

Linking Green Human Resource Management, Green Innovation and Environmental Performance to Sustainable Business Performance: Evidence from Pakistan

Fahad Zain*, Muhammad Rizwan Ali†, Muhammad Zaigham Abbas‡

Abstract

This study examines the impact of green human resource management (GHRM) and green innovation (GI) on sustainable business performance (SBP) with the mediation of environmental performance (EP). For this quantitative study, data were gathered from managers of manufacturing firms in Punjab, Pakistan. A purposive sampling technique was used to collect primary data. Three hundred forty-one (341) respondents were analyzed using SPSS and smartPLS. The measurement and structural models were carried out with smartPLS, while descriptive statistics and correlation were analyzed with SPSS. Results indicate a positive and significant impact of GHRM and GI on EP and SBP. EP has a direct and positive effect on SBP. Moreover, EP mediates between GHRM and SBP, GI and SBP. It contributes to the existing body of knowledge by illuminating the connections among GHRM, GI, EP, and SBP in terms of natural RBV theory. It also demonstrates how GHRM, GI, and EP are essential within manufacturing companies to achieve SBP. To accomplish SBP, manufacturing business management must analyze their environmental performance using GHRM and GI.

Keywords: green humane resource management, green innovation, environmental performance, sustainable business performance.

Introduction

Several years ago, researchers, policymakers and business owners paid little consideration to the environment because they believed that firms had a little environmental impact. Now, environmental deterioration has become a global issue. However, today's policymakers and academics agree that the reasons of ecological degradation are pollution and the use of unsafe materials etc. (Kraus, Rehman, & García, 2020). Economic growth with environmental awareness is becoming increasingly important (Hernández et al., 2020). The competitive climate has changed business patterns swiftly all over the world. Now, earn profit and obtain a

* M.Phil. scholar, Department of Business Administration, Ghazi University, Dera Ghazi Khan Email: fahadzain90@gmail.com

† PhD scholar, Department of Zoology, Ghazi University, Dera Ghazi Khan Email: rizwanali7212@gmail.com

‡ PhD scholar, Department of Sociology, University of Sindh, Sindh Email: zaighamabbasdkg@gmail.com

competitive advantage is not enough; it requires to account for environmental repercussions (Kraus, Rehman, & García, 2020). Stakeholders put much pressure on firms to make ecofriendly production activities (Yu et al., 2017). Because of the numerous environmental concerns highlighted, businesses must focus on environmental protection activities. Industrialists and academics are increasingly motivated by "green" issues (Kraus, Rehman, & García, 2020). From an academic standpoint, researchers are gradually shifting focus to green HRM (GHRM) (Singh et al., 2020), green innovation (GI) (Singh et al., 2020; Zhang et al., 2020), environmental performance (EP) (Adegbile et al., 2017; Asadi et al., 2020; Ferreira et al., 2020; Zhao & Huang, 2022). Techniques of GHRM aim to lessen businesses' environmental effects (Singh et al., 2020; Suba et al., 2021) lead to sustainable business performance (SBP). Green innovation is a strong indicator of firm performance (Qiu et al., 2020). Moreover, research has shown GI is critical to ensuring long-term performance (Zhao & Huang, 2022). The environmental strategy has been the focus of industrial practitioners and academics (Zhou et al., 2019). Foustieris et al. (2018) said environmental strategy (novel preventative procedures, eco-friendly practices etc.) is connected to success. Manufacturing companies pollute the planet and endanger life (Kraus, Rehman, & García, 2020).

Organizations negatively influenced due to deterioration of the environment (Kraus, Rehman, García, et al., 2020). Stakeholder is sensitive regarding society and environment, creating performance issues which are facing organizations (Wang, 2019). Researchers are focusing on green aspects (Takalo & Tooranloo, 2021). So, there is need of time to achieve sustainability. The study was motivated by the fact that researchers need to pay more attention to GHRM and GI in determining SBP, EP as mediator in Pakistani manufacturing firms. As a result, this research aims to fill that void. CSR-Performance relationship examined by "Stakeholder theory" (Hernández et al., 2020), GI-EP relationship examined by "ability motivation-opportunity theory" (Singh et al., 2020). The "natural resource-based view" (RBV) philosophy found that environment and GI are critical in determining long-term performance (Hart, 1995). This study determining the interrelationship among GHRM, GI, EP, and SBP in light of natural RBV theory which is advancement of "RBV theory" (Hart, 1995). Scholars can practice "natural RBV theory" to assess performance of organizations by aiming environment (Menguc & Ozanne, 2005). Managers can use GHRM and GI to improve the EP and SBP of Pakistani manufacturing firms.

Literature Review

Sustainable Business Performance

A company can attain sustainable performance only when its functions, processes, or operations are eco-friendly. Business transactions must be carried out to foster relationships with stakeholders (Zhao & Huang, 2022). A company which is sustainable, make policies which maximize business profits while preserving the environment's quality and society's welfare (Ng & Rezaee, 2020). Green Innovation affects both the hotels' economic and environmental performance (Asadi et al., 2020). A research showed that green transformational leadership (GTL) directly and significantly impact long-term business performance, same impact noted by human resource management and green innovation (Zhao & Huang, 2022). According to the study, perceived organizational support moderates the relationship of GTL, GI, HRM and sustainable business performance. Researchers and practitioners are focusing on sustainability in business (Zhao & Huang, 2022).

Green Human Resource Management

Employees become able to demonstrate behaviors to remain competitive and deliver excellent performance due to GHRM (Boxall & Steeneveld, 1999). GHRM refers to HRM practices that reduce businesses' environmental impact (Singh et al., 2020; Suba et al., 2021). It is associated with sustainability and employee behaviors (Singh et al., 2020). Practicing GHRM leads to corporate environmental management activities focusing on environmental management (Masri & Jaaron, 2017). GHRM emphasizes environmental protection and encourages top management to focus on institutional practices encouraging employees to reduce workplace pollution (Oh et al., 2016).

Green Innovation

Chen et al. (2017) believed Innovation is the reorganization of elements seen in business operations as changes in goods, manufacturing processes, resources, and organizational management structure. Green innovation defined as all inventions are integrated refers to production that reduce resource consumption (Abbas & Sağsan, 2019). In recent decades, academics have become increasingly interested in going green. The study is divided into two parts: green innovation technique and process, which includes innovativeness, innovative green products, green manufacturing ecosystems, and green innovation channels (Song & Yu, 2018). Abdullah et al. (2016) have studied manufacturing company's barriers regarding ecofriendly innovation in Malaysia. Focusing on sustainability, a study focused on different types of innovation for enhancing performance (García-Granero et al., 2018). A study examined green innovation capacity

by examining green industrial revolution outputs and inputs (Li et al., 2019).

Green Human Resource Management and Sustainable Business Performance

Green HRM evaluated to see whether or not they may motivate businesses to embrace eco-friendly business strategies. This research used resource-based perspective theory on Malaysian manufacturing firms to assess GHRM practices on company sustainability. Moreover, training equips employees to solve environmental issues and enhances the corporate operations to sustainability (Yong et al., 2020). Paulet et al. (2021) examined how important it is to change HRM practices from a green point of view to make businesses more sustainable. The investigation showed that the company could succeed long-term with green HRM techniques like green hiring, performance management, training, and rewards. Green HRM enables a firm to increase the sustainability of its firm performance by creating a green consciousness and skill set among the employees responsible for operating the company's operations (Bose & Gupta, 2017).

Green Innovation and Sustainable Business Performance

Environmentally friendly innovation and sustainable company success is examined in the research. The research suggests that companies establish policies and plans to introduce technological innovation to current environmental needs. The companies can establish consistency in their operations and sustain their commercial success (Fernando et al., 2019). The innovation in building business sustainability, this study suggests the advancement of ability in employees and technology allow the company to become eco-friendly and have financial success (Song et al., 2019). Ullah et al. (2022) found that focus on utilize resources in green perspectives because they help to obtain sustainability in businesses. They discovered that sustainable business performance is achieved by adding value to or implementing something entirely new in business operations such as operations and marketing techniques in green perspectives.

Environmental Performance Mediates between Green Human Resource Management, Green Innovation and Sustainable Business Performance

GI significantly encourages management (Adegbile et al., 2017). Additionally, improve ecology and enhance performance in many aspects (Weng et al., 2015). The performance of exports is also significantly improved by technological innovation (Edeh et al., 2020). According to Ferreira et al. (2020), technological transfers occasionally harm ecology. According to Chiou et al. (2011), green managerial innovation has no

effect, while green innovation impacts environmental performance. As a result, there is still room for research on GI and EP. The quality of products and environmental issues into business operations all affect environmental performance (Singh et al., 2019). GI supports environmental management and performance (Adegbile et al., 2017). GHRM refers to HRM methods that decrease companies' and society's environmental effect (Singh et al., 2020). Additionally, by reducing waste and costs, green innovation reduces negative ecological footprint, enhances its performance (Weng et al., 2015). Moreover, the firm uses green innovation to accomplish its environmental objectives (Singh & El-Kassar, 2019).

Green product and process innovation decreases waste, expenses, and the business's ecological effects, improving performance (Del Giudice et al., 2019; Weng et al., 2015). Production efficiency doesn't harm environment is not considered environmental performance. Experts worldwide agree that environmental performance assessment is the best way to gauge sustainability (Halkos & Tzeremes, 2013; Jawahar et al., 2017). "The natural resource-based view theory" states that business strategies are vital to sustained success, but the RBV theory does not. For sustainable performance, practitioners and academics recommend focusing on environmental methods (Kraus, Rehman, García, et al., 2020). RBV and institutional theory were used to analyze environmental performance mediating role between financial performance and green supply chain management (Ma et al., 2022). Using the natural RBV theory and concentrating on environmental, researchers may evaluate the performance of firms (Menguc & Ozanne, 2005). Based on above literature, following hypotheses are proposed.

H1: GHRM has positive and significant impact on SBP

H2: GI has positive and significant effect on SBP

H3: GHRM has positive and significant effect on EP

H4: GI has positive and significant effect on EP

H5: EP has positive and significant effect on SBP

H6: EP mediates between the relationship of GHRM and SBP

H7: EP mediates between the relationship of GI and SBP

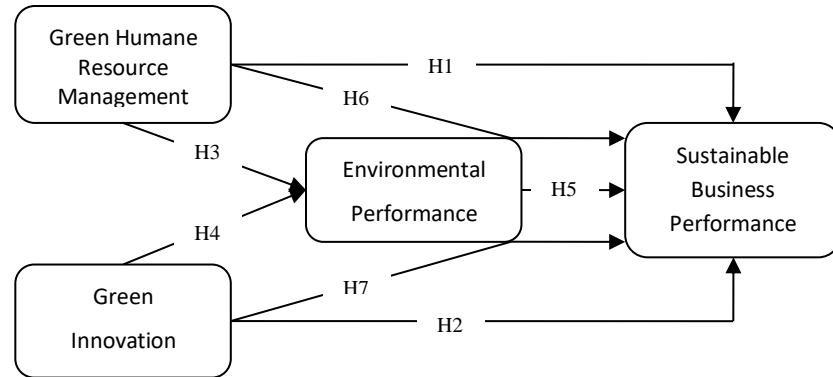


Figure 1: Framework

Methodology

Sample and Data Collection

The study is quantitative, and the managers actively engaged in implementing green practices were surveyed to collect primary data. Manufacturing firms (Industries: Food and beverages, Textile, Rubber Products, and Iron & Steel Products) in Punjab, Pakistan provided the information. Purposive sampling was used in a quantitative study to gather primary data (Zhao & Huang, 2022). Non-probability sampling is useful when randomization is problematic, such as when the population is large. It may aid researchers with scarce resources and expertise (Nechval et al., 2016). A sample was obtained via the use of purposive sampling, and cross-sectional information was gathered through a self-administered questionnaire and email. The instrument's content validity was established by field experts. A pilot research was done, and 50 respondents received the survey to offer input to guarantee its clarity. The questionnaires did not need to be changed at all. All respondents were informed about study objectives before being asked to complete the questionnaire. Once they agreed, the next step was to fill out a questionnaire. Five hundred (500) questionnaires were distributed and three hundred forty-one (341) useful questionnaires (68.2% response rate) were received and used to test the hypotheses. PLS-SEM and the SPSS were used to analyze the data.

Measurement

The measurement instruments for the underlying constructs were all derived from earlier studies. They were all multiple-item measures. There were two sections to the questionnaire. There were inquiries about demographic data in Section "A." There are inquiries about the study's variables in Section "B." A "5- Point Likert scale" is used; research employs four variables with a total of 18 items. Six items measured

GHRM, four items were used to measure GI, three items measured environmental performance and five items make up the Sustainable Business Performance (SBP) measurement.

Table 1

Data Collection Instruments

Sr.	Variables	Items	Source	Scale
1	GHRM	6	(Dumont et al., 2017)	5- Point LS
2	GI	4	(Singh et al., 2020)	5-Point LS
3	EP	3	(Chen et al., 2015; Kuo & Chen, 2016)	5-Point LS
4	SBP	5	(Singh et al., 2020)	5-Point LS

Results and Discussion

Table 2 provides respondents' demographic information, revealing that most respondents (86.22%) were male. The educational backgrounds of the respondents ranged from matriculation to Ph.D., with the majority (34.31%) holding a bachelor's degree. Most managers have 6-10 years of experience, with 24.05% having 11-15 years. Descriptive statistics and correlation analyses were performed using SPSS. SBP, GHRM, GI, and EP had mean values of 4.264, 4.327, 4.357, and 4.389, respectively. Correlation exposed the association among the constructs, outcome show a moderate correlation between the constructs (Morgan et al., 2004).

Table 2

Demographic Information

Question	Detail	Frequency	Percent
Gender	Male	294	86.22%
	Female	47	13.78%
Age in years	28-37	218	63.92%
	38-47	96	28.15%
	48 or above	27	7.92%
Level of Education	Matriculation	34	9.97%
	Intermediate	97	28.45%
	Bachelor	117	34.31%
	MS/M.Phil.	85	24.93%
	Ph.D.	8	2.35%

Experience in years	0-5	73	21.41%
	6-10	165	48.39%
	11-15	82	24.05%
	16-above	21	6.16%

Table3
Descriptive statistics and correlation analysis

Construct	Mean	Std. Deviation	SBP	GHRM	GI	EP
SBP	4.264	0.824	1			
GHRM	4.327	0.695	0.442**	1		
GI	4.357	0.706	0.467**	0.464**	1	
EP	4.389	0.609	0.509**	0.591**	0.544**	1

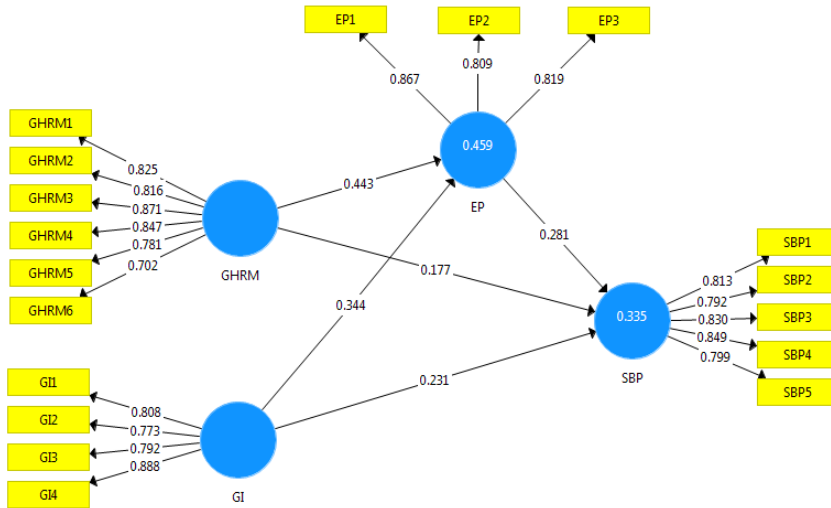


Figure 2: Measurement model

The hypotheses formulated in the preceding section are checked using PLS-SEM. This approach is more appropriate for complex models(Hair Jr et al., 2014). For evaluating mediation, PLS-SEM is thought to perform estimations more effectively (Sarstedt et al., 2020). the PLS-SEM method accurately estimates the mediation influence and permits accounting for measurement error (Chin, 1998).There are outer and inner models in PLS-SEM. Table 4 demonstrates that the factor loading ranges from 0.702 to 0.888 are acceptable value(Hair Jr et al.,

2014). Researchers can keep an item if the factor loading is between 0.40 to 0.50 and does not affect the composite reliability (CR). (Hair Jr et al., 2014) recommend CR values higher than 0.60. CR value between 0.6 and 0.70 is considered acceptable, between 0.7 and 0.90 is considered satisfactory to good, and above 0.95 is considered not acceptable (Diamantopoulos et al., 2012; Drolet & Morrison, 2001). Average variance extracted (AVE) is between 0.654 to 0.693, exceeds 0.50 (Hair Jr et al., 2014). The R^2 statistic explains how exogenous factors affect endogenous variables (Falk & Miller, 1992) suggest R^2 values greater than 0.10. Cohen (1988) categorized endogenous latent variable R^2 values as big (0.26), moderate (0.13), and small (0.02). The R^2 value of EP is 0.45; hence all independent variables (GHRM and GI) represent 45.9% of EP variation. The R^2 value for SBP is 0.335, which indicates that GHRM, GI, and EP account for 33.5% of the variation in SBP.

Table 4
Construct Reliability and Validity

Construct	Items	Loadings	VIF	α	CR	AVE	R^2
EP	EP1	0.867	1.73	0.77	0.87	0.69	0.45
	EP2	0.809	1.55				
	EP3	0.819	1.58				
GHRM	GHRM1	0.825	2.23	0.89	0.91	0.65	
	GHRM2	0.816	2.16				
	GHRM3	0.871	2.60				
	GHRM4	0.847	2.44				
	GHRM5	0.781	1.89				
	GHRM6	0.702	1.61				
GI	GI1	0.808	1.80	0.83	0.88	0.66	
	GI2	0.773	1.59				
	GI3	0.792	1.75				
	GI4	0.888	2.36				
SBP	SBP1	0.813	1.91	0.87	0.90	0.66	0.33
	SBP2	0.792	1.96				
	SBP3	0.830	2.22				
	SBP4	0.849	2.25				
	SBP5	0.799	1.78				

According to Rehman et al. (2019), discriminant validity develops when two variables must not be statistically identical. Fornell and Larcker (1981) proposed two methods for calculating discriminant validity using a traditional metric. First, compare the AVE square root value to the correlation values. Second, contrast the AVE value with the square correlation value. Researchers developed a novel discriminant validity approach “Heterotrait-monotrait ratio (HTMT)” years before(Henseler et al., 2015).The Fornell and Larcker (Diagonal and lower diagonal elements) and HTMT tests (upper diagonal part) were used to establish discriminant validity (see Table 5) between variables. Henseler et al. (2015) recommend HTMT thresholds under 0.85. The "variance inflation factor (VIF)” (see table 4) must be below 5(Hair Jr et al., 2014).

Table 5
Fornell and Larker Criterion and HTMT

Construct	EP	GHRM	GI	SBP
EP	0.832	0.713	0.680	0.617
GHRM	0.607	0.809	0.542	0.504
GI	0.555	0.478	0.817	0.547
SBP	0.516	0.458	0.471	0.817

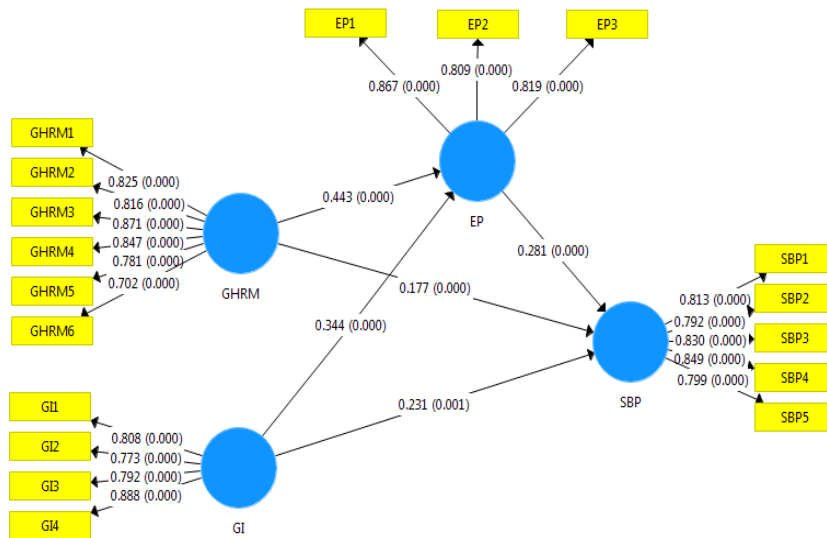


Figure 3: Structural model

This study examines the interrelationship among GHRM, GI, EP, and SBP. The structural model is performed in this section. In order to verify the hypotheses; result evaluates SBP significantly affected by

GHRM. H₁ was accepted ($\beta=0.301, t=4.365, p=0.000$). This fact is accurate (Paulet et al., 2021; Yong et al., 2020). H₂ evaluates SBP significantly affected by GI. H₂ was accepted ($\beta=0.327, t=4.755, p=0.000$). The results are comparable with (Fernando et al., 2019; Ullah et al., 2022). H₃ was accepted because the results demonstrated that GHRM influences EP significantly and positively ($\beta=0.443, t=6.186, p=0.000$). Several researchers found similar outcomes (Gilal et al., 2019; Yusoff et al., 2020). H₄ investigates whether GI positively and significantly affect EP. H₄ was accepted because the results demonstrated that GI influences EP ($\beta =0.344, t=4.542, p=0.000$). The study yields comparable results to study by (Adegbile et al., 2017; Singh & El-Kassar, 2019). H₅ evaluates EP significantly and favorably influences SBP ($\beta =0.281, t=3.794, p=0.000$); thus, H₅ was accepted ($=0.281, t=3.794, p=0.000$). The results corresponded to those of a study by (Escrig-Olmedo et al., 2017; King & Lenox, 2001).

Table 6
Total effects

Construct	β	SD	T-Value	P-Value	BI	
					2.50%	97.50%
GHRM -> SBP	0.30	0.069	4.365	***	0.161	0.434
GI -> SBP	0.33	0.069	4.755	***	0.197	0.463
GHRM -> EP	0.44	0.072	6.186	***	0.303	0.582
GI -> EP	0.34	0.076	4.542	***	0.197	0.495
EP -> SBP	0.28	0.074	3.794	***	0.139	0.422

Note: BI, bias corrected confidence interval.

Mediation analysis was performed to evaluate whether EP mediates between GHRM and SBP. The total effect of GHRM on SBP is substantial. The direct impact of GHRM on SBP is significant when EP is considered a mediator. The specific indirect impact of GHRM on SBP through EP is also significant. H₆ was approved because EP partially mediates between GHRM and SBP. A study done in Jordan, environmental performance mediates between export performance and green supply chain management (Al-Ghwayeen & Abdallah, 2018). A manufacturing sector research indicated GHRM and EP mediated by GI (Aftab et al., 2022). EP negatively impacted financial success in the Czech Republic, although it has long-term benefits (Horváthová, 2012). A second mediation was conducted to determine whether or not EP mediates between GI and SBP. The total effect of GI on SBP is substantial. The direct impact of GI

on SBP is significant when taking into account EP as a mediator. It is also important to note that the specific indirect effect of GHRM on SBP through EP is also significant. EP partly mediates the connection between GHRM and SBP, which supported H₇. Table 7 provides the results of all mediation analyses. A Study on hotel and IPPC law sector showed early investments in proactive environmental initiatives impact corporate and environmental performance. Also, the competitive edge mediates between financial and environmental performance(López-Gamero et al., 2009). A study found that environmental and business performance is negatively correlated (Imran & Jingzu, 2022).

Table 7
Mediation analysis

H	Total effect			Direct effect			Indirect effect		
	β	T	P	β	T	P	β	T	P
H6	0.30	4.36	0	0.17	3.72	0.000	0.12	3.05	0.002
H7	0.32	4.75	0	0.23	3.41	0.001	0.09	3.29	0.001

Note: H, hypothesis; β , coefficient; T, t-value; P, p-value.

Predictive Relevance and Effect Size

Calculating (*f*²) “the effect size” in a structural model is something that a minority of researchers recommend (Henseler et al., 2009). *f*² values (see Table 8) “0.02, 0.15, and 0.35” imply minor, medium, and high impact sizes(Cohen, 1998). *f*² values can be used to determine whether an exogenous construct significantly influences an endogenous construct (Götz et al., 2009). Few authors propose an alternate way for measuring the predictive relevance of the PLS-SEM to determine Q² (Geisser, 1974; Stone, 1974). The blindfolding process utilized in the calculation of Q² by SmartPLS 3.2.9. Q² (see Table 9) must be greater than 0 (Chin, 1998). Although the predictive relevance of the SBP is 0.267, the effect size of the EP is 0.428. As a consequence of this, the framework of this investigation is capable of providing predictive relevance.

Table 8
Effect size of the model (*f*²)

Construct	EP	GHRM	GI	SBP
EP				0.064
GHRM	0.280			0.028
GI	0.169			0.053
SBP				

Table 9Predictive Relevance (Q²)

Construct	Q ² _predict
EP	0.428
SBP	0.267

Conclusion

This study intends to examine the connections among GHRM, GI, and SBP in Pakistan and EP's role as a mediator in these connections. GHRM & GI are independent; EP is mediating while SBP is a dependent variable. The participants in the study were managers from different manufacturing companies. This information comes from the responses of 341 managers and is then statistically analyzed. SPSS was used to carry out analyses of correlation as well as descriptive statistics. Results of smartPLS showed that every construct in the measurement model is reliable and valid. PLS was operated to check the hypotheses. According to findings, GHRM and GI impact both EP and SBP. Furthermore, EP has a significant and direct impact on SBP. Additionally, the research demonstrated that EP partially mediates the connection between GI and SBP. In addition, it discovers that EP acts as a partial mediator between GHRM and SBP.

Theoretical implications

These results provide fresh insights essential for increasing an organization's value. Our study offers practitioners and policymakers a unique perspective and original insights because it is based on empirical data and pertains to GHRM, GI, EP, and SBP. It examines the interaction between GHRM, GI, SBP, and EP as mediator. The study contributes significantly by shedding light on the connections among GHRM, GI, EP, and SBP in concepts of the natural RBV theory. This study expanded SBP knowledge by investigating how GHRM, GI, and EP reached their SBP manufacturing sector conclusions. This study also demonstrates how GHRM, GI, and EP are important within manufacturing companies to achieve SBP.

Managerial implications

The research has important outcomes for those in positions of managerial responsibility and business professionals. Our research framework aims to provide manufacturing companies with guidance regarding GHRM and GI's impact on SBP, accomplished through the mediation of EP. Managers and policymakers can utilize this research to lessen the amount of waste produced, pollution, air emissions, water and

energy waste, and the consumption of nonrenewable resources. Because of this, environmental performance will improve the performance of sustainable businesses. According to the findings, GHRM and GI directly affect the EP and the SBP; EP mediates the relationship between GHRM, GI, and SBP. Therefore, manufacturing company managers may evaluate their organizations' environmental performance using GHRM and GI to achieve SBP. The GHRM, GI, and EP metrics must be used to measure SBP by managers and policymakers.

Limitations and recommendations

Similar to other studies, this one has shortcomings that researchers can improve in the future. Due to the fact that the researchers used a cross-sectional methodology, they need to determine whether or not GHRM, GI, and EP in other Pakistani manufacturing firms produce the same results. Future researchers may employ the same framework to determine if results change over time or if they remain the same. Because Pakistani manufacturing firms targeted for data, subsequent researchers can use this method to collect data from various sectors (automobiles, fertilizers, chemical, and optical products, etc.) to investigate how the findings vary depending on the industry. Within the confines of this framework, green organizational culture and transformational leadership can serve as a "mediating construct," which will assist researchers in determining their impact. Since this study did not use any moderating variables, future researchers may use the green absorptive capacity. In the future, research can use other sampling techniques to collect data. In conclusion, research was carried out in Pakistan, a country with a unique culture. In the future, researchers can examine this framework in other nations. Researchers can do comparative studies in the future.

References

- Abbas, J., & Sağsan, M. (2019). Impact of knowledge management practices on green innovation and corporate sustainable development: A structural analysis. *Journal of cleaner production*, 229, 611-620.
- Abdullah, M., Zailani, S., Iranmanesh, M., & Jayaraman, K. J. R. o. M. S. (2016). Barriers to green innovation initiatives among manufacturers: the Malaysian case. *10*, 683-709.
- 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.
- Aftab, J., Abid, N., Cucari, N., Savastano, M. J. B. S., & Environment, t. (2022). Green human resource management and environmental

- performance: The role of green innovation and environmental strategy in a developing country.
- Al-Ghwayeen, W. S., & Abdallah, A. B. J. J. o. M. T. M. (2018). Green supply chain management and export performance: The mediating role of environmental performance.
- Asadi, S., Pourhashemi, S. O., Nilashi, M., Abdullah, R., Samad, S., Yadegaridehkordi, E., . . . Razali, N. S. (2020). Investigating influence of green innovation on sustainability performance: A case on Malaysian hotel industry. *Journal of cleaner production*, 258, 120860.
- Bose, I., & Gupta, V. (2017). Green HRM practices in private health care & banking sectors in India. *Indian Journal of Industrial Relations*, 53(1), 48-58.
- Boxall, P., & Steeneveld, M. (1999). Human resource strategy and competitive advantage: A longitudinal study of engineering consultancies. *Journal of Management studies*, 36(4), 443-463.
- Chen, J., Cheng, J., & Dai, S. (2017). Regional eco-innovation in China: An analysis of eco-innovation levels and influencing factors. *Journal of cleaner production*, 153, 1-14.
- Chen, Y., Tang, G., Jin, J., Li, J., & Paillé, P. (2015). Linking market orientation and environmental performance: The influence of environmental strategy, employee's environmental involvement, and environmental product quality. *Journal of Business Ethics*, 127, 479-500.
- Chin, W. W. (1998). Commentary: Issues and opinion on structural equation modeling. In (pp. vii-xvi): JSTOR.
- Chiou, T.-Y., Chan, H. K., Lettice, F., & Chung, S. H. (2011). The influence of greening the suppliers and green innovation on environmental performance and competitive advantage in Taiwan. *Transportation Research Part E: Logistics and Transportation Review*, 47(6), 822-836.
- Cohen, J. (1988). Statistical power analysis for the behavioral sciences. Abingdon. *England: Routledge*.
- Cohen, J. (1998). Statistical power analysis for the behavioural sciences, xxi. *Hillsdale, NJ: L Erlbaum Associates*.
- Del Giudice, M., Scuotto, V., Garcia-Perez, A., & Petruzzelli, A. M. (2019). Shifting Wealth II in Chinese economy. The effect of the horizontal technology spillover for SMEs for international growth. *Technological Forecasting and Social Change*, 145, 307-316.
- Diamantopoulos, A., Sarstedt, M., Fuchs, C., Wilczynski, P., & Kaiser, S. J. J. o. t. A. o. M. S. (2012). Guidelines for choosing between

- multi-item and single-item scales for construct measurement: a predictive validity perspective. *40*, 434-449.
- Drolet, A. L., & Morrison, D. G. J. J. o. s. r. (2001). Do we really need multiple-item measures in service research? , *3*(3), 196-204.
- Dumont, J., Shen, J., & Deng, X. (2017). Effects of green HRM practices on employee workplace green behavior: The role of psychological green climate and employee green values. *Human resource management*, *56*(4), 613-627.
- Edeh, J. N., Obodoechi, D. N., & Ramos-Hidalgo, E. (2020). Effects of innovation strategies on export performance: New empirical evidence from developing market firms. *Technological Forecasting and Social Change*, *158*, 120167.
- Escrig-Olmedo, E., Muñoz-Torres, M. J., Fernández-Izquierdo, M. Á., & Rivera-Lirio, J. M. (2017). Measuring corporate environmental performance: A methodology for sustainable development. *Business Strategy and the Environment*, *26*(2), 142-162.
- Falk, R. F., & Miller, N. B. (1992). *A primer for soft modeling*: University of Akron Press.
- Fernando, Y., Jabbour, C. J. C., & Wah, W.-X. (2019). Pursuing green growth in technology firms through the connections between environmental innovation and sustainable business performance: does service capability matter? *Resources, Conservation and Recycling*, *141*, 8-20.
- Ferreira, J. J., Fernandes, C. I., & Ferreira, F. A. (2020). Technology transfer, climate change mitigation, and environmental patent impact on sustainability and economic growth: A comparison of European countries. *Technological Forecasting and Social Change*, *150*, 119770.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39-50.
- Fousteris, A. E., Didaskalou, E. A., Tsogas, M.-M. H., & Georgakellos, D. A. (2018). The environmental strategy of businesses as an option under recession in Greece. *Sustainability*, *10*(12), 4399.
- García-Granero, E. M., Piedra-Muñoz, L., & Galdeano-Gómez, E. J. J. o. c. p. (2018). Eco-innovation measurement: A review of firm performance indicators. *191*, 304-317.
- Geisser, S. (1974). A predictive approach to the random effect model. *Biometrika*, *61*(1), 101-107.
- Gilal, F. G., Ashraf, Z., Gilal, N. G., Gilal, R. G., & Channa, N. A. (2019). Promoting environmental performance through green human resource management practices in higher education institutions: A

- moderated mediation model. *Corporate Social Responsibility and Environmental Management*, 26(6), 1579-1590.
- Götz, O., Liehr-Gobbers, K., & Krafft, M. (2009). Evaluation of structural equation models using the partial least squares (PLS) approach. In *Handbook of partial least squares: Concepts, methods and applications* (pp. 691-711): Springer.
- Guerci, M., Longoni, A., & Luzzini, D. (2016). Translating stakeholder pressures into environmental performance—the mediating role of green HRM practices. *The international journal of human resource management*, 27(2), 262-289.
- Hair Jr, J. F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. *European business review*.
- Halkos, G. E., & Tzeremes, N. G. J. E. J. o. O. R. (2013). A conditional directional distance function approach for measuring regional environmental efficiency: Evidence from UK regions. 227(1), 182-189.
- Hart, S. L. (1995). A natural-resource-based view of the firm. *Academy of management review*, 20(4), 986-1014.
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43, 115-135.
- Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. In *New challenges to international marketing*: Emerald Group Publishing Limited.
- Hernández, J. P. S.-I., Yañez-Araque, B., & Moreno-García, J. (2020). Moderating effect of firm size on the influence of corporate social responsibility in the economic performance of micro-, small-and medium-sized enterprises. *Technological Forecasting and Social Change*, 151, 119774.
- Horváthová, E. J. E. E. (2012). The impact of environmental performance on firm performance: Short-term costs and long-term benefits? , 84, 91-97.
- Imran, M., & Jingzu, G. J. J. o. A.-P. B. (2022). Green organizational culture, organizational performance, green innovation, environmental performance: A mediation-moderation model. 23(2), 161-182.
- Jawahar, N., Satish Pandian, G., Gunasekaran, A., & Subramanian, N. J. A. o. O. R. (2017). An optimization model for sustainability program. 250, 389-425.

- King, A. A., & Lenox, M. J. (2001). Does it really pay to be green? An empirical study of firm environmental and financial performance: An empirical study of firm environmental and financial performance. *Journal of industrial ecology*, 5(1), 105-116.
- 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.
- Kraus, S., Rehman, S. U., García, F. J. S. J. T. F., & Change, S. (2020). Corporate social responsibility and environmental performance: The mediating role of environmental strategy and green innovation. *160*, 120262.
- Kuo, Y., & Chen, M. (2016). Impact of eco-innovation on environment performance and competitive advantage: Moderating effect of green reputation. *Int. J. Manag. Appl. Sci*, 2, 69-77.
- Li, G., Wang, X., Su, S., & Su, Y. (2019). How green technological innovation ability influences enterprise competitiveness. *Technology in Society*, 59, 101136.
- López-Gamero, M. D., Molina-Azorín, J. F., & Claver-Cortés, E. J. J. o. e. m. (2009). The whole relationship between environmental variables and firm performance: Competitive advantage and firm resources as mediator variables. *90*(10), 3110-3121.
- Ma, X., Akhtar, R., Akhtar, A., Hashim, R. A., & Sibte-Ali, M. J. F. i. E. S. (2022). Mediation effect of environmental performance in the relationship between green supply chain management practices, institutional pressures, and financial performance. 1196.
- Masri, H. A., & Jaaron, A. A. (2017). Assessing green human resources management practices in Palestinian manufacturing context: An empirical study. *Journal of cleaner production*, 143, 474-489.
- Menguc, B., & Ozanne, L. K. (2005). Challenges of the “green imperative”: A natural resource-based approach to the environmental orientation–business performance relationship. *Journal of Business Research*, 58(4), 430-438.
- Morgan, G. A., Leech, N. L., Gloeckner, G. W., & Barrett, K. C. (2004). *SPSS for introductory statistics: Use and interpretation*: Psychology Press.
- Nechval, N. A., Nechval, K. N. J. A. J. o. T., & Statistics, A. (2016). Tolerance limits on order statistics in future samples coming from the two-parameter exponential distribution. *5*(2-1), 1-6.
- Ng, A. C., & Rezaee, Z. (2020). Business sustainability factors and stock price informativeness. *Journal of Corporate Finance*, 64, 101688.

- O'Donohue, W., & Torugsa, N. (2016). The moderating effect of 'Green' HRM on the association between proactive environmental management and financial performance in small firms. *The international journal of human resource management*, 27(2), 239-261.
- Oh, D.-S., Phillips, F., Park, S., & Lee, E. (2016). Innovation ecosystems: A critical examination. *Technovation*, 54, 1-6.
- Paulet, R., Holland, P., & Morgan, D. (2021). A meta-review of 10 years of green human resource management: is Green HRM headed towards a roadblock or a revitalisation? *Asia Pacific Journal of Human Resources*, 59(2), 159-183.
- Qiu, L., Jie, X., Wang, Y., & Zhao, M. (2020). Green product innovation, green dynamic capability, and competitive advantage: Evidence from Chinese manufacturing enterprises. *Corporate Social Responsibility and Environmental Management*, 27(1), 146-165.
- Rehman, S.-u., Mohamed, R., & Ayoup, H. (2019). The mediating role of organizational capabilities between organizational performance and its determinants. *Journal of Global Entrepreneurship Research*, 9, 1-23.
- Sarstedt, M., Hair Jr, J. F., Nitzl, C., Ringle, C. M., & Howard, M. C. (2020). Beyond a tandem analysis of SEM and PROCESS: Use of PLS-SEM for mediation analyses! *International Journal of Market Research*, 62(3), 288-299.
- Singh, S., FL, O., DB, P., & BI, S. (2019). Innovation in the main Brazilian business sectors: characteristics, types and comparison of innovation.
- Singh, S. K., Del Giudice, M., 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.
- Singh, S. K., & El-Kassar, A.-N. (2019). Role of big data analytics in developing sustainable capabilities. *Journal of cleaner production*, 213, 1264-1273.
- Song, M., Fisher, R., & Kwoh, Y. (2019). Technological challenges of green innovation and sustainable resource management with large scale data. *Technological Forecasting and Social Change*, 144, 361-368.
- Song, W., & Yu, H. (2018). Green innovation strategy and green innovation: The roles of green creativity and green organizational identity. *Corporate Social Responsibility and Environmental Management*, 25(2), 135-150.

- Stone, M. (1974). Cross-validators choice and assessment of statistical predictions. *Journal of the royal statistical society: Series B (Methodological)*, 36(2), 111-133.
- Suba, M., Inayath Ahamed, S., & Priya, B. S. (2021). Green-Hrm a Strategic Move Towards the CSR Through Green Employee Performance. M. Suba, SB Inayath Ahamed and B. Shanmuga Priya, *Green-HRM A Strategic Move towards the CSR through Green Employee Performance, International Journal of Management*, 11(11), 2020.
- Takalo, S. K., & Tooranloo, H. S. J. J. o. C. P. (2021). Green innovation: A systematic literature review. 279, 122474.
- Ullah, H., Wang, Z., Mohsin, M., Jiang, W., & Abbas, H. (2022). Multidimensional perspective of green financial innovation between green intellectual capital on sustainable business: the case of Pakistan. *Environmental Science and Pollution Research*, 29(4), 5552-5568.
- Wang, C.-H. J. J. o. M. T. M. (2019). How organizational green culture influences green performance and competitive advantage: The mediating role of green innovation.
- Weng, H.-H., Chen, J.-S., & Chen, P.-C. (2015). Effects of green innovation on environmental and corporate performance: A stakeholder perspective. *Sustainability*, 7(5), 4997-5026.
- Yong, J. Y., Yusliza, M. Y., Ramayah, T., Chiappetta Jabbour, C. J., Sehnem, S., & Mani, V. (2020). Pathways towards sustainability in manufacturing organizations: Empirical evidence on the role of green human resource management. *Business Strategy and the Environment*, 29(1), 212-228.
- Yu, W., Ramanathan, R., & Nath, P. (2017). Environmental pressures and performance: An analysis of the roles of environmental innovation strategy and marketing capability. *Technological Forecasting and Social Change*, 117, 160-169.
- Yusoff, Y. M., Nejati, M., Kee, D. M. H., & Amran, A. (2020). Linking green human resource management practices to environmental performance in hotel industry. *Global Business Review*, 21(3), 663-680.
- Zhang, J., Liang, G., Feng, T., Yuan, C., & Jiang, W. (2020). Green innovation to respond to environmental regulation: How external knowledge adoption and green absorptive capacity matter? *Business Strategy and the Environment*, 29(1), 39-53.
- Zhao, W., & Huang, L. (2022). The impact of green transformational leadership, green HRM, green innovation and organizational support on the sustainable business performance: Evidence from

China. *Economic Research-Ekonomska Istraživanja*, 35(1), 6121-6141.

Zhou, S., Zhang, D., Lyu, C., & Zhang, H. (2018). Does seeing “mind acts upon mind” affect green psychological climate and green product development performance? The role of matching between green transformational leadership and individual green values. *Sustainability*, 10(9), 3206.

Zhou, Y., Shu, C., Jiang, W., & Gao, S. (2019). Green management, firm innovations, and environmental turbulence. *Business Strategy and the Environment*, 28(4), 567-581.