
How does an employee's green creativity influence environmental performance? Evidence from China

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Abstract: In recent decades, the literature has documented the importance of intellectual capital in corporate innovation and competitive edge. However, its influence on employee environmental performance in the Asia-Pacific region remains unclear. In this study, we used three multidimensional intellectual capital dimensions (i.e., green creativity, structural empowerment, and person-organisation fit) to test the effects of employees' green creativity on their environmental performance in organisational settings via the mediator of structural empowerment and examine whether person-organisation fit moderated these effects. Using a sample of 235 Chinese employees working in different industries, we found that green creativity positively influences employees' environmental performance. In addition, the effect is mediated by structural empowerment and moderated by person-organisation fit. These findings may help firms in the Asia-Pacific region guide their employees' daily activities to integrate potential environmental value into green innovation practice to enhance their competitiveness ultimately.

Keywords: intellectual capital; green creativity; structural empowerment; person-organisation fit; green innovation; China.

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1 Introduction

With rapid economic development, environmental issues have become a significant challenge for enterprises in the Asia-Pacific region (Miller et al., 2020). For example, the Chinese government and all sectors of society attach great importance to environmental protection (Chang et al., 2015; Chen et al., 2021). To force enterprises to create more competitive advantages through green innovation, the Chinese government has committed to ‘achieving carbon neutrality by 2060’ (Wang, 2021). In this vein, employees’ contribution to environmental protection has become a vital solution for firms in the Asia-Pacific region to minimise socioeconomic environmental challenges. With employees spending one-third of their day in the workplace, their environmentally friendly behaviours, such as purchasing recycled paper and sustainable food, improving

waste treatment (Dhir et al., 2020), and reducing energy consumption (van den Broek et al., 2019) can reduce the adverse effects of production activities (Blok et al., 2015). Moreover, some companies are attempting to capture the value of employees' environmental potential. For example, Unilever China, a giant manufacturer of fast-moving consumer goods, not only uses the slogan 'small actions can make a big difference' but also encourages employees to participate in environmentally friendly work (Edwards, 2018).

Since employees' green performance is becoming increasingly important, a stream of articles has investigated the factors influencing employees' green behaviour (Norton et al., 2014; Su and Swanson, 2019; Al-Swidi et al., 2021; Sabokro et al., 2021; Wang et al., 2021; Zhang et al., 2021; Unsworth et al., 2021). Some of these articles have evaluated the individual influencing factors of employees' green behaviour. For example, Norton et al. (2014) proposed that the perceived existence of an organisational sustainability policy (i.e., how they perceive the orientation of organisations and colleagues to environmental sustainability) and perceived green work climate would affect employees' green behaviour. The results were confirmed by Sabokro et al. (2021). Other studies have focused on the organisational factors influencing employees' green behaviour. For example, Al-Swidi et al. (2021) revealed that the green culture of an organisation positively influences employees' environmental performance. Zhang et al. (2021) also proposed that responsible leadership is an essential predictor of voluntary green behaviour in the workplace. Other studies have analysed the external and social factors influencing employees' green behaviour. For example, green-extrinsic motivation can weaken the impact of green-intrinsic motivation on green creative behaviour (Li et al., 2020).

Some studies consider the interaction of organisational and individual factors and their influence on the green behaviour of employees (Unsworth et al., 2021). The literature emphasises the importance of values and self-harmony at the individual level. At the organisational level, recent developments have emphasised environmental dynamics, leadership, and human resource management practices, such as training. Therefore, Unsworth et al. (2021) highlighted the need for a dynamic systems perspective when studying green employee behaviour. Su and Swanson (2019) explored the impact of perceived corporate social responsibility on employee-corporate relationships and employees' participation in green behaviours in the workplace. They showed that organisational trust and identity play a partially mediating role. However, organisational support is not always enough to encourage employee's environmental performance (Paillé and Meija-Morelos, 2019); more empirical evidence is needed to explore the underlying logic of how green creativity works on employee environmental performance at the individual, organisational, and social levels simultaneously.

Therefore, this research aimed to examine the impact of green creativity on green behaviour based on intellectual capital theory. Intellectual capital is a multidimensional concept (Chen et al., 2015), which is defined as the integration of three types of intangibles:

- 1 human capital, which refers to the competencies, abilities, and specific knowledge of human resources
- 2 structural capital, which defines the knowledge of the organisation and is mainly integrated into business procedures, workflows, and systems

- 3 social capital, which refers to the knowledge flowing in business networks and the knowledge internalised within informal interactions among individuals.

With the new dynamics of competition arising from social and environmental changes, researchers pay more attention to using the intellectual capital of companies to enhance innovation capability (Delgado-Verde et al., 2015; Jimenez-Jimenez and Sanz-Valle, 2020). More importantly, the intellectual capital theory provides an integrated theoretical framework that can systematically examine the impact of employees' green creativity on green behaviour from an individual, organisational, and social perspectives.

Based on intellectual capital theory, previous studies have suggested that intellectual property, as a value of business training, employee knowledge, skills, or any proprietary information, enhances the creation and sustenance of competitive advantage (Holgersson and Aaboen, 2019). Intellectual capital is also considered an intellectual property asset that can improve profits, attain new customers, develop novel products, or facilitate the entire business. Moreover, intellectual capital promotes the sustainability of small and medium enterprises (Todericiu and Stăniș, 2015) and the hospitality sector (Liu and Jiang, 2020). Intellectual capital influences employee-level greening capabilities, such as green creativity, affecting environmental performance (Chen and Chang, 2013). Researchers suggest that environmentally sustainable development and solutions depend mainly on their translation into usable knowledge and information (Newson and Chalk, 2004). This study incorporates three specific components: green creativity, structural empowerment, and person-organisation fit. First, we examine the linkage between green creativity and employees' environmental performance in a Chinese organisational setting and the mediating role of structural empowerment. Second, we test the moderating role of person-organisation fit to provide several theoretical knowledge of the influence of green creativity on employees' environmental performance through structural empowerment.

This article contributes to employees' green behaviour literature. First, based on the intellectual capital theoretical framework, we try to answer the questions about the instances in which employee green creativity enhances an organisation's environmental performance. Second, this study attempts to identify the key factors contributing to corporate green innovation in the Asia-Pacific region from an employee's perspective. Finally, unlike previous studies from single or double perspectives, this study systematically examines the impact of employee green creativity on green behaviour from the individual, organisational, and social perspectives.

2 Theoretical framework and hypotheses development

2.1 Green innovation in the Asia-Pacific region

In the Asia-Pacific region, rapidly increasing population growth and overconsumption of resources have caused several environmental problems, such as climate change and water pollution, thereby impelling companies to extensively adopt green innovation and encourage creativity to balance sustainable development and environmental issues (Chareonpanich et al., 2017). To achieve green innovation and cleaner production in this region, Charmondusit et al. (2016) introduced approaches from the technology and assessment levels, including developing and improving corporate ability in terms of environmental assessment in the production process.

Since green innovation has become a critical motivator for the economic and social development of countries in the Asia-Pacific region, including China and Singapore (Kilkiş, 2016), multidisciplinary scholars have explored approaches to effectively assess corporate green innovation and its outcomes in terms of environmental performance (Chareonpanich et al., 2017). Gao et al. (2021) built a conceptual framework of the influencing mechanism of green innovation strategies on corporate competitive advantage. Their research documented resource management's critical role in resource integration and reconfiguration.

Specifically, human resources may influence green innovation and corporate sustainability performance (Wang et al., 2020). Liu et al. (2021) introduced a new management philosophy applying the concept of 'green' to human resource management in China, that is, green human resource management (GHRM). They proposed that GHRM plays a crucial role in achieving environmental objectives and increasing competitive advantage. In this vein, companies should integrate sustainable development with employees' creativity mindset to stimulate green creativity and innovation (Luu, 2020) and thereby promote green creativity and performance (Chen and Chang, 2013). In addition, Liang et al. (2019) argued that green creativity is essential for sustainable economic development in the Asia-Pacific region. Green creativity is an agency for green innovation that "contributes to organisational greening by creating more eco-efficient services, resolving environmental issues, and mitigating the environmental impact of the organisation" [Luu, (2020), p.1]. Therefore, Yong et al. (2019) suggested that a company should manage employees' green creativity to achieve green innovation management and increase corporate performance.

2.2 Intellectual capital and employees' environmental performance

Intellectual capital is a robust engine of economic production and a critical driver of inclusive, intelligent, sustainable, economic, and social development (Matos and Vairinhos, 2017). Previous studies have classified three significant domains of intellectual capital: human capital (embedded in employees' minds), structural capital (reflected in workflows and management systems), and social capital (internalised in organisational cultural and social impacts) (Subramaniam and Youndt, 2005). Through human capital, organisations can integrate employees' creative ideas and increase innovation by applying employees' abilities and skills (Vomberg et al., 2015), mediated by technological capabilities (Jimenez-Jimenez and Sanz-Valle, 2020).

Meanwhile, structural capital can create firm-specific resources and is thus an essential factor in explaining employee performance because structural support can improve employee productivity (Chen and Inklaar, 2016). Finally, social capital affects employee characteristics and corporate environment. Ellinger et al. (2013) suggested that an organisation that invests more social capital will positively influence employees' work-related attitudes, norms, and behaviours.

Within the intellectual capital theory framework, employees' attitudes or behaviours are stimulated if their traits align with the organisation's (Kristof-Brown et al., 2005). Thus, intellectual capital can influence an employee's sustainable behaviour (Secundo et al., 2020). López-Gamero et al. (2011) introduced the new concept of 'green intellectual capital,' referring to 'the sum of all knowledge that an organisation can leverage in the process of conducting environmental management to gain a competitive advantage' (p.19). Therefore, intellectual capital becomes a practical conceptual

framework to examine how well employees can perform by aiming toward firms' environmental targets and individual environmental performance.

Recently, regional economic integration has become a remarkable trait of global supply chains. China is now one of the world's largest carbon emitters, and participates in the Asia-Pacific region via trading with the USA, Japan, South Korea, and other countries (Baldwin and Lopezgonzalez, 2015). Therefore, this study considers China as the scenario and, to some extent, reflects the green behaviour of employees in enterprises in various industrial chains in the Asia-Pacific region. For brevity, all the hypotheses reflect the predictions related to the Asia-Pacific region, and the behavioural patterns from other regions are not considered.

2.3 Green creativity and employees' environmental performance

Human capital is a type of intellectual capital that refers to individuals' accumulated abilities and knowledge (Subramaniam and Youndt, 2005). The ability of individuals to identify potentially valuable new knowledge originates from prior relevant experiences in their consciousness (Cohen and Levinthal, 1990). Cohen and Levinthal (1990) argued that learning is cumulative and that performance maximisation is achieved when a high association occurs between knowledge and the subject of learning. Moreover, human capital can take many forms that are shaped by knowledge, experience, and cognitive ability (Augusto Felício et al., 2014). Cognitive ability is associated with innovativeness, risk perception, strategic decision-making, and identification of market opportunities.

Human capital has several dimensions, including relationship development and maintenance (Sena and Ozdemir, 2020), creativity, and innovation (Fonseca et al., 2019). Green creativity depicts new ideas about green products/services and processes (Chen and Chang, 2013), which promotes general green innovation (Song and Yu, 2018). Norton et al. (2015) argued that employees' beliefs are associated with green behaviour. Meanwhile, other scholars have characterised green creativity as developing green products (Chen and Chang, 2013).

Gong et al. (2012) demonstrated that employees should have two salient resources to be creative, namely, cognitive and motivational resources. Hence, to perform well in environmental innovation, employees should have green values (i.e., motivational resources) and green-related skills and knowledge (i.e., cognitive resources). For example, when an organisation faces external pressure to solve environmental issues, employees may foster novel and valuable ideas to improve the firm's capability for green innovation (Chen, 2011). These novel and practical green ideas may contribute to employees' environmental performance. Wang et al. (2020) documented a positive impact of human capital on sustainable enterprise performance.

Hypothesis 1 (H1) Green creativity of employee's improves environmental performance.

2.4 Mediating role of structural empowerment

Structural capital depicts knowledge or learning ability integrated into the organisation's formal processes, structural systems, repetitive activities, and procedures (Menor et al., 2007). As a crucial aspect of structural capital, structural empowerment depicts employees' capability to acquire support, resources, information, and opportunities to

learn and improve at work (Monje Amor et al., 2020). The active and efficient communication caused by structural empowerment leads to better performance in the workplace and interpersonal relationships. Moreover, enhanced structural empowerment with the organisation's thriving support and resources fosters fluent information flow and promotes employee development opportunities (Ayala Calvo and García, 2018).

Additionally, creative employees are part of an organisation's capabilities that sustain its competitiveness (Mumford, 2000). Janssen et al. (2004) argued that creative ideas that belong to individuals or groups are the foundation of all innovation because they generate, promote, discuss, modify, and ultimately realise innovation. Therefore, employee creativity is critical for firms' long-term success. The contribution of employee creativity to a firm's success could come from performance efficiency improvement, positive job attitudes, innovative change, and well-being (Janssen et al., 2004).

Furthermore, employees' creativity can become a facet of job design, which encourages autonomy, task complexity, and creativity in the job description (Gilson and Shalley, 2004). When creativity becomes a critical component of the work environment, employees are more inclined to create novel ideas or approaches to improve work performance. Shalley et al. (2000) documented that employees' creativity is positively associated with creative performance and intrinsic motivation. Mayfield and Mayfield (2007) found a strong relationship between employees' perceived work environment and creativity. By establishing clear employee creativity requirements, organisations can empower employees to act spontaneously with their sustainable objectives. In addition, studies on environmental sustainability have indicated that when employees feel organisations' support, they are inclined to invest additional efforts in behaving environmentally (Paillé and Meija-Morelos, 2019). Employees voluntarily improve their environmental performance through intellectual capital and their organisations' support of their access to information, aid, and resources.

As mentioned earlier, green creativity predicts structural empowerment and makes employees behave in an environmentally friendly manner with adequate knowledge, experience, professional proficiency, and cognitive abilities. Meanwhile, structural empowerment enhances organisational support, engages employees in their work, and further motivates them to improve their environmental performance. Therefore, we believe that structural empowerment is a bridge between individuals' green creativity and their performance in environment-related issues.

Hypothesis 2 (H2) Structural empowerment mediates the effect of green creativity on employees' environmental performance.

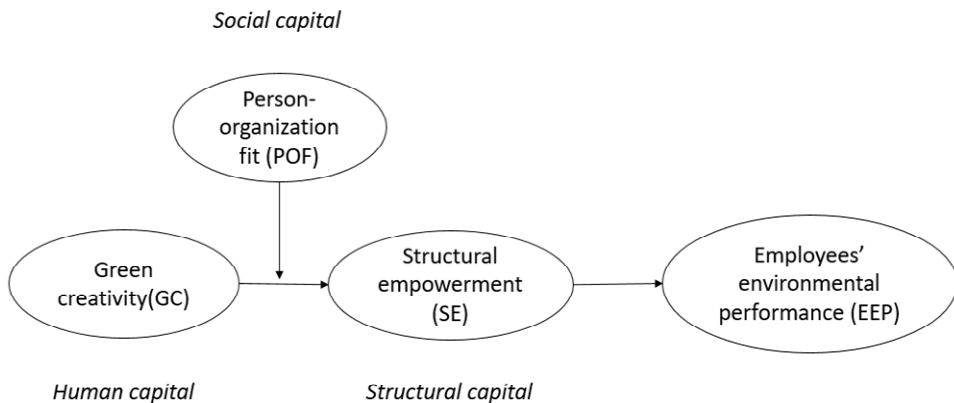
2.5 Moderating role of person-organisation fit

Social capital, the third type of intellectual capital, refers to the learning capability and knowledge internalised in informal organisational interactions (Nahapiet and Ghoshal, 1998). Unlike structural capital, which originates from formal processes and repetitive activities, social capital does not involve predetermined rules. However, like structural capital, social capital becomes stable and is significantly influenced by norms for interactions and organisational culture (Putnam, 2000). Previous research has claimed a crucial aspect of social capital: creative, trustful, and collaborative interrelationships between individuals and organisations that lead to positive team culture (Subramaniam and Youndt, 2005).

Safavi and Bouzari (2020) showed that organisational fit is directly and positively associated with social capital. As the person-organisation fit theory proposes, the strength of the fit between the corporate environment and individual characteristics leads to differences in employees' attitudes and behaviours (Kristof-Brown et al., 2005). Thus, a higher match between employees and organisations increases the former's consensus on the latter's goals (Chen et al., 2016). Proper match enhances employees' creativity and dependence on the organisation while realising the organisation's environmental goals, and person-organisation fit can satisfy employees' needs to seek congruity with the organisation's values. Furthermore, it can assist them in dealing with differences (i.e., satisfaction with individual requirements). Therefore, person-organisation fit refers to employees' recognition of an organisational culture that matches their endowment. Through structural effectiveness, employees are more likely to practice self-ethics and social responsibility.

Previous studies have revealed that employees' innovative work behaviour (Afsar et al., 2018) and performance (Raffice and Byun, 2020) are significantly different under varied person-organisation fit levels. Relative to employees under low levels of person-organisation fit, high-fit employees may engage in innovative work behaviour more frequently because they possess autonomous work motivation (Saether, 2019). Once managers seek consensus with employees and organisational values, they will have a stronger inclination to enhance environmental incentives to compensate for ecological defects in their organisations. In this case, a high person-organisation fit may enhance organisations' structural empowerment through employees' green creativity.

Figure 1 Conceptual model



Conversely, low perceptions of person-organisation fit may impede the formation or the complete lack of motivation (Saether, 2019). In such a case, there is a lack of value congruence between employees and organisations, indicating potential reasons for unvalued work (Greguras et al., 2014). Moreover, employees' work activities do not motivate them. Instead, only obtaining external rewards (e.g., earnings) or realising other goals (e.g., avoiding punishment) would encourage them. Therefore, the positive impact of employees' green creativity on structural empowerment may be reduced under a low person-organisation fit.

Hypothesis 3 (H3) Person-organisation fit moderates the effect of green creativity on structural empowerment.

Figure 1 shows the conceptual model.

Table 1 Demographic information of the respondents

<i>Variable</i>	<i>Indicator</i>	<i>Number</i>	<i>Percentage</i>
Gender	Male	109	46.40%
	Female	126	53.60%
Age	20–29 years old	84	35.70%
	30–39 years old	112	47.70%
	40–49 years old	36	15.30%
	> 49 years old	3	1.30%
Education	Others	57	24.30%
	Bachelor	154	65.50%
	Postgraduate or above	24	10.20%
Income (RMB)	Missing	8	3.40%
	< 3,000	10	4.30%
	3,001–5,000	46	19.60%
	5,001–8,000	90	38.30%
	8,001–20,000	70	29.80%
	> 2,0000	11	4.70%
Company type	Others	14	6.00%
	Private enterprise	82	34.90%
	State-owned enterprise	26	11.10%
	Joint venture enterprise	30	12.80%
	Foreign-owned enterprise	83	35.30%
Position	Clerk	118	50.20%
	Junior management	58	24.70%
	Middle management	53	22.60%
	Senior management	6	2.60%
Work age	Missing	6	2.60%
	< 1 year	3	1.30%
	1–3 years	60	25.50%
	3–5 years	37	15.70%
	5–10 years	56	23.80%
	> 10 years	73	31.10%

3 Methodology

3.1 Data collection

We collected data through a survey to test our research hypotheses. Before the formal survey, we conducted a pretest to examine the appropriateness of the questionnaire. First, we invited five doctoral students researching sustainable management to appraise the structure and expression of the questionnaire to ensure that respondents would not misinterpret any of the questions. Second, 20 undergraduate students were asked to complete the questionnaire. Finally, we revised the questionnaire according to the suggestions from the doctoral students and undergraduates.

Then, we strategically collected data from employees of several companies in the Shanghai–Jiangsu–Zhejiang region, China’s most well-developed manufacturing area. To control for the impact of industry differences on green creativity, we randomly surveyed employees from companies in various industries, including the automotive, chemical, iron, electronics, clothing, food, and service sectors. We mailed the questionnaire to the companies with a letter of request that included an explanation of the importance of the research. Approximately five days later, we made follow-up calls to the contact person of each target company to request a response. We assured them that we would share our research reports with them. From January to March 2020, 250 respondents from the sampled companies returned their questionnaires, but 15 questionnaires were deleted because of incomplete or various missing values. A total of 235 valid questionnaires were obtained (see Table 1).

3.2 Measurement

We adapted well-validated measures from previous research to fit this study and performed a translation–back-translation procedure to ensure translation validity. Seven-point Likert scales anchored by 1 to 7 were used to measure from strongly disagree to strongly agree. Six items from Rego et al. (2007) and Barczak et al. (2010) were used to measure green creativity. Structural empowerment was assessed using 12 items adapted from Laschinger et al. (2004). Following Zhao et al. (2021), we measured person-organisation fit using two items from Cable and DeRue (2002). Finally, we used four items from Judge and Douglas (1998) to measure employees’ environmental performance.

3.3 Results

3.3.1 Common method bias

Since the data derives from the respondents’ self-reports, common method bias should be controlled before data analysis. Two common methods were employed to control for bias (Fan et al., 2021). First, before the formal survey, we improved the questionnaire and modified the items with ambiguous expressions (Hua et al. 2020); we also informed the participants that we would protect their personal information well. Second, we performed Harman’s single-factor test (Li et al., 2018), which showed five constructs with eigenvalues > 1.0 emerging from the exploratory factor analysis. Moreover, the first factor explained 38.61% of the variance (below the threshold of 40%), and all factors

explained 65.71% of the total variance. Therefore, the possibility of common method bias was excluded.

3.3.2 Measurement model

In this study, Cronbach's α of constructs ranged from 0.713 to 0.900, which confirmed the internal consistency of the measurement (see Table 2). Furthermore, the combined reliabilities (CRs) were above 0.7, and the average variance extracted (AVE) values were above 0.50 (Hua et al., 2019), thereby confirming convergent validity. Finally, discriminant validity was tested by comparing the square root of the AVE and cross-correlations among the latent variables (Li et al., 2018). The results show that the square root of the AVEs was higher than its cross-correlation with the other variables (see Table 3). Thus, discriminant validity was verified.

Table 2 Construct reliability and convergent validity

<i>Variable</i>	<i>Items</i>	<i>Loading</i>	<i>CR</i>	<i>AVE</i>	<i>Mean</i>	<i>SD</i>
Green creativity $\alpha = 0.895$	GC1	0.823	0.920	0.658	4.88	0.93
	GC2	0.855				
	GC3	0.710				
	GC4	0.852				
	GC5	0.821				
	GC6	0.796				
Structural empowerment $\alpha = 0.900$	SE1	0.682	0.923	0.501	5.09	0.77
	SE2	0.667				
	SE3	0.692				
	SE4	0.697				
	SE5	0.738				
	SE6	0.748				
	SE7	0.767				
	SE8	0.774				
	SE9	0.749				
	SE10	0.622				
	SE11	0.673				
	SE12	0.664				
Person-organisation fit $\alpha = 0.873$	POF1	0.942	0.940	0.887	4.93	1.03
	POF2	0.942				
Employee's environmental performance $\alpha = 0.713$	EEP1	0.760	0.942	0.802	5.33	0.76
	EEP2	0.796				
	EEP3	0.708				
	EEP4	0.692				

Table 3 Construct discriminant validity

Construct	1	2	3	4	5	6	7	8	9
Gender	-								
Age	0.228**	-							
Company	0.200**	0.316**	-						
Position	0.093	0.030	-0.118	-					
Work age	0.233**	0.502**	0.188**	0.162*	-				
Green creativity	0.079	0.143*	0.208**	0.055	0.178**	-			
Structural empowerment	-0.005	-0.025	0.011	0.063	0.118	0.444**	-		
Person-organization fit	0.034	0.073	0.128*	0.080	0.133*	0.420**	0.680**	-	
Employee's environmental performance	0.043	0.117	0.209**	0.041	0.181**	0.609**	0.559**	0.493**	-
	0.811	0.708	0.896	0.811	0.708	0.896	0.811	0.708	0.811

Note: “-” refers to no square root of AVE was estimated due to the construct is not latent variable; **p < 0.001, *p < 0.01, p < 0.05.

3.3.3 Structural model

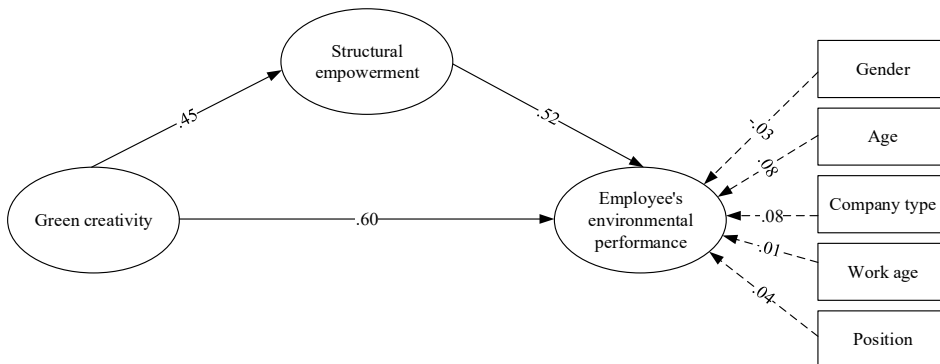
In this study, the structural model in AMOS 21.0 was conducted to estimate the path coefficients among the constructs (see Table 4 and Figure 2). The results of the model fit are as follows: CMIN/DF = 1.54, RMSEA = 0.05, TLI = 0.93, RMR = 0.06, GFI = 0.88, IFI = 0.95, CFI = 0.94. The coefficients of all paths were significant, indicating that the data supported all hypotheses.

Table 4 Summary of path analysis

<i>Relationships</i>	<i>Coefficients</i>	<i>T value</i>
Green creativity → structural empowerment	0.45***	6.28
Structural empowerment → employee's environmental performance	0.52***	5.42
Green creativity → employee's environmental performance	0.60***	7.07
Control variables		
Gender → employee's environmental performance	-0.03	-0.28
Age → employee's environmental performance	0.08	0.94
Company type → employee's environmental performance	0.08	1.94
Work age → employee's environmental performance	0.01	0.21
Position → employee's environmental performance	0.04	0.69

Note: ***p < 0.001.

Figure 2 Path coefficients



3.3.4 Moderated mediation analysis

To test the moderated mediation effect, we conducted a bootstrap analysis (SPSS PROCESS 3.0, models 4 and 7), with green creativity (independent variable), structural empowerment (mediator), personal-organisation fit (moderator), and employees' environmental performance (dependent variable). The results showed that green creativity positively influenced employees' environmental performance in a direct and indirect manner through increased structural empowerment (direct effect = 0.368, SE = 0.043, 95% CI = [0.2819, 0.4528]; indirect effect = 0.131, SE = 0.032, 95% CI = [0.0752, 0.2007]).

With a low personal–organisation fit, the indirect effect of structural empowerment was not significant (95% CI = [−0.0117, 0.0825]); with a middle fit, the indirect effect was 0.068 (95% CI = [0.0317, 0.1192]); with a high fit, the indirect effect was 0.117 (95% CI = [0.0565, 0.1721]). The moderated mediation effect of personal-organisation fit was 0.039 (95% CI = [0.0123, 0.0727]). Therefore, H3 was supported (Table 5 and Figures 3 and 4).

Table 5 Summary of moderated mediation analysis

	<i>Effect</i>	<i>SE</i>	<i>LLCI</i>	<i>ULCI</i>
<i>Mediation analysis</i>				
Direct effect	0.368	0.043	0.2819	0.4528
Indirect effect	0.131	0.032	0.0752	0.2007
<i>Moderated mediation analysis</i>				
Indirect effect (low fit)	0.029	0.024	-0.0117	0.0825
Indirect effect (middle fit)	0.068	0.022	0.0317	0.1192
Indirect effect (high fit)	0.117	0.030	0.0565	0.1721
Moderated mediation effect	0.039	0.016	0.0123	0.0727

Note: low fit group = mean-1SD, high fit group = mean + 1SD.

Figure 3 Moderated effect on structural empowerment

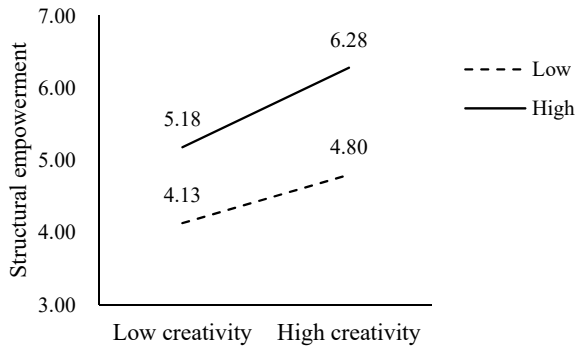
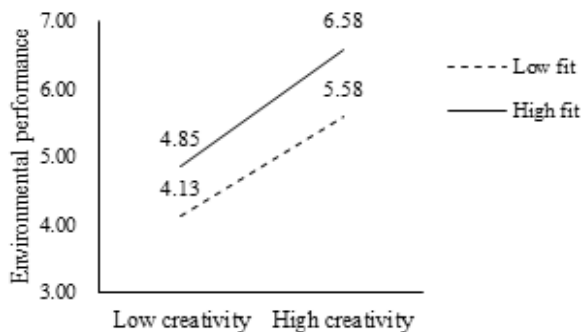


Figure 4 Moderated effect on employee’s environmental performance



4 Discussion

With multiple social and environmental challenges, green innovation has become essential for firms in the Asia-Pacific region to enhance their competitive advantages and achieve further development (Miller et al., 2020). At the same time, human capital has become more vital for firms' innovation (Chen, et al., 2015; Jimenez-Jimenez and Sanz-Valle, 2020). This study focuses on the challenges and innovation decisions faced by Chinese firms in the context of China's 'carbon neutrality' policy. As China is an essential economy in the Asia-Pacific region, studying Chinese employees' intellectual capital and environmental performance is critical for firms' innovation in the Asia-Pacific region. As noted in the literature, human intellectual capital is a crucial antecedent of technological capabilities and firm innovation (Jimenez-Jimenez and Sanz-Valle, 2020). Since environmental issues are a vital constraint to the further development of firms in the Asia-Pacific region, our China-based study has implications for the green innovation of these firms.

Using a sample of Chinese employees, this study tested the relationships between the three elements of intellectual capital (i.e., green creativity, structural empowerment, and person-organisation fit) and employees' environmental performance. Specifically, we examined the effects of green creativity, structural empowerment, and person-organisation fit on employees' environmental performance in an organisational setting. The research yielded the following results:

- a green creativity can predict employees' environmental performance
- b structural empowerment mediates the effect of green creativity on employees' environmental performance
- c person-organisation fit not only moderates the effect of green creativity on structural empowerment but also strengthens the indirect relationship between green creativity and employees' environmental performance via structural empowerment.

Specifically, green creativity has a more significant influence on structural empowerment when the person-organisation fit is high.

4.1 Theoretical implications

This study discloses the influencing mechanism of green creativity on employees' environmental performance through the intellectual capital perspective, thereby facilitating the integration of human resource management within the framework of corporate social responsibility.

First, most of the literature on intellectual capital analyses intellectual capital's strategic role (López-Gamero et al., 2011). It provides empirical studies concerning the impact of intellectual capital on financial performance (Dženopoljac et al., 2016). Some scholars have recently discussed the role of intellectual capital on sustainable performance in organisations. Expanding the possible mediators and moderators is crucial in answering the unaddressed question of causality between intellectual capital and employees' sustainable outcomes. Drawing on intellectual capital theory (Subramaniam and Youndt, 2005; Menor et al., 2007), we examined three dimensions of intellectual capital: green creativity, structural empowerment, and person-organisation fit, to examine their effects on employees' environmental performance.

Second, drawing upon the definition of intellectual capital theory is essential for sustainable benefits from employees' environmental performance, which examined hypotheses using a multidimensional perspective involving the green creativity, structural empowerment, and person-organisation fit dimensions of intellectual capital. We verified that these three dimensions of intellectual capital could predict employees' environmental performance individually and jointly. Previous studies have argued that initiating green creativity and innovation can help firms reap first-mover advantages in the green context (Yong et al., 2019). Some studies have also found that companies can integrate green creativity into their sustainable products/services to reduce environmental pressures (Eide et al., 2020). Employees' green creativity encourages them to engage in the green process in the workplace, promotes a better fit between themselves and their organisations, and helps them target environmental goals through their work (Ouyang et al., 2020).

Furthermore, green creativity mediates the impact of green knowledge on environmental performance (Riva et al., 2021). Structural empowerment is a means by which employees can give play to their green creativity through their work alignment and thereby improve their environmental outcomes. Utilising the intellectual capital framework, we suggest that green creativity positively affects employees' abilities and motivates them to find more green opportunities in the work process, subsequently enhancing their environmental performance. Thus, structural empowerment is expected to play an essential role as a mediator of green creativity in employees' environmental performance.

Finally, structural empowerment is a mediator between green creativity and employees' environmental performance, whereas person-organisation fit exerts a moderating effect. An employee's creative work behaviour involves multiple stages to improve products/services/procedures and can thus be achieved by applying a new idea (Janssen, 2000). Previous studies have focused more on the antecedents and consequences of green creativity (Chen and Chang, 2013; Song and Yu, 2018). Few researchers have addressed the interaction between individuals and organisations, such as person-organisation fit (Jehanzeb and Mohanty, 2018). Recent studies have shown that person-organisation fit drives employees' work behaviour (Saether, 2019). Although it does not always favour environmental behaviour, person-organisation fit is associated with employees' green creativity. Moreover, the person-organisation fit may moderate green creativity in the structural process.

In summary, our study aims to understand better the underlying mechanism involved in the effect of intellectual capital on employees' environmental performance by extending the extant findings. Using data from Chinese employees, our study provides insights into firms' green innovation in the Asia-Pacific region. First, we outlined green creativity, structural empowerment, and person-organisation fit as three critical elements within the intellectual capital framework. We show that green creativity as human capital can increase employees' environmental performance through structural empowerment. Second, we examined our mediated model's moderated mediation effects of person-organisation fit. We found that green creativity influences employees' environmental performance through structural empowerment, especially when the person-organisation fit is higher. Our study offers a new lens to evaluate when and how an organisation can improve its employees' environmental performance engagement in response to its environmental objectives. Hence, our study differs from the existing environmental or sustainable management literature.

4.2 Managerial implications

This study offers theoretical and practical significance for firms in the Asia-Pacific region. First, because this study shows that green creativity can effectively improve employees' environmental performance, managers (or human resource managers) should consider their selection criteria and promote higher green creativity. For example, Bhutto et al. (2021) proposed that green inclusive leadership, a green psychological climate, and green job participation can be used to enhance employees' green creativity. The employees of firms in the Asia-Pacific region have experienced rapid economic growth, and their work behaviours are mainly for financial purposes; however, they generally lack green innovation awareness and the ability for environmental performance. Therefore, for the management of firms in the Asia-Pacific region, it is necessary to design job descriptions to incorporate the green creativity requirements formally when recruiting new employees. Meanwhile, in terms of continuing education and training, it is also essential to equip existing employees with the required green innovation knowledge and skills to elicit better environmental performance.

Second, this study found that structural empowerment promotes employees' green creativity in their environmental performance. This finding may help company managers recognise that green innovation is not sufficient to enhance the environmental performance of organisations as the structural power of organisations, especially the organisational style that is in line with the characteristics of the Asia-Pacific region, is also vital. This study reveals that enhancing structural empowerment is an effective approach to achieving this goal. However, the external boundary conditions of structural empowerment result in a significant moderating effect of person-organisation fit on green creativity and structural empowerment. A high person-organisation fit means a strong impact of green creativity on structural empowerment. Therefore, managers in the Asia-Pacific region should enhance the fit between individuals and organisations and design and maintain suitable organisational procedures, which actively create a context in which employees can share more opportunities to incorporate environmental ideas or methods into their daily work. This might help employees better fit with their organisations and engage in fulfilling environmental behaviours. Conversely, relying on their potential for green creativity is ineffective for employees under a low level of person-organisation fit. An organisation's external reward or punishment mechanisms and leadership could be more effective in promoting its employees' environmental behaviours.

4.3 Limitations and future research

This study has several limitations that can be improved in future work. First, future work can refine the connotations and extensions of intellectual capital. Nevertheless, the three primary constructs were tested by previous studies, and the scope of these constructs was adjusted in a different context. A complete alternative set may be examined for other purposes. Second, the sample is only representative of the Chinese population; therefore, the generalisability of the findings is a concern. Future research could examine our model using multiple sample sources in the Asia-Pacific region with significant cultural differences.

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