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Conflict of Interest
The author (s) declared no conflict of interest and have not received any funds for the project.

Antecedent to Green Creativity and the Moderating Role of Green Intrinsic Motivation and Green Autonomy

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Abstract

Concern about the green environment has increased significantly in recent years. Regulators now have strict policies and regulations for firms to reduce pollution by recycling water and other industrial waste. However, policies and regulations may not reduce environmental decay unless all the stakeholders, including employees and management of the firms, actively contribute to making the environment sustainable. Given its importance, the study has focused on Pakistan's chemical sector, which significantly contributes to environmental decay. The study has three independent variables (i.e., green intrinsic motivation, green transformation leadership, and green innovation climate), one dependent variable (i.e., green creativity), and two moderators (i.e., green extrinsic motivation and green autonomy). The study collected a sample of 460 from the target sector and found that our results support five hypotheses but do not support one. The results show that "green intrinsic motivation and green innovation climate significantly affect green creativity." However, "green innovative climate insignificantly affects green creativity." We also found that "green transformational leadership positively affects green creativity and green intrinsic motivation." The study also documents that "green extrinsic motivation moderates green intrinsic motivation and green creativity." Moreover, "green autonomy moderates the green innovation climate and green creativity."

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Introduction

Various theories, including Resource-Based Theory, underscore the pivotal role of business entities' future in adopting and practicing policies and procedures related to a sustainable environment (Panda, 2023). As per the Paris Accord, the global community has committed to phasing out manufacturing units that harm the green environment (Qin & Yu, 2023). Consequently, such units will be transformed into green firms (Zuhaida & Alkazahfa, 2023). Numerous researchers advocate that green production enhances efficiency and reduces environmental pollution (Ren et al., 2022). Green creativity refers to developing innovative green products and environmentally friendly services (Ogbeibu et al., 2021). Several factors influence green creativity, including green passion (Shah et al., 2023), green intrinsic motivation, green extensive motivation (Faraz et al., 2021), and green autonomy (Tian et al., 2020).

Notably, many scholars argue that green visionary leaders contribute significantly to developing and marketing green products (Begum et al., 2022). For instance, the CEO of Good Energy's green vision translated into supplying 100% electric devices and equipment in Britain (Maitlo et al., 2022). Moreover, the CEO of Tesla has shared his green vision with the employees. As a result, it launched innovative green products, including electric cars and solar energy solutions for homes and offices (Townsend, 2018). In contrast, leaders in developing Asian countries are less green visionary than those in developed countries (Tian et al., 2020).

The Theory of Creativity postulates that individuals' positive attitude toward green sustainability promotes green creativity (Shah et al., 2023). Thus, we argue that organizational climate stimulates employees' green-creative behavior, especially if they are motivated and have relevant skills (Abualigah et al., 2023). Extant literature maintains that a green-innovative climate empowers employees and gives them the freedom to practice and implement green innovation (Tuan, 2023). Building on the Creative Theory, we argue that a green-innovative climate is an important precursor of green innovative activities (Ogbeibu et al., 2021). Besides other benefits, a green-innovative environment rewards employees for creative ideas and provides all the necessary resources to support green creativity (Mansoor et al., 2021).

The literature also argues that organizations that adopt green creativity and innovation will have a competitive edge over firms that do not practice them.

Supporting these discussions, we argue that firms that practice green practices would positively affect their brand image (Qayyum et al., 2023). Thus, we also argue that green visionary leaders promote an environment that motivates and inspires employees to create environmentally friendly products (Luu, 2023). Extending this argument, we believe that transformational leaders promote green creative behavior, a precursor of environmental sustainability (Samad et al., 2023). Although green transformational leadership is instrumental in promoting a green environment, its success significantly depends on the intrinsic and extrinsic motivation of the employees (Awan et al., 2023).

Given the above discussion, the study examines the "impact of green intrinsic motivation, green transformational leadership, and green innovation climate on green creativity." It also examines the effect of green transformational leadership on green creativity and green intrinsic motivation. Furthermore, it also examines the moderating role of green intrinsic motivation and green autonomy on green creativity.

Literature Review and Hypotheses Development

Green Intrinsic Motivation and Creativity

Employees' motivational orientation is not uniform. It varies from employee to employee (Hu et al., 2022). Researchers believe that intrinsically motivated individuals find work assignments interesting. Therefore, they take more interest in job-related assignments (Fishbach & Woolley, 2022). Such employees develop new skills, resulting in high motivation and engagement (Bougie & Ichise, 2020; Haddad et al., 2023). Moreover, creative, challenging, and interesting jobs increase intrinsic motivation (Baluarte et al., 2023). Furthermore, extant literature highlights that intrinsic motivation positively correlates with green creativity (Yesuf et al., 2023).

We found no empirical evidence on the relationship between green intrinsic motivation and green creativity (Emami et al., 2023). However, past studies based on theoretical support have inferred that green intrinsic motivation promotes green creativity. For example, extending motivation and creativity theories, many researchers argue that individuals with a high orientation toward the environment are green-creative (Tuan, 2023). Moreover, many researchers assert that employees with low passion and interest in the green environment have low attitudes and behaviors toward the green environment (Shah et al., 2023). Furthermore, many researchers argue that green-intrinsic-motivated employees are passionate about green environments and often have hobbies related to green plantations and gardening (Conrad & Fehlings, 2023).

H1. Green intrinsic motivation "positively affects green creativity."

Green Transformational Leadership and Green Creativity

Transformational leaders guide employees to achieve firm vision (Awan et al., 2023). Such leaders motivate and inspire employees by treating all employees fairly and without discrimination (Cui et al., 2023). They also empower employees and are concerned about their well-being (Pham et al., 2023). As a result, it enhances employees' creativity and promotes "inspirational motivation, intellectual stimulation, charisma, and individualized consideration" (Odugbesan et al., 2023). Similarly, Hameed et al. (2022) argue that leaders enhance employee creativity through inspirational motivation. As a result, employees solve job-related and personal problems by looking at them from different perspectives. Leaders with charismatic personalities are concerned about the employees. They also share their vision and expectations with the employees, enhancing employee commitment (Zhang et al., 2020. Ahmad, Ullah, & Khan, 2022).

As Begum et al. (2022) emphasize, Green transformational leaders are at the forefront of promoting environmental sustainability. They motivate and inspire employees to be more green-creative, focusing on green environmental goals and encouraging the generation of novel ideas for environmental sustainability (Mansoor et al., 2021). Arici and Uysal (2022) further assert that these leaders must guide, inspire, and motivate employees to adopt and practice green creativity, as supported by the works of Ahmad et al. (2022), Çop et al. (2021), and Pham et al. (2023).

H2. Green transformational leadership "positively affects green creativity."

Green Innovation Climate and Green Creativity

Organizational climate is the perception and attitudes of individuals about an organization (Abbas & Khan, 2023). Song, Wang, and Ma (2020) assert that in an innovative organizational climate, management encourages employees to share their creative ideas with the management and other employees of the organization (Peng & Jia, 2023). Similarly, the employees in green organizations receive explicit and implicit signals from the management about focusing on green creativity (Shah et al., 2023). When employees receive these signals, they often respond positively by sharing their creative ideas with management, resulting in increased self-satisfaction of the employees (Alyahya et al., 2023).

Many researchers believe that the three components of organizational climate are support for innovation (Önhon, 2019), search for creative innovative ideas, and resource supply (Shafiq et al., 2023). Support for innovation allows employees to

work independently (Allan & Meckling, 2023). Search for creative and innovative ideas (Abualigah et al., 2023), enable employees to understand the diversity of work in an organization (Shafiq et al., 2023). Resource supply provides employees with materials, information, and finances for creative and innovative ideas (Abualigah et al., 2023). Moreover, extant literature documents that employees in those organizations are more creative, where they receive bonuses and rewards for creativity, than the employees of the organizations that do not reward employees for creativity and innovation (Allan & Meckling, 2023).

Extending the concept of organizational climate, researchers have developed the concept of green organizational climate (Zafar et al., 2023). A green organizational climate allows employees to focus on green products and practices (Ma et al., 2023). Moreover, such an organization provides materials and finances to the employees for developing green products and practices, resulting in green creativity (Jayaraman et al., 2023). Similarly, Aftab et al. (2024) cite that many studies have examined the association between green organizational climate and green creativity in different domains and found a positive correlation between them. Furthermore, Usman et al. (2023) assert that when employees receive support and encouragement from the management about developing and implementing green practices, their motivation for green products and services increases significantly.

H3. A green, innovation climate "promotes green creativity."

Green Transformational Leadership and Green Intrinsic Motivation
Intrinsically motivated individuals are obsessed with work and are least bothered about rewards (Awan et al., 2023). Similarly, other researchers believe that intrinsic employees' love and passion for work keep them focused on work, promoting creative behavior (Du & Yan, 2022). Many researchers believe that green intrinsic motivation stems from green motivation (Faraz et al., 2021). These researchers argue that intrinsically motivated green employees are more concerned about a sustainable environment than others (Farrukh et al., 2022). Moreover, extant literature documents that compared to other leaders, green transformational leaders promote intrinsic motivation in employees by sharing their professionalism and green vision (Rizvi & Garg, 2021).

Furthermore, researchers believe idiosyncratic leadership is an essential precursor of green intrinsic motivation (Odugbesan et al., 2023). However, past studies have mainly focused on identifying the association between transformational leadership and intrinsic motivation and found they are positively associated (Hameed et al., 2022).

While reviewing the past literature, we found limited studies on the association of "green transformational leadership and intrinsic motivation." (Tosun et al., 2022). Thus, we argue that green transformational leadership intrinsically motivates employees to adopt green environmental behavior (Pham et al., 2023). Moreover, researchers maintain that green transformational leaders encourage and motivate employees to focus on a green environment, enhancing green intrinsic motivation (Xi, Fang, & Feng, 2023). Similarly, Zhu et al. (2022) believe such leaders significantly increase employees' love and passion for pro-environmental issues.

H4: Green transformational leadership "promotes green intrinsic motivation."

Green Extrinsic Motivation as a Moderator

Extrinsically motivated employees' job satisfaction and commitment significantly depend on monetary rewards, including salaries and bonuses (Li et al., 2020). At the same time, researchers believe that contingent rewards decrease the intrinsic interest of the employees (Saether et al., 2020). Similarly, many studies found that employees' motivation decreases when leaders regulate their behavior with extrinsic rewards (Zhang & Liu, 2022). In the same context, Yang et al. (2023) argue that intrinsic motivation decreases when leaders focus more on extrinsic rewards. Similarly, extant literature also cites that individuals with higher green extrinsic motivation exhibit pro-environmental behavior if they believe they will be appropriately rewarded (Ojo, 2022). However, such rewards may decrease the intrinsic motivation of the employees. Moreover, many researchers maintain that external factors, including tangible rewards, punishments, and negative feedback, are inversely associated with employees' creativity (Saintilan & Schreiber, 2023). In the same context, many researchers believe excessive control adversely affects employees' self-determination and creative behavior (Huyghebaert-Zouaghi et al., 2023). Thus, we argue that extrinsic motivation has a varying effect on green motivaton and green creativity.

H5: Green extrinsic motivation moderates green intrinsic motivation and green creativity.

Green Autonomy as a Moderator

Green autonomy refers to empowering employees to perform green tasks (Alsetoohy et al., 2020). In this context, the Self-Determination Theory postulates that the need for autonomy refers to individuals' inherent desire for psychological and physical freedom to carry out their routine activities at work (Haw (2022). Thus, many researchers believe autonomy allows employees to be creative and innovative (Shakil et al., 2023). They also argue that a conducive autonomy-supported environment increases employees'

intrinsic motivation. As a result, they become more creative at work (Santiago-Torner, 2023).

On the contrary, reducing employee empowerment may adversely affect their creativity (Aulia et al., 2024). Similarly, many scholars maintain that the low empowerment of the employees may reduce their innovative and creative behavior (Zhang et al., 2023). Thus, we argue that extending green autonomy to employees may enable them to be creative in green performance (Shafiq et al., 2023). Moreover, scholars argue that a "positive relationship exists between green innovation climate and green creativity" (Arici & Uysal, 2022). Furthermore, many researchers believe green autonmy has a varying effect on the relationship between green innovation climate and creativity (Abbas & Khan, 2023).

H6: Green autonomy "moderates the green innovation climate and green- creativity."

Conceptual Framework
Given the above discussion, the study proposes a model depicted in Figure 1. It has three independent variables, one dependent variable, and two moderating variables.
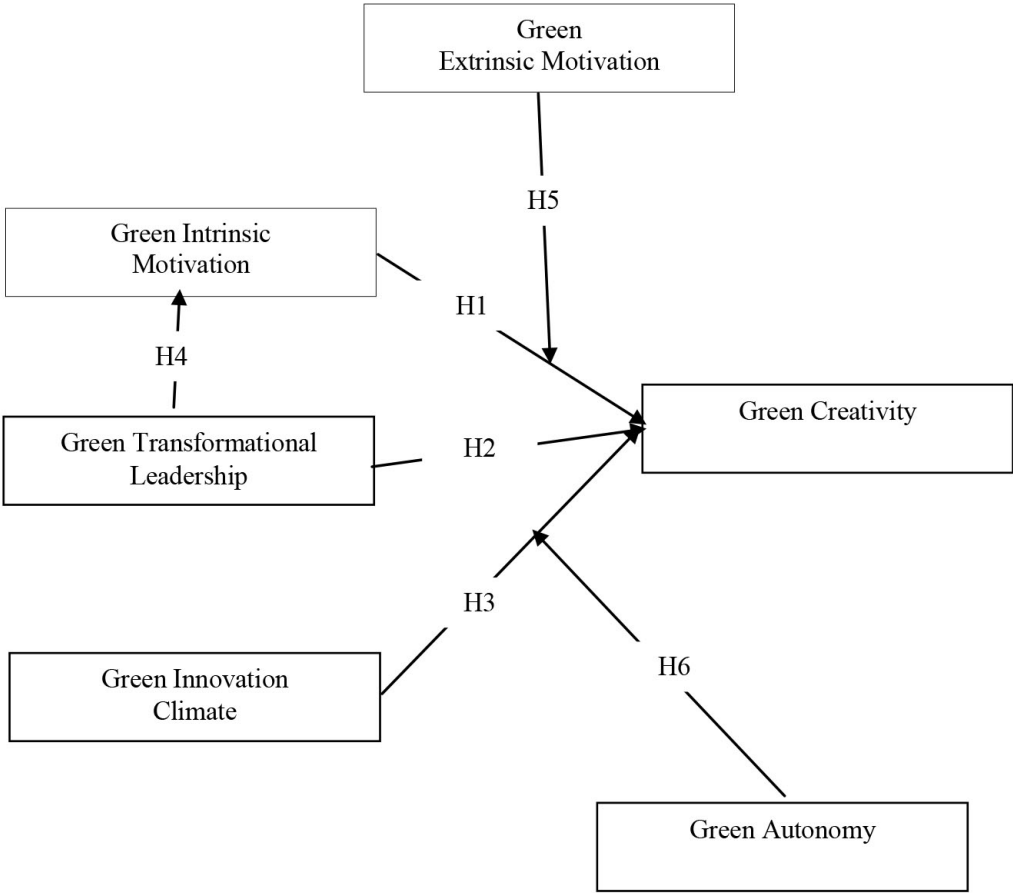
Figure 1: Conceptual Framework

Methodology

Research Design

Research design is the road map for achieving the research objectives (Nayak & Singh, 2021;. Molina-Azorin & Fetters, 2022). The approach used in this study is deductive since, based on the theory, we proposed a model containing six hypotheses, which we empirically tested using Smart PLS (Mello, 2021). The number of elements or individuals refers to a population. The target population for this study is the chemical sector in Pakistan. The study has focused on this sector as it contributes significantly to pollution and environmental decay. Additionally, it is a key sector of Pakistan's economy, and its contribution towards GDP is about 3%. Moreover, it significantly contributes to

employment generation.

Population and Sample Size

Collecting data from the whole population is time-consuming and inefficient. Therefore, the researchers suggest drawing a sample for the study. Researchers also believe that the drawn sample would represent the population provided researchers draw an appropriate sample size and use the right sampling technique (Nayak & Singh, 2021). The study calculated the minimum sample size following Hair Jr. et al. (2017) suggestion. The researchers mentioned above suggest using five to thirty cases for each indicator variable. The number of indicators in this study is 29. Therefore, a sample of 435 (29 indicator variables X 15 cases) will be appropriate for the study. According to the Pakistan Stock Exchange, there are 24 listed chemical industries in Pakistan. Of this total, we randomly selected ten chemical industries and distributed 50 in each. However, we received 460 complete questionnaires.

Ethical Consideration

Before collecting the data from the employees of targeted chemical industries, we obtained permission from the management. Subsequently, we approached the employees non-randomly since the management did not provide us with a sample frame. We also told the respondents that they had no compulsion to fill out the questionnaires. We also explained the study's objectives and informed them that we would use the collected data only for academic purposes. We also told the respondents that we would not share the data with any third party.

Scale and Measures

The study has adopted the questionnaire from past studies. The questionnaire used in the study has two sections. Section one relates to demographics, containing five questions based on a nominal scale. The second part of the questionnaire has six variables and 29 indicators. The study measured the response of the target population using the Five Point Liker Scale, with one suggesting low agreement and five indicating high agreement. Table 1 exhibits a summary of the constructs used in the questionnaire.

Table 1: Scales and Measures

Constructs	Sources	Items
Green Creativity	Chen and Chang (2013)	6
Green Transformational Leadership	Chen and Chang (2013)	6
Green Intrinsic Motivation	Amabile et al. (1994)	6
Green Extrinsic Motivation	Amabile et al. (1994)	5
Green Innovation Climate	Maitlo et al. (2022)	3
Green Autonomy	Maitlo et al. (2022)	3

Results

Respondents Profile

The respondents' profile, besides other aspects, helps readers and future researchers ascertain the generalizability of a study. This study has focused on the chemical sector, and Table 2 exhibits the respondents' classification and frequency in percentage terms.

Table 2: Respondents Profile

Demographic	Classification	Percentage
Gender	Male	65%
	Female	35%
Age Group	Below 30	30%
	30-35	25%
	36-40	20%
	41-50	15%
	50 & Above	10%
Education	Intermediate	16%
	Graduate	65%
	Masters & Above	16%
	Diploma/Others	3%
Employment Structure	Non-Management Cadre	81%
	Middle Management Cadre	13%
	Upper Management Cadre	6%
Income Range	Less than Rs 35,000	32%
	Rs.36,000 – 50,000	29%
	Rs. 51,000 – 75,000	16%
	Rs 76,000 – 90,000	19%
	Rs 91,000 – 120,000	4%

Measurement Model

Researchers suggest using two stages in Smart PLS (Hair Jr et al., 2020). Following the advice of the researchers mentioned above in step one, we developed a measurement model (Hair et al., 2019) for results related to reliability (Spuling et al., 2020), validity (Hair Jr et al., 2020), and other statistical results. Figure 2 exhibits the measurement model.
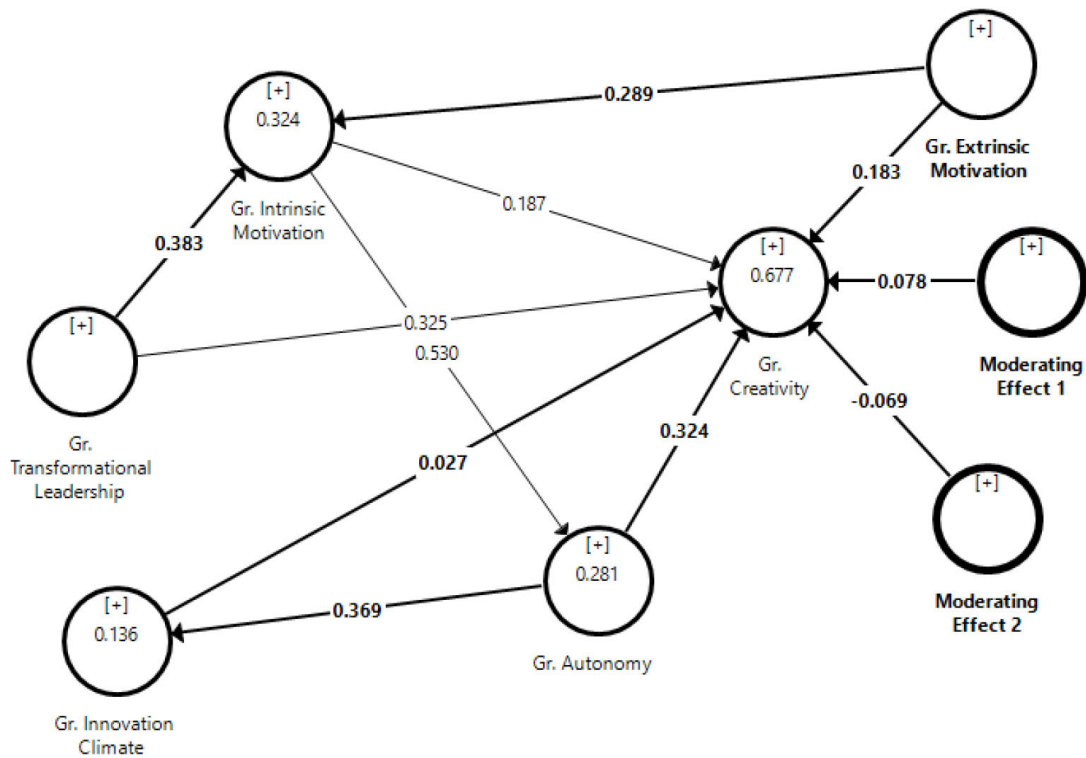
Figure 2: Measurement Model

Descriptive Analysis

Descriptive analysis summarizes the results to draw meaningful conclusions (Nayak & Singh, 2021). It generally includes results related to internal consistency (Sarstedt et al., 2020), Mean, Skewness (Hair Jr et al., 2020), and Kurtosis (Nayak & Singh, 2021). Table 3 exhibits the related results.

Table 3: Descriptive Analysis

Constructs	Cronbach's Alpha	Mean	Std.Dev.	Skewness	Kurtosis
Gr. Autonomy	0.862	3.863	1.537	1.708	1.759
Gr. Extrinsic Motivation	0.894	3.946	1.006	1.363	1.517
Gr. Intrinsic Motivation	0.848	3.954	2.062	2.145	2.105
Gr. Creativity	0.882	3.878	2.188	1.233	2.175
Green Innovation Climate	0.843	3.722	1.766	2.481	1.717
Green Transformational Leadership	0.896	3.723	1.417	2.123	1.902

Hair Jr et al. (2020) suggest that Cronbach's values of the latent variables must "be at least 0.70 for internal consistency." Our results align with the recommendations of the researchers above. Our results also show that the latent variables have adequate univariate normality (Sarstedt et al., 2020) since "Skewness and Kurtosis values are between ±3.5."

Convergent Validity

Hair et al. (2019) suggest using composite reliability and AVE values for convergent validity analysis. Table 4 summarizes the results exhibiting composite reliability and AVE values.

Table 4: Convergent Validity

Constructs	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Gr. Autonomy _	0.874	0.900	0.643
Gr. Extrinsic _Motivation _	0.895	0.919	0.654
Gr. Intrinsic Motivation_	0.853	0.908	0.768
Gr. _Creativity	0.885	0.914	0.682
Green Innovation Climate	0.853	0.894	0.679
Green Transformational Leadership	0.898	0.928	0.763

Spuling et al. (2020) suggest that for convergent validity, the "composite reliability must be at least 0.70, and AVE values must be more than 0.60." The results are within the recommended suggestions, which endorse acceptable convergent validity for the constructs used in the study.

Discriminant Validly

Discriminant validity determines whether the variables used in the study are "unique and distinct." The study ascertained discriminant validity using the criteria of Fornell and Larcker (1981). Table 5 exhibits the results related to discriminant validity.

Table 5: Discriminant Validity

Constructs	GA	GEM	GIM	GC	GIC	GTL
Gr. Autonomy	0.802					
Gr. Extrinsic Motivation	0.635	0.809				
Gr. Intrinsic Motivation	0.53	0.451	0.876			
Gr. Creativity	0.695	0.618	0.606	0.826		
Green Innovation Climate	0.369	0.383	0.233	0.359	0.824	
Green Transformational Leadership	0.453	0.424	0.506	0.653	0.309	0.873

The results in Table 5 show that "AVE square root values exceed Pearson Correlation Values." Thus, it is safe to assume the "constructs used in the study are unique and distinct"(Fornell & Larcker, 1981).

Discriminant Validity using HTMT Criterion

Many researchers, including Ab Hamid, Sami, and Sidek (2017), believe that discriminant validity based on Fornell Larcker's (1981) criteria has certain limitations. Therefore, they suggest using two methods for ascertaining discriminant validity. Following the advice of the researchers above, the study used the HTMT criterion for discriminant validity in addition to Fornell and Larcker's (1981) criterion. Table 6 shows results related to the HTMT criterion.

Table 6: Discriminant Validity (Heterotrait and Montrait Ratio)

Constructs	GA	GEM	GIM	GC	GIC	GTL
Gr. Autonomy						
Gr. Extrinsic Motivation	0.719					
Gr. Intrinsic Motivation	0.614	0.516				
Gr. Creativity	0.776	0.694	0.698			
Green Innovation Climate	0.418	0.439	0.271	0.409		
Gr. Transformational Leadership	0.494	0.466	0.572	0.731	0.347	

The results show that all HTMT values are below the threshold of "0.850, suggesting that the constructs used in the study are unique and distinct."

Predictive Power of the Model

One of the benefits of using Smart PLS is that it gives "the predictive power of the measurement model" (Wong, 2013). Table 7 shows that all the "R square values are greater than 0.20, and Q square values are greater than zero." Thus, we have inferred that the "measurement model has adequate predictive power."

Table 7: R Square Value and Q Square Value

Constructs	R Square	R Square Adjusted	SSO	SSE	Q^2 (=1-SSE/SSO)
Gr. Autonomy	0.281	0.280	5990	4935.213	0.176
Gr. Intrinsic Motivation	0.324	0.323	3594	2709.313	0.246
Gr. Creativity	0.677	0.675	5990	3262.557	0.455
Green Innovation Climate	0.136	0.135	4792	4370.234	0.088

Fit Indices

The results in Table 8 show that the "SRMR value is less than 0.08, and NFI value is

greater than 0.800," suggesting the model has adequate fitness.

Table 8: Fit Indices

	Saturated Model	Estimated Model
SRMR	0.065	0.752
NFI	0.808	0.802

Structural Model

The study generated a structural model for the results related to the hypotheses. The structural model in Figure 3 shows that all the t-values are greater than ± 1.96, except Hypothesis 3, which suggests that "green innovation climate positively affects green creativity." Thus, we have accepted all the hypotheses except Hypothesis 3.
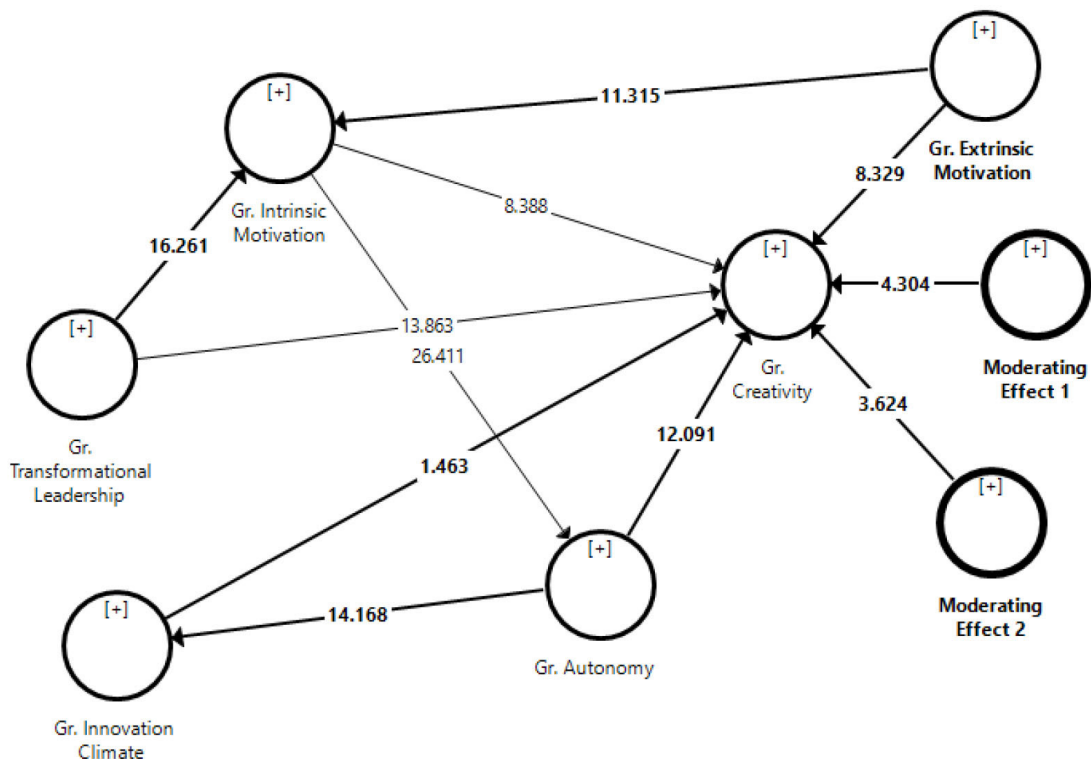

Figure 3: Structural Model

Hypothesis Results

In Table 9, we have presented results related to articulated hypotheses.

Table 9: Hypotheses Results

Hypotheses	B	T Statistics	P Values	Results
Gr. Intrinsic Motivation_ -> Gr. Creativity (H1)	0.187	8.388	0.000	Accepted
Green Transformational Leadership -> Gr. Creativity (H2)	0.325	13.863	0.000	Accepted
Green Innovation Climate -> Gr. Creativity (H3)	0.027	1.463	0.072	Rejected
Green Trans. Leadership -> Gr. Intrinsic Motivation (H4)	0.383	16.261	0.000	Accepted
Gr. Extirnsic Mot. * Gr. Ext, Mot. -> Gr.Creativity (H5)	0.078	4.304	0.000	Accepted
Gr. Autonomy* Gr, Innov. Climate-> Gr. _Creativity (H6)	-0.069	3.624	0.000	Accepted

The results presented in Table 9 show that our study has supported all the hypotheses except Hypothesis 3 (β= 0.027, t=1.463>0.05) which states, "Green innovative climate positively affects green creativity. "

Discussion and Conclusion

Discussion

The study supported Hypothesis 1 (β= 0.187, t=8.388<0.05), stating, "Green intrinsic motivation positively affects green creativity." Extant literature highlights that intrinsic motivation positively correlates with green creativity (Yesuf et al., 2023). We found no studies empirically proving that intrinsic motivation promotes green creativity (Emami et al., 2023). However, past studies based on theoretical support have inferred that green intrinsic motivation promotes green creativity. For example, extending motivation and creativity theories, many researchers argue that individuals with a high orientation toward the environment are green-creative (Tuan, 2023). Moreover, many researchers assert that employees with low passion and interest in the green environment have low attitudes and behaviors toward the green environment (Shah et al., 2023). Furthermore, many researchers argue that green-intrinsic-motivated employees are passionate about green environments and often have hobbies related to green plantations and gardening (Conrad & Fehlings, 2023).

The study supported Hypothesis 2 (β= 0.325, t=13.863<0.05), stating, "Green transformational leadership positively affects green creativity." Hameed et al. (2022) argue that leaders enhance employee creativity through inspirational motivation. As a result, employees solve job-related and personal problems by looking at them from different perspectives. Leaders with charismatic personalities are concerned about the employees. They also share their vision and expectations with the employees, enhancing employee commitment (Zhang et al., 2020; Ahmad, Ullah, & Khan, 2022). Green transformational leaders are concerned about the sustainability of the environment, and they motivate and inspire employees to be more green-creative (Begum et al., 2022). Such leaders motivate employees to focus on green environmental

goals and encourage them to generate novel ideas for environmental sustainability (Mansoor et al., 2021). Extending this argument, Arici and Uysal (2022) assert that green transformational leaders must guide, inspire, and motivate employees to adopt and practice green creativity (Ahmad et al., 2022; Çop et al., 2021; Pham et al., 2023).

The study rejected Hypothesis 3 (β= 0.027, t=1.463>0.05), stating, "Green innovation climate positively affects green creativity." The employees in green organizations receive explicit and implicit signals from the management about focusing on green creativity (Shah et al., 2023). When employees receive these signals, they often respond positively by sharing their creative ideas with management, resulting in increased self-satisfaction of the employees (Alyahya et al., 2023). Many researchers believe that the three components of organizational climate are support for innovation (Önhon, 2019), search for creative innovative ideas, and resource supply (Shafiq et al., 2023). Support for innovation allows employees to work independently (Allan & Meckling, 2023). Search for creative and innovative ideas (Abualigah et al., 2023), enable employees to understand the diversity of work in an organization (Shafiq et al., 2023).

Resource supply provides employees with materials, information, and finances for creative and innovative ideas (Abualigah et al., 2023). Furthermore, extant literature documents that employees in green organizations are more creative, where they receive bonuses and rewards for creativity, than the employees of the organizations that do not reward employees for creativity and innovation (Allan & Meckling, 2023). Extending the concept of organizational climate, researchers have developed the concept of green organizational climate (Zafar et al., 2023). A green organizational climate allows employees to focus on green products and practices (Ma et al., 2023). Moreover, such an organization provides materials and finances to the employees for developing green products and practices, resulting in green creativity (Jayaraman et al., 2023). Similarly, Aftab et al. (2024) cite that many studies have examined the association between green organizational climate and green creativity in different domains and found a positive correlation between them.

The study accepted Hypothesis 4 (β= 0.383, t=16.261< 0.05), stating, "Green transformation leadership positively affects green creativity." Researchers believe idiosyncratic leadership is an essential precursor of green intrinsic motivation (Odugbesan et al., 2023). However, past studies have mainly focused on identifying the association between transformational leadership and intrinsic motivation and found they are positively associated (Hameed et al., 2022). While reviewing the past literature, we found limited studies on the association of "green transformational leadership and intrinsic motivation." (Tosun et al., 2022). Thus, we argue that green transformational leadership intrinsically motivates employees to adopt green pro-environmental

behavior (Pham et al., 2023). Moreover, researchers maintain that green transformational leaders encourage and motivate intrinsically motivated employees to focus on a green environment, enhancing green intrinsic motivation (Xi, Fang, & Feng, 2023). Similarly, Zhu et al. (2022) believe such leaders significantly increase employees' love and passion for pro-environmental issues.

The study accepted Hypothesis 5 (β= 0.078, t= 4.304< 0.05), stating, " Green extrinsic motivation moderates green motivation and green creativity." Many studies found that employees' motivation decreases when leaders regulate their behavior with extrinsic rewards (Zhang & Liu, 2022). In the same context, Yang et al. (2023) argue that intrinsic motivation may decrease when leaders focus more on extrinsic rewards. Similarly, extant literature also cites that individuals with higher green extrinsic motivation exhibit pro-environmental behavior if they believe they will be appropriately rewarded (Ojo, 2022). However, such rewards may decrease the intrinsic motivation of the employees. Moreover, many researchers maintain that external factors, including tangible rewards, punishments, and negative feedback, are inversely associated with employees' creativity (Saintilan & Schreiber, 2023). In the same context, many researchers believe excessive control adversely affects employees' self-determination and creative behavior (Huyghebaert-Zouaghi et al., 2023).

The study accepted Hypothesis 6 (β= -0.069, t= 3.634< 0.05), stating, "Green autonomy moderates the green innovation climate and green creativity." Many researchers believe autonomy allows employees to be creative and innovative (Shakil et al., 2023). They also argue that a conducive autonomy-supported environment increases employees' intrinsic motivation. As a result, they become more creative at work (Santiago-Torner, 2023). On the contrary, reducing employee empowerment may adversely affect their creativity (Aulia et al., 2024). Similarly, many scholars maintain that the low empowerment of the employees may reduce their innovative and creative behavior (Zhang et al., 2023). Thus, we argue that extending green autonomy to employees may enable them to be creative in green performance (Shafiq et al., 2023). Furthermore, scholars argue that a "positive relationship exists between green innovation climate and green creativity" (Arici & Uysal, 2022). Many researchers believe green motivation has a varying effect on the relationship between green innovation climate and creativity (Abbas & Khan, 2023).

Conclusion

Concerns about global warming and environmental decay have significantly increased in recent years. Besides other industries, the textile, leather, and chemical sectors profoundly contribute to environmental decay. Given its importance, the study has focused on Pakistan's chemical sector. The study has examined the impact of green intrinsic motivation, transformation leadership, and innovative climate on green creativity. The impact of green transformational leadership on green intrinsic motivation.

It also examined the moderating effect of green extrinsic motivation and green autonomy on green creativity. The study collected a sample of 460 from the target sector and found that our results support five hypotheses but do not support one. The results show that green intrinsic motivation and green transformation leadership significantly affect green creativity. Green innovation climate insignificantly affects green creativity. Green transformational leadership positively affect green creativity and green intrinsic motivation. Green extrinsic motivation moderates green intrinsic motivation and green creativity. Green innovation climate moderates the green innovation climate and green creativity.

Implications

To develop a green image and contribute towards a green environment, the firms must incorporate factors such as green transformation leadership, green creativity, and green innovation in their long-term corporate strategies. The firms should have a green vision, which they should share with all the stakeholders, including employees, management, and supply chain members. The firms must empower the employees to share their views on green ideas with the management and other employees. We also suggest that HRM focus on rewarding the employees who contribute towards green products and services. Management must also organize seminars and counseling sessions for all the firm's stakeholders, including employees, management, and suppliers. Firms may also make it mandatory for the employees to share the green creative ideas with the management. Some ideas may not be viable, but a few could be viable and implementable. Firms must also provide financial and other resources to employees to experiment with green products and services.

Limitations and Future Research

This study has focused on the chemical sector in Pakistan. Other studies may extend their scope to the textile, spinning, and leather sectors, as they also significantly contribute to pollution and environmental decay. Besides the manufacturing sector, future studies may also explore service sectors such as hotels and tourism. We focused on all the employees of the target chemical industries. However, we advised others to collect the data from research and development departments of the target industries. We collected the data using cross-sectional. Future studies may use longitudinal and multilevel approaches to understand the discussed phenomenon. Quantitative studies have several limitations. Therefore, we recommend that others adopt the mixed methodology. This study used extrinsic motivation and green autonomy as moderators; other studies may use them as mediators. Demographics often have varying effects on antecedents and dependent variables. Therefore, we recommend that others use demographics as moderators.

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Annexure 1

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Constructs and Items Used in the Questionnaire

Green Intrinsic Creativity

GIC1. I suggest new ways to achieve environmental goals.

GIC2. I propose new green ideas to improve environmental performance.

GIC3. I promote and share green ideas with others.

GIC4. I develop adequate plans for the implementation of new green ideas.

GIC5. I developed new skills for green creativity.

GIC6. I would find creative solutions to environmental problems.

Green Transformational Leadership

GTL1. The leader provides a clear environmental vision for the employees to follow.

GTL2. The leader inspires employees with environmental plans.

GTL3. The leader gets the employees to work together for the same environmental goals.

GTL4. The leader encourages employees to achieve environmental goals.

GTL5. The leader acts by considering the environmental beliefs of the employees

GTL6. The leader stimulates employees to think about green ideas.

Green Intrinsic Motivation

GIM1. I enjoy coming up with new green ideas.

GIM2. I enjoy trying to solve environmental tasks on the job.

GIM3. I enjoy tackling completely new environmental tasks.

GIM4. I enjoy improving existing green ideas at my job.

GIM5. I feel excited when I hear new green ideas.

GIM6. I engage myself in developing green ideas.

Green Extrinsic Motivation

GEM1. My motivation increases when I receive recognition from my organization.

GEM2. Salary and promotion increase my motivation.

GEM3. I want others to know how good I am at environmental tasks.

GEM4. I feel that I am earning something for my environmental tasks.

GEM5. I am concerned about how other people will react to my environmental ideas.

Green Innovation Climate

JIC1. My organization encourages employees to give feedback on improving green performance.

JIC2. My organizations adopt green policies and procedures used by other industries.

JIC3. My organization is willing to implement policies and procedures related to a sustainable environment.

Green Autonomy

GSC1. My organization gives full autonomy to develop green products and practices.

GSC2. My organization allows employees to exchange and share policies related to green products.

GSC3. My organization allows employees to criticize policies that are not aligned with a sustainable environment.

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