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The Impact of Green Entrepreneurs, Competitive Intensity, and Climate Risks on Innovation

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Abstract

Greater Kuala Lumpur, a global city connecting Malaysia and Asia with the world, is a growing hub for innovation. This study explores the influence of green entrepreneurial orientation and managerial environmental concerns on innovative behavior and creative performance, incorporating climate change risk perception and competitive intensity. Grounded in cultural cognition theory, data from 220 young small business owners were analyzed using structural equation modeling to examine how climate change risk perception mediates the relationship between green entrepreneurial orientation, managerial environmental concerns, and innovation. Results indicate that climate change risk perception significantly mediates these variables' impact on both innovation behavior and creative performance, while competitive intensity moderates the effects of green entrepreneurship and managerial environmental concerns on climate risk perception. The study offers theoretical and practical insights to support creative and innovative behavior in small enterprises.

Keywords

Green Entrepreneurial Orientation, Managerial Environmental Concerns, Innovation Behavior, Creative Performance, Climate Change Risk Perception, Competitive Intensity, Cultural Cognition Theory

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1. Background

Employee creativity is increasingly recognized as a key factor for organizational performance, drawing significant attention from both practitioners and researchers (Makhloufi et al., 2024). While many firms incentivize creativity, questions remain about the efficacy of these incentives in enhancing creative output. Creative performance includes not only achieving innovative outcomes but also generating practical ideas relevant to processes, goods, services, or procedures (Handoyo et al., 2023). (Ameer & Khan, 2023) suggest that creative performance does not occur in isolation; contextual elements like leadership play a critical role. Personal and contextual traits are often seen to interact within the creative process (Aftab et al., 2023). Supporting an environment that encourages employees and instills confidence in their capabilities is recognized as an effective strategy to drive creativity. Innovation is essential for organizational success, especially within today's competitive and dynamic economy (Suseno et al., 2020). (Muangmee et al., 2021) highlight leadership as a key factor influencing creativity and innovation. Similarly, (Ndubisi et al., 2020) emphasize the increasing interest in how green entrepreneurship affects innovation and creativity. Government agencies are also driven to innovate in response to complex environmental challenges, aiming to improve efficiency and service quality (Bayighomog Likoum et al., 2020; Grošelj et al., 2020; Mutonyi et al., 2020a; Ndubisi et al., 2020). Most research on small business innovation has focused on types and components of innovation processes. Recently, green entrepreneurial orientation has been identified as crucial for enhancing creative performance while reducing environmental impacts (Ameer & Khan, 2023; Makhloufi et al., 2022). Green entrepreneurial orientation drives the pursuit of opportunities to develop

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eco-friendly (Frare & Beuren, 2022; Majali et al., 2022). While previous studies (Luu, 2021; Muangmee et al., 2021) have examined the drivers and benefits of green entrepreneurship, its specific effects on creative performance and innovation behavior remain unclear. Managerial environmental concern, defined as a personal commitment to ecological well-being, is seen as a precursor to green consumption intentions (Munawar et al., 2022). The modern world faces the challenge of balancing economic growth with environmental sustainability amid growing energy demands and environmental degradation (Song et al., 2021). Recognizing that contemporary technologies and products require eco-friendly design has contributed to this shift (Chuah et al., 2020; Yue et al., 2020). Accordingly, environmental innovations play a vital role in advancing sustainability goals (Munawar et al., 2022; Song et al., 2021). Climate change, one of today's most pressing issues, has a wide range of adverse effects on public health, especially in coastal regions (Latif et al., 2024). Major health concerns linked to climate change include thermal stress, extreme weather events, infectious diseases, future food security, hunger, and various risks arising from the economic, social, and demographic consequences of environmental change (Van Valkengoed et al., 2024). As (Wang et al., 2021) observe, there is an urgent need for research on the public health implications of climate change, as delays in addressing this issue may endanger lives on a global scale. Climate change heightens vulnerability to natural disasters such as heatwaves, droughts, and floods (Brosch, 2021). Many governments are actively working to mitigate these effects while adapting to new threats, although factors like institutional mistrust and corruption can inhibit climate action in some countries (Ahmed et al., 2021; Khan et al., 2020; Mutonyi et al., 2020b).

Drawing on cultural cognition theory and prior literature on creativity, green entrepreneurship, and climate change (Johnson & Swedlow, 2020; Van Valkengoed et al., 2024), this study considers the role of individual beliefs in shaping attitudes towards environmental issues. For instance, egalitarians, who oppose social inequities, may view climate change as a threat to social justice (Kahan, 2008). In contrast, individualists, who favor minimal restrictions on trade and business, are less likely to prioritize environmental concerns. This study contributes to the literature on creative performance and innovation behavior in several ways. First, it is among the few cross-cultural studies examining the relationship between managerial environmental concerns, climate change risk perception, and green entrepreneurial orientation. Second, the findings provide insights into competitive dynamics, particularly among young small business owners. Finally, this research expands discussions about the potential benefits of creative behavior supported by green entrepreneurial orientation and managerial environmental concerns, with a focus on small business contexts in Cyberjaya, Kuala Lumpur, Malaysia.

2. Literature Review and Hypothesis Development

2.1. Creative Performance

Employee creative performance, as same citation (Ilyana & Sholihin, 2021), arises when employees intentionally generate, support, and implement new ideas for the benefit of their team, organization, or themselves. (Shaw & Choi, 2023) describe creativity as an outcome of both environmental and individual factors. (Luu, 2021) identifies predictors of individual creativity, such as personality, cognitive processes, intrinsic and prosocial motivation, self-efficacy, affect, and a sense of meaningful work. These traits vary among individuals, with some people exhibiting more creativity-enhancing qualities than others. Creativity becomes particularly vital during times of crisis, as organizations face unexpected challenges. Researchers suggest that creativity helps individuals cope with uncertainty by questioning assumptions and attempting innovative solutions (Wadei et al., 2021). In a work context, creative performance includes risk-taking, adopting new ideas and methods, and fostering change. This can lead to developing new products, services, or practices that benefit the organization. (Hora et al., 2021) emphasize that employees with digital skills and adequate resources are more likely to engage in creative problem-solving. Given the surrounding contextual dynamics, creativity likely differs among

individuals. An employee demonstrating a high degree of creativity-enhancing traits may exhibit stronger creative abilities, regardless of environmental factors. Organizations that attract, retain, and manage highly creative employees have a competitive advantage over those with less creative talent (Mutonyi et al., 2020b).

2.2. Innovative Behavior

Sharing ideas with management and colleagues to gather feedback is a crucial aspect of innovative behavior (Suseno et al., 2020). Key components of innovative behavior include personality traits (such as risk-taking), specific actions (such as forming coalitions), and behaviors like championing ideas. (Mutonyi et al., 2020a) identified six core components of innovative behavior essential for achieving innovation outcomes. Research on employee innovative behavior consistently includes idea generation as a fundamental aspect of creativity (Bayighomog Likoum et al., 2020; Lukes & Stephan, 2017; Purwanto et al., 2021). In addition to generating ideas, employees may find inspiration in their surroundings, actively seeking new ideas. This "idea search" perspective supports studies suggesting that drawing on existing information sources can serve as a foundation for innovation and entrepreneurial initiatives (Suseno et al., 2020). The implementation of new ideas is critical for successful innovation. In many cases, employees require management's support to carry out their ideas. Innovation champions play a vital role in initiating implementation activities by designing strategies, securing resources, and anticipating potential challenges (Grošelj et al., 2020). During the implementation phase, overcoming resistance and obstacles is a significant challenge, often requiring adaptation of the original concept or implementation plan to achieve an improved product, service, or process and to generate innovative outcomes within the organization (Purwanto et al., 2021).

3. Hypothesis Development

3.1. Managerial environmental concerns and green entrepreneur orientation with climate change risk perception.

Entrepreneurial orientation encompasses proactive, innovative, risk-taking, aggressive, and autonomous practices, processes, and behaviors (Majali et al., 2022). Senior management's commitment to overcoming environmental constraints and promoting innovative behavior is underpinned by managerial environmental concerns, which are central to a corporate green entrepreneurial orientation addressing environmental challenges (Shehzad et al., 2023). Managers must develop the skills needed to address these environmental challenges effectively. (Ameer & Khan, 2023) highlight the difficulty owners face in supporting green entrepreneurial orientation amidst business instability. Research of same citation (Makhloufi et al., 2022) shows that organizational capacity to support green entrepreneurial orientation and improve creative performance varies widely. Green entrepreneurial orientation aligns with the triple bottom line theory, which emphasizes sustainable business growth. (Muangmee et al., 2021) emphasize the importance of leveraging green innovation through effective resource allocation to reduce negative environmental impacts. (Luu, 2021) and (Makhloufi et al., 2024) outline two key components of green entrepreneurial orientation: environmental orientation and social orientation. Further, (Jiang et al., 2018) and (Mutonyi et al., 2020a) assert that social and innovative orientations form the basis of green entrepreneurial orientation. Companies seeking a sustained competitive advantage must embrace a robust entrepreneurial spirit that adds value to client offerings (Makhloufi et al., 2022). Entrepreneurial orientation is a strong predictor of business success, with a proactive entrepreneurial approach increasing a company's likelihood of outperforming competitors. Green entrepreneurial orientation, in particular, can support the development of innovative green products, strengthening sustainable business performance. The main objective of green entrepreneurial orientation is to drive environmentally friendly production processes and the launch of green products and services. Green innovation plays a critical role in helping companies create eco-friendly products. Additionally, terms like "green innovation" and "eco-

innovation" reflect how organizations contribute to sustainable development while enhancing competitiveness (Van Valkengoed et al., 2024). This study views green entrepreneurial orientation as an independent system reflecting firms' strategic choices to enhance creative performance and accelerate innovation behavior.

H1: Green entrepreneur orientation is significantly related to climate change risk perception.

Alongside objective information on climate change, personal emotions and subjective evaluations of perceived hazards significantly impact climate risk perception (Wang et al., 2021). Scientific understanding of climate change can shape risk perception but is not the sole determinant. In many developing countries facing climate vulnerabilities, local perspectives, cultural values, and beliefs also shape how individuals perceive climate risks and influence their corresponding actions (Brosch, 2021). (Ahmed et al., 2021) and (Mutonyi et al., 2020b) highlight that the perceived threat of climate change is a crucial factor for encouraging public engagement and supporting effective climate policies. Over the years, discussions have focused on the scope of this influence (Munawar et al., 2022). Managerial environmental concerns, widely used to explain environmentally responsible behaviors and sustainable practices, are directly driven by environmental awareness, often viewed as a fundamental predictor of pro-environmental behavior (Song et al., 2021; Yue et al., 2020). While defining environmental concern can be challenging for some scholars, others argue it is inherently evident (Sreen et al., 2021), a stance supported by prior studies (Akter & Khanal, 2020; Ameer & Khan, 2023; Khan et al., 2020; Makhloufi et al., 2024; Mutonyi et al., 2020b; Yue et al., 2020). Drawing on this discourse, the following hypothesis is formulated:

H2: Managerial environmental concerns significantly relate to climate change risk perception.

3.2. Competitive intensity impact on green entrepreneur orientation, managerial environmental concerns with climate change risk perception

Competitive intensity is the heightened level of rivalry among firms in a market with limited growth prospects, where competitor actions and strategies significantly influence a firm's performance and decision-making processes (Handoyo et al., 2023). In highly competitive environments, predictability and consistency decrease, prompting firms to take calculated risks, innovate, and explore new opportunities to differentiate themselves (Bayighomog Likoum et al., 2020; Eldor, 2020). Firms must thus adopt proactive strategies that may include product and process innovation, entry into unexplored markets, and the formulation of distinct competitive tactics (Garlovsky et al., 2020). The perception of climate change risk, which includes assessments of environmental hazards, climate change mitigation and adaptation efforts, and technological optimism, plays a vital role in motivating firms to avoid and adapt to the adverse effects of climate change (Handoyo et al., 2023; Kula, 2022; Ndubisi et al., 2020). This risk perception is particularly relevant in developing countries, where the effects of climate change are pronounced, and the progress toward sustainable practices remains limited. Malaysia, for instance, faces the challenge of addressing climate change impacts despite its minimal contribution to global greenhouse gas emissions (Latif et al., 2024). While countries like Brazil, India, and China have gained recognition for climate mitigation efforts, Malaysia has yet to make significant strides in this area (Van Valkengoed et al., 2024).

Competitive intensity, a fundamental aspect of the business environment, has been studied extensively for its moderating effects on organizational performance (Brosch, 2021; Wang et al., 2021). (Whitley & Bowers, 2023), for instance, demonstrated that competition intensity moderates the relationship between ownership and firm performance in India's manufacturing sector, with competition levels influencing firm performance outcomes. Other studies indicate that higher competition levels can reduce future profitability and stock returns (Mutonyi et al., 2020b). (Khan et al., 2020) further found that competitive intensity strengthens the relationship between firm resources and performance, particularly in highly competitive contexts. Similarly, (Shehzad et al., 2023)

discussed the variability in findings related to firm success and entrepreneurial orientation, suggesting the inclusion of additional organizational factors, such as competitive intensity, to clarify these outcomes. Competitive intensity reflects the level of industrial competition through price strategies, promotions, product imitation, and value-added services (Frare & Beuren, 2022; Luu, 2021; Muangmee et al., 2021). While market dynamism involves the ongoing external changes within an industry, competitive intensity is more directly associated with the environment's immediate pressures (Mutonyi et al., 2020a). These considerations lead to the formulation of the following hypotheses:

H3: Competitive intensity moderates the relationship between green entrepreneurial orientation and climate change risk perception.

H4: Competitive intensity moderates the relationship between managerial environmental concerns and climate change risk perception.

3.3. Climate change risk perception with innovation behavior and Creative Performance

Climate change risk perception fosters a proactive stance toward mitigating climate impacts by supporting behavioral intentions to engage in actions that address climate-related threats (Van Valkengoed et al., 2024). This perception also encourages a more positive behavioral outlook, leading to increased risk detection and actions aligned with climate-resilient practices (Wang et al., 2021; Whitley & Bowers, 2023). Climate change risk perception not only promotes sustainable policies but also motivates individual actions to counter environmental challenges, a vital aspect for both developed and developing nations, though it progresses more slowly in the latter (Ahmed et al., 2021; Brosch, 2021; Mutonyi et al., 2020b). Previous studies highlight the importance of incorporating competitive intensity as a moderating factor in examining the relationship between entrepreneurial orientation, creative performance, and innovation behavior, although the specific role of firm competitive intensity has often been less explored. Creative activity involves generating new concepts or practical solutions (Shaw & Choi, 2023). Green creative behavior, a subset of creative activity, focuses on developing environmentally sustainable ideas that lead to green processes, products, or services, such as eco-friendly tours or conservation projects (Luu, 2021; Wadei et al., 2021). This behavior relies on both emotional and cognitive resources, such as the desire for community improvement and knowledge of eco-friendly practices (Ilyana & Sholihin, 2021; Shaw & Choi, 2023).

Green entrepreneurial orientation in small businesses enables them to recognize and seize opportunities for sustainable innovation by evaluating their capabilities and identifying resource mobilization options for environmental goals (Mutonyi et al., 2020b; Wadei et al., 2021). Opportunity-seeking behaviors within this orientation help businesses continually renew their resources and adapt their activities to achieve greater market success (Hora et al., 2021; Ilyana & Sholihin, 2021). Such a proactive orientation also encourages green innovation through risk-taking and strategic action plans (Rana & Arya, 2024). Businesses with a green entrepreneurial orientation strive to appeal to customers by highlighting environmentally responsible operations and sustainable products (Chuah et al., 2020). Managerial environmental concerns significantly impact the adoption of green strategies, particularly in businesses subject to environmental constraints (Munawar et al., 2022). Senior management's environmental commitment shapes firm policies, as they establish standards that encourage green innovation (Wang & Juo, 2021). Top managers influence organizational behavior by promoting environmental protection initiatives and allocating resources to these efforts (Frare & Beuren, 2022; Sreen et al., 2021; Wang & Juo, 2021). The creation of goods, concepts, or answers to novel issues by people, groups, and society as a whole serves as the foundation for innovation (Yue et al., 2020). Such management support is essential for fostering employee creativity in green practices and developing environmentally sustainable products and solutions (Makhloufi et al., 2024). Climate change risk perception, a key predictor of actions to mitigate climate impact, affects attitudes and willingness to engage in climate-friendly practices. Studies show that a lower perception of climate risks is linked to reduced interest in climate-friendly actions and decreased frequency of engagement

(Chuah et al., 2020; Frare & Beuren, 2022; Kula, 2022; Makhloufi et al., 2022; Song et al., 2021). Based on these findings, the following hypotheses are proposed:

H5: Climate change risk perception mediates the relationship between green entrepreneurial orientation and innovation behavior.

H6: Climate change risk perception mediates the relationship between green entrepreneurial orientation and creative performance.

H7: Climate change risk perception mediates the relationship between managerial environmental concerns and innovation behavior.

H8: Climate change risk perception mediates the relationship between managerial environmental concerns and creative performance.

Figure 1 presents a theoretical model integrating the theory of cultural cognition with recent research on creative performance and innovation behavior. This model aims to explore the mediating and moderating roles of climate change risk perception on the relationships between managerial environmental concerns, green entrepreneurial orientation, and innovative outcomes.

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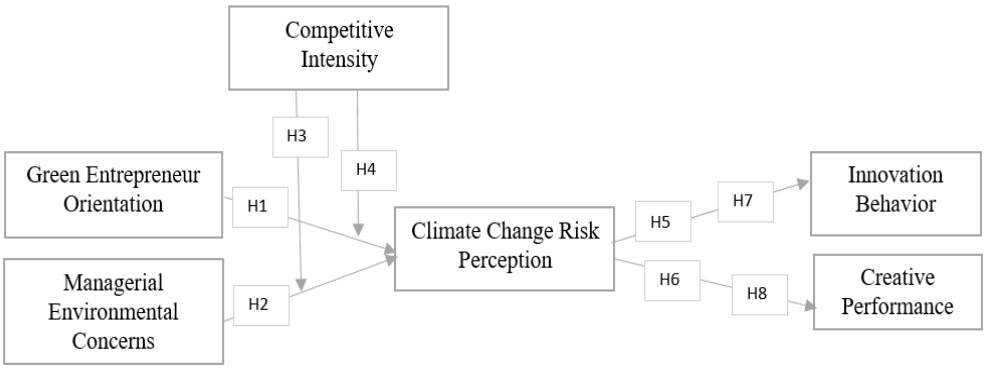

Figure 1: Research Model

4. Methodology

4.1. Data Collection and Sample

Data was collected through an online survey using a structured, adapted questionnaire. Items for each variable were measured on a 5-point Likert scale. The instrument provided comprehensive information on the study and instructions for response. The survey aimed to assess innovation behavior and creative performance in relation to the independent variables: green entrepreneurial orientation and managerial environmental concerns, with competitive intensity as a moderator and climate change risk perception as a mediator. The survey was conducted online using a previously validated questionnaire adapted to fit the study's context. The primary data collection followed a longitudinal design, with participants completing online questionnaires over time. Given that the population was unknown, a non-probability sampling method was chosen, specifically convenience sampling. Data collection occurred in multiple phases, retaining only participants who were responsive in the initial phase for follow-up. The target population consisted of young small business owners in Cyberjaya and Kuala Lumpur, Malaysia. A total of 220 responses were deemed complete and suitable for analysis. After refining the survey, participants had access from March 2024 to mid-June 2024. Participation was voluntary and anonymous, adhering to ethical considerations. Out of 265 participants, 30 responses were excluded due to identical scoring patterns, and 15 were omitted due to missing data. The final

response rate was 83%, resulting in 220 valid responses for analysis.

4.2. Measures

4.2.1. Green entrepreneurial orientation

Green entrepreneurial orientation was measured with five items adapted from (Jiang et al., 2018). Sample items included, "In general, our firm favors a strong emphasis on green practices, such as R&D, technological leadership, and innovation" and "When facing uncertainty, we typically adopt a proactive stance to capture potential green opportunities." Responses were recorded on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). The scale showed strong internal consistency (Cronbach's alpha = 0.865, M = 4.92, SD = 0.786).

4.2.2. Managerial environmental concerns

Managerial environmental concerns were measured with four items adapted from the scale developed of same citation (Ar, 2012). Sample items included, "Most environmental innovations are worthwhile" and "Environmental innovation is an effective strategy." Participants responded on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree), and the measure demonstrated good reliability (Cronbach's alpha = 0.829, M = 3.67, SD = 0.668).

4.2.3. Competitive intensity

Competitive intensity was assessed using six items adapted from (Auh & Menguc, 2005). Sample items included, "One hears of a new competitive move almost every day" and "Our competitors are relatively weak." Responses were recorded on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree), with the scale showing strong reliability (Cronbach's alpha = 0.912, M = 3.47, SD = 0.608).

4.2.4. Climate change risk perception

Climate change risk perception was measured using nine items adapted from (Sun & Han, 2018). Sample items included, "I feel concerned about climate change" and "I feel concerned that people's standard of living will decrease worldwide." Responses were recorded on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree), and the measure showed high reliability (Cronbach's alpha = 0.926, M = 4.31, SD = 0.512).

4.2.5. Innovative behavior

Innovative behavior was assessed with seven items adapted from the scale developed of same citation (Sagnak, 2012). Sample items included, "I try new ways of doing things at work" and "I prefer work that requires original thinking." Responses were recorded on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree), and the measure demonstrated good internal consistency (Cronbach's alpha = 0.879, M = 4.31, SD = 0.512).

4.2.6. Creative performance

Creative performance was measured using five items adapted from (Choi, 2004). Sample items included, "This person generates creative ideas" and "This person searches for new technologies, processes, techniques, and/or product ideas." Responses were recorded on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree), with the measure showing reliable internal consistency (Cronbach's alpha = 0.850, M = 3.13, SD = 0.419).

4.3. Demographic Information.

Table 1 provides a summary of the demographic data and descriptive statistics for the sample (N=220). Among the respondents, 66% were male, and 34% were female. Age distribution was as follows: 18-25 years (20%), 25-32 years (35%), 32-40 years (24%), and over 40 years (21%). In terms of educational qualifications, 35% had a bachelor's degree, 44% held a master's degree, and 21% had other qualifications. Marital status included single (33%), married (46%), and divorced (21%). Regarding experience, 32% had less than 2 years, 31% had 2-4 years, and 37% had over 4 years of experience.

Table 1: Descriptive Statistics (N=220)

Variables	**Male**	**Distribution**	**%**
Gender	Male	145	66%
	Female	75	34%
Age	18-25	50	22%
	25-32	75	34%
	32-40	55	25%
	Above 40	40	18%
Marital Status	Single	72	33%
	Married	105	47%
	Divorced	43	19%
Qualification	Bachelors	78	35%
	Masters	98	44%
	others	44	20%
Experience	Less than 2 Years	72	32%
	2-4 Years	70	31%
	More than 4 Years	78	35%

4.3. The Measurement Model and Common Method Variance

This study evaluated individual indicator reliability by examining standardized loadings for each latent construct. (Hair et al., 2024) indicate that an individual item's reliability is verified with a standardized loading of at least 0.707. Based on the measurement model results, individual indicator reliability met this threshold. All constructs also had Variance Inflation Factors (VIF) below the threshold of 5.0, confirming no multicollinearity issues. As shown in Table 2, factor loadings range from 0.700 to 0.886, while Cronbach's alpha values for each construct exceed the 0.70 threshold, specifically ranging from 0.829 to 0.926.

Table 2: Measurement Model Results

Constructs	Items	Factor Loadings	VIF	Cronbach Alpha
Climate Change Risk Perception	CCRP1	0.813	2.966	0.926
	CCRP2	0.794	2.552	
	CCRP3	0.744	2.009	
	CCRP4	0.781	2.379	
	CCRP5	0.788	2.670	
	CCRP6	0.810	2.882	
	CCRP7	0.829	2.883	
	CCRP8	0.716	1.866	
	CCRP9	0.855	3.435	
Competitive Intensity	CI1	0.777	2.049	0.912
	CI2	0.863	3.754	
	CI3	0.881	3.714	
	CI4	0.808	3.856	
	CI5	0.829	4.057	
	CI6	0.829	3.034	
Creative Performance	CP1	0.827	2.216	0.850
	CP2	0.834	2.010	
	CP3	0.851	2.454	
	CP4	0.762	1.940	
	CP5	0.669	1.573	
Green Entrepreneur Orientation	GEO1	0.750	1.645	0.865
	GEO2	0.839	2.764	
	GEO3	0.880	3.184	
	GEO4	0.763	1.895	
	GEO5	0.796	1.984	
Innovation Behavior	IB1	0.796	2.528	0.879
	IB2	0.850	2.667	
	IB3	0.839	2.853	
	IB4	0.756	2.201	
	IB5	0.700	1.793	
	IB6	0.750	2.087	
	IB7	0.630	1.599	
Managerial Environmental Concerns	MEC1	0.797	1.718	0.829
	MEC2	0.758	1.603	
	MEC3	0.848	2.253	
	MEC4	0.847	2.292	

Cross-loadings and validity tests confirm that there are no significant issues, as shown in Table 3.

Table 3: Cross-Loading of Measurement Items

	1	2	3	4	5
CCRP1	.813	-.704	-.642	-.593	-.633
CCRP2	.794	-.586	-.532	-.455	-.511
CCRP3	.744	-.584	-.495	-.536	-.521
CCRP4	.781	-.618	-.479	-.473	-.536
CCRP5	.788	-.595	-.528	-.444	-.558
CCRP6	.810	-.568	-.500	-.465	-.527
CCRP7	.829	-.633	-.515	-.483	-.561
CCRP8	.716	-.597	-.524	-.567	-.539
CCRP9	.855	-.700	-.637	-.643	-.652
CI1	-.773	.777	.574	.591	.627
CI2	-.728	.863	.569	.594	.643
CI3	-.695	.881	.609	.576	.690
CI4	-.518	.808	.693	.478	.721
CI5	-.557	.829	.707	.485	.714
CI6	-.566	.829	.718	.491	.761
CP1	-.556	.666	.827	.483	.718
CP2	-.628	.641	.834	.626	.766
CP3	-.607	.713	.851	.546	.770
CP4	-.450	.520	.762	.585	.682
CP5	-.429	.441	.669	.444	.603
GEO1	-.550	.544	.546	.750	.599
GEO2	-.539	.462	.539	.839	.553
GEO3	-.594	.548	.613	.880	.619
GEO4	-.440	.550	.462	.763	.547
GEO5	-.511	.540	.565	.796	.620
IB1	-.562	.735	.805	.515	.796
IB2	-.658	.715	.830	.656	.850
IB3	-.616	.781	.800	.564	.839
IB4	-.452	.586	.704	.584	.756
IB5	-.444	.531	.631	.472	.700
IB6	-.569	.558	.567	.647	.750
IB7	-.433	.441	.394	.431	.630
MEC1	-.467	.516	.531	.458	.529
MEC2	-.456	.556	.489	.479	.448
MEC3	-.515	.508	.582	.546	.643
MEC4	-.450	.511	.537	.498	.562

Note: "CCRP=Climate change risk perception, Cl=Competitive intensity, CP=Creative performance, GEO=Green entrepreneur orientation, IB=Innovative behavior, MEC=Managerial environmental concerns"

Confirmatory Factor Analysis (CFA) results indicate that standard loadings, Composite Reliability (CR), Average Variance Extracted (AVE), and both convergent and discriminant validity were appropriate. A CR of at least 0.70 and an AVE of at least 0.50 are necessary to demonstrate reliability and authenticity (Hair et al., 2024). As shown in Table 4, AVE values range from 0.583 to 0.692, and CR values from 0.886 to 0.938, suggesting strong measurement consistency. The square root of AVE for each construct exceeded its correlations with other constructs, further supporting discriminant validity.

Table 4: Discriminant Validity

Construct	CR	AVE	CCRP	CI	CP	GEO	IB	MEC
	0.938	0.629	0.793					
CI	0.931	0.692	0.786	0.832				
CP	0.893	0.626	0.685	0.765	0.791			
GEO	0.903	0.651	0.658	0.654	0.680	0.807		
IB	0.907	0.583	0.710	0.826	0.698	0.729	0.764	
MEC	0.886	0.662	0.582	0.642	0.659	0.611	0.674	0.813

Note: "CCRP=Climate change risk perception, CI=Competitive intensity, CP=Creative performance, GEO=Green entrepreneur orientation, IB=Innovative behavior, MEC=Managerial environmental concerns".

4.4. Path Results of Structural Model

This study employs a structural model to test hypotheses, examining both direct and indirect effects. Following the recommendations citation (Hair et al., 2024), the model uses a standard t-value threshold of 1.96 and a p-value cutoff of less than 0.005, with bootstrapping of 5,000 resamples. Table 5 presents findings indicating that green entrepreneurial orientation has a direct and negative effect on climate change risk perception (β = -0.211, $p < .05$), providing support for H1. Companies with an entrepreneurial orientation tend to innovate in products and markets, assume certain risks, and develop proactive strategies to stay ahead of competitors. Managerial environmental concerns also show a direct and negative effect on climate change risk perception (β = -0.182, $p < .05$), supporting H2. Competitive intensity plays a significant moderating role, with an indirect impact on the relationship between green entrepreneurial orientation and climate change risk perception (β = -0.131, $p < .05$), as well as between managerial environmental concerns and climate change risk perception (β = 0.111, $p < .05$), thus providing support for H3 and H4. This suggests that in highly competitive environments, the combined innovation capabilities of organizations may not be sufficient to promptly adapt to shifting demand. In these circumstances, relying solely on collaborative innovation capabilities may not always yield creative solutions. Furthermore, climate change risk perception has a significant mediating role, with an indirect effect on the relationship between green entrepreneurial orientation and innovative behavior (β = 0.150, $p < .05$) as well as between managerial environmental concerns and innovative behavior (β = 0.129, $p < .05$), supporting H5 and H7. Additionally, climate change risk perception mediates the relationship between green entrepreneurial orientation and creative performance (β = 0.145, $p < .05$) and between managerial environmental concerns and creative performance (β = 0.125, $p < .05$), supporting H6 and H8.

Table 5: Path results of Structural Model

	Relationships	Path Coefficient	T Statistics	P Values	Decision
Direct Path	GEO -> CCPR	-0.211	4.614	0.000	H1:Accepted
	MEC -> CCPR	-0.182	3.093	0.002	H2:Accepted
	GEO*CI-> CCPR	-0.131	12.720	0.007	H3:Accepted
	MEC*CI -> CCPR	0.111	11.793	0.011	H4:Accepted
In-Direct Path	GEO -> CCPR -> IB	0.150	4.570	0.000	H5:Accepted
	GEO -> CCPR -> CP	0.145	4.473	0.000	H6:Accepted
	MEC -> CCPR -> IB	0.129	3.117	0.002	H7:Accepted
	MEC -> CCPR -> CP	0.125	3.049	0.002	H8:Accepted

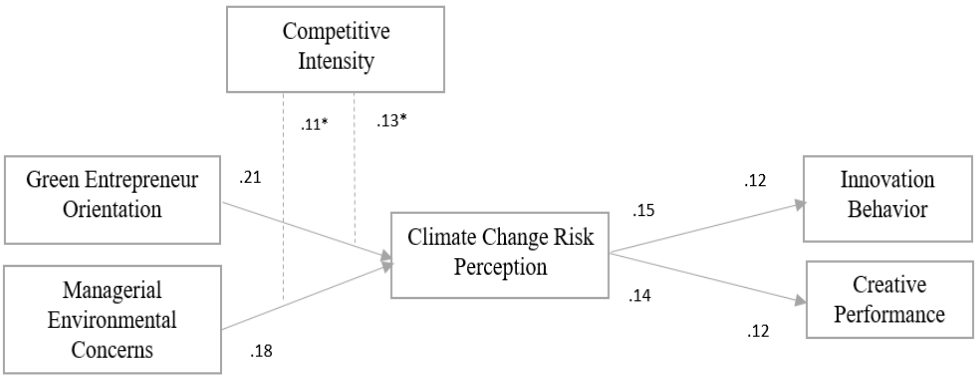

Figure 2: Path Analysis of Hypothesized Model

5. Discussion and Implications

5.1. Summary of Findings

This study's findings highlight the importance of supporting individual creative behavior to drive organizational performance, especially for small enterprises. The results show that managerial environmental concerns and green entrepreneurial orientation moderately mediate the relationship between innovative behavior and creative performance. In public sector organizations, risk-taking behaviors are often under closer scrutiny, and ambiguous goals may cultivate cultures that stifle creativity (Hora et al., 2021; Wadei et al., 2021). Consequently, employees may increasingly rely on leaders who inspire creativity. Leaders who take a visionary and charismatic approach can positively influence employees' motivation and engagement, fostering commitment to organizational goals and vision. Managers who focus on enabling their subordinates' unique innovative behaviors help to reduce obstacles and constraints on employee creativity. Entrepreneurial orientation is conceptualized as an organizational-level commitment to activities that drive change within the organization or marketplace. This encompasses behaviors like experimenting with new product offerings amid uncertainty, encouraging employee initiative in developing and implementing innovative ideas, monitoring competitors' best practices and trends, and maintaining a pipeline of new ideas (Kula, 2022; Lukes & Stephan, 2017). Practicing entrepreneurial orientation positions companies for sustained competitive advantage and improved business success (Majali et al., 2022; Muangmee et al., 2021). The study's results indicate that green entrepreneurial orientation directly influences climate change risk perception. This finding aligns with prior research, including studies citation (Ameer & Khan, 2023; Luu, 2021; Mutonyi et al., 2020a; Shehzad et al., 2023). Green entrepreneurial orientation appears to encourage proactive adaptation, placing organizations in a better position to mitigate climate risks. This proactive approach likely contributes to accelerated development and reduced risk as these companies are accustomed to managing uncertainty. Integrating green entrepreneurship into business models thus emerges as an effective way to decrease perceived climate-related risks through innovative environmental practices.

A significant relationship is observed between managerial environmental concerns and climate change risk perception. Managers who apply sustainable principles and practices can help reduce potential risks by increasing organizational resilience. The negative relationship indicates that managers with strong environmental concerns influence organizational risk perception, thereby supporting strategic sustainability. While management environmental concerns significantly impact climate change risk perception, they also enhance green business and environmental performance (Munawar et al., 2022; Song et al., 2021). This study underscores the importance of creative performance in raising managerial environmental awareness and addressing green issues.

Reconfiguring dynamic capabilities to integrate newly acquired knowledge aids in addressing environmental challenges (Yue et al., 2020). This approach results in novel insights and supports human resources in developing training, eco-friendly practices, business procedures, sustainable products, and awareness of future trends. Competitive intensity is shown to moderate the relationship between green entrepreneurial orientation, managerial environmental concerns, and climate change risk perception. Managers committed to environmental sustainability frequently reaffirm their company's dedication to sustainable practices, a crucial factor in highly competitive markets where stakeholder and customer expectations are high. Green businesses are urged to grow more assertively to maintain a competitive edge in response to intensifying competition. This drive toward innovation enhances their ability to manage climate-related risks and aligns with evolving market demands. In competitive environments, meeting customer expectations is challenging due to intense competition, price and promotional pressures, and numerous product offerings (Handoyo et al., 2023). Collaborative innovation capabilities help businesses navigate such environments by providing market data, external resources, and expertise, enabling them to anticipate and respond to market demands (Eldor, 2020; Ndubisi et al., 2020). Climate change risk perception also mediates the impact of green entrepreneurial orientation and environmental concerns on innovative behavior and creative performance. This is supported by previous research that highlights the relationship between green entrepreneurial orientation, environmental concerns, and their influence on innovative behavior and creative performance (Latif et al., 2024). Reduced perceived risk allows organizations to explore novel ideas and create solutions addressing climate challenges, fostering a culture of innovation. A green entrepreneurial approach may encourage an innovative culture, as lower risk perception promotes experimentation and creative flexibility. Green entrepreneurial firms, due to their proactive stance on climate issues, may be better positioned for the experimentation and risk-taking often needed for creative performance. Integrating environmental values within organizations strengthens employee commitment to achieving work objectives, fostering a collective eco-friendly mindset (Ahmed et al., 2021; Sun & Han, 2018). Findings suggest that individuals with strong environmental values are more likely to adopt eco-friendly lifestyles, show high motivation to protect the environment, and be influenced by climate risk perceptions. Environmental values shape employee attitudes toward green enterprises and environmental issues, impacting their engagement with sustainable initiatives (Akter & Khanal, 2020).

5.2. Theoretical Implications

This study provides several theoretical insights. First, it extends the application of cultural cognition theory to analyze how green entrepreneurial orientation and managerial environmental concerns influence innovation and creativity within small enterprises. The study highlights how individual cultural perspectives on environmental responsibility can substantially impact organizational outcomes. Leaders' perceptions of environmental risks not only shape their sustainable behaviors but also influence the creative potential of their teams by positioning climate change risk perception as a mediating factor. This approach adds a new dimension to cultural cognition theory by emphasizing the importance of cultural and individual perceptions of environmental risks in fostering sustainable innovation. Second, the research demonstrates the moderating effect of competitive intensity, showing that competitive environments amplify the impact of environmental concerns and green entrepreneurship on climate change risk perception. By suggesting that sustainable behaviors gain greater importance in competitive settings, the study deepens our understanding of competitive dynamics within the cultural cognition framework. Third, by focusing on young small business owners in Cyberjaya, Kuala Lumpur, this study contributes to the relatively underexplored area of sustainable practices in small enterprises. This sector-specific analysis provides insights into the unique role small businesses play in promoting innovation and environmental sustainability, adding to the body of literature on entrepreneurship.

5.3. Practical Implications

This study presents several practical implications. First, it enhances the research on employee creative performance, with a focus on small businesses. The findings underscore the need for a quantitative approach in studying creative behaviors in small enterprises, expanding current knowledge of employee creativity in this context. Second, this study separates the creative performance variable into two dimensions—innovative behavior and creative performance—allowing a more detailed analysis of how managerial environmental concerns influence these aspects. Findings indicate that innovative behavior and creative performance in small businesses are positively affected by employees' perception of their organizational environment. In environments conducive to innovation, employees in small organizations are more likely to adopt and implement ideas in their work (Kula, 2022). Third, the presence of creative performance, regardless of the organizational setting, affects employees' capacity to direct attention and activities towards innovation. Fourth, the link between cultural worldviews and climate change risk perception, although minor, aligns with other research findings (Ahmed et al., 2021; Handoyo et al., 2023; Latif et al., 2024; Sun & Han, 2018). Green entrepreneurial orientation is a critical factor that drives companies toward green innovation, enriching the body of literature on this topic. Fifth, as consumer awareness of green practices increases, entrepreneurs can look to this study for guidance. The study demonstrates a demand for green initiatives. Although green product innovation is not yet widespread in Jordan, it holds significance at the 10% importance level, underscoring the value of environmental practices. Malaysian policymakers and business incubators, especially in areas like Cyberjaya, can utilize these insights to formulate policies that encourage sustainable business practices among young entrepreneurs. Governments could support sustainable economic growth by assisting small firms in integrating green entrepreneurship through supportive policies and resources.

5.4. Limitations and Future Research

Despite the valuable insights of this study, certain limitations should be noted. First, this study utilized longitudinal data to assess all assumptions within the models, focusing primarily on young small business entrepreneurs in Cyberjaya, who generally possess the resources and time to engage in extensive research. Future research could employ cross-sectional methods to further investigate the relationships between green entrepreneurial orientation, environmental concerns, competitive intensity, and innovative behavior. Second, data collection relied on online surveys using a questionnaire adapted from previous studies. The survey examined innovative behavior and creative performance in relation to green entrepreneurial orientation and managerial environmental concerns, with competitive intensity as a moderator and climate change risk perception as a mediator. Third, this study employed convenience sampling and conducted multiple rounds of data collection, where only respondents who completed the initial questionnaire were included in subsequent phases. Future research could adopt snowball sampling to achieve larger and more representative samples. Fourth, this study used a quantitative research approach. Future studies could use a mixed-method approach to integrate quantitative and qualitative insights. Finally, this research focused exclusively on young small business owners in Cyberjaya. Future studies could expand the scope by comparing young owners across various regions in the country to better understand interpersonal dynamics and identify additional contextual factors.

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