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Corporate Social Responsibility and Ambidextrous Green Innovation: The Role of Green Creativity as Mediator

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Abstract

This study examines how corporate social responsibility (CSR) affects green creativity (GC) and ambidextrous green innovation (AGI). Using information from 220 manufacturing companies in Bangladesh, this paper investigates the function of green creativity as a mediator in the connection between CSR and green innovation. The data were gathered using survey methods through the convenience sampling technique via covariance-based SEM (CB-SEM). Our findings demonstrate that CSR directly affects innovation in green exploitation and exploration. CSR is more associated with green exploration innovation than green exploitation innovation, and CSR positively correlates with green creativity. The study also found that green creativity acts as a mediator between CSR and ambidextrous green innovation, suggesting that improving CSR initiatives can foster green creativity, which can lead to innovation in green exploration and exploitation. The findings suggest that managers should focus on improving their CSR initiatives to foster green creativity, which can lead to innovation in both green exploitation and green exploration.

Keywords: Corporate social responsibility (CSR), green creativity, green innovation, green exploration innovation, green exploitation innovation, manufacturing industry, Bangladesh.

1. Introduction

Environmental awareness is an issue of paramount importance, with stakeholders expressing concern about environmental contamination, deforestation, and climate change (Aftab et al., 2022; Cheng et al., 2017; Tariq et al., 2021; Ullah et al., 2022). Green innovation has emerged as a critical strategy to address these issues, promoting environmental performance through reduced pollution. Stakeholders pressure firms to reduce environmental pollution from mills and factories (Singh et al., 2022; Yu et al., 2017), with green innovation seen as a crucial element of environmental protection (Xie et al., 2019; Wang et al., 2022). GI refers to the improvement of eco-friendly products and

processes through the use of sustainable raw materials, resulting in decreased consumption of materials and energy, as well as reduced emissions of toxins such as electricity and water (Kraus et al., 2020; Li et al., 2022). Implementing GI practices can help improve environmental sustainability by producing eco-friendly goods and services (Li et al., 2022).

Moreover, GI can help fulfill environmental demands and facilitate sustainable growth (Bekmezci, 2015; Zheng et al., 2022), with an emphasis on long-term strategies (Berrone et al., 2013). While fulfilling social responsibilities is recognized as a strategy for achieving sustainability (Achi et al., 2022), it is essential to investigate how CSR practices affect XPL and XPT. We propose that firms that adopt CSR practices can gather valuable information from stakeholders, which can help them develop green creativity, leading to the exploration and exploitation of green opportunities. In other words, CSR practices enable firms to develop innovative and sustainable solutions that benefit the environment and society.

CSR refers to a company's responsibility towards its stakeholders and its obligation to society and sustainable development. It is reflected in organizational behaviors emphasizing social and environmental components (Le et al., 2022; Xiong & Luo, 2021). CSR demonstrates how firms are accountable to their customers and corresponding social responsibilities (Van Marrewijk, 2003; Yuan & Cao, 2022; Zhai et al., 2022). CSR initiatives significantly aid firms in attaining their innovative goals by developing trust with ancillary stakeholders and encouraging the formation of cooperative networks (Pan et al., 2021). These networks also help businesses obtain innovative resources, reduce associated risks, and save time, which positively impacts corporate innovation (Forcadell et al., 2020). Using green creativity to gain a competitive edge in a rapidly shifting environment has enticing possibilities. All innovation starts with original concepts for developing new products (NPD), meaning that creativity is the root of innovation. Additionally, the resource-based view (RBV) theory contends that creativity, an ingrained company value, may capitalize on the benefits of new products (Hunt & Morgan, 1995). The majority of research on CSR examines it through the RBV lens and concludes that innovation resources are crucial for implementing GI (Forcadell et al., 2021; Halkos & Skouloudis, 2018). We propose that firms can generate green innovation if they have CSR practices and can get valuable information from different stakeholders, such as suppliers, buyers, and partners. The RBV theory also implies that CSR activities may generate resources and support GI (Guo et al., 2020; Forcadell et al., 2021).

Prior studies have mostly emphasized the significance of CSR and GI (Hao & He, 2022; Mbanyele et al., 2022; Shahzad et al., 2020). For example, Yuan and Cao (2022) and Le (2022) investigated the role of CSR on GI in terms of “green products and process innovation”. Therefore, the effect of CSR on green exploration innovation and exploitation innovation is scant, and we want to uncover the gaps. In addition, Chen and Chang (2013) evaluated how green leadership and dynamic skills affect success in developing green products. Kraus et al. (2020) examined the impact of CSR on GI, ecological strategy. Le

(2022) studied the role of CSR as a mediator on the link between green strategy and performance in SME industries. However, the role of GC as a mediator in the connection between CSR and XPL-XPT has yet to be thoroughly examined. Our research seeks to fill this gap by investigating the mediating effects of GC between CSR and XPL-XPT innovation in the context of manufacturing firms in Bangladesh.

Our study contributes to the marketing literature in several ways. Firstly, we examine the empirical relationship between CSR and AGI, investigating the mediating effect of GC on the link between CSR and XPL-XPT. Secondly, we investigate the impact of CSR on GC and explore the role of GC in ambidextrous green innovation (AGI). Thirdly, we propose GC as a mediator of the link between CSR and AGI, finding that it partially mediates this relationship in the manufacturing firms in Bangladesh. Lastly, our study is distinct from previous research by being conducted in an emerging economy, providing the role of CSR in fostering exploratory and exploitative GI. Our findings can inform managerial and policymaking decisions regarding the promotion of CSR initiatives to drive sustainable innovation in the manufacturing industry, highlighting the importance of GC as a mediator of the association between CSR and AGI.

2. Theoretical Underpinning

This study explores the connection between CSR, GC, and AGI using several theories, including RBV, institutional, and stakeholder. According to RBV, a company can achieve a competitive benefit by effectively utilizing its resources and capabilities (Barney, 1991). Natural RBV theory extends this concept by proposing that firms can gain a persistent competitive benefit by addressing environmental challenges (Hart, 1995; Hart & Dowell, 2011). RBV theory provides a framework for understanding the connection between CSR and GI from a motivational viewpoint (Yuan & Cao, 2022). The theory posits that a company's core competitiveness is based on its unique, valuable, and difficult-to-replicate resources (Barney, 1991). Therefore, CSR practices can be considered a resource that firms can use to develop XPL and XPT (Porter & Miller, 1985; Zhang et al., 2022). By providing unique resources, firms can create a competitive benefit in promoting GI development.

Moreover, incorporating the resources of peripheral stakeholders, such as buyers, suppliers, and the government, into green innovation development can benefit a company with limited resources (Wu et al., 2020). CSR activities can generate resources and support GI, leading to a competitive benefit for firms (Guo et al., 2020; Forcadell et al., 2021). By implementing CSR initiatives, companies can lower manufacturing costs, build stronger stakeholder relationships, and improve knowledge gathering for green innovation (Luo & Du, 2015). The institutional theory offers insight into the pressure perspective on CSR and GI (Tariq et al., 2017). Companies face pressure from customers and environmental organizations to address sustainability concerns, and the institutional theory explains how different institutions' expectations for corporate green innovation activities vary (Huang & Chen, 2022; Shu et al., 2016). Stakeholder theory emphasizes the importance of creating value for stakeholders in achieving business success (Freeman et al., 2020). CSR addresses

stakeholder interests and promotes green exploration and exploitation innovation (Le, 2022). By combining these theories, this study comprehensively explains the association between CSR, GC, and AGI.

2.1 Corporate Social Responsibility (CSR)

CSR has emerged as a crucial element of contemporary business operations. Embracing CSR can provide companies with a means of differentiating themselves from their competitors. As a result, it has drawn the attention of entrepreneurs, policymakers, and academics alike in marketing and management (Ul Hassan et al., 2022; Zheng et al., 2022). It is crucial for companies to acknowledge their responsibility toward environmental protection and consider the demands of their stakeholders, such as a pollution-free environment (Le, 2022). CSR goes beyond legal obligations and involves voluntarily incorporating social and ecological concerns (Song et al., 2019). The activities of CSR play a noteworthy role in promoting GI (Hao & He, 2022).

2.2 Green Creativity (GC)

Creativity is a crucial precursor to innovation, and it has a noteworthy role in the innovation process (Amabile et al., 1996; Arici & Uysal, 2022). It enables marketers and policymakers to identify customer needs and competitive actions (Das et al., 2023). Chen and Chang (2013) define GC as the generation of innovative and useful concepts pertaining to green products, processes, or practices, which are unique and novel. Practical and innovative ideas, methods, and products are the outcomes of creativity (Hanan & Hemanto, 2020). These beneficial concepts have the potential to improve manufacturing enterprises' green exploration and exploitation innovation. Hence, if companies can ensure GC, it can result in green exploration and exploitation.

2.3 Green Innovation (GI)

Environmental performance is a critical concern for every company, and GI can help achieve this goal by minimizing waste and saving energy (Yu et al., 2022). The adoption of GI has become an urgent matter to maintain a healthy environment. However, there are several definitions of GI in the literature. According to Chen (2008, p.534), it refers to "hardware or software innovation related to green products or processes, including technologies involved in energy-saving, pollution-prevention, waste recycling, green product designs, or corporate environmental management". Firms can engage in green exploitation (XPL) and green exploration innovation (XPT) to address ecological issues (Wang et al., 2020). XPL concentrates on obtaining new environmental knowledge, information, and abilities to create novel green markets and products. XPT involves using existing ecological knowledge, capabilities, and processes to enhance eco-friendly products and designs (Chen et al., 2014). Successful GI can benefit a company by increasing its expertise and enhancing its green image, ultimately leading to improved profitability (Chen, 2008).

3. Research Hypothesis

3.1 CSR and Ambidextrous Green Innovation (AGI)

According to stakeholder theory, businesses are responsible for meeting the requirements and desires of their stakeholders, such as customers, workers, suppliers, and the surrounding communities (Freeman, 1984). To do so, companies must engage in both exploratory and exploitative green innovation, which are crucial for promoting sustainability and caring for the environment (Chen et al., 2014; Triguero et al., 2013). Manufacturing firms can enhance their GI through CSR strategies, which help develop new green products and improve existing eco-friendly ones (Albino et al., 2009; Dangelico & Pujari, 2010). CSR practices not only aid in creating unique business models that promote XPL and XPT (Reverte et al., 2016; Tsang et al., 2021) but also assist companies in building and managing relationships with stakeholders, which is essential for developing XPL and XPT (Luo & Du, 2015; Zhao et al., 2021). Moreover, building strong connections with stakeholders helps companies gain legitimacy, create long-term value, and leverage resources and capabilities, creating a favorable environment for the development of green innovation (Han & Lee, 2021).

Furthermore, stewardship theory suggests that employees who work for organizations are intrinsically motivated to complete assigned tasks (Donaldson & Davis, 1991). When a firm engages in CSR, employees consider themselves stewards and work to improve society, the organization, and the environment, helping to develop green products and services (Hernandez, 2008; Murtaza et al., 2021). Moreover, CSR-oriented businesses can expand their reach through interactions with shareholders that inspire innovation (Marin et al., 2017). Companies can develop new green products and services and improve existing ones by implementing CSR practices. As per McWilliams and Siegel (2000), CSR and innovation are closely related. In addition, the firm's RBV suggests that a company's resources and competences can provide a sustainable distinctive advantage and contribute to developing new products and services (Barney, 1991). CSR practices are a resource that firms can use to develop green exploration and exploitation innovation. Businesses can foster an environment conducive to the growth of green innovation by cultivating and managing relationships with stakeholders, acquiring credibility and social acceptance, producing long-term value for stakeholders, and utilizing resources and capabilities. However, earlier studies examined the effect of CSR on GI in terms of green product and process innovation (Yuan & Cao, 2022). Researchers have not applied CSR to assess AGI. Hence, the following idea is put forward in this study to fill the gaps in the existing literature: Hence, we propose that:

- H1a: CSR has a positive influence on green exploration innovation.
- H1b: CSR has a positive influence on green exploitation innovation.

3.2 CSR and Green Creativity

Companies can develop new ideas and think based on their CSR activities, and their associated practices provide the necessary information from different stakeholders. The information obtained from the CSR practices inspires the development of a firm's GC, which refers to the "development of new ideas about green products, services, processes, or practices that are original, novel, and useful" (Chen & Chang, 2013, p.113). Companies that actively practice CSR may consider consumer needs when designing and producing green products and lessen the ecological impact of the manufacturing and procurement processes by focusing on suppliers' green knowledge and skills (Jiang et al., 2018). Additionally, by implementing CSR strategies, firms may increase resource integration channels and build stronger ties with stakeholders such as buyers, partners, suppliers, and governments to access more abundant green resources (Flammer & Kacperczyk, 2016). Thus, corporate environmental information insight is improved through CSR practices that enhance GC (Ahmad et al., 2022).

Companies that actively practice CSR cultivate positive relationships with industry groups (Forcadell et al., 2020). Through these interactions, businesses can better comprehend customer needs and government policies that encourage green development and creativity and quickly identify business prospects that will result in new profit growth. CSR programs are crucial in developing relationships and strengthening current bonding (Luo & Du, 2015). Activities of CSR also help firms cultivate new links with the environmental public, green-sensitive customers, and community leaders (Sharma & Vredenburg, 1998). Furthermore, these social initiatives assist a firm in developing a link with diverse stakeholders. As a result, firms with more extensive and deeper networks of relationships have more readily available information and ideas from their sponsor networks (Jansen et al., 2006). Thus, CSR aids a company's pursuit of green creativity. Therefore, we propose:

- H2: CSR has a positive effect on green creativity.

3.3 Green creativity and Ambidextrous Green Innovation

Creativity means producing innovative and practical concepts, methods, and items (Hanan & Hemanto, 2020). GC involves explicitly the development of new ideas that lead to creating green products and practices (Chen & Chang, 2013; Hunt & Morgan, 1995). Green creativity is a crucial driver of GI, developing novel processes and products that minimize waste and save energy (Zameer et al., 2020). Creativity also plays a critical role in identifying buyer needs, understanding competition, and navigating a rapidly changing business environment and these skills are necessary for companies to explore and exploit GI (Das et al., 2023). Mittal and Dhar (2016) suggest that GC involves developing novel ways to improve environmental sustainability. Therefore, creativity is a precursor to GI (Sarac et al., 2014). Stakeholder theory posits that green regulations and policies are a reflection of the interests and concerns of stakeholders. This is the reason why governments

encourage businesses to adopt environmentally-friendly practices. This perspective is particularly relevant in the current global context, where there is a growing emphasis on environmental responsibility. For this reason, business leaders are constantly seeking innovative ideas to create environmentally-friendly products and practices (Eiadat et al., 2008). Hence, we suggest:

- H3a: GC has a significant impact on green exploration.
- H3b: GC has a significant impact on green exploitation.

3.4 Mediating Effect of Green Creativity Between CSR and AGI

The need for businesses to generate green innovation is becoming increasingly important as consumers become more aware of environmental issues (Zhang et al., 2020). GC is essential to foster innovation in green exploitation and exploration, which can benefit the company. While GI involves transforming ideas into practical and financially successful green products, services, and practices, GC involves generating novel ideas, methods, and activities related to environmental sustainability (Wyer et al., 2010). It is a critical driver of sustainable development and helps firms develop a positive green image (Zameer et al., 2020). Mittal and Dhar (2016) also suggest that GC involves presenting innovative ways to enhance sustainable performance. Song and Yu (2018) argue that firms can generate new ideas from corporate and environmental issues, leading to GC. GC is necessary for manufacturing to translate concepts into green exploration and exploitation. Therefore, developing GC is crucial for fostering innovation-related activities (Arici & Uysal, 2022). CSR practices can significantly impact GC, which, in turn, fosters green exploration and green exploitation innovations. As a result, the relationship between CSR and XPL-XPT can be mediated by GC.

In addition to fostering GC, CSR activities help businesses cultivate positive relationships with stakeholders and respond to demands for green development from governments, suppliers, and consumers. According to institutional theory, businesses are motivated to pursue green development due to environmental pressures from stakeholders (Guo et al., 2020). This institutional pressure can inspire companies to focus on practical green innovation ideas (Qiu et al., 2020). We argue that when companies practice CSR, they are better able to understand the demands of stakeholders for GI. This understanding can help firms generate new green ideas to aid exploratory and exploitative GI. Furthermore, improving GC can assist businesses in accurately identifying consumer desires for green products and provide information to support green product innovation (Das et al., 2023; Joshi & Dhar, 2020). Therefore, practicing CSR can positively impact green creativity by providing businesses with a better understanding of stakeholder demands for exploratory and exploitative GI and help businesses better meet consumer demands for environmentally-friendly products. Hence, we suggest:

- H4a: GC mediates the relationship between CSR and XPL.
- H4b: GC mediates the relationship between CSR and XPT.

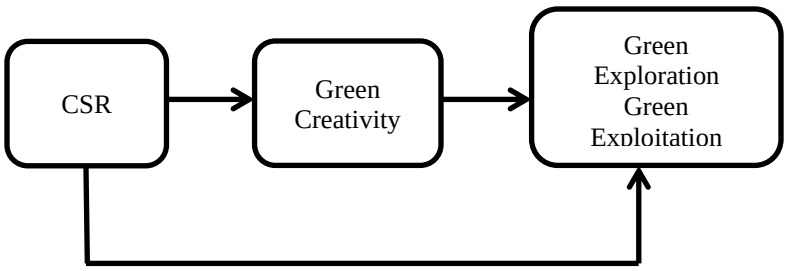

Figure 1: Theoretical Framework

4. Research Methodology

4.1 Population and sampling

Manufacturing is one of the major industrial sectors in Bangladesh and sup.ports the growth of this nation's economy; however, this industry causes environmental pollution. Given their high pollution and energy consumption levels, green innovation is essential for manufacturing companies in the economic revolution era (Li et al., 2018). The survey questionnaire examined CSR, GC, XPL, and XPT. We selected manufacturing firms in Dhaka and Chittagong and gave questionnaires to 500 managers. A total of 227 questionnaires were filled out and received, and seven of these had missing data. In all, 220 questionnaires were examined. Previous researchers have suggested that a sample size of over 200 is adequate for conducting covariance-based SEM (Sultan et al., 2021). A convenience sampling method was used to gather the data between October 2022 and January 2023. We utilized convenience sampling as it allows for the quick acquisition of sufficient responses within a short amount of time (Al-Swidi et al., 2021). In order to comprehend the factor structure, two academics initially validated the instrument and conducted a pre-test on 60 participants. The questionnaire comprised a total of 28 items on a 1–5 scale, with 1 denoting “strongly disagree” and 5 denoting “strongly agree”; however, four items were eliminated from the CSR because of a low loading factor. The collected data were analyzed with CB-SEM using SPSS AMOS 23. It was utilized for several reasons. Firstly, CB-SEM employs a maximum likelihood (ML) estimation procedure and is a suitable data analysis tool for management research (Zhang et al., 2021). Secondly, CB-SEM is recognized as the most appropriate method for examining mediating effects, as it offers advantages such as flexible manipulation of analysis for mediation (Iacobucci et al., 2007). Thirdly, CB-SEM provides more accurate estimates than other quantitative analytical methods (e.g., PLS-SEM) for a sample size of 50 or more (Jannoo et al., 2014). In this study, we first analyzed the measurement model to evaluate validity, reliability, and statistical fit, and later, we assessed the structural model and path analysis (Hair et al., 2010).

4.2 Measures

Using its 14 items, CSR was evaluated and adopted from (Yuan & Cao, 2022). Six items of green creativity were adapted from (Song & Yu, 2018). The items of exploratory and exploitative GI were adapted from (Wang et al., 2020). Four items are, however, removed from the CSR owing to poor factor loading. CSR, GC, and XPL-XPT are all measured using 28 items on a 5-point Likert scale.

4.3 Common Method Bias

Due to the fact that this study used data from a single source to acquire information on both independent and dependent components, common method bias (CMB) issues are likely to arise. Harman's single factor test was applied to evaluate CMB (Podsakoff et al., 2003). It might strengthen the connection between variables that are measured (Conway & Lance, 2010). The results of this investigation confirm that a single component explains 31.008 percent of the total variation when the single-factor technique of Harman is applied to compute CMB. Therefore, there is no CMB problem in the data. A total variance value greater than 50% discloses the existence of a CMB problem, whereas a CMB value less than 50% confirms the absence of a CMB problem. Consequently, there is no CMB problem in the data in this investigation (Williams et al., 1989).

4.4 Sample Characteristics and Data Collection

To collect data relating to the research hypotheses, a survey was employed. The managers of industrial companies received the questionnaire. The survey's respondents were senior executives (Managers, general managers or top executives).

Table 1: Sample Characteristics (N = 220)

Characteristics of firms	Classifications	Frequency	Percentage
	Less than 100	20	9.09
	101-500	45	20.45
Firm size (Number of employees)	501-1000	90	40.90
	1001-2000	35	15.90
	Above 2000	30	13.63
	Less than 5	20	9.09
	6-10	50	22.72
Firm age (year)	11-15	75	34.09
	15-20	45	20.45
	Above 20	30	13.63

5. Data Analysis and Results

5.1 Assessment of Measurement Model

In order to assess the structural validity, discriminant validity, and convergent validity of the model, confirmatory factor analysis was conducted using the SPSS v.23 and AMOS

v.23 software on the key variables of “corporate social responsibility”, “green creativity”, “green exploration innovation and green exploitation innovation”. The CFA's outcomes are displayed in (Table 2). These findings demonstrated that all constructs had factor loadings that were above 0.7, average variance extracted (AVE) values that were all above 0.5, and construct reliability values that were all above 0.7. The value of the results is within the advised threshold ranges (Hair et al., 2014), which guarantees convergent validity (Hair et al., 1998). As recommended by Fornell and Larcker (1981), the discriminant validity of the research constructs was evaluated, as shown in table 3. Additionally, Cronbach's alpha (α) value was greater than 0.7, demonstrating the validity of the constructs (Hair et al., 2010). Additionally, the model is fit since its index value is within the suggested ranges, supporting the assertion that the model is well-fitted. The goodness-of-fit indices (CMIN/DF=1.584, CFI= 0.957, GFI= 0.875, TLI=0.951, SRMR=0.046, RMSEA=0.052, PClose=0.380) support the measurement model's unidimensionality (Hair et al., 2010).

Table 3 indicates the high degree of correlation between the constructs, but none of the correlations exceed 0.9, suggesting that there is no multicollinearity among these variables (Tabachnick & Fidell, 2012). A path diagram in the structural equation model is illustrated in Figure 2, displaying the standardized coefficient (β) and the items' loading in the path model relationships. Furthermore, Table 4 provides a summary of the findings from fitting the research model, in addition to Figure 2.

Table 2: Summary of the Measurement Model

Constructs	**Statements**	**Factor Loading**
CSR AVE=.650, CR=.948, α=.948	The company establishes procedures to comply with customer complaints.	0.824
	The company tries to ensure its survival and long-term success.	0.818
	The company keeps a strict control over its costs.	0.855
	The company tries to maximize its profits.	0.868
	The company offers safety at work to its employees.	0.802
	The company uses part of its budget for donations and social projects to advance the situation of the most underprivileged groups of the society.	0.861
	The company offers training and career opportunities to its employees.	0.895

	The company uses part of its budget for donations and social projects to advance the situation of the most underprivileged groups of the society.	0.70
	The company is concerned to improve the well-being of society.	0.775
	The company behaves responsibly regarding the environment.	0.874
Green Creativity (GC) AVE=.533, CR=.870, α=.871	Members of the green product development project propose new green ideas to improve environmental performance	0.804
	Members of the green product development project suggest new ways to achieve environmental goals	0.704
	Members of the green product development project promote and champion new green ideas to others	0.863
	Members of the green product development project develop adequate plans for the implementation of new green ideas	0.843
	Members of the green product development project would rethink new green ideas	0.718
	Members of the green product development project would find out creative solutions to environmental problems	0.75
Green Exploration (XPL) AVE=.865, CR=.865, α=.861	The company actively adopts new green products, processes and services.	0.838
	The company actively exploits new green products, processes and services.	0.857
	The company actively discovers new green market.	0.787
	The company actively enters new green technology.	0.872
Green Exploitation (XPT) AVE=.834, CR=.834, α=.835	The company actively improves current green products, processes and services	0.816
	The company actively adjusts current green products, processes and services	0.780
	The company actively strengthens current green market	0.823
	The company actively strengthens current green technology	0.844

α= Cronbach's alpha, CR= Construct reliability, AVE=Average variance extracted

Table 3: Descriptive Statistics and correlation Matrix for the constructs from CFA

Constructs	**Mean**	**SD**	**CSR**	**GC**	**XPL**	**XPT**
CSR	3.57	.66	**(0.806)**			
Green Creativity	3.50	.59	0.209**	**(0.730)**		
Green Exploratory Innovation	3.53	.60	0.343***	0.321***	**(0.785)**	
Green Exploitative Innovation	3.59	.55	0.225**	0.300***	0.301***	**(0.746)**

***Correlation is significant at $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

5.2 Hypothesis Assessment

We utilized structural equation modeling to assess the study framework and hypotheses. Figure 2 depicts the path relationship in the structural model, which exhibited a superb model fitness. Based on the overall fit index measurements, the structural model's fit was deemed acceptable (CMIN/DF=1.83, CFI= 0.937, GFI= 0.855, TLI= 0.930, SRMR= 0.053, RMSEA=0.062) (Hair et al., 2010). Table 4 displays the outcomes for the structural model. H1a and H1b hypothesized that CSR has a positive influence on XPL and XPT. The results demonstrate that CSR is significantly related to XPL (β= 0.288, t-value=3.52), and XPT (β= 0.167, t-value=2.212), thereby supporting H1a and H1b. These findings support preceding studies based on green innovation (Hao & He, 2022; Nureen et al., 2023) that found CSR has a positive impact on GI in developing countries. CSR practices play a crucial role to develop new and existing eco-friendly products. Again, H2 hypothesized that CSR has a positive influence on GC. Results show that CSR is positively related to GC (β= 0.211, t-value=2.851) as shown in table 4. Therefore, H2 provide support for this research. The finding of our results supports the study of (Ahmad et al., 2022). This implies that CSR activities help firm develop GC in the manufacturing organization. Additionally, H3a and H3b hypothesized that GC has a significant impact on XPL and XPT. The results show that GC is strongly and positively correlated with XPL (β= 0.268, t-value=3.85) and XPT (β= 0.270, t-value=3.378). This research fortifies H3a and H3b and implies that higher levels of GC are helpful for a manufacturing firm in fostering green exploration and exploitation. The finding of our results supports the study of (Song & Yu, 2018) in term of GI. Our study contributes to the current literature that GC fosters XPL and XPT.

Table 4: Result of Hypotheses Test

Hypothesis	Path relationships	ß	S. E	*t value*	*P-value*	Decisions
H1a	CSR –> Green exploratory innovation	0.288	0.072	3.52	0.000	Significant
H1b	CSR –> Green exploitative innovation	0.167	0.06	2.212	0.027	Significant
H2	CSR –> Green Creativity	0.211	0.065	2.851	0.004	Significant
H3a	Green creativity –> Green exploratory innovation	0.268	0.063	3.853	0.000	Significant
H3b	Green creativity –> Green exploitative innovation	0.270	0.071	3.378	0.000	Significant

*** Correlation is significant at p < 0.001, ** Correlation is significant at p < 0.01, *Correlation is significant at p < 0.05

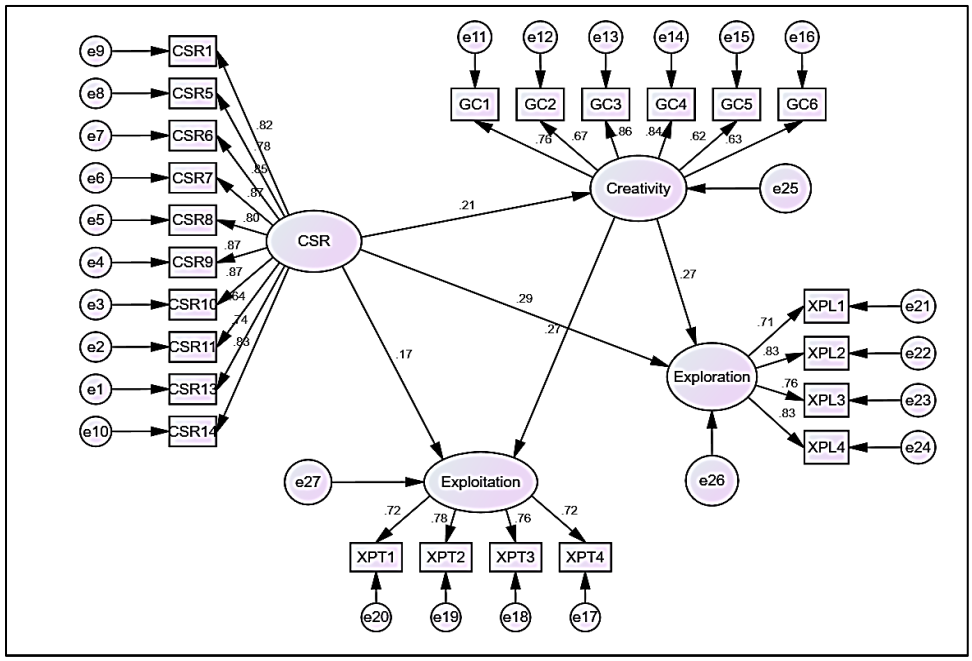

Figure 2: Structural Model

5.3 Mediation Testing of Green Creativity

Next, we looked into mediation effects (H4a-H4b). 2000 resamples were utilized in the bootstrapping procedure, and the 95 percent confidence intervals were utilized to gauge how significant the bridging effects were (Byrne, 2009). Partial mediation and complete mediation are the 2 different types of mediation. According to (Cheung & Lau, 2008, p.304), "When both direct path and indirect path from independent variable to dependent variables are significant, it is assumed to be partial mediation; however, if the direct effect is insignificant and indirect effect is significant, it is assumed to be full mediation". Accordingly, the results in Table 5 demonstrated that GC partially mediated the relationships between CSR and green exploration innovation (direct effect = 0.288, $p < 0.01$; indirect effect = 0.056, $p < 0.01$) and green exploitative innovation (direct effect = 0.167, $p < 0.05$; indirect effect = 0.057, $p < 0.01$). Therefore, H4a and H4b were approved as a result. Table 5 displays a summary of the mediation's outcomes. Finally, the study's results revealed that GC played a significant mediating role in the relationship between CSR and AGI. These findings are in line with those of Yuan and Cao's (2022) research. This study is the first of its kind to investigate the interplay between CSR, AGI, and GC in the Bangladeshi manufacturing industry. Our research demonstrated that CSR not only directly impacts AGI, but also indirectly influences it through GC. These results are consistent with institutional theory, which suggests that by practicing CSR, companies can better understand the demands of stakeholders for GI. Simultaneously, companies can gain access to green innovation resources by establishing good cooperative relationships with external stakeholders (Joshi & Dhar, 2020). This understanding can help firms generate new green ideas that will aid in both exploratory and exploitative GI.

Table 5: Mediation Test

Hypothesis	Path	ß-Value	*P* value	Result	Conclusion
	CSR –> Green exploratory innovation	.288	***	Significant	Partial Mediation
H(4a)	CSR –> Green creativity –> Green exploratory innovation	.056	.001	Significant	
	CSR –> Green exploitative innovation	.167	.027	Significant	Partial Mediation
H(4b)	CSR –> Green creativity –> Green exploitative innovation	.057	.002	Significant	

6. Discussion

This study investigates the impact of CSR on GC and AGI and the mediating role of GC in the association between CSR and AGI. Additionally, the study examines the impact of GC on AGI. First, the results of the study demonstrate that CSR has a direct impact on both green exploration and green exploitation. These findings are in line with preceding studies by Hao and He (2022), Nureen et al. (2023), and Wan et al. (2023). Moreover, the findings of Yuan and Cao's (2022) research corroborate this conclusion concerning GI, as they discovered that CSR significantly positively impacts green products and process innovation. Our study examines the mechanism of CSR and XPL-XPT through the lens of RBV, providing a valuable addition to the current CSR literature. These findings align with the RBV, which suggests that a company's resources and capabilities can provide a sustainable distinctive benefit and contribute to developing new products and services (Barney, 1991). Thus, CSR practices can be seen as a resource firm can use to develop XPL and XPT. As Martin et al. (2017) suggest, CSR-oriented businesses can enhance their reach through interactions with shareholders that inspire innovation. Therefore, implementing CSR practices can help companies expand their innovation capabilities and develop sustainable solutions to environmental challenges.

Second, our study reveals a significant association between CSR and GC, whereby GC is crucial in promoting both green exploration and exploitation. The findings indicate that CSR practices can facilitate firms in establishing and managing relationships with various stakeholders, thereby obtaining novel ideas and information. By implementing these ideas, firms can enhance their innovation capabilities in green exploration and exploitation. These findings align with prior studies on creativity, such as Abdullah et al. (2017), Luo and Du (2015), and Song and Yu (2018). The results of our study also support the stakeholder theory that highlights the importance of fulfilling the expectations of stakeholders (Freeman, 1984). Furthermore, firms are increasingly facing stricter environmental regulations imposed by governments (Eiadat et al., 2008), which has resulted in stakeholders pressuring managers to prioritize green innovation strategies for addressing environmental issues. Executing creative green ideas can help firms enhance their innovation capabilities in XPL and XPT. Therefore, our findings demonstrate that GC significantly fosters AGI, which is consistent with the recommendations of Chen and Chang (2013). We also examined the relationship between GC and AGI and found positive relations. This study's findings align with those of Bocquet et al. (2017) and Ratajczak and Szutowski (2016).

Third, the current research explores the mediating role of GC in the connotation between CSR and AGI, which has received scant attention in prior research. Therefore, our study successfully fills this gap by examining the impact of GC in the connection between CSR and AGI. To summarize, our study concludes that CSR, directly and indirectly, impacts AGI mediated by GC. Our research enriches the existing literature on CSR and AGI by comprehensively understanding their relationship.

6.1. Theoretical Contribution

This study represents a significant theoretical contribution by exploring the link between CSR, GC, and ambidextrous GI, specifically in terms of green exploration and green exploitation. Prior research has emphasized the importance of CSR and GI (Shahzad et al., 2020; Hao & He, 2022; Mbanyele et al., 2022). The papers of Yuan and Cao (2022) and Le (2022) investigated the role of CSR on green innovation in terms of "green product and process innovation". Besides previous studies, few studies examined the role of CSR on firm performance (Nureen et al., 2023) or environmental performance (Hsu & Chen, 2023), with little attention given to the effect of CSR on AGI. Consequently, this study is pioneering in its significant contributions to these areas. This study represents a pioneering effort to empirically investigate the influence of CSR on XPL and XPT within the context of the Bangladeshi manufacturing industry.

Second, prior studies have utilized various theories, such as contingency theory, RBV, and AMO, to explore the link between CSR and GI (Liao & Zhang, 2020; Rötzel et al., 2019; Singh et al., 2020). However, the present study contributes to the existing literature by employing a combination of RBV, institutional theory, and stakeholder theory to investigate the link between CSR, GC, and AGI, as each theory offers unique strengths. We state that CSR practices can be considered a resource from the perspective of RBV that firms can use to develop XPL and XPT innovations (Zhang et al., 2022). From the viewpoint of stakeholder theory, CSR is crucial to addressing stakeholder interests and promoting XPL and XPT (Le, 2022). Thus, this theory has considerable potential to elucidate the association between CSR and AGI within the framework of the manufacturing industry in Bangladesh. This study makes a significant contribution by examining the role of GC as a mediator between CSR and green exploration and exploitation, which has not been studied extensively. The study's findings proved that CSR practices facilitate XPL and XPT, and GC mediates the relationship between CSR and AGI. Previous studies have investigated factors that drive GI, including the viewpoints of diverse stakeholders, such as retailers, government bodies, competitors, and shareholders. (Li et al., 2018). However, this study's key finding is that GC plays a vital role in mediating the link between CSR and ambidextrous GI.

6.2. Managerial Implications

Our study has important implications for business executives, legislators, and other professionals concerned with promoting environmentally-friendly practices in manufacturing firms in Bangladesh. Our research highlights the importance of CSR in fostering XPL and XPT, emphasizing the need for firms and their stakeholders to develop better relationships to identify the demand of consumers and society for environmentally-friendly products. By gaining information from stakeholders, manufacturing firms can develop GI that ensures environmental performance, leading to the development of new and improved green products and services. Our findings suggest that CSR activities can

help firms develop new green products and advance prevailing ones, ultimately contributing to environmental performance. CSR can also be a significant source of GC, enabling firms to acquire novel ideas that ensure XPL and XPT innovation.

Therefore, maintaining proper CSR can enable a firm in Bangladesh to develop creative ideas and improve XPL and XPT, ultimately leading to enhanced green performance. Moreover, in order to build green performance, managers of manufacturing firms must recognize CSR, as several studies have shown that it greatly improves organizational effectiveness (Long et al., 2020; Orazalin, 2020). To promote GI, CSR and eco-creativity must be priorities for general managers and decision-makers of manufacturing companies in Bangladesh. Our research also indicates a connection between CSR and GC in that GC greatly encourages AGI. Therefore, managers should focus more on innovative suggestions for developing environmentally-friendly products and procedures and put these ideas into practice to improve green exploration and exploitation. Bangladeshi manufacturing companies should enhance GC by creating tight relationships between departments and stakeholders, including product development, production, and advertising.

Additionally, Companies should work closely with suppliers, distributors, and other relevant stakeholders to gather input from all parties and pursue innovative green technologies. Our study shows that CSR and AGI are mediated by GC, highlighting the importance of businesses being aware of how GC may lead to GI. Thus, CSR activities should be beneficial for managing manufacturing firms in Bangladesh to enhance GI.

6.3. Limitations and Future Research

One of the limitations of this study is that its sample scopes only considered manufacturing enterprises. A future study could expand our approach to include other sectors relevant to green growth, such as construction, farming, and the chemical industry, to confirm our findings' applicability. Second, because this study only focused on the role of GC as a mediator between CSR and AGI, it did not account for the boundary conditions of CSR's effect on GI. Moreover, the research solely focuses on green creativity's mediating role. Therefore, future research should incorporate other mediating and moderating variables to deepen the comprehension of the implications of green innovation. The present study utilizes a quantitative approach as its primary research method, and it may be beneficial for future studies to employ a mixed-method approach to broaden the range of research methodologies in this field. Lastly, as our research was conducted in Bangladesh, where a unique cultural environment exists, further studies could be conducted in other countries to explore possible variations.

6.4. Conclusion

Green innovation has attracted much attention due to environmental issues in developing nations. This study investigates the effect of CSR on AGI and GC, specifically by examining how the latter functions as a mediator in the interaction between CSR and GI. Our results show that CSR has a direct impact on innovation in green exploration and green

exploitation. CSR has a clear correlation with green creativity and is more connected to green exploration innovation than green exploitation innovation. Our findings, therefore, also demonstrate that GC serves as a mediator between CSR and ambidextrous GI.

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