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Green HRM for Enhanced Environmental Performance: A Circular Economy Perspective Aligned with SDGs

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Abstract

This empirical inquiry explores the use of Green HRM as a strategic tool to improve environmental performance within the context of a circular economy. We chose 200 employees from the Pakistan Stock Exchange (PSX) based on data from the Corporate Social Responsibility (CSR) index. The study employs Structural Equation Modeling-Partial Least Squares (SEM-PLS 4) to examine the relationship between organizational policies and the implementation of circular economy principles within the framework of Green HRM practices. This research is supported by the circular economy, which is defined as a fundamental change in thinking that promotes the reuse of resources, reduction of waste, and efficient use of resources. The SEM-PLS 4 approach is used to validate the theoretical framework that proposes that Green HRM practices provide a significant contribution to the promotion of circular economy initiatives, which in turn lead to considerable gains in environmental performance metrics. Moreover, this method is employed to evaluate the complex causal links in action. Policymakers and business leaders may facilitate the integration of Green HRM into sustainability programs by utilizing the study's findings. It is expected that human capital management will play a crucial role in achieving the circular economy paradigm. This research not only improves our understanding of how Green HRM affects sustainability, but also provides firms with a strategic roadmap for implementing circular economy models.

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INTRODUCTION

An increasing number of individuals worldwide are expressing apprehension regarding the environmental consequences. Maniu et al. (2021) have identified environmental conservation and the adoption of eco-friendly practices as emerging key concerns for these businesses. Businesses and governments are increasingly focusing on environmental accountability to promote sustainability and assist the shift towards a circular economy (Kazancoglu et al., 2021). Concurrently, a growing amount of academic research provides evidence for this phenomenon. Academic literature encompasses environmental subjects like life-cycle assessment, green marketing, green procurement, and general effect management. The field of GHRM has recently garnered attention from both scholars and professionals in the industry (Bahuguna et al., 2023). The phrase "green HRM" refers to a set of efforts aimed at improving the environmental friendliness and sustainability of firms by changing employee behavior (Liu et al., 2023). The prevalence of literature reviews signifies that scholars broadly acknowledge this topic. The papers by Benevene and Buonomo (2020) have received substantial recognition in the field of GHRM. In addition to providing the background of the subject topic, the writers identified shortcomings in the current knowledge and suggested potential areas for further research. They

claimed that the many GHRM initiatives still lack sufficient integration to promote the organization's environmental sustainability. The authors argue that firms are not fully adopting a range of GHRM approaches to enhance environmental management, potentially diminishing their efficacy. Specific subcategories of GHRM can be identified based on the different GHRM practices. A GHRM framework consists of the components of "empowerment/engagement," "performance management/appraisal," "attracting/selecting," and "training/development," as defined by Marrucci et al. (2021). Ren et al. (2018) validate this categorization and emphasize the extremely restricted impact on GHRM and environmental management. Our research examined the impact of societal, economic, and market aspects on GHRM and environmental management approaches. We aimed to address a gap in the existing literature by assessing the extent to which GHRM policies and practices improve operational effectiveness. The primary objective of this research is to investigate the correlations between GHRM practices and business outcomes. However, we have chosen to include economic performance, environmental reputation, and circular economy performance in our research. By following this methodology, we have the potential to make a completely new and valuable contribution to the fields of academics, policymaking, and practical application.

CONCEPTUAL FRAMEWORK

Green HRM and EP

The literature reviews described above offer numerous potential research subjects for GHRM, a subject that may be analyzed from various viewpoints due to its complex and multi-dimensional nature (Bawa et al., 2022). Despite its primary emphasis on practical challenges, GHRM has received significant attention in the realm of organizational and management theories. Several academic scholars have put forth various conceptualizations of GHRM, including contingency theory (Yu et al., 2020), dynamic capabilities (Joshi and Dhar, 2020), and stakeholder theory (Guerci et al., 2016a). These revised theories build upon the AMO (Ability-Motivation-Opportunity) paradigm. The extensive research conducted by GHRM has provided valuable insights on strategies for constructing enduring organizations, benefiting both corporate managers and policymakers. In a study conducted by Usman and Mat (2021), the focus was on examining the impact of GHRM (Green Human Resource Management) in developing countries. The study highlighted the significance of GHRM in promoting environmental consciousness and its influence on the formulation of more efficient government policies.

Nevertheless, Pham et al. (2020) research indicates that the predominant focus of studies has been on the implementation of GHRM in organizational activities. The potential for examining the influence of Green Human Resource Management (GHRM) practices on organizational performance is vast when considering the various environmental practices that can be used in people management. Nevertheless, identifying connections could be challenging because of the extensive array of potential outcomes. To address this concern, researchers have examined GHRM from two angles: implementation and overall concept. However, it is uncommon for academics to thoroughly evaluate GHRM initiatives, analyzing each one to determine its specific influence on business outcomes. The objective of our study was to evaluate the impact of each GHRM action on an organization's financial and environmental performance, environmental reputation, and involvement in circular economy initiatives (Marrucci et al., 2021). Our intention was to make a valuable contribution to

academic discussions and offer useful advice to professionals in the field. The impact of GHRM on business outcomes remains uncertain, despite the abundance of research that has identified connections between the concept and various areas of environmental management and performance (Ren et al., 2018). It is unexpected that organizations registered with EMAS do not carry out GHRM research, considering that EMAS encourages employee empowerment and engagement. GHRM has been extensively studied in various industries and countries, including Europe, China, and the United States (Shahriari & Hassanpoor, 2019). In recent times, EMS research has primarily concentrated on internalization, which refers to the thorough but unofficial integration of standard requirements into an organization's operations (Karmelić et al., 2023).

The practices of GHRM are typically aligned with those that promote the appropriate implementation of EMS standards in relation to individuals. In addition, considering the considerable attention that circular economy has received from scholars and practitioners in the industry (Merli, et al., 2018), we expand the range of our research to encompass all facets of organizational performance, with a specific emphasis on the green economy. A circular economy is an economic model that integrates strategies such as material reduction, alternative reuse, recycling, and recovery at every stage of production, distribution, and consumption (Ruiz et al., 2020). Researchers have recently focused on the importance of employees' duties in the transition to a more circular economy (Bertassini et al., 2021). Nevertheless, the connections between these duties and GHRM have not been comprehensively examined. Although our purpose was to assess the association between GHRM practices and the circular economy, it is crucial to consider that the extent to which companies embrace the circular economy may be influenced by external circumstances that are beyond their control.

Hence, we conducted an investigation into the moderating impact of three variables: "competitive intensity," which assesses the extent to which rival businesses and government initiatives have adopted circular practices, "market commitment," which indicates the level of consumer interest in the circular economy; and "technological support," which signifies the extent to which technology has facilitated the shift towards a circular economy (Marrucci et al., 2021). However, all of these components were combined into a single variable called "Circular environment." Thorough deliberation was given to the environmental reputation, environmental performance, and the concept of the circular economy. As far as we know, only Zhao et al. (2020) have investigated the relationship between GHRM and environmental reputation. The authors observed that the implementation of Green Human Resource Management (GHRM) and the involvement of managers play a crucial role in improving the environmental reputation of firms.

The relationship between GHRM (Human Resource Management) and the financial success of enterprises is not well understood. The study's results suggested that the implementation of GHRM had a positive impact on the financial performance of Palestinian organizations (O'Donohue & Torugsa, 2016). However, it is important to note that the study's validity may have been affected due to its geographical location and insufficient sample size (Hennink & Kaiser, 2022). To shed light on these lesser-explored results and contribute to the discussion on environmental performance, we examined the impact of GHRM and each individual GHRM activity on the four organizational performances described earlier. Therefore, our main conjecture is as follows:

MEDIATING ROLE OF CIRCULAR ECONOMY

The concept of the "circular economy" has arisen as a response to the linear economic model characterized by the 'take-make-dispose' attitude. The circular economy diverges from the linear model by prioritizing waste reduction, prolonging product lifecycles, and optimizing resource consumption (Reddy et al., 2023). By embracing this paradigm, businesses can promote creativity and improve their ability to compete, thereby creating an economic structure that is more environmentally sustainable and beneficial for both the environment and the industry.

Human Resource Management (HRM) has the capacity to greatly facilitate firms in their shift towards a circular economy. Human resource management (HRM) refers to a set of strategies aimed at helping firms achieve their strategic objectives by efficiently managing their personnel. According to Al-Swidi et al. (2021), it is possible to tailor human resource management practices to encourage environmental stewardship and creativity within an organization's sustainability framework. As a result, this may motivate employees to adopt environmentally friendly behaviors and make significant contributions to achieving the organization's environmental performance goals.

The circular economy tackles the discrepancy between environmental performance and human resource management through several vital strategies. HRM policies have the ability to impact both the culture of a business and the behavior of employees, which can possibly alter the degree to which circular economy ideas are adopted. Circular economy initiatives involve strategies to minimize waste and optimize the use of resources. These strategies can be effectively communicated to employees through development and training programs (Amjad et al., 2021). In addition, Amjad et al. (2021) argue that firms can improve their environmental performance by implementing reward and performance systems that align with sustainability goals. This will motivate staff members to participate in environmentally sustainable practices.

Furthermore, businesses have the opportunity to reassess their operations and business models in alignment with the requirements of the circular economy, thereby enhancing their environmental sustainability. Organizations can reduce their environmental impact by adopting circular economy principles, which involve minimizing waste, conserving resources, and mitigating greenhouse gas emissions. Human resource management (HRM) enables the necessary organizational changes to implement these principles by hiring personnel with the necessary skills, promoting collaboration across different departments, and managing resistance to change (Yang et al., 2023).

Empirical study indicates that the circular economy enables the linkage between environmental performance and human resource management. A study conducted by van Assen (2020) found that organizations that give importance to human resource management practices, such as empowering employees to make decisions and fostering a culture of continuous learning, are more inclined to use circular economy tactics that improve their environmental performance. Furthermore, academic research has shown the importance of leadership in advancing circular economy activities, namely transformational leaders who have a greater capacity to persuade their teams to embrace sustainability efforts (Hidayat-ur-Rehman & Alsolamy, 2023). The discipline of human resource management is facing new challenges due to the economic transition towards a circular framework. Organizations may face

challenges due to a lack of individuals who have the necessary knowledge and skills in materials science, supply chain management, sustainable design, and circular economy methodologies (Kumar, et al.,2021). To address these difficulties, it is crucial to use a strategic approach to human resource management. The suggested approach should include support for professional development and progress, targeted recruitment, and the formation of interdisciplinary teams capable of creating innovative sustainable solutions (Pardo-Garcia & Barac,2020).

Businesses aiming to improve their sustainability and achieve a competitive advantage by integrating environmental performance and human resource management will find the circular economy to be a transformative change. Strategic human resource management approaches can help firms create a sustainable culture, train employees in necessary skills, and navigate the organizational changes needed to adopt circular economy principles. It is crucial to continue researching and using methods in this ever-changing field (Boon et al.,2018). This comprehensive approach to managing human resources, promoting sustainability, and improving environmental performance has significant potential benefits, despite the challenges. The intersection of environmental performance, human resource management (HRM), and the circular economy offers firms numerous opportunities to implement positive change in the upcoming years.

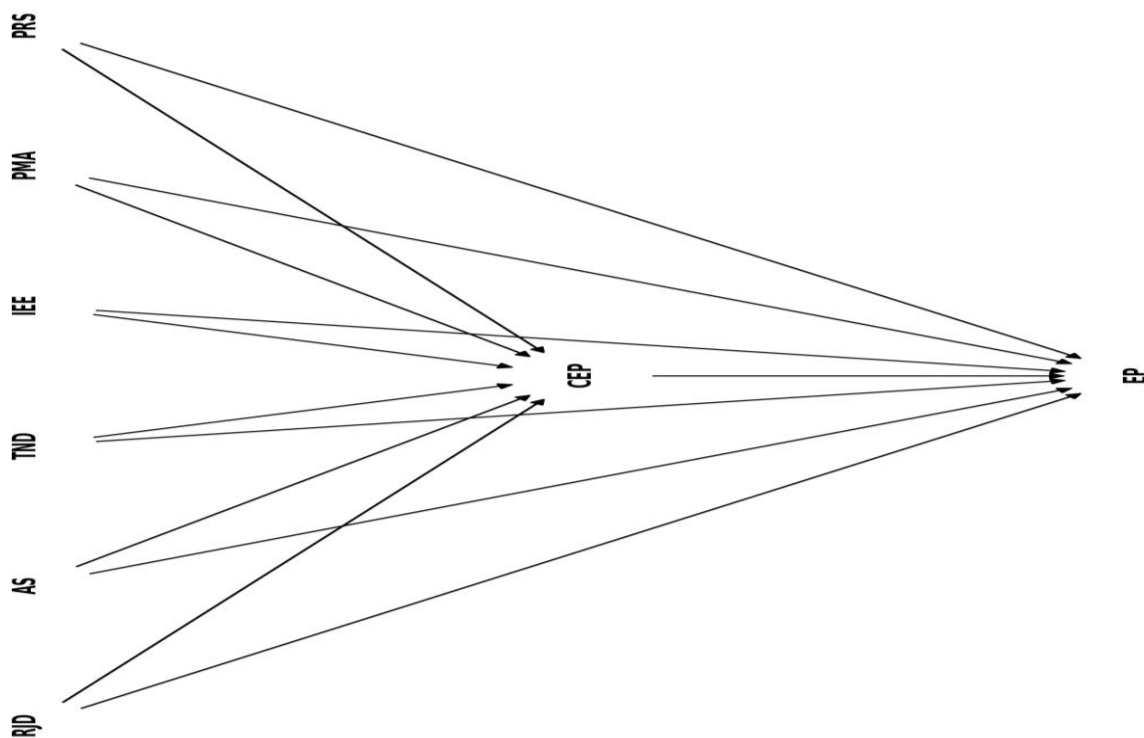


Figure 1.
Conceptual Framework

H1. Recruitment & Job Design (RJD) is in a significant relationship with Environmental Performance (EP).

H2. Attracting & Selecting (AS) is in a significant relationship with Environmental Performance (EP).

H3. Training & Development (TND) is in a significant relationship with Environmental Performance (EP).

H4. Involvement, Empowerment & Engagement (IEE) is in a significant relationship with Environmental Performance (EP).

H5. Performance Management & Appraisals (PMA) is in a significant relationship with Environmental Performance (EP).

H6: Pay and Reward System (PRS) is in a significant relationship with Environmental Performance (EP).

H7. Recruitment & Job Design (RJD) is in a significant relationship with Circular Economic Practices (CEP).

H8. Attracting & Selecting (AS) is in a significant relationship with Circular Economic Practices (CEP).

H9. Training & Development (TND) is in a significant relationship with Circular Economic Practices (CEP).

H10. Involvement, Empowerment & Engagement (IEE) is in a significant relationship with Circular Economic Practices (CEP).

H11. Performance Management & Appraisals (PMA) is in a significant relationship with Circular Economic Practices (CEP).

H12. Pay and Reward System (PRS) is in a significant relationship with Circular Economic Practices (CEP).

H13. Circular Economic Practices (CEP) is in a significant relationship with Environmental Performance (EP).

H14. Circular Economic Practices (CEP) mediates the relationship between Recruitment & Job Design (RJD) and Environmental Performance (EP).

H15. Circular Economic Practices (CEP) mediates the relationship between Attracting & Selecting (AS) and Environmental Performance (EP).

H16. Circular Economic Practices (CEP) mediates the relationship between Training & Development (TND) and Environmental Performance (EP).

H17. Circular Economic Practices (CEP) mediates the relationship between Involvement, Empowerment & Engagement (IEE) and Environmental Performance (EP).

H18. Circular Economic Practices (CEP) mediates the relationship between Performance Management & Appraisals (PMA) and Environmental Performance (EP).

H19. Circular Economic Practices (CEP) mediates the relationship between Pay and Reward System (PRS) and Environmental Performance (EP).

METHODOLOGY

The hypotheses were examined by the application of Partial Least Squares (PLS) path modeling, which also considered the mediating and moderating effects of EO and dynamic capacities (Aftab et al., 2022). The Partial Least Squares (PLS) technique is a statistical model that employs regression analysis to estimate the relationships between latent variables and their indicators, as well as the interactions among latent variables. There are several reasons for utilizing PLS route modeling to investigate the

hypotheses of this study. Firstly, it performs effectively with highly intricate models that encompass a substantial quantity of latent variables or indicators. Ultimately, it functions effectively with hybrid formative second-order variables, association research, and studies that incorporate moderators and mediators into their models. Moreover, studies that involve distinct modeling of the formative and reflective interactions between hidden variables and their measures can greatly profit from utilizing Partial Least Squares (PLS). This study employed a mixed-methods approach, including formative and reflective assessments to model the variables and their measures. Consequently, Partial Least Squares (PLS) is considered to be preferable to covariance techniques, which can result in various problems while studying formative concepts (Hair et al., 2019).

PLS eventually fails to provide clear definitions for assumptions. Having a normal distribution is not necessary, for example. PLS (Partial Least Squares) is a more rigorous method compared to regression or correlation research. This is because PLS takes into account the premise that there may be errors in the measurements. Furthermore, PLS offers increased versatility in finding an optimal sample size. According to Sarstedt et al. (2021), it is advised that the minimum sample size for an indicator scale should be 10 times more than the number of items on the scale with the largest population. Statistical data are evaluated in a similar way to the covariance-based structural equation modeling (SEM). It is not unexpected that PLS is being increasingly recognized as a viable tool for structural equation modeling (SEM) in the disciplines of management and entrepreneurship research, given the reasons indicated earlier (Ringle et al., 2020). The present study utilized 3M's SmartPLS Version 2.0 software to conduct its analysis, following the findings given by Sözbilir (2023). The following section outlines the main findings of the investigation.

Questionnaire

Tang et al. (2018) developed measurement instruments that formed the basis for the measurement items employed in GHRM methods. In addition, specific investigations were restated, starting with Song (2023) (see Appendix 1). The GHRM items were assessed using a five-point Likert scale, where a score of one represented strong disagreement and a score of five represented strong agreement. The data utilized for analyzing the circular economy were generated by Sassanelli et al. (2019) and Marrucci et al. (2019) are the rightful owners of the components related to reputation and environmental performance, respectively.

RESULTS

In order to determine the accuracy and consistency of the concepts, an assessment of the measuring model is carried out. The external loadings can be examined to assess the dependability of the signals. The results demonstrate that every input value above the preset threshold of 0.60, as specified by Hair et al. (2019). Olanrewaju et al. (2022) argue that the model's constructs have successfully integrated indicators that are both statistically significant and remarkably similar. In addition, as part of the assessment of construct reliability, alpha and composite reliability are examined. Based on the data, both the alpha and CR values exceed the predetermined threshold of 0.7. The study completed in 2014 offers additional confirmation of the reliability of the indicators, as corroborated by the research carried out by Alhassany & Faisal, (2018) Table 1 presents the alpha values, CR (composite reliability), and item loadings of the model's items. Consequently, it was crucial to analyze the extracted average variance (AVE) values to evaluate convergent validity. The results of Ab

Cheung et al. (2013) indicate that every AVE value surpasses the key threshold of 0.50. In 1981, Fornell and Larcker introduced a conventional method for assessing discriminant validity. In this particular context, correlations between latent variables are precisely specified as the square root of the extracted average variance (AVE). Hair et al. (2019) assert that the square root of the average variance extracted (AVE) for each construct should exceed the AVE of the construct that has the most significant correlation with the others. HTMT ratios can serve as an alternative approach to evaluate discriminant validity. According to Yusoff et al. (2020), in order to achieve discriminant validity, the HTMT ratio should be reduced to a value below 0.85. Table 1 displays the established threshold values for reliability and validity in the current investigation.

Table 1.
Reliability and Validity

Construct	Indicators	Loadings	Cronbach's alpha	Composite Reliability	AVE
Recruitment & Job Design (RJD)	RJD1	0.742	0.919	0.934	0.616
	RJD2	0.638			
	RJD3	0.659			
	RJD4	0.679			
Attracting & Selecting (AS)	AS1	0.856	0.931	0.911	0.621
	AS2	0.832			
	AS3	0.820			
	AS4	0.892			
Training & Development (TND)	TND1	0.891	0.910	0.901	0.612
	TND2	0.736			
	TND3	0.749			
	TND4	0.875			
	TND5	0.898			
	TND6	0.790			
Involvement, Empowerment & Engagement (IEE)	IEE1	0.859	0.917	0.929	0.523
	IEE2	0.816			
	IEE3	0.829			
	IEE4	0.728			
	IEE5	0.792			
	IEE6	0.795			
Performance Management & Appraisals (PMA)	PMA1	0.896	0.914	0.919	0.623
	PMA2	0.847			
	PMA3	0.871			
	PMA4	0.865			
	PMA5	0.825			
	PMA6	0.748			
Pay and Reward System (PRS)	PRS1	0.738	0.888	0.921	0.821
	PRS2	0.840			
	PRS3	0.875			
	PRS4	0.872			
Circular Economic Practices (CEP)	CEP1	0.903	0.912	0.911	0.749
	CEP2	0.946			
	CEP3	0.945			
	CEP4	0.913			
	CEP5	0.881			
	CEP7	0.915			
	CEP8	0.889			
	Environmental performance (EP)	EP1			
EP2		0.771			
EP3		0.783			
EP4		0.792			

EP5	0.826
EP6	0.861
EP7	0.817
EP8	0.837
EP9	0.833
EP10	0.840

Table 2.
Fornell-Larcker Criterion

	DYNC	INN	PRO	RT	SC	SME FP	TC
Recruitment & Job Design (RJD)	0.881						
Attracting & Selecting (AS)	0.772	0.927					
Training & Development (TND)	0.712	0.667	0.895				
Involvement, Empowerment & Engagement (IEE)	0.612	0.708	0.636	0.871			
Performance Management & Appraisals (PMA)	0.609	0.602	0.661	0.644	0.801		
Pay and Reward System (PRS)	0.671	0.861	0.606	0.650	0.689	0.785	
Circular Economic Practices (CEP)	0.638	0.657	0.501	0.676	0.696	0.621	0.723
Environmental performance (EP)	0.548	0.557	0.511	0.546	0.676	0.541	0.632

Evaluation of the Structural Model

According to Ramayah et al. (2023), Raouf et al. (2021), and Basheer et al. (2022a), Smart PLS utilizes the bootstrapping approach to determine partial coefficients. To assess the importance of coefficients and conduct hypothesis testing, standard errors are calculated using the bootstrapping technique (Hair et al., 2019; Basheer et al., 2022b). Table 4 presents the findings from the analysis of the structural model.

Table 4.
Structural Model Assessment

hypotheses	Relationship	Beta	STD	T Value	P Values	Decision
H1	RJD -> EP	0.287	0.038	3.797	0.023	Supported
H2	AS -> EP	0.575	0.037	6.628	0.007	Supported
H3	TND -> EP	0.466	0.037	7.332	0.025	Supported
H4	IEE -> EP	0.399	0.042	2.418	0.003	Supported
H5	PMA -> EP	0.178	0.051	7.468	0.046	Supported
H6	PRS -> EP	0.178	0.047	3.535	0.014	Supported
H7	RJD -> CEP	0.129	0.042	2.585	0.033	Supported
H8	AS -> CEP	0.533	0.054	10.540	0.016	Supported
H9	TND -> CEP	0.401	0.036	10.691	0.026	Supported
H10	IEE -> CEP	0.454	0.042	9.276	0.028	Supported
H11	PMA -> CEP	0.110	0.045	4.742	0.010	Supported
H12	PRS -> CEP	0.585	0.048	2.879	0.049	Supported
H13	CEP -> EP	0.516	0.061	8.158	0.039	Supported

Circular economic practices (CEP) have a direct and indirect impact on environmental performance (EP) through human resource practices. The research also reveals a positive correlation between CEP and EP. It is evident that there is a clear requirement for complete human resource strategies to enhance environmental outcomes, as demonstrated by the significant positive impacts of RJD, AS, TND, IEE, PMA, and PRS on EP. The profound influence that IEE (Institute of Electrical and

Electronics Engineers) has on EP (Environmental Protection) underscores the imperative of including employees in sustainability initiatives. Furthermore, the continuous endorsement of CEP-related assumptions indicates that integrating circular economy concepts into company operations can enhance the efficacy of human resource practices in achieving environmental objectives, in addition to the evident advantages of EP. Integrating HR practices with circular economy ideas tends to have a positive impact on environmental sustainability.

Table 5.

HYPOTHESES	RELATIONSHIP	BETA	STD	T VALUE	P VALUES	DECISION
H14	RJD -> CEP->EP	0.570	0.032	4.528	0.039	Supported
H15	AS -> CEP>EP	0.547	0.043	6.884	0.011	Supported
H16	TND -> CEP>EP	0.399	0.046	3.268	0.001	Supported
H17	IEE -> CEP>EP	0.561	0.041	9.220	0.041	Supported
H18	PMA -> CEP>EP	0.144	0.063	2.671	0.036	Supported
H19	PRS -> CEP>EP	0.198	0.044	10.882	0.037	Supported

Hypotheses H14-H19 extend the scope of the inquiry to include the mediating role of Circular Economic Practices (CEP) in the relationship between various human resource practices and environmental performance. These concepts demonstrate a successful advancement from RJD to AS to TND to IEE to PMA to PRS via CEP to EP, based on continuously positive and statistically significant results. This illustrates the impact of these HR policies on employee performance (EP) and underscores the need of embracing circular economy principles to cultivate more sustainable HR methods. The circular practices have a considerable impact on environmental performance, as seen by the high beta values and significant T values of AS, IEE, and PRS from CEP to EP. This demonstrates the diverse role that HR can play in promoting environmental sustainability.

CONCLUSION

The empirical research conducted in this study provides support for the notion that Green Human Resource Management (GHRM) is essential for enhancing environmental performance in the context of a circular economy. For this work, we employed Structural Equation Modeling-Partial Least Squares 4 (SEM-PLS 4) to analyze data from 200 companies listed on the Pakistan Stock Exchange (PSX). The application of GHRM practices has been found to work as a mediator between organizational policies and the adoption of circular economy concepts, leading to a significant enhancement in environmental performance measures. This research study adds to the existing knowledge on sustainable business practices by illustrating how the combined implementation of HRM (Human Resource Management) and circular economy methods can yield favourable environmental results. Based on the research, it is recommended that companies prioritize the development of an innovation and sustainability culture aligned with circular economy principles above strategic human resource management (GHRM) when formulating their sustainability strategy.

Implementing the following techniques can greatly enhance environmental performance: recruiting and job design, attraction and selection, training and development, involvement, empowerment and engagement, performance management and appraisals, and compensation and reward systems. This highlights the crucial importance of human resources in advancing sustainability initiatives and

establishing a robust and enduring corporate structure that aligns with the aims of the circular economy. The study's significant findings provide robust endorsement for the United Nations' Sustainable Development Goals. The text emphasizes the crucial significance of Green Human Resource Management (GHRM) in enhancing environmental performance by implementing circular economy principles. Organizations that integrate Global Human Resource Management (GHRM) into their sustainability plan can contribute to the progress of the worldwide movement towards a sustainable future, while also promoting environmental accountability (Obeidat(et al.,2023). The correlation between the study's results and different Sustainable Development Goals (SDGs) underscores the significance of efficient human resource management in achieving these worldwide objectives.

The findings corroborate SDG 8 (Decent Work and Economic Growth), which advocates for the promotion of environmentally-friendly employment and fair labor conditions as means of cultivating sustainable and all-encompassing economic advancement. Adopting GHRM policies can lead to enhanced worker skills and productivity, which in turn can contribute to the long-term sustainability of economic growth. Sustainable Development Goal 9 (Industry, Innovation, and Infrastructure) states that GHRM frameworks prioritize circular economy approaches to promote environmentally responsible manufacturing and innovation. The GHRM's support for fostering innovation in businesses, particularly with an emphasis on sustainability, significantly contributes to the advancement of robust infrastructure and the encouragement of inclusive and sustainable industrial growth. This study provides clear evidence in favor of SDG 12, responsible consumption and production, by illustrating how GHRM policies can assist companies in adopting more sustainable purchasing and production behaviors. Organizations can enhance resource efficiency and sustainability, as well as minimize waste, by adopting circular economy principles. SDG 13, known as "Climate Action," aims to accelerate efforts in mitigating the impacts of climate change. Implementing GHRM practices that enhance environmental performance contributes to the achievement of this objective. GHGRM is a strategic framework that promotes the implementation of sustainable business practices and initiatives to mitigate the adverse impacts of climate change and its associated risks.

POLICY IMPLICATIONS

The study's findings highlight the importance of Green Human Resource Management (GHRM) in enhancing environmental performance through the adoption of circular economy solutions. This has significant implications for practical policy (Marrucci et al.,2021). These observations provide a basis for companies seeking to incorporate sustainability concepts into their daily operations, as well as demonstrate how to align with the broader Sustainable Development Goals. An organization can foster a culture that emphasizes sustainability by incorporating Green Human Resource Management (GHRM) principles into its long-term strategic objectives. This necessitates integrating environmentally sustainable practices into the organization's development, training, and reward systems, while enforcing environmentally friendly rules. By aligning human resources procedures with environmental objectives, a team can optimize its full potential to drive sustainable innovation and practices. Moreover, it is crucial for politicians to build legislative and regulatory frameworks that encourage enterprises to embrace sustainable and circular practices. Governmental organizations may require corporations to include circular economy principles into their operational strategies or provide financial incentives to enterprises that

demonstrate a strong commitment to sustainability. The use of these frameworks could help firms migrate to more sustainable models and lower the barriers for circular economy activities. Furthermore, fostering collaboration amongst different departments is a crucial factor in effectively shifting towards a more sustainable economy. Public-private partnerships are highly beneficial because they facilitate the sharing of resources and information, leading to improved effectiveness of sustainability programs. Collaborations like these can lead to the development of new technologies and practices that promote the circular economy. Another crucial requirement is to commit resources specifically for the purpose of education and workforce development. Organizations can ensure a reliable and capable staff to drive their sustainability initiatives by educating and training current and potential employees to embrace and promote sustainable practices.

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Consent to Participate: Yes

Consent for publication and Ethical approval: Because this study does not include human or animal data, ethical approval is not required for publication. All authors have given their consent.

REFERENCES

- Aftab, J., Veneziani, M., Sarwar, H., & Ishaq, M. I. (2022). Entrepreneurial orientation and firm performance in SMEs: The mediating role of entrepreneurial competencies and moderating role of environmental dynamism. *International Journal of Emerging Markets*.
- Alhassany, H., & Faisal, F. (2018). Factors influencing the internet banking adoption decision in North Cyprus: an evidence from the partial least square approach of the structural equation modeling. *Financial Innovation*, 4, 1-21.
- Al-Swidi, A. K., Gelaidan, H. M., & Saleh, R. M. (2021). The joint impact of green human resource management, leadership and organizational culture on employees' green behaviour and organisational environmental performance. *Journal of cleaner production*, 316, 128112.
- Amjad, F., Abbas, W., Zia-Ur-Rehman, M., Baig, S. A., Hashim, M., Khan, A., & Rehman, H. U. (2021). Effect of green human resource management practices on organizational sustainability: the mediating role of environmental and employee performance. *Environmental Science and Pollution Research*, 28, 28191-28206.
- Bahuguna, P. C., Srivastava, R., & Tiwari, S. (2023). Two-decade journey of green human resource management research: a bibliometric analysis. *Benchmarking: An International Journal*, 30(2), 585-602.
- Bashir, M. F., Sadiq, M., Talbi, B., Shahzad, L., & Adnan Bashir, M. (2022). An outlook on the development of renewable energy, policy measures to reshape the current energy mix, and how to achieve sustainable economic growth in the post COVID-19 era. *Environmental Science and Pollution Research*, 29(29), 43636-43647.
- Bawa, R. K., Kathuria, K., & Dhiman, R. (2022). Green Human Resource Management: Proposed Conceptual Model Through Systematic Literature Review. *ECS Transactions*, 107(1), 3429.

- Benevene, P., & Buonomo, I. (2020). Green human resource management: An evidence-based systematic literature review. *Sustainability*, 12(15), 5974.
- Bertassini, A. C., Ometto, A. R., Severengiz, S., & Gerolamo, M. C. (2021). Circular economy and sustainability: The role of organizational behaviour in the transition journey. *Business Strategy and the Environment*, 30(7), 3160-3193.
- Boon, C., Eckardt, R., Lepak, D. P., & Boselie, P. (2018). Integrating strategic human capital and strategic human resource management. *The International Journal of Human Resource Management*, 29(1), 34-67.
- Cheung, G. W., Cooper-Thomas, H. D., Lau, R. S., & Wang, L. C. (2023). Reporting reliability, convergent and discriminant validity with structural equation modeling: A review and best-practice recommendations. *Asia Pacific Journal of Management*, 1-39.
- 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, J. F., Sarstedt, M., & Ringle, C. M. (2019). Rethinking some of the rethinking of partial least squares. *European journal of marketing*, 53(4), 566-584.
- Hennink, M., & Kaiser, B. N. (2022). Sample sizes for saturation in qualitative research: A systematic review of empirical tests. *Social science & medicine*, 292, 114523.
- Hidayat-ur-Rehman, I., & Alsolamy, M. (2023). A SEM-ANN analysis to examine sustainable performance in SMEs: The moderating role of transformational leadership. *Journal of Open Innovation: Technology, Market, and Complexity*, 9(4), 100166.
- Joshi, G., & Dhar, R. L. (2020). Green training in enhancing green creativity via green dynamic capabilities in the Indian handicraft sector: The moderating effect of resource commitment. *Journal of Cleaner Production*, 267, 121948.
- Karmelić, E., Lindlöf, H., Luckhaus, J. L., Castillo, M. M., Vicente, V., Härenstam, K. P., & Savage, C. (2023). Decision-making on the fly: a qualitative study of physicians in out-of-hospital emergency medical services. *BMC Emergency Medicine*, 23(1), 65.
- Kazancoglu, I., Sagnak, M., Kumar Mangla, S., & Kazancoglu, Y. (2021). Circular economy and the policy: A framework for improving the corporate environmental management in supply chains. *Business Strategy and the Environment*, 30(1), 590-608.
- Kumar, P., Singh, R. K., & Kumar, V. (2021). Managing supply chains for sustainable operations in the era of industry 4.0 and circular economy: Analysis of barriers. *Resources, Conservation and Recycling*, 164, 105215.
- Liu, R., Yue, Z., Ijaz, A., Lutfi, A., & Mao, J. (2023). Sustainable business performance: Examining the role of green HRM practices, green innovation and responsible leadership through the lens of pro-environmental behavior. *Sustainability*, 15(9), 7317.
- Maniu, I., Costache, C., & Dumitraşcu, D. D. (2021). Adoption of green environmental practices in small and medium-sized enterprises: Entrepreneur and business policies patterns in romania. *Sustainability*, 13(9), 4968.
- Marrucci, L., Daddi, T., & Iraldo, F. (2019). The integration of circular economy with sustainable consumption and production tools: Systematic review and future research agenda. *Journal of Cleaner Production*, 240, 118268.
- Marrucci, L., Daddi, T., & Iraldo, F. (2021). The contribution of green human resource management to the circular economy and performance of environmental certified organisations. *Journal of Cleaner Production*, 319, 128859.
- Marrucci, L., Daddi, T., & Iraldo, F. (2021). The contribution of green human resource management to the circular economy and performance of environmental certified organisations. *Journal of Cleaner Production*, 319, 128859.
- Merli, R., Preziosi, M., & Acampora, A. (2018). How do scholars approach the circular economy? A systematic literature review. *Journal of cleaner production*, 178, 703-722.
- Obeidat, S. M., Abdalla, S., & Al Bakri, A. A. K. (2023). Integrating green human resource management and circular economy to enhance sustainable performance: an empirical study from the Qatari service sector. *Employee Relations: The International Journal*, 45(2), 535-563.

- 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.
- Olanrewaju, O. I., Kineber, A. F., Chileshe, N., & Edwards, D. J. (2022). Modelling the relationship between Building Information Modelling (BIM) implementation barriers, usage and awareness on building project lifecycle. *Building and Environment*, 207, 108556.
- Pardo-Garcia, C., & Barac, M. (2020). Promoting employability in higher education: A case study on boosting entrepreneurship skills. *Sustainability*, 12(10), 4004.
- Pham, N. T., Hoang, H. T., & Phan, Q. P. T. (2020). Green human resource management: a comprehensive review and future research agenda. *International Journal of Manpower*, 41(7), 845-878.
- Ramayah, T. J. F. H., Cheah, J., Chuah, F., Ting, H., & Memon, M. A. (2018). Partial least squares structural equation modeling (PLS-SEM) using smartPLS 3.0. *An updated guide and practical guide to statistical analysis*, 978-967.
- Ramezan, C. A., Warner, T. A., Maxwell, A. E., & Price, B. S. (2021). Effects of training set size on supervised machine-learning land-cover classification of large-area high-resolution remotely sensed data. *Remote Sensing*, 13(3), 368.
- Raof, R., Basheer, M. F., Shabbir, J., Ghulam Hassan, S., & Jabeen, S. (2021). Enterprise resource planning, entrepreneurial orientation, and the performance of SMEs in a South Asian economy: The mediating role of organizational excellence. *Cogent Business & Management*, 8(1), 1973236.
- Ren, S., Tang, G., & E Jackson, S. (2018). Green human resource management research in emergence: A review and future directions. *Asia Pacific Journal of Management*, 35, 769-803.
- Ringle, C. M., Sarstedt, M., Mitchell, R., & Gudergan, S. P. (2020). Partial least squares structural equation modeling in HRM research. *The international journal of human resource management*, 31(12), 1617-1643.
- Ruiz, L. A. L., Ramón, X. R., & Domingo, S. G. (2020). The circular economy in the construction and demolition waste sector—A review and an integrative model approach. *Journal of Cleaner Production*, 248, 119238.
- Sarstedt, M., Ringle, C. M., & Hair, J. F. (2021). Partial least squares structural equation modeling. In *Handbook of market research* (pp. 587-632). Cham: Springer International Publishing.
- Sassanelli, C., Rosa, P., Rocca, R., & Terzi, S. (2019). Circular economy performance assessment methods: A systematic literature review. *Journal of cleaner production*, 229, 440-453.
- Shahriari, B., & Hassanpoor, A. (2019). Green human resource management in the east and west. *Revista Gestão & Tecnologia*, 19(2), 27-57.
- Sözbilir, F. (2023). The Impact of Emotional Intelligence and Organizational Identification on Creativity Performance. *International Journal of Organizational Leadership*, 12(3).
- Tang, G., Chen, Y., Jiang, Y., Paillé, P., & Jia, J. (2018). Green human resource management practices: scale development and validity. *Asia pacific journal of human resources*, 56(1), 31-55.
- Usman, M., & Mat, N. (2021). Green Human Resource Management: Implication towards environmental performance in developing countries. *International Journal of Economics, Management and Accounting*, 29(1), 207-221.
- van Assen, M. F. (2020). Empowering leadership and contextual ambidexterity—The mediating role of committed leadership for continuous improvement. *European Management Journal*, 38(3), 435-449.
- Yang, M., Chen, L., Wang, J., Msigwa, G., Osman, A. I., Fawzy, S., ... & Yap, P. S. (2023). Circular economy strategies for combating climate change and other environmental issues. *Environmental Chemistry Letters*, 21(1), 55-80.
- Yu, W., Chavez, R., Feng, M., Wong, C. Y., & Fynes, B. (2020). Green human resource management and environmental cooperation: An ability-motivation-opportunity and contingency perspective. *international journal of production Economics*, 219, 224-235.
- Yusoff, A. S. M., Peng, F. S., Abd Razak, F. Z., & Mustafa, W. A. (2020, April). Discriminant validity assessment of religious teacher acceptance: The use of HTMT criterion. In *Journal of Physics: Conference Series* (Vol. 1529, No. 4, p. 042045). IOP Publishing.

- Zhao, J., Liu, H., & Sun, W. (2020). How proactive environmental strategy facilitates environmental reputation: Roles of green human resource management and discretionary slack. *Sustainability*, 12(3), 763.
- Jabbour, C.J.C., 2015. Environmental training and environmental management maturity of Brazilian companies with ISO14001: empirical evidence. *J. Clean. Prod.* 96, 331–338. <https://doi.org/10.1016/j.jclepro.2013.10.039>.
- Jabbour, C.J.C., De Sousa Jabbour, A.B.L., 2016. Green human resource management and green supply chain management: linking two emerging agendas. *J. Clean. Prod.* 112, 1824–1833 doi.org/10.1016/j.jclepro.2015.01.052.
- Masri, H.A., Jaaron, A.A.M., 2017. Assessing Green Human Resources Management practices in Palestinian manufacturing context: an empirical study. *J. Clean. Prod.* 143, 474–489. <https://doi.org/10.1016/j.jclepro.2016.12.087>.
- Tang, G., Chen, Y., Jiang, Y., Paill'e, P., Jia, J., 2018. Green human resource management practices: scale development and validity. *Asia Pac. J. Hum. Resour.* 56 (1), 31–55. <https://doi.org/10.1111/1744-7941.12147>.
- Shah, M., 2019. Green human resource management: development of a valid measurement scale. *Bus. Strat. Environ.* 28 (5), 771–785. <https://doi.org/10.1002/bse.2279>.
- Sassanelli, C., Rosa, P., Rocca, R., Terzi, S., 2019. Circular economy performance assessment methods: a systematic literature review. *J. Clean. Prod.* 229, 440–453. <https://doi.org/10.1016/j.jclepro.2019.05.019>.
- Marrucci, L., Daddi, T., & Iraldo, F. (2021). The contribution of green human resource management to the circular economy and performance of environmental certified organisations. *Journal of Cleaner Production*, 319, 128859.

Appendix-A

Green HRM

Recruitment & job design

1. Environmental protection is now an integral part of every job description at my company (Shah, 2019).
2. Incorporating the company's social and environmental requirements into job descriptions and specifications is a practice at my organization (Shah, 2019).
3. The environmental aspect is now a part of the job description at my company (Shah, 2019).
4. As a differentiating factor in job specifications, my company has included green capabilities (Shah, 2019).
4. In order to highlight the importance of environmental protection, my organization has developed and implemented innovative positions (Shah, 2019).

Attracting & selecting

1. The HR staffing policy at my company has been updated to include "green aware" criteria (Shah, 2019).
2. During the interview process, candidates for jobs are evaluated based on their environmental-friendly qualities in my organization (Shah, 2019).
3. The environmental performance of my company is a major factor in the recruitment of new employees (Jabbour, 2015).
4. The environmental concern, motivation, and interest of candidates are taken into consideration by my organization as selection criteria (Saeed et al., 2019).

Training & development

1. In my company, environmental training is provided to all of the employees, including those who are outsourced, and it is provided at all levels of the organizational hierarchy (Jabbour, 2015; Saeed et al., 2019).

2. The employees of my company exhibit a high level of contentment with the environmental training that is provided to them (Jabbour, 2015)
3. The topics that are discussed during environmental training sessions at my organization are appropriate and up-to-date in conjunction with the activities that are carried out by the organization (Jabbour, 2015).
4. The employees of my company are evaluated to determine which aspects of the environment require training (Shah, 2019).
5. My organization provides an evaluation of those individuals who require training in environmental management (Shah, 2019).
6. My company provides training in environmental management to its employees in order to enhance their awareness, skills, and knowledge (Shah, 2019).

Involvement, empowerment & engagement

1. To promote green values, my organization employs a variety of formal and informal communication channels (Shah, 2019).
2. In order for employees to enhance their environmental conduct and share unspoken knowledge, my organization facilitates workshops, forums, and joint sessions (Masri and Jaaron, 2017; Saeed et al., 2019).
3. Top-level executives in my organization effectively manage and raise awareness of environmental issues through the use of teamwork (Masri and Jaaron, 2017).
4. Employees are acknowledged as a critical stakeholder in environmental management by my organization (Saeed et al., 2019).
5. A culture of environmental protection is prioritized at my organization, which emphasizes the value of green safety and the implementation of green practices (rephrased from Shah, 2019).
6. My organization has helpline and green whistleblower procedures (Shah, 2019).

Performance management & appraisals

1. In order to assist personnel or groups in attaining environmental objectives or enhancing their environmental performance, my organization consistently offers constructive criticism (Masri and Jaaron, 2017; Saeed et al., 2019).
2. The performance evaluation system at my organization integrates objectives and targets related to corporate environmental management (Masri and Jaaron, 2017).
3. Every employee in my organization is assigned green goals, objectives, and responsibilities (Shah, 2019).
4. Green objectives are integrated into periodic evaluations as set by managers in my organization (Shah, 2019).
5. The communication of green objectives is a priority for my organization (Shah, 2019).
6. Environmental incidents are continuously assessed and documented in my organization (Shah, 2019).

Pay and reward system

1. In accordance with environmental accomplishments, my organization provides both monetary and non-monetary incentives (sabbatical, leave, gifts, bonuses, cash, premiums, promotion) (Masri and Jaaron, 2017; Saeed et al., 2019).
2. Environmental performance is publicly acknowledged within my organization (Masri and Jaaron, 2017; Saeed et al., 2019).

3. Car-sharing, among other environmentally sustainable behaviors and activities, are incentivized by my organization (Saeed et al., 2019).
4. My organization organizes activities that are friendly to the environment for its employees.

Circular economic practices

1. We are implementing a life cycle management strategy.
2. Our product designs prioritize features that facilitate upgrades, repairs, refurbishments, and remanufacturing, as well as complete biodegradability, high recyclable content, and easy recoverability at the end-of-life stage.
3. The implementation of closed-loop systems in our manufacturing operations aims to prevent leaks and reduce waste generation.
4. The material and energy efficiency of our manufacturing process is being enhanced.
5. We engage in the transfer or sale of byproducts and surplus energy generated during our manufacturing operations to external entities.
6. We provide customers with services pertaining to the refurbishment, upgrading, and repair of our products.
7. We are gathering product components and end-of-life products for the purposes of recycling and material recovery.
8. Our production process incorporates bi-products, end-of-life products, recycled materials, and excess energy as inputs.

Environmental performance

1. Energy efficiency.
2. Efficiency in the use of materials (e.g. chemicals, raw materials).
3. Water consumption.
4. Waste production.
5. Quality/quantity of wastewater effluents.
6. Quality/quantity of air emissions.
7. Noise emissions
8. Increased trust in the organization's relationship with its customers and suppliers (Daddi et al., 2019a)
9. An enhanced perception of the organization in the eyes of the government authorities (Daddi et al., 2019a).
10. An improved representation of the organization in comparison to the reputation of competitors who do not use EMAS (Daddi et al., 2019a).
11. Eleventh, an improvement in relationships with local communities and a reduction in conflicts (such as public complaints) (Daddi et al., 2019a)

