Pak. j. life soc. Sci. (2024), 22(2): 11465-11479 E-ISSN: 2221-7630;P-ISSN: 1727-4915

Pakistan Journal of Life and Social Sciences
www.pjlss.edu.pk

https://doi.org/10.57239/PJLSS-2024-22.2.00866

**RESEARCH ARTICLE**

# Impact of Green Transformational Leadership and Corporate Environmental Strategy on Firm Performance in Textile Industry of Developing Country: Mediating Role of Green Process Innovation

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***ARTICLE INFO***

Received: Sep 23, 2024

Accepted: Oct 28, 2024

***Keywords***

Green transformational leadership

Corporate environmental strategy

Green process innovation

Firm performance

Textile industry

Developing country

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**ABSTRACT**

The present research aims to find out the effect of green transformational leadership (GTL) and corporate environmental strategy (CES) on firm performance (FP) with green process innovation (GPI) as a mediating in the textile industry of a developing country, Pakistan. According to the RBV and NRBV theories, the following conceptual model has been developed, where GTL and CGS positively affect FP, which GPI mediates. Furthermore, data were collected through adopted questionnaires from previous studies, and 196 managers and owners of textile firms in Pakistan were considered as samples. Relationships were analyzed with structural equation modeling (SEM) in SmartPLS version 3 to validate the proposed hypothesis. The findings revealed that GTL and CES are positively related to the FP. Additionally, the study showed that GPI partially mediated the relationship between CES and FP. Therefore, the research has extended the knowledge base by establishing GTL and CES as significant predictors of GPI and FP in the context of Pakistan's textile industry as a developing country. The study presents important managerial recommendations and highlights that corporate environmental initiatives, process green research and development, and a sustainability culture are critical for superior-edge textile firm performance.

## INTRODUCTION

It has been mentioned that owing to the outbreak of rivalry in the business environment, which is increasingly becoming more complex and rapidly changing, it is crucial to identify critical determinants affecting business performance (Kennerley & Neely, 2002). Due to high levels of competition and increased complexities of the customers' needs and demands, technologies, and other dynamic factors, firms are compelled to implement practices that would help achieve goals and

maybe surpass them (Knoppen & Knight, 2022). However, the fact that the degree of leadership style and behavior impacts the organization's performance is debatable. Thus, although the overall performance of a firm depends on many factors, leadership style has a distinguishable impact on performance (Jensen et al., 2020). Furthermore, leaders also play an essential role in managing a business's policies that define competition. There are many problems that the organization has to cope with operating in an environment characterized by a high level of competitiveness. As a result, the primary function of a business is to establish a competitive edge based on its organizational strategies pertinent to higher operation performance (Farida & Setiawan, 2022; Al-khresheh et al., 2021). Here, it is crucial to ask how the manufacturing industry can carry on its activities regarding ecology and profit.

Regarding the business environment, green innovation (GI) is one of the new methods of solving various environmental problems. Thus, to reduce adverse effects on the natural environment, manufacturing firms should achieve consistency between the environmental management philosophy and GI practices (Albloushi et al., 2023; Al-khresheh et al., 2024). Although coverage of the GTL has been discovered to apply more to leaders, especially those who are environmentally mindful, more stress has been placed on the fact that even environmentally mindful leaders bend more towards the said style. The behavior style applied here is GTL, which encourages its followers to achieve their environmental goals and perform beyond environmental standards. Many have adopted the centrality of the firm managers and the positive influence on environmental performance.

As stated, there is a need to formulate suitable means to implement innovations. In this manner, firms can avoid the negative impacts of their actions on the environment. A recent study stress that firms must sustain their existence and function more efficiently through CES (Haris et al., 2023). The authors whose works are reviewed in this paper imply that there is an obvious need to identify the primary antecedents of CES. Strategy, on the one hand, and culture, systems, and applications, on the other hand, come closely under the firm management. Hence, with the GTL management style, it is possible to use internal and external resources to facilitate the adaptation of CES (Tian et al., 2023).

Nonetheless, the available literature needs to pay more attention to the essential question of GTL (Afsharbakeshlo et al., 2024; Jam et al., 2013), (Le et al., n.d.). After all, innovation is a process that is usually associated with expenses. Thus, the fundamental question is whether GPI can promote revenue growth. In the words of [], profit is the only language firms understand when investisng in green technologies. At this point, knowing if investments in environmentally friendly technologies can boost FP is relevant. However, the core meaning of both consideration and investment is that every innovation type – product and process – can attain various performance results by nature. Therefore, research on GPI could not obtain continuous results, and the relationship between GPI and FP remains a question mark. Therefore, more studies need to be done to develop alternative solutions. The following research objectives guided this study:

RO1: The identify the impact of green transformational leadership on firm performance.

RO2: To examine the impact of corporate environmental strategy on firm performance.

RO3: To study the mediating role of green process innovation between corporate environmental strategy and firm performance.

This research intended to fill those mentioned theoretical and methodological voids to contribute to the current literature regarding the effects of GTL and CES for enhancing the FP in the textile industry of a developing country with the mediating factor of GPI. First, most of the survey findings of GTL are generalized toward developed countries of the West, whereas there are limited studies in developing countries. Second, the essential research on the relationship between CES and FP has yet to be studied in the presence of a mediator in the textile industry based on the authors' limited

knowledge. Therefore, this study focuses on GPI as a mediator to fill this knowledge gap, as it offers an understanding of how environmental initiatives lead to the enhancement of FP. From a methodological point of view, analyzing the existing literature to identify the nature of the relationships between the variables of interest, we have based our analysis mainly on conventional approaches involving regression models. Concerning the methodological contribution of this study, it employed structural equation modeling (SEM).

## Theoretical foundation and Hypothesis development

### Theoretical foundation

Looking at the theoretical framework on which this study can be grounded, one can turn to the firm's Natural Resource-Based View (NRBV), which was elaborated on by (Hart, 1995). According to the NRBV, firms realize superior performance by building and utilizing environmental firms' capabilities, such as green process innovation capabilities, to mitigate environmental issues and satisfy the stakeholders' demands. GTL stands for the leadership approach that enables and motivates the workers to consider environmental responsibility and support the sustainability procedures and the organization's environmental goals in the workforce (Çop et al., 2021; Nasir et al., 2024). Consistent with the NRBV, it is suggested that transformational leaders can reach environmental sustainability and impact the firm's strategic management of the environment (Rizvi & Garg, 2021). When transformational leadership is used, it can encourage the employees to support environmental activities, enhancing better perception and a more robust course for the overall successful corporate environmental plan. Environmentalism is the long-term plan to tackle environmental concerns in the organization, minimize the firm's environmental footprint, and ensure that the impact of environmental concerns is factored into its business and strategic decisions (Saether et al., 2021). Based on the NRBV, this paper argues that firms can create superior resources through investments in environmental capability and green process innovation. This supportive structure facilitates the appropriate resources, encouragement, and culture to enable green process innovation according to a firm's corporate environmental strategy. GPI is the creation and adoption by an organization of new production systems, processes, technologies, or methods that cut down on the effects of the company's operations on the environment (Andaregie & Astatkie, 2022). Using the NRBV, the mediating effect of green process innovation can also be proposed in the link between GTL, CEs, and firm performance. Pro-Environmental attitudes and behaviors of transformational leaders promote the purchase, development, and use of sustainable green products, enhancing the establishment of a healthy environmental corporate strategy. This can help with the adoption of green process innovation, which in turn can impact the firm's performance positively.

### Hypothesis development

### Green transformational leadership

The transformational leadership approach forms the basis of the main focus of transformational leaders in improving performance at all organizational strata. In the meantime, empirical research has focused on assessing the correlation between transformational leadership and followers' performance at each employee level (Budur & Demir, 2022), and the transformational leadership approach outlines how transformational leaders can impact their teams and organizational performance. In the case of the firm's top management, transformational leadership ensures that the leadership type is adopted all over the firm, either by the top management or by other levels of leadership (Prabhu & Srivastava, 2023). This can enhance team cohesiveness, motivation, and goal consensus, which, in turn, can help lower management to perform better at the organizational level (Van der Voet & Steijn, 2021). In addition, they can increase FP positively by impacting organizations' climate, systems, and strategies. Thus, GTL can influence the values of a firm's operating system and environment and its FP. As earlier noted, the critical objectives of a firm embarking on green

implementations are to enhance environmental performance and FP. Thus, the goal of GTL is to support the enterprise in achieving the set goals regarding environmental protection and economic outcomes. Concerning the author's knowledge, previous research has yet to attempt to explore the combined direct and indirect impact of GTL on FP. By developing and maintaining an environment-oriented culture in the company, environmental management becomes a working culture where all the employees take personal responsibility for environmental management to the extent of stimulating environmentally responsible performance, hence, an entire and participating environmental preservation atmosphere (Biswas et al., 2022). The mentioned type of environmental protection behavior aids in creating the firm's image of being environmentally sensitive; thus, a customer base and sales market will be established (Prokop et al., 2022). The works have pointed to a positive relationship between an enterprise's anticipatory measures to mitigate environmental harm and FP.

*H1: GTL positively related to FP.*

**Corporate environmental strategy**

Increasing awareness of the effect of the business activity on the environment raises the society's concern, which pressures the management to develop less destructive environmental strategies (Camilleri, 2022). In a highly competitive environment, firms have to accept the challenges created by environmental issues. This necessary condition is met through strategies of increasing efficiency in production processes while at the same time minimizing environmental effects. This implies that business organizations should respect the environment as much as they try to create business values. To realize this objective, the life cycle of products must be effectively managed by enhancing production input utilization, as well as minimizing waste and polluting emissions (Zhang et al., 2021), to achieve environmental superiority that correlates with the business's overall superiority (Kuo et al., 2022). Several firms have not shifted to increase the application of eco-friendly strategies because there is no adequate research to show that the returns are higher than the costs. It is important to note that the management of the environment generates outcomes that are broader than the cost of the firm. Also, firms that practice sustainable production and consumption of resources can easily be noticed in the market, gaining them an image (Baah et al., 2021), and consumer demand drives the price up for such products, giving them a premium (Kapferer & Valette-Florence, 2021). Since the awareness of the customer to the environment is getting high and there is evidence that such customers are likely to pay a premium and be willing to acquire goods and services that have been produced in an environmentally friendly manner, environmentally friendly goods and services are likely to increase in demand. Thus, the amount of money firms can get from selling their products or implementing eco-friendly services increases.

*H2: CES positively related to FP.*

*H3: CES positively related to GPI.*

**Mediating role of Green Process Innovation**

Organizations save their costs with GPI. Pollution is typically caused by the wastage of many resources, partially utilized commodities, or energy loss (Kibria et al., 2023). As (Babu et al., 2022) pointed out, pollution is an economic cost because it refers to some waste while utilizing resources in production. However, a firm with inadequate process controls has superfluous waste, resource deficit, and impaired or warehoused materials. According to "Porter's Hypertension," Efficiency gains are readily available by investing in simple safeguards. Previous research has also indicated that recognizing GPI improves the firms' competitive advantage and sustainability (Serrano-García et al., 2022). Hence, the authors who examined the correlation between GPI and developed nations, advanced that end-of-pipe technologies and clean technologies, which form the potential of GPI, are. Green innovation has therefore emerged to meet this awareness by developing greener approaches

to company goals, which manufacturing firms employ to attain corporate environmental conservation objectives (Padilla-Lozano & Collazzo, 2022). Green innovation research is in a relatively early stage and is characterized by rather low levels of accomplishment. The existing literature comprises a limited number of empirical researchers applying innovation and environmental concerns. Studies done on green innovation and performance have also produced inconclusive results (Vasileiou et al., 2022).

On the one hand, there are considerations that although the employment of green innovation strategies does not increase the level of SFA profitability, the encouragement of manufacturing firms to adopt such strategies is positive. However, other researchers have postulated that such integration may lead to poor performance because of the increased time developers take to develop applications and the costs incurred (Jirakraisiri et al., 2021). These mixed results have evidenced the concern among researchers in improving the insights of the link between the firms' green innovation and green performance (Fontoura & Coelho, 2022). Therefore, this paper delivers an understanding of such contradictions to establish if green innovation affords green performance to organizations.

*H4: GPI positively related to FP.*

*H5: GPI mediates the relationship between CES and FP.*

## METHODOLOGY

### Data collection procedure and sample

The choice of the research methodology strongly depends on the goal and the problem of the investigation (Pandey & Pandey, 2021), and the choice of an adequate methodology is rather crucial for the results. Presumably, the current study's problem and goal have led to choosing an appropriate research paradigm and data collection technique. The research adopted a quantitative paradigm and a cross-sectional data collection method in the given case. As for data collection, the researchers incorporated a questionnaire. Because of these advantages, a survey questionnaire is appropriate for the current research study since it enables researchers to gather data within a given time and consumes less money (Taherdoost, 2021). Moreover, applying this method also allows for explicit secrecy among the respondents, and sensitive information can be easily obtained.

The questions are formulated in the context of proceeding sections of literature. In the first stage of the study, 300 questionnaires were administered to textile firms by mail. Thus, 196 of the 300 subjects still need to complete the questionnaire. Thus, the total number of questionnaires received was 196, and the response rate being percent was 56.3%. Thus, the final sample comprised 196 duly completed questionnaires.

The sample comprises Pakistan textile firms, as Pakistan textile firms have recently been alleged to have committed acts unbecoming towards the global environment by discharging hazardous and toxic waste, which has raised public concern over the Pakistan textile industry (Sardar et al., 2022). With a rising concern for environmental damage, Pakistan textile firms are even more environmentally irresponsible (Abbas & Halog, 2021). Based on the perspective of the applied grant and the essential role of Pakistan textile firms in the environmental issue, the given sample is suitable for the topic of this study.

### Scale development

To measure the various related constructs, the procedure followed was to examine the various literature for valid measures of the constructs as described below: All the higher order constructs were measured using a five-point Likert scale with the following options: 1 = strongly disagree, 5 =strongly agree.

Green Transformational Leadership (GTL): GTL refer for the leadership approach that engages and motivates the workers to participate in the process fostering environmental responsibility and supporting green practices within the organization's environment. Six items were taken from the study of (Özgül & Zehir, 2023). Sample item was "Our top management inspires the members of the organization with environmental plans".

Corporate Environmental Strategy (CES): CES is actually a long-term business management strategy of the organization aimed at minimizing the adverse effects of environment on the organization as well as incorporating environmentally friendly factors in the organizational business activities and decisions. Five items were taken from the study of (Özgül & Zehir, 2023). Sample item was "Our firm has integrated environmental issues into our strategic planning process".

Green Process Innovation (GPI): GPI comprises the introduction of wholly new or a significant enhancement of incoming processes, techniques or technologies designed to minimize the environmental effects of the organization's operations. Four items were taken from the study of (Özgül & Zehir, 2023). Sample item was "The manufacturing process of our firm effectively reduces the emission of hazardous substances or waste".

Firm Performance (FP): FP can be defined as the company's management goals or aims including the financial and or non-financial goals, which are profit, market position, and superior competitive position among others. Nine items were taken from the study of (Shahzad et al., 2022). Sample item was "Organizations in challenging environments show strong commitment regarding the achievement of their targets".

### Software tool

Structurally equation modeling, or SEM, is used to analyze the collected data. SEM is a procedure used to determine the fitness of some theoretical propositions to make estimations (Owolabi et al., 2020). Moreover, SEM generates multivariate components. SEM makes identifying and establishing relations between a vast array of factors possible. The primary purpose of SEM is to establish the relationship between numerous latent constructs, which minimizes the error in the model. There are two commonly used SEM techniques: Covariance-based and variance-based.

Nevertheless, covariance-based (CB-SEM) has been the most common technique for analyzing intricate interdependence of latent and observed variables compared to variance-based partial least squares (PLS-SEM). However, the proportion has changed in the recent past, with a higher growth rate in the usage of PLS-SEM, as evidenced by published articles. However, PLS-SEM seems to be the best strategy where a small population restricts the sample size; nonetheless, it also flows seamlessly in significant sample analysis (Kurtaliqi et al., 2024). Thus, this study used PLS-SEM to examine the hypotheses developed in a tool known as SmartPLS V3. 3. 3 ().

## RESULTS AND DISCUSSION

### Reliability and Validity

It can also be referred to as the internal reliability or the dependability of the data (Quintão et al., 2020). The above kinds of reliability of the measurement also imply that the overall assessment of it is expressed by a reliability coefficient, which is derived from the number of observed repetitions. Another essential aspect would be determining whether this measurement instrument (a questionnaire) will yield a similar score if the same phenomena are assessed at different intervals but in similar conditions (Sürücü & Maslakci, 2020). Namely, reliability is one of the main categories of estimation that deal with the scope and manageability of the conditions.

The measure of scale reliability is realized using the figure of Cronbach's alpha and the figures of composite reliability (CR). Based on the recent study, it is recommended that Cronbach's alpha and

CR not be less than 0.70 (Cho & Kim, 2015). Table 1 shows that all the alpha values of the variables are more significant than the recommended value of 0.70. In addition, the researchers should have sought the outer loading brought out by the individual items in each construct. Hence, all the values signifying the reliability based on the internal consistency were also relatively high and had a mean of about 0.70. (Please see Table 1 and Figure 1).

Likewise, validity is employed in various senses and means the degree of the measure construction; therefore, the reliability in the instruments is high if the measurements are near or equal in value (Borsboom et al., 2004). Therefore, the suggestion found in the prior sections concerning AVE's adequate threshold is appropriate 0.50 (Clark & Watson, 2016). The following also meets the requirement of validity of the study; the values are as follows: All variables, 0. 657 to 0. 747 (See Table 1). Hence, with these aspects of reliability and validity integrated, the researchers will be well placed to account for the quality of the measurement instruments employed in the endeavor and the degree of precision of the data in the conclusion.

**Table 1.Instrument Reliability and Validity**

| **Factors** | **Item SPSS coding** | **Value of outer loading** | **Value of Cronbach alpha** | **Value of Composite Reliability** | **Value of Average Variance Extraction (AVE)** |
|---|---|---|---|---|---|
| **Green Transformational Leadership** | GTL1 | 0.828 | 0.896 | 0.920 | 0.657 |
| | GTL2 | 0.810 | | | |
| | GTL3 | 0.800 | | | |
| | GTL4 | 0.807 | | | |
| | GTL5 | 0.828 | | | |
| | GTL6 | 0.790 | | | |
| **Corporate Environmental Strategy** | CES1 | 0.830 | 0.909 | 0.932 | 0.734 |
| | CES2 | 0.819 | | | |
| | CES3 | 0.853 | | | |
| | CES4 | 0.899 | | | |
| | CES5 | 0.879 | | | |
| **Green Process Innovation** | GPI1 | 0.920 | 0.875 | 0.914 | 0.729 |
| | GPI2 | 0.775 | | | |
| | GPI3 | 0.839 | | | |
| | GPI4 | 0.874 | | | |
| **Firm performance** | FP1 | 0.900 | 0.958 | 0.964 | 0.747 |
| | FP2 | 0.841 | | | |
| | FP3 | 0.881 | | | |
| | FP4 | 0.854 | | | |
| | FP5 | 0.854 | | | |
| | FP6 | 0.904 | | | |
| | FP7 | 0.832 | | | |
| | FP8 | 0.872 | | | |
| | FP9 | 0.837 | | | |

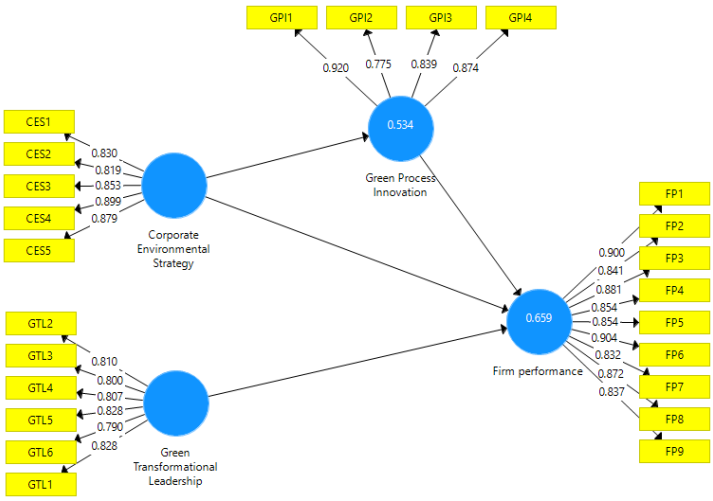


**Figure 1. Measurement model**

## Hypotheses Testing and Discussion

***H1:*** According to the results, it is established that the path coefficient of green transformational leadership to firm performance is 0.419 and result is statistically significant 0.000. This means that there is a positive correlation between the two and is statistically significant at the 0. 05 level. The path coefficient was 0.419. Another validation criterion this study satisfies is the parity of the proposed hypotheses with the prior literature findings of green transformational leadership and firm performance (Kusi et al., 2021). This might be because GTL deals mainly with global innovation and sustainable development within the business and establishes a definite business image and purpose so that organizational members can readily embrace environmentally sustainable activities (Mukonza & Swarts, 2020). It is crucial to note that these factors can improve business performance and create value for customers and the community. On the other hand, implementing change in GTL may have a delayed effect on EP. Accordingly, it may take time to yield a positive change in the environmental operational efficiency. Other researchers have also indicated positive impacts in several sectors of the economy—results aligned with past studies (Majali et al., 2022), (Sun et al., 2022).

***H2:*** It is discovered from the results that the path coefficient between corporate environmental strategy and firm performance is = 0. 260, and the p-value related to the above test results is equal to 0. 000. This forms a positive and significant correlation between the two variables or coefficients. A prospector business-level strategy means the firm constantly creates new products; therefore, it tends to have dynamic capabilities and sensitivity to opportunities (Thoumrungroje & Racela, 2022). Business organizations with prospector strategies have high motivation concerning long-term plans and goals, and their orientation is on the development and realization of the company in the future (Alsharari, 2024), which means that prospector organizations know the significance of environmental and social considerations. Firms require enhanced monetary outcomes and reject socially and ecologically unfavorable activities to capture sustainable business opportunities. It is because when companies manage their environmental impacts proactively, value is created for shareholders and others in the long term, which is better for associated firms (Quintana-García et al., 2022).

***H3:*** The findings show that the path coefficient of the research model linking CES and green process innovation is equal to 0. 731, and the related p-value is 0. 000. This means an increase in the probability of one variable influencing the other, and the correlation is positive and statistically significant. Some measures impacting EP are the quality of sustainable products, products, and

services, the green processes involved, and the spread of sustainable business practices and product design (Kovilage, 2021). The authors find GPI's positive impact on FP in Japan (Wang et al., 2021). GPI commits to lowering the environmental impact it has compared to comparable products. While conducting business, GPI applies technologies that help design economic effectiveness with less environmental impact.

***H4:*** Thus, the findings on the path coefficient indicate that the relationship between green process innovation and firm performance is 0. 219, while the p-value linked to this statistic is 0. 000. This further points to a positive and statistically significant relationship between the two variables. It assists in decreasing the costs and enhancing the operation situation of companies in competitive and fast-changing markets. As noted, (Saeidi et al., 2018), GPI could also contribute to its FP in terms of monetary (enhanced market share and decreased cost) and non-monetary (e.g., higher client allegiance, better image, and reputation). The results obtained by this study are generally in consonant with prior research (Tang et al., 2018), (Helmi & Widiastuty, 2023).

***H5:*** As indicated by the findings, the indirect effect of the corporate environmental strategy on the firm's performance through the green process innovation mediating variable is equal to 0. 160 and the corresponding p-value is 0. 000. This shows the partial mediation effect, which is positive and significant at $p < 0.05$. The partial mediation effect of green process innovation on the colonial care corporate environmental strategy and firm performance relationship discovered in the study form's part and parcel of the outcomes identified in the past in this research domain. Past studies have established that CES is central in attaining environmental sustainability and other green business operations necessary for change (Kraus et al., 2020), (Bhatia, 2021). Thus, based on this, companies ought to meet two core conditions, which include environmental beliefs and values, which will foster the execution of environmentally friendly activities and ideas through their employees. On the other hand, green transformational leaders use visions and strategies to promote green activities or encourage employees to advance GI and enhance green performance (Awan et al., 2023).

**Table 2. Hypotheses Testing**

| **Paths** | **Value of Beta** | **P-Value** | **Remarks** |
|---|---|---|---|
| Green Transformational Leadership -> Firm performance | 0.419 | 0.000 | Accepted |
| Corporate Environmental Strategy -> Firm performance | 0.260 | 0.000 | Accepted |
| Corporate Environmental Strategy -> Green Process Innovation | 0.731 | 0.000 | Accepted |
| Green Process Innovation -> Firm performance | 0.219 | 0.000 | Accepted |
| Corporate Environmental Strategy -> Green Process Innovation -> Firm performance | 0.160 | 0.000 | Partial mediation effect |

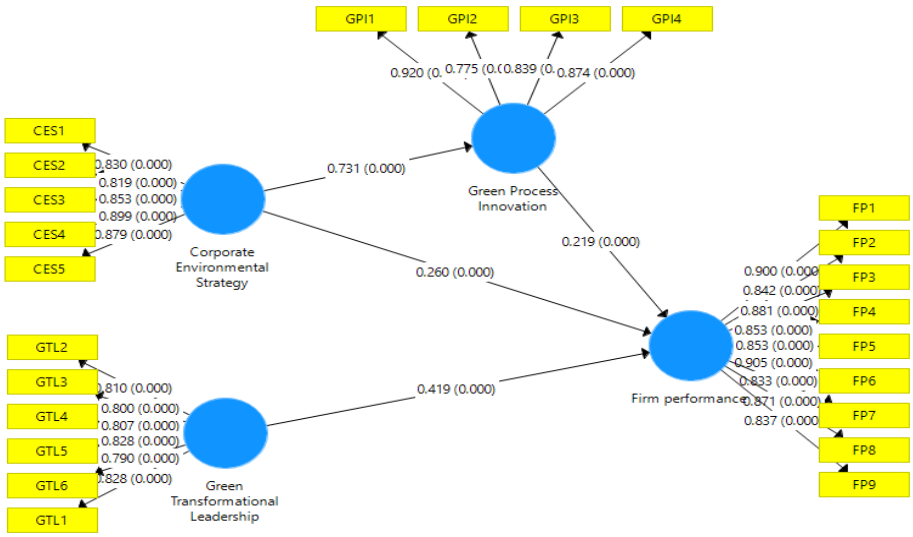


**Figure 2. Structural model**

## CONCLUSION

This study examined the impact of green transformational leadership and corporate environmental strategy on firm performance and the mediating role of green process innovation. The relationship between CES and GPI is even stronger with a path coefficient of 0. 731, far-reaching the influence of green transformational leadership. This, therefore, implies that the extent to which environmental matters are incorporated into the firm's management and operations processes for strategic purposes is a more decisive factor for sustainable innovation within the textile industry of a developing country context. Instead of relying on leadership action, which is a part of the problem, managers and owners of textile firms should focus on creating corporate environmental strategies and encouraging innovations in the processes. Additionally, the findings of this study indicated partial mediation of green process innovation for the link between CES and FP. This suggests that green process innovations, comprising renewable energy sources, waste management, and energy-efficient technologies, are valuable ways corporate environmental strategies can improve the firm performance. Textile firms in developing countries should embrace sustainable technology advancements to reduce their impacts on the environment while at the same time increasing their returns by cutting emerged costs, increasing productivity, and improving market image. It was noted that the findings of this study are placed, in part, in the broader sphere of nursing culture; however, several caveats may be of interest to the readership at large. Most of the earlier research in this particular stream of study has been carried out in the framework of the developed economy; however, this research presents empirical findings derived from the textile industry of a developing country, Pakistan.

### Managerial implication

Therefore, the current study reveals that corporate environmental strategy has a comparatively enhanced effect on green process innovation than green transformational leadership. This means that textile firms need to find ways of creating and applying broad strategies for managing the environment and incorporating environmental management into their managerial and operational plans. Thus, this strategic approach is more efficient for developing sustainable innovations than leadership-based initiatives.

Second, sustaining the partial mediation of green process innovation in the relationship between CES and FP substantiates the appropriateness of investing in green process innovations. Resources

should be invested to adopt green technologies, systems, and methods in textile firms, including the efficient use of energy resources, waste disposal methods, and energy-conserving technology in production. Such green process innovations may not only be effective in reducing the firm's environmental impact but also positive for organizational efficiency, cumulative cost reductions, and better market image, which have a direct and enhanced impact on the firm's financial performance.

Finally, the implications of the country-specific data of the study lie in understanding the peculiarities of the developing country's environment, where environmental strategies and innovations must be developed and implemented. It is advised that textile firms and manufacturers elaborate a dialogue with the policymakers and related authorities, convey the information regarding the problems and opportunities within this field, and advocate for the critical considerations regarding various green process innovations and the sustainable development of the textile firms.

### Limitations and future research directions

First, the present study used a cross-sectional research design, which hindered the establishment of a research relationship between variables. Thus, it shall be imperative for future research to incorporate a cross-sectional research design to capture the developmental nature of the observed relationships between green transformational leadership, corporate environmental strategy, green process innovation, and firm performance.

Secondly, the current study has yet to derive the relationships between the potential moderating variables that may affect the identified vital constructs. Future studies could examine contextual variables, organizational characteristics, or external conditions as mediators to gather empirical evidence that underpins the notion presented in this work's conceptual model.

Thirdly, this study mainly used the RBV and the NRBV to explain the flow of the variables. Evaluating the findings of this study using other theoretical frameworks, such as the stakeholder theory or the institutional theory, could provide a deeper understanding of the relationships among green leadership, environmental strategy, innovation, and firm performance.

Finally, the present research targeted the textile sector in Pakistan and thus was confined to the context of developing countries. Future research can, therefore, carry out cross-sectional comparisons with other developing countries with similar conditions. Instead of daily measurements, there would be assessments of the relationships among the critical variables spread over time, enhancing the understanding of the contextual factors surrounding the relationships and thus giving more valid results.

## REFERENCES

Abbas, S., & Halog, A. (2021). Analysis of Pakistani textile industry: Recommendations towards circular and sustainable production. *Circular Economy: Assessment and Case Studies*, 77–111.

Afsharbakeshlo, Z., Omidvar, M., & Gigauri, I. (2024). Green Transformational Leadership: A Systematic Literature Review and Future Research Suggestion. *Marketing and Resource Management for Green Transitions in Economies*, 47–74.

Albloushi, B., Alharmoodi, A., Jabeen, F., Mehmood, K., & Farouk, S. (2023). Total quality management practices and corporate sustainable development in manufacturing companies: the mediating role of green innovation. *Management Research Review*, *46*(1), 20–45.

Alsharari, N. M. (2024). The interplay of strategic management accounting, business strategy and organizational change: as influenced by a configurational theory. *Journal of Accounting & Organizational Change*, *20*(1), 153–176.

Andaregie, A., & Astatkie, T. (2022). Determinants of the adoption of green manufacturing practices by medium-and large-scale manufacturing industries in northern Ethiopia. *African Journal of Science, Technology, Innovation and Development*, *14*(4), 960–975.

Awan, F. H., Dunnan, L., Jamil, K., & Gul, R. F. (2023). Stimulating environmental performance via green human resource management, green transformational leadership, and green innovation: a mediation-moderation model. *Environmental Science and Pollution Research*, *30*(2), 2958–2976.

Baah, C., Opoku-Agyeman, D., Acquah, I. S. K., Agyabeng-Mensah, Y., Afum, E., Faibil, D., & Abdoulaye, F. A. M. (2021). Examining the correlations between stakeholder pressures, green production practices, firm reputation, environmental and financial performance: Evidence from manufacturing SMEs. *Sustainable Production and Consumption*, *27*, 100–114.

Babu, S., Rathore, S. S., Singh, R., Kumar, S., Singh, V. K., Yadav, S. K., Yadav, V., Raj, R., Yadav, D., & Shekhawat, K. (2022). Exploring agricultural waste biomass for energy, food and feed production and pollution mitigation: A review. *Bioresource Technology*, *360*, 127566.

Bhatia, M. S. (2021). Green process innovation and operational performance: The role of proactive environment strategy, technological capabilities, and organizational learning. *Business Strategy and the Environment*, *30*(7), 2845–2857.

Biswas, S. R., Uddin, M. A., Bhattacharjee, S., Dey, M., & Rana, T. (2022). Ecocentric leadership and voluntary environmental behavior for promoting sustainability strategy: The role of psychological green climate. *Business Strategy and the Environment*, *31*(4), 1705–1718.

Borsboom, D., Mellenbergh, G. J., & Van Heerden, J. (2004). The concept of validity. *Psychological Review*, *111*(4), 1061.

Budur, T., & Demir, A. (2022). The relationship between transformational leadership and employee performance: Mediating effects of organizational citizenship behaviors. *Interdisciplinary Journal of Management Studies (Formerly Known as Iranian Journal of Management Studies)*, *15*(4), 899–921.

Camilleri, M. A. (2022). Strategic attributions of corporate social responsibility and environmental management: The business case for doing well by doing good! *Sustainable Development*, *30*(3), 409–422.

Cho, E., & Kim, S. (2015). Cronbach's coefficient alpha: Well known but poorly understood. *Organizational Research Methods*, *18*(2), 207–230.

Clark, L. A., & Watson, D. (2016). *Constructing validity: Basic issues in objective scale development.*

Çop, S., Olorunsola, V. O., & Alola, U. V. (2021). Achieving environmental sustainability through green transformational leadership policy: Can green team resilience help? *Business Strategy and the Environment*, *30*(1), 671–682.

Farida, I., & Setiawan, D. (2022). Business strategies and competitive advantage: the role of performance and innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, *8*(3), 163.

Fontoura, P., & Coelho, A. (2022). How to boost green innovation and performance through collaboration in the supply chain: Insights into a more sustainable economy. *Journal of Cleaner Production*, *359*, 132005.

Haris, M., Yang, Q., Khokhar, M. N., & Akram, U. (2023). Exploring the Moderating Role of COVID-19 on the Adaptive Performance and Project Success: Inching towards Energy Transition. *Sustainability*, *15*(21), 15605.

Hart, S. L. (1995). A natural-resource-based view of the firm. *Academy of Management Review*, *20*(4), 986–1014.

Helmi, W. M., & Widiastuty, E. (2023). Effect of green innovation and green process innovation on firm performance. *Jurnal Riset Akuntansi Aksioma*, *22*(1), 55–69.

Jensen, M., Potočnik, K., & Chaudhry, S. (2020). A mixed-methods study of CEO transformational leadership and firm performance. *European Management Journal*, *38*(6), 836–845.

Jirakraisiri, J., Badir, Y. F., & Frank, B. (2021). Translating green strategic intent into green process innovation performance: the role of green intellectual capital. *Journal of Intellectual Capital*, *22*(7), 43–67. https://doi.org/10.1108/JIC-08-2020-0277

Kapferer, J.-N., & Valette-Florence, P. (2021). Which consumers believe luxury must be expensive and why? A cross-cultural comparison of motivations. *Journal of Business Research*, *132*, 301–313.

Kennerley, M., & Neely, A. (2002). A framework of the factors affecting the evolution of performance measurement systems. *International Journal of Operations & Production Management*, *22*(11), 1222–1245.

Kibria, M. G., Masuk, N. I., Safayet, R., Nguyen, H. Q., & Mourshed, M. (2023). Plastic waste: challenges and opportunities to mitigate pollution and effective management. *International Journal of Environmental Research*, *17*(1), 20.

Knoppen, D., & Knight, L. (2022). Pursuing sustainability advantage: The dynamic capabilities of born sustainable firms. *Business Strategy and the Environment*, *31*(4), 1789–1813.

Kovilage, M. P. (2021). Influence of lean–green practices on organizational sustainable performance. *Journal of Asian Business and Economic Studies*, *28*(2), 121–142.

Kraus, S., Rehman, S. U., & García, F. J. S. (2020). Corporate social responsibility and environmental performance: The mediating role of environmental strategy and green innovation. *Technological Forecasting and Social Change*, *160*, 120262.

Kuo, F.-I., Fang, W.-T., & LePage, B. A. (2022). Proactive environmental strategies in the hotel industry: eco-innovation, green competitive advantage, and green core competence. *Journal of Sustainable Tourism*, *30*(6), 1240–1261.

Kurtaliqi, F., Miltgen, C. L., Viglia, G., & Pantin-Sohier, G. (2024). Using advanced mixed methods approaches: Combining PLS-SEM and qualitative studies. *Journal of Business Research*, *172*, 114464.

Kusi, M., Zhao, F., & Sukamani, D. (2021). Impact of perceived organizational support and green transformational leadership on sustainable organizational performance: a SEM approach. *Business Process Management Journal*, *27*(5), 1373–1390.

Le, T. T., Chau, T. L. Q., Ngoc, L. T. T., & Tieu, T. T. (n.d.). How green transformational leadership drives environmental performance and firm performance? Empirical evidence from an emerging economy. *Corporate Social Responsibility and Environmental Management*.

Majali, T., Alkaraki, M., Asad, M., Aladwan, N., & Aledeinat, M. (2022). Green transformational leadership, green entrepreneurial orientation and performance of SMEs: The mediating role of green product innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, *8*(4), 191.

Mukonza, C., & Swarts, I. (2020). The influence of green marketing strategies on business performance and corporate image in the retail sector. *Business Strategy and the Environment*, *29*(3), 838–845.

Owolabi, H. O., Ayandele, J. K., & Olaoye, D. D. (2020). A Systematic Review of Structural Equation Model (SEM). *Open Journal of Educational Development (ISSN: 2734-2050)*, *1*(2), 27–39.

Özgül, B., & Zehir, C. (2023). How managers' green transformational leadership affects a firm's environmental strategy, green innovation, and performance: The moderating impact of differentiation strategy. *Sustainability*, *15*(4), 3597.

Padilla-Lozano, C. P., & Collazzo, P. (2022). Corporate social responsibility, green innovation and competitiveness–causality in manufacturing. *Competitiveness Review: An International Business Journal*, *32*(7), 21–39.

Pandey, P., & Pandey, M. M. (2021). *Research methodology tools and techniques*. Bridge Center.

Prabhu, H. M., & Srivastava, A. K. (2023). CEO transformational leadership, supply chain agility and firm performance: A TISM modeling among SMEs. *Global Journal of Flexible Systems Management*, *24*(1), 51–65.

Prokop, V., Gerstlberger, W., Zapletal, D., & Striteska, M. K. (2022). The double-edged role of firm environmental behaviour in the creation of product innovation in Central and Eastern European countries. *Journal of Cleaner Production*, *331*, 129989.

Quintana-García, C., Marchante-Lara, M., & Benavides-Chicón, C. G. (2022). Towards sustainable development: Environmental innovation, cleaner production performance, and reputation. *Corporate Social Responsibility and Environmental Management*, *29*(5), 1330–1340.

Quintão, C., Andrade, P., & Almeida, F. (2020). How to improve the validity and reliability of a case study approach? *Journal of Interdisciplinary Studies in Education*, *9*(2), 264–275.

Rizvi, Y. S., & Garg, R. (2021). The simultaneous effect of green ability-motivation-opportunity and transformational leadership in environment management: the mediating role of green culture. *Benchmarking: An International Journal*, *28*(3), 830–856.

Saeidi, S. P., Othman, M. S. H., Saeidi, P., & Saeidi, S. P. (2018). The moderating role of environmental management accounting between environmental innovation and firm financial performance. *International Journal of Business Performance Management*, *19*(3), 326–348.

Saether, E. A., Eide, A. E., & Bjørgum, Ø. (2021). Sustainability among Norwegian maritime firms: Green strategy and innovation as mediators of long-term orientation and emission reduction. *Business Strategy and the Environment*, *30*(5), 2382–2395.

Sardar, S., Mohsin, M., Memon, M. S., Ramzan, B., & Sharif, R. (2022). An empirical study regarding the environmental sustainability practices in the textile industry. *Industria Textila*, *73*(4), 384–396.

Serrano-García, J., Bikfalvi, A., Llach, J., & Arbeláez-Toro, J. J. (2022). Capabilities and organisational dimensions conducive to green product innovation: Evidence from Croatian and Spanish manufacturing firms. *Business Strategy and the Environment*, *31*(7), 2767–2785.

Shahzad, M. A., Iqbal, T., Jan, N., & Zahid, M. (2022). The role of transformational leadership on firm performance: mediating effect of corporate sustainability and moderating effect of knowledge-sharing. *Frontiers in Psychology*, *13*, 883224.

Sun, X., El Askary, A., Meo, M. S., & Hussain, B. (2022). Green transformational leadership and environmental performance in small and medium enterprises. *Economic Research-Ekonomska Istraživanja*, *35*(1), 5273–5291.

Sürücü, L., & Maslakci, A. (2020). Validity and reliability in quantitative research. *Business & Management Studies: An International Journal*, *8*(3), 2694–2726.

Taherdoost, H. (2021). Data collection methods and tools for research; a step-by-step guide to choose data collection technique for academic and business research projects. *International Journal of Academic Research in Management (IJARM)*, *10*(1), 10–38.

Tang, M., Walsh, G., Lerner, D., Fitza, M. A., & Li, Q. (2018). Green innovation, managerial concern and firm performance: An empirical study. *Business Strategy and the Environment*, *27*(1), 39–51.

Thoumrungroje, A., & Racela, O. C. (2022). Innovation and performance implications of customer-orientation across different business strategy types. *Journal of Open Innovation: Technology, Market, and Complexity*, *8*(4), 178.

Tian, H., Siddik, A. B., Pertheban, T. R., & Rahman, M. N. (2023). *Journal of Innovation & Knowledge*.

Van der Voet, J., & Steijn, B. (2021). Team innovation through collaboration: How visionary leadership spurs innovation via team cohesion. *Public Management Review*, *23*(9), 1275–1294.

Vasileiou, E., Georgantzis, N., Attanasi, G., & Llerena, P. (2022). Green innovation and financial performance: A study on Italian firms. *Research Policy*, *51*(6), 104530.

Wang, J., Wang, L., & Qian, X. (2021). Revisiting firm innovation and environmental performance: New evidence from Japanese firm-level data. *Journal of Cleaner Production*, *281*, 124446.

Zhang, J., Qin, Q., Li, G., & Tseng, C.-H. (2021). Sustainable municipal waste management strategies through life cycle assessment method: A review. *Journal of Environmental Management*, *287*, 112238.

Jam, F. A., Mehmood, S., & Ahmad, Z. (2013). Time series model to forecast area of mangoes from Pakistan: An application of univariate ARIMA model. *Acad. Contemp. Res*, *2*, 10-15.

Al-khresheh, M. H. (2024). Bridging technology and pedagogy from a global lens: Teachers' perspectives on integrating ChatGPT in English language teaching. *Computers and Education: Artificial Intelligence*, *6*, 100218.https://doi.org/10.1016/j.caeai.2024.100218

Al-khresheh, M. (2021). Revisiting the effectiveness of Blackboard learning management system in teaching English in the era of COVID 19. *World Journal of English Language*, *12*(1), 1-14.https://doi.org/10.5430/wjel.v12n1p1

Nasir, A. M., & Mustapa, I. R. (2024). Building The Nigerian Corporate Governance Index (NCGI) and Intellectual Capital Disclosure Practices. *Pakistan Journal of Life and Social Sciences*, *22*(1).