Remittances Review
September 2024
Volume: 9, No: 4, pp.2187-2208
ISSN: 2059-6588(Print) | ISSN 2059-6596(Online)
Received : 15July 2024, Accepted: 20 August 2024
DOI: https://doi.org/10.33282/rr.vx9i2.119

Impact of Green HRM on Green Technology Innovation by considering the role of Green Knowledge Sharing and Corporate environmental Performance

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ABSTRACT

With increasing regulatory obligations to modify and execute activities that are harmless to the ecosystem, businesses should examine strategies to increase their market intensity. Both academics and practitioners are increasingly focused on determining how green HR management techniques may help organizations prosper. To address this expanding academic interest, this study examines the crucial roles that green human resource management plays in encouraging green knowledge sharing and corporate environmental performance in terms of green technological innovation. The study model was verified using structural equation modeling using survey data from 300 Pakistani businesses, suggesting that green human resource management has a considerable influence on green knowledge sharing and green technological innovation. The statistics data also indicate that green HRM promotes green technology innovation and enhances corporate environmental performance by sharing green knowledge. The findings indicate that green human resource management has a positive impact on green technology innovation interaction, green knowledge sharing, and CEP, providing managers with practical insights that allow them to focus on planning, allocating, and budgeting resources for effective green practices that can help improve organizational performance through the implementation of advanced green technology innovation.

Key words

Green human resource management (GHRM), Green knowledge sharing (GKS), Corporate environmental performance (CEP) and Green technology innovation (GTI).

1. INTRODUCTION

According to Mehta et al. (2023), many current experts regard the preservation of natural resources as one of the most crucial components of solving global challenges such as climate change and environmental degradation. Maintaining an advantage in the age of globalization has become a key challenge as firms struggle to strike a balance between fixing natural challenges and earning monetary benefits (Islam & Saikh, 2023). Computerized figuring, systems management, monitoring, and estimating breakthroughs have enabled current cycles to immerse associations with massively diverse information from any location, at any time, via any device, resulting in "enormous information" (Babu et al.,2024). Using big data to extract relevant information may help organizations make better decisions and achieve a competitive advantage, despite its seeming simplicity (Maroufkhani et al., 2023). Manufacturers aiming for versatility and adaptability are exploring big data analytics to improve knowledge sharing (Aljumah, 2021). Acquiring, disseminating, and using environmental knowledge can assist businesses in achieving their goals of market dominance and better service quality (Amoako, 2022).

According to Benzidia et al. (2021), advanced business analytics is used by manufacturers to optimize operations, boost supply chain productivity, and increase green production. As Nisar et al. (2021), big data analytics paired with green human resource management (GHRM) allows manufacturers to adjust to market changes and enhance sustainability, enhancing trustworthiness, customer and stakeholder confidence. However, research on GHRM's influence on GTI is still in its early phases, with a limited scope of study (Naz et al., 2023). An observational examination found a connection among GHRM and GTI in the Chinese modern area (Kanan et al., 2023). The researcher proposed broadening the study to include green knowledge integration and environmental consciousness (Polas et al., 2023). GHRM is recognized as critical to the development and enhancement of new supportability-centered services and green products, as well as the implementation of practical approaches that follow administrative principles in today's sophisticated business environment (Khan & Muktar, 2024).

Nguyen et al. (2024) demonstrated that manufacturers want improved green technology

innovation (GTI) capabilities by implementing successful GKS strategies. GTI refers to a company's capacity to use innovative ideas to develop new functional processes and products, as well as to improve existing processes or products from an environmental aspect (Castellano et al., 2022). Organizations that embrace a GTI mindset improve the environment and social well-being of all stakeholders while also gaining a competitive edge, claim Begum et al. (2022).

According to Shahzad et al. (2020) GHRM, GKS, and CEP are excellent resources for firms looking to improve their GTI by creating innovative concepts, goods, services, process methods, and administrative structures that address environmental challenges. HRM enhances GKS (Bhatti et al., 2023), which improves employee outcomes. Given this connection, it is hypothesized that GHRM may influence employee green service behavior and sharing of green knowledge, thereby promoting its adoption (Rubel et al., 2021). Knowledge sharing parameters have also been found to have mixed mediation effects in previous research (Bhatti et al., 2023).

SOCIAL IDENTITY THEORY (SIT)

According to this theory (Tajfel & Turner, 1979), identifying with a certain group is the first step toward building a good self-concept. Furthermore, positive images influences self-image (Ashforth & Mael, 1989); when people relate to a group, they look for similarities in their beliefs and activities. As a result, social identity theory is commonly employed in organizational research to describe how individuals identify with their organization's social environment (Simbula et al., 2023). Wijaya and Silitonga (2023) state that personnel are dedicated to the organization, enjoy organizational activities, and support the organization's ideals. According to theory, people start by developing a good self-concept. Thus, O'Reilly and Chatman (1986) discovered that when an organization favorably impacts employee behaviors, organizational identity boosts employee loyalty to the enterprise. According to Trzeciak and Banasik (2002), the current study applies social identity theory to claim that other employees can benefit from working with employees who support the organization's green activities. As a consequence, all employees support the company's green service and information sharing policies (Munawar et al., 2022).

According to Khan et al. (2023), GHRM reduces social ambiguity by outlining representatives' behaviors, assumptions, and connections with partners about GKS and assistance. GKS and GTI may be more prevalent among employees who contribute to this corporate culture (Wang et al.,

2022). Ahmad et al. (2023) argue that reflections increase the relationship between GHRM, GKS, CEP, and GTI. Carmeli et al. (2017) investigated the link between representative manageability conduct and a pleasant attitude. GHRM is expected to encourage more representative collaboration in controllable practices for three reasons. GHRM clearly demonstrates the organization's major focus on sustainability. This obligation energizes and propels employees' conduct. According to social brain science study, workers' views of the organization's responsibility to sustainability impact their attitudes and responses to authoritative CSR programs (Latif et al., 2022). Second, GHRM encourages green behavior among employees, giving them a sense of purpose and involvement. Representatives begin to believe that they are essential to a bigger campaign to achieve positive climate change. Finally, GHRM demonstrates a high level of engagement by concentrating on sharing knowledge about sustainability concerns and providing members with environmental information.

2. REVIEW OF LITERATURE AND HYPOTHESIS DEVELOPMENT

2.1 Green HRM and Green Knowledge Sharing

GHRM is the term used to describe HRM in relation to environmental issues (Molina-Azorin et al., 2021). Yong et al. (2020) comprises green employee recruiting, training, and sustainability management skills; within this framework, associated performance evaluations monitor employee sustainability performance and reward workers for attaining green objectives. According to Bekhit et al. (2023), GHRM is an ecologically friendly HRM program that seeks to secure and mobilize employee engagement by increasing green efficiency and lowering expenses. It also pushes firms to save and use resources as efficiently as possible. Consider energy-efficient office design, job sharing, teleconferencing, virtual interviews, recycling, and online training (Srividya et al., 2022). GHRM blends environmental management with human resource management activities (Vázquez-Brust et al., 2023). According to Cancela et al. (2023), this cycle highlights how businesses are transforming their strategic plans and objectives to a more corporate green methodology.

Pham et al. (2023) explore the relationship between environmental management and human resource management, focusing on how much workers contribute in "greening" workplaces.

According to Usman et al. (2023), the HR department should be capable of assessing and inspiring workers' knowledge, attitudes, motivation, and behaviors related to sustainability.

Organizations may utilize HRM to encourage sustainable and environmentally responsive employee conducts (Liu et al., 2023). Prior research in this area has focused on how green human resource management might be a useful tool for encouraging representatives to promote natural drives in the workplace (Omarova & Jo, 2022). Several experts advocate that GHRM ensure that enterprises' hiring plans strive to improve representatives' natural awareness, mentalities, and behaviors (Zubair & Khan, 2019; Alzgool, 2019). According to Lei et al. (2022), knowledge sharing is a person's method of sharing, communicating, and disseminating data inside the organization as well as with partners and subordinates.

Researchers acknowledge the importance of knowledge management in the workplace (Dezi et al., 2019). Nevertheless, not much research has been done to determine what information the executives intend to convey to the company. According to Peñalba-Aguirrezabalaga et al. (2021), information is a valuable resource for businesses with anticipated long-term advantages. Industries rely on GKS to provide more feature items to the worldwide market, and organizations flourish as their expertise expands (Buchgeher et al., 2021). According to Alnaimi and Rjoub (2021), a lack of knowledge leads to a lack of information sharing. According to Agarwal et al. (2022) and Zhong et al. (2021), the main differences between knowledge sharing and concealment are implementation strategies and goals. HRM focuses on enhancing employees' capabilities, knowledge, and skills so that they can participate by appropriately reinvesting their abilities. Human resource management is therefore an excellent predictor of employee knowledge sharing (Bhatti et al., 2021). According to Rohim and Budhiasa's (2019) findings, there is a strong positive correlation between employee knowledge sharing behavior and HRM practices. Consequently, we contend that employees are more likely to share green knowledge if they have a positive impression of GHRM. We therefore propose the following hypothesis:

H_1. Green HRM has a tremendous influence on green knowledge sharing.

2.2 Green HRM and Corporate Environmental Performance

Corporate environmental performance includes measuring environmental effect, resource consumption, and financial factors, as well as implementing preventative steps to decrease consequences (Ameer & Khan, 2023). Businesses competing on CEP often employ strategies that focus on waste reduction and pollution control, allowing them to improve resource consumption efficiency while maintaining their commitment to environmental sustainability

(Nisar et al., 2021).Accordingly, CEP can be thought of as the culmination of an organization's ecologically conscious operational activities, or more precisely, the entirety of a business's attitudes and behaviors that are intended to achieve ecological equilibrium (Magnano et al., 2024). Companies that want to boost their reputation and profitability, as well as gain the trust and ecological and conservation expectations of important stakeholders, should think about CEP, according to Aslam et al. (2021).

Thus, focusing on naturally economic activity through regular monitoring and occasional CEP benchmarking could help associations not only mobilize people's representatives to work together to address and mitigate ecological threats, but also advance authoritative knowledge of possible arrangements and the mechanical design of utilitarian cycles (Yasir et al., 2020). Hassan et al. (2024) Initiatives to improve business environmental performance are offered as a means of reducing emissions, managing hazardous waste, and fulfilling environmental standards. The Pakistani ministries' Rating Programs in Environmental Management assess business environmental performance by looking at both meeting and surpassing regulations (Butt, 2021). Employing people with green values, promoting knowledge sharing and problem-solving activities, offering environmentally friendly training and incentives, and other strategies can all help businesses improve environmental performance (Surahman & Andriyani, 2024). GHRM approaches enhance corporate environmental performance in manufacturing companies (Saeed et al., 2022). GHRM methods can encourage employees to enhance environmental performance (Aggarwal & Agarwala, 2023). GHRM implementation strategies for environmental management include green hiring, training, performance management, compensation and incentives, and engagement (Faeni, 2024).

H_2. GHRM has positive impact on CEP.

2.3 Green knowledge Sharing and Corporate Environmental Performance

The extent to which a competent person collects and disseminates green knowledge in other organizations also learning from other organizations is referred to as green knowledge sharing (Sahoo et al., 2023). Experts share their expertise with others to help them learn and build new abilities in the environment (Chari, et al., 2022). In the learning process, it is a sort of transfer behavior that is more than simply transmitting knowledge (Carless, 2022). Because it is also about aiding team members in discovering and utilizing knowledge wherever they want through

the team knowledge sharing process (Natu & Aparicio, 2022).Green Knowledge sharing helps generate new environmental ideas, address present concerns, and achieve desired objectives (Ma et al., 2022). GKS is viewed as not only a critical component of inspiring employees to engage in innovative behaviors and actions to increase environmental commitment (Ahmad et al., 2023), but also as a key tool for fostering critical thinking, as a consequence, translating ideas into innovative capability (Posen et al., 2023). Suharyani et al. (2024) illustrated how GKS among employees may strengthen personal and professional knowledge and talents, produce creative ideas, and stimulate others' creativity by building a good environment, resulting in improved CEP. Similarly, GKS may enhance green technology innovation and improve CEP (Pudi et al., 2022). As a result, GKS is drawing increasing interest from academia and the corporate sector (Yu et al., 2022). So the hypothesis can be explained as:

H_3. Green knowledge sharing has positive link with CEP.

2.4 Green Knowledge Sharing and Green Technology Innovation

Theorists describe innovation as an organization's ability to deal with current challenges and satisfy stakeholder expectations (Shahzad et al., 2020). GTI is defined as a company's ability to apply creative ideas to build new functional processes and products while also upgrading existing processes or goods with a greener perspective (Sahoo et al., 2023). The successful application of Green Knowledge Sharing enables businesses to recognize innovations that support energy conservation, emission reduction, the production of eco-products, and sustainable development (Singh et al., 2024). Green Technology Innovation-oriented firms gain a competitive edge while also increasing stakeholders' environmental and social well-being (Zhou et al., 2023). Rodríguez-Espíndola et al. (2022) emphasized the significance of Green Technology Innovation and Green Knowledge Sharing in developing CEP through novel concepts and process approaches that solve environmental issues. The hypothesis can be summarized as follows:

H_4. GKS has significant link to GTI.

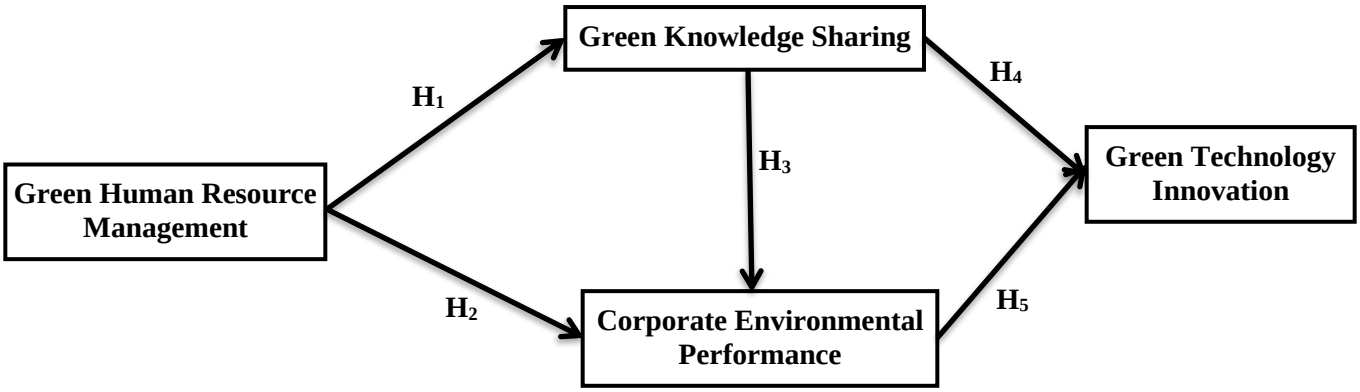
2.5 Corporate Environmental Performance and Green Technology Innovation

CEP encourages GTI because improved environmental performance leads to enhanced innovation (Zhang et al., 2023). To protect the environment by reducing resource consumption, waste, and pollution, GTI transforms operational design, develops eco-products, implements eco-

technologies, and improves functional processes (Hameed et al., 2023). According to Padilla-Lozano and Collazzo (2002), establishing pioneering corporate environmental performance to boost green technology innovation provides businesses with a variety of advantages, including financial incentives that may increase competitiveness and economic rewards from the production of eco-friendly goods. However, newly published researches have demonstrated a positive relationship between CEP and GTI (Xu & Liu, 2023). Thus, the relationship between CEP and GTI remains unknown, motivating the creation of the following hypothesis:

$H_{5.}$ CEP positively relate to Green Technology Innovation.

The Figure 1 illustrates the hypothesized Model.



3. RESEARCH METHODOLOGY

3.1 Research Design

The deductive method is applied to conduct a quantitative study. The study found that GHRM, GKA, CEP, and GTI have a remarkable correlation. It also investigates factors to explain this association using generating hypothetical models that are based on the logic that supports Social Identity Theory. The study methodology uses a survey of 300 Pakistani enterprises to evaluate variable relationships. The model is empirically evaluated using the partial least squares regression-based structural equation modeling (SEM) approach. The PLS approach was chosen because it can assess a conceptual model of simultaneous equations describing the set of links

between variables and, as a result, estimate values that quantify these interconnections (Wavei, 2023). Based on the research model, a questionnaire for the survey component was created to collect subjective responses to each of the criteria being assessed. This technique relied on past research to create survey items that characterized the study model's major components. Each respondent's position on each survey subject was scored on a five-point Likert scale ranging from "1" (strongly disagree) to "5" (strongly agree). Developing a survey instrument to examine hypotheses requires a methodical approach.

3.2 Study Population, Sampling and Data Collection

Random sampling was recommended. In Pakistan, the provinces of Punjab and Sindh are selected at random. The target demographic for the review was producing companies with ISO 14001 certifications that the Pakistani Service of Corporate Undertakings had designated as large businesses. The study was conducted using a variety of methods, including online surveys, telephone interviews, remote polls, and individual meetings. Approximately 380 large assembling companies in Pakistan's Punjab and Sindh regions were contacted through various channels. The analyst invited middle- and senior-level natural administration supervisors from these organizations to participate in the review. The researcher informed each respondent that their individual responses would not be disclosed and that only aggregate results would be provided prior to beginning the data collection process. To increment reaction rates, follow-up calls were made to people who picked the remote or online survey choices. A total of 319 responses were received, and 300 of them included comprehensive and significant information. Table 1 provides a detailed description of the descriptive analysis of survey results by demographic factors.

Table 1: Respondents' Demographic Profile

Demographic characteristics	Frequency (%)	Demographic characteristics	Frequency (%)
Rank		**Sectors**	
Director Productions	94 (31.33%)	Chemicals	54(18%)
Manager Operations	86 (28.67%)	Food Manufacturing	81(27%)
Plant Manager	55 (18.33%)	Maintenance	37 (12.33%)
General Manager	65 (21.67%)	Transport	19 (6.33%)
		Fiberglass	25 (8.34%)

		Pharmaceutical	38 (12.67%)
		Leather& Plastic processing	46 (15.33%)
Ownership			
Public	129 (43%)		
Private	171 7%)		

3.3 Measures

CEP is based on Huang and Li (2017) and Vanalle et al. (2017). Green technological innovation based on Singh and El-Kassar (2019) and Huang and Li (2017). Wong (2013) used a five-item scale to assess green knowledge sharing in companies. Six items from Dumont et al. (2017) were used to measure GHRM.

Table 2

Model for Measurement

Variables	Variable Items	F.L	α	KMO	CR	AVE
	G HRM1	0.79	.887	0.793	0.931	0.713
	GHRM2	0.83				
(GHRM)	GHRM3	0.81				
	GHRM4	0.78				
	GHRM5	0.76				
	GKS1	0.91	.877	0.801	0.841	0.784
	GKS2	0.82				
(GKS)	GKS3	0.71				
	GKS4	0.73				
	GKS5	0.77				
	CEP1	0.87	.881	0.832	0.911	0.799
	CEP2	0.82				
(CEP)	CEP3	0.90				
	CEP4	0.89				
	CEP5	0.77				

	GTI1	0.88	.913	0.845	0.921	0.787
	GTI2	0.91				
(GTI)	GTI 3	0.88				
	GTI 4	0.87				
	GTI 5	0.79				

Note: Green HRM=Green Human Resource Management, GKS=Green Knowledge Sharing, CEP=Corporate Environmental Performance, GTI=Green Technology Innovation, AVE=average variance extracted; CR=composite reliability, F.L=factor loading, KMO=Kaiser–Meyer–Olkin, α= Cronbach's alpha.

3.4 Methods of Data Analysis and Results

Smart PLS software was used to conduct the PLS regressions that evaluated the research model's assumptions. There are various advantages to using the PLS method. Therefore, the ongoing review must first decide whether it is appropriate for exploratory examination before concentrating on the original conceptualizations of GKS, Green HRM, CEP, and GTI. Accordingly, the PLS approach may be a less exclusive model assessor than covariance-based SEM and is less vulnerable to errors in model details (Zhang et al., 2021). Prior to using PLS to study a SEM model, it is necessary to define the nature of interactions between items and constructs, quantify construct reliability and validity, and assess the fit of measurement and structural models (Hair et al., 2020). Corroborative element analysis, or CFA, was used to resolve the actions' unidimensionality (Koufteros, 1999). CFA examines the concurrent and discriminant legitimacy of each action, along with its composite dependability (CR). According to Table 2, each build had a CR value higher than 0.70, meaning that all structures had good dependability. The CR values ranged from 0.841 to 0.931.

The average variance extracted (AVE), which ranged from 0.713 to 0.799 according to the 0.50 criteria, showed convergent validity for every component. Standard root mean square lingering (SRMR) and root mean square estimation (RMSEA) are the two forms of outright fit estimations. A model fit is better when the RMSEA value is less than or equal to 0.08 than when it is greater than or equal to 0.08 when used as the poor fit index. Similarly, an SRMR value close to zero indicates optimal model fitness, however values less than 0.08 are frequently acceptable. Moreover, incremental fit indices demonstrate the degree of fit between the goal and null models. Among the elements that comprise these indices are the Tucker-Lewis Index (TLI)

and the Comparative Fit Index (CFI). Outright fit estimations come in two varieties: root mean square estimation (RMSEA) and standard root mean square lingering (SRMR). When RMSEA is used as the poor fit index, a value less than or equal to 0.08 indicates a better model fit than a value greater than or equal to 0.08. In the same way, ideal model fitness is indicated by an SRMR value near zero, though values below 0.08 are usually OK. In addition, incremental fit indices show how well the null model and the goal model fit together. These files' parts incorporate the Exhaust Lewis Record (TLI) and the Similar Fit Record (CFI).

Table 3

Comparative Fitness of Models

Model		χ^2/df	TLI	CFI	RMSEA	$SRMR^w$	$SRMR^b$
Alternative	Single Factor	2.53	0.25	0.27	0.16	0.14	0.14
Measurement	Two Factor	2.7	0.40	0.38	0.12	0.09	0.12
Models	Three Factor	1.59	0.77	0.81	0.08	0.05	0.07
Model Proposed	Four-Factor	1.35	0.97	0.96	0.05	0.04	0.02

Notes: Where χ^2 = Chi-square; df = Degrees of Freedom, TLI = Tucker-Lewis index, CFI = Comparative Fit Index, $SRMR^b$ = Standardized Root Mean Square Residual Between; $SRMR^w$ = Standardized Root Mean Square Residual Within, RMSEA = Root Mean Square Error of Approximation

4. DISCUSSION

The research model, which is based on inconsistent evidence from previous studies (Sahoo et al., 2023; Surahman & Andriyani, 2024), has allowed this study to show how big data analytics-based environmental decision-making develops a corporation's capability to accomplish GKS, thereby increasing eco-friendly product and process innovation. Hypothesis testing results indicate that the better GHRM practices that firms use, the higher their environmental performance and green technological innovation, which is consistent with previous research by Gill et al. (2021) and Sahoo et al. (2023). GHRM practices are seen as a strategic step toward improving green technology innovation since managing human resources in accordance with environmentally friendly principles allows for the fulfillment of environmental goals. This study also bridges research gaps by looking at the relationship between GHRM practices, GKS, CEP, and green technology innovation in the industrial sector, notably in Pakistan. Green technology

innovation has been proved in industrial firms to benefit from GHRM practices. According to the findings, companies that possess technological resources and cognitive analytical abilities may be able to lower the risks associated with the quickly shifting market environment in which they operate. By incorporating GHRM, GKS, CEP, and GTI, the investigation is able to add new hypothetical perspectives on green knowledge sharing and green human resources in general. This gives policymakers and overseers useful experiences as they work to move modern exercises away from the era of contamination and toward a green economy.

4.1 THEORETICAL IMPLICATIONS

The review's findings highlight areas of strength for GHRM and green knowledge sharing. These findings support various ongoing observational studies that suggest that GHRM powered by big data analysis may increase joint efforts among authoritative individuals with different areas of mental skill, resulting in better independent direction (Nimmagadda et al., 2018; Surahman and Andriyani, 2024). To maximize the knowledge value of their environmental research, manufacturers must ensure that all organizational members have access to high-quality data and current information on green technology innovation. This study demonstrates GHRM's ability to emphasize the depth of fresh understanding that can be generated from enormous volumes of data for constructive green knowledge sharing by visualizing, organizing, analyzing, and modeling information that would otherwise be hard to get. Digital transformation has the ability to revolutionize GTI capacities and knowledge management systems. GKS promotes functional perceivability at the CEP level and helps producers get the swing of things, drive change, and continuously enhance functionality through the constant provision of natural information from linked frameworks. For producers to thrive, procedures must be reengineered, cooperative plan thinking encouraged, and innovation coordinated across useful divisions. GHRM is an immaterial resource that should be generated during assembly to enhance the GKS limit while reducing the environmental impact of GTI activity. This innovative study focuses on GHRM's natural impact on GKS as a mental asset and generative component in the hierarchical union of Green Innovation Development.

4.2 PRACTICAL IMPLICATIONS

The study's findings have several implications for industrial administrators and management decision makers. First, decision-makers may use existing technology and big data analytics to

develop a proactive environmental management system that encompasses the whole industrial value chain (Arunachalam et al., 2018; Meriton et al., 2021). This study shows how GKS may help with routine work environment difficulties (Shahzad et al., 2020). It is the process by which individuals exchange their knowledge and collaborate to generate new revelations. However, according to Nisula et al. (2022), GKS has a direct impact on organizational innovation. Information is currently the major source of production processes, exceeding land, labor, money, machinery, and other fixed assets (Zahoor et al., 2022). GKS enables individuals to effectively share their information, learn from one another, innovate, and collaborate to improve the environment (Khan et al., 2023). Due to topology variations and a lack of expertise with environmental practices, managers should invest in cutting-edge IT infrastructure to increase the efficacy of GHRM, GKS, and GTI activities in industrial operations (Mao et al., 2016). Organizations spend much in studying the consequences, making it an essential topic in green technology development. Environmental issues provide organizations with high-quality information and lead to additional research.

4.3 LIMITATIONS

This is a cross-sectional analysis. To acquire a better understanding, future research might use a longitudinal study design to analyze the changes in GKS, CEP, and GTI as a result of green HRM practice implementation over time. Many Pakistani manufacturing enterprises are striving hard to make their goods more ecologically friendly. Future research could include industrial enterprises from many nations and cultures in order to generalize study findings (Piwowar-Sulej, 2022). Future qualitative research might look into the link between green HRM practices and green technology innovation outcomes (Shah & Soomro, 2023). Other green HRM techniques, such as green work-life balance, should be included in future research (Lin et al., 2024).

4.4 CONCLUSION

The study's findings demonstrated the positive and significant effects of green human resource management (GHRM), green knowledge sharing (GKS), corporate environmental performance (CEP), and green technological innovation (GTI). According to the latest findings, manufacturing companies should incorporate green HRM practices into corporate environmental performance programs, take specific steps to improve employees' environmental competence and motivation, promote green knowledge sharing, and effectively involve them in green technology

innovation initiatives. The study contributes to closing gaps and has significant implications for corporate environmental performance for practicing manufacturing managers. The study's findings contribute to the domain literature by establishing links between green HRM, green technical innovation (GTI), GKS, and CEP in Pakistan's manufacturing industry. These studies also add to knowledge by implementing green HRM, which ultimately supports in the attainment of enterprises' green goals.

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