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Corporate Social Responsibility and Green Innovation: The Moderating Roles of Unabsorbed Slack Resources and Media Evaluation

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Abstract: Research on the relationship between corporate social responsibility (CSR) and green innovation has long been inconclusive. In this article, CSR is conceptualized as CSR conformity and CSR differentiation based on optimal distinctiveness theory, and their respective impacts on exploratory green innovation and exploitative green innovation are explored. The moderating effects of unabsorbed slack resources and media evaluation on these relationships are also investigated. Drawing on a dataset collected from manufacturing firms publicly listed on the Shanghai and Shenzhen stock exchanges in a period between 2011 and 2021, the results reveal the following: (1) CSR conformity has an inverted U-shaped relationship with exploratory green innovation; (2) CSR differentiation positively impacts exploitative green innovation; (3) unabsorbed slack resources positively moderate the relationship between CSR conformity and exploratory green innovation; (4) media evaluation positively moderates the relationship between CSR differentiation and green exploitative innovation. These findings enrich the understanding of CSR conceptualization, and also contribute to the application of optimal distinctiveness theory in the strategic management field.

Keywords: optimal distinctiveness; CSR conformity; CSR differentiation; green exploratory innovation; green exploitative innovation

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1. Introduction

Green innovation is an important pathway for an industrial transition toward clean and sustainable modes of operation and production. Due to the more disruptive and novel nature of green innovation [1,2], firms usually need to absorb external knowledge to meet the development and application needs of technologies in the context of open innovation. As a key way for firms to build relationships with multiple stakeholders, corporate social responsibility (CSR) is an important channel through which firms access external knowledge [3,4]; thus, theoretically, it should promote green innovation. However, current research on the association between CSR and green innovation is paradoxical: while some studies have found that CSR can positively contribute to green innovation [5,6], others have indicated that such CSR behaviors exacerbate agent costs, crowd out innovation resources, and hamper green innovation [7]. Therefore, this issue requires further exploration.

In previous studies, the impacts of diverse types of CSR on green innovation, such as proactive and reactive CSR [8,9], and internal and external CSR [10], were investigated in different ways. However, the essence of these classifications reflects two ends of a holistic concept, and it is difficult for them to capture the various CSR strategies. Optimal distinctiveness theory provides a way to address this problem: it states that the strategy of a firm should concern both conformity and differentiation to simultaneously achieve legitimacy and competitive advantage [11]. This theoretical framework has been applied in

recent CSR studies. For instance, Zhang et al. [12] subcategorized CSR into conformity and differentiation. CSR conformity captures the scope of stakeholder types covered by a focal firm and is associated with firm legitimacy. As a result of the distinct institutional logic of different stakeholders [13], there may be a risk of high agency costs [14]. CSR differentiation assesses the degrees of relationships with specific stakeholders and emphasizes the further reinforcement of the established core competitive advantage. This categorization contributes to the analysis of the aforementioned problem in terms of CSR connotation. Given the diverse strategic targets of CSR conformity and CSR differentiation, their impacts on green innovation may also differ. Therefore, additional study regarding the relationships between different types of CSR and green innovation is necessary.

Additionally, the paradox may also be influenced by contextual contingencies [15]. Drawing on contingency theory, the economics of a strategy usually depend on the resource endowment and external environment of a firm [16,17]. On the one hand, when a firm has abundant, flexible, and allocable resources, it tends to respond to uncertainty during the strategy implementation process, and ensures that the strategic results meet expectations [16,18]. On the other hand, the strategy practice of a firm, such as CSR and research and development (R&D), is usually accompanied by severe information asymmetry between managers and some stakeholders [19], which constrains the sustained investment of resources. It has been shown that the better the external evaluation, the better it can help minimize the information asymmetry between the firm and its stakeholders [17,20], thus enhancing the effectiveness of the strategy. Consequently, the boundary conditions of the relationship between CSR and green innovation are still under-researched when optimal distinctiveness theory is introduced in this study. Therefore, the following problems should be explored.

(1) Do different types of CSR have different impacts on green innovation?
(2) How do unabsorbed slack resources and media evaluation affect these relationships?

Our study aims to address these problems. First, CSR conformity and CSR differentiation are constructed based on optimal distinctiveness theory. Combined with ambidextrous innovation theory, the effects of the two types of CSR on exploratory and exploitative green innovation are respectively investigated. Second, unabsorbed slack resources and media evaluation are further introduced, and their moderating roles in the aforementioned relationships are examined. These ideas are tested by using a panel dataset of 572 manufacturing firms characterized by the disclosure of CSR reports; these firms were all listed on the Shanghai and Shenzhen stock exchanges from 2011 to 2021. Our findings enrich the understanding of CSR conceptualization and the relationship between CSR and green innovation, and also contribute to the application of optimal distinctiveness theory in the strategic management field.

2. Theoretical Background and Hypothesis Development

2.1. CSR and Green Innovation

Green innovation is defined as the development of new or improved products, processes, or technologies that benefit both the economy and the environment simultaneously [21,22]. Compared with regular innovation, green innovation relies on more diverse knowledge and the integration of more technological components, which is characterized by uncertainty and disruptiveness [1,23]. Therefore, green innovation depends on R&D cooperation with stakeholders and external knowledge sources in the context of open innovation [23,24]. Existing research suggests that interaction with external networks facilitates the acquisition of new knowledge and information [25,26]. Moreover, partnerships with external stakeholders can promote resource complementarity and improve the innovation performance of firms [27]. CSR, as a strategic practice for firms to build and manage relationships with various stakeholders [28], is a crucial pathway through which to acquire external knowledge. The extant research on CSR and green innovation mainly focuses on two broad streams.

One stream of studies rooted in stakeholder theory suggests that CSR can promote green innovation via healthy networks with stakeholders [5,6]. These networks not only contribute to access to external knowledge and resources, but also help to reduce the information asymmetry between managers and stakeholders [29]. Mao et al. [6] and Yuan et al. [30] verified this argument via a case study and empirical analysis, respectively. Conversely, some studies based on principal-agent theory state that managers excessively engage in CSR activities in pursuit of self-interest, such as social status or reputation; this over-consumes the costs of firms and consequently leads to the "crowding out" effect of innovation resources, thus negatively affecting green innovation [7].

Regarding this controversy, prior studies have examined the relationships between different types of CSR and green innovation at the conceptual level. However, these classifications are not conducive to the implementation of the strategic practice of CSR. The nature of CSR represents a comprehensive management philosophy, rather than a standardized norm, and often involves interactions with different stakeholders with complex characteristics [31]. In addition, different types of CSR that have distinct goals may have diverse influences on green innovation. Therefore, the association between CSR and green innovation requires a new perspective for explanation and examination.

2.2. CSR and Green Innovation from the Optimal Distinctiveness Perspective

Optimal distinctiveness theory originates from social philosophy, and argues that social identities should be viewed as a reconciliation of conformity and differentiation from others [11,32,33]. Subsequent studies extended this theory to the strategic management field, emphasizing both conformity and differentiation to simultaneously achieve legitimacy and competitive advantage [11,34]. Therefore, grounded in optimal distinctiveness theory and combined with the definition of CSR, CSR is classified as CSR conformity and CSR differentiation. Specifically, CSR conformity refers to the scope of stakeholder types involved with the CSR practice of a firm to obtain legitimacy. CSR differentiation refers to the degree of interaction with specific stakeholders to strengthen the core competitive advantage of firms [11,12,15].

Drawing on ambidextrous innovation theory, green innovation is categorized into exploratory green innovation and exploitative green innovation [16,35]. Exploratory green innovation refers to the environmental efforts made by firms toward the identification or generation of new knowledge that expands the current knowledge base through extensive linkages with stakeholders. Exploitative green innovation refers to environmental efforts made by firms toward the upscaling or improvement of the current knowledge base through intensive networks with specific stakeholders [36,37].

Based on optimal distinctiveness theory and organizational learning theory, it is assumed that CSR conformity may influence exploratory green innovation. First, when a firm implements more CSR conformity, it benefits the construction of external networks with various stakeholders [38]. Cutting edge and diversified knowledge can be obtained via these networks, which helps to broaden organizational learning paths and the breadth of knowledge reserves for firms [39–41]. Thus, it promotes exploratory green innovation. Second, when a firm associates with a wide range of stakeholders via CSR, it can capture more comprehensive market information to reduce the risk and uncertainty of exploratory green innovation [41,42]. However, excessive linkages with stakeholders may improve principal-agent costs and the risk of technology leakage [43]. Moreover, the limitation of the knowledge management ability and absorption capacity of firms may cause a waste of resources, which is not beneficial to exploratory green innovation [44]. Additionally, the impact of CSR conformity on exploitative green innovation is not significant. A possible reason for this is that the extensive acquisition of new external knowledge and information is not related to the existing technology and knowledge base of firms. Accordingly:

H1a. *CSR conformity has a nonlinear (inverted U-shaped) relationship with exploratory green innovation.*

It is also asserted that CSR differentiation can promote exploitative green innovation. The institutional logic and resource endowment of diverse stakeholders are different, resulting in differences in their interactions with firms [12]. Furthermore, given the scarcity of the resources of firms, they should focus on critical stakeholders, which would be more helpful for them to strengthen their core competitive advantage [45,46]. Therefore, the greater the CSR differentiation, the more communication between firms and certain stakeholders. The knowledge obtained from these networks can then better solve the existing green innovation bottlenecks of firms, and a synergistic effect can be achieved [42]. Moreover, close cooperation with critical stakeholders promotes the in-depth exploration of the core technology, facilitates strategic positioning in the market, and alleviates the uncertainty of exploitative green innovation [47]. In particular, the implementation of CSR differentiation can strengthen the existing technology field of firms, rather than necessitating that they search for various innovative components and knowledge, so its influence on exploratory green innovation is limited. Accordingly, the following hypothesis is put forward:

H1b. *CSR differentiation positively affects exploitative green innovation.*

2.3. The Moderating Roles of Unabsorbed Slack Resources and Media Evaluation

Firms manage, communicate, and collaborate with different types of stakeholders in the process of CSR [12,47]. They require not only flexible and allocable resources [48], but also positive external evaluations [49]. Therefore, the boundary conditions of the aforementioned relationships are primarily investigated from the perspectives of slack resources and media evaluation in this study.

Slack resources refer to the stock of excess resources accessible to a business within a certain planning cycle, and are a planned and strategic buffer to deal with competition [18]. In line with Suzuki [16], slack resources are divided into absorbed and unabsorbed slack resources. Absorbed slack resources are those that are distributed to particular usages, such as excess inventory and excess machine capacity. Unabsorbed slack resources are those that are excessive, liquid, more readily redeployable, and uncommitted; they are not assigned to any particular usages, such as cash and marketable securities. Considering that it is difficult for absorbed slack resources to provide timely support in the process of CSR practice, only the moderating role of unabsorbed slack resources is investigated.

Prior research has demonstrated that unabsorbed slack resources can effectively support strategy implementation in complex management scenarios. For example, Suzuki [16] found that unabsorbed slack resources could foster the collaborative development of exploratory and exploitative innovation. Ji et al. [50] also verified that unabsorbed slack resources can alleviate resource constraints in CSR practice to improve innovation performance. As considered in this study, the effect of CSR conformity on exploratory green innovation depends on the types of stakeholders covered by CSR, while the relationship between CSR differentiation and exploitative green innovation is influenced by the efforts of the interactions between firms and specific stakeholders [41]. When firms have sufficient unabsorbed slack resources, they can maintain stakeholder relationship networks and in-depth interactions with critical stakeholders [12]. Thus, they may promote the effects of both types of CSR on ambidextrous green innovation. The following hypotheses are therefore proposed:

H2a. *Unabsorbed slack resources steepen the curvilinear association between CSR conformity and exploratory green innovation.*

H2b. *Unabsorbed slack resources positively moderate the association between CSR differentiation and exploitative green innovation.*

Organizational external evaluation reflects the social attention and recognition of a firm [51]. Positive organizational external evaluations can help firms to better obtain

responses from stakeholders when implementing a strategic practice [28]. Among various external evaluation institutions, the media often plays a vital role as an information intermediary. Therefore, the moderating role of media evaluation is examined in this study.

According to signaling theory, the media can reduce information asymmetry between firms and stakeholders via its "information intermediary" and "external disciplining" functions [49,52]. On the one hand, when the media give more positive evaluations of a firm, it helps the firm to enhance its social reputation and the recognition of stakeholders [53]. Therefore, media evaluation can not only help firms establish connections with different types of organizations or stakeholders in CSR construction and further facilitate firms to build partnership networks, but can also deepen cooperation with key stakeholders. On the other hand, media evaluation can supervise firm information disclosure and reduce the information asymmetry between firms and stakeholders, such as investors [49]. More positive media evaluations can improve the financing ability of firms and reduce risks [54], which supports continuous investment in CSR construction. Accordingly:

H3a. *Media evaluation steepen the curvilinear association between CSR conformity and exploratory green innovation.*

H3b. *Media evaluation positively moderates the association between CSR differentiation and exploitative green innovation.*

The conceptual model is shown in Figure 1.

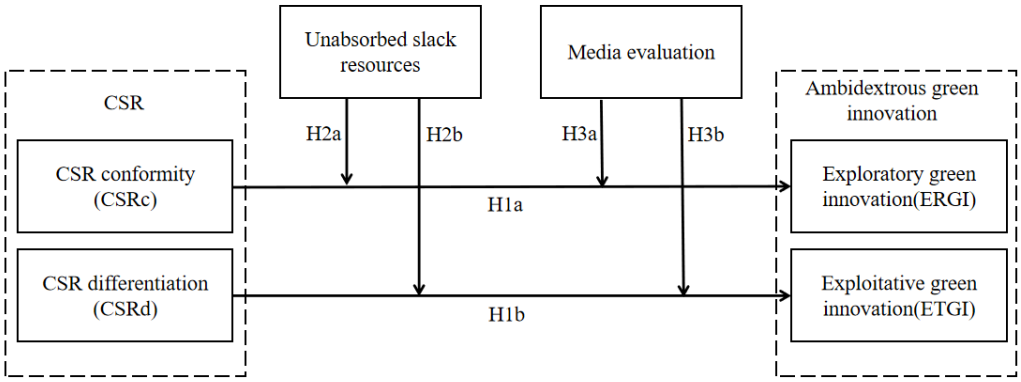


Figure 1. Conceptual model.

3. Method

3.1. Sample and Data

To test the hypotheses, a dataset was constructed based on a sample of manufacturing firms listed on the Shanghai and Shenzhen stock exchanges from 2011 to 2021. The dataset was assembled from multiple data sources by the following steps. First, an initial sample of 3165 firms based on the North American Industry Classification System (NAICS) codes 31, 32, and 33 was selected from the BvD-Osiris database, which contains financial information about publicly listed firms worldwide. Next, the initial sample was matched with the CSR information from the China Stock Market & Accounting Research (CSMAR) database, which collects CSR information on publicly listed firms in China. After this, 755 firms remained. Third, due to the 11-year observation period, firms with less than five years of CSR data were eliminated [48]. Additionally, firms marked as ST and *ST (Special Treatment) were excluded. The final sample included 572 firms. Finally, other data for empirical analyses were obtained from multiple databases, such as the Derwent World Patent Index (DWPI, the world's largest patent database) and the China Research Data Service Platform (CNRDS, a comprehensive data platform for economic, financial, and business research in China).

3.2. Measures

3.2.1. Dependent Variables: Exploratory Green Innovation (ERGI) and Exploitative Green Innovation (ETGI)

In line with prior studies [36], ERGI and ETGI were measured according to the International Patent Classification System (IPC). First, the patent information of sample firms was collected from the DWPI database. Then, based on the IPC green inventory issued by the World Intellectual Property Organization (WIPO), 77,362 green patents were identified. Next, following Ji et al. [9], the technological fields of green patents were classified by the top four digits provided by the IPC. If a technological field had not appeared in the patent application of a firm during the past five years (t − 1 to t −5), the technological field was considered a new field, and the green patent was recognized as exploratory green innovation; otherwise, it was considered exploitative green innovation. Moreover, once a technological field was identified as exploratory, all green patents in this technological field were identified as exploratory green innovation for the next three years. Python was used to obtain two types of green innovation, among which exploratory and exploitative green innovation accounted for 20.36% and 79.64%, respectively.

3.2.2. Independent Variables: CSR Conformity (CSRc) and CSR Differentiation (CSRd)

Based on Perez-Batres et al. [55], the CSR report from the CSMAR database contains the social activities of firms from the perspectives of eight different types of stakeholders, namely shareholders, creditors, employees, suppliers, customers, the environment, the community, and the government. CSR conformity is defined as the scope of stakeholder types involved in the CSR practice of a firm to obtain legitimacy. In line with Zhang et al. [12], CSR conformity was calculated as follows:

$$CSRc = \sum_{i=1}^{n} C_{it} CSRt_{it} \quad (1)$$

where $CSRc$ refers to CSR conformity, C_{it} refers to the network centrality of stakeholder type i at time t, and $CSRt_{it}$ refers to whether stakeholder type i is included in the CSR report of the firm at time t (yes = 1, no = 0).

Moreover, CSR differentiation is defined as the degree of interaction with specific stakeholders to strengthen the core competitive advantage of firms. Drawing on Zhang et al. [12], CSR differentiation was calculated as follows:

$$CSRd = \sum_{i=1}^{n} C_{it} |A_{it} - F_{it}| \quad (2)$$

where $CSRd$ refers to CSR differentiation, C_{it} refers to the network centrality of stakeholder type i at time t, and F_{it} is the effort that a firm puts into stakeholder type i at time t; specifically, it is calculated by the ratio of the number of items invested by the firm in stakeholder type i to the total number of items invested by the firm at time t. Finally, A_{it} is the average effort put into stakeholder type i at time t.

3.2.3. Moderating Variables: Unabsorbed Slack Resources (USR) and Media Evaluation (MJF)

According to a previous study [16], the current ratio was used to measure unabsorbed slack resources. Specifically, the indicator was calculated as the ratio of the current assets to the current liabilities of the firm. It was gathered from the BvD-Osiris database.

Following Zhou et al. [56], the Janis-Fadner (J-F) coefficient was employed to measure media evaluation. News reports about the sample firms were obtained from the CNRDS,

and included positive, neutral, and negative categories. Then, the J-F coefficient was calculated according to the following equation:

$$\text{J-F} = \begin{cases} (p^2 - pn)/N^2 \; p > n \\ (np - n^2)/N^2 \; p < n \\ 0 \; p = n \end{cases} \quad (3)$$

where p indicates the number of positive news reports, n indicates the number of negative news reports, and N refers to the total number of news reports. The J-F coefficient ranges from -1 to 1; the higher the value, the better the media evaluation received by a firm.

3.2.4. Control Variables

In the econometric models, the following set of variables that could have potential impacts on green innovation was controlled for [9,31]: (1) number of patent applications; (2) firm size; (3) firm age; (4) operating income growth rate; (5) R&D expenses. The number of patent applications was computed as the natural logarithm of the number of patent applications plus 1. The firm size was calculated by the natural logarithm of the number of employees plus 1. The firm age was calculated by the natural logarithm of the age of each firm plus 1. The operating income growth rate was measured by the ratio of the growth in the operating income of the firm in the current year to the total operating income of the prior year. R&D expenses were computed as the R&D expenditure divided by the total revenue. Additionally, to avoid the effects of unobservable factors, one-year-lagged dependent variables were also controlled for. Year and firm dummies were also controlled for to prevent the influences of economic cycles and firm characteristics.

These variables were gathered from the BvD-Osiris database and DWPI, and the missing items were supplemented by searching the annual financial reports of firms. Table 1 provides a summary of the measurements of all variables.

Table 1. Measurements of all variables.

Variables	Measurements	Data Sources
Exploratory green innovation (ERGI)	Ln (number of exploratory green patent applications + 1)	DWPI
Exploitative green innovation (ETGI)	Ln (number of exploitative green patent applications + 1)	DWPI
CSR conformity (CSRc)	Please refer to Equation (1) for details	CSMAR
CSR differentiation (CSRd)	Please refer to Equation (2) for details	CSMAR
Patent applications (FP)	Ln (number of patent applications + 1)	DWPI
Firm size (FS)	Ln (number of employees + 1)	BvD-Osiris
Firm age (FA)	Ln (firm's age + 1)	BvD-Osiris
Operating income growth rate (FBR)	$(\text{Operating income})_t - (\text{Operating income})_{t-1}/(\text{Operating income})_{t-1}$	BvD-Osiris
R&D expenses (RD)	R&D expenditure/total revenues	BvD-Osiris
Unabsorbed slack resources (USR)	current assets/current liabilities	BvD-Osiris
Media evaluation (MJF)	Please refer to Equation (3) for details	CNRDS
One-year lagged exploratory green innovation (L. ERGI)	ERGI_{t-1}	DWPI
One-year lagged exploitative green innovation (L. ETGI)	ETGI_{t-1}	DWPI

3.3. Model

Fixed-effects models were employed to analyze the effects of CSR on green innovation after the Hausman test. To test these hypotheses, we construct following models. Specifically, Equation (4) was used to examine H1a and H1b, and Equation (5) was used to examine H2a, H2b, H3a, and H3b.

$$GI_{it} = \beta_0 + \beta_1 CSR_{it} + \beta_k Controls_{i,t} + a_i + z_t + \xi_{it} \quad (4)$$

$$GI_{it} = \beta_0 + \beta_2 CSR_{it} + \beta_3 CSR_{it} * Moderator_{i,t-1} + \beta_k Controls_{i,t} + a_i + z_t + \xi_{it} \quad (5)$$

where GI_{it} denotes the dependent variables (i.e., ERGI and ETGI), CSR_{it} indicates the independent variables (i.e., CSRc and CSRd), $Controls_{i,t}$ indicates the control variables, $Moderator_{i,t-1}$ refers to the moderating variables, a_i is the firm fixed effect, z_t denotes the time fixed effect, ξ_{it} represents the standard residual term, and β is a coefficient. In addition, all variables within the interaction terms were standardized to prevent multicollinearity.

4. Results

4.1. Descriptive Statistics

Table 2 presents the descriptive statics and correlation matrix. It indicates that CSRc and ERGI are significantly correlated, and that CSRd is significantly correlated with ETGI, which initially supports the hypotheses. Moreover, most of the correlation coefficients between the variables were found to be less than 0.3, and the highest variance inflation factor (VIF) is 2.17, which is below the criterion of 10. Therefore, the influence of multicollinearity on the models can be ignored.

Table 2. Descriptive statistics and correlation matrix.

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10
1. ERGI	1.99	1.28										
2. ETGI	2.13	2.05	0.02									
3. CSRc	1.79	0.93	0.76 ***	0.03								
4. CSRd	0.50	0.25	0.02	0.32 ***	0.26 ***							
5. FP	3.52	1.86	0.20 ***	0.09 ***	0.10 ***	0.01						
6. FS	8.48	1.28	0.30 ***	0.15 ***	0.21 ***	0.06 ***	0.58 ***					
7. FA	2.88	0.35	−0.09 ***	0.03 *	0.05 ***	0.02	0.04 **	0.07 ***				
8. FBR	0.23	2.10	−0.01	0.01	−0.01	0.00	−0.01	0.03 *	−0.01			
9. RD	0.04	0.04	0.22 ***	0.01	−0.03	−0.04 **	0.22 ***	−0.14 ***	−0.10 ***	−0.04 **		
10. USR	2.21	3.54	0.26 ***	0.08 ***	−0.06 ***	0.02	−0.16 ***	−0.26 ***	−0.11 ***	−0.02	0.12 ***	
11. MJF	0.14	0.22	0.03 *	0.02	0.01	−0.01	0.18 ***	0.01	0.01	0.06 ***	0.11 ***	−0.03 *

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

4.2. Regression Analysis

Table 3 displays the empirical results for the effect of CSR on green innovation and the moderating role of unabsorbed slack resources and media evaluation. Particularly, Models 1–2 examine H1a. It shows that CSRc has no significantly linear relationship with ERGI in Model 1. The association between the quadratic term of CSRc and ERGI is negative and significant at the 10% level in Model 2. Therefore, CSR conformity has an inverted U-shaped relationship with exploratory green innovation. H1a is supported. Model 5 indicates that the relationship between a firm's CSRd and ETGI is positive and significant at the 5% level. H1b is supported.

Model 3 shows the moderating effect of unabsorbed slack resources on the relationship between CSRc and ERGI. The coefficient for the interaction term of USR and the quadratic term of CSRc is negative and significant at the 5% level. Unabsorbed slack resources steepen the inverted U-shaped curvilinear between CSRc and ERGI. Therefore, H2a receives empirical support. Model 4 reveals the moderating effect of media evaluation on the relationship between CSRc and ERGI. The interaction terms of MJF and CSRc have no significant association with ERGI. H3a is not supported. Models 6–7 show the moderating role of USR and MJF on the relationship between CSRd and ETGI. The coefficient for the interaction term of USR and CSRd is positive and insignificant. However, the coefficient for the interaction term of MJF and CSRd is positive and significant at the 5% level. Therefore, H2b is rejected and H3b is supported.

Table 3. Fixed-effects models predicting ERGI an ETGI and moderating effects (2011–2021).

Variables	ERGI				ETGI		
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
FP	0.284 ***	0.284 ***	0.284 ***	0.284 ***	0.349 ***	0.350 ***	0.350 ***
	(12.188)	(12.196)	(12.223)	(12.227)	(13.244)	(13.251)	(13.241)
FS	0.148 ***	0.151 ***	0.150 ***	0.150 ***	0.085 **	0.084 **	0.084 **
	(3.752)	(3.843)	(3.827)	(3.820)	(2.298)	(2.257)	(2.258)
FA	0.111	0.117	0.118	0.118	−0.228	−0.243	−0.244
	(0.475)	(0.495)	(0.495)	(0.495)	(−1.221)	(−1.297)	(−1.303)
FBR	0.004	0.004	0.004	0.004	−0.003	−0.003	−0.003
	(1.222)	(1.128)	(1.133)	(1.153)	(−0.699)	(−0.696)	(−0.693)
RD	1.545 *	1.468 *	1.473 *	1.461 *	0.876	0.896	0.895
	(1.876)	(1.787)	(1.799)	(1.783)	(1.066)	(1.086)	(1.085)
USR	0.004 *	0.004 *	−0.006 *	−0.007 *	0.005	−0.003	−0.003
	(1.739)	(1.729)	(−1.715)	(−1.727)	(2.168)	(−0.435)	(−0.438)
MJF	0.070	0.073	0.073	0.181	0.051 **	0.051 **	0.030 **
	(0.961)	(1.000)	(1.004)	(0.818)	(2.017)	(2.101)	(1.998)
L.ERGI	0.255 ***	0.255 ***	0.256 ***	0.256 ***			
	(9.143)	(9.183)	(9.218)	(9.215)			
L.ETGI					0.102 ***	0.102 ***	0.102 ***
					(3.869)	(3.871)	(3.872)
CSRc	0.017	0.116 *	0.124 *	0.129 *			
	(0.246)	(1.679)	(1.779)	(1.838)			
$CSRc^2$		−0.027 *	−0.031 *	−0.030 *			
		(−1.686)	(−1.855)	(−1.856)			
CSRd					0.385 **	0.383 **	0.393 **
					(2.205)	(2.245)	(2.247)
CSRc × USR			0.054	0.055			
			(0.652)	(0.664)			
$CSRc^2$ × USR			−0.012 **	−0.013 **			
			(−2.026)	(−1.994)			
CSRc × MJF				0.009			
				(0.567)			
$CSRc^2$ × MJF				−0.033			
				(−0.564)			
CSRd × USR						0.050	0.050
						(1.050)	(1.048)
CSRd × MJF							0.417 **
							(2.253)
Firm	YES	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES	YES
R2	38.55	38.62	38.63	38.64	33.22	33.23	32.23
N	2937	2937	2937	2937	2937	2937	2937

Notes: *t*-values in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

4.3. Robustness Tests

Two tests were conducted to check the robustness of the findings. First, the sample was categorized into three sub-samples based on NAICS codes 31, 32, and 33. I regression results are reported in Tables 4–6 The results support the main findings. Next, to avoid potential endogeneity problems arising from reverse causality, following Belderbos et al. [57], ERGI and ETGI in year t−1 were respectively regressed on two types of CSR in year t. Moreover, two types of green innovation in year t−1 were respectively regressed on the change of CSR ($CSRc_t - CSRc_{t-1}$; $CSRd_t - CSRd_{t-1}$). The results demonstrate that the coefficients of all regressions are insignificant ($p = 0.182$, $p = 0.361$ and $p = 0.457$, $p = 1.022$). Thus, it is believed that there is no endogeneity problem from potential reverse causality in the empirical analyses.

Table 4. Regression results for sub-sample (NAICS = 31).

Variables	ERGI		ETGI	
	Model 8	**Model 9**	**Model 10**	**Model 11**
$CSRc^2$	−0.039 *	−0.058 *		
	(−1.879)	(−1.905)		
CSRc	0.235	0.154		
	(1.155)	(0.802)		
CSRc × USR		0.108		
		(0.999)		
$CSRc^2$ × USR		−0.377 *		
		(−1.870)		
CSRc × MJF		−0.038		
		(−0.803)		
$CSRc^2$ × MJF		0.085		
		(0.494)		
CSRd			0.166 *	0.169 *
			(1.733)	(1.729)
CSRd × USR				0.571
				(1.364)
CSRd × MJF				0.095
				(0.950)
Controls	YES	YES	YES	YES
Firm	YES	YES	YES	YES
Year	YES	YES	YES	YES
R2	22.35	23.24	19.99	20.56
N	353	353	353	353

Notes: *t*-values in parentheses; * $p < 0.1$.

Table 5. Regression results for sub-sample (NAICS = 32).

Variables	ERGI		ETGI	
	Model 12	**Model 13**	**Model 14**	**Model 15**
$CSRc^2$	−0.020 *	−0.025 *		
	(−1.798)	(−1.814)		
CSRc	0.101 *	0.124 *		
	(1.713)	(1.750)		
CSRc × USR		0.042 *		
		(1.957)		
$CSRc^2$ × USR		−0.193 **		
		(−2.434)		
CSRc × MJF		0.008		
		(0.309)		
$CSRc^2$ × MJF		−0.031		
		(−0.315)		
CSRd			0.057 **	0.067 **
			(2.011)	(2.121)
CSRd × USR				−0.030
				(−0.323)
CSRd × MJF				0.083 *
				(1.852)
Controls	YES	YES	YES	YES
Firm	YES	YES	YES	YES
Year	YES	YES	YES	YES
R2	31.10	31.30	30.10	30.18
N	979	979	979	979

Notes: *t*-values in parentheses; ** $p < 0.05$, * $p < 0.1$.

Table 6. Regression results for sub-sample (NAICS = 33).

Variables	ERGI		ETGI	
	Model 16	**Model 17**	**Model 18**	**Model 19**
$CSRc^2$	−0.022 *	−0.029 *		
	(−1.759)	(−1.874)		
CSRc	0.082 *	0.090 *		
	(1.781)	(1.813)		
CSRc × USR		−0.047		
		(−1.355)		
$CSRc^2$ × USR		−0.230 **		
		(−2.083)		
CSRc × MJF		0.018		
		(0.789)		
$CSRc^2$ × MJF		−0.057		
		(−0.716)		
CSRd			0.115 **	0.127 **
			(2.105)	(2.324)
CSRd × USR				0.004
				(0.279)
CSRd × MJF				0.017 **
				(2.172)
Controls	YES	YES	YES	YES
Firm	YES	YES	YES	YES
Year	YES	YES	YES	YES
R2	45.60	45.84	36.34	36.24
N	1605	1605	1605	1605

Notes: *t*-values in parentheses; ** $p < 0.05$, * $p < 0.1$.

5. Discussion

Previous findings on the impact of CSR on green innovation are controversial, i.e., some scholars believe that CSR can promote green innovation, while others hold the opposite view. According to optimal distinctiveness theory and ambidextrous innovation theory, CSR was conceptualized as CSR conformity and CSR differentiation. It was argued that CSR conformity and CSR differentiation have heterogeneous impacts on ambidextrous green innovation. Using a multi-source heterogeneous dataset composed of manufacturing firms with the disclosure of CSR reports publicly listed on the Shanghai and Shenzhen stock exchanges from 2011 to 2021, this study explored how CSR affects green innovation, as well as the moderating effects of unabsorbed slack resources and media evaluation. The following findings were discovered,

First, CSR conformity has an inverted U-shaped relationship with exploratory green innovation. Based on the deconstruction of the complex connotation of CSR, we found that moderate linkages between firms and stakeholders facilitate exploratory green innovation in China. This result is consistent with prior studies, which conclude that the appropriate knowledge network constructed through CSR can maximize green innovation [41–44].

Second, CSR differentiation was found to have a positive effect on exploitative green innovation. This result is line with previous efforts, which argue that focusing on key stakeholders is helpful to exploitative green innovation. For instance, Loučanová et al. [58,59] found that the close relationships between building firms and customers benefit the development and application of environmentally friendly building materials.

Third, unabsorbed slack resources steepen the inverted U-shaped relationship between CSR conformity and exploratory green innovation. The result is in line with Suzuki [16] and Ji et al. [50], which indicates that unabsorbed slack resources can benefit firms' innovation. Our findings contribute to the relevant literature by revealing that unabsorbed slack resources can boost exploratory green innovation through the construction of stakeholder networks.

Fourth, media evaluation strengthens this relationship between CSR differentiation and exploitative green innovation. This result is consistent with previous studies [49,52], which suggest that media evaluation can contribute to CSR and green innovation of firms by reducing information asymmetry between firms and stakeholders. Our findings further prove that media evaluation is beneficial to the sustainable and green development of firms.

6. Conclusions

6.1. Theoretical Contributions

This work makes two contributions to the CSR and green innovation literature. First, it advances the understanding of CSR conceptualization and the relationship between CSR and green innovation rooted in optimal distinctiveness theory and ambidextrous innovation theory. Two types of CSR, i.e., CSRc and CSRd, were conceptualized, and their different effects on ambidextrous green innovation (ERGI and ETGI), were investigated. The findings reveal that controversial arguments about the association between CSR and green innovation may be the result of neglecting the analysis of the complex connotations of CSR. In particular, the empirical results confirm the view that CSR can promote green innovation by allowing the wide search for external knowledge from various stakeholders [40,41]. Furthermore, the findings support the research conclusion that excessive knowledge searching can hamper innovation due to the waste of resources [44]. Therefore, the results supplement the extant literature from the optimal distinctiveness perspective.

Second, this study enriches the boundary conditions of the relationship between CSR and green innovation by employing unabsorbed slack resources and media evaluation as the contextual factors. On the one hand, unabsorbed slack resources steepen the curvilinear relationship between CSRc and ERGI. This is consistent with the finding that unabsorbed slack resources can guarantee the resources for extensive networking and the exploration of external knowledge [16,18]. On the other hand, media evaluation positively moderates the impact of CSRd on ETGI. This finding verifies the view that media evaluation can alleviate information asymmetry between firms and stakeholders to help firms reduce agency costs and focus on their core competitive advantage.

6.2. Practical Implications

The findings may provide practical implications for managers and policymakers. First, the theoretical and empirical findings offer a possible direction for the practice of CSR. Firms should not only conform to the CSR norms formed by the formal and informal institutional environments, and appropriately explore and expand the relationship networks of different stakeholders, but should also combine specific CSR behavior with their own strategies based on their resource endowments to deepen their core competitive advantage. Second, the findings suggest that the government should create a healthy and well-organized market environment and encourage the "information intermediary" and "external disciplining" functions of the media to ensure the implementation of the strategic behavior of firms.

6.3. Limitations and Future Research

This research has the following two limitations. First, although the sample of Chinese manufacturing firms is typical, other countries and industries require more exploration to improve the applicability of these findings. Second, although the measurement of CSRd with good validity has been applied in previous studies, and considering that CSRd should have a richer connotation, it is recommended that future studies use big data analysis to enrich the measurement method of CSRd.

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