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Analysing the relationship of adaption of green culture, innovation, green performance for achieving sustainability

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1 **Analysing the relationship of adaption of green culture, innovation, green**
2 **performance for achieving sustainability: mediating role of employee commitment**

3 Sahiba Sharma, Gyan Prakash, Anil Kumar, Eswara Krishna Mussada, Jiju Antony, Sunil Luthra

4 **Abstract**

5 Increasing sustainability traction in business and the environmental consciousness of customers
6 have forced multinationals to adopt eco-friendly processes. Despite using the different recycling
7 approaches the textile industry is still fighting with problems like higher water pollution,
8 emissions, and increased carbon footprint. Hence, the need for innovating green products or
9 using sustainable material is growing and researchers still have discordance on the predictor and
10 outcome of innovation in the industry. Considering this, the present study is tried to understand
11 the impact of the environmental consciousness of consumers on the green performance of the
12 textile industry. A conceptual model has been proposed which includes adaptability of green
13 culture, innovation, green performance, and employee commitment. The study uses the data of
14 198 employees from textile manufacturing organizations through a structured questionnaire.
15 With the help of the structural equation modelling (SEM) technique, it was found that the most
16 relevant factor of innovation is the adaptability of green culture and green performance was
17 found as the major outcome and significant mediating role of employee commitment between
18 innovation and green performance. The findings of the study would help the textile industry
19 managers to create a green culture by creating its link with green innovation and green
20 performance through developing environmental consciousness among the employees which
21 further support the textile industry in pollution reduction.

22 **Keywords:** Business strategy; Environmental consciousness; Innovation; Green performance;
23 Adaptability; Textile industry; Empirical analysis.

24 **Introduction**

25 Emerging markets (EM) potential economic growth has lifted millions of people out of poverty,
26 conversely, it has led to budding environmental damage and resource degradation (OECD,
27 2017). EM dependency on natural resources and their vulnerability to climate change threats
28 poses risks for their future economic growth. Groundwater depletion, degrading air quality,
29 unavailability of sanitary landfills to dispose of the generated waste are some of the major
30 environmental challenges of EM (EMS, 2017). Certain industries contribute to significant carbon

31 footprint such as the Textile industry specifically, fast fashion, cheap and dirty textiles. EM such
32 as India and China are the largest cotton producers and exporters in the world and half of the
33 global textile industry is in the Asia-Pacific region. The textile industry is water-intensive as it
34 requires water in all stages of manufacturing. The wastewater from textile manufacturing
35 processes comprises of chemicals, salts, dyes, and solvents that are harmful to the environment
36 (Bento et al., 2019; Samanta et al., 2019; Saxena et al, 2017). Today, the textile is one of the
37 most polluting industries and it has been further stated that it contributes to total global emission
38 around 5% (Bauck, 2017). Global climate change and environment protection policies enforced
39 manufacturers to adopt environmental procedures and practices. Organizations in EM find
40 managing corporate environmental sustainability a challenging task as they are required to act
41 and behave responsibly towards the environment while focusing on its economic goals (Gupta et
42 al., 2018) with the help of their human resources. In India considering the usage of water,
43 regulatory authorities have enforced wastewater treatment and discharge standards. Therefore,
44 organizations are forced to opt for more sustainable solutions. Some of the innovative sustainable
45 solutions are zero liquid discharge solution, recycling water. Organizations have to frequently
46 develop different strategies to survive in business competition in EM, for example, General
47 Electric Healthcare (an American Multinational) uses different strategies as they make software
48 for diagnostic machines in India and their parts in China, Hungary, and Mexico. Home Depot
49 (headquartered in Georgia, US) is another example of an organization that used different
50 strategies for different markets such as they set up stores in Chile and Argentina markets but
51 failed. Later with the help of greenfield strategy, they entered Mexico successfully and they have
52 been exploring new emerging markets. Hence, there lies the need to innovate. It can be business
53 model innovation, product innovation, or process innovation.

54 The innovation literature is categorized into: (1) studies related to the process (for instance:
55 Ziegler and Nogareda, 2009; Rennings et al., 2006); (2) studies related to the relationship
56 between innovation and policies (for instance: Demirel and Kesidou, 2011; Kemp and Pontoglio,
57 2008). Manufacturing products that do not contain dangerous and toxic substances are crucial for
58 organizations today considering global climate change and to raise environmental awareness,
59 hence green innovation has become important and a critical factor for organizations (Chiou et al.,
60 2011; Lin and Chang, 2009). According to Calza et al. (2017) Green innovation refers to the
61 innovative approaches adopted by industries to shift their traditional practices into sustainable

62 operations. Green innovation can be further of different types: product, process or managerial
63 innovation (Chen, 2008). In this study, we have focused on product innovation and not on the
64 processor managerial because an understanding of the determinants and consequences of product
65 innovation is very limited (Kurkkio et al., 2011). Hence, in the context of textile manufacturing
66 industries, the antecedents and consequences of innovation are crucial to understanding.

67 The pattern of shared basic assumptions about environmental management and problems is
68 defined as green organizational culture (Marshall et al., 2015; Chen, 2011; Schein, 2010). These
69 assumptions or beliefs values regarding environmental management shape the behaviours of
70 individuals and the green culture has been found to have a positive influence on green innovation
71 (Chang, 2015). Furthermore, organizations with adaptability or adaptability culture take risks and
72 learn from mistakes and have the capability and experience to create change (Denison, 2000;
73 Senge, 1990). These organizations can reform themselves to meet the changing market demands
74 (Eisenhardt and Martin, 2000). Hence, it can be said that organizational culture influence
75 creativity and innovation (Martin and Terblanche, 2003) that can further increase the
76 performance (Danneels, 2002) specifically, green performance.

77 A key competitive advantage for any organization is human resource management (HRM) (Sun
78 et al., 2007) as it affects the performance of the organization through its influence on employee
79 organizational commitment (Nishii et al, 2008). Employee organizational commitment is a
80 predictor of performance (Caillier, 2012; Anderfuhren-Biget et al., 2010) as employees
81 committed to a particular organization devote more effort to their job. Organizations when using
82 HRM policies to encourage the sustainable use of the resources and promotes the cause of
83 environmentalism to boost employee morale and satisfaction is described as green HRM
84 (GHRM) (Mampra, 2013). Additionally, they feel strongly about the environment as employees
85 today are more committed as well as satisfied with the organization that is proactive in endorsing
86 green (Ahmad, 2015). To reduce environmental degradation and wastage, international
87 organizations, academicians, and policies framed nationally are focusing on the importance of
88 green initiatives (Rahman et al., 2020). Mokterdir et al. (2021) explored several antecedents such
89 as green organizational culture, top management commitment for the implementation of GHRM
90 practices (Kumar et al, 2020) also stated that organizational culture is the most influencing
91 behavioural factor, followed by ‘commitment from higher authority. According to Ng et al.
92 (2010), higher organizational commitment at all levels from senior management to people of the

93 show floor leads to higher innovative work behaviour but there is a lack of empirical research
94 related to it (Jafri, 2010) especially in the Asian context (Nguyen et al., 2019). Hence, exploring
95 the role of employee commitment in innovation is crucial and therefore this work addresses the
96 following research question:1) what are the major precursors of innovation in the textile
97 industry? 2) what are the major outcomes of innovation in the textile industry? and 3) what is the
98 role of employee commitment in innovation?

99 Green capabilities have been found as an antecedent of green product innovation (Chen et al.,
100 2012). While current literature comprises various internal and external organizational factors, in
101 this study we have focused on the internal organizational factors as this study focuses on the
102 internal variables such as adaptability of green culture inside the organization and commitment
103 of employees. One of the key antecedents of green product innovation is corporate
104 environmental ethics and culture (Keskin et al., 2013; Chen et al., 2012; Dangelico and Pujari,
105 2010). In response to the change in the external business environment with flexibility, the
106 adaptability culture has a high potential to change internally (Denison and Mishra, 1995) which
107 contributes to organizational innovation (Daft, 2007) which is important for the firm
108 performance (Danneels, 2002; Cooper and Kleinschmidt, 1995; Brown and Eisenhardt, 1995). It
109 has been found that any improvement made in environmental commitment will affect green
110 innovation as they are related to each other (Keogh and Polonsky, 1998). Additionally, a
111 corporate culture that encourages environmental commitment throughout the company helps in
112 attaining green innovation which can be achieved by setting clear environmental targets, criteria
113 and practices (Dangelico, 2016). Hence, The current study identifies the adaptability of green
114 culture as a major antecedent and green performance as an outcome of innovation. The following
115 objectives have been set for the study based on the literature:

- 116 • To find the relationship between adaptability culture and innovation.
- 117 • To find the relationship between innovation and green performance
- 118 • To test the mediating role of employee commitment between innovation and green
119 performance.

120 The paper is structured as: firstly, the literature review has been presented along with the
121 hypothesis for the study. In the next section, research methodology has been discussed followed
122 by analysis. The next section is a discussion and implication in which theoretical and practical

123 contributions, as well as managerial implications, have been discussed. The last section presents
124 the conclusion, limitations and future research directions of the study.

125 **2. Literature review**

126 According to Chang (2012), industrial competition patterns are changed due to two
127 environmental pressures i.e., environmental regulation and consumer environmentalism.
128 Therefore, organizations have to change their processes, products and even business models.
129 Developing environment-friendly products and processes by adopting organizational practices
130 such as the use of few or green raw material that aims at reducing the water consumption,
131 emissions (Albort-Morant et al., 2017; Gunasekaran and Spalanzani, 2012) is defined as green
132 innovation. According to Howard-Grenville (2006), successful implementation of green
133 innovation can be achieved by leading organizations and employees through green
134 organizational culture. According to Harris and Crane (2002) Green organizational culture is
135 defined as the set of assumptions, values, symbols, artefacts of an organization that reflected a
136 desire or need to operate in an environmentally sustainable manner. Hence, the culture of the
137 organization is considered green, when the employees seek to reduce the profit-seeking purposes
138 and encourage organizational action's that have a positive influence on the environment (Roscoe
139 et al., 2019). As culture has been found a predictor of innovation but empirical studies on this are
140 limited. Either the studies have focused on the cultural element (Lin et al., 2013; Buschgens et
141 al., 2013) or have pointed to the need for empirical studies (Nakata and Di Benedetto, 2012;
142 Prabhu and Chandy, 2009). Further, what type of culture is effective and can help in innovation
143 and employee behaviour is still not clear. Concerning improvement in organizational
144 performance, several studies have focused on innovation that helps in enhancing it (Koc and
145 Ceylan, 2007). But despite having a wide scope of innovation in the literature scholars pay less
146 attention to green innovation (Gürlek and Tuna, 2017; Lin et al., 2013; Chen et al., 2006). Based
147 on the literature review it was found that there are studies that have focused on service and
148 manufacturing industries in western countries but there is very less attention given to green
149 innovation specifically textile industries in India. The present study aims to bridge this gap by
150 exploring the antecedents and consequences of innovation as pointed by Crossa and Apaydin
151 (2010) that to advance the research on innovation it is important to test the relationship between
152 innovation determinants and their outcomes. Therefore, the literature review is looking into three

153 aspects such as adaptability culture and innovation, innovation and green performance and the
154 mediating role of organizational commitment.

155

156 **2.1 Conceptual framework and hypothesis development**

157

158 **2.1.1. Adaptability Culture and Innovation**

159 “Adaptive culture” (Kotter and Heskett, 1992) has been described as the range of cultural
160 attributes that enables an organization to become more adaptive to environmental changes by
161 helping “organizations anticipate and adapt to the environmental change”. One of the essential
162 features of an organization in the contemporary environment identified in competitive
163 sustainability (Wei and Lau, 2010) is adaptability. Hence, to survive and compete, organizations
164 must understand the importance of cultural adaptability (Schein, 1992). The research on green
165 innovation has been growing over the past few years (Dangelico, 2016). Due to increasing social
166 and political pressures organizations are gradually creating an environment that is more adaptive
167 as well as contributes to the green innovative products (Song et al, 2020). Organizational
168 adaptive culture can facilitate its innovation (Woodman et al, 1993) and the culture of the
169 organization is one of the critical factors for innovation performance (Herbig and Dunphy,
170 1998). If any organization have an adaptive culture then they have a high potential to change
171 internally concerning a change in the external conditions (Denison and Mishra, 1995). The
172 working environment or the organizational culture encourages or influences the innovation
173 capacity of the employee and the organizations that are engaged in continuous innovation and
174 development of knowledge and capabilities can enhance their performance as developing a new
175 product is a precursor to organizational performance (Chan et al., 2017). The adaptation of green
176 culture depends on three key factors: managerial, internal and external (Law and Gunasekaran,
177 2012). Managerial includes mindset or strategic policies; internal includes the system and
178 performance and external factors include competition, market trends, law and regulations. The
179 different influence level of these factors within an organization determines their adaptation level
180 to sustainable development. Hence, we propose that:

181 **H1:** There exists a relationship between adaptability culture and innovation

182 **2.1.2 Innovation and Green Performance**

183 The adoption of green practices would result in the improvement of green/environmental
184 performance (Zhu and Sarkis, 2004). According to Olsthoorn et al (2001) Green performance is
185 defined as the measurement of the interaction between the business and the environment. Product
186 innovation can be the idea generation or creating something new that is reflected in the changes
187 made in product or services by the organization (Prajogo and Ahmed, 2006). Earlier studies have
188 found a relationship between innovation and performance and clearly defines the importance of
189 innovation for the firm's performance (Danneels, 2002; Cooper and Kleinschmidt, 1995; Brown
190 and Eisenhardt 1995). This can be explained further with the help of various empirical studies on
191 green innovation that have stated performance as the major outcome specifically, environmental
192 performance (Singh et al, 2020; Huang and Li, 2017; Kucukoglu and Pinar, 2015; Weng et al.,
193 2015; Alhadid and As'Ad, 2014; Chiou et al., 2011) and firm performance (Zhang et al., 2019;
194 Tang et al., 2018; Handayani et al., 2017; Lin et al., 2013). Additionally, there exists a
195 relationship between environmental innovation and performance (Carrion-Flores and Innes,
196 2010), green innovation and business performance (Gluch et al., 2009), eco-innovation activities
197 and market performance (Pujari, 2006). Based on the above discussion, we assume that
198 innovation has an association with green performance. Hence, this study hypothesizes that
199 **H2:** There exists a relationship between innovation (green product) and green performance.

200 **2.1.3 Mediating role of commitment**

201 Employee commitment refers to the intentions to behave in some way that is beneficial to the
202 organization (Buchko et al., 1988; Messmer-Magnus et al., 2012; Cantor et al., 2012). Further,
203 according to Klien et al. (2014), this area of study has a long history but in the environmental
204 sustainability context, it was first explored by Polonsky in 1998. Hence, the environmental
205 aspect recently emerges as a research focus. In this study, we have focused on the affective
206 commitment of employees. Innovation initiatives by employees rely on their commitment
207 (Youndt et al., 1996). Employee commitment has a positive relationship with turnover (Steers,
208 1977). Employees with less commitment only show the required behaviours for employment
209 (Riketta, 2002). Also, employees can go beyond their regular responsibilities if they are proud to
210 work for the organization hence, demonstrate employee commitment and these committed
211 employees are often loyal that results in better performance (Yu et al., 2019; Allen and Shanock,

212 2013; Jaworski and Kohli 1993). Employees commitment to the environment rely on their desire
213 to share and care about the environmental concerns of their organization (Paille and Valeau,
214 2020). Hence, Organizational green goals can be achieved if the employees are committed. It has
215 been found that higher levels of employee commitment led to enhanced organizational
216 performance (Arthur,1994; Owens 2006) and also increase organizational productivity.
217 Additionally, top management commitment towards the environment influences their employee
218 commitment (Aguinis and Glavas, 2012). In brief, employee commitment to change (here, adopt
219 green behaviour) is important for the operational process of an organization and its ability to
220 innovate product that satisfies the environment and market need (Hasu et al., 2014). Employee
221 commitment to change positively influence their perceptions which in turn improves
222 performance (Nohe et al., 2013). Conversely, without commitment, the innovation may be
223 difficult to achieve (Herscovitch and Meyer, 2002) and it will affect the performance. Based on
224 the above discussion, we propose that

225 **H3:** Commitment mediates the relationship between innovation and green performance

226 H3_a: There exists a relationship between innovation and commitment

227 H3_b: There exists a relationship between commitment and green performance

228 Figure 1 proposes a conceptual framework for the study which shows the relationship between
229 adaptability culture, product innovation, commitment and green performance.

230

231

232

Figure 1: Proposed Conceptual Model

233 **3. Research methodology**

234 The research methodology framework for the study has been presented in figure 2. Initially,
235 problem identification and literature review have been conducted (described in section 1, 2 and
236 3) related to adaptability culture, innovation, green performance and commitment in the textile
237 industry. Then, a structured questionnaire has been used for data collection from the middle-level
238 employees working in textile manufacturing organizations in India. Further, the assessment of
239 the model has been carried out such that for measurement model assessment: unidimensionality
240 was checked using exploratory factor analysis. Internal consistency reliability was checked using
241 Cronbach's alpha and composite reliability. Indicator reliability has been checked using indicator
242 loading. Convergent validity was checked using Average variance extracted while discriminant

243 validity was checked using cross-loadings, Fornell-Larcker criterion and HTMT_{0.85} criterion.
244 Further, indicator validity was checked using indicator weights and variance inflation factor
245 (VIF), construct validity using inner construct correlations. For structural model assessment:
246 Model validity has been assessed using the coefficient of determination (R^2), Path coefficients
247 and T value, effect size (f^2), Predictive relevance (Q^2), goodness of fit index, standardized root
248 mean square residual. After model validation, hypothesis testing results have been presented and
249 interpreted.

250

251

Figure 2: Research Methodology Framework

252 3.1 Questionnaire design

253 A structured questionnaire has been designed to collect the data through paper and pen survey. It
254 comprises of two sections: A and B. Section A consists of demographic details of respondents
255 such as age, educational qualification and gender, while section B comprises the constructs used
256 in the study. The minimum sample size for the pilot study can be thirty or above (Browne, 1995).
257 As some items of the scale have been modified therefore a pilot study of thirty-seven
258 respondents were collected from industry professionals as well as from the academicians. After
259 making the relevant language correction and modifications based on the suggestion received, the
260 final questionnaire was then used for data collection.

261 3.1 Variables and Measurement

262 Green Performance has been used as a dependent variable. It has been measured using Yu et al.,
263 (2017) nine-item scale (for instance: our firm conforms with requirements of inputs of energy)
264 Adaptability culture has been measured using three items from previous studies (Denison and
265 Mishra, 1995; Lau and Ngo, 2004) (for instance: The culture of this firm can be regarded as
266 flexible). Innovation, here product innovation has been used. Green product innovation has been
267 measured using Chang (2019); Chen (2008); Chen et al. (2006); scale having three items (for
268 instance: The enterprise uses materials with the least pollution during the process of product
269 development, design, or production). Employee commitment towards the environment has been
270 measured using three items (the modified scale that has been developed by Raineri and Paille',
271 2016) (for instance: I care about the environmental concern of my organization). All the items
272 were measured on a five-point Likert scale. The items for each construct have been mentioned in
273 table 2.

274 **3.2 Sample and data collection**

275 The questionnaire was sent to textile manufacturing organizations in the Delhi National Capital
 276 Region (NCR). A representative of each organization was given two questionnaires. The
 277 questionnaire was attached with a cover letter that elucidates the study objective along with the
 278 guidelines and instructions to fill it. Data was collected between August 2019 to January 2020,
 279 and to collect the data snowball sampling method (Johnson, 2014) was used as it was hard to
 280 approach the senior managers for the researcher. A total of 215 questionnaires were collected
 281 (response rate of 53.75%). Out of 215 questionnaires, only 198 were used for further analysis
 282 due to incomplete information provided by the respondents. Based on the minimum sample size
 283 estimation method of the “10 times rule” in PLS-SEM (Hair et al., 2011), 198 is acceptable
 284 sample size for the present study. Table 1 shows the respondents details.

285 **Table 1:** Respondent Details

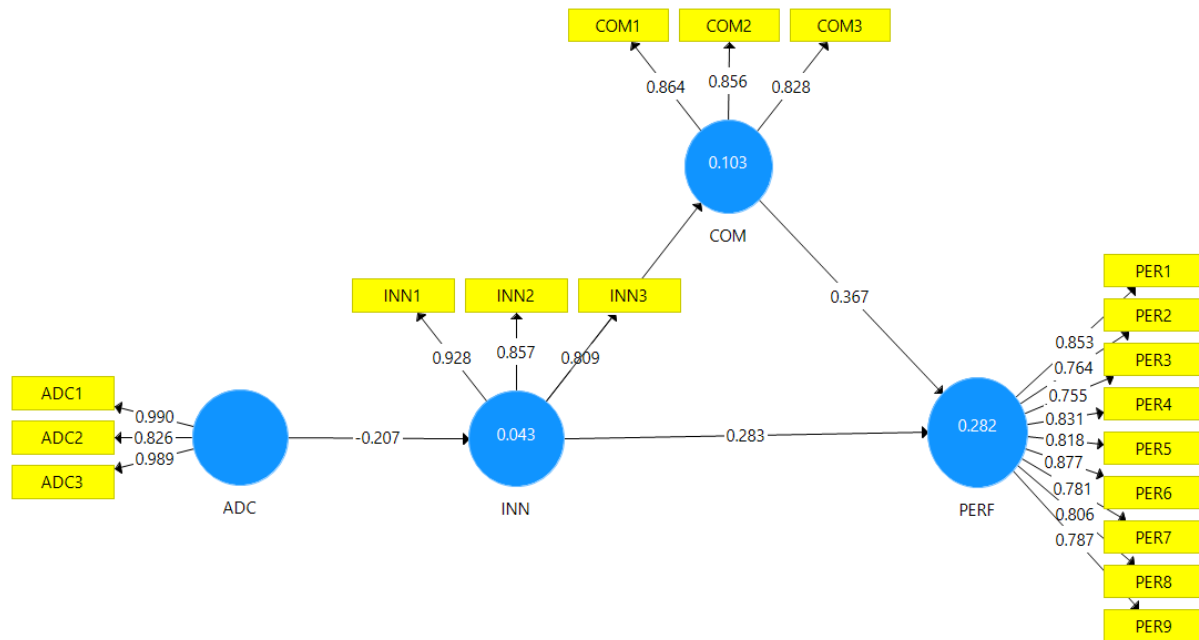
Age	Less than 25	25-35	35-45	More than 45
	42 (21%)	82 (42%)	62 (31%)	12 (6%)
Gender	Male	Female		
	132 (67%)	66 (33%)		
Education qualification	High School	Graduation	Post-Graduation	PhD
	21 (11%)	97 (49%)	71 (36%)	9 (4%)
Managerial Level	Executives	Middle-Level Managers	Senior Level Managers	
	25 (12%)	111 (56%)	62 (32%)	

286

287 **4. Analysis**

288 Partial least square equation modeling technique has been used by SmartPLS 3.3.2, the results
 289 are shown in Figure 3. PLS is recommended for a small sample size (Agarwal and Karahanna,
 290 2000) and is widely accepted as a method for testing research model (Zhu et al., 2006) at early
 291 stages which have not been used extensively, therefore, we have used this technique. Model
 292 reliability and validity are shown in Table 2 and 3. Composite reliability values should be
 293 greater or equal to 0.7 to be reliable (Hair et al, 2014). Table 2 reveals that the composite
 294 reliability value is 0.88 for commitment, 0.93 for green performance, 0.93 for adaptability
 295 culture and 0.83 for innovation. Further, the analysis results reveal that all variables have a
 296 satisfactory i.e., above 0.70 level of internal consistency reliability. In this, the average variance
 297 extracted value is 0.72 for commitment, 0.65 for green performance, 0.88 for adaptability culture
 298 and 0.75 for innovation. Since all values are above 0.5 (Fornell and Larcker, 1981), the measures

299 used in this study have a high level of convergent validity while discriminant validity has been
 300 assessed using Fornel-Lacker criterion. The average variance extracted (AVE) should be more
 301 than 0.50 (Chin, 2010). The table shows the square root of AVE of construct Adaptability
 302 culture, commitment, innovation and green performance is greater than the corresponding latent
 303 variables correlation. For example, The AVE of adaptability culture is 0.88 and its square root is
 304 0.93. Therefore, 0.93 is greater than the correlation values in the column of adaptability culture
 305 and similar is the case with all other variables. Additionally, all heterotrait-monotrait ratio of
 306 correlations (HTMT) values were also less than 0.85 (Henseler et al., 2014), hence the
 307 establishment of discriminant validity based on $HTMT_{0.85}$ criterion.
 308



309
 310
 311 **Figure 3:** PLS SEM results (ADC- Adaptability Culture, INN- Product Innovation, COM-
 312 Employee Commitment, PER- Green Performance)
 313

314 **Table 2:** Constructs and their Indicators, loading, reliability estimates and convergent validity

Constructs and their indicators	Item Loading	Alph a	Rho_A	CR	AVE
Commitment		0.80	0.81	0.88	0.72
I care about the environmental concern of my organization (COM1)	0.864				
I feel as if my organization’s environmental problems are my own (COM2)	0.856				
I would feel guilty about not supporting the	0.828				

environmental efforts of my organization (COM3)					
Green Performance		0.93	0.93	0.94	0.65
Our firm conforms with the requirements of inputs of energy (PER1)	0.853				
Our firm conforms with the requirements of community relations (PER2)	0.764				
Our firm conforms with the requirements of outputs of air emissions (PER3)	0.755				
Our firm conforms with the requirements of indicators on the local, regional or national condition of the environment (PER4)	0.831				
Our firm conforms with the requirements of outputs of waste-water (PER5)	0.818				
Our firm conforms with expectations of implementation of environmental policies and programs (PER6)	0.877				
Our firm has achieved an important environment-related certification (e.g. ISO 14031) (PER7)	0.781				
Our firm has regularly achieved targets for energy conservation, recycling or waste reductions (PER8)	0.806				
On average, the overall environmental performance of our company has improved over the past five years (PER9)	0.787				
Adaptability Culture		0.934	1.03	0.95	0.88
The culture of this firm can be regarded as flexible (ADC1)	0.99				
Our firm values adaptability and responsiveness to change (ADC2)	0.82				
Our firm emphasizes creativity and innovation (ADC3)	0.98				
Green Product Innovation		0.833	0.86	0.90	0.75
The enterprise uses materials with the least pollution during the process of product development, design, or production. (INN1)	0.928				
The enterprise uses the most energy-efficient materials during the process of product development, design, or production (INN2)	0.857				
The enterprise examines whether products are easily recycled, reused, and decomposed during the process of product development, design, or production. (INN3)	0.809				

315 Note*: For reliability (CR> .70), convergent validity (CR>AVE>.50) and discriminant validity
316 (MSV<AVE)
317 *Hair et al., 2010

318
 319
 320
 321
 322

Table 3: Discriminant Validity (Fornell-Larcker Criteria)

Construct	Adaptability Culture	Commitment	Innovation	Green Performance
Adaptability Culture	0.938			
Commitment	-0.058	0.850		
Innovation	-0.207	0.320	0.866	
Green Performance	-0.078	0.458	0.401	0.809

323

324 *Structural Model Evaluation*

325 To assess the collinearity, the variance inflation factor(VIF) values were calculated. VIF values
 326 should be less than 3 (Hair et al, 2019). All the values were less than 3 for the exogenous
 327 construct which indicates no concern of collinearity issues (refer to Table 4). Further, identifying
 328 the direct relationship between the variables, the mediator was added to the model. The model
 329 was tested using the bootstrapping method (5000 subsamples) to assess the significance of the
 330 outer loading of proposed hypotheses. The outer loadings were more than 0.7 at a significance
 331 level $p < 0.001$. Common method bias (CMB) is very frequent in self-stated surveys. Therefore, to
 332 tackle the CMB, process orientation and statistical solutions by Podsakoff et al. (2012) were
 333 applied. In the process-oriented solutions step the data were collected from one source; several
 334 sources procedure was used. Apart from that several rearrangements in the order of the items
 335 were applied to maintain the confidentiality of answers, Moreover Harman's single factor
 336 ($< 50\%$) and common latent factor (CLF $< 50\%$) were also calculated; found that the data is free
 337 from CMB issue. After the above procedure, data from 198 respondents were considered.

338

339

Table 4: Variance Inflation Factor

Variables	Adaptability Culture	Commitment	Innovation	Green Performance
Adaptability Culture			1.000	
Commitment				1.114
Innovation		1.000		1.114
Green				

Performance				
-------------	--	--	--	--

340

341 The coefficients of direct as well as indirect path reveal that the structural model relationship is
 342 statistically significant as shown in table 5. R square values of commitment are 0.103, Innovation
 343 is 0.043 and green performance is 0.282. In behavioural sciences, according to Giau et al (2020),
 344 R square values above 0.26 are considered a large effect, 0.13 as moderate effect and 0.02 as a
 345 small effect. Additionally, according to Ritchey (2008), in social science, the R square values
 346 between 0.04-0.16 can be described as moderately weak while values between 0.2-0.49 as
 347 moderately strong. Hence, based on these criteria green performance has a moderately strong
 348 effect, while commitment and innovation have a moderately weak effect on the model. As the R
 349 square for green performance was 0.282 which indicated that 28.2% of the total variation of
 350 green performance may be explained by employee commitment, green product innovation and
 351 adaptability culture. Hence, proved the model-data fit. Path coefficient and hypothesis testing
 352 results are shown in Table 5 and Table 6. The *t* value of the path (ADC -> INN) is 2.966 with a
 353 *p*-value of 0.003, which confirms the relationship between adaptability culture and innovation.
 354 Hence, supports hypothesis 1. The *t* value of the path (INN -> PERF) is 4.855 with *p*-value 0.00,
 355 which confirms the relationship between innovation and green performance. Hence, support
 356 hypothesis 2. The *t* value of indirect path (INN -> COM -> PERF) is 2.536 with a *p*-value of
 357 0.01, confirms the mediating role of commitment between the relationship of innovation and
 358 green performance. Hence, supports hypothesis 3. Q^2 (cross-validated redundancy) was
 359 calculated using the blindfolding procedures (Tenenhaus et al., 2005) and for green performance,
 360 it was 0.175 which was greater than the threshold limit (greater than zero) supporting the path
 361 model predictive relevance.

362

Table 5: Path Coefficients

Path	<i>t</i>-value	<i>p</i>-value
ADC -> INN	2.966	0.003
COM -> PERF	5.852	0.000
INN -> COM	3.416	0.001
INN -> PERF	4.855	0.000
INN -> COM -> PERF	2.536	0.011

363 The standardized root means square residual (SRMR) values of the saturated, as well as an
 364 estimated model, were 0.057 and 0.057 respectively. These values were below the threshold limit
 365 (between 0 and 1) that indicates the model goodness of fit (Hair et al., 2019, Henseler, 2015).

366 Hence, the model is parsimonious and plausible (Henseler et al, 2016). Cohen f^2 was used to
 367 examine the effect size where $f^2 \geq 0.02$, $f^2 \geq 0.15$, and $f^2 \geq 0.35$ represent small, medium, and large
 368 effect sizes, respectively (Cohen, 1988). The effect size measures if an independent variable has
 369 any impact on the dependent variable. Here, the f^2 of employee commitment represents a large
 370 effect on green performance while green product innovation has a medium effect on green
 371 performance.

372 **Table 6:** Hypothesis Testing Result

Hypothesis	Path	<i>p</i> -values	Decision
Hypothesis 1	ADC -> INN	0.003	ACCEPTED
Hypothesis 2	INN -> PERF	0.000	ACCEPTED
Hypothesis 3	INN -> COM -> PERF	0.011	ACCEPTED
H3 _a	INN -> COM	0.001	ACCEPTED
H3 _b	INN -> PERF	0.000	ACCEPTED

373

374 5. Discussion and Implications

375 The study findings reveal the relationship between adaptability culture, innovation and green
 376 performance. Both the study hypotheses (H1 and H2) have been supported. Hence, in textile
 377 industries organizations that have an adaptative culture or enables an organization to adapt to
 378 environmental changes textile industries should innovate to increase their green performance.
 379 Employee commitment further has a mediating role in green product innovation and green
 380 performance supporting hypothesis H3. The growing need for business to integrate
 381 environmental management into their practices gave rise to the concept of GHRM that includes
 382 the practices for conservation and preservation of the natural environment (Gholami et al., 2016;
 383 Haddock-Millar et al, 2016, Longoni et al, 2016). Moreover, integrating environmental goals in
 384 organizational strategies and mission improves organizational image as well as its performance.
 385 In this study we have focused on GHRM research in the Indian context, an emerging economy to
 386 explore the ways by which an organization can enhance its performance through employee
 387 commitment. Eco-friendly behaviour is more costly and effortful than eco-unfriendly behaviour
 388 (Ohtomo and Hirose, 2007). The top management eco-friendly behaviour, their commitment may
 389 influence employee behaviour and commitment (Raineri and Paille, 2016; Norton et al., 2015).
 390 Singh et al. (2013) identify that commitment of top management is one of the performance
 391 measures for environmentally conscious manufacturing. With the implementation of green

392 practices and policies, employees will become conscious. Also, with proper rewards,
393 compensation packages (Govindarajulu and Daily, 2004) employees can be motivated to adopt
394 these practices in routine, and ultimately achieve environmental goals. Moreover, an
395 adaptability culture of the organization can help them detect, recognize and evaluate adaptive
396 attributes that may further aid in surviving the competition. Though adaptability culture was
397 found as a major antecedent of innovation (Verdu-jover et al., 2017) in our findings, there was a
398 negative significant relationship which states that the textile manufacturing firms rate of
399 adaptation of green culture is low or lacking. There can be multiple factors that are responsible
400 for this. According to the report of ASSOCHAM (2015) the absorption rate of technology is
401 slow in India as with up-gradation in the technology there is an increase in the skill requirement.
402 Due to this fear of skill requirement, textile firms are hesitant in upgrading technology besides
403 having schemes available from the government such as Technology Up-gradation Fund Scheme
404 and in 2022, the shortfall in skills (26.2 million people) is estimated. Additionally, according to
405 the report power shortage, counterfeiting and competition from other countries such as
406 Bangladesh affect the level of investment and innovation. As power shortage forces the
407 organization to use a manual machine that increases the cost and decrease the quality. Also, if
408 one can imitate an innovation at a cost lower than the innovator, it is likely to kill the innovator's
409 incentive to carry further innovation or any research and development. Hence, these might be the
410 reason why it is delayed or very less innovation that influence the firm's green performance. But
411 these specific reasons we have confined to our study sample as there are companies in India who
412 have adopted international standards of sustainable manufacturing such as Century Rayon in
413 2014 was the first company in India that was awarded Sustainable Textile Production (STeP)
414 certificate by OEKOTEX, which is the certification for the textile companies that want to
415 communicate their sustainable production to the public credibly and transparently.

416 **5.1 Implications for theory and practice on cleaner production/sustainability**

417 **5.1.1 Theoretical implications**

418 Existing models of innovation process such as the model by Hauser (1998), West and Farr
419 (1990), Woodman et al. (1993) suggested the importance of organizational culture variable in
420 their innovation models (Gudmundson et al., 2003). Further, it has been found that cultural
421 adaptation influence innovation in an organization (Kanter, 2000). However, what type of
422 organizational culture or traits is useful for innovation is not explained or empirically tested.

423 Hence, the findings of our study suggest that adaptive organizational culture is crucial for
424 innovation in the organizations and add to the existing literature of organizational culture
425 influence on innovation. Considering the significance of innovation in the textile industry, this
426 study gives answers to the question: What are the antecedents and consequences of innovation in
427 the textile industry? Moreover, studies about green performance are in the initial stage and the
428 literature is very limited (Wang, 2019; Zhang et al., 2019). Hence this study further adds to the
429 literature of green performance along with adaptability culture and employee commitment.
430 Educating the consumers and creating awareness regarding the use of green products and their
431 societal outcomes may induce consumers to buy these products (Tandon et al., 2020)
432 Additionally, to build the trust in consumer's minds regarding the authenticity of the products,
433 the consumers can be made aware regarding various certifications. The knowledge received
434 through these awareness campaigns can influence the behavioural choice and ethical
435 consumption intentions of the consumers which may help in converting non-buyers into buyers
436 (Kushwah et al., 2019) as when people became aware of the various environmental problems
437 their intentions and attitude changes (Sharma and Bansal, 2013). Earlier studies have also
438 confirmed that environmental concern influences environmental attitude (Trivedi et al., 2018;
439 Yadav, 2016; Yadav and Pathak, 2016) and consumers high in environmental concerns tend to
440 buy more green products (Yadav and Pathak, 2016)

441 **5.1.2 Managerial implications**

442 The current research presents interesting managerial implications and practical perspectives for
443 organizations that are seeking to become greener. There are several environmental management
444 systems available that can help an organization achieve environmental sustainability, greening
445 the processes of the organization or maybe workforce but it is very costly to implement it and the
446 majority of the organizations may not be able to adapt it (Jackson et al., 2012; Palmer et al.,
447 1995). Hence, other methods such as changing the employee behaviour towards the environment
448 by increasing their commitment to avoid non-green behaviour along with the organizational
449 adaptability culture can help the organization achieve environmental sustainability improvement
450 or increase the organization green performance. Thus, the above argument is supported by these
451 study findings as we found that employee commitment has a crucial role in innovation and green
452 performance of the company and organization can develop green HR practices and training

453 modules to shape employee commitment towards the green behaviour that can ultimately help in
454 increasing their green performance.

455 The present study was found to be in line with the findings of Conding and Habidin (2012) that
456 green innovation has a positive effect on green performance. Based on the study finding we
457 suggest that the industry managers can develop the adaptive culture as it will influence green
458 product innovation that will contribute to green performance. They can develop this culture by
459 measuring, evaluating and supporting positive environmental behaviour of the organizational
460 members by giving them rewards or incentives, stating clear green goals of the organization to
461 the employees and introducing green HRM policies and practices in the organizations.
462 Additionally, increasing the green product innovation can also increase the organizational
463 competitive advantage (Chang, 2011), one of the key factors in surviving the global competition.
464 Organizations that will create an appropriate culture and climate will be most innovative in
465 future and if the culture is not conducive, innovation fails (Szczepańska-Woszczyzna, 2015;
466 Ahmed, 1998). Our findings suggest that building an adaptive culture influence innovation and
467 innovation in turn have a positive impact on green performance. This finding indicates that if the
468 Indian textile industry has a high adaptive culture, they may quickly respond to the
469 environmental changes and comes up with an innovative product or processes. For instance:
470 During COVID 19 and under nationwide lockdown, the textile industry has been badly hit and
471 currently to cope up with the market demands they are manufacturing fashionable masks and
472 planning to export. However, countries such as Bangladesh and Vietnam have already started
473 exporting these masks (Times of India, 2020). This delay in coping with the environmental
474 situations is due to the lack of Indian textile companies' adaptive culture which affects their
475 innovation.

476 Currently, the Indian government schemes and policies are focused on technology up-gradation,
477 skills development and up-gradation, employment, attracting investments and modernization but
478 there are no policies to assess the adaptability culture of these textile companies which has
479 around 45 million workers employed and is the second-largest producer of textile in the world.
480 We suggest that standardization of culture-related policies should be set by the policymakers or
481 the organizations' board so that the existing policies and schemes can succeed. The Indian textile
482 industry consists of a huge number of small-scale market players that makes the market
483 competitive. The entry of foreign MNCs in India further adds to the competition. Therefore,

484 concerning the existing competition, the companies can focus on green product innovation and
485 industry-specific strategic culture and roadmap should be developed to achieve sustainability
486 goals. Certain other recommendations along with the examples that could help the textile
487 manufacturers to increase their green performance are: They can adapt a zero-waste action plan;
488 increase the green commitment of top management to increase the employee creativity and
489 innovation in manufacturing processes and products; Mostly industries are currently using the
490 recycling approach such as SMEs in Asia's biggest recycling hub, Panipat (Delhi NCR- Haryana
491 subregion) collect the discarded clothes from all over the world and recycle it. However, the
492 increased textile dumping still needs a better solution and adaptive culture awareness in these
493 type organizations is a must; they can adopt the textile circular economy approach as initiated by
494 some of the Indian start-ups such as Kiabza, Lionise; using digitization technologies such as
495 Trustrace, which is using a blockchain technology for improving its transparency and traceability
496 in the supply chain; new organized models can be developed by organization for collection of
497 used clothes such as "Myntra" (E-commerce player in Fashion) collaborated with NGO (named
498 Goonj) where the online shoppers can exchange their used clothes and that can finally be
499 distributed to needy people by Goonj; Medical textile is another area where Indian textile
500 companies can enter as presently there is less awareness of medical textile amongst people in
501 India as it is under crises situation (COVID pandemic) the authorities have urged the textile
502 industry to produce innovative and reusable personal protective kit.

503 **6. Conclusion, limitations and future research directions**

504 Firstly, managers, today realize the importance of innovation in the organization but fails to
505 implement it. Hence, building adaptive culture in the organization can aid innovation i.e., the
506 major contribution of our study. Secondly, the present study has not only focused on the textile
507 industry innovation in India but have also explored the role of employee commitment that is
508 crucial for the green culture of the organization. This contribution of the study bridges the
509 existing gap in the literature concerning innovation in the Indian textile industry. The study
510 model not only explored the predictor and outcome of innovation but also explored the role of
511 employee commitment in enhancing the green performance of the firm. Hence, we conclude that
512 building adaptive green culture in the textile industries will help in making the company's
513 innovative. Further, the key recommendations are: to encourage policymakers to develop

514 policies that can aid in measuring the use of the existing schemes, by imposing strict control over
515 the illicit markets and providing uninterrupted power supply to this sector.
516 This study is survey-based which has certain limitations as it is a cross-sectional study but a
517 longitudinal study can give a better evaluation of the employees and organization adaptability
518 culture. Future studies may use other variables such as top management commitment to the
519 conceptual model tested or the control variables. Additionally, the study conceptual model
520 relationships can be affected due to some underlying moderating variables. For instance,
521 employee commitment is positively influencing green performance. The commitment of
522 employees may be dependent upon leadership style and behaviours in an organization, Respect
523 for People pioneered by Toyota Production System, Employee Ownership and accountability
524 (not command and control leadership), reward and recognition at a team level and individual
525 levels etc. Similarly, if we say product innovation influences Green performance in a positive
526 way, but there can be some moderating variables that affect this relationship. These elements are
527 not explored in the study but they should be explored in future studies and hence this could be a
528 limitation of the study. The study can be done in different industries or a comparative study of
529 industries can be done. The study sample is limited to Delhi National Capital Region (NCR) so
530 future studies can increase the study sample size to get more refined results and it can be done in
531 a different geographical context. As two questionnaires were provided to each company, most
532 likely the sample collected is one or a maximum of two per company. Therefore, the consistency
533 of the responses from each company is unknown unless we collate multiple samples per
534 company. This might raise inter-rater reliability issues, thus the limitation of the study.

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