ORIGINAL PAPER

A PATH TOWARDS A GREENER FUTURE: FOSTERING GREEN SUPPLY CHAIN, GREEN MARKETING, AND ENVIRONMENTAL SUSTAINABILITY

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ABSTRACT. Background: This study contributes to the green supply chain while examining the role of institutional pressure and green marketing to achieve environmental sustainability.
Methods: Data from 256 manufacturing firms in Pakistan was analyzed through a quantitative dyadic data analysis using Structural Equation Modeling by incorporating quota sampling.
Results: The finding revealed that institutional pressures are significantly associated with the green supply chain. The results indicated that green marketing acts as a significant moderator between the green supply chain and customer green purchase intention. Finally, green supply chain practices are significantly associated with environmental sustainability.
Conclusions: This is a novel study that contributed to a green supply chain that integrates all dimensions of the green supply chain in one hybrid model. This study has contributed solid theoretical insights by integrating the theory of planned behavior and institutional theory.

Keywords: Institutional pressures, green supply chain, green marketing, customer green purchase intention, environmental sustainability.

INTRODUCTION

Balancing economic growth and environmental sustainability remains a challenge in the world. In the Asia-Pacific region, including Pakistan, a lack of environmental handling problems and failure to meet the UN's Sustainable Development Goals are reported. The manufacturing sector is a major contributor to environmental pollution in the region and is a significant source of employment and economic growth in Pakistan. However, developing countries lag behind in implementing environmentally friendly processes in their industries compared to developed countries. Companies in developing countries are under institutional pressure and face increased customer demand to incorporate environmental management practices into their operations.

The manufacturing sector of Pakistan significantly contributed to GDP after the agriculture sector. It provides 16.1 % of employment opportunities and contributes 13-14 % to the GDP [Ministry of Finance, 2020]. Large-scale manufacturing counts for 78% of the contribution to manufacturing and has a 9.5 % share of GDP, while small-scale manufacturing contributed 9.5 % to manufacturing and only 2.04 % of GDP [MOF, 2020].

The developed countries took adequate measures to counter these changes, but developing and emerging economies are still far behind [Khan *et al.,* 2017]. Globally, countries have incorporated certain environmentally friendly processes into the production and services industry that help reduce waste [Haq *et al.,* 2016], energy use [Tufail *et al.,* 2021] and enhance resources and reduce the danger to

human beings and the natural environment [Ma *et al*., 2020]. Achieving sustainable growth is a challenging task for organizations worldwide and especially in developing countries such as China, India, Malaysia, Bangladesh, Pakistan [Khan and Ghouri, 2022].

It is very essential that managers realize the motivating factors for the incorporation of a green supply chain (Green SC) and their substantial impact on sustainability, especially from the perspective of developing nations. Therefore, this study aims to evaluate the antecedents and results of Green SC in context of the role of institutional pressure and environmental performance.

LITERATURE REVIEW

THEORETICAL UNDERPINNING AND HYPOTHESES DEVELOPMENT

The implementation of Green SC among firms is always driven by certain factors that might be motivational, compulsive, or lucrative [DiMaggio & Powell, 1983]. From compulsive factors, certain external elements influence organizations to implement these Green SC, and these might be institutional pressures [Zhu *et al*., 2013]. Furthermore, access to resources and resource allocation may also be the antecedents of the green supply chain among firms [Shi *et al*., 2012]. Therefore, this study defines internal Green SC as the eco-friendly practices implemented, controlled, and managed independently by firms or manufacturers; however, external Green SC are those which usually require the external collaboration of customers and suppliers. The literature indicated that the implementation of both internal and external Green SC results in a higher sustainable performance [Ahmed *et al*., 2019; Khan *et al*., 2021; Samad *et al*., 2021]. These studies also indicated that economic growth can also be enhanced through environmental performance by reducing waste and resource use.

In addition to these antecedents in the implementation of Green SC, certain other factors may also contribute to the improvement of performance measures [El-Garaihy *et al*., 2022;]. However, only the implementation of

Green SC is not adequate to get maximum sustainable performance, especially ecological performance [Lee *et al*., 2021]. Similarly, very few studies have highlighted that customer intention and participation are crucial in achieving sustainable organizational performance [Lee *et al*., 2021]. Therefore, an intricate and myriad association exists among antecedents of Green SC, their implementation, customer intention, and organizational performance. To address this gap, a hybrid theoretical model is formulated, while integrating institutional theory [DiMaggio & Powell, 1983] and theory of planned behavior [Ajzen, 1987, 1991].

INSTITUTIONAL PRESSURES AND GREEN SUPPLY CHAIN

The institutional theory states that organizations implement green initiatives and practices for two reasons: compliance with regulations, laws, taxes, and fines, and incentivizing ecological and socially responsible practices [Zailani *et al*., 2012]. Institutional pressures are crucial for the implementation of Green SC, which improves environmental and economic outcomes. The theory supports the link between institutional pressure and the green supply chain.

H1a Coercive pressure significantly influences the internal green supply chain.

H1b Coercive pressure significantly influence on the external green supply chain.

Selection, cooperation, and close ties with suppliers are crucial in incorporating green initiatives in production and manufacturing [Sancha *et al*., 2015]. Coercive pressures play an important role in developed countries in making decisions about suppliers and raw materials [Beske *et al*., 2008; Esfahbodi *et al*., 2017]. External stakeholders, such as customers, suppliers, society, and NGOs, exert normative pressure on the implementation of Green SC [Sancha *et al*., 2015]. In developing nations, normative pressure from suppliers is the main predictor of implementing Green SC [Saeed *et al*., 2018]. In some cases, the threat of copying competitors' practices leads to pressure to

implement sustainable suppliers and Green SC [Hoejmose *et al*., 2014]. Implementing an external Green SC promotes environmental sustainability and is associated with better operational performance for companies. Incorporating green practices benefits both organizations and the environment, creating a win-win situation.

H2a Normative pressure significantly influence the internal green supply chain.

H2b Normative pressure significantly influence the external green supply chain.

GREEN SUPPLY CHAIN AND CUSTOMER GREEN PURCHASE INTENTION

Previous literature indicated that customers are not influenced by commercial advertising or promotion through the media [Albayrak *et al*., 2013]. However, the internal green business practices and operations of the firms (such as green manufacturing and green products) can influence customer decisions and, along with the successful implementation of Green SC [D'souza and Taghian, 2005]. The influence of internal ecological practices and ISO certifications on customer behavior has not been widely studied. The combination of external Green SC and green marketing strategies can minimize the ecological impact of business operations. New techniques and values in supply chains can be introduced through customer evaluation of suppliers and return management cooperation.

H3 Internal green supply chain significantly influences customer intention in purchasing green products.

H4 External green supply chain significantly influences customer intention in purchasing green products.

MODERATING ROLE OF GREEN MARKETING

Green marketing is seen as a moderator between Green SC and customer green purchase intention. Green SC refers to the integration of environmentally friendly practices throughout the entire process of production and delivery of goods and services. The role of green marketing is to communicate and promote the green attributes of products and services to customers [Robinot and Giannelloni, 2010]. Green marketing can increase customer awareness and understanding [Zhao and Xie, 2011], and in turn, influence their purchase intention [Khan *et al.,* 2021]. Hence, the moderating effect of green marketing on the relationship between the Green SC and customer green purchase intention highlights the importance of effective green marketing strategies in driving the success of environmentally sustainable business practices.

H5 Green marketing acts as a significant moderator between the internal green supply chain and customer green purchase intention.

H6 Green marketing acts as a significant moderator between external green supply chain and customer green purchase intention.

MEDIATING ROLE OF CUSTOMER GREEN PURCHASE INTENTION

Promoting green initiatives of firms through an eco-friendly supply chain is mandatory to achieve a competitive edge [Beske-Janssen *et al*., 2015; Akhtar et al., 2022]. A Green SC refers to the integration of environmentally friendly practices in the production and delivery of goods and services [Srivastava, 2007]. The customer green purchase intention refers to the likelihood of a customer to choose environmentally friendly products over traditional products [Amin & Tarun, 2021]. Therefore, the role of the firm and the customer in achieving eco-oriented objectives is essential to achieve environmental sustainability [Wolf *et al*., 2014]. When a customer expresses their green purchase intention by choosing a product with a Green SC, this creates a demand for such products, which in turn incentivizes companies to adopt and improve environmentally sustainable practices [Hu *et al*., 2019]. Thus, the customer green purchase intention serves as a mediating factor between Green SC and environmental sustainability.

H7 Internal green supply chain significantly influences environmental sustainability.

H8 External green supply chain significantly influences environmental sustainability.

H9 Customer green purchase intention mediates the relationship between green supply chain and environmental sustainability.

METHODOLOGY

A quantitative data collection technique using primary data. The quota sampling technique was adopted and the units of analysis were dyads, that is, employees and customers. Six major manufacturing sectors were elected on their contribution to production. These include the textile, pharmaceutical, automobile, beverage, chemical, and petroleum sectors. The list of mentioned firms was obtained from Dun and Bradstreet (D&B) and verified from the Chamber of Commerce of all mentioned cities and the All-Pakistan Textile Mills Association (APTMA). The sample size of this study for employees was 256 and for customers was 384. The green marketing measure adopted from

Haytko and Matulich [2008], customer green purchase intention from Zhang *et al*, [2017] and institutional pressure, Green SC and environmental performance from Zhu *et al*. [2004,2013]. A quantitative dyadic data analysis approach through Structural Equation Modeling (SEM) was employed since it can handle complex models and run at the same time [Schumacker and Lomax, 2012; Tabachnick *et al*., 2007].

RESULTS

The demographic data results indicated that the majority of the respondents were male (94.4%) and 62.6 % of them were masters. An almost similar number of respondents was between 20-30 (43.2 %) years and 31-40 (39.3%) years. The data was collected through quota sampling and the proportion of respondents based on cities was mentioned in Table 4.1 above. Furthermore, the demographic tables showed that 39.3 % of the managers were supply chain managers of manufacturing firms. The details of others are also mentioned above. The major manufacturing industry contributes 29.9 % of respondents with experience of > 5 years. Details are presented in Table 1.

Table 1 Demographic profile of Managers and Customers

	Managers		Customers	
	Frequency	Percentage	Frequency	Percentage
Gender				
Male	291	94.4 %	213	69.1
Female	17	5.6 %	95	30.9
Age				
20-30 years	133	43.2 %	157	51.0
31-40 years	121	39.3 %	105	34.1
41-50 years	38	12.3 %	33	10.7
Above 50 years	16	5.2 %	13	4.2
Education				
Bachelors	104	33.7 %	189	61.3
Masters	193	62.6 %	88	28.6
Post Graduate	11	3.7 %	31	10.1
City				
Karachi	61	19.9 %	93	36.32

Lahore	48	15.6 %	64	25		
Rawalpindi/Islamabad	42	13.7 %	18	7.00		
Faisalabad	38	12.3 %	18	7.00		
Gujranwala	29	9.4 %	12	4.68		
Peshawar	27	8.7 %	11	4.29		
Multan	16	5.2 %	11	4.29		
Quetta	13	4.2 %	6	2.34		
Bahawalpur	9	2.9 %	5	1.95		
Hyderabad	9	2.9 %	10	3.90		
Sargodha	8	2.6 %	4	1.56		
Sialkot	8	2.6 %	4	1.56		
Position			**Industry**			
SC Manager	121	39.3 %	Textile	92	29.9 %	
Logistics Manager	68	22.0 %	Pharmaceutical	61	19.9 %	
Warehouse Manager	29	9.4 %	Beverages	47	15.2 %	
Inventory Manager	39	12.6 %	Automobile	37	12.0 %	
Operations Manager	21	6.8 %	Petroleum	37	12.0 %	
Q&C Manager	16	5.3 %	Chemical	34	11.0 %	
Procurement Manager	14	4.6 %				
Experience						
➤ 5 Years	199	64.6 %				
➤ 10 years	65	21.1 %				
➤ 15 Years	44	14.3 %				

Similarly, the majority of the customers were male (69.9 %) with bachelor's degrees (61.3 %). Among them, 51 % were between the ages of 20-30 years. The quota for customer respondents was calculated based on the population of each metropolitan city, respectively. The majority of the percentage is given to the city with the highest population.

MEASUREMENT MODEL

The reliability of the constructs was assessed using Cronbach's Alpha, CR, and AVE. According to [Hair *et al.*, 2017], values of Cronbach Alpha should be greater than 0.70, CR and AVE should be greater than 0.70 and 0.50 respectively. Cronbach's alpha of all variables is well above the threshold hold. Furthermore, the values of CR and AVE are also well above 0.7 and .50. The values are presented in Table 2.

Table 2 Construct Reliability and Validity

Construct Name	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
CGPI	0.916	0.931	0.628
CP	0.866	0.901	0.603
EGSCM	0.923	0.936	0.574
ES	0.923	0.940	0.722
GM	0.861	0.900	0.643
IGSCM	0.938	0.947	0.617
NP	0.752	0.834	0.502

The desired value of AVE for variables should ideally be greater than the squared correlation R^2 between the specified variable and the other variable [Fornell and Larcker, 1981]. Table 3 showed the discriminant values of each construct. The values highlighted in bold indicate that the square root of AVE is higher than the other values shown in rows and columns. Therefore, the desired different correlations of the construct indicated a good discriminant validity and met the criteria.

Table 3 Discriminant Validity

Variable Name	CGPI	CP	EGSCM	ES	GM	IGSCM	NP
CGPI	**0.792**						
CP	0.033	**0.776**					
EGSCM	0.088	0.452	**0.758**				
ES	0.084	0.488	0.665	**0.850**			
GM	0.729	0.029	0.069	0.046	**0.802**		
IGSCM	0.108	0.490	0.840	0.608	0.108	**0.786**	
NP	0.079	0.551	0.504	0.430	0.117	0.555	**0.709**

STRUCTURAL MODEL

To evaluate the proposed hypotheses and their statistically significant values, structural equation modeling (SEM) was performed. PLS-SEM was carried out using smart PLS 4.0 software by running a bootstrapping resampling method with 5000 subsamples to analyze the statistical significance of the path coefficients. In the structural model, the path coefficients examined the association among the variables [Haenlein & Kaplan, 2004; Hair Jr *et al*., 2017; Kaplan, 2008]. The estimates of path coefficients are shown in Figure 1 and Table 4.

Complete Model Results, Hypothesis Testing, and Path Coefficients

Table 4 Hypothesis Results

Hypotheses	Standardized Coefficients	T-Statistics	P-Values	Results
CP → IGSCM	0.063	4.116	0.000	**Supported**
CP → EGSCM	0.058	4.107	0.000	**Supported**
NP → IGSCM	0.060	6.918	0.000	**Supported**
NP → EGSCM	0.052	7.274	0.000	**Supported**
IGSCM → CGPI	0.084	0.488	0.626	**Not Supported**
EGSCM → CGPI	0.082	1.121	0.263	**Not Supported**
GM x IGSCM x CGPI	0.085	1.989	0.047	**Supported**
GM x EGSCM x CGPI	0.096	2.859	0.004	**Supported**
IGSCM → ES	0.106	2.299	0.022	**Supported**
EGSCM → ES	0.099	4.347	0.000	**Supported**
CGPI → ES	0.040	0.2399	0.811	**Not Supported**

Table 4 shows the results of hypotheses test. The results showed that coercive pressures have a significant positive impact on internal Green SC (β =0.063, t = 4.116, p =0.000). Similarly, coercive pressures are also positively significant with external Green SC (β =0.058, t = 4.107, p =0.000). The normative pressures are also found to have a significant positive association with the internal Green SC (β =0.60, t = 6.918, p =0.000). Similarly, normative pressures are also positively significant with external Green SC (β =0.052, t = 7.274, p =0.000). The relationship between internal Green SC and customer green purchase intention is not significant (β =0.084, t = 0.488, p =0.626). Similarly, the relationship between external GSCM with customer green purchase intention is insignificant (β =0.082, t =

1.121, p =0.263). The moderating role between internal Green SC and customer green purchase intention is found significant (β =-0.085, t = 1.989, p =0.047). Similarly, the moderating relationship between the external Green SC and customer green purchase intention was also found to be significant (β = 0.096, t = 2.859, p =0.004). The impact of internal Green SC on environmental sustainability is significant (β = 0.106, t = 2.299, p =0.022). Similarly, the direct impact of external Green SC on environmental sustainability is also significant (β = 0.099, t = 4.347, p =0.000). The impact of customer green purchase intention on environmental sustainability is found to be insignificant (β = 0.040, t = 0.239, p =0.811). Hence, most of the proposed hypotheses were found to be significant at p< 0.05.

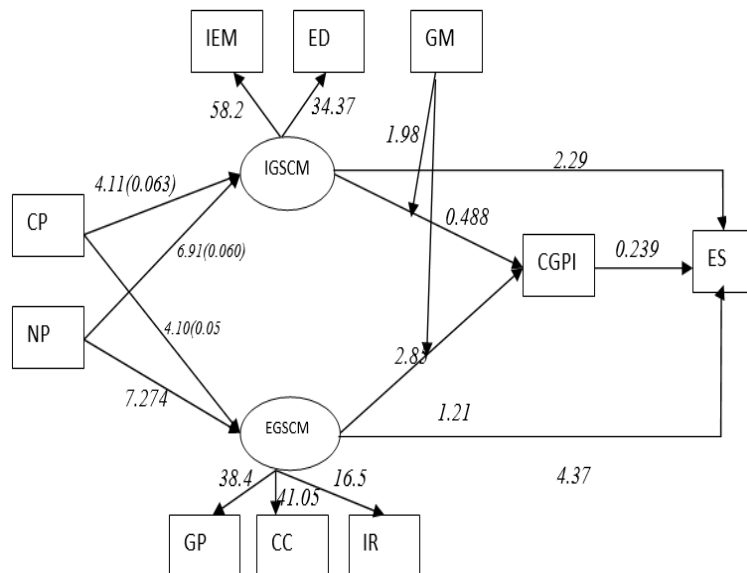Fig. 1: Path coefficient analysis

Model Fit and Construct Predictive Power

Table 5 R-square and Q Square

Variable Name	Q Square	R Square
CGPI	0.314	0.534
EGSCM	0.227	0.298
ES	0.191	0.451
IGSCM	0.304	0.357
Legend: IGSCM= Internal Green Supply Chain Management, EGSCM= External Green Supply Chain Management, CGPI= Customer Green Purchase Intention, ES= Environmental Sustainability		

The fit of the model of the constructs was examined through the coefficient of determination (R^2). The thresh hold values for

small, medium, and large predictive accuracy of the proposed model is (<0.25 small), (< .050 medium) and (< .70 large) [Chin *et al*., 2020; Hair *et al*., 2017]. Therefore, the results in the

table showed that in this study the predictive power of constructs is medium, since all the R^2 values are above 0.25 and below 0.50. The values of R^2 of all the variables are good enough to predict the accuracy of the proposed model. Similarly, the predictive power of the model has been evaluated through Q^2 the details of the table indicated that the model bears a good predictive power as all values are greater than 0.

MEDIATING ROLE OF CUSTOMER GREEN PURCHASE INTENTION

A mediation analysis was performed to assess the mediating role of CGPI in the relationship between IGSCM, EGSCM, and ES.

The results indicated an insignificant indirect effect of IGSCM and EGSCM on ES through CGPI (β=0.000, T=0.103, P= 0.918), (β=0.001, T=0.174, P= 0.862) respectively. The total effect of IGSCM and EGSCM on ES was significant (β=0.243, T=2.299, P= 0.022), (β=0.428, T=4.374, P= 0.000) respectively, with the inclusion of the mediator, the effect of IGSCM and EGSCM on ES was significant (β=0.243, T=2.296, P= 0.022), (β=0.427, T=4.320, P= 0.000) respectively. This shows that CGPI does not play a mediating role in the relationship between IGSCM, EGSCM, and ES. Hence, H_9 was not supported because the indirect effect was insignificant and the direct effect was significant. The results are shown in Table 6 below.

Table 6 Mediating Role of CGPI Between Green SC and ES

Variable Name	Standardized Coefficients	T- Statistics	P-Values
IGSCM--->ES	0.243	2.296	0.022
IGSCM--> CGPI--> ES	0.000	0.103	0.918
EGSCM---->ES	0.427	4.320	0.000
EGSCM-->CGPI-->ES	0.001	0.174	0.862

Note: IGSCM= Internal Green Supply Chain Management, EGSCM= External Green Supply Chain Management, CGPI= Customer Green Purchase Intention, ES= Environmental Sustainability

MODERATING ROLE OF GREEN MARKETING

The moderation results indicated that green marketing significantly moderated the relationship between Green SC and CGPI (β = 0.085, t = 1.99, p = 0.047) so hypothesis 5 was supported. Similarly, the moderating role of green marketing between external Green SC and CGPI was also examined. The results indicated that GM acts as a significant moderator between external Green SC and CGPI (β = 0.096, t = 2.859, p = 0.004), therefore hypothesis 6 was also supported.

Table 7 Moderating Role of Green Marketing

Hypotheses Interaction Variables	Standardized Coefficients	T- Statistics	P-Values	Results
GM x IGSCM x CGPI	0.085	1.989	0.047	**Supported**
GM x EGSCM x CGPI	0.096	2.859	0.004	**Supported**

DISCUSSION

The results of Hypothesis H_{1a} indicated a positive significant association between coercive pressures and internal GSCM; these findings are consistent with the findings of Yang [2018]. The results of $H1_b$ indicated a positive significant association with external GSCM. These findings are consistent with previous studies of [Ali *et al*., 2022; El-Garaihy *et al*., 2022]. However, previous literature on the role of normative and coercive pressures in the adoption of GSCM also contradict these findings [Saeed et al. 2018, Sancha et al. 2015].

The results of $H2_a$ revealed that normative pressures played a significant positive role in internal Green SC. These findings are consistent with previous studies by [Chu *et al*., 2017; Wang *et al*., 2018]. The H_{2b} revealed a strong association between normative influence and external GSCM. These findings are similar to previous studies [Saeed *et al*., 2018].

The results of H_3 and H_4 indicated that IGSCM and EGSCM were not significantly associated with the customer's green purchase intention. Therefore, the association between IGSCM and EGSCM practices and CGPI was found inconsistent with the limited previous studies [Hsu *et al*., 2017; Lee *et al*., 2021]. The contextual difference is the main cause of this inconsistency in results.

The results of H_5 and H_6 indicated that green marketing significantly moderates the relationship between internal and external Green SC and customer green purchase intention. These results are consistent with previous studies [Roh *et al*., 2022,Kao & Du, 2020].

The mediating role of CGPI between Green SC and environmental sustainability has been found to be insignificant, measured through H_9. The direct effect of Green SC and environmental sustainability was also investigated through H_7 and H_8. The results indicated that the internal Green SC has a strong and positive influence on the environmental sustainability of a company. These findings are consistent with [De Sousa Jabbour 2015 and Green et al. 2012], however,

partially contradict the findings of [Saeed et al. 2018].

The results of H_9 indicated that CGPI is not positively and significantly associated with environmental sustainability. This relationship has never been witnessed in the GSCM literature, so little is known about the phenomenon.

CONCLUSION

The results of a study showed that green supply chain management in manufacturing firms is influenced by various factors such as institutional pressures, access to resources, and resource allocation. The finding illustrates that coercive and normative pressures have a positive and significant impact on the internal and external Green SC. The relationship between the internal and external Green SC and customer green purchase intention was found to be insignificant. The results of the moderation analysis showed that green marketing significantly moderated the relationship between internal and external Green SC and customer green purchase intention. The results of the study indicate that internal and external Green SC have a positive and significant impact on environmental sustainability, with no mediating role of customer green purchase intention, thus, internal and external Green SC directly result in higher sustainable performance and can enhance economic growth. The predictive power of the proposed model was found to be medium. The results are consistent with previous studies in the field.

THEORETICAL AND PRACTICAL IMPLICATIONS

The study has solid implications for the green supply chain in Pakistan. The results show that environmental regulations are the most influential factor in the implementation of Green SC. Companies must focus on implementing total quality environmental management, cross-functional cooperation, environmental compliance, and ISO14000/14001 certification. In terms of external practices, firms should focus on supplier environmental audits, strong collaboration with suppliers, and sharing product specifications. The results suggest that managers

should focus on implementing internal and external GSCM and green marketing to achieve environmental performance. Customers respond positively to green marketing and companies that advertise their products as green. The study also shows that implementing Green SC and attracting customers to green products can lead to improved environmental performance and reduced waste, hazardous materials use, and environmental accidents.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

This study has some limitations. First, the data were collected from all large-scale manufacturing firms. Future research can be conducted to obtain data from small and medium firms for a better generalization of GSCM. Second, this study revealed an insignificant index of the moderated mediation of proposed hybrid theoretical model. Therefore, this hybrid model can be tested using mixed research methods that could provide deep insights into the three specified elements. Third, this study has evaluated the most common Green SC implementation, hence future research can be conducted to evaluate the subdimensions of green compliance like environmental auditing and environmental compliance.

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