

1 **Investing in green intellectual capital to enhance green corporate image under the Influence**
2 **of green innovation climate: A Case of Chinese Entrepreneurial SMEs**

3 **Abstract**

4 Modern firms have been urged to play their role toward a sustainable business environment. The
5 relevance of green prospects in the work environment continues to expand. Still, little research has
6 been conducted to understand the role of green intellectual capital plays in promoting
7 environmental behaviours and outcomes. With China's higher level of carbon emission, it has
8 become imperative for businesses to investigate ways to improve their environmental
9 performance. For this purpose, we collected the data from 451 entrepreneurial small and medium-
10 sized enterprises based in Jiangsu province of China and then analyzed it through partial least
11 square-structural equation modeling (PLS-SEM). Based on the social cognitive theory
12 assumptions, this research study argues that; green intellectual capital, measured with green human
13 resource, relation capital, and structural capital, positively influences green core competence. And,
14 Green core competence positively impacts the green corporate image (environmental performance
15 and green innovation practices). Additionally, Green core competence was found to mediate the
16 relationship between green intellectual capital and green corporate image. Lastly, the study's
17 outcome delineated that innovative green climate moderates the relationship between green core
18 competence and green corporate image. This study broadens the scope of social cognitive theory
19 and presents a viable solution for entrepreneurial small and medium-sized enterprises stakeholders
20 to use the knowledge generated by green intellectual capital and core competence to improve their
21 green corporate image.

22 **Keywords:** Green intellectual capital; Green core competence; Green innovation climate;
23 Entrepreneurial small and medium-sized enterprises; Green corporate image

24 **Introduction**

25 Scholars and various stakeholders have been keen on solving the environmental menace in
26 recent decades, especially in China. This is because China is among the top five emitters of carbon
27 emissions globally. Moreover, due to pressure from international bodies, customers, the
28 government, and society, businesses are more concerned about improving their green corporate
29 image to dissipate environmental pollution (Sampene et al., 2022). Environmental scientists have
30 suggested green intellectual capital (GIC) as one of the innovative ideas to overcome ecological
31 degradation and serve as a competitive advantage to enterprises (Benevene et al., 2021a; Jirakraisiri
32 et al., 2021). Erstwhile studies have proven that GIC helps firms' corporate green image, which
33 comprises environmental performance (EP) and green innovation performance (GIP) (Jirakraisiri
34 et al., 2021; Khan, Li et al., 2022; Saran & Shokouhyar, 2021). Despite the growing significance of
35 GIC, there is a literature gap on how GIC can help firms achieve higher EP and GIP from emerging
36 countries such as China. Few studies exist to analyze how GIC can facilitate reaching a low-carbon
37 environment in China (Zhang et al., 2022; Li et al., 2021; Qu et al., 2021; Ye et al., 2022a). As a
38 result, this study provides an empirical analysis focusing on filling the literature gap on GIC and
39 its influence on EP and GIP.

40 Theoretically, the concept of GIC emerged from Intellectual Capital (IC), described by Ali
41 et al. (2021) as an intangible organizational asset that includes a stock of data and information that
42 firms use to improve their value. GIC can be defined as data, supply of ideas, licensed rights, learning
43 process, and corporate image, which make firms more valuable and worthy (Ali et al., 2021;
44 Chatterjee et al., 2022). GIC has been captured into three forms: thus, Social Capital, Human Capital,
45 and organizational Capital. Social capital is characterized as customer dedication, goodwill, trust,
46 and well-established connection with various stakeholders, suppliers, and other organizations (M.

47 Ali, Naz, et al., 2021). Human Capital comprises the capabilities and skills of employees,
48 capacities, and ingenuity that firms harness to achieve their goals (Bombiak, 2021). Organizational
49 capital can be described as corporate image, trademarks, licenses, organizational culture, climate,
50 database, and firm assets (Benevene et al., 2021b; Shah et al., 2021a). However, for this research, the
51 concept of GIC is categorized into green human capital, green relational Capital, and green
52 structural Capital, which recent studies have suggested (Abbas et al., 2021; M. Ali et al., 2021;
53 Mansoor et al., 2021; Shah et al., 2021b).

54 Another key variable that increases firms' competitive advantage is the critical capabilities
55 and resources, generally classified as core competencies (Kuo et al., 2022). Hence, environmental
56 scientists have begun investigating the influence of green core competence (GCC) on firms EP
57 and GIP (Gómez-Valenzuela, 2022; Qu et al., 2021; Wang et al., 2021). GIC is a collective form
58 of learning about how firms manage their green initiatives, especially their abilities and capabilities
59 in achieving specified environmental goals (Farzaneh et al., 2022; Chen, 2008). Thus, GCC can
60 enable firms to effectively and efficiently reach a higher level of GIP and EP (Kuo et al., 2022; Qu
61 et al., 2021). Therefore, in this research, we evaluate the mediation role of GCC from two theoretical
62 perspectives. First, the study examines the mediation effect of GCC between GIC and EP, and
63 second, the mediation role of GCC between GIC and GIP. This topic is worth investigating, and
64 few studies have evaluated the mediation role of GCC in their studies. As Qu et al. (2021)
65 indicated, scholars have not focused on GCC as a mediating factor that tends to enhance the present
66 state of GIP and EP of enterprises.

67 Extant studies placed green innovation climate as an integral aspect in promoting firms' GIC
68 and environmental performance (Naseer et al., 2021a; Visser and Scheepers, 2022). Ye et al. (2022)
69 described an innovation climate formed by connecting staff and top-level management. Thus, their

70 study argued that an innovative climate comprised of eight components which include leadership
71 care for staff, the intimacy of management-staff interaction, the association between co-workers,
72 the shared work achievement of staff, leaders serving as role models, team spirit, incentives offered
73 from leaders to staffs and fair distribution of workload among employees (Naseer et al., 2021b; Ye
74 et al., 2022b). Thus, if employees feel these connections at the workplace, it will empower them to
75 think and bring out innovative ways to help firms achieve their environmental objectives. Hence
76 this research analyzed the moderating effect of innovation climate on the connection between the
77 first GCC and EP. Second, the moderation impact of green innovation climate on GIP and EP.
78 Hence this research intends to achieve the following objectives:

- 79 (1) To evaluate the effect of GIC on GCC and the impact of GCC on EP and GIP.
- 80 (2) To examine the mediation role of GCC on the relationship between GIC and different
81 dimensions of green corporate image.
- 82 (3) To investigate the moderation effect of green innovation climate on the connection between
83 GIC and different dimensions of green corporate image.

84 The outcome of the current paper provides a novel contribution to the literature on
85 environmental sustainability. First, this study extends the social cognitive theory by investigating
86 the mechanism through which green intellectual capital can influence GCC and the environmental
87 performance of SMEs. Second, the paper addresses the literature gap on the mediation effect of
88 green core competence on the association between green intellectual capita and green corporate
89 image. Specifically, the research provides an empirical outcome that supports the arguments that
90 SMEs can improve the association between GIC and green corporate image by focusing on
91 employees' GCC. Thus, firms can outline measures to improve their employees' core abilities,
92 eventually affecting their green corporate image. Third, an innovative green climate has become

93 an important concept for businesses to pursue. An innovative green climate involves developing
94 and implementing environmentally friendly and sustainable solutions to address climate change
95 and promote a greener future. It encompasses a wide range of innovative technologies, practices,
96 and policies aimed at reducing greenhouse gas emissions, conserving resources, and mitigating the
97 negative impacts of climate change. Hence, the outcome of this study has demonstrated that a
98 green innovative climate has a positive moderating influence on the connection between GIC and
99 green corporate image. These findings imply that an innovative green climate strengthens the
100 nexus between GIC and green corporate image. Fourth, since some scanty studies have evaluated
101 how GCC, GIC, and innovative climate affect a green corporate image, this study is a pioneer in
102 evaluating these concepts, especially among SMEs from emerging economies such as China.
103 Lastly, the current analysis has provided empirical evidence highlighting how GCC and GIC can
104 stimulate green innovation practices and environmental performance. Moreover, the study has
105 enumerated several practical measures that managers, stakeholders, and enterprises can learn on
106 how to improve environmental sustainability

107 The rest of the paper is structured as follows. Section 2 examines the theoretical framework
108 and hypothesis development. Section 3 introduces the methodology adopted. Section 4 expounds
109 on the findings based on PLS-SEM analysis. Section 5 will present this work's interpretation,
110 leading to practical and theoretical consequences of the research.

111 **Theoretical Background and Hypotheses Development**

112 **Social cognitive theory**

113 In its early form, SCT explains the mechanism of human interactions with the external
114 environment (Bandura, 1986). This theory emphasizes three significant areas which are overlapped;

115 behaviour, person, and environment; One way or another; they are linked to each other (Nisar et
116 al., 2021; Yusliza et al., 2020a). Knowledge resources and skills equip an individual to think beyond
117 their traditional wisdom. At the same time, capabilities force them to play their role in their external
118 environment (Qu et al., 2021; Shahzad et al., 2020). On the foundation of SCT, we propose our
119 conceptual framework that green intellectual capital will help employees of entrepreneurial SMEs
120 achieve green core competence, which can result in a sustainable green corporate image.

121 This research evaluates a theoretical framework based on social cognitive theory (SCT)
122 (Bandura, 1991a; Martin and Guerrero, 2020). The SCT has been extensively applied to examine
123 organizational behaviour and how employees in firms actively improve their environment due to
124 their own needs and moral standards (Ye et al., 2022b). The individual-environment-behaviour
125 illustrated by the SCT highlights the interaction among these variables and how it affects
126 individual decisions in protecting the environment (Cai et al., 2022). Accordingly, this study utilized
127 the SCT to assess how employees' GCC, GIC, and innovation climate affect firms' environmental
128 and green innovation performance. The present research advances and adds to the existing studies
129 on GCC, GIC, and green image performance. It indicates how firms can improve their
130 environmental performance by interacting with these variables.

131 Moreover, the study extends the SCT by including new variables such as GCC and GIC as
132 critical components that can help individuals cultivate green behaviour that can help contribute to
133 environmental sustainability in China. Stakeholders can provide mechanisms and strategies to help
134 firms enhance their EP and GIP. Based on the study's empirical outcome, policy interventions
135 have been provided to promote EP and GIP through GIC. Firms focusing on a green innovation
136 climate tend to dissipate environmental pollution from their business activities.

137

138 **Hypothesis Development**

139 This section comprehensively sheds light on the status of given variables used in the conceptual
140 framework and proposes their relationships.

141 *Green intellectual capital and green core competence*

142 Intellectual capital is a vital asset of organizations that can add value to achieve
143 organizational goals. Intellectual capital can be nurtured through training and development
144 programs, organizational knowledge dissemination capabilities, etc. (Andersen and Kragh, 2015;
145 Levina and Vaast, 2005). IC is a corporate resource based on a firm's experience, knowledge, and
146 capabilities to organize and utilize these skills to enhance employees' efficiency (Huang et al., 2021;
147 Nguyen and Doan, 2020; Olarewaju and Msomi, 2021). On the other hand, green intellectual Capital
148 (GIC) involves an individual's wisdom, skills, and capabilities to make environmental
149 conservation efforts efficiently (Ali et al., 2021; Jirakraisiri et al., 2021; Yusliza et al., 2020).
150 Employees with concurrent knowledge of the external environment tend to pay more attention to
151 their contribution toward a sustainable business environment (Asiaei et al., 2023; Cai et al., 2022);
152 thus, this wisdom is an added skill of their green Intellectual Capital. On the other hand, many
153 scholars believe that an organization's competitiveness depends upon its core competence and the
154 tangible results of its core competence, its unique product, processes, etc. (Prahalad and Hamel,
155 2009).

156 In a turbulent business environment, firms must strive to target a specific market through
157 their core competence. It cannot be explained with a single trait or unique characteristics of a firm;
158 its rather a skill set or a group of capabilities a firm must possess to gain a competitive advantage
159 (Kuo et al., 2022; Sun et al., 2021; Wevers and Voinea, 2021). GCC could be explained as the

160 transitional set of added capabilities, skills, or features of an organization to reflect its contribution
161 to the natural environment (Nuryanto et al., 2020; Trott, 2013). Thus, it could be put forward as green
162 Intellectual Capital as a much-needed resource or capability of a firm that will help to organize
163 unique traits, skills, and capabilities, which could, in turn, transform into a firm's green core
164 competence.

165 **H1:** GIC will be significantly related to GCC

166 *Green core competence and green corporate image*

167 Chen's (2008) work in the GCC domain is still acknowledged and acknowledged in the
168 current sustainability research. His research's central theme is building a firm's core competence
169 to gain competitive advantage rather than relying on specific skills or capabilities. His famous
170 work has established a relationship between GCC and green image (Arslan, 2019; Li et al., 2021).
171 However, our definitions and parameters of the green corporate image (GCI) are different in this
172 research. However, our research still extends established researchers' viewpoint that GCC is
173 crucial in building GCI. In this research, GCI is the collection of organizational efforts to play its
174 role toward sustainability. Many researchers in the current literature investigated it as an
175 environmental performance (EP), which is reflective. However, we believe that a perfect green
176 corporate image combines the organization's role towards sustainability and how regularly they
177 pay attention to modifying their products, processes, and managerial aspects to reflect green. On
178 the back of previously established outcomes of researchers, we also propose that

179 **H2:** GCC will significantly influence EP

180 **H3:** GCC will significantly influence IP

181

182 *Mediation of GCC*

183 Modern firms are keen to develop core competence which may provide them with all the
184 essential elements to play their vital role in the external environment (Trott, 2013). Similarly, GCC
185 helps firms establish skills and capabilities that could benefit them in transitioning to eco-friendly
186 activities (Khan et al., 2020; Pagiaslis and Krontalis, 2014). The set of needed resources, capabilities,
187 and operations make eco-friendly activities smoother and edge firms over others, as they can
188 respond to environmental demands swiftly. In the conceptual model, GCC mediates GIC and
189 Green image. We posited this view because GCC could carry the knowledge and wisdom of human
190 capital to achieve the sustainable outcomes of modern enterprises. The GCC of a firm must have
191 equipped itself with the most needed capabilities and resources to perform environmental-related
192 tasks (Muscio et al., 2017); thus, it will not be difficult for them to comprehensively transform the
193 external knowledge or wisdom of its intellectual capital. Therefore, GCC will ultimately pave the
194 way to enhance the environmental outcomes of entrepreneurial SMEs. To further validate the SCT,
195 our study proposes that.

196 **H4 (a):** *GCC will mediate the relationship between GIC and EP*

197 **H4 (b):** *GCC will meditate on the relationship between GIC and GIP*

198 *Moderation of GIC*

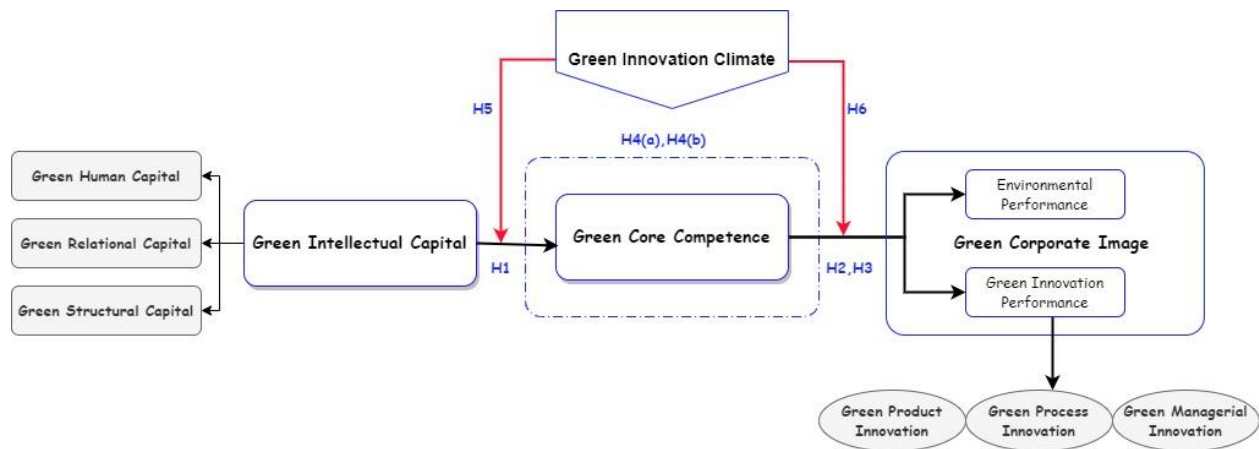
199 Firms can develop skills or competencies but need a conducive climate to transform them
200 into desirable outcomes. In this regard, previous researchers have been keen to study the role of
201 organizational culture or commitment, which decides the results (Maitlo et al., 2022; Wang, 2019).
202 On the other hand, if the organization's culture is not flexible or slow to react to external market
203 changes, it could adversely impact the firms' outcomes (Chen et al., 2012; Qu et al., 2021).

204 Green intellectual capital is mainly associated with employees' wisdom and experiences and can
 205 benefit firms if they can expertly utilize this knowledge. Modern firms attempt to lay a foundation
 206 for a system of core competence that triggers the mechanism of needed outcomes (Khan et al.,
 207 2022b). Thus, this study proposes that the knowledge dissemination process will be more
 208 straightforward in a green innovation climate. Therefore, a green innovation climate can disrupt
 209 the relationship between GIC and GCC and GCC and green corporate image. If the firms' general
 210 climate does not accommodate modern trends and ideas, it will be hard for them to use the
 211 knowledge generated by GCC and GIC entirely. Thus, we propose that;

212 **H5:** *Green innovation climate will moderate the relationship between GIC and GCC*

213 **H6:** *Green innovation climate C will moderate the relationship between GCC and GCI (EP and*
 214 *GIP)*

215 The conceptual model of this research is presented below.



216

217

Figure 1. *The research model*

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219

220 **Methodology**

221 Data were gathered from the Chinese entrepreneurial SMEs through online and offline
222 surveys. The researchers collected data from enterprises implementing green practices in one way
223 or another. Only those employees were asked to complete the surveys on the supervisory or
224 management positions as they better understand organizational policies. After removing 31
225 incomplete surveys (missing values or incomplete information), the present study received 451
226 appropriate responses. The sample size of 451, as stated by Hair et al. (2014), should be greater than
227 ten times the highest number of structural paths that lead to a particular parameter in the structural
228 model. This sample size is in line with their recommendation. The researchers generated a self-
229 administered questionnaire for this study and collected data in seven months (January 2022 to July
230 2022) to gather participant responses. To ensure the measures used in this research are valid and
231 reliable, suggestions and recommendations from experts in the field were sought before sending
232 the questionnaires for responses. The format of the questionnaires was based on earlier literary
233 works. The questionnaire was first created in English with support from literature before being
234 translated into Chinese. The forward and backward translation method was used for all constructs
235 to assure the translation's accuracy (Sperber et al., 1994). The sample's complete demographic
236 profile is shown in Table 1. The current research employed non-probability convenient sampling
237 due to a lack of resources and time. The research model attempted to build some measures to assess
238 green intellectual capital, green innovation climate, and green innovation performance in the
239 context of the environment; this study was exploratory.

240

241

242 **Table 1.** Demographics Analysis

Demographics		Frequency	Percentage
Gender	Male	167	37.1%
	Female	284	62.9%
Marital Status	Single	104	23.1%
	Married	347	76.9%
Age	18-22	27	6.0%
	23-27	205	45.5%
	28-32	57	12.6%
	33-37	90	19.9%
	38-42	47	10.5%
	Equal to or above 43	25	5.5%
Education	Bachelor	157	34.8%
	Master	234	51.9%
	Ph.D. and above	28	6.21%
	Others (Technical Diploma)	32	7.09%
Job Position	Manager	54	11.9%
	First Line Manager	142	31.5%
	Supervisor	255	56.6%

243 **Pilot Testing**

244 A pilot test was carried out to evaluate the questionnaire's quality. Thirty employees with
245 extensive experience in green innovation and sustainable organizational practices participated in
246 this procedure. Based on the results of the pilot study, the present study improved the questions'
247 wording and changed the instrument's questions. After modifying the instrument, the second round
248 of pilot research was carried out. This pilot study's positive findings hope the instrument was
249 prepared for data collection.

250 **Measurement Development**

251 Measurement items were adapted from the previous literature and scored on a 7-point
252 Likert scale, with one being the least (strongly disagree) and seven being the strongest (strongly
253 agree). The questionnaire was created in Chinese because our research mainly focused on studying
254 Chinese employees' performance. To ensure the questionnaire communicated the same meaning,
255 translation and back-translation techniques were used (Sperber et al., 1994).

256 **Constructs and items**

257 This study conceptualizes green intellectual capital GIC (the independent variable) as a
258 higher-order formative construct. It assesses it using three sub-dimensions: green human capital,
259 green relational Capital, and green structural Capital. Five items were used to generate green
260 human capital, three to quantify green relational capital, and eight to measure the green structural
261 capital construct obtained from Huang and Kung's (2011) study. The mediating variable, green core
262 competence, is developed from Chen's (2008) study. The dependent variable, which measures
263 environmental performance, is taken from the research of Laosirihongthong et al. (2013) and
264 comprises five items. GIP was measured using three sub-dimensions: green product innovation,

265 process innovation, and managerial innovation. Green product innovation was measured using
266 four items. The three items were used to quantify green process innovation, and four were used to
267 assess green managerial innovation adapted from the studies of Chen (2008) and Reid and Miedzinski
268 (2008). Eight items adapted from Jaiswal and Dhar (2015) that were modified to measure green
269 innovation climate were used as a moderating variable in this study.

270 **Results and Analysis**

271 Version 3.0 of Smart PLS was employed for data analysis. Structured equation modelling
272 based on partial least squares (PLS-SEM) was utilized to examine the links between the
273 assumptions. PLS-SEM is the best fit for this study because it can measure reflective and formative
274 constructs.

275 **Measurement Model**

276 The validity of the measurement model was tested utilizing convergent and discriminant
277 validity. Convergent validity was assessed through factor loadings (outer loadings), composite
278 reliability, Cronbach's Alpha, and Average Variance Extracted (AVE) (Hair et al., 2020a). Table 2
279 shows that all item loadings were above the threshold of 0.70 (Chin et al., 2008). Composite
280 reliability values, which present the degree to which the construct indicators indicate the latent
281 construct, surpassed the threshold value of 0.7, while average variance extracted, which reflects
282 the total amount of variance in the latent structure indicators, surpassed the suggested value of 0.5
283 (Hair et al., 2020b). To check the internal inconsistency, which measures the reliability based on
284 the interrelationship of the observed items variables, Cronbach alpha was used, which surpasses
285 the required threshold of 0.70 (Hair et al., 2020). This study used generally acknowledged
286 standards to assess the measurement model's reliability, average variance extracted (AVE),

287 discriminant, and convergent validity. The criterion of 0.70 was met in all constructs throughout
 288 the reliability assessment (Hair Jr et al., 2016). Table 2 displays these reliability and AVE results.

289 **Table 2.** Reliability and AVE

	Cronbach's Alpha	rho_A	Composite Reliability	AVE
EP	0.886	0.889	0.922	0.747
GCC	0.921	0.925	0.941	0.76
GHC	0.9	0.9	0.926	0.714
GM	0.879	0.879	0.917	0.733
GProcess	0.819	0.819	0.892	0.734
GProduct	0.846	0.846	0.896	0.684
GRC	0.827	0.828	0.897	0.743
GSC	0.914	0.915	0.933	0.7
Innovation Climate	0.796	0.803	0.858	0.51

290 EP= Environmental Performance, GCC= green core competence, GHC= green human capital, GM= green managerial innovation,
 291 GProcess= green process innovation, GProduct= green product innovation, GRC= green relation capital, GSC= green structural
 292 capital

293 **Discriminant Validity**

294 To avoid multicollinearity difficulties, discriminant validity must be assessed in each study
 295 involving latent variables. Discriminant validity is the extent to which the latent constructs used
 296 for evaluating the fundamental relationships under study are distinctive. The most extensively used

297 method for this is the Fornell and Larcker criterion. The discriminant validity was assessed using
 298 (Fornell & Larcker, 1981a) by comparing the square root of each construct's AVE (diagonal bolded
 299 values) with the correlation coefficients of each construct (off-diagonal values). Sufficient
 300 discriminant validity is confirmed as the square root of each construct's AVE (diagonal bolded
 301 values) is greater than its corresponding coefficients (off-diagonal values). Discriminant validity
 302 requires that all of the instrument's constructs are not firmly correlated (Fornell and Larcker,
 303 1981b). Table 3 shows that the discriminant validity of the factors included in the measurement
 304 model was also evaluated according to Fornell and Larcker's criterion and met the threshold.

305 **Table 3.** Discriminant Validity

	EP	GCC	GHC	GM	GProcess	GProduct	GRC	GSC	Innovation Climate
EP	0.864								
GCC	0.588	0.872							
GHC	0.616	0.148	0.845						
GM	0.583	0.142	0.494	0.856					
GProcess	0.59	0.158	0.5	0.834	0.857				
GProduct	0.596	0.143	0.501	0.757	0.793	0.827			
GRC	0.602	0.134	0.705	0.504	0.472	0.48	0.862		
GSC	0.636	0.517	0.173	0.201	0.195	0.209	0.169	0.837	

Innovation

Climate 0.665 0.496 0.36 0.348 0.353 0.341 0.33 0.499 0.714

306

307 **Validation of the Higher Order Formative Constructs**

308 Higher-order formative elements need to be validated with more skill. This study was done
309 to support the three sub-dimensions of green intellectual Capital (GIC) and three sub-dimensions
310 of green innovation performance (GIP) by following the guidelines of (G. M. Marakas, R. D.
311 Johnson, and P. F. Clay, 2007). This study began by evaluating the importance of the indicators. The
312 present study considered the influence of first to second-order components on these constructs.
313 This research study had reliable support from the computed findings for the three GIC
314 characteristics and three GIP sub-dimensions as second-order constructs in Table 4. The current
315 study also ran additional experiments to assess the multicollinearity's severity. The variance
316 inflation factors for each construct are all less than 3 and fall within the 3.3 cut-off range (Grimmer
317 and Oddy, 2007).

318 **Table 4.** Validating the Higher Order Formative Constructs

Relationship	Original Sample	Type	STDEV	T Statistics	P Values
GHC -> GIC	0.552	1 st →2 nd	0.028	19.393	0.000
GRC -> GIC	0.337	1 st →2 nd	0.017	19.722	0.000
GSC -> GIC	0.366	1 st →2 nd	0.061	5.997	0.000
GM -> GIP	0.39	1 st →2 nd	0.005	73.301	0.000
GProcess -> GIP	0.291	1 st →2 nd	0.004	66.71	0.000

GProduct -> GIP	0.369	1 st →2 nd	0.005	81.144	0.000
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320 **Structural Model**

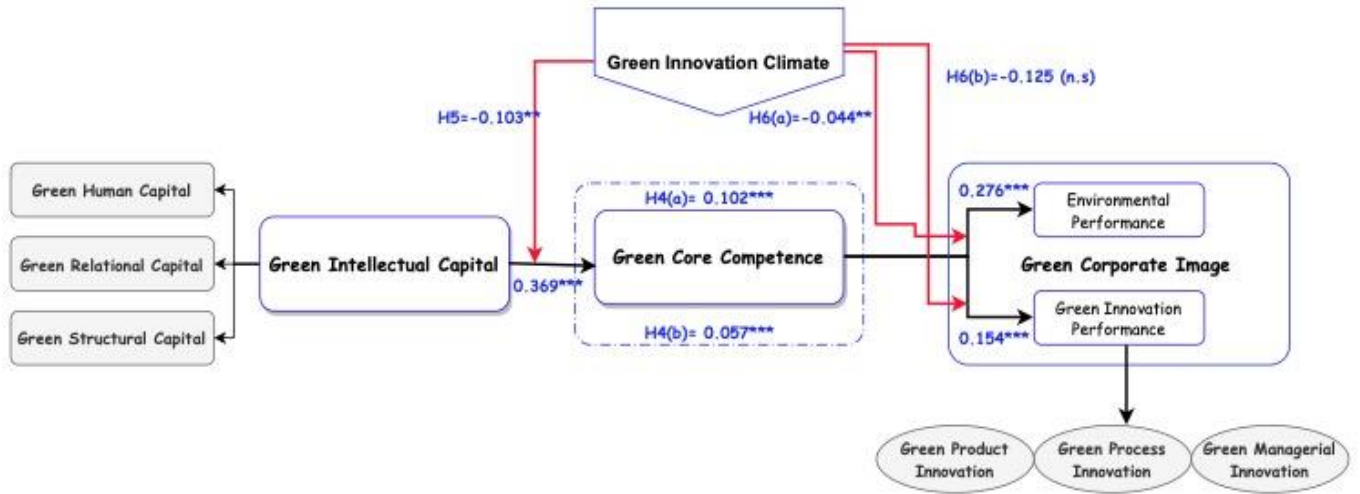
321 The bootstrapping method used to assess model fitness also included calculating the
 322 standardized root mean square (SRMR) score. The structural model used in this investigation's
 323 SRMR value was 0.131, falling within the acceptable range of 0 to 1 (Hooper et al., 2008). This
 324 study looked at the current era's green corporate image, green innovation climate, green core
 325 competence, and green Intellectual Capital. Data was gathered, hypotheses were tested, and path
 326 coefficients were explained. The path coefficient demonstrates the direct impact of one variable,
 327 intended to be a cause, on another, designed to be an effect. The outcomes of the structural equation
 328 modelling with PLS for the suggested model are shown in Table 5. GIC and GCC were
 329 significantly and favourably correlated (coefficient=0.369, t=9.147). H1 was therefore supported.
 330 The association between GCC and EP was substantial (coefficient=0.276, t=9.39). H2 was
 331 therefore supported. The association between GCC and GIP was significant and positive
 332 (coefficient=0.154, t=3.698), further supporting the validity of H3. The outcomes in Fig. 2 were
 333 explicated.

334 **Table 5.** Path Coefficients of proposed hypotheses

Hypothesis	Original					Hypothesis Supported
	Relationship	Sample	STDEV	T Statistics	P Values	
H1	GIC -> GCC	0.369	0.04	9.147	0.000	yes
H2	GCC -> EP	0.276	0.029	9.390	0.000	yes

H3	GCC -> GIP	0.154	0.042	3.698	0.000	yes
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336

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Figure 2- Structural Model Analysis

338 Mediation Analysis

339 With a bootstrapping approach, the present study used the most recent conventions to test
 340 for the mediating role through H4 (a) and H4 (b) (Hayes, 2013; Hussain et al., 2021). The indirect
 341 effect must also be substantial for a mediating effect (Gaskin, J., Godfrey, S., and Vance, 2018). After
 342 examining the model, it was discovered that GIC (substantially positive) had a significant and high
 343 impact on GCC, keeping with the strong association between GCC, EP, and GIP. Both of the
 344 indirect effects of GIC via the mediator GCC were substantial. All the results of the mediation
 345 analysis are shown in Table 6.

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347

348

349 **Table 6. Mediation Analysis**

	Mediating	Original			
Hypothesis	Relationship	Sample	STDEV	T Statistics	P Values
H4 (a)	GIC -> GCC -> EP	0.102	0.019	5.319	0.000
H4 (b)	GIC -> GCC -> GIP	0.057	0.019	2.944	0.003

350

351 **Moderation Analysis**

352 To identify the moderating effect of green innovation climate on the relationship between
 353 green core competence and green corporate image (environmental performance and green
 354 innovation performance), the present study discussed the evaluation of moderation using the PLS
 355 product-indicator approach (Henseler and Fassott, 2010a). To examine the moderating effect, current
 356 research first calculated the impact of GCC on EP and GIP. Second, the effect of the green
 357 innovation climate on EP and GIP and, afterward, the influence of the interaction construct on EP
 358 and GIP were evaluated. No matter how significant the other linked route coefficients are, a
 359 moderator's significance can be demonstrated where the interaction impact is substantial (Henseler
 360 and Fassott, 2010b). For the interaction construct in the case of EP, the results derived a standardized
 361 path coefficient of -0.044, which was substantial ($t = 2.095$). H6 (a) was supported in this regard.

362 Furthermore, for the interaction construct in the case of GIP, the standardized path
 363 coefficient was -0.125, which was not significant ($t = 0.925$), not support H6 (b). Following the
 364 same procedure for H5, the green innovation climate was negative but significant in the GIC-GCC
 365 relationship (coefficient = -0.103, $t = 2.019$). Table 7 presents all the results of the moderation

366 analysis. The research model explained that the adjusted R² for EP was 0.642, whereas R² for GIP
 367 was 0.022. Furthermore, the adjusted R² for GCC was 0.134 in the current research model.

368 **Table 7.** Moderation Analysis

Hypothesis	Moderating Relationship	Original			
		Sample	STDEV	T Statistics	P Values
	Innovation Climate -> GCC	0.415	0.041	10.162	0.000
	Innovation Climate -> EP	0.639	0.025	25.593	0.000
	Innovation Climate -> GIP	0.418	0.045	9.318	0.000
H5	GIC*Innovation Climate -> GCC	-0.103	0.051	2.019	0.044
H6 (a)	GCC*Innovation Climate -> EP	-0.044	0.021	2.095	0.030
H6 (b)	GCC*Innovation Climate -> GIP	-0.125	0.135	0.925	0.355

369

370 **Discussion**

371 SMEs choose alternative ways to contribute towards environmental sustainability. They
 372 either invest in acquiring green organizational resources, equipping themselves with concurrent
 373 green capabilities, or integrating them. However, this study argues that with a set of needed
 374 resources and capabilities, enterprises also invest in GIC, which could be a fundamental capability
 375 to bolster GCC and green corporate performance. The empirical findings of this particular model
 376 are discussed individually in the next section.

377 *First*, the study's findings supported the proposed hypothesis 1, which indicated that GIC
 378 significantly influences GCC. Thus, we found a positive connection between employees' GIC and

379 their GCC level in protecting the environment. The outcome of this study revealed that the
380 enhancement of GIC can lead to a greater level of GCC as these intangible organizational assets
381 can favour firms to achieve their intended environmental objective. In addition, GIC in the form
382 of green human Capital, green relational Capital, and green structural Capital that firms nurture
383 significantly increases the competence level of employees, increasing their green behaviour.
384 Further, GCC also promotes the establishment of crucial core competencies that enable staff to
385 learn and suggest innovative ways to encourage firms' EP that supports the SCT (Bandura, 1991b;
386 Benevene et al., 2021b; Rehman et al., 2021). The study's findings align with erstwhile studies that
387 established the GIC has a direct connection with GCC from different jurisdictions (Kuo et al., 2022;
388 Sun et al., 2021; Wang and Juo, 2021; Wevers and Voinea, 2021).

389 *Second*, the research proved that GCC directly and significantly associates with
390 environmental performance. Thus, staff competencies, abilities, and capabilities help mitigate
391 ecological challenges. The results further highlighted that employees' skills, attitudes, and
392 competencies enhance firms' EP. Previous studies indicate that individual competencies are
393 essential in aligning EP through GCC components, such as collaborative attitude, teamwork, and
394 skills. Accordingly, firms' investment in GCC can be an effective mechanism for promoting EP,
395 and this outcome supports the findings of extant studies (Chen, 2008; Li et al., 2021; Nuryanto et al.,
396 2020; Qu et al., 2021).

397 *Third*, the empirical results show that GCC positively relates to GIP. These results indicate
398 that employees' skills, knowledge, and abilities concerning preserving the environment
399 significantly affect firms' green innovation initiatives and performance. As revealed by prior
400 research, enterprises must therefore provide the proper training approach so that workers can learn
401 the required skills and competencies to improve the process, operations, structure, and the

402 development of new products and services. This finding extends prior studies that established that
403 GCC directly connects with GIP (Kuo et al., 2022; Qu et al., 2021).

404 *Fourth*, the present study evaluated the mediation role of GCC in two ways. Thus, research
405 hypothesis 4a focused on GCC mediating the interplay between GIC and GIP. In addition, 4b also
406 supported that GIC significantly mediates the association between GIC and EP. This exciting
407 outcome indicates that firms with higher levels of GCC among employees can effectively use GIC
408 to promote the GI and EP. The primary underlying assumption is that the GIC strategy enables
409 competitive advantage by captivating the unique GCC of employees, which can help them improve
410 on their GIP and thereby increase the level of their EP. Thus, the firms' exceptional GCC can be
411 utilized to strengthen the connection between GIC and corporate green images such as EP and
412 GIP. Li et al. (2021) revealed that a higher concentration and development of GCC can lead to a
413 better GIP and firms' EP. These findings align with erstwhile research that concluded that GCC
414 could effectively improve the interplay between GIC and corporate green image (Chen, 2008; Saran
415 and Shokouhyar, 2021b; Zameer et al., 2020).

416 This study assessed the moderation effect of green innovation climate on the nexus between
417 GIC and GCC in H5 and the effect of green innovation climate on GCC-GCI (EP and GIP) in
418 H6(a,b). The findings suggested that H5 and H6(a) were significant. The results showed that an
419 innovative green climate played a crucial role and was a moderator in the present study. Innovative
420 green climate, as a moderator, was significant but negative in the GIC-GCC relationship. This
421 might be because entrepreneurial SMEs in this part of China still have not established a mechanism
422 or culture which could comprehensively accommodate sustainable, innovative ideas, thus resulting
423 in a negative relationship in the given context. Moreover, in the case of the GCC-EP relationship,
424 the innovative green climate significantly affected the stated relationship. Entrepreneurial SMEs

425 are at the emerging phase of their business life cycle; with time, they could be more agile and
426 responsive to external environment demands. Currently, environmental performance can alter the
427 choices of needed capabilities to be adopted to attain sustainable goals, which is why our proposed
428 relationship is adverse, as empirical evidence suggests. Furthermore, the present study also
429 checked the moderating effect of green innovation climate on the GCC-GIP relationship, but that
430 relationship was not significant.

431 **Conclusion**

432 The main objective of the current paper was to explore the influence of green intellectual
433 capital on green corporate image and the environmental performance of SMEs in China. The
434 research also tested the mediation effect of green core competencies on the association between
435 GIC and green corporate image (EP and GIP). Furthermore, three moderation analysis was
436 evaluated. (1) The research assessed the moderation effect of green innovation climate on the
437 nexus between GIC and GCC. (2) The moderation effect of green innovation climate on the
438 association between GCC and EP. (3) The moderation effect of green innovation climate on the
439 association between GCC and GIP. The study proposed several hypotheses to achieve the main
440 goals of this research. Moreover, the SCT was employed as the theoretical background to help
441 understand how these variables can contribute to environmental sustainability. Since
442 manufacturing enterprises has been recognized as a major source of producing carbon emission
443 among emerging nations such as China, it is important to evaluate how they can help formulate
444 policies and action to dissipate ecological pollution. Hence, the study targeted SMEs to respond to
445 this research's questionnaires. The researchers received 451 responses from SMEs in China. The
446 study employed the PLS-SEM to evaluate the direct, mediation, and moderation analyses. The
447 empirical outcome from the research indicated that; (1) GIC, measured with green human resource,

448 relation capital, and structural capital, positively influences GCC. (2) Green core competence
449 positively impacts green corporate image (thus environmental performance and green innovation
450 practices). (3) GCC was found to mediate the connection between GIC and green corporate image
451 (EP and GIP). (4) Lastly, the study's outcome delineated that the green innovation climate
452 moderated the connection between GIC and GCC in H5. Furthermore, the green innovation climate
453 moderated the connection between GCC and EP in H6(a), whereas H6(b) was insignificant, and
454 the green innovation climate didn't moderate the connection between GCC and GIP.

455 **Theoretical Implications**

456 This study enriches the domain of SCT and broadens its domains to the spheres of
457 organizational-level research. First, green core competence could be explained as the transitional
458 set of added capabilities, skills, or features of an organization to reflect its contribution to the
459 natural environment (Nuryanto et al., 2020; Trott, 2013). Thus, it could be put forward as green
460 Intellectual Capital as a much-needed resource or capability of a firm that will help to organize
461 unique traits, skills, and capabilities. Second, by using green intellectual capital, this study has
462 enhanced the green core competence of SMEs, which in turn helps to enhance the green corporate
463 image. Third, it provides empirical evidence to validate the GIC as a multidimensional construct
464 that proved to help estimate GCC and GCI in the proposed model. In this investigation, the GCC
465 is brought up as an intervening variable. GCC not only offers a multi-solution to complex problems
466 faced by modern firms but also paves the way to enhance desired organizational outcomes, as it
467 pools the necessary constituents, resources, and capabilities. Last but not least, this study also
468 enriches the literature on green innovation climate by investigating its moderating role in the given
469 relationships. This is also one of the novel aspects of this research, positing the view that; until and

470 unless modern firms do not introduce a culture of innovation, it would be hard for them to bolster
471 or sustain any desired organizational performance.

472 **Managerial Implications**

473 Entrepreneurial SMEs are emerging trends in developing countries that aim to contribute
474 to the country's financial development. Meanwhile, young entrepreneurs are keener to play their
475 role toward the natural environment. These firms' stakeholders could benefit from this study's
476 outcomes by using their employees' wisdom, knowledge, and experiences to establish a GCC,
477 which could be a trigger point to achieve environmental-related results. Similarly, the managers
478 of SMEs may also deduce from the outcomes of this study that investing in GIC is mandatory.
479 They can regularly work on this through on-the-job green training and development programs and
480 educate them. More precisely, the following steps can help entrepreneurial SMEs to enhance green
481 innovation via green intellectual capital;

- 482 • **Emphasize sustainability-oriented recruitment and training about their social and**
483 **moral responsibility towards the natural ecosystem:** Hire employees with a strong
484 understanding of environmental issues and a passion for sustainability. Provide training
485 programs to enhance their knowledge of green practices and innovation. This will help
486 create a workforce aligned with the company's green objectives.
- 487 • **Foster a culture of innovation and collaboration:** Encourage employees to generate
488 green ideas and participate in green innovation initiatives. Establish cross-functional teams
489 to work on sustainability projects and promote collaboration among different departments.
490 This will enhance the company's ability to develop and implement green intellectual
491 capital.

- 492 • **Establish partnerships with research institutions and universities:** Collaborate with
493 academic institutions to access cutting-edge research and technologies in green innovation.
494 This can help SMEs stay updated with the latest developments and gain a competitive edge.
- 495 • **Engage in open innovation and collaboration with external stakeholders:** Seek
496 partnerships with suppliers, customers, and other relevant stakeholders to co-create
497 sustainable solutions. SMEs can tap into additional intellectual capital and expand their
498 innovation capabilities by involving external partners.
- 499 • **Communicate and promote green initiatives transparently:** Develop a comprehensive
500 communication strategy to inform stakeholders about the company's green intellectual
501 capital investments, innovation projects, and environmental achievements
- 502 • **Seek certification and recognition for green practices:** Pursue relevant certifications and
503 awards validating the company's sustainability commitment. Certifications like ISO 14001
504 (environmental management) or LEED (Leadership in Energy and Environmental Design)
505 can enhance the company's credibility and reputation in the market.
- 506 • **Continuously evaluate and improve green intellectual capital:** Regularly assess the
507 effectiveness of investments in green intellectual capital and innovation initiatives. Collect
508 feedback from employees, customers, and other stakeholders to identify areas for
509 improvement. Use this feedback to refine strategies, enhance processes, and strengthen the
510 overall green corporate image.

511 **Limitations**

512 Like most studies based on primary data collection, our research also has certain
513 limitations. The survey method's inherent limitation of focusing on a particular group or
514 companies creeps in when data is collected by one specific sector. However, this opens the door

515 for future researchers to investigate the given model on longitudinal design. The scope of the study
516 could also be broadened if the data of entrepreneurial SMEs were collected from the different
517 provinces of China and compared.

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