



Open Access

The Impact of Green Transformational Leadership on Sustainable Performance in Pakistan's Manufacturing Sector: The Mediation Effect of Green Innovation

Aiman Butt¹ Zubair Arshad² Umair Butt³

Abstract: As the concerns about the environment grow and the need to promote sustainable practices becomes more pressing, organizations are looking increasingly to green transformational leadership as a key component in guiding their operations toward ecological responsibility. The goal of this study is to analyze the impact of green transformational leadership on sustainable performance mediated by green innovation. This is a quantitative study and uses a deductive approach. The Pakistan Securities Exchange Commission-regulated elite manufacturing sector, which employs manufacturing workers, was the subject of the study. Convenience sampling, a non-probability technique, was used to gather data from Pakistan's industrial companies. 250 people made up the study's sample, and 238 questionnaires were returned within the allotted research period. The study reveals a significant relationship between green transformational leadership, green innovation, and environmental, financial, and social performance. The study found a strong correlation between changes in green transformational leadership, predictable changes in green innovation, and improved environmental, financial, and social performance. This research is noteworthy because it shows how leadership shapes organizational strategies and behaviors, especially those related to sustainability. Understanding how green transformational leadership affects sustainable performance is crucial for researchers and managers alike as sectors struggle with the urgent need to address environmental issues.

Key Words: Green Transformational Leadership, Green Innovation, Environmental Performance, Financial Performance, Social Performance

Introduction

Nowadays, corporations place a greater emphasis on environmental challenges, which affect both the private sector and society as a whole. The increase in stakeholder expectations for sustainability and environmental protection is the cause. Consumers are seeking more environmentally conscious and sustainable products. Pakistan is placed 169th on the environmental performance Index despite being one of the countries that struggle with environmental sustainability (Niazi et al., 2023). Businesses and academics have noticed a rising tendency toward incorporating a sustainable approach into their procedures and operations (Li et al., 2020b). Various factors are fueling the current trend, such as the buyers' demand for diversity in brands, regulatory constraints, cost management, and the growing recognition of the significance of addressing environmental and social issues. To tackle the issues and protect the environment, additional steps must be performed to address environmental concerns.

Businesses are working harder than ever to promote environmentally friendly behavior and create brands that are ecologically aware. Greening business practices contribute to increased operating performance and a functioning corporate governance structure constructed on the organization's environmental leadership, expertise, and skills. (Song et al., 2020). This movement in industrial focus

¹ MS Scholar, Department of Commerce and Economics, Superior University, Lahore, Punjab, Pakistan. Email: su92-msafw-f23-010@superior.edu.pk

² Assistant Professor, Department of Commerce and Economics, Superior University, Lahore, Punjab, Pakistan. Email: zubair.arshad@superior.edu.pk

³ MS Scholar, Department of Commerce and Economics, Superior University, Lahore, Punjab, Pakistan.

▪ **Corresponding Author:** Umair Butt (buttumair440@gmail.com)

▪ **To Cite:** Butt, A., Arshad, Z., & Butt, U. (2024). The Impact of Green Transformational Leadership on Sustainable Performance in Pakistan's Manufacturing Sector: The Mediation Effect of Green Innovation. *Qlantia Journal of Social Sciences*, 5(3), 137-151. <https://doi.org/10.55737/qjss.597193536>



toward a greener strategy has been witnessed in a diversity of industries, with innovation, guidance, inspiration, and creativity being among the most significant characteristics. (Shahzad et al., 2020).

It has been emphasized that, particularly among leaders who care about the environment, the green transformational leadership style is more prevalent (Egri & Herman, 2000). A behavior pattern known as green transformational leadership inspires its adherents to perform above the standards of the environment and motivates them to accomplish their environmental goals (Chen & Chang, 2013). Green transformational leadership, which is concerned with implementing modern ways for increasing efficiency and enhancing performance while also paying attention to environmental concerns, is an important component in the organizational context of institutions (Suliman et al., 2023). Green transformational leadership has contributed to the exploration of leadership skills and competencies to advance organizational goals and consequently maximize profitability (Rhead et al., 2015).

Although scholars have emphasized the beneficial impact of company managers on environmental performance (Nushrath, 2021; Liu & Jie, 2020). Managers often fail to focus on leadership skills, ignoring the advantages that environmentally conscious operations can bring. A firm's competitive edge can be boosted by adopting NRBV-based green transformational leadership behavior, which enhances capabilities related to GPI and GPT and is a significant internal resource for corporate environmental management (Begum et al., 2022b).

Green transformational leadership promotes superior business performance, but the mediators between these two constructs are unknown, and scholars are particularly interested in this (Para-González et al., 2018). Today's organizations strive to be more pioneering in their operations and products to obtain a competitive advantage and improve the overall performance of the company, making the interest in the relationship between green transformational leadership and firm success particularly pertinent (Della Peruta et al., 2018). Green transformational leadership, according to the research, refers to a type of leadership characterized by a leader's focus on sharing a well-defined vision with employees, motivating and inspiring them, and ensuring their growth and development toward the attainment of environmental objectives (Mittal & Dhar, 2016).

In order to achieve institutional responsibilities, firms must develop innovations expressly to protect the environment during both manufacturing and commercial processes (Qu et al., 2022). In the meantime, green innovation strategies and their results give companies a lasting competitive edge and let them fulfill societal expectations (Albort-Morant et al., 2016). Green innovation techniques can greatly boost the profitability of firms, despite the fact that they are sometimes thought to be only suitable to enterprises of a large scale. In fact, the few studies that have examined small-scale companies' use of green innovation have shown that these companies are more profitable when using effective green practices than larger ones (Lin et al., 2019).

As stated by (Aguilera-Caracuel et al., 2013), green innovation has a significant role in reducing the negative consequences that enterprises have on the environment. As a result, a lot of companies are making an effort to focus on green innovation as a strategy for raising environmental consciousness (Karimi et al., 2021). Sustainable development has become an important global issue as a result of environmental concerns and resource shortages. The long-term growth of both corporate organizations and human society depends on environmental conservation (Liu et al., 2014). Achieving environmental and social performance while generating economic performance is becoming more and more crucial for businesses (El-Kassar et al., 2019). In order to address environmental problems, green innovation has been recognized as vital, as well as a successful plan for fostering a long-term competitive advantage (Xie et al., 2022; Xie et al., 2019). Additionally, it has been said that companies can increase their market share by utilizing green innovation to draw in clients and provide eco-friendly goods and services (Gürlek & Koseoglu, 2021).

The world is currently dealing with a number of environmental concerns, including climate catastrophe, conflict, and inflation. Leaders who adopt a green transformational approach can stimulate the development of fresh perspectives in their companies, demonstrating examples of promoting creativity and productivity, which ultimately contributes to enhanced organizational performance. Transformational leadership is critical for advancing innovation (Rehman et al., 2020). Previously, (Nisar et al., 2017) conducted a study in Pakistan. According to the study, green transformational leadership has a significant and positive impact on green performance. Numerous research studies have been conducted to examine

the influence of green transformational leadership on green innovation and other aspects. Previous research has focused less on the influence of green transformational leadership on environmental performance. Furthermore, it pays less attention to the role of green transformational leadership in mediating environmental, social, and financial performance. (Sun et al., [2022](#)).

Literature Review

Green Transformational Leadership and Green Innovation

Global environmental concerns call for a different kind of leadership that transcends self-interest in order to increase leadership opportunities within the organization. The most popular leadership philosophy for attaining environmental objectives is GTL (Cop et al., [2020](#)). GTL is distinct as "the behavior of leaders who motivate followers to achieve environmental goals and inspire them to perform above and beyond expected levels of EP" (Chen & Chang, [2013](#)).

In order to achieve green objectives that are advantageous to the company, human society, and the environment, GTL articulates a strong green idea and inspires staff to act sustainably (Mittal & Dhar, [2016](#)). In order to plan, communicate, and put sustainability programs into action, these leaders need broad mental perspectives and emotional dispositions. According to (García-Guiu et al., [2016](#)), they are searching for ways to invest in concepts, initiatives, and technological advancements that will reduce carbon emissions and improve the utilization of natural resources. More importantly, these leaders place a high priority on green management practices and push their teams to gather market intelligence in order to adapt to shifting market dynamics (Chen et al., [2014](#)).

Increasing environmental issues have altered organizations and communities to be more environmentally resilient. GI enables businesses to incorporate environmental aims into their business objectives. (Chen et al., [2006a](#)) defines GI as "innovation in hardware and software that is associated with eco-friendly processes or products, for insistence, energy-saving, population-prevention, waste-recycling, ecologic products or business environmental management" in their seminal work. She continues by arguing that environmentally responsible technological innovations made possible by GI offer both enduring financial advantages and a competitive advantage over competitors.

GI aids in the advancement and growth of the economy. To minimize environmental effect and maximize the use of natural resources, it entails altering products, processes, technologies, and services (Xie et al., [2020](#)). Businesses can use GI to produce things more effectively while cutting production costs and time. Particularly GI increases sales and draws in new customers eager to pay for eco-friendly goods and services, enabling the business to operate more effectively and profitably. (Ali et al., [2020](#); Ahmeda et al., [2010](#)).

H₁: GTL has a positive and significant relationship with GI.

Green Innovation and Environmental Performance

According to (Hervani et al., [2005](#)), environmental performance discusses organizational initiatives, ensuring that rules and regulations are followed in order to meet better social opportunities for the environment. Adhering to environmental laws addresses the effects that firm activities, products, and resource use have on the environment (Dubey et al., [2015](#)). According to a prior study, EP is impacted by the efficiency of eco-friendly products, the development of green processes and products, and the incorporation of environmental sustainability issues in corporate operations and the development of the product (Dubey et al., [2015](#)).

A firm's environmental management agenda is linked to GI and thus promotes EP (Kammerer, [2009](#)). Green product and process innovation likewise recover a firm's financial and Social performance by eliminating costs and waste (Weng et al., [2015](#)). According to an earlier study, GI should be seen as an organizational practice and proactive. A business can use essential organizational resources like green processes and product innovation to boost EP and win over important stakeholders (Singh et al., [2020b](#)).

The environmental impact of organizational policies, practices, and resource allocation that goes beyond the requirements of environmental legislation all have an effect on EP (Dubey et al., [2015](#)). The literature claims that the foundation of EP is the superiority of environmentally friendly products, green



processes, and product innovations, as well as the integration of aspects that are consistent with nature into organizational and operational models and the methods used to generate products (Oliva et al., 2018).

To support the EP of GIs, GI is incorporated into an organization's environmental management plan (Adegbile et al., 2017). In recent times, it has been proposed that GI can aid organizations in boosting their EP (Singh et al., 2020b). Similarly, (Kraus et al., 2020) defined green activity innovation as the use of technology to decrease waste, global warming, and the consumption of natural resources.

H2: *GI has a positive and significant influence on EP.*

Green Innovation and Social Performance

During the implementation of GI, various organizations will prioritize the three dimensions in different ways, and all of these aspects will, of course, have an effect on how well company operations go (Khurshid et al., 2016). Additionally, businesses can gain a competitive advantage in addressing environmental problems, which will raise employee retention and satisfaction, enhance collaboration with sponsors, and help build a sturdy brand image (Mehta et al., 2015).

Additionally, the incentives might raise employees' awareness of their social duty, which would help a company attract and keep talented people (Zhu et al., 2008) if an organization's Employees and customers may be happy if an organization's SP is kept at a high level (Yadegaridehkordi et al., 2020). Businesses that value the environment will put forth significant effort to reduce detrimental emissions and waste in order to avert environmental catastrophes (Rodríguez-Antón et al., 2012). In order to gain a competitive edge, many organizations have begun to take the initiative to improve organizational sustainable performance by implementing a variety of EP programs. (B. DiPietro et al., 2013).

EP programs assist organizations in lowering waste production and greenhouse gas emissions (Daily et al., 2012). Prior research has demonstrated that enhancing manufacturing procedures boosts productivity while simultaneously increasing the potential for supporting the environment and SP (Montabon et al., 2007).

(Lee et al., 2005) argue that corporate GI actively contributes to industrial EP (Lee & Min, 2015; Asadi et al., 2020). Some researchers believe that company reputation, firm size, and corporate governance all have an impact on SP (Qi et al., 2014; Aggarwal & Dow, 2012). SP is a development of corporate social responsibility that emphasizes tangible outcomes. The obligations of economic stakeholders are emphasized (Turban & Greening, 1997). Many experts claim that corporate SP is a broad concept that encompasses a variety of unique incidents (Li et al., 2020a).

The effort put forward for social responsibility relates to and includes SP. But it differs in that it is whether a social responsibility project succeeds in achieving its goals or outcomes (Wood, 1991). (Swanson, 1995) further contends that an executive's moral compass and personal beliefs and ethics have a significant impact on corporate SP. Improved FP and SP are linked to social responsibility, and GI also promotes it in the manufacturing industry (Montiel et al., 2014).

H3: *GI has a positive and significant influence on SP.*

Green Innovation and Financial Performance

A long-term transformation of the original production mode is also possible with the aid of GI (Asadi et al., 2020; Chan et al., 2016), as well as transform the original production mode in the long run (Pujari, 2006), both of which are valuable, uncommon, and challenging to duplicate in terms of their green capabilities. The resource-based view of the business argues that valuable, distinctive, and hard-to-replicate resources can help businesses function well (Barney, 1991). Overall, we argue that GI can benefit businesses by improving their FP. The literature has given great emphasis to the study of the association between GI and FP (Leyva-de la Hiz et al., 2019).

The vast majority of empirical studies have shown a favorable link between GI and FP (Leal-Rodríguez et al., 2018). The key justifications put up in this field are that GI demonstrates strong, long-term organizational capacities (Berrone et al., 2013), recovers firm legality (Wang et al., 2015), and requires a stakeholder-centered approach. (Albort-Morant et al., 2018; Singh et al., 2020b), and cuts active costs (Wong et al., 2020).

Based on our analysis of the study, we have identified four elements of FP: market expansion, profitability, cost reduction, and Tobin's Q. Cost-cutting is essential to corporate operations, profitability is concerned with net earnings, and Tobin's Q indicates investors' perceptions of a company. Market expansion, in particular, reflects consumer acceptability (Yi et al., 2021).

We think that GI can result in Diverse approaches that can lead to appreciable gains in a range of performance metrics. First, as their standing grows, businesses creating GI can grow their market share and profits by paying more attention to customer claims for eco-friendly goods and facilities. Second, GI minimizes the cost of waste disposal, raw materials, and the management of related stakeholders, including societal and environmental organizations, which results in a cost-benefit (Buysse & Verbeke, 2003). Third, businesses that engage in significant GI may see financial gains.

Profit from increased environmental and technical capabilities. Fourthly, engaging in environmental innovation shows that Tobin's Q values are elevated by enhancing a green company's reputation through environmental legitimacy. GI can be viewed as a tool for each of these things: enhancing companies' environmental abilities, decreasing costs, acquiring environmental legality, creating innovative ways to distinguish products, and gratifying the needs of various stakeholders (Yi et al., 2021).

H4: GI has a positive and significant influence on FP.

Green Innovation as Mediator

The discussion that came before examined the connection between GI, organizational performance, and green organizational culture. Green organizations and GI are encouraged to improve organizational performance. The results of earlier studies supported this. A green organizational culture, per the literature, significantly enhances organizational performance (Chandra et al., 2021). However, studies by Saputra and Tahir, Athar, Faisal, Solangi, and HR 2019 have shown a contradictory construction between green organization and organizational performance. (Chandra et al., 2021). Despite this, research by (Saputra) and (Tahir et al., 2019) has demonstrated a paradoxical association between green organizations and organizational performance.

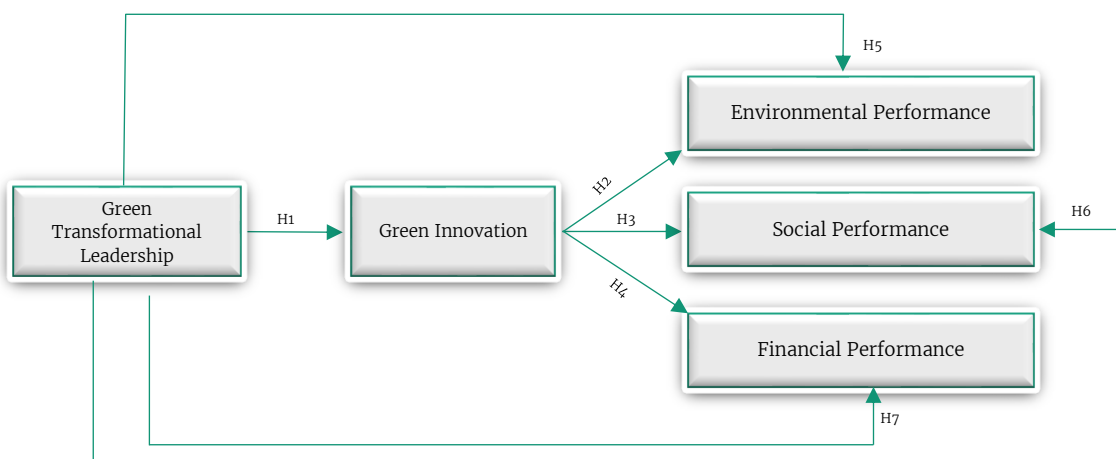
Researchers are particularly interested in the implications of environmental innovation for firm sustainability, such as FP, EP, and SP (Singh et al., 2020b; Long et al., 2017). This is consistent with the notion of sustainability as economic or financial, environmental, and SP (Asadi et al., 2020). Singh et al. calculated the economic and environmental implications of the business (Singh et al., 2020b).

As a result, A mediator variable needs to be included in the model in order to clarify the confusing association between green organization and organizational performance. GI is used in conjunction with other techniques to mediate midst organizational performance and green organization (Imran & Jingzu, 2022).

H5: GI mediates the relationship between GTL and EP.

H6: GI mediates the relationship between GTL and SP.

H7: GI mediates the relationship between GTL and FP.





Methodology

The study aims to analyze the impact of GTL on sustainable performance mediated by GI. As a result, the proper unit of investigation is the individual, who is needed to assess the degree of comprehension of GTL and GI on EP, SP, and FP. We conducted our research in Pakistan's manufacturing industry. The data we collected and analyzed was quantitative in nature. The time horizon of the study was cross-sectional in which the study was performed. The study's population consisted of manufacturing employees through a convenience sampling strategy. 250 people made up the study's sample size. 250 questionnaires were floated, of which 238 were received.

The study adopted the questions related to the variables from the previous studies. Green Transformational leadership was measured by using 6 items (Chen & Chang, 2013). GI was measured by using 8 items, of which 4 consist of Green Product Innovation by (Chen et al., 2006b) and the remaining four consist of Green Process Innovation by (Xie et al., 2015). Further, EP was measured by using 5 items (Daily et al., 2007), SP was measured by using 2 items, and FP was measured by using 5 items (Afum et al., 2023).

The data were entered into IBM SPSS for statistical analysis. Statistics were first produced on the demographic data variables to describe the sample characteristics. Each item was assessed on a scale of 1 to 5, and then it was leveled out. An ordinal scale offers a logical indication of rank and order. In brief, the study's objective was to establish the impact of GTL, GI, and demographic and attitudinal variables on EP, SP, and FP utilizing quantitative data from four validated instruments. Similarly, (Shamim et al., 2019) used the PLS-SEM and reported a response rate of 27% in their investigation. Furthermore, the PLS method was utilized, followed by the bootstrapping approach, to evaluate the measurement and structural model.

Results

Demographics Profile of the Respondents

The demographics of the respondents are detailed in this analysis. The analysis of demographic variables compares demographic variables to the study's main variables to determine whether or not there is a possible association between demographic and primary factors. The demographic analysis comprises the respondents' age, gender, qualification, and experience. According to the table, 153 men and 85 women participated in this questionnaire-based survey. According to the percentages, there were 238 responders in total, with 64.3% being male and 35.7% being female. According to the age, 63 participants were in the age group of (20-25), 101 participants belonged to the age group of (26-30), 56 participants were (31-35), 11 participants were (36-40) and 7 participants were above 40. According to the percentage, 26.5% are from the age group of (20-25). 42.4% are from the age group of (26-30), 23.5% are from the age group of (31-35), 4.6% are from the age group of (36-40) and 2.9% are from 40+. According to the qualification, 60 participants have completed their Intermediate, which represents 25.2% of the total respondents; 65 participants have done their Bachelor's and represent 27.3% of the total respondents; 67 participants have completed their Master and are 28.2% of the total respondents, whereas 46 participants have an educational background in other degrees and represent 19.3% of total respondents. As per the experience, 32 respondents have an experience of 1 year with a percentage of 19.7%, 129 respondents have 1-5 years of experience with a percentage of 30.3%, 18 respondents have an experience of 6-10 years with a percentage of 34.0%, 69 respondents have an experience of 10+ years with the percentage of 16.0%.

Table 1

Demographic Variables	Categories	Frequency	Percentage
Gender	Male	153	64.3
	Female	85	35.7
Age Group	20-25	63	26.5
	26-30	101	42.4
	31-35	56	23.5
	36-40	11	4.6
	40+	7	2.9

Demographic Variables	Categories	Frequency	Percentage
Education	Intermediate	60	25.2
	Bachelors	65	27.3
	Master	67	28.2
	Other	46	19.3
Experience	1 Year	47	19.7
	1-5 Year	72	30.3
	6-10 Year	81	34.0
	10+ Year	38	16.0

Confirmatory Factor Analysis

Following table 2 shows the results of the confirmatory factor analysis. The Cronbach's Alpha values for all the variables related to GTL, GI, EP, SP and FP are greater than 0.7 demonstrating reliability. Furthermore, the factor loadings values are greater than 0.5 laterally with AVE greater than 0.50 representing the convergent validity. Lastly, the values of CR of the variables are greater than 0.8 signifying the reliability of the data.

Table 2

Constructs	Items	Loadings	Alpha	rho_A	CR	AVE
Green Transformational Leadership	GTL1	0.834	0.884	0.891	0.911	0.631
	GTL2	0.808				
	GTL3	0.779				
	GTL4	0.788				
	GTL5	0.757				
	GTL6	0.800				
Green Innovation	GI1	0.757	0.903	0.905	0.922	0.596
	GI2	0.720				
	GI3	0.813				
	GI4	0.762				
	GI5	0.813				
	GI6	0.784				
	GI7	0.801				
	GI8	0.720				
Environmental Performance	EP1	0.807	0.851	0.978	0.881	0.599
	EP2	0.681				
	EP3	0.840				
	EP4	0.793				
	EP5	0.738				
Social Performance	SP1	0.926	0.821	0.823	0.918	0.848
	SP2	0.916				
Financial Performance	FP1	0.830	0.841	0.853	0.887	0.611
	FP2	0.789				
	FP3	0.776				
	FP4	0.805				
	FP5	0.702				

Discriminant Validity

When conducting cross-sectional research, it becomes essential to evaluate the discriminant validity to ensure that the variables are dissimilar from one another. Consequently, HTMT was used to evaluate the discriminant validity. The values of HTMT for all the variables related to GTL, GI, EP, SP and FP are less

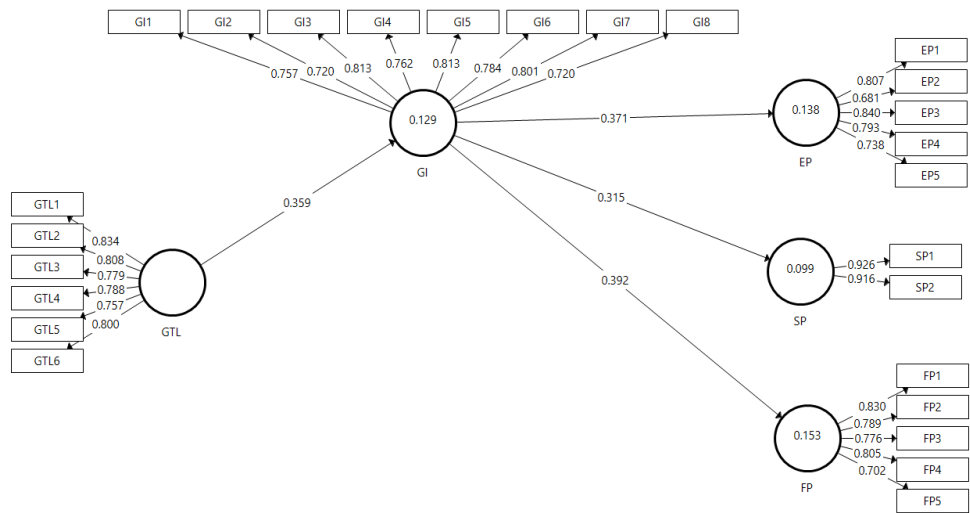


than 0.85 shows that all of the constructs are different from one another (Henseler et al., 2015). The table also reported that all of the values are less than 0.85 established the discriminant validity.

Table 3

	GTL	GI	EP	SP	FP
GTL					
GI	.359				
EP	.205	.371			
SP	.590	.315	.143		
FP	.281	.392	.435	.197	

Figure 1



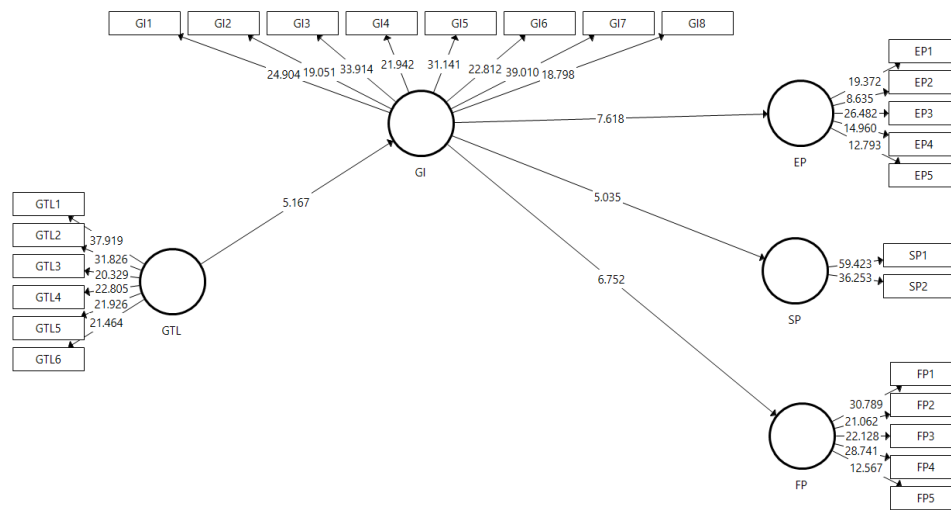
Path Coefficients

Table 4 illustrates the values for the path coefficients and explains variance and collinearity statistics. According to the findings of the study, R² for GTL regarding GI is valued at 0.129, indicating that GTL has captured the 12.9% variance in GI while it captured the 13.8%, 09.9%, and 15.3% variance in EP, SP, and FP correspondingly. Furthermore, the VIF value for variables is 1.00, demonstrating no multi-collinearity exists in the statistical data.

Additionally, the table also shows the path coefficients for the association between the variables. The results testified in Table 5 found that GTL positively influenced GI ($\beta = 0.359, t = 5.106, p = 0.000$). GI positively influenced EP, SP, and FP ($\beta = 0.371, t = 7.044, p = 0.000$), ($\beta = 0.315, t = 4.961, p = 0.000$), and ($\beta = 0.392, t = 6.771, p = 0.000$) respectively, this indicates that one unit increase in GI will increase in EP, SP, and FP. Additionally, GI mediates the relationship between GTL and Ep ($\beta = 0.141, t = 3.740, p = 0.000$), GTL and SP ($\beta = 0.113, t = 2.674, p = 0.008$), and GTL and FP ($\beta = 0.133, t = 4.702, p = 0$).

Table 4

Hypotheses	Standardized Estimates			Significance	Explained Variance	Collinearity
	β	SD	t value	p-value	R ²	VIF
GTL -> GI	0.359	0.070	5.106	0	0.129	1.000
GI -> EP	0.371	0.050	7.044	0	0.138	1.000
GI -> SP	0.315	0.064	4.961	0	0.099	1.000
GI -> FP	0.392	0.058	6.771	0	0.153	1.000
GTL -> GI -> EP	0.141	0.038	3.740	0		
GTL -> GI -> SP	0.113	0.042	2.674	0.008		
GTL -> GI -> FP	0.133	0.028	4.702	0		



Discussion

In the present-day fiercely competitive global economy, it is crucial for firms to not only achieve success and deliver value but also exhibit corporate responsibility, which encompasses environmental responsibility. As environmental concerns become increasingly globalized, businesses are adopting more eco-friendly practices to become more competitive and sustainable. By taking on a role in environmental protection, businesses can benefit their society and contribute to a greener future. The study was conducted to demystify the impact of green transformational leadership on sustainable performance: the mediation effect of green innovation. A company's ability to achieve its objectives and gain a competitive edge depends on having leaders with effective traits (Karimi & Nabavi Chashmi, 2019). It has been emphasized that, particularly among leaders who care about the environment, the GTL style is more prevalent (Egri & Herman, 2000). A behavior pattern known as GTL inspires its adherents to perform above the standards of the environment and motivates them to accomplish their environmental goals (Chen & Chang, 2013).

This study's sample was drawn from 250 manufacturing sector employees. This is a cross-sectional study that is quantitative in nature. The method utilized was deductive. The sampling strategy employed was convenient. The information was gathered through a questionnaire distributed to employees working in manufacturing industry. 7 hypotheses were generated to test the relationship between variables which were all accepted.

The study looked at the relationship between GTL and GI in the manufacturing division. The study's findings indicated that GTL significantly and favorably affects GI. The study's conclusions are consistent with those of earlier research. For instance, Begum et al. (2022a) study the function of GTL and GI in organizations through cognitive processes. Their research showed that GTL significantly and favorably affects GI. The association between GTL and GI in the manufacturing industry. The finding of the study concluded that GTL has a positive and significant effect on GI. The findings of the study are aligned with the previous studies. For instance, Singh et al. (2020a) examined the relationships in linkages amongst GTL, GI, and EP, and the studies revealed a positive and significant influence of GI between GTL and EP. Moreover, the relationship between GTL and GI in the manufacturing industry. The finding of the study concluded that GTL has a positive and significant impact on GI. The findings of the study are aligned with the previous studies. The study looked at how GI and FP interact in the manufacturing sector. According to the study's findings, GTL significantly and favorably affects FP. The study's conclusions are consistent with those of earlier research. For instance, Vasileiou et al. (2022) investigated how GI affected company performance, and the findings disclosed that GI had a favorable and significant impact on firm performance.

Further, the study looked at the connection between GTL and GI in the manufacturing sector. The study's findings indicated that GTL significantly and favorably affects GI. The study's conclusions are consistent with those of earlier research. For instance, Singh et al. (2020a) looked at the effects of green human resource management on the relationships between GTL, GI, and EP. The study revealed a



significant and beneficial influence of GI on GTL and EP. In the manufacturing business, the study looked at how GI mediated the relationship between GTL and financial success. The study's findings indicated that GTL significantly and favorably affects GI. The study's conclusions are consistent with those of earlier research. For example, Zhou et al. (2021) investigated how GTL affected the accomplishment of new green products through GI and revealed that GI positively mediated the relationship between GTL and new product green success, which in turn affected an organization's performance.

Conclusion and Limitations

Finally, this study examines how GI functions as a mediator between GTL and EP, SP, and FP. According to numerous research, innovation can enhance the performance of a firm. It is difficult to ensure an enhancement in financial, social, and environmental performance without a strong implementation of GTL and GI. As a result, human resource management should uncover the most effective method to implement GTL and GI in order to benefit the organization. Overall, the study's objectives, research question, research objective, and hypothesis have been met.

The study discovered numerous constraints when doing this investigation, such as a lack of information or a lack of time. One limitation of our study was the limited time frame, which resulted in data collection from only one site and time frame. The sample size was 250, and we received 238 responses; nonetheless, greater sample size findings would amaze us. There are additional methods for gathering statistics. Our study was cross-sectional, but the results would have been clearer if it had been a continuous study with data collected over a continuous time span. Moderating variables can be added to the model to better understand the relationship between variables. The study was carried out in manufacturing industries, but other sectors should also be considered. Furthermore, other variables can be introduced in the model as mediators, such as green employee behavior, green organizational culture, and green knowledge management, which could introduce a moderator in the model, which could be environmental values, perceived organizational support, and innovation orientation.

References

- Adegbile, A., Sarpong, D., & Meissner, D. (2017). Strategic foresight for innovation management: A review and research agenda. *International Journal of Innovation and Technology Management*, 14(04), 1750019. <https://doi.org/10.1142/s0219877017500195>
- Afum, E., Issau, K., Agyabeng-Mensah, Y., Baah, C., Dacosta, E., Essandoh, E., & Agyenim Boateng, E. (2021). undefined. *Journal of Engineering, Design and Technology*, 21(1), 167-187. <https://doi.org/10.1108/jedt-05-2021-0267>
- Aggarwal, R., & Dow, S. (2012). Corporate governance and business strategies for climate change and environmental mitigation. *The European Journal of Finance*, 18(3-4), 311-331. <https://doi.org/10.1080/1351847x.2011.579745>
- Aguilera-Caracuel, J., & Ortiz-de-Mandojana, N. (2013). Green innovation and financial performance. *Organization & Environment*, 26(4), 365-385. <https://doi.org/10.1177/1086026613507931>
- Ahmeda, U., Mozammelb, S., & Zamanc, F. (2020). Green HRM and green innovation: Can green transformational leadership moderate: Case of pharmaceutical firms in Australia. *Systematic Review in Pharmacy*, 11, 616-617. <https://d1wqtxts1xzle7.cloudfront.net/97914938>
- Albort-Morant, G., Leal-Millán, A., & Cepeda-Carrión, G. (2016). The antecedents of green innovation performance: A model of learning and capabilities. *Journal of Business Research*, 69(11), 4912-4917. <https://doi.org/10.1016/j.jbusres.2016.04.052>
- Albort-Morant, G., Leal-Rodríguez, A. L., & De Marchi, V. (2018). Absorptive capacity and relationship learning mechanisms as complementary drivers of green innovation performance. *Journal of Knowledge Management*, 22(2), 432-452. <https://doi.org/10.1108/jkm-07-2017-0310>
- Ali, F., Ashfaq, M., Begum, S., & Ali, A. (2020). How “Green” thinking and altruism translate into purchasing intentions for electronics products: The intrinsic-extrinsic motivation mechanism. *Sustainable Production and Consumption*, 24, 281-291. <https://doi.org/10.1016/j.spc.2020.07.013>

- Asadi, S., OmSalameh Pourhashemi, S., Nilashi, M., Abdullah, R., Samad, S., Yadegaridehkordi, E., Aljojo, N., & Razali, N. S. (2020). Investigating influence of green innovation on sustainability performance: A case on Malaysian hotel industry. *Journal of Cleaner Production*, 258, 120860. <https://doi.org/10.1016/j.jclepro.2020.120860>
- B. DiPietro, R., Cao, Y., & Partlow, C. (2013). Green practices in upscale foodservice operations. *International Journal of Contemporary Hospitality Management*, 25(5), 779–796. <https://doi.org/10.1108/ijchm-may-2012-0082>
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120. <https://doi.org/10.1177/014920639101700108>
- Begum, S., Ashfaq, M., Xia, E., & Awan, U. (2021). Does green transformational leadership lead to green innovation? The role of green thinking and creative process engagement. *Business Strategy and the Environment*, 31(1), 580–597. <https://doi.org/10.1002/bse.2911>
- Begum, S., Xia, E., Ali, F., Awan, U., & Ashfaq, M. (2021). Achieving green product and process innovation through green leadership and creative engagement in manufacturing. *Journal of Manufacturing Technology Management*, 33(4), 656–674. <https://doi.org/10.1108/jmtm-01-2021-0003>
- Berrone, P., Fosfuri, A., Gelabert, L., & Gomez-Mejia, L. R. (2013). Necessity as the mother of 'green' inventions: Institutional pressures and environmental innovations. *Strategic Management Journal*, 34(8), 891–909. <https://doi.org/10.1002/smj.2041>
- Buysse, K., & Verbeke, A. (2002). Proactive environmental strategies: A stakeholder management perspective. *Strategic Management Journal*, 24(5), 453–470. <https://doi.org/10.1002/smj.299>
- Chan, H. K., Yee, R. W., Dai, J., & Lim, M. K. (2016). The moderating effect of environmental dynamism on green product innovation and performance. *International Journal of Production Economics*, 181, 384–391. <https://doi.org/10.1016/j.ijpe.2015.12.006>
- Chandra, K., Arafah, W., & Basri, Y. Z. (2021). Analysis of the effect of green organizational culture on organizational performance and competitive advantages of green through green innovation in manufacturing industries. *Journal of Hunan University Natural Sciences*, 48(6), 112–121. <http://www.jonuns.com/index.php/journal/article/view/596/593>
- Chen, Y., & Chang, C. (2012). The determinants of green product development performance: Green dynamic capabilities, green transformational leadership, and green creativity. *Journal of Business Ethics*, 116(1), 107–119. <https://doi.org/10.1007/s10551-012-1452-x>
- Chen, Y., Chang, C., & Lin, Y. (2014). Green transformational leadership and green performance: The mediation effects of green mindfulness and green self-efficacy. *Sustainability*, 6(10), 6604–6621. <https://doi.org/10.3390/su6106604>
- Chen, Y., Lai, S., & Wen, C. (2006). The influence of green innovation performance on corporate advantage in Taiwan. *Journal of Business Ethics*, 67(4), 331–339. <https://doi.org/10.1007/s10551-006-9025-5>
- Cop, S., Alola, U. V., & Alola, A. A. (2020). Perceived behavioral control as a mediator of hotels' green training, environmental commitment, and organizational citizenship behavior: A sustainable environmental practice. *Business Strategy and the Environment*, 29(8), 3495–3508. <https://doi.org/10.1002/bse.2592>
- Daily, B. F., Bishop, J. W., & Massoud, J. A. (2012). The role of training and empowerment in environmental performance. *International Journal of Operations & Production Management*, 32(5), 631–647. <https://doi.org/10.1108/01443571211226524>
- Daily, B. F., Bishop, J. W., & Steiner, R. (2011). The mediating role of EMS teamwork as it pertains to HR factors and perceived environmental performance. *Journal of Applied Business Research (JABR)*, 23(1). <https://doi.org/10.19030/jabr.v23i1.1411>
- Della Peruta, M. R., Del Giudice, M., Lombardi, R., & Soto-Acosta, P. (2016). Open innovation, product development, and inter-company relationships within regional knowledge clusters. *Journal of the Knowledge Economy*, 9(2), 680–693. <https://doi.org/10.1007/s13132-016-0356-x>
- Dubey, R., Gunasekaran, A., & Samar Ali, S. (2015). Exploring the relationship between leadership, operational practices, institutional pressures and environmental performance: A framework for green supply chain. *International Journal of Production Economics*, 160, 120–132. <https://doi.org/10.1016/j.ijpe.2014.10.001>



- Egri, C. P., & Herman, S. (2000). Leadership in the North American environmental sector: Values, leadership styles, and contexts of environmental leaders and their organizations. *Academy of Management Journal*, 43(4), 571–604. <https://doi.org/10.2307/1556356>
- El-Kassar, A., & Singh, S. K. (2019). Green innovation and organizational performance: The influence of big data and the moderating role of management commitment and HR practices. *Technological Forecasting and Social Change*, 144, 483–498. <https://doi.org/10.1016/j.techfore.2017.12.016>
- García-Guiú, C., Moya, M., Molero, F., & Moriano, J. A. (2016). Transformational leadership and group potency in small military units: The mediating role of group identification and cohesion. *Revista de Psicología del Trabajo y de las Organizaciones*, 32(3), 145–152. <https://doi.org/10.1016/j.rpto.2016.06.002>
- Gürlek, M., & Koseoglu, M. A. (2021). Green innovation research in the field of hospitality and tourism: The construct, antecedents, consequences, and future outlook. *The Service Industries Journal*, 41(11–12), 734–766. <https://doi.org/10.1080/02642069.2021.1929930>
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2014). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135. <https://doi.org/10.1007/s11747-014-0403-8>
- Hervani, A. A., Helms, M. M., & Sarkis, J. (2005). Performance measurement for green supply chain management. *Benchmarking: An International Journal*, 12(4), 330–353. <https://doi.org/10.1108/14635770510609015>
- Imran, M., & Jingzu, G. (2022). Green organizational culture, organizational performance, green innovation, environmental performance: A mediation-moderation model. *Journal of Asia-Pacific Business*, 23(2), 161–182. <https://doi.org/10.1080/10599231.2022.2072493>
- Kammerer, D. (2009). The effects of customer benefit and regulation on environmental product innovation. *Ecological Economics*, 68(8–9), 2285–2295. <https://doi.org/10.1016/j.ecolecon.2009.02.016>
- Karimi Takalo, S., Sayyadi Tooranloo, H., & Shahabaldini parizi, Z. (2021). Green innovation: A systematic literature review. *Journal of Cleaner Production*, 279, 122474. <https://doi.org/10.1016/j.jclepro.2020.122474>
- Karimi, R. F., & Nabavi Chashmi, S. A. (2019). Designing green entrepreneurship model in sustainable development consistent with the performance of Tehran industrial towns. *Journal of Business-to-Business Marketing*, 26(1), 95–102. <https://doi.org/10.1080/1051712x.2019.1565143>
- Khurshid, R., & Darzi, M. A. (2016). Go green with green human resource management practices. *Clear International Journal of Research in Commerce & Management*, 7(1), 19–21.
- Kraus, S., Rehman, S. U., & García, F. J. (2020). Corporate social responsibility and environmental performance: The mediating role of environmental strategy and green innovation. *Technological Forecasting and Social Change*, 160, 120262. <https://doi.org/10.1016/j.techfore.2020.120262>
- Leal-Rodríguez, A. L., Ariza-Montes, A. J., Morales-Fernández, E., & Albort-Morant, G. (2018). Green innovation, indeed a cornerstone in linking market requests and business performance. Evidence from the Spanish automotive components industry. *Technological Forecasting and Social Change*, 129, 185–193. <https://doi.org/10.1016/j.techfore.2017.07.021>
- Lee, K., & Min, B. (2015). Green R&D for eco-innovation and its impact on carbon emissions and firm performance. *Journal of Cleaner Production*, 108, 534–542. <https://doi.org/10.1016/j.jclepro.2015.05.114>
- Lee, W., Min, W., Chun, S., Lee, Y., Park, H., Lee, D. H., Lee, Y. K., & Son, J. E. (2005). Long-term effects of green tea ingestion on atherosclerotic biological markers in smokers. *Clinical Biochemistry*, 38(1), 84–87. <https://doi.org/10.1016/j.clinbiochem.2004.09.024>
- Leyva-de la Hiz, D. I., Ferron-Vilchez, V., & Aragon-Correa, J. A. (2018). Do firms' slack resources influence the relationship between focused environmental innovations and financial performance? More is not always better. *Journal of Business Ethics*, 159(4), 1215–1227. <https://doi.org/10.1007/s10551-017-3772-3>
- Li, L., Msaad, H., Sun, H., Tan, M. X., Lu, Y., & Lau, A. K. (2020). Green innovation and business sustainability: New evidence from energy intensive industry in China. *International Journal of Environmental Research and Public Health*, 17(21), 7826. <https://doi.org/10.3390/ijerph17217826>

- Li, R., & Ramanathan, R. (2020). Can environmental investments benefit environmental performance? The moderating roles of institutional environment and foreign direct investment. *Business Strategy and the Environment*, 29(8), 3385–3398. <https://doi.org/10.1002/bse.2578>
- Lin, W., Cheah, J., Azali, M., Ho, J. A., & Yip, N. (2019). Does firm size matter? Evidence on the impact of the green innovation strategy on corporate financial performance in the automotive sector. *Journal of Cleaner Production*, 229, 974–988. <https://doi.org/10.1016/j.jclepro.2019.04.214>
- Liu, X., & Jie, X. (2019). Can manager's environmentally specific transformational leadership improve environmental performance? *Advances in Intelligent Systems and Computing*, 730–742. https://doi.org/10.1007/978-3-030-21255-1_56
- Liu, Z., Li, J., Zhu, H., Cai, Z., & Wang, L. (2012). Chinese firms' sustainable development—The role of future orientation, environmental commitment, and employee training. *Asia Pacific Journal of Management*, 31(1), 195–213. <https://doi.org/10.1007/s10490-012-9291-y>
- Long, X., Chen, Y., Du, J., Oh, K., & Han, I. (2017). Environmental innovation and its impact on economic and environmental performance: Evidence from Korean-owned firms in China. *Energy Policy*, 107, 131–137. <https://doi.org/10.1016/j.enpol.2017.04.044>
- Mehta, K., & Chugan, P. K. (2015). Green HRM in pursuit of environmentally sustainable business. *Universal Journal of Industrial and Business Management*, 3(3), 74–81. <https://doi.org/10.13189/ujibm.2015.030302>
- Mittal, S., & Dhar, R. L. (2016). Effect of green transformational leadership on green creativity: A study of tourist hotels. *Tourism Management*, 57, 118–127. <https://doi.org/10.1016/j.tourman.2016.05.007>
- Montabon, F., Sroufe, R., & Narasimhan, R. (2006). An examination of corporate reporting, environmental management practices and firm performance. *Journal of Operations Management*, 25(5), 998–1014. <https://doi.org/10.1016/j.jom.2006.10.003>
- Montiel, I., & Delgado-Ceballos, J. (2014). Defining and measuring corporate sustainability. *Organization & Environment*, 27(2), 113–139. <https://doi.org/10.1177/1086026614526413>
- Niazi, U. I., Nisar, Q. A., Nasir, N., Naz, S., Haider, S., & Khan, W. (2023). Green HRM, green innovation and environmental performance: The role of green transformational leadership and green corporate social responsibility. *Environmental Science and Pollution Research*, 30(15), 45353–45368. <https://doi.org/10.1007/s11356-023-25442-6>
- Nisar, Q. A., Zafar, A., Shoukat, M., & Ikram, M. (2017). Green transformational leadership and green performance: The mediating role of green mindfulness and green self-efficacy. *International Journal of Management Excellence*, 9(2), 1059–1066. <https://doi.org/10.17722/ijme.v9i2.916>
- Nushrath, N. F. (2021). *Green Transformational Leadership and Green Performance: The Mediation Effects of Green Mindfulness in Banking Sector in Hatton Area, Nuwara-Eliya District* [Doctoral Dissertation]. Faculty of Commerce and Management Eastern University, Sri Lanka.
- Oliva, F. L., Semensato, B. I., Prioste, D. B., Winandy, E. J., Bution, J. L., Couto, M. H., Bottacin, M. A., Mac Lennan, M. L., Teberga, P. M., Santos, R. F., Singh, S. K., Da Silva, S. F., & Massaini, S. A. (2019). Innovation in the main Brazilian business sectors: Characteristics, types and comparison of innovation. *Journal of Knowledge Management*, 23(1), 135–175. <https://doi.org/10.1108/jkm-03-2018-0159>
- Para-González, L., Jiménez-Jiménez, D., & Martínez-Lorente, A. R. (2018). Exploring the mediating effects between transformational leadership and organizational performance. *Employee Relations*, 40(2), 412–432. <https://doi.org/10.1108/er-10-2016-0190>
- Pujari, D. (2006). Eco-innovation and new product development: Understanding the influences on market performance. *Technovation*, 26(1), 76–85. <https://doi.org/10.1016/j.technovation.2004.07.006>
- Qi, G., Zeng, S., Shi, J. J., Meng, X., Lin, H., & Yang, Q. (2014). Revisiting the relationship between environmental and financial performance in Chinese industry. *Journal of Environmental Management*, 145, 349–356. <https://doi.org/10.1016/j.jenvman.2014.07.010>
- Qu, X., Khan, A., Yahya, S., Zafar, A. U., & Shahzad, M. (2021). Green core competencies to prompt green absorptive capacity and bolster green innovation: The moderating role of organization's green culture. *Journal of Environmental Planning and Management*, 65(3), 536–561. <https://doi.org/10.1080/09640568.2021.1891029>



- Rehman, S. U., Shahzad, M., Farooq, M. S., & Javaid, M. U. (2020). Impact of leadership behavior of a project manager on his/her subordinate's job-attitudes and job-outcomes. *Asia Pacific Management Review*, 25(1), 38–47. <https://doi.org/10.1016/j.apmr.2019.06.004>
- Rhead, R., Elliot, M., & Upham, P. (2015). Assessing the structure of UK environmental concern and its association with pro-environmental behaviour. *Journal of Environmental Psychology*, 43, 175–183. <https://doi.org/10.1016/j.jenvp.2015.06.002>
- Rodríguez-Antón, J. M., Del Mar Alonso-Almeida, M., Celemín, M. S., & Rubio, L. (2012). Use of different sustainability management systems in the hospitality industry. The case of Spanish hotels. *Journal of Cleaner Production*, 22(1), 76–84. <https://doi.org/10.1016/j.jclepro.2011.09.024>
- Shahzad, M., Qu, Y., Zafar, A. U., Rehman, S. U., & Islam, T. (2020). Exploring the influence of knowledge management process on corporate sustainable performance through green innovation. *Journal of Knowledge Management*, 24(9), 2079–2106. <https://doi.org/10.1108/jkm-11-2019-0624>
- Shamim, S., Zeng, J., Shariq, S. M., & Khan, Z. (2019). Role of big data management in enhancing big data decision-making capability and quality among Chinese firms: A dynamic capabilities view. *Information & Management*, 56(6), 103135. <https://doi.org/10.1016/j.im.2018.12.003>
- Singh, S. K., Giudice, M. D., Chierici, R., & Graziano, D. (2020). Green innovation and environmental performance: The role of green transformational leadership and green human resource management. *Technological Forecasting and Social Change*, 150, 119762. <https://doi.org/10.1016/j.techfore.2019.119762>
- Song, M., Yang, M. X., Zeng, K. J., & Feng, W. (2020). Green knowledge sharing, stakeholder pressure, absorptive capacity, and green innovation: Evidence from Chinese manufacturing firms. *Business Strategy and the Environment*, 29(3), 1517–1531. <https://doi.org/10.1002/bse.2450>
- Suliman, M. A., Abdou, A. H., Ibrahim, M. F., Al-Khaldy, D. A., Anas, A. M., Alrefae, W. M., & Salama, W. (2023). Impact of green transformational leadership on employees' environmental performance in the hotel industry context: Does green work engagement matter? *Sustainability*, 15(3), 2690. <https://doi.org/10.3390/su15032690>
- Sun, X., El Askary, A., Meo, M. S., Zafar, N. U., & Hussain, B. (2022). Green transformational leadership and environmental performance in small and medium enterprises. *Economic Research-Ekonomska Istraživanja*, 35(1), 5273–5291. <https://doi.org/10.1080/1331677x.2021.2025127>
- Swanson, D. L. (1995). Addressing a theoretical problem by reorienting the corporate social performance model. *Academy of Management Review*, 20(1), 43–64. <https://doi.org/10.5465/amr.1995.9503271990>
- Tahir, R., Athar, M. R., Faisal, F., Shahani, N. u., & Solangi, B. (2019). Green organizational culture: A review of literature and future research agenda. *Annals of Contemporary Developments in Management & HR*, 1(1), 23–38. <https://doi.org/10.33166/acdmhr.2019.01.004>
- Turban, D. B., & Greening, D. W. (1997). Corporate social performance and organizational attractiveness to prospective employees. *Academy of Management Journal*, 40(3), 658–672. <https://doi.org/10.5465/257057>
- Vasileiou, E., Georgantzis, N., Attanasi, G., & Llerena, P. (2022). Green innovation and financial performance: A study on Italian firms. *Research Policy*, 51(6), 104530. <https://doi.org/10.1016/j.respol.2022.104530>
- Wang, L., Cui, Z., & Liang, X. (2015). Does it pay to be green? Financial benefits of environmental labeling among Chinese firms, 2000–2005. *Management and Organization Review*, 11(3), 493–519. <https://doi.org/10.1017/mor.2014.8>
- Weng, H., Chen, J., & Chen, P. (2015). Effects of green innovation on environmental and corporate performance: A stakeholder perspective. *Sustainability*, 7(5), 4997–5026. <https://doi.org/10.3390/su7054997>
- Wong, C. W., Wong, C. Y., & Boon-itt, S. (2020). Environmental management systems, practices and outcomes: Differences in resource allocation between small and large firms. *International Journal of Production Economics*, 228, 107734. <https://doi.org/10.1016/j.ijpe.2020.107734>
- Wood, D. J. (1991). Corporate social performance revisited. *Academy of Management Review*, 16(4), 691–718. <https://doi.org/10.5465/amr.1991.4279616>

- Xie, X., & Zhu, Q. (2020). Exploring an innovative pivot: How green training can spur corporate sustainability performance. *Business Strategy and the Environment*, 29(6), 2432–2449. <https://doi.org/10.1002/bse.2512>
- Xie, X., Hoang, T. T., & Zhu, Q. (2022). Green process innovation and financial performance: The role of green social capital and customers' tacit green needs. *Journal of Innovation & Knowledge*, 7(1), 100165. <https://doi.org/10.1016/j.jik.2022.100165>
- Xie, X., Huo, J., & Zou, H. (2019). Green process innovation, green product innovation, and corporate financial performance: A content analysis method. *Journal of Business Research*, 101, 697–706. <https://doi.org/10.1016/j.jbusres.2019.01.010>
- Xie, X., Huo, J., Qi, G., & Zhu, K. X. (2016). Green process innovation and financial performance in emerging economies: Moderating effects of absorptive capacity and green subsidies. *IEEE Transactions on Engineering Management*, 63(1), 101–112. <https://doi.org/10.1109/tem.2015.2507585>
- Yadegaridehkordi, E., Hourmand, M., Nilashi, M., Alsolami, E., Samad, S., Mahmoud, M., Alarood, A. A., Zainol, A., Majeed, H. D., & Shuib, L. (2020). Assessment of sustainability indicators for green building manufacturing using fuzzy multi-criteria decision making approach. *Journal of Cleaner Production*, 277, 122905. <https://doi.org/10.1016/j.jclepro.2020.122905>
- Yi, Y., Zeng, S., Chen, H., & Shi, J. J. (2023). When does it pay to be good? A meta-analysis of the relationship between green innovation and financial performance. *IEEE Transactions on Engineering Management*, 70(9), 3260–3270. <https://doi.org/10.1109/tem.2021.3079098>
- Zhou, J., Sawyer, L., & Safi, A. (2021). Institutional pressure and green product success: The role of green transformational leadership, green innovation, and green brand image. *Frontiers in Psychology*, 12. <https://doi.org/10.3389/fpsyg.2021.704855>
- Zhu, Q., Sarkis, J., & Lai, K. (2008). Confirmation of a measurement model for green supply chain management practices implementation. *International Journal of Production Economics*, 111(2), 261–273. <https://doi.org/10.1016/j.ijpe.2006.11.029>