impact is larger when organizational slack is large. In order to make better judgments, business managers need to be aware of this intricate link. In order to fulfill stakeholder expectations and compete in the market, managers should also engage in CER activities and achieve strategic similarities. Strategic similarity helps organizations achieve legitimacy and sustain a competitive position in the market while enhancing company performance in a complicated environment with significant CER demand from stakeholders. Organizational slack also has little value and can only give organizations a competitive edge if properly utilized. Managers can invest in strategic similarity and CER operations with surplus funds, improving their businesses' ability to compete with rivals and execute environmental actions, thus improving company performance. The study's conclusions have important practical ramifications for comprehending how CER and company performance are related. The link between CER and business performance is more complicated than a straightforward, direct relationship, so managers must first understand it. Through strategic similarity, CER indirectly impacts company performance; this impact is larger when organizational slack is high. Managers should thus consider this while making CER-related decisions. In order to handle stakeholder pressure and keep up with rivals in the market, managers should engage in CER activities that lead to a strong similarity. Strategic similarity helps organizations achieve legitimacy and sustain a competitive position in the market while enhancing company performance in a complicated environment with significant CER demand from stakeholders. Third, managers should invest in strategic similarities and support CER initiatives by efficiently using organizational slack. As a result, businesses will be better able to compete with one another, engage in environmental initiatives, and ultimately perform better overall. Finally, to increase firm performance, managers should be aware of the

complicated link between CER and business performance and take some action to engage in CER activities and lead to a strong similar while efficiently employing organizational slack to support these efforts.

6. Conclusion and future works

This study is one of the first empirical investigations into how organizational slack and strategic similarity interact to explain the link between CER and company performance. Practically speaking, the findings offer insightful information for company managers and executives intending to implement CER policies that will improve the quality of the environment and long-term environmental strategy. The study's findings also add to the knowledge of CER and sustainability in emerging and developing economies. Future studies in this field can be framed under the suggested moderated mediation paradigm.

As a result of examining the relationship between corporate environment protection responsibility (CER) and business performance, this study developed a moderated mediation model of strategic similarity and organizational slack. The research's findings make numerous significant contributions to the body of knowledge on CER and company performance. First, the study discovered that CER had no direct impact on business performance, indicating that there may be more complexity in the link between CER and firm success than was previously believed. The study also put forth an integrated mediation and moderation framework to further investigate the connection between CER and business operations. Second, the study discovered that CER influences business performance through strategic similarity in an indirect manner. This study emphasizes the significance of strategy similarity in the link between CER and business performance and implies that firms should pursue strategy similarity and engage in CER activities to manage stakeholder pressure and stay up with rivals in the market. Third, the study discovered that organizational slack serves as a "buffer" to help businesses adapt to environmental change by giving them more resources to support CER initiatives and improve their ability to keep up with rivals in the market.

The drawbacks of this study are numerous, however. First, because it only uses data from listed Chinese firms over the previous three years, the impact of CER on company performance over the long term needs to be fully understood. Long-term panel data should be utilized in future studies better to explore the relationship between CER and company success. Second, because environmental and social concerns are so prominent in China's economic environment, there is significant demand from stakeholders and rivals for legitimacy and competitive advantage. Therefore, it is suitable for this study to explore how CER affects company performance in such a setting. Future studies should, however, apply these findings broadly across nations and cultural situations. Last but not least, it would be advantageous for future research to do a cross-industry study, given that industry-specific characteristics may influence the association between CER and business operations.

Future research could expand on this study by exploring the moderating effect of organizational slack further. Additionally, it could be useful to investigate the moderating effect of other variables such as the type of industry, the geographic location of the firm and the level of environmental regulation.

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