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The Impact of Policy Orientation on Green Innovative Performance: The Role of Green Innovative Capacity and Absorptive Capacity

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Green innovation has been recognized as a key factor for balancing environmental sustainability and financial growth. Although the literature has examined the impacts of policy orientation on green innovation, there are still outstanding issues to be addressed. On the one hand, existing studies have focused on the direct impact of environmental regulation or institutional pressure on green innovation, but fail to account for the issue of intermediate mechanisms between policy orientation and green innovations. On the other hand, there are inconsistent findings in the current empirical evidence on the impact of environmental policies on green innovation. Therefore, this study tries to address these research gaps by clarifying the internal mechanisms and boundary conditions between policy orientation and green innovation. Based on Porter's hypothesis and absorptive capacity perspective, this study explores the mediation effect of green innovative capability and the moderation effect of absorptive capacity in the relationship between policy orientation and green innovative capacity. To test the research model, we collected data from 359 Chinese green manufacturing companies. Our findings suggest that whether policy orientation has a significant positive effect on a firm's green innovation performance depends on the firm's absorptive capacity. In addition, green innovative capacity mediated the effect of policy orientation on green innovation performance. Furthermore, absorptive capacity strengthens this mediation effect. Therefore, we identified the mediating role of green innovative capacity and the moderating role of absorptive capacity between policy orientation and green innovation performance. Our findings theoretically enrich the literature on Porter's hypothesis and absorptive capacity perspectives and provide a reference for green innovation practices.

Keywords: policy orientation, green innovative performance, green innovative capacity, absorptive capacity, green economy

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INTRODUCTION

In recent years, economic growth and ecology are seriously threatened by the increasing environmental issues (Cao and Wang, 2017; Tang et al., 2018; Zhang et al., 2018). And as a result, the call for green innovation is becoming increasingly urgent (Zhang et al., 2019). Green innovation has been recognized as one of the key factors for balancing environmental sustainability and financial growth (Kunapatarawong and Martínez-Ros, 2016; Miao et al., 2017). It could not only

satisfy consumer needs and increase a firm's competitive advantage, but could also help to achieve environmental sustainability (Melander, 2018; Liao and Long, 2019). Thus, it is important to find the key predictor of green innovation in companies.

Policy orientation means that the government set some rules and standards that will limit and guide the direction of enterprises. Previous studies suggest that policy orientation has a crucial role in green innovation (Zhang et al., 2019; Fang and Sheng, 2021). Although a lot of research concentrate on the relationship between policy orientation and green innovation, the results in the literature are mixed and inconclusive. On the one hand, past research varied strength sizes of the positive association between policy orientation and green innovation (Rehfeld et al., 2007; Doran and Ryan, 2016; Zhang et al., 2019). For example, Porter and Van der Linde (1995a, 1995b) believe that environmental regulation may force industry innovation, to improve resource efficiency and productivity. Rehfeld et al. (2007) found that environmental policy, technology promotion, and market pull have a significant positive impact on green innovation. Zhang et al. (2019) also found that policy direction can drive the development of corporate green innovation. On the other hand, some studies found a negative association between policy orientation and green innovation (Lanoie et al., 2011; Borghesi et al., 2015). For example, Bernauer et al. (2007) believe that regulation has a negative impact on productivity and competitiveness, as it leads to increased spending by firms and imposes restrictions on industry behavior. Wang et al. (2018) found that policy orientation from the government enhanced the mounting pressure effect on companies' environmental actions. Tang et al. (2020) found that environmental regulation negatively affects the green innovation of firms in the short term. Thus, to address these research gaps, we need to clarify the internal mechanism between policy orientation and green innovation.

Given that policy orientation is an external force for green innovation, the green innovative capability is an internal force for green innovation (Chen, 2008). And past studies suggest that the green innovative capability can help improve a company's green image and increase its green innovation (Pujari, 2006; Chiou et al., 2011; Zhao et al., 2019). For example, Zhao et al. (2019) found that green innovative capability can effectively reduce the negative impacts caused by environmental pollution, and enable firms to control environmental risks more effectively, then achieve green innovation performance of firms (Zhao et al., 2019). This study therefore firstly focuses on the mediation effect of green innovative capability between policy orientation and green innovation.

Furthermore, Zhang et al. (2019) suggested the absorptive capacity as the serendipity of linking environmental regulation, knowledge adoption, and green innovation. Firms with high levels of absorptive capacity can increase their organizational flexibility and increase the likelihood of adapting to policy pressures (Zhang et al., 2019). Therefore, the study also tries to explore the moderation effect of a firm's absorptive capacity between policy orientation, green innovation capacity, and green innovation performance.

The current study proposes an integrated framework to explain the relationships among policy orientation, absorptive capacity, green innovative capability, and green innovation. Past studies indicate that green innovation is driven by a company's internal conditions as well as the legal requirement from the outside (Zhang, et al., 2020). Some studies explore outside factor such as policy orientation (Gerstlberger et al., 2014; Li et al., 2017); some research explores internal factors such as absorptive capacity (Zhang et al., 2019) and green innovative capability (Pujari, 2006; Chiou et al., 2011; Zhao et al., 2019). Though there is a lot of literature on policy orientation, green innovative capability, and absorptive capacity, the three concepts are seldom considered together. In this regard, this study tries to shed some light on this debate by arguing that some internal factors such as green innovative capability and absorptive capacity between policy orientation and green innovation.

The following contents are arranged as follows: **Section 2** provides the theoretical framework and research hypotheses. **Section 3** presents the methodology including samples, and questionnaires, and details how data were collected. **Section 4** describes the analysis of empirical results. Finally, the last section presents a discussion and conclusions including contributions, implications, limitations, and future research directions.

HYPOTHESIS DEVELOPMENT

Green Policy Orientation and Green Innovative Performance

According to the Porter hypothesis, "properly designed environmental standards can trigger innovation that may partially or more than fully offset the costs of complying with them (Porter et al., 1995a)," which means an effective environmental system will improve the green innovation level of employees and technology. Since the advent of the Porter hypothesis, environmental policies and green innovation of enterprises have attracted the attention of experts and scholars in the field of ecology. For example, Ambec and Lanoie (2007) collected and collated the production data of more than 4,000 enterprises in the international scope as the basis of analysis, and the results showed that environmental regulation can effectively realize the innovation of enterprises. Falck et al. (2010) suggested that cluster-oriented policy increased the likelihood of becoming an innovator in the target industries by 4.6–5.7 percentage points. Cao and Chen (2018) found that the coercive policy and incentive policy both have a significant positive impact on the green innovation strategy. Feng et al. (2018) indicated that political ties strengthen the positive impacts of internal environmental orientation on green product innovation and green process innovation while attenuating the positive impact of external environmental orientation on green process innovation. In addition, a green innovation policy may offer more financial support and preferential policies to deal with environmental issues (Lin et al., 2014). Thus, the firm with more political resources helps to achieve better green innovative capacity and green innovation performance. These lead to the following hypothesis:

H1a. Green policy orientation has a positive effect on green innovation performance.

H1b. Green policy orientation has a positive effect on green innovative capacity.

The Mediating Role of Green Innovative Capacity

Green innovative capability can be defined as "collective learning and competence about green innovation and environmental management" (Chen, 2008, p. 533), which can help improve a company's green image and increase its competitive advantage (Chiou et al., 2011). Past studies suggest that firms tend to implement more green strategies to comply with green policy orientation (Weng et al., 2015; Asadi et al., 2020). Green innovative capability is the core factor of green strategies which includes green technologies, green products, and green supply chain practices in firms (Chiou et al., 2011; Rosenbusch et al., 2011). Due to green innovative capability, which can effectively reduce the negative impacts caused by environmental pollution, and then achieve green innovation performance (Zhao et al., 2019). Researchers suggest that firms have to invest in developing green innovative capabilities to deal with the most environmental issues (Gökkaya and Kaya Özbağ, 2015).

Cao and Chen (2018) argue that firms lack the initiative to implement green innovation, but the pressure of policy can push their green innovation strategy. Green strategy requests organizations to improve their green innovative capability to achieve green innovation performance (Chiou et al., 2011; Rosenbusch et al., 2011). A recent study also shows that the green entrepreneurial orientation can lead to green innovation in small and medium-sized enterprises (Muangmee et al., 2021). According to Porter's hypothesis (Porter and Van der Linde, 1995a), an appropriate level of green innovative policy orientation can stimulate firms to actively engage in green innovation and thus enhance their green innovative capabilities. For firms, green innovative capacity development can lead to significant benefits and thus enhance their green innovative performance. Thus, we proposed:

H2. Green innovation capability mediates the relationship between green policy orientation and green innovative performance.

The Moderating Role of Absorptive Capacity

Cohen and Levinthal (1990) argue that while outside sources of knowledge are often critical to the innovation process, the ability to exploit external knowledge is thus a pivotal role of innovative capabilities. Then they define absorptive capacity as "the ability to recognize the value of new information, to assimilate it, and apply it to commercial ends" (Cohen and Levinthal, 1990). Zahra and George (2002) suggest that absorptive capacity includes potential and realized capacities, "potential capacity comprises knowledge acquisition and assimilation capabilities, and realized capacity centers on knowledge transformation and exploitation". Moreover, Jansen et al. (2008) expanded absorptive capacity into four processes consisting of "acquisition, assimilation, transformation, and exploitation". Many existing studies indicate that absorptive capacity boosts an organization's adaptation to institutional pressures through technology and management innovation (e.g., Lichtenthaler, 2009; Arfi et al., 2018; Mahmood and Mubarik, 2020; Müller et al., 2021; Siachou et al., 2021).

According to the knowledge spillover theory, absorptive capacity plays a moderating role in turning knowledge into economic outcomes by facilitating the commercialization of external knowledge (Qian and Jung, 2017). Qian and Jung (2017) point out that absorptive capacity is an effective mechanism to solve the knowledge filter problem, it has a moderating effect on the positive impact of new knowledge on regional economic development and innovation performance. Furthermore, recent studies also show that absorptive capacity has a positive impact on green innovation performance (e.g., Miguélez and Moreno, 2015; Smit et al., 2015; Zhang et al., 2020; Qi et al., 2021; Zhou et al., 2021). For example, Miguélez and Moreno (2015) argue that absorptive capacity critically enhances the influence of mobility and networks on innovation (Miguélez and Moreno, 2015). Smit et al. (2015) indicate that absorptive capacity is significantly related to a firm's green innovation output, and it has a much stronger effect than regular agglomeration externalities. Zhou et al. (2021) find a significant effect of green absorptive capacity on the relationship between organizational factors and green innovation in MEs. Qi et al. (2021) suggest that absorptive capacity has a moderating effect between institutional pressures and green technology innovation. Thus, absorptive capacity plays a key role in a firm's green innovation.

With green policy orientation, firms will allocate resources to address the environmental issues and develop their green practice and green capabilities (Lin et al., 2015; Li et al., 2018). However, a firm's response to green policy orientation through green innovative capacity relies on the capacity of assimilating information and knowledge (Sidhu et al., 2007; Brix, 2019). As mentioned before, absorptive capacity determines the extent to which knowledge flows influence green innovation (Miguélez and Moreno, 2015). Moreover, absorptive capacity helps firms to absorb knowledge through integration with internal processes, to promote green innovation (Lane and Lubatkin, 1998; Qi et al., 2021) Higher absorptive capacity levels that guarantee the sufficient comprehension and transformation of external knowledge (Zhou et al., 2021), then reinforce the relationship between green policy and green innovative capacity, therefore increasing the green innovation performance. Thus, we postulate the following hypotheses:

H3a. Absorptive capacity positively moderates the relationship between green policy orientation and green innovative capacity.

H3b. Absorptive capacity positively moderates the relationship between green policy orientation and green innovation performance.

H3c. Absorptive capacity positively moderates the indirect effect of green innovative capacity between green policy orientation and green innovation performance.

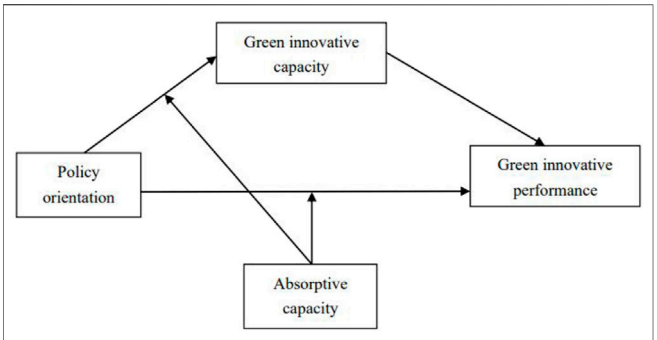

FIGURE 1 | Conceptual model.

THE THEORY MODEL

In summary, this study aimed to investigate the influence of policy orientation on green innovation performance and mediating role of green innovative capacity, and the moderating role of absorptive capacity. An overview of the research proposed model is shown in **Figure 1**.

METHODOLOGY

Sample and Data Collection

The study uses a database of Chinese green manufacturing firms, which are established by the Ministry of Industry and Information Technology of the People's Republic of China. The study collected information by self-administered electronic questionnaires through Wenjuanxing (a platform that provides the functional equivalent of Amazon Mechanical Turk). Each survey was sent to the firm's senior manager by e-mail. Everyone can receive a money reward after they finished the questionnaire. From May 2020 to July 2020, we randomly distributed 600 questionnaires in totality, of which 370 finished the survey, 359 valid questionnaires were finally included in the analysis after eliminating the invalid questionnaires such as missing data.

Measures

Policy Orientation

We followed Peng (2013) and assessed the firm's policy orientation using seven items, which were adopted from Falck et al. (2010), and Acedo and Jones (2007). Sample items such as "The government sector provides effective incentives in the process of entrepreneurial financing." Respondents were given their answers on a 7-point scale from "1 = strongly disagree" to "7 = strongly agree". Cronbach's alpha of this scale was 0.76 in this study.

Absorptive Capacity

We measured the absorptive capacity by four items from Guo and Wang (2014). Sample items such as "our firm can quickly absorb, master, and utilize equipment and production processes acquired from outside". Respondents rated their answers based on a 7-point scale ranging from "1 = strongly disagree" to "7 = strongly agree". Cronbach's alpha of this scale was 0.75 in the current study.

Green Innovative Capacity

We assessed the firm's green innovative capacity using a nine items scale adopted from Chiou et al. (2011). Sample items include "Using less or non-polluting/toxic materials.". Respondents rated their answers based on a 5-point scale from "1 = strongly disagree" to "5 = strongly agree". Cronbach's alpha of this scale was 0.76 in the study.

Green Innovative Performance

We measured the firm's green innovative performance by eight items adopted from Chen et al. (2006). Sample items such as "The company chooses the materials of the product that produce the least amount of pollution for conducting the product development or design." Respondents rated their answers on a 5-point scale ranging from "1 = strongly disagree" to "5 = strongly agree". Cronbach's alpha of this scale was 0.74 in this study.

Control Variables

We also added employee position, firms size (number of employees), firms age (year of firm establishment), and industry type as control variables. The basis for introducing these control variables is because firms might not have the

TABLE 1 | Background of respondents and firms.

Respondents profile	Frequency	Percentage (%)
Position		
senior managers	8	2.2%
middle managers	124	34.5%
grassroots managers	140	39%
general employees	87	24.2%
Firm size		
1–10	0	0
10–100	53	14.8%
100–300	120	33.4%
300–1,000	104	29%
1,000–2000	32	8.9%
More than 2000	50	13.9%
Firms age		
1–3 years	7	1.9%
3–5 years	33	9.2%
5–10 years	114	31.8%
10–15 years	91	25.3%
15–20 years	48	13.4%
More than 20 years	66	18.4%
Industry types		
Pharmaceutical industry	18	5%
Chemical industry	28	7.8%
Mechanical industry	111	30.9%
Light industry	43	12%
Car industry	20	5.6%
Colored industry	3	0.8%
Building materials industry	25	7%
Food industry	21	5.8%
Electronic industry	67	18.7%
Metallurgical industry	6	1.7%
Others	17	4.7%

TABLE 2 | Results of confirmatory factor analysis of the measurement models.

Measurement models	χ2 (df)	Δ χ2	*CFI*	*IFI*	*RMSEA*
Baseline model: four-factor	660.04 (344)***	—	0.88	0.88	0.05
Model 1: three-factor[a]	737.84 (347)***	77.80 (3)***	0.85	0.85	0.06
Model 2: three-factor[b]	756.34 (347)***	96.30 (3)***	0.84	0.84	0.06
Model 3: two-factor[c]	738.29 (349)***	78.25 (5)***	0.85	0.85	0.06
Model 4: A one-factor	912.74 (350)***	252.70 (6)***	0.78	0.78	0.06

N = *359.* ***p < *0.001.*

[a]*Policy orientation and absorptive capacity were combined into one factor.*

[b]*Absorptive capacity and green innovative capacity were combined into one factor.*

[c]*Policy orientation and absorptive capacity were combined into one factor. Absorptive capacity and green innovative capacity were combined into one factor.*

TABLE 3 | Descriptive statistics and correlations.

Variable	Mean	SD	1	2	3
1 Policy orientation	5.43	0.72	—	—	—
2 Absorptive capacity	5.41	0.93	0.55**	—	—
3 Green innovative capacity	3.99	0.53	0.45**	0.56**	—
4 Green innovative performance	3.93	0.54	0.47**	0.55**	0.76**

N = *359.* *p < *0.05;* **p < *0.01.*

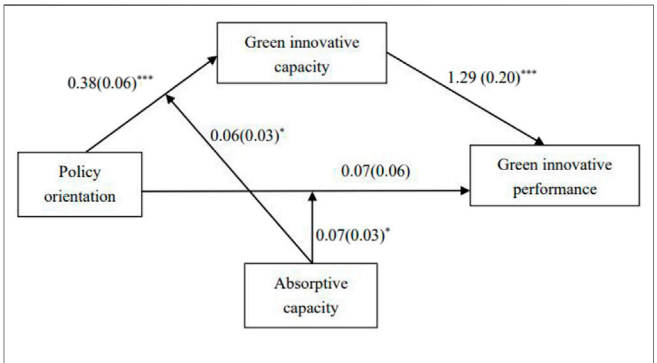

FIGURE 2 | Results of structural model.

power and experience of the same resources, which impacts environmental innovation development from the company to other ones (Makhloufi et al., 2022). The detailed background of the firms can be found in **Table 1**.

RESULTS

Common Method Bias Analysis

Firstly, we used a confirmatory factor analysis (CFA) to assess the construct validity and test the common method bias in the data reported by participants (Podsakoff et al., 2003). As shown in **Table 2**, the four-factor model meets the requirements and is significantly better than other models, the model fit indices are χ^2 = 660.04, *df* = 344, *CFI* = 0.88, *IFI* = 0.88, *RMSEA* = 0.05. This suggests that the measurement model is acceptable.

Descriptive Statistics Analysis

We run the correlations analysis by using the statistical software SPSS 21.0. Descriptive statistics including the means, standard deviations, and correlation coefficients are shown in **Table 3**. As expected, policy orientation was positively related to green innovative capacity (r = 0.45, p < 0.01), and green innovative performance as well (r = 0.47, p < 0.01). Additionally, green innovative capacity and green innovative performance were also positively related (r = 0.76, p < 0.01).

Structural Model Analysis

We used AOMS 24.0 for structural equation model testing. The structural path in **Figure 2**; **Table 4** showed a non-significant relationship between policy orientation and green innovative performance (β = 0.07, *ns*), H1a is unsupported. Additionally, the effect of policy orientation on green innovative capacity (β = 0.38, p < 0.001) was positive and significant. Hence, H1b is supported. Likewise, the moderating effects of absorptive capacity on green innovation capacity (β = 0.06, p < 0.05) and green innovation performance (β = 0.07, p < 0.05) are respectively significant, H3a, and H3b are supported.

Mediation Effect Analysis

Green innovative capacity's mediation effect between policy orientation and green innovative performance was assessed by using Preacher and Hayes's (2004, 2008) approach and using the bootstrapping procedure to test the indirect effect as suggested in the literature. The result presented in **Table 5** shows that policy orientation's indirect effect on green innovative performance has a beta value of 0.12 and t value of 4.26, respectively. As recommended by (Hair et al., 2013), the variance accounted for (VAF) that determines the indirect effect size in relation to the total effect was calculated. As shown in **Table 6**, the VAF = direct effect/total effect has a value of 0.1246/0.5359 = 0.2325, indicating that 23.25% of green policy orientation effect on green innovative performance is explained via the existence of the mediation effect of green innovative capacity. Since the VAF is greater than 20% but less than 80%, inferring that green innovative capacity partially mediates this relationship. Thereby H2 is supported.

Moderation Effect Analysis

To test absorptive capacity's moderation effect, the study applied a product indicator approach by (Henseler and Fassott, 2010) to assess the strength of the moderation effect of absorptive capacity. **Table 7** details that the positive interaction between absorptive

TABLE 4 | Results of structural model analysis.

Hypotheses	Relationships	Beta	SE	*z* (CR)	*p* value	Decision
H1a	policy orientation- > green innovative performance	0.07	0.06	1.15	0.25	Unsupported
H1b	policy orientation- > green innovative capacity	0.38	0.06	5.92	0.00	Supported
H3a	policy orientation*absorptive capacity- > green innovative capacity	0.06	0.03	2.09	0.04	Supported
H3b	policy orientation*absorptive capacity- > green innovative performance	0.07	0.03	2.39	0.02	Supported

Significant at 0.01(two-tailed tests).

TABLE 5 | Indirect effects in the mediation model.

Hypotheses	Relationships	Beta	t value	*p* value	LLCI	ULCI	Decision
H2	policy orientation- > green innovative capacity- > green innovative performance	0.12	4.26	0.00	0.07	0.18	Supported

Significant at 0.01(two-tailed tests).

TABLE 6 | Variance accounted for (VAF) of green innovative capacity.

Independent variable	Mediator variable	Dependent variable	Indirect effect	Total effect	VAF (%)
Policy orientation	Green innovative capacity	Green innovative performance	0.1246	0.5359	23.25

TABLE 7 | Results of moderation effect of absorptive capacity.

Hypotheses	Relationship	Beta	t value	*p* Value	Decision
H3a	absorptive capacity*policy orientation- > green innovative capacity	0.07	2.41	0.02	Supported
H3b	absorptive capacity*policy orientation- > Green innovative performance	0.09	3.73	0.00	Supported

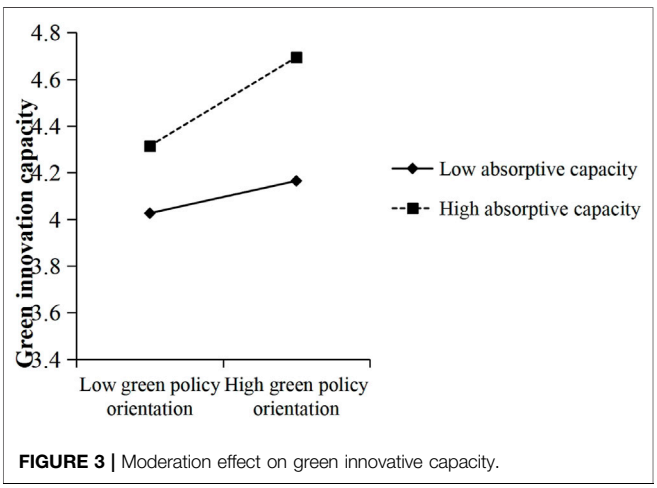

FIGURE 3 | Moderation effect on green innovative capacity.

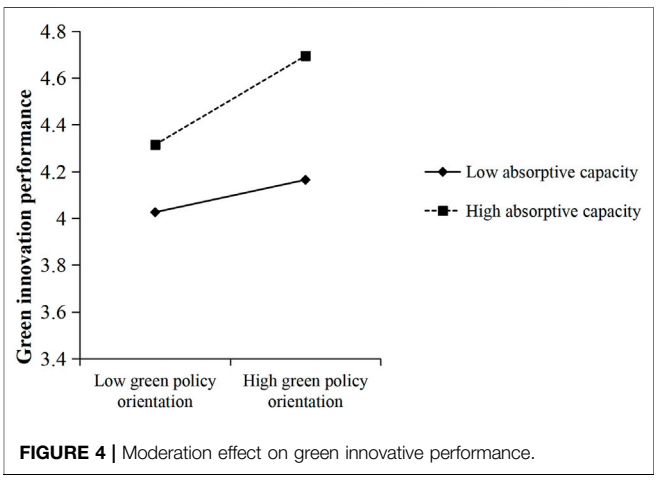

FIGURE 4 | Moderation effect on green innovative performance.

capacity and policy orientation ($\beta = 0.07$, $t = 2.41$, $p < 0.05$) on green innovative capacity was statistically significant, conjecturing that absorptive capacity strengthens the relationship between policy orientation and green innovative capacity. Hence H3a is supported (**Figure 3**). Likewise, the positive interaction between absorptive capacity and policy orientation ($\beta = 0.09$, $t = 3.73$, $p < 0.001$) on green innovative performance was statistically significant, conjecturing that absorptive capacity strengthens the relationship between policy orientation and green innovative performance. Therefore, H3b is supported (**Figure 4**).

Finally, we conducted a test for the moderated mediating effect. We used the PROCESS 3.0 program in SPSS 21.0 (Model 8, bootstrapping = 5,000; Preacher and Hayes, 2004, 2008) to calculate bias-corrected confidence intervals for moderated mediation, assessing whether absorptive capacity moderates policy orientation after excluding the

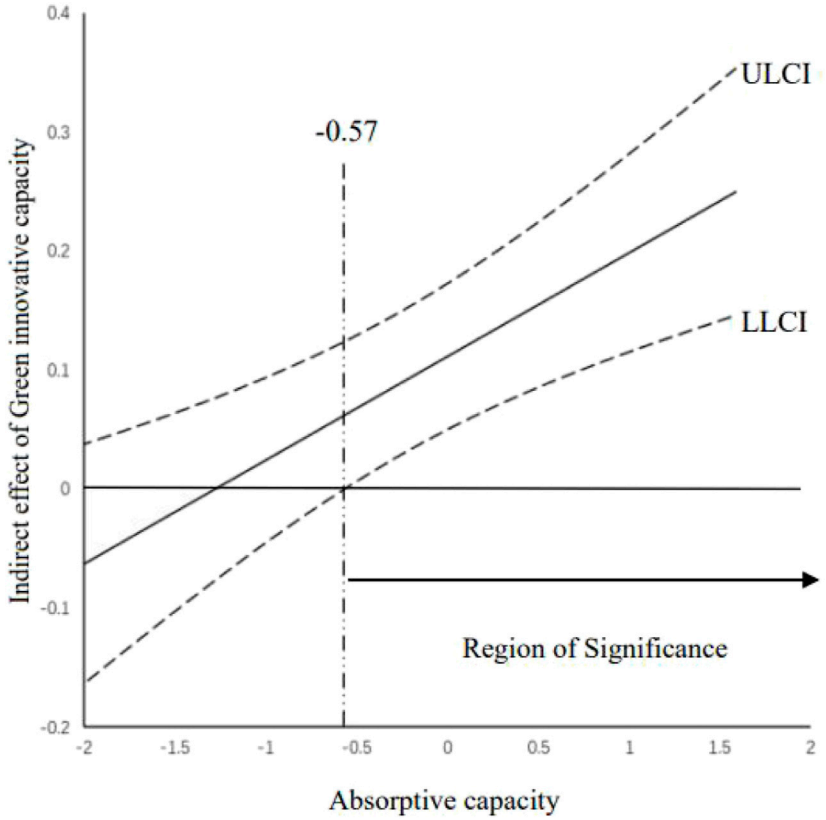

FIGURE 5 | The Moderated mediation effect (95%CI).

effects of other control variables. The analysis shows that absorptive capacity has an indirect effect on green innovative performance through green innovative capacity. The 95% bias-corrected confidence interval (0.1063, 0.2629) indicates that at high absorptive capacity, policy orientation through green innovation capacity can positively and significantly affect green innovation performance (β = 0.18, p < 0.001), but at low absorptive capacity and this positive indirect effect is not significant (β = 0.03, 95% confidence interval (-0.0356, 0.0996), see more details in **Table 7**; **Figure 5**. Thus, H3c was supported.

DISCUSSION

Green innovation has been increasingly recognized by academics and policymakers as a critical method for balancing environmental sustainability and financial growth (Kunapatarawong and Martínez-Ros, 2016; Miao et al., 2017). It is certainly interesting whether the green innovation can be improved by the policy orientation. From the perspective of Porter's hypothesis (Porter and Van der Linde, 1995a; 1995b) and absorptive capacity (Cohen and Levinthal, 1990), this study introduced the green innovative capacity and absorptive capacity as two key factors in the relationship of policy orientation and green innovation performance.

The findings from the current study have great important contributions to the increasing literature on the environmental issues and potential policy interventions to boost firms' green innovation and sustainability. Firstly, this study explores the impact of policy orientation on green innovation, and the results suggest that whether policy orientation promotes green innovative performance depends on a firm's absorptive capacity. Only in the condition of a high level of absorptive capacity, the policy orientation can effectively improve green innovation performance directly. This finding clarifies the inconsistent findings regarding the relationship between policy orientation and green innovation in the previous literature (such as positive association, Chiou et al., 2011; Pujari, 2006; Zhao et al., 2019; or negative association, Borghesi et al., 2015; Lanoie et al., 2011).

Secondly, the study validates the mediating mechanism of green innovative capacity between policy orientation and green innovation performance. According to past studies (Chiou et al., 2011; Rosenbusch et al., 2011; Zhao et al., 2019), green innovative capacity help to reduce negative impacts and enhance green innovation performance. However, the role of green innovative capacity between policy orientation and green innovation performance is newfangled. The results show that green innovative capacity plays a mediator role between policy orientation and green innovation performance. In other words, policy orientation can lead to the green innovative capacity to improve a firm's green innovation performance. This finding

enriches the existing theoretical pathways from policy orientation to green innovation performance.

Finally, the current study also identifies the moderating role of a firm's absorptive capacity between policy orientation and green innovation capacity. In other words, a firm's absorptive capacity can be beneficial for the firm's green innovative capacity and green innovation performance. Since absorptive capacity was proposed (Cohen and Levinthal, 1990), a great many studies have proved the positive impact of absorptive capacity on green innovation performance (e.g., Miguélez and Moreno, 2015; Smit et al., 2015; Zhang et al., 2020). However, only a few studies have explored the moderate effect of absorptive capacity between organizational factors and green innovation (Qi et al., 2021; Zhou et al., 2021). Therefore, this study clarifies the moderating role of absorptive capacity among policy orientation, green innovative capacity, and green innovation performance, expanding the sphere of influence of the absorptive capacity more comprehensively and systematically.

The study has also the following practical insights. First, according to the policy orientation, firms should fully understand the policy and adjust their work orientation to reduce the uncertainty of green innovation. In addition, the green innovative capability is the mediating mechanism between policy orientation and green innovative performance. Green innovative performance can only be improved by improving its green innovative capability. Therefore, enterprises need to focus on the development of their green innovative capability and improve it by cultivating green innovation talents and strategies. Furthermore, absorptive capacity is a key variable for the impact of policy orientation on green innovation. By establishing an enterprise absorptive capacity system, enterprises can proactively respond to external policy pressures and internal organizational green innovation learning capabilities to accelerate the pace of green innovation.

LIMITATIONS AND FUTURE RESEARCH

This study inevitably has some limitations that need to be further explored. First, we adopted a single-stage measurement, the variables were all self-assessed by the employees, future research can adopt a multi-stage measurement method or leader-employee paired multiple-source method or use the second hands data to avoid common method bias. Meanwhile, longitudinal follow-up studies can also be added, which can better reflect the causal relationship between variables. Second, the sample of this study is mainly concentrated in South China, and the applicability of the findings to other regions is yet to be verified. Third, this study focused on the underlying mechanisms of the influence of policy orientation on a firm' green innovative performance but neglected some moderating factors that may influence the degree of influence of policy orientation on a firm' green innovative performance. Thus, future research could further explore the boundary conditions that influence the relationship between policy orientation and green innovative performance.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusion of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Jinan University Management School Research Committee. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

BL and WL designed the study. YL and MH collected the data. BL and YL analyzed the data and draft the manuscript. YL, MH, and BL participated in the interpretation of the data. BL, YL, and WL revised the manuscript.

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