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How Green Entrepreneurial Orientation leads to Business Success? A Resource Base and Resource Dependency Perspectives

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Abstract

This study investigates the impact of Green Entrepreneurial Orientation (GEO) on firm performance through green innovation and green entrepreneurship image with the moderating influence of green value co-creation. In recent years, the incorporation of sustainability and entrepreneurship into company plans has gained significance, and understanding the processes through which these aspects effect firm outcomes is critical.

This study employed survey methodology to collect data from the Chinese manufacturing firms. The analysis was done on 383 finalized responses through SPSS and AMOS. The findings show that GEO has a positive impact on firm performance through green innovation and green entrepreneurship image. Furthermore, green value co-creation moderates the relationship between GEO and green innovation, suggesting the importance of external stakeholders in facilitating the firm GEO.

This study emphasizes the multidimensional nature of the link between GEO and firm performance, emphasizing the significance of taking both mediating and moderating factors into account. It adds to the growing body of knowledge on sustainability, entrepreneurship, and corporate success by offering a comprehensive framework that captures the subtle interplay of these elements. The findings have implications for firms looking to capitalize on the benefits of GEO and green innovation while also acknowledging the need of collaborative value co-creation in gaining long-term competitive advantage.

Keywords: Green Entrepreneurial Orientation, Green Innovation, Green Entrepreneurship Image, Green Value Co-Creation

Introduction

As environmental challenges escalate, posing increasing threats to economic development, businesses are increasingly recognizing the significance of human health and living conditions as integral components of their core activities (Leonidou, Christodoulides, Kyrgidou, & Palihawadana, 2017; Waheed, Zhang, Rashid, Tahir, & Zafar, 2020). This heightened awareness extends beyond the private sector, as governments and academia are also intensifying their efforts to address environmental issues and combat environmental degradation (Sun, Zeng, Chen, Meng, & Jin, 2019). Consequently, recent research has stressed the pivotal role of green entrepreneurial orientation (GEO) in mitigating environmental consequences while simultaneously enhancing firm performance (Chen, Shen, Qiu, Liu, & Mardani, 2023; Makhloufi, Laghouag, Meirun, & Belaid, 2022; Momayez, Rasouli, Alimohammadirokni, & Rasoolimanesh, 2023). Through the creation and marketing of eco-friendly goods and services, GEO exemplifies a strategic propensity toward seeking possibilities that result in both economic and ecological advantages (Makhloufi et al., 2022).

In recent times, although, the primary drivers of green entrepreneurship and its advantages (such as their positive effects on the economy, the environment, and society) have been discussed in earlier studies (Gast, Gundolf, & Cesinger, 2017), it is uncertain how GEO affects business performance. We still lack a thorough knowledge of the circumstances in which GEO affects firm performance. While some studies (Shrivastava & Tamvada, 2019) imply that the provision of green goods and services, a tangible-external greening approach, has a detrimental impact on business success, others (Jiang, Chai, Shao, & Feng, 2018; Makhloufi et al., 2022; Pratono, Darmasetiawan, Yudiarso, & Jeong, 2019) explain how green entrepreneurship has a beneficial influence on firm performance. Some even claim that the promotion of green entrepreneurship is not properly linked to financial advantages. (Mrkajic, Murtinu, & Scalera, 2019; Nikolaou, Ierapetritis, & Tsagarakis, 2011) and firm growth (Leoncini, Marzucchi, Montresor, Rentocchini, & Rizzo, 2019).

Consequently, according to scholars (Coelho, Ferreira, & Proença, 2023; Ishaq, Sarwar, Aftab, Franzoni, & Raza, 2023; Majali, Alkaraki, Asad, Aladwan, & Aledeinat, 2022), further study is necessary to fully understand how GEO effects company performance through green innovation.

As the growing use of green innovation by businesses as a means of achieving long-term competitive advantages emphasizes the necessity of comprehending the fundamental elements propelling this adoption. In his regard, previous studies have mostly concentrated on external factors, such as meeting customer needs (Xie, Abbass, & Li, 2024), keeping up with industry technical standards and regulations (Yuan & Xiang, 2018; Zhou, Hong, Zhu, Yang, & Zhao, 2018), reacting to competition (Weng, Chen, & Chen, 2015), and living up to social expectations (Bossle, de Barcellos, Vieira, & Sauvée, 2016). However, Zhou et al. (2018) argue that these exogenous factors do not explain early adoption trends or really propel the adoption of green technologies. To elucidate the conditions and underlying processes that might explain the relationship between GEO and firm performance, more research is required (Ameer & Khan, 2022; Silva, Gomes, Carvalho, & Geraldes, 2021). The distinct contribution of green innovation to this gap is still understudied, but it has a great deal of explanatory potential (Majali et al., 2022), particularly through EO-induced learning and creativity (Shehzad, Zhang, Latif, Jamil, & Waseel, 2023).

Furthermore, academics acknowledge that innovation-related activities are the primary cause of a firm's growth (Tang, Walsh, Lerner, Fitza, & Li, 2018). However, because of environmental concerns, the idea of green entrepreneurship image might progress the existing trend of corporate operation in connection to green innovation (Guan, Ahmad, Rahman, & Halim, 2020). Businesses are realizing that implementing green technologies may help them expand into new areas, enhance their reputation, and acquire a competitive edge (Leonidou et al., 2017; Tomczak et al., 2018). Additionally, businesses that reduce waste in manufacturing, boost output, and improve their reputation for green entrepreneurship might eventually improve their corporate competitiveness (Guan et al., 2020). Hence, by fostering a positive perception of green entrepreneurship, green innovations can provide a way for businesses to stand out from one another.

Therefore, the time is ripe to explore further factors to better understand the GEO-performance link. Consequently, a particularly important and under-researched aspect of this subject is the mediating roles of green innovation along with green entrepreneurship image. According to the resources-based view (RBV), a firm has a competitive advantage because of its special resources and talents (Bertram & Bertram, 2016; Madhani, 2010). According to this viewpoint, a company’s commitment to green entrepreneurship may be considered as a differentiating quality that fosters green innovation and builds the firm’s reputation for green entrepreneurship. In turn, they

contribute to better corporate performance. As a result, there is a compelling need for research that looks into how green innovation and a positive green entrepreneurship image serve as conduits via which GEO contributes to overall company performance.

Furthermore, while some research has looked at the direct association between GEO and green innovation (Guo, Wang, & Chen, 2020; Shehzad et al., 2023; Wang, Zhang, & Teng, 2023; Xiue & Qing, 2021), we still do not know how contextual variables impact this relationship. The moderating role of green value co-creation is one such component with significant potential for influencing this connection. In the context of sustainability, existing research has underlined the importance of joint value creation activities between enterprises and external stakeholders (Yousaf, 2021). A thorough examination of how green value co-creation moderates the relationship between GEO and green innovation, on the other hand, is noticeably lacking from the literature. According to resource dependence theory (RDT), companies rely on external resources, which necessitates a variety of strategic activities to manage these dependencies. Green value co-creation entails harnessing the skills and resources of external partners to achieve long-term results. Because GEO impacts resource strategic use (Yousaf, 2021), the moderating effect of green value co-creation may give insight on how this relationship changes green innovation initiatives.

Give that and above research gaps, the current study aims at:

1. Examining the link between GEO and firm performance through the lens of green innovation and green entrepreneurship image.
2. Determine the moderating role of green value co-creation among the association between GEO and green innovation.

The current study is important to theory in several ways. First, this study puts forward a sequential multi-mediator framework that addresses significant gaps prevalent in the literature investigating GEO drivers of performance. Earlier research examining mechanisms linking GEO and firm performance has largely focused on validating direct linear associations (Frare & Beuren, 2022; Makhloufi et al., 2022) or testing isolated mediators such as only innovation (Jiang et al., 2018; Shehzad et al., 2023) or supply chain practices (Abbate, Centobelli, & Cerchione, 2023; Habib, Bao, & Ilmudeen, 2020). These approaches provide limited perspectives in depicting the pathways

through which GEO confers performance gains. Moreover, they overlook the potential synergistic interplay between intermediary factors in enabling GEO's transformational capacity.

By proposing and validating a two-staged mediation model with linked paths via green innovation and green image building, this research captures the dynamic sequencing of outcomes catalyzed by adoption of a GEO strategic orientation. The framework recognizes capabilities developed in eco-innovation can set the stage for subsequent reputation enhancement, with combined mediating effects over time better translating GEO into sustainability-focused competitive performance. This perspective addressing previous gaps by tracing the multidimensional transformations triggered by GEO holds important theoretical implications. Second, the study significantly develops RBV theory in the context of green entrepreneurship by conceptualizing GEO as a unique strategic resource. It expands RBV by explicating how this GEO resource catalyzes the building of supplementary assets - specifically green innovation capabilities and green entrepreneurship image - that ultimately improve performance. This elucidates the "resource transformation" process, advancing understanding of how resources intersect with sustainability for competitive advantages.

Additionally, the examination of green value co-creation's moderating effect contributes to RDT by demonstrating the vital role external collaboration plays in managing dependencies for green innovation success under a strong GEO. Firms leverage relationships to access requisite resources, insights and legitimacy for robust sustainable innovation initiatives.

The following sections are divided into theoretical background and hypotheses, research methodology, main findings, discussion of findings, and conclusion.

Theoretical Background and Hypotheses

Resource-Based View (RBV) theory and Green Entrepreneurial Orientation

The Resource-Based View (RBV) hypothesis sheds light on the link between a company's internal resources and its competitive advantage. According to RBV, a firm's distinctive resources and talents may serve as sources of long-term competitive advantage (Singh, Chen, Del Giudice, & El-Kassar, 2019). Within this theoretical framework, GEO shines out as a unique and dynamic capacity that is critical in developing a company's approach to sustainability and subsequent performance results. Due to the fact that GEO embodies an organization's proactive and deliberate

commitment to environmental sustainability, it may be seen as a special skill inside the RBV framework (Makhloufi et al., 2022). It incorporates a way of thinking and a set of actions that help businesses find, assess, and take advantage of green business possibilities (Makhloufi et al., 2022; Xiue & Qing, 2021). This skill shows an organization's commitment to go above and beyond the call of duty in pursuing eco-friendly projects and innovations. It goes beyond just complying with environmental standards.

It is significant to note that a GEO acts as a catalyst for the growth of green innovation and the promotion of a favorable green entrepreneurship image (Wang et al., 2023). The development of environmentally friendly methods, procedures, and goods is referred to as "green innovation," and it may provide a company a competitive advantage in the marketplace. On the other side, a company's "green entrepreneurial image" represents how stakeholders, such as clients, investors, and the general public, see it in terms of its dedication to sustainability.

Within the RBV paradigm, the relationship between GEO, green innovation, and green entrepreneurship image may be seen as an internal resource transformation process. The firm's proactive approach to sustainability, as represented in its GEO, starts and drives the development of green innovation. This inventive capability, in turn, allows the company to develop environmentally friendly goods and services that appeal to environmentally concerned customers and stakeholders. Concurrently, the firm's dedication to sustainability builds its green entrepreneurial image, establishing a favorable reputation and boosting legitimacy in a society more concerned with environmental challenges.

Green Entrepreneurial Orientation

GEO is a strategic mindset and strategy that stresses a company's commitment to environmental sustainability and good business practices while exploring entrepreneurial possibilities (Jiang et al., 2018). It combines principles of entrepreneurship with environmental responsibility to provide a framework for long-term corporate growth (Guo et al., 2020). Firms with a strong GEO are proactive in recognizing and capitalizing on environmental and social sustainability prospects, as well as innovation in eco-friendly goods, services, and processes (Frare & Beuren, 2022; Makhloufi et al., 2022). The entrepreneurship orientation theory and green entrepreneurial theory serve as the cornerstones of the GEO concept (Guo et al., 2020). GEO adheres to the triple bottom line theory, which focuses on the growth of businesses. According to Luo et al. (2005), it is crucial

to make use of green innovation by properly allocating resources that lessen their potentially harmful effects on the environment. Particularly, some academics claimed that environmental orientation and social orientation are two components of GEO (Guo et al., 2020; Lozano et al., 2018).

The present research covers three aspects of GEO, namely environmental orientation, proactiveness, and innovativeness, building on previous literature (Ge, Jiang, Gao, & Tsai, 2016; Keszey, 2020; S. Li, Jayaraman, Paulraj, & Shang, 2016; Lioutas & Charatsari, 2018; Xiue & Qing, 2021). Environmental orientation in GEO denotes the extent to which a company incorporates environmental issues into its fundamental business activity (Keszey, 2020). It entails a dedication to limiting environmental consequences, preserving resources, and implementing eco-friendly procedures (Gabler, Richey Jr, & Rapp, 2015). An environmentally conscious company strives to decrease its carbon footprint, waste, and resource use. This component highlights the need of connecting the firm's operations with environmental sustainability objectives, even if it requires considerable adjustments to present processes (Umar & Chunwe, 2019).

Proactiveness in GEO denotes the company's forward-thinking and anticipatory attitude toward environmental and social challenges. Firms with a high degree of proactiveness are fast to notice new sustainability issues and take proactive actions to solve them (Segarra Oña, Peiró Signes, & Mondejar Jimenez, 2013). This might include defining environmental objectives, implementing eco-friendly practices ahead of legislative requirements, and participating in environmental and social projects that match with their fundamental beliefs. Proactive GEO is about being ahead of the curve and being a leader in sustainable initiatives.

Within the context of GEO, innovativeness refers to a company's competence and desire to develop unique and environmentally sustainable goods, services, or processes (Lioutas & Charatsari, 2018). It entails taking a practical approach to finding creative solutions to environmental concerns and opportunities (Afum, Gao, Agyabeng-Mensah, & Sun, 2021). Firms with a high level of innovativeness in the context of GEO may actively spend in research and development to create and deploy green technologies that help the environment while also improving their market competitiveness.

Green Entrepreneurial Orientation and Green Innovation

Green innovation is defined as inventions that reduce environmental harm and risk (Cocca & Ganz, 2015; Gürlek & Koseoglu, 2021). Green innovation provides organizations with numerous approaches to create or employ creative goods, processes, management strategies, or business practices in order to avoid environmental hazards, pollution, and other negative impacts (Gürlek & Koseoglu, 2021). To foster green innovation, entrepreneurial orientation can provide organizations with methodologies, activities, entrepreneurial actions, and creative domains (Momayez et al., 2023).

Green innovation, especially concerning GEO, is a crucial component of sustainable business practices and may be fueled by a number of GEO important aspects, including innovativeness, proactiveness, and environmental orientation. Environmental orientation is the GEO's dimension most closely related to green innovation. Firms with a strong environmental focus are firmly devoted to reducing their environmental effect and implementing eco-friendly strategies (Dalla Lana, n.d.). This viewpoint provides as a basis for green innovation by encouraging businesses to include sustainability ideas into their innovation processes. It impacts material selection, design decisions, and manufacturing processes to achieve eco-friendly goals. Companies with a strong environmental orientation are more likely to invest in research and development activities aimed at sustainable innovation (Imran, Alam, & Beaumont, 2014), leading in the production of environmentally responsible goods or services.

Similarly, organizations with a high innovativeness as a GEO are more likely to produce fresh and environmentally friendly concepts, products, and processes (Lioutas & Charatsari, 2018). They aggressively explore possibilities to produce sustainable products that solve environmental concerns and leverage on eco-conscious customer preferences (Afum et al., 2021). For example, a company's innovativeness may lead to the development of energy-efficient technology, eco-friendly materials, or sustainable packaging solutions. Finally, proactiveness supplements innovativeness by ensuring that firms take timely and anticipatory efforts to embrace green innovation prospects. Proactive businesses are innovative and quick to adapt to evolving environmental trends and regulatory changes (Ge et al., 2016). They do not wait for external pressures or rules to produce eco-friendly goods or processes; instead, they find and exploit

chances to develop eco-friendly products or processes before rivals (S. Li et al., 2016). Proactiveness drives the development and speedy execution of green innovation initiatives, resulting in a competitive edge in environmentally concerned markets.

Successful businesses often reflect a mix of these dimensions (S. Chen et al., 2023). A company with a high level of innovativeness, for example, may develop green product concepts on a regular basis; a proactive approach ensures that these concepts are translated into tangible green innovations; and a strong environmental orientation ensures that these innovations align with the firm's broader sustainability strategy.

H1: Firm's GEO in terms of environmental orientation, proactiveness, and innovativeness is positively associated with green innovation**.**

Green Innovation and Green Entrepreneurship Image

Green innovation has emerged as a crucial driver of a company's green entrepreneurship image, with multiple studies highlighting its critical role in creating corporate sustainability attitudes (Guan et al., 2020; Song & Yu, 2018). The creation of environmentally friendly goods, processes, and services demonstrates a commitment towards handling critical environmental issues. This dedication, shown via green innovation, provides powerful signals to stakeholders such as customers, investors, and the general public about a company's proactive approach to decreasing its environmental imprint. According to Chen and Chang (2012), organizations that continually develop green innovations are evaluated positively by customers who value ecologically responsible goods and services. In this context, green innovations serve as physical representations of a company's commitment to environmental preservation and resource conservation. These developments represent a determined attempt to shift away from conventional corporate methods and toward more sustainable and environmentally sensitive operations (Heikkurinen, Young, & Morgan, 2019; Hutchins, Sinha, & Nandan, 2019).

Furthermore, Delmas and Pekovic (2013) highlighted the favorable influence of green innovation on a company's reputation. According to their findings, organizations that embrace eco-friendly technologies are more likely to be seen as responsible and devoted to sustainability. This improved reputation translated into increased trust from both customers and investors. The results

emphasized that green innovation is about more than simply developing environmentally friendly solutions; it is also about developing a reputation for being socially and ecologically responsible.

H2 Firm's green innovation is positively associated with green entrepreneurship image.

Green Innovation and Firm Performance

Green innovation has the potential to improve corporate performance (Frare & Beuren, 2022; Jakhar, 2017; Wijethilake, Munir, & Appuhami, 2018). First, it increases revenue by encouraging firms to enhance production procedures, so creating new value. According to research, green innovation promotes company internal efficiency (Cai & Li, 2018), overall productivity (Chang, 2011), and firm profit. The purpose of green innovation is to lessen the negative environmental effect of firms' production operations (OECD, 2009), assist firms in establishing and maintaining a green image (Chen, 2008), create a positive reputation, and even explore new markets (Yu-shan Chen, Lai, & Wen, 2006). Green innovation enables enterprises to develop product distinctiveness, allowing them to set higher pricing and enhance product profitability (Chen, 2008). Green innovation may enhance business earnings for all of these reasons. In terms of cost, green innovation may enhance resource efficiency and productivity by successfully reducing waste in manufacturing processes (e.g., by reusing materials) (Chen, 2008). Green innovation also assists businesses in improving product manufacturing efficiency, reducing resource consumption, and, to some degree, lowering production costs. Furthermore, green innovation assists businesses in reducing environmental burdens (such as hazardous and harmful chemical emissions) and the high punitive cost of complying with environmental regulations (Chang, 2011; Tang et al., 2018). As a result, green innovation may lower business expenses.

Recent literature has begun to creatively handle this subject. According to Saunila et al. (2018), investing in and using green innovation are related to sustainability. They discover that the need to achieve sustainable development is a major driver of green innovation. According to Cai and Li (2018), firms' choices to adopt green technologies are influenced by both internal and external forces, which highlights the importance of market-based processes for fostering green innovation. In summary, they discover evidence in favor of the so-called Porter Hypothesis and propose that businesses might benefit indirectly from environmental performance fueled by green innovation in order to boost their economic performance. According to research conducted by Arfi et al. (2018) on a sample of small and medium-sized organizations (SMEs) in France, the risk associated

with sharing information about green innovation might have a detrimental impact on a firm's performance. Jiang et al. (2018) demonstrate the contribution of green entrepreneurial approach to the green innovation-performance connection using a sample of 264 Chinese enterprises. Lee and Min (2015) discover that green innovation has a favorable effect on Japanese business performance. Consequently, we contend that:

H3 Green innovation is positively associated with overall firm performance green.

Green Entrepreneurship Image and Firm Performance

A positive green entrepreneurship image sends a strong signal to a wide range of stakeholders, conveying a company's unshakable commitment to environmental and social responsibility. This open commitment to sustainability not only develops trust, but also generates a feeling of integrity that resonates with consumers, investors, and the general public (Widyastuti, Said, Siswono, & Firmansyah, 2019) In the business world, trust is a key commodity, and a company with a strong green entrepreneurial image is considered as a reliable partner on the path to a more sustainable future (Guan et al., 2020).

When customers believe a firm is really devoted to sustainability and ethical standards, they are more likely to pick its goods or services over competitors' products and services. The trust generated by a positive green entrepreneurship image translates into client loyalty, repeat business, and favorable word-of-mouth referrals, eventually generating better sales and revenue (Han, Lin, Wang, Wang, & Jiang, 2019; Hu, Liu, Yuen, Lim, & Hu, 2019). Similarly, investors see a strong green entrepreneurial image as a sign of a company's long-term survival and development potential. They are more willing to invest in firms that share their values and exhibit a commitment to sustainability. This investor trust may lead to easier access to financial resources, allowing the company to undertake long-term objectives, expand operations, and boost financial success. Hence, we come to conclusion that;

H4 Green entrepreneurship image improves overall firm performance

Resource Dependency Theory and Moderating Role of Green Value Co-Creation

RDT gives vital insights into how firms manage their external dependence by strategically accessing and exploiting external resources (Biermann & Harsch, 2017; Nemati, Bhatti, Maqsal,

Mansoor, & Naveed, 2010). Organizations often depend on external elements, such as suppliers, customers, or partners, for vital resources like as information, expertise, money, and technology, according to RDT. This theory highlights that firms engage in a variety of strategic initiatives to decrease their susceptibility to external resource restrictions, with the ultimate goal of maintaining or improving their competitive position (Anggraeni, 2014).

The notion of green value co-creation is especially significant in the context of sustainability and environmental responsibility. Green value co-creation entails companies cooperating with external stakeholders such as consumers, suppliers, environmental groups, or research institutes in order to harness their knowledge and resources in pursuit of long-term results (Li, Shi, Yang, & Lee, 2020). This collaborative approach understands that sustainability concerns are complicated and that successful solutions need a varied set of viewpoints and resources (Yousaf, 2021; Zhu et al., 2021). key factor in determining how firms interact with external resources and stakeholders is the adoption of a GEO, a strategic mindset that places an emphasis on environmental responsibility and sustainability. In order to further their sustainability projects, organizations with a strong GEO are more inclined to actively seek out and use outside resources. They understand the need of working with outside parties to solve environmental issues, whether it means producing eco-friendly goods together, exchanging information about green living, or co-funding studies on new environmental technologies (Hawkins, Krause, Feiock, & Curley, 2018).

Therefore, by actively participating in green value co-creation, businesses with strong GEO may attempt to diversify their resource base and lessen their susceptibility to environmental concerns. Through this partnership, they will have better access to the information, skills, resources, and market insights that are essential to the advancement of green innovation.

H5 Green entrepreneurship image improves overall firm performance.

The hypothesized relationships are presented in Figure 1.

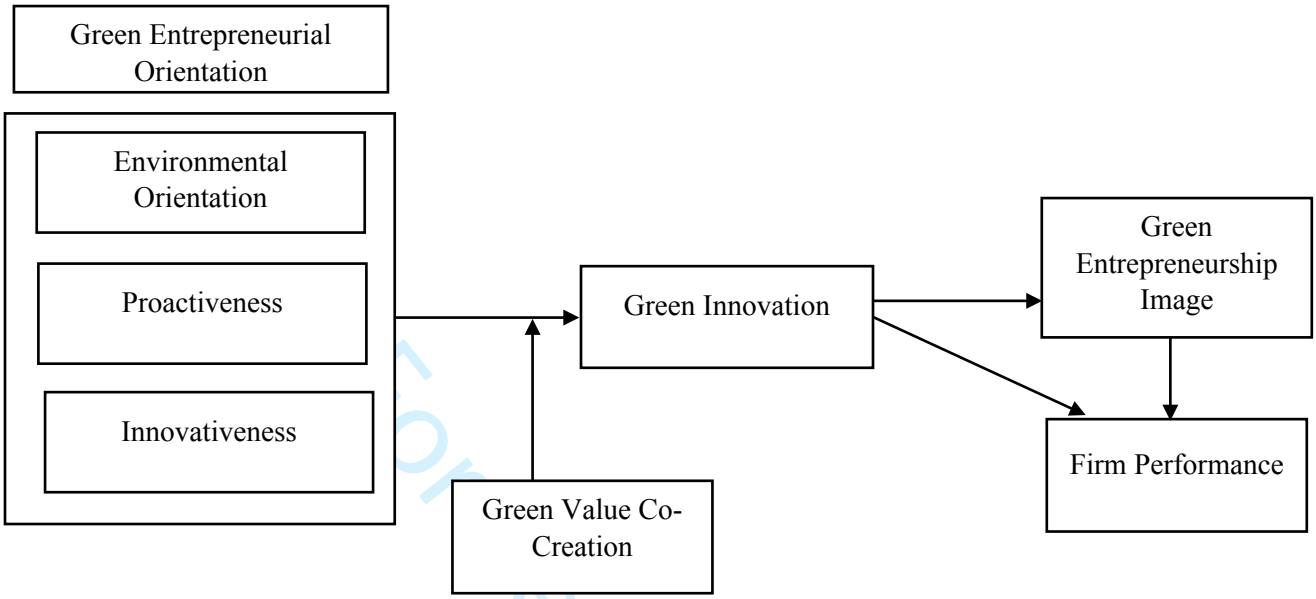

Figure 1 Conceptual Model

Methodology

Participants and Data Collection

In 2023, we performed research in China using a unique dataset comprising 383 respondents that we personally gathered. Since the 1990s, a number of environmental regulations and policies have been put into place in the Chinese setting. These regulations, meanwhile, did not become stricter in terms of regulation and application for environmental protection until 2014. In order to raise awareness of the importance of environmental concerns among local governments and enterprises, China amended the Environmental Protection Law in 2014. These modifications were made to encourage them to improve their environmentally friendly practices via the adoption of several green management methodologies. As a result, information gathered after 2014 may offers a more realistic picture of GEO in the context of China.

We picked manufacturing businesses from six different Chinese provinces, including Jiangsu, Guangdong, Shandong, Shanxi, and Sichuan. These geographically diverse areas represent China's many market economies and ecological circumstances. Shanxi Province is the industrial

hub in Western China, while Jilin Province is the traditional industrial base in Northeast China. Together, they show China's low level of economic growth. China's two provinces, Sichuan in the center and Shandong in the east, are representative of the country's average degree of economic development. The Yangtze River Delta and the Pearl River Delta, which both reflect a high level of economic growth, are where Jiangsu and Guangdong provinces are situated.

This study incorporated a survey technique to look at the suggested links, in line with earlier research on GEO (Al-Swidi, Gelaidan, & Saleh, 2021; Coelho et al., 2023; Ishaq et al., 2023). There are several reasons behind using this methodology. First, key components of a GEO, such as the degree of proactivity, risk-taking, and innovativeness in implementing environmental practices, may be measured with the use of well-crafted questionnaires and validated assessments (Roxas & Coetzer, 2012). The secondary data approach has very seldom been incorporated into GEO research. There might be a variety of causes for this narrow emphasis. For example, comparing and synthesizing data from several sources is more difficult since secondary sources are likely to have employed different procedures, metrics, samples, etc. Furthermore, surveys designed to answer questions related to research on green entrepreneurship tend to yield more complexity and depth than secondary data. Surveys can capture data on attitudes, intentions, and self-reported behaviors linked to green entrepreneurship (Vilchez, Darnall, & Correa, 2017). These self-reported statistics can offer insightful information. In conclusion, surveys allow for customization and precise measurement tailored to green entrepreneurship. Although secondary data offers effective access to vast amounts of contextual information, the measurements could not fully capture the relevant essential characteristics.

The information was gathered in four stages. First, we randomly selected 1200 samples from official directories of industrial enterprises. We contact the companies via email and phone to get permission to participate. We also sent each company a survey invitation letter detailing the context and goal of our research in an effort to boost the response rate. Five hundred sixteen businesses responded that they could take part in the poll. Second, we created a questionnaire based on past research, translated international scales into Chinese for improved comprehension, and then asked professors and PhD students majoring in business administration to propose changes. The final poll was refined after a pilot test with 20 responders from nine organizations, including senior and intermediate managers. Before the official survey, a telephone survey was done to screen the firms. A company was removed from the sample if it did not include consumers

or suppliers in its green entrepreneurial activities. Finally, our survey was distributed to each firm and was directed at top managers and middle managers, such as purchasing managers, marketing managers, and financial managers, because they have a thorough understanding of the entire organization and can provide pertinent key information about the knowledge process and stakeholder management. From August to September 2023, the questionnaires were distributed. We got 405 responses. Twenty-two partial samples were removed, and 383 businesses were tested. Table 1 shows the company profiles.

Measurement of Variables

The questionnaire was split into two sections. One was used to collect information on the businesses' size, age, growth stage, ownership, and industry. The questions in the second part address the variables of interest. To identify which questions should be included in the survey instrument, a rigorous evaluation process was applied. Throughout the evaluation process, we interact with academic experts and review relevant papers. In keeping with prior research, the questionnaire employed a 5-point Likert scale. Existing scales have been adjusted and are now being used to assess these factors. We chose to alter the measures created by several sources in order to assess the green entrepreneurial orientation in terms of environmental orientation (four items), proactiveness (three items), and innovativeness (five items) (Covin & Slevin, 1988; Keszey, 2020; Zhang & Li, 2021). In addition, the green innovation scale created by Song and Yu (2018) was applied. Guan et al. (2020) provided eight items measure to evaluate the green entrepreneurship image. Keszey's (2020) broad three-item scale of firm performance was adopted (2020). Finally, a three-item scale of green value co-creation was derived from the study of Albinsson et al (2016). Appendix I has a detailed description of the measures.

Table 3 provides information about the correlation among variables. There was no correlation coefficient more than 0.60, indicating that there was no major multicollinearity concern. The information about firm profile is reported in Table 1.

Table 1 Firms' Characteristics

Demographics	Levels	Number	Percentage
Firm Age	0-3	110	28.7
	3-8	44	11.5
	More than 8 years	229	59.8

Firm Size	0-20 employees	16	4.2
	20-400 employees	106	27.7
	300-1000 employees	94	24.5
	More than 1000 employees	167	43.6
Development Stage	Introduction	85	22.2
	Growth	154	40.2
	Maturity	116	30.3
	Recession	28	7.3
Ownership	State owned	139	36.3
	Privately owned	146	38.1
	Foreign Firms	70	18.3
	Others	28	7.3
Industry	Heavy industry	173	
	Light industry	114	
	Construction	35	
	Service industry	61	

Common Method Bias

Common method bias (CMB) was avoided by making sure all questionnaire questions were succinct and understandable. Additionally, to ensure consistency, questions evaluating several aspects of a variable were dispersed across the questionnaire, and negative items were paired with positive ones. To overcome CMB, ex-post statistical methods were also used. The partial correlation method and the Harman's single factor test were used in this case (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). All items covering study variables were loaded on a single

factor, which explained 21% of the total variance, according to Harman's single factor test. This is far less than 50%, showing that CMB is not a concern. The results of the partial correlation analysis showed that the projected routes and their significance were unaffected by the marker variable's inclusion in the model. Furthermore, because the correlation values are less than 0.7, multicollinearity is not a problem (see Table 3) (Johnson & LeBreton, 2004).

Data Analysis and Main Findings

Reliability and Validity Assessment

Structural equation modeling (SEM) was utilized to evaluate the reliability of the study and test hypotheses. As a consequence, a covariance-based measurement model was developed using the AMOS program. The covariance-based SEM aids in evaluating the factor structure and variation among the key variables that is explained. To investigate the connection between CSR, green reputation, and pro-environmental behavior, a covariance model was constructed. As shown by the model fitness findings of Chi2/df 3 (1.772), CFI > 0.90 (0.970), TLI > 0.90 (0.966), and RMSEA 0.08 (0.045), there are no model fitness issues (0.045) (Hair, Black, Babin, Anderson, & Tatham, 2006).

Since the average extracted variance is within acceptable bounds (AVE > 0.5), the composite reliability is greater than 0.7, and the values of factor loadings for each variable are greater than 0.5, the convergent validity is established (Hair et al. 2006). The data on convergent validity are summarized in Table 2.

Table 2: Convergent Validity

Constructs	Items	Factor Loadings	Composite Reliability	Average Extracted	Variance
Environmental Orientation	EO1	0.833	0.924	0.752	
	EO2	0.87			
	EO3	0.832			
	EO5	0.789			
Proactiveness	PRO1	0.875	0.882	0.713	

	PRO2	0.901		
	PRO3	0.879		
Innovativeness	IN1	0.912	0.894	0.631
	IN2	0.941		
	IN3	0.927		
	IN4	0.808		
	IN5	0.692		
Green Innovation	GI1	0.888	0.920	0.699
	GI2	0.802		
	GI4	0.883		
	GI5	0.892		
	GI6	0.881		
Green Entrepreneurship Image	GEI1	0.94	0.953	0.774
	GEI2	0.872		
	GEI3	0.814		
	GEI4	0.942		
	GEI5	0.831		
	GEI8	0.88		
Green Value Co-Creation	GVCO1	0.776	0.916	0.783
	GVCO2	0.857		

	GVCO3	0.818			
Firm Performance	PER1	0.875	0.948		0.859
	PER2	0.901			
	PER3	0.879			

We followed Fornell and Larcker's (1981) approach to evaluate discriminant validity in this study. They explain that the parallel correlations should be greater than the square root of the AVE for each variable in the model. This criterion is validated in Table 3, ensuring the discriminant validity of the variables.

Table 3: Discriminant Validity

	1	2	3	4	5	6	7
(1) Firm Performance	**0.927**						
(2) Environmental Orientation	0.182	**0.867**					
(3) Green Innovation	0.239	0.187	**0.836**				
(4) Green Entrepreneurship Image	0.305	0.116	0.164	**0.880**			
(5) Proactiveness	0.218	0.421	0.236	0.200	**0.844**		
(6) Innovativeness	0.253	0.512	0.113	0.320	0.482	**0.794**	
(7) Green Value Co-Creation	0.290	0.196	0.252	0.323	0.307	0.286	**0.885**

Hypotheses testing

To assess the study hypotheses, OLS regression analysis was used. As may be seen from the equations below, six estimating models were created in this respect. In model 1, firm performance was regressed against the control variables. Model 2 regressed control variables and GEO against green innovation. Control variables and green innovation were regressed against the perception of green entrepreneurship image in model three. In model 4, control factors and green innovation were regressed against firm performance. Control factors and the image of green entrepreneurship

were regressed against company performance in model 5. Finally, in model 6, control variables, GEO, green value co-creation, and the interaction between GEO and green value co-creation were regressed against green innovation. Multicollinearity and autocorrelation issues were resolved before to testing these models by calculating the Variance Inflation Factor (VIF) and tolerance values, observing correlation between independent variables, and using the Durbin Watson test. There was no evidence of multicollinearity because the correlation between independent variables was less than 0.6 (Table 2), the VIF was under 4, and the tolerance value for each independent variable was greater than 0.2. Additionally, the Durbin-Watson test result was between 1.5 and 2.5, demonstrating that there was no autocorrelation.

$$Firm\ Performance,\mathrm{t} = \beta 0 + \sum_{i=1}^{n} \beta_n F\_Control_{it} + \varepsilon_{it} \qquad (\mathbf{1})$$

$$Greeen\ Innovation,\mathrm{t} = \beta 0 + \beta 1 Green\ Entrepreneurial\ Orientation + \sum_{i=1}^{n} \beta_n F\_Control_{it} + \varepsilon_{it} \quad (\mathbf{2})$$

$$Green\ Entrepreneurship\ Image,\mathrm{t} = \beta 0 + \beta 2 Green\ Innovation + \sum_{i=1}^{n} \beta_n F\_Control_{it} + \varepsilon_{it} \quad (\mathbf{3})$$

$$Firm\ Performance,\mathrm{t} = \beta 0 + \beta 2 Green\ Innovation + \sum_{i=1}^{n} \beta_n F\_Control_{it} + \varepsilon_{it} \qquad (\mathbf{4})$$

$$Firm\ Performance,\mathrm{t} = \beta 0 + \beta 3 Green\ Entrepreneurship\ Image + \sum_{i=1}^{n} \beta_n F\_Control_{it} + \varepsilon_{it} \quad (\mathbf{5})$$

$$Green\ Innovation,\mathrm{t} = \beta 0 + \beta 1 \mathrm{Green}\ Entrepreneurial\ Orientation + \beta 4 \mathrm{Green}\ Value\ Co-Creation + \beta 5 \mathrm{Green}\ Entrepreneurial\ Orientation \times Green\ Value\ Co-Creation \sum_{i=1}^{n} \beta_n F\_Control_{it} + \varepsilon_{it} \quad (\mathbf{6})$$

Table 4 provides information about the OLS regression analysis. Model 3 was used to examine H1, which posits that *firm's GEO in terms of environmental orientation, proactiveness, and innovativeness is positively associated with green innovation*. It is accepted as the β-value (.204)

from GEO to green innovation is positive and significant with p<0.05. Model 3 was used to test H2, which states that *firm's green innovation is positively associated with green entrepreneurship image*. It is accepted as the β-value (.146) from green reputation to pro-environmental behavior is positive and significant with p<0.05. Model 4 was developed to examine H3, which posits that *green innovation is positively associated with overall firm performance* green. It is accepted as the β-value (0.215) from the green innovation to firm performance is positive and significant with p<0.05. Model 5 was constructed to examine H4, which posits that *green entrepreneurship image improves overall firm performance.* It is accepted as the β-value (0.173) from the green entrepreneurship to firm performance is positive and significant with p<0.05. Finally, the model 6 is about testing of moderating effect of green value co-creation. Finding shows that interaction between GEO and green value co-creation is significantly related to green innovation. Hence, H5 is also accepted. Also, simple slope analysis (Figure 2) shows that the green value co-creation strengthens the positive relationship between GEO and green innovation.

Table 4 Hypotheses testing (OLS regression)

	Model 1 (Controls)	Model 2 (Main effect, H1)	Model 3 (Main effect, H2)	Model 4 (Main effect, H3)	Model 5 (Main effect, H3)	Model 6 (Interaction effect, H3)
Direct effects						
Green Entrepreneurial Orientation		.204***				0.231***
Green Innovation			.146**			
Green Innovation				0.215***		
Green Entrepreneurship Image					0.173**	

Interaction effect						
Green Value Co-Creation						0.213***
Green Entrepreneurial Orientation ×Green Value Co-Creation						0.146*
Controls						
Firm Age	.029	-.049	-.049	.037	.038	-.057
Firm Size	-.142	-.109	-.054	-.115	-.130	-.106
Development Stage	-.092	-.005	-.074	-.090	-.079	-.015
Ownership	.032	.023	.055	.026	.022	.018
Industry	-.047	.023	-.044	-.049	-.040	.029
Adjust R^2	.020	.043	0.202	0.064	0.047	0.090
Model F	2.55*	3.847 **	2.452*	5.321***	4.160***	5.703***

***p < 0.01; *p < 0.05; N = 210*

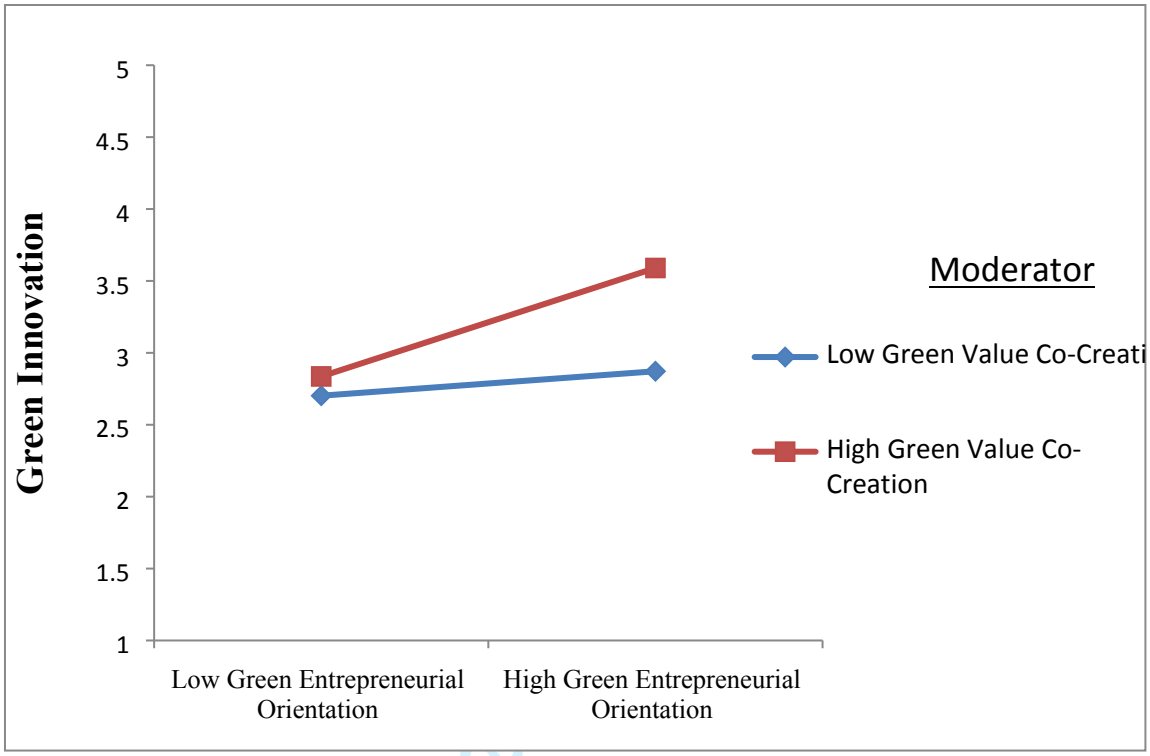

Figure 2 Simple Slope Analysis

Discussion of Findings and Conclusion

The study's results on the influence of GEO on company performance via green innovation and green entrepreneurship image are consistent with earlier studies in the field of sustainability and corporate environmental responsibility.

Previous research has repeatedly found a link between GEO and firm performance (Frare & Beuren, 2022; Habib et al., 2020; Majali et al., 2022; Momayez et al., 2023). Firms with a strong green entrepreneurial focus beat their rivals in financial success, market share, and long-term sustainability (Chen et al., 2023). This is consistent with the current study's findings, which underline that organizations that prioritize environmental responsibility and sustainability in their strategic planning are better positioned to achieve superior performance outcomes. Furthermore, the study's identification of green innovation as a crucial mediator is consistent with previous research that has underlined the critical importance of innovation in achieving long-term corporate success. Green innovation, which involves the creation of environmentally friendly goods, processes, and practices, has been identified as a fundamental method through which enterprises may improve their environmental performance while gaining a competitive advantage (Li, 2022;

Weng, Chen, & Chen, 2015). The study's validation of green innovation as a mediator highlights its significance as a method via which GEO contributes to business success.

Furthermore, the study's recognition of the mediating effect of green entrepreneurial image is consistent with the literature on corporate image and reputation in sustainability contexts. According to previous studies, a favorable environmental image may have a considerable influence on consumer preferences, investment decisions, and stakeholder relationships (Chen, 2008; Guan et al., 2020; Widyastuti et al., 2019). The study's findings support the notion that cultivating a strong green entrepreneurial image through sustainable business practices and innovation may improve a company's overall success.

The mediation model proposed in this study, where GEO influences firm performance through the sequential pathways of green innovation and green entrepreneurship image, aligns with the conceptualization of sustainable business processes as interconnected and interdependent. Previous studies have also highlighted the importance of understanding the interplay among different elements of sustainability strategy. This approach recognizes that green innovation is not an isolated endeavor but is intertwined with a firm's overall sustainability narrative and image, ultimately influencing its performance outcomes (Chen, 2008).

The study's findings on the impact of GEO on green innovation, with a focus on the moderating role of green value co-creation, are in line with and further the body of knowledge on this topic. A nuanced perspective is added to our knowledge of how green innovation is impacted by the study's attention on the moderating function of green value co-creation. Prior studies have emphasized the significance of external partnerships and collaborations in the context of sustainability and innovation (Li et al., 2020; Yousaf, 2021). The current study takes a step further, though, by exploring how the degree of participation in the co-creation of green value might either strengthen or weaken the connection between a green entrepreneurial mindset and green innovation. According to this, businesses with a strong GEO stand to gain greatly from actively involving external stakeholders, such as clients, vendors, research institutions, and environmental groups in co-creating value for sustainable results. These outside partners can offer beneficial resources, knowledge, and experience that complement a company's internal strengths, thereby advancing its attempts to innovate in the green sector.

Theoretical Contributions

The present study provides several theoretical advancements. First, by expanding the RBV to include green entrepreneurial orientation (GEO) as a distinct and valued resource, this work contributes significantly to theory. By suggesting that GEO may stimulate the development of new strategic resources, such as expertise for green innovation and the development of a positive green image, it broadens the framework. When evaluated through a sustainable lens, this approach improves our knowledge of how resources might be exploited to maximize performance. Furthermore, prior research has examined the adoption of green innovation and the ensuing company performance with an emphasis on external factors. The present study identifies GEO as a key internal component impacting the uptake of green innovation, which strengthens the green entrepreneurship image and influences firm performance.

Second, unlike earlier studies that frequently ignored the multi-dimensional nature of GEO, this study offers a more thorough examination of the influence of GEO on firm performance at dimensional level, providing a comprehensive understanding of the many viewpoints on the GEO-performance link.

Thirdly, the results highlight the need of collaborating to co-create green value as a means of controlling resource demands, so advancing the idea of resource dependency in the context of sustainability. According to the survey, companies, which include external stakeholders in order to collaboratively generate value by utilizing their resources, expertise, and knowledge, are better able to transform their GEOs into green innovation. These findings enhance our comprehension of the necessary resources and the cooperative strategies employed to get outside resources.

Managerial Implications

The current study offers several practical contributions. First, the study emphasizes the strategic value for managers in cultivating a strong green GEO within their organizations. Leadership should recognize that environmental stewardship is not just a moral imperative, but also a pathway to enhanced business performance. Promoting a creative, eco-conscious culture that permeates decision-making can spur new products, processes, and practices.

Second, the findings highlight the critical role of green innovation in driving business success. Managers should actively support green innovation initiatives by allocating resources, fostering a

culture of experimentation and creativity, and rewarding sustainability-focused contributions from employees. Green innovation can provide competitive differentiators that appeal to eco-conscious consumers and improve financial results.

Third, the study emphasizes the importance of strategic communication about sustainability efforts to stakeholders. In addition to implementing green practices, managers must effectively convey the organization's commitment to environmental responsibility through sustainability reporting, green marketing, and engagement with concerned stakeholders. This helps build a reputation as a green enterprise.

Finally, managers should recognize the strategic value of co-creating green value through collaborations with external partners like suppliers, research institutions, customers and environmental groups. Such cooperative networks provide access to knowledge, skills and resources that can enhance internal capabilities for green innovation. Leaders should promote openness to these external partnerships within their organizations.

Limitations and Future Research Directions

First, longitudinal data or experimental designs should be leveraged in future research to establish stronger causal evidence between the variables examined. The current cross-sectional data limits claims of causality. Second, analyzing the different dimensions of GEO (environmental orientation, innovativeness, proactiveness) separately could provide more nuanced insights into how each specifically impacts firm performance. The current composite GEO measure may obscure these distinct effects. Third, testing the conceptual model in developed economy contexts would improve generalizability beyond the emerging market setting of the current study. Regulatory and cultural differences may moderate the relationships. Fourth, additional variables could be incorporated and controlled for, such as market competition, government regulations, and industry effects. The conclusions may be shaped in part by the unique regulatory and industrial environment. Testing boundary conditions across contexts would elucidate these effects.

Besides, authors (Abbate, Centobelli, Cerchione, Oropallo, & Riccio, 2022; Shashi, Centobelli, Cerchione, & Mittal, 2021) suggest that digital transitions can be studied while exploring the role of GEO and green innovation. This suggests a desire to learn more about how companies' use of digital technology affects their capacity to promote green innovation and engage in green

entrepreneurship. Digital tools and platforms have the potential to facilitate the effective collection and analysis of environmental data by businesses, pinpoint areas for improvement in sustainability practices, foster stakeholder collaboration on eco-friendly initiatives, and foster the development of new solutions to address environmental concerns.

Finally, the relationships examined are complex, so there may be unaccounted variables that influence the outcomes. Replication in diverse settings along with inclusion of additional contextual factors would provide a more comprehensive understanding and enhance generalizability. Overall, the study makes a valuable contribution, but expansion along these lines would further enrich the insights and theoretical implications.

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Appendix I-Measurement Detail

Variables	**Dimensions**	**Item Description**
Green Entrepreneurial Orientation	Environmental Orientation	Environmental issues are very relevant to the major function of our firm
		At our firm, we make a concerted effort to make every employee understand the importance of environmental preservation
		We try to promote environmental preservation as a major goal across all departments
		Our firm has a clear policy statement urging environmental awareness in every area of operations
		Preserving the environment is a central corporate value in our firm
	Proactiveness	When facing uncertainty, we typically adopt initiates actions which competitors then respond to
		In dealing with competitors, we favor a tendency initiate green actions that competitors respond to
		Our firm favors a tendency to be a leader, and always being the first to introduce green products, service, or technology first
	Innovativeness	Technical green innovations based on research results are accepted quickly
		Importance given to innovative ideas regarding green products and services
		In our firm, green innovations are accepted easily in projects
		Employees are not punished even if their new ideas

	regarding green innovations do not work
	Green innovativeness is encouraged in the firm
Green Innovation	The company chooses the materials of the product that produce the least amount of pollution for conducting the product development or design
	The company uses the fewest amount of materials to comprise the product for conducting the product development or design
	The company would circumspectly deliberate whether the product is easy to recycle, reuse, and decompose for conducting the product development or design
	The manufacturing process of the company reduces the consumption of water, electricity, coal, or oil
	The manufacturing process of the company effectively reduces the emission of hazardous substances or waste
	The manufacturing process of the company reduces the use of raw materials
Green Entrepreneurship Image	The firm is regarded as one of the best benchmark of environmental management
	The firm is professional about environmental management
	The firm is considered successful about environmental management
	The environmental management of the firm is well established
	The reputation of the firm about environmental management is stable
	The firm is trustworthy about environmental management
	The firm is dependable about environmental management
	The firm concerns for customers about environmental management
Green Value Co-Creation	The provider lets the customer decide how he/she receives the green service/product offering
	The customer has many options to choose how he/she experiences the green service/ product offering
	It is easy for the customer to receive the green service/product offering when, where, and how he/she wants it