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EFFECT OF GREEN HUMAN RESOURCE MANAGEMENT ON GREEN PERFORMANCE: THE MEDIATING ROLE OF GREEN HUMAN CAPITAL IN THE TELECOM SECTOR OF PAKISTAN

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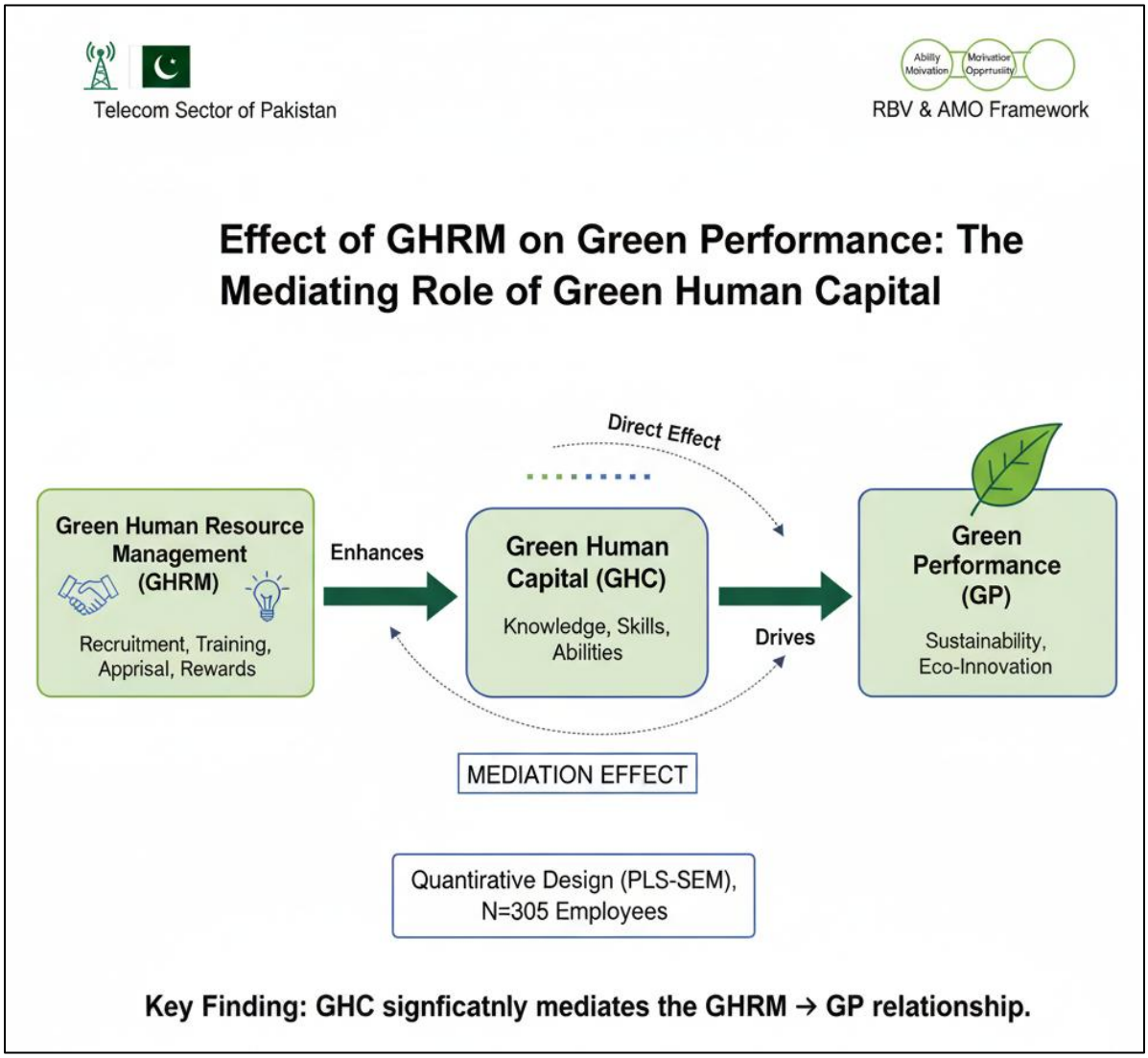
Abstract

The increasing ecological pressures have made Green Human Resource Management (GHRM) more critical than ever. Amongst other industries, “The Telecom Sector within Pakistan can be identified as having a burning need to understand how GHRM contributes to Organizational Sustainability, given its high energy consumption and electronic waste characteristics. The aim of this research is to identify the impact of GHRM on green performance and green human capital as the critical mediator. Using the Resource Based View (RBV) and Ability Motivation Opportunity (AMO) conceptualizes GHRM as a GHRM constituent that endows the organization with a valuable green intangible strategic asset, eco-capital. It’s defined as an outcome of green human capital transformative GHRM initiatives and efforts. This research adopts a quantitative design and distributes a structured Likert-scale questionnaire to employees at the top telecommunication firms within Pakistan. Partial Least Squares Structural Equation Modeling (PLS-SEM) verified the eco-capital theory. HR systems designed to enhance recruitment, training, performance appraisal, and rewards systems deployment for environmental sustainability purposes improve retention and turnover of green human capital, with GHC GHRM eco-capital. The results of the research enhance the body of knowledge by GHRM empirics as a resource orchestration for sustainability and GHRM operationalized as a GHRM for practical integration for telecom managers for a human capital investment on green startups innovation.

Keywords:

Green Human Resource Management; Green Human Capital; Green Performance; Telecom Sector; Pakistan; Sustainability; PLS-SEM.

Graphical Abstract:



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CHAPTER 1

1. INTRODUCTION

Worldwide, various organizations are reprioritizing their strategies, owing to how rapidly globalization, digital transformation, and environmental degradation have been occurring. Green HR Management has developed as a critical tool for intertwining business operations with environmental responsibilities. GHRM is no longer limited to mere administrative tasks; it has undergone a radical transformation, GHRM sustains the environmental value commitments of the entire workforce by instilling ecological principles during recruitment, training, performance evaluation, and reward systems (S. Ahmad; 2015).

Within the telecom sector and other similar industries, sustainability obstacles are of great concern. Data centers, with their constantly running networks and digital infrastructure, emit a high amount of CO2 and contribute to the growing concern of electronic waste. Pakistan's telecom sector, with main players such as Jazz, Zong, Telenor, and Ufone, has seen a huge growth in its subscribers and data usage. However, this growth is accompanied by an increase in environmental degradation, along with depleted resources and electronic waste. Electric waste has attracted concern from the country's regulators and the public, with targeting the profitably maintained and service quality ways (M. A. Aukhoon, et al., 2024).

To this end, Green Human Resource Management systematically integrates and sustains ecology and human resource practices to foster and maintain workplace sustainability. Recruiting 'green' employees, developing eco-centric training, incorporating sustainability indicators into evaluations, and eco- incentive programs helps to foster a culture of sustainability and proactive environmental behavior. GHRM improves ecological results and also improves reputation, innovation, and competitiveness over the long run (G. Tang, Yet al, 2018).

The Resource- Based View (RBV) and Ability – Motivation – Opportunity (AMO) theories lay the foundation for this research. The RBV argues that human capital that has the skills, knowledge, and commitment to the environment is strategic, valuable, rare, and a sustainable competitive

advantage (M. Delgado-Verde, et al, 2014). In addition, the AMO theory argues that employees will perform at their best when they have the ability (through training and learning), the motivation (through rewards and recognition), and the opportunity (through participation in eco- projects) to behave in an environmentally responsible manner. Collectively, the theories show the practices of GHRM that develop the Green Human Capital (GHC) and then improve Green Performance (GP) by reducing emissions, improving energy efficiency, and meeting sustainability compliance (Z. Abbas, et al., 2022).

This evidence supports the theories. Recently, GHRM has been proven to enhance environmental organizational innovation and performance more robustly when mediated by employee behavior. However, despite the increased interest in GHRM, little research has been done about the telecommunications industry in developing countries where environmental vulnerability is coupled with advanced technology. There is a glaring lacuna within the context of Pakistan which is an emerging telecom market with high consumption of energy and digitalization. There is a need to understand how GHRM practices can be used to develop green human capital and achieve better sustainability outcomes (S. T. Alshahrani and K. Iqbal, 2024).

In this regard, the current paper seeks to determine the impact of Green Human Resource Management practices on Green Performance with Green Human Capital as a mediating variable in the telecom industry of Pakistan. It attempts to fill in the theoretical and contextual void in the developing country context while sustaining the pervasive RBV and AMO framework which will enrich the sustainability literature and add to the managerial practices as well (M. Miah, et al., 2024).

The main objective of this study is to show that people are the starting point for any sustainable transformation. It can be achieved if the organization invests strategically in green human capital. In that way, the organization can realize human potential as ecological innovation integrated with tangible outputs. It is also anticipated that the results will be useful for policymakers, telecom managers, and HR specialists who wish to the align the environmental and HR strategies of the organization, aimed at competitive and responsible growth (M. Shoaib, et al., 2025).

1. 1 Background

The evolution of business strategies to include sustainable practices have greatly impacted the way organization manage their workforce, business activities and available resources aimed at achieving sustainability both ecologically and economically. The need to accelerate sustainability at the core of business strategy has now become urgent as every industrial sector is now facing intense pressure from global environmental policies, civic awareness and climate change regulations. In the case of energy intensive sectors, telecoms and the like have continuous network operations, enormous data transmission activities, and a heavy reliance on energy intensive data centers – all of which help a lot to the carbon footprint and electronic waste generation. The reason for this is that telecom organizations to mainstream sustainability into their key HR and operational functions, rather than only integrating it into auxiliary functions (R. Batool *et al.*, 2019).

In this context, GHRM has emerged as a new paradigm which seeks to integrate environmental sustainability with the core functions of human resource management like recruitment, selection, training, performance appraisal, and remuneration. GHRM seeks to invest in the culture of environmental sustainability and to promote the development of eco-innovations along with minimizing the ecological footprint of the organization as a whole. With the internalization of 'green' values and competencies in the human resource functions, the firm would be able to behaviors that promote eco-efficient resource use like energy conservation, waste minimization, and responsible resource use. This would enhance the environmental and economic performance of the firm (A. Ahmad, et al., 2022).

Having the requisite knowledge, skills and attitudinal green orientation can lead to the development of superior performance and sustain resilience in turbulent market conditions. As stated in "Resource-Based View" (RBV), organizations which focus on the development and utilization of employee knowledge, skills, and green-oriented attitudes have high performance. Sustainable operational and environmental effectiveness can be achieved when employees possess "green competencies" which include environmental literacy, capability to innovate green products and services, and sustainability-oriented decision making. The human capital and the sustainability objectives alignment driven the employees to be proactive contributors to ecological instead of passive executors of policy (J. Aftab and M. Veneziani, 2024).

Integrating GHRM in Pakistan's telecom sector is both an ethical and strategic obligation, considering that expansion of digital infrastructure is accompanied with ever-increasing environmental deterioration. Increased electricity consumption, in addition to unchecked public and regulatory expectations on environmental accountability, has accelerated the generation of electronic waste. Achieving green objectives helps the telecom sector in raising operational performance, lowering environmental impacts, and boosting reputation at the same time. GHRM practices also increase the level of employee motivation, retention, and engagement by enhancing the sense of collective ownership toward organizational and environmental sustainability. GHRM integration in the development of Green Human Capital helps in the attainment of sustainable Green Performance, which ensures a long-term balance between innovation, profitability, and environmental accountability (J. Aftab, N. Abid, N. Cucari, and M. Savastano, 2023).

1.2 Research Gap

Despite the increasing interest in Green Human Resource Management (GHRM) and its implications for sustainability, significant gaps persist in the literature, particularly concerning the telecommunications sector in developing countries like Pakistan. The following outlines both theoretical and conceptual gaps that warrant further investigation.

Theoretical Gap

Limited Application of Theoretical Frameworks:

Recent studies have started to validate the Resource-Based View (RBV), Ability-Motivation-Opportunity (AMO) theory, and Stakeholder Theory within the context of GHRM. However, there remains a scarcity of comprehensive frameworks that synthesize these theories to investigate Green Human Capital (GHC) as a mediator between GHRM and Green Performance (GP). The existing literature has yet to fully explore how these interconnected theories can inform a cohesive understanding of how human-centric capabilities drive environmental outcomes, particularly in developing economies post-2023.

Underexplored Mediating Role of GHC:

While GHC is recognized as a significant resource in enhancing organizational performance, its specific mediating role in the context of GHRM and GP remains under-researched, especially in sectors prone to high environmental impact like telecommunications. Current studies have primarily focused on direct relationships, neglecting the nuanced pathways through which GHC influences the effectiveness of GHRM practices.

Emerging Sustainability Paradigms:

With the rapid evolution of sustainability paradigms in the wake of global challenges such as climate change, there is a need for theoretical frameworks that incorporate recent developments and empirical evidence post-2023. This includes addressing the integration of digital transformation, innovation capabilities, and stakeholder engagement in shaping effective GHRM practices.

Conceptual Gap

Context-Specific Research on GHRM in Telecommunications:

Although GHRM has been studied in various industrial contexts, there is a significant lack of conceptual understanding related to its application within the telecommunications sector in Pakistan. Most existing studies do not adequately account for unique regional challenges, such as high energy consumption and electronic waste, or the regulatory landscape that shapes the adoption of green practices in developing countries since 2023.

Integration of Behavioral Aspects within GHRM Frameworks:

Current research often underrepresents the behavioral dimensions of GHRM and GHC. More empirical studies are needed that focus on how GHRM practices can effectively change employee behavior and attitudes toward sustainability, particularly in regions where environmental consciousness is still developing. This gap presents an opportunity to explore the practical measures that can enhance employee engagement in green initiatives.

Lack of Comprehensive Models for Sustainability Outcomes:

There remains a conceptual void concerning the causal mechanisms between GHRM, GHC, and GP. This includes a failure to articulate how specific GHRM practices contribute to the cultivation of Green Human Capital and how this, in turn, affects environmental performance. A more detailed understanding is required to establish actionable frameworks that link theory with practical implementation in the telecommunications sector.

Insufficient Focus on Policy Implications:

Research often falls short of connecting findings on GHRM and sustainability outcomes to broader policy implications. This gap highlights the need for studies that assess how GHRM practices can shape industry standards, regulatory frameworks, and strategic guidelines in the telecommunications sector, considering the evolving landscape of environmental governance as of 2023.

In summary, the gaps identified in both theoretical and conceptual frameworks underscore the urgent need for targeted research in GHRM and its implications for sustainability outcomes in the telecommunications industry, particularly in the context of Pakistan. Addressing these gaps will significantly contribute to the development of effective strategies that align human resource practices with environmental objectives, ultimately enhancing organizational performance and sustainability in emerging markets.

1.3 Problem Statement

Despite the heightened global focus on environmental management and sustainability, the adoption of Green Human Resource Management (GHRM) practices within Pakistan's telecommunications sector remains inconsistent and fragmented. While some firms implement eco-initiatives, many fail to develop integrated human-resource frameworks that seamlessly incorporate sustainability into their operations, resulting in minimal gains in Green Performance (GP). This lack of coherence not only stifles potential advancements in environmental outcomes but also hampers competitive advantage in an industry increasingly scrutinized for its ecological impact.

Additionally, the role of Green Human Capital (GHC) as a crucial mediator that connects GHRM practices to enhanced environmental performance has not been adequately explored, particularly

within the context of emerging markets like Pakistan. Existing literature frequently overlooks the specific challenges and intricacies faced by telecommunications companies operating in this region, such as high energy consumption, electronic waste generation, and varying regulatory landscapes.

Furthermore, the behavioral dimensions of GHRM and GHC—specifically how these practices influence employee attitudes and actions toward sustainability—are critically understudied. This gap presents an urgent need for research that not only elucidates the mechanisms through which GHRM cultivates GHC but also endeavors to establish a robust conceptual framework that articulates the causal relationships between these constructs.

In addressing these gaps, this study aims to explore how targeted GHRM practices can effectively develop Green Human Capital and improve organizational Green Performance in Pakistan's telecommunications sector. By providing empirical insights and practical recommendations, this research aspires to inform both industry stakeholders and policymakers in aligning human resource practices with broader environmental objectives, thereby facilitating sustainable growth and innovation.

1.4 Research Objectives

1. To explore the relationship between GHRM practices and green performance in the Pakistani telecom sector.
2. To assess the green human capital and green performance relationship in the context of GHRM.
3. To provide practical measures to telecom firms in Pakistan in relation to GHRM.

1.5 Research Questions

- How do GHRM practices influence green performance in the telecom sector?
- Does green human capital mediate the relationship between GHRM and green performance?
- Which HR interventions most effectively develop green human capital?

1.6 Significance of the Study

This study is significant from a theoretical, managerial, policy, and societal perspective, thus contributing to both theory and practice within the telecommunications context from multiple angles. With corporate sustainability constituting a vital part of the corporate strategy, the fusion of GHRM and GHC and GP is of utmost importance to transcending economies like Pakistan, where digital advances are fraught with environmental hurdles. This research increases the existing GHRM literature by contributing empirical evidence to the Resource-Based View (RBV) and the Ability–Motivation–Opportunity (AMO) theory in the context of a developing county. While previous studies have focused on these theories in isolation, this study draws on all three to explain how green human capital is a major strategic asset and the employee ability, motivation, and opportunity system determines their environmental performance outcomes. The dual theoretical validation advances the debate in the field of sustainable human resource management and competitive advantage by providing evidence from a sector where this has been lacking (A. Nawaz Khan, 2023).

Taking into consideration the managerial implications, the study provides relevant suggestions to telecom executives and HR managers, as well as sustainability officers whose tasks involve the integration of the environmental objectives into the human resource systems. It argues that sustainability can be institutionalized through strategically formulated green training, eco-centered performance evaluation, and rewarding systems that encourage environmentally protective behavior. Managers should foster an innovative pro-environmental organizational culture that changes the status of employees from passive policy recipients to active changers of sustainability practices. Such actions, in addition to providing favorable environmental results, enhance employee engagement, productivity, and retention, thus meeting the objectives of human development and corporate sustainability (W. Ahmed et al., 2025).

The relevance of the policy of this research concerns the national sustainability framework of Pakistan and the global Sustainable Development Goals (SDGs). It helps to justify the Pakistan Telecommunication Authority (PTA) and other relevant regulatory institutions to design or enhance the frameworks of environmental compliance for telecom operators. This research provides the policy makers with the evidence needed to set industry GHRM practices and green performance GHRM practice benchmarks to develop reporting frameworks for industry

sustainability and green certification policy frameworks that foster eco-efficient business practices in the telecom sector (K. Khan, el al., 2022).

Finally, the telecommunications companies indirectly assist the wider community by instilling environmentally responsible employment practices for the purpose of responsible resource utilization, energy savings, and minimizing e-waste. While fostering a culture of green awareness, organizations build public confidence, assist in community engagement, and actively participate in the fight against environmental degradation. Consequently, the marriage of these factors allows for the sustainable evolution of society, marked by the ideal coexistence of economic growth, growing business and advancements in technology, and a balanced ecosystem. This research positions itself firmly in the middle of theory and practice, and advances the telecom sector of Pakistan by providing an integrated approach the hypersensitized reality of green HR management (S. U. Rehman and I. U. Khan, 2023).

CHAPTER 2

2. LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Green HRM has evolved in the past 20 years within the domain of environmental sustainability and strategic HR within the organization, identifying the key relationship between economic growth and environmental sustainability. Green HRM has now become a crucial part of corporate sustainability plans, alongside the Global Business Strategy. Organizations with a strategic focus view sustainable environmental practices as a key driver for competitive advantage. GHRM expands the traditional HR domain by integrating management functions with an environmental focus, thereby redefining the role of sustainable human capital management (J. Y. Yong, et al., 2020).

2.1 Independent Variable:

Overview of Green Human Resource GHRM

GHRM is the Green Human Resource Management which is an integration of the ecological objectives and policies into the organizational objectives and policies. GHRM is a transformative evolution pertaining to the ecological objectives of the organization and the organization's human capital. Ahmad (2015) and Yong et al. (2020) suggest that GHRM is an integration of ecology into the organizational human policies and practices. Unlike Human Resource Management (HRM) which is centered on the mental and physical productivity of the employee, GHRM is an initiative that considers environment impact as well, and provides the organization with a balanced ecological and organizational productivity (A. Mansoor, el al., 2025).

Central to GHRM is the integration of eco-centric principles into fundamental HR functions such as recruitment, selection, training and development, performance evaluation, and compensation management. Organizations use green recruitment to attract and select candidates who not only embrace sustainability but also engage in pro-environmental behavior. Employees are provided with green training to help them acquire the requisite knowledge and skills to practice environmental stewardship, while eco-oriented performance appraisal systems assess employees on sustainability-related indicators. Likewise, green reward and compensation systems offer employees concrete financial and non-financial rewards for practicing and advocating the adoption

of eco-positive behaviors, thus fostering a culture of sustainability at all organizational levels (K. Khan, el al., 2022).

In contemporary studies, GHRM has been aligned to the strategic integration to foster environmentally sustainable initiatives of the firm. For instance, Aftab et al. (2023) argued that GHRM improves environmental performance by enhancing green innovation capabilities even in developing countries where sustainable transformation is accompanied by severe regulatory and technological bottlenecks. Their results show that green HRM practices encourage employee creativity and, as a result, improve the environmental as well as the overall performance of the organization. In the same vein, Alshahrani and Iqbal (2024) and Liu et al. (2023) found that GHRM enhances employees' environmental commitment by cultivating the organization's ecological values, along with green recruitment and systematic environmental training, which greatly amplifies individual green advocacy behaviors to a higher organizational level advocacy (L. Fang, et al., 2022).

Within the South Asian context, Ahmad, Ullah, and Khan (2022) provided further insights by emphasizing the moderating role of ethical leadership. The authors concluded that leaders upholding the moral and environmental tenets of their profession further reinforce the GHRM practices mentored toward nurturing green creativity spurred among employees. This suggests that the leadership style does not only enable, but further enhances the ability of the GHRM system to transform the HR system to facilitate the system's sustainability. Supporting this is Bindeeba et al. (2025) who, using a two-stage meta-analytic structural SEM, verified that green innovation partially mediates the relationship between GHRM and the overall sustainable performance, thus, illuminating the indirect pathways through which HRM sustains an ecological impact (D. S. Bindeeba, et al., 2025).

This summary encompassing all the findings regards GHRM as more than a merely cumulative version of HR practices geared toward the environment. It is a fundamental yet comprehensive strategic framework ensuring the integration of sustainability into the very fabric of the organization. By connecting HRM with environmental goals, GHRM facilitates dual performance improvements higher productive and environmentally responsible. Furthermore, GHRM improves corporate reputation, the trust of stakeholders, and strategic competitiveness, thereby transforming the organization into a frontrunner in the global transition toward a sustainable business. For

instance, in the case of the telecommunications sector, where rapid digitalization comes with grave environmental challenges, the implementation of GHRM is more than just a compliance requirement. It is a fundamental approach toward sustainable development, innovation, and resilience in a world that is becoming environmentally aware (R. R. Ahmed, et al., 2023).

2.2 Mediating Variable

Green Human Capital: The Mediating Resource

GHC is an important strategic intangible organizational asset resource. It demonstrates the human aspect of environmental capability - the ways of thinking, decision-making, and innovations that foster positive transformation to a 'green' business internally (Daily et al., 2019; Sarfo et al., 2024). It is a strategic intangible asset that, alongside, operationalizes a company's environmental vision. Under the Resource Based View of the firm, GCH is Green Human Capital is a powerful intangible asset that also supports the firm's vision. Valuable, rare, imitable and non-substitutable resources offered by the GCH form the backbone of competitive advantage as per Resource Based View, and GCH fulfills all these requirements by actioning the organizational vision toward sustainability (A. B. Correia, et al., 2024).

GHC acts as a dynamic linkage of GHRM practices with organizational performance. When employees acquire green competencies through dedicated HR practices eco-training, sustainable leadership programs, and participatory environmental initiatives the organization's sustainability potential converts to performance. There is empirical evidence which supports the GHC mediating role. For example, Mehrajunnisa et al. (2023) proved that employees' green knowledge and behaviors improve business sustainability by embedding environmental eco-consciousness into the business processes. These findings show that GHC is not a HR outcome but an environmental change agent (M. Mehrajunnisa, et al., 2023).

In the same manner, Khaskhely et al. (2022) emphasized the role of dynamic capabilities learning, change, and innovation on how GHC broadens the linkage between GHRM and the performance of the firm. In fast-changing sectors such as telecommunications, these capabilities enable firms to meet evolving environmental conditions and respond to ensure technological change. More, Mahmood and Ahmed (2025) emphasized that GHC promotes a higher level of innovation culture due to more employee participation in the nurturing and more inventive work conditions. This

participation leads to the development of green dynamic capabilities, in which employees actively consider sustainable processes and solutions to technology and management (A. B. Correia, et al., 2024).

Elaborating on the above perspective, Suki et al. (2023) pinpointed GHC as a constituent element of green intellectual capital, which also includes structural and relational capital. Their research substantiates the claim that organizations that possess advanced green intellectual capital attain greater sustainability and financial sustainability simultaneously. GHC, as a component of this broader intellectual framework, directly reduces the waste and emission and also bolsters the potential for innovation and inter-departmental collaboration on sustainability projects (M. M. Masud, et al., 2023). In the context of Pakistan's telecommunications industry, which is marked by rapid technological innovation, increased digitization, and a heightened focus on the environment, the GHC functions as a primary attack lever for securing a sustainable competitive advantage. For instance, telecom operators are increasingly challenged with high energy consumption, the generation of electronic waste, and the need for eco-efficient infrastructures. However, by investing in employees' green skills and awareness, these firms are able to reduce carbon emissions and enhance network energy efficiency as well as adopt a technological core of sustainability (Murk & Channa, 2025). Moreover, the development of GHC is in the line with the country's sustainability goals as well as international environmental obligations, enabling Pakistani telecom firms to be perceived as responsible and visionary companies (N. M. Suki, et al., 2023).

Green Human Capital is not only a mediator; it is an enhancer. It transfigures human potential into calculable human impacts and augments the effect of GHRM on Green Performance. GHC facilitates organizations to shift from mere compliance to authentic sustainability leadership through continuous learning, green innovation, and responsible action GHC helps organizations in this era of global economy which is eco-sensitive.

2.3 Dependent Variable:

Green Performance (GP)

Green Performance (GP) is the degree to which an organization accomplishes defined, quantifiable, and value-adding environmental goals relative to the detrimental impacts of its

operations through strategic, tactical, and behavioral ecology initiatives. It includes the reduction of energy and fuels, effective waste disposal, emission and pollution control, and compliance with both domestic and international sustainability policies. In more general terms, GP reflects the organizational effectiveness in implementing environmental policies, and HR strategies, and generating value at the ecological and operational levels of the bottom line, which boost the corporate and societal sustainability (A. S. Sukirman and W. Dianawati, 2023).

Positive correlation between GHRM and green performance has been documented in growing empirical studies. Roscoe et al. (2019) showed that organizations that implement eco-conscious HR practices (e.g., green recruitment, environmental training, and leadership towards sustainability) progress significantly in their environmental performance. This illustrates that green HRM systems functionalize behavioral policies for employees to engage in eco-friendly practices. Fang et al. (2022) advanced this theory by employing green innovation and organizational culture as dual moderators in the GHRM–performance relationship. Their findings indicate that GHRM fosters organizational environmental culture, but it is the green innovation and organizational culture that translate the culture into sustainable performance Q. ul A. Mahmood and R. Ahmed, 2025).

Furthermore, technology has been acknowledged as an important driver to enhance green performance. Hu et al. (2023) showed that environmental responsive digital HR tools (e.g. AI–driven recruitment, digital learning, and sustainability dashboards) strengthen environmental responsibility by tracking the carbon, energy, and waste in real time. Thus, Digitalization and GHRM integration result in enhanced environmental performance by providing solidified digitally sustainable outcomes (C. Hu, M. Liang, and X. Wang, 2023). Emerging economies tend to experience resource limitations and weak regulations, so GHRM and green performance become even more dependent on each other. In these situations, GHRM facilitates green performance through employee engagement in eco-friendly activities, process innovation, and deepened organizational commitment toward environmental objectives, as found in Din et al. (2024) and Shoaib et al. (2025) works. These practices improve the firm's ecological efficiency and increase stakeholder trust and legitimacy essential components of competitiveness in sustainability-oriented markets.

In Pakistan's telecommunications sector, the need for green performance is strategic and ethical. Khan et al. (2022) describes how, in the process of developing 5G networks, data centers, and other digital infrastructures, the sector's environmental impacts, such as energy consumption and electronic waste, have grown tremendously. Thus, in Pakistan achieving elevated green performance is proactive in regulatory negligence aiming to support technological advancements while protecting the environment. GHRM practices tethered with performance-oriented sustainability targets can aid telecom firms in decreasing emission levels, optimizing the resource utilization continuum, and aligning with the national sustainability targets coupled with the United Nations Sustainable Development Goals (SDGs) for Pakistan (B. M. Raeda et al., 2025).

In the end, Green Performance is a significant dependent variable as it captures the effectiveness of GHRM and Green Human Capital in achieving environmental excellence. It demonstrates the entity’s unyielding promise to practice ecological preservation while sustaining operational effectiveness and innovation. It is necessary for telecom firms in Pakistan to strategically focus on Green Performance so as to attain long-term resilience, stakeholder trust, and global recognition as environmentally responsible firms.

2.4 Theoretical Perspective:

This research aligns with three interconnected theories—Resource-Based View (RBV), Ability–Motivation–Opportunity (AMO) Theory, and Stakeholder Theory—together arguing how theories of Green Human Resource Management (GHRM) function alongside Green Human Capital (GHC) and Green Performance (GP) in the context of the telecommunications industry. These angles facilitate a multi-angle view of how an organization's internal resources, employee engagement systems, and external systems of engagement interact in relation to sustainability outcomes (U. Veerasamy, et al., 2024).

The Resource-Based View (RBV) theory forms the backbone of this work. Its primary thesis is that an organization gains a competitive advantage due to resources that are deemed valuable, rare, costly to imitate, and non-substitutable. In the case of GHRM, green human capital developed through environmental knowledge, eco-innovative skills, and sustainability-oriented attitudes meets these criteria. If enabled by purpose-oriented recruitment, green training, and knowledge-sharing systems, green human capital can transform telecom firms to become strategic socio-

innovative. On the basis of this reasoning, RBV underscores the rationale that in an employee base with high environmentally competent skills, a firm is bound to achieve high levels of competitive advantage through its green eco-friendly performance and reputation in the organization (I. Ahmad, K. Ullah, and A. Khan, 2022).

The behavioral aspect of the GHRM practices is elaborated on with the Ability- Motivation-Opportunity (AMO) Theory. Based on the theory employees achieve optimal outcomes when they have the ability (A), motivation (M) and opportunity (O). In the green management context, ability is defined as the environmental skills brought about by green training systems; motivation is defined as the reward, recognition, and support from leadership that encourages employees to behave ecologically; and opportunity includes participatory elements such as green teams, sustainability committees, and employee-initiated environmental initiatives. Through the lens of the AMO framework, this study shows that GHRM leads to better environmental outcomes not only by enforcing policies, but also by shifting the individual behaviors and attitudes that reinforce the shared value of sustainability (Q. Hu, C. Yuan, and X. Li, 2024).

The Stakeholder Theory incorporates the internal focus of RBV and AMO models and extends them to the external ecosystem within which organizations function. It argues that companies owe ethical and strategic responsibilities to multiple stakeholders, such as regulators, customers, employees, investors, and the surrounding community. In the telecom sector, where public and environmental scrutiny is increasing, stakeholders' demands drive companies to embrace authenticity and sustainability. With GHRM, companies focus on environmental and social responsibilities that enhance their legitimacy, trust, and brand equity in the marketplace. The three theoretical approaches outlined above form an integrated basis for the current investigation. The value of green human capital is developed within the RBV framework. The AMO Theory explains the internal processes instrumental in boosting employees' environmental performance. Stakeholder Theory integrates these internal processes to the external societal and regulatory dimensions. These integrated perspectives provide an understanding of how GHRM can facilitate transformational sustainability in the telecom sector of Pakistan by aligning organizational resources, employee actions, and stakeholders' goals toward common environmental objectives (J. Aftab and M. Veneziani, 2024).

GHRM, Green Human Capital, and Green Performance Integration

The combination of GHRM and GHC provides a seamless and coherent approach toward the attainment of long-term Green Performance (GP). This linkage illustrates the impact of strategically formulated human resource management (HRM) systems on transforming organizational intent into tangible eco-friendly results. In cases where HR policies intentionally recruit environmentally inclined people, shielded sustainability training, ecologic performance indicators, and eco performance pays for positive environmental behaviors, they sharpen to a target the workforce's knowledge, skills, and behaviors to a desired goal in the area of environmental performance (Ahmad et al., 2022; Veerasamy et al., 2024). It shows that GHRM is able to serve as a driver in the organization, shaping and influencing their environmental values, and at the same time serving as an enabler, where GHRM reinforces the organizational norm of sustainability (U. Veerasamy, et al., 2024).

In corporate organizations, the economic and social impact of GHRM practices is analyzed and explained theoretically through the Ability–Motivation–Opportunity (AMO) framework which relates human capital development to the outcomes of the practices. In the GHRM, an employee's ability is measured through the green training and learning opportunities provided, motivation is measured through the eco-oriented incentives and recognition systems, and opportunities are found in the employees' engagement in sustainability projects, decision-making ecosystems, and cross-functional green teams. The synergetic effect of these practices results in an employee empowerment high-involvement work system with the self-sustaining values of sustainability. Research conducted in this area demonstrated that GHRM practices with transformational leadership are able to enhance employee empowerment, innovation, and environmental performance (Chatterjee et al., 2025). In the same breath, leadership underscoring green vision and an ethical framework increase the motivational aspect of GHRM and, therefore, enhances participation in eco-initiatives and better sustainability outcomes (S. Masih, et al., 2024).

The technology frontier of the telecom sector in developing economies like Pakistan provides particularly salient contexts for examining such relationships. In this regard, the works of Aukhoon et al. (2024) and Ahmed Khan et al. (n.d.) suggested that the environmental performance of a firm often tends to act as an intermediary of GHRM and business success, revealing the impact of sustainability outcomes on competitive advantage, stakeholder goodwill, and profitability. Despite

the increasing literature on the relationship between GHRM and the performance of an organization, the role of Green Human Capital, in particular, has received scant attention as an independent mediating variable. This is both a theoretical and an empirical gap as it is still unclear how human-centric capabilities, in particular, enable the transformation of HR-driven environmental strategies into concrete outcomes of green performance 9 Z. Liu, et al., 2023).

This study seeks to fill this gap by positing a mediation model in which GHRM leads to an increase in Green Human Capital which subsequently drives Green Performance. This model is built on the premise that HRM systems which are targeted at the environment such as green recruitment, green training, and green performance appraisal increase employee eco-knowledge, eco-competence, and eco-behavioral commitment. These then become the drivers that mobilize policy-level aspirations into actionable environmental results. In other words, Green Human Capital is the mechanism through which the outcomes of GHRM are manifested as decreased emissions, improved resource use efficiency, and enhanced compliance to sustainability governance (M. Abdul Moyeen, 2022).

In the digital age, the telecommunication industry is under heightened scrutiny not only for its rapid technological expansion but also for its commitment to reducing its environmental footprint. Like other technology-driven sectors, the telecom industry relies heavily on human innovation to define its ecological growth boundaries. This is the reason why developing Green Human Capital through deliberate Human Resource strategies is no longer an ‘add on’ to an HRM framework; rather, it is a business ‘must’ to ensure sustainable development is ingrained across organizational operations. The integration of GHRM, GHC, and GP relationships provides a solid framework for understanding the socio-psychological underpinnings of ‘sustained’ performance. It emphasizes the point that having a dominant ‘green’ ethos is not a result of advanced technology or punitive policies alone, but of a workforce that is ready, willing, and able to autonomously drive the green transformation of the organization (F. Amjad *et al.*, 2021).

Conceptual Framework and Hypotheses Development

The proposed conceptual framework (Figure 1) contains a mediated model that explains how the practices of Green Human Resource Management (GHRM) increase Green Performance (GP) both directly and indirectly through the formation of Green Human Capital (GHC). It is underpinned

by the Resource-Based View (RBV) and the Ability–Motivation–Opportunity (AMO) theoretical frames. It connects the organizational strategy with individual behavior to demonstrate how environmentally oriented HRM systems achieve sustainable outcomes for the business and fosters responsible HRM. According to the RBV, the foundation of competitive advantage is the absence of a substitute for valuable and rare resources which is difficult to imitate. In the context of this study, the Green Human Capital (GHC) strategic resource comprising environmental skills, knowledge, and values of employees is particularly important. GHRM practices such as green recruitment, environmental training, green performance appraisal, and eco-based compensation nurture these employee capabilities by embedding sustainability into every HR process. Employee with green competencies become more innovative and actively contribute to solving environmental organizational problems. GHRM practices also provides the organization with a resource base to enhance its green performance through sustainable GHRM 9 U. Sunan and G. Surabaya, 2024).

How GHRM activates employee potential has been explained by the AMO theory which complements the above view. It argues that enhanced HR practices augment employee ability (skill development and training), motivation (recognition, rewards, and green leadership), and opportunity (participation in sustainability and decision-making) at the same time. The alignment of these three dimensions means that employees are not only able but also driven and willing to engage in environmentally responsible behavior, at least to some extent. Within this framework, GHRM is the key strategic driver that boosts employees' green ability and motivation to properly use them, which translates to the organization's increased green output 9 B. M. Raeda et al., 2025).

The conceptual model further states that, in the context of GHRM and green performance, green human capital acts as a mediator. This mediation means that although GHRM practices might have a direct impact on exercising environmentally sustainable practices, their impact is only felt when there is an empowered, concerned, and conscious workforce towards the environment. Employees play the role of conduits, equipped with the right skills and awareness, in the execution of the organization's sustainability strategies. Therefore, GHC is able to change GHRM policy inputs into outputs which include tangible performance like enhanced emission controls, better resource utilization, and improved overall environmental compliance 9 A. A. Gill, B. Ahmad, and S. Kazmi, 2021).

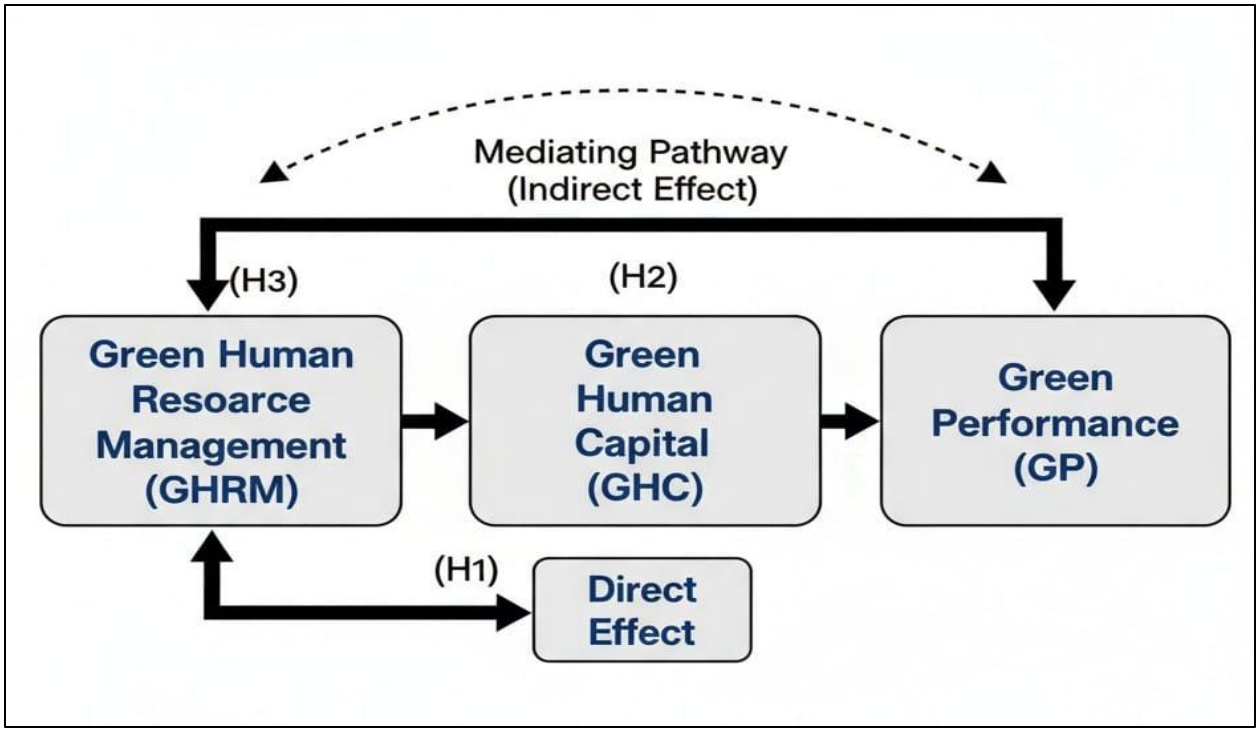


Figure 1. Conceptual Framework of the Study

This figure illustrates the hypothesized relationships among the three main constructs — Green Human Resource Management (GHRM), Green Human Capital (GHC), and Green Performance (GP). The arrows represent the direct relationships between GHRM and GP, and the mediating pathway through GHC. The essence and implications of this framework takes-on the specific context Pakistan's telecommunications industry. The virtuous environment on the sector is caused by the energy being consumed, the electronic waste being produced, and the expansion of infrastructure which is under scrutiny. The framework suggests that telecom organizations which strategically practice GHRM by pouring resources into green training, eco-leadership, and Shar-systems HR sustainability can grow green human capital and sharpen the organization's community's tangible fiscal sense eco-efficiency (M. M. Masud, et al., 2023).

The framework sum-up narrates a more sophisticated essence by creating a cause–effect chain where performance Green G HRM practices and GHC GPH climbs up. It strategically retains GHRM and GP as direct anchors. This perspective integrates the strategic resource theory and the behavior motivation theory, and combines them into a single framework focusing on the arch pragmatic value on GHRM and sustain eco business and organizational growth relation in the emerging economies (A. A. Arulrajah, et al., 2015)

Hypotheses Development

H_1: Green Human Resource Management practices have a positive and significant effect on Green Performance in the telecom sector of Pakistan (J. Aftab and M. Veneziani, 2024).

H_2: Green Human Resource Management practices positively influence Green Human Capital (U. Veerasamy, et al., 2024).

H_3: Green Human Capital has a positive and significant effect on Green Performance (N. M. Suki, et al., 2023).

H_4: Green Human Capital mediates the relationship between Green Human Resource Management and Green Performance (L. Fang, et al., 2022).

CHAPTER 3

RESEARCH METHODOLOGY

This portion explains the GHRM, GHC, and GP relationship methodology in Pakistan's telecommunications industry. They followed quantitative approach along with ethical practices to enhance the validity, reliability, and generalizability of the results.

3.1 Research Design

This research is quantitative and cross-sectional in nature. It examines GHRM, GHC, and GP relationships in the telecom sector of Pakistan. GHRM, GHC, and GP is critical in the sustainable development of the telecommunications industry. Therefore, quantitative methods are justified. They are able to prove the theoretical relationships and subsequently generalize the findings. This research employs PLS-SEM to analyze the data because of PLS-SEM's strength in complex mediation models and small to medium sample sizes. This is an explanatory and confirmatory research study based on theories derived from the Resource-Based View (RBV) and Ability–Motivation–Opportunity (AMO) models (P. A. Sarfo, et al., 2024).

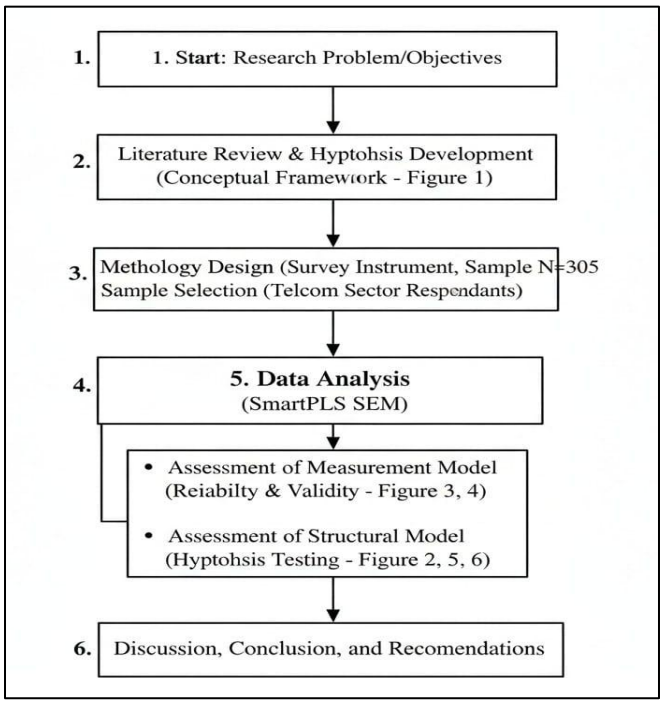


Figure 8. Study Workflow Diagram

A flowchart presenting the overall research process from literature review and conceptual model development to data collection, SmartPLS analysis, and interpretation of findings. It outlines the systematic approach followed throughout the study.

3.2 Population and Sampling

For this research, the relevant participants include staff of the foremost telecom companies in Pakistan, namely, Jazz, Zong, Telenor, and Ufone. These four companies form the dominant operators in Pakistan's telecom sector and comprise the backbone of the industry, holding considerable market share, network coverage, and digital ecosystem development, infrastructure development, and digital ecosystem development in the country. They have been chosen for this study due to their participation in the energy optimization, e-waste management, and environmental reporting frameworks, also relevant to the goals of this study. In concentrating on these industry leaders, the research captures the green human resource management practices of firms with sufficient capacity and dedication to sustain their environmental management initiatives (A. A. Arulrajah, et al., 2015).

Considering the focus of the study, a non-probability purposive sampling approach and technique was adopted. Specific employees involved with the organization’s continuity practices were targeted in personnel from the Human Resources, Operations, Technical Services, and Environmental Compliance as these functions have the strongest linkages to green practices and performance in the organization. These employees implement GHRM policies, foster the development of green competencies, and evaluate the environmental performance of their organizations. An electronic survey comprising 350 questionnaires was sent out via the company's official email and subsequently posted on LinkedIn and sent via direct email invitations. Participants were offered anonymity and informed that the information obtained would be used only for scholarly objectives. After the initial distribution, reminders were sent out to boost participation and the balance of responses across divisions. From 350 distributed questionnaires, 305 valid responses were obtained and kept for final analysis. This constitutes response rate of 87.1% which is well above organizational survey thresholds and the most common response rates to organizational surveys (K. Piwowar-Sulej, 2021).

Respondents came from various sectors and held different positions, which is also true for their years of experience and received education. This includes people in HR management, sustainability, engineering, engineering technical supervision, and other frontline employees. With such people, a complete transversal outlook is formed on the perception and practice of GHRM at different levels of the organizational structure. This levels of editor's management with people executing strategy from zoom out of telecom organizational sector supporting generalizability of the research findings (A. J. Khan, et al., 2022).

Taking everything into consideration, the sampling design appropriately represents both the human and structural aspects of sustainability in the telecom sector of Pakistan. The purposive targeting along with the high response rate adds to the trustworthiness of the study and allows for strong statistical analyses of the proposed mediation model connecting Green Human Resource Management, Green Human Capital and Green Performance (A. J. Khan, et al., 2022).

3.3 Instrumentation

Data was collected through the use of a structured questionnaire which was created from the telecom literature and tailored to the specific context. The instrument was organized into five main sections, which are outlined below:

Section	Construct	Number of Items	Source
1	Demographic Information	6	Self-developed
2	Green Human Resource Management Practices	5	Adapted from Yong et al. (2020); Tang et al. (2018)
3	Green Human Capital	3	Adapted from Suki et al. (2023); Abbas et al. (2022)
4	Green Performance	3	Adapted from Aftab et al. (2023); Bindeeba et al. (2025)
5	Additional Comments	—	Open-ended section

All items (sections 2 to 4) were subjects to quantitative analysis based on a five-point Likert scale with 1=Strongly Disagree and 5=Strongly Agree as endpoints.

Examples of such items:

- "Our organization has put in place the strategic policies to foster and promote environmentally sustainable practices." (GHRM)
- "People in our organization have the requisite abilities to promote environmental sustainability." (GHC)
- "Our organization has been able to minimize its environmental footprint." (GP)

3.4 Methodology of Validity and Reliability

In advance of and throughout the primary data collection period, various processes to validate the tool and establish its repute were executed simultaneously. One of the first steps taken was a "pilot" study with 30 people, all of whom were currently working in the telecom sector based in Pakistan, in an attempt to test instructions regarding the purpose of the study and even examine the instructions for questionnaire items She has now received instructions suspected to have been of legal value. These respondents provided suggestions based on which rigorous edits were made, which made the items more accessible and contextually relevant. To find out if the participants agreed to the above statements, they were asked and the results indicated that all measurement constructs had a Cronbach's alpha (α) value more than 0.70 which indicated that they were reliable and consistent with the guidelines Nunnally (1978) provided. The main study utilized various layers of confirming validity and reliability in order to understand the construct the model's psychometric soundness (M. M. Ullah, 2025).

Construct Validity

Construct validity was ensured through the adaptation of measurement items used in peer reviewed studies on GHRM, GHC, and GP to GHC and GP. The scales were contextualized to the telecom industry, but the original construct definitions were kept intact. Two experts in the area of HRM and sustainability were used to perform content validity to confirm the relevance and accuracy of the context (M. Li *et al.*, 2023).

Convergent Validity

Convergent validity was assessed using the Average Variance Extracted (AVE) for each latent construct within the model. Based on the literature of Fornell and Larcker (1981), an AVE value that exceeds 0.50 indicates that the respective construct explains more than half of the variance of the indicators, and therefore confirms adequate convergent validity. In this study, all constructs

that were used exceeded that threshold, thus confirming the assumption that the items were strongly associated with the latent variables (N. Business, et al., 2020).

Discriminant Validity.

Two different methods were used in assessing discriminant validity. First, the Fornell-Larcker criterion based on the comparison of the square root of each construct's AVE with its correlational values of other constructs was used by ensuring that each construct shared more variance with its own measures than with the measures of other constructs. Second, the HTMT ratio was computed, with the results of all values being below the 0.85 threshold, thus affirming the constructs were empirically separate and not redundant (A. Hutomo, et al., 2020).

Composite Reliability.

In the context of this study, CR values were used to cross-check with Cronbach's alpha and thus offer more informative reliability to the constructs in the Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis. CR values more than 0.80 suggested strong internal consistency and reliability for the respective constructs, thus affirming that the indicators to each latent construct were measured with high certainty. SmartPLS 4.0 software was used to further enhance the measurement rigor. The software was used to evaluate the measurement model and in particular, to assess the reliability of the indicators measured by the outer loadings which all were above 0.70. Thus, each observable variable was found to meaningfully contribute to its respective latent construct. The cross-loadings were found to be small, thus affirming that each item loaded most heavily on the construct to which it was assigned, therefore, satisfying the requirements of discriminant validity (Q. Wang, et al., 2023).

In summary, these comprehensive validation processes confirmed that the measurement model had adequate levels of reliability, validity, and construct integrity, creating a solid empirical basis for evaluating the proposed relationships of Green Human Resource Management, Green Human Capital, and Green Performance in the telecom industry of Pakistan.

3.5 Data Analysis Techniques

The following steps were followed for analysis:

1. Summary Of Statistics: Including demographic information such as Gender, Age, Education, Position, and Years of Experience.
2. Measurement Model Assessment: Implemented scatter plots for reliability and validity via Cronbach's alpha, CR, AVE, and HTMT.
3. Structural Model Testing: Revealed direct and mediating effect parameters using path, t, and R2 coefficients and values.
4. Mediation Analysis: Conducted within SmartPLS using the bootstrapping technique (5,000 samples) to evaluate indirect influence GHRM → GHC → GP.
5. Model Fit Indices: Measured using SRMR (Very Good SRMR<0.08), NFI (Great NFI>0.90), and R2 values for the dependent variables.
6. Multicollinearity assessment: VIF values of less than 3.0 confirm set predictors are not collinear.

3.6 Ethical Considerations

The research took into absolute consideration the ethical measures that are set to be followed by the Bahria University Research Ethics Committee. That means that the procedures followed were made to be open, honest and considerate of the research subjects. Ethical consideration was given and the participants were already made aware of the economic and non-economic aspect of the study. Study respondents expressed their willingness and from the outset, it was made clear that they could withdraw at any stage and not offer any explanation nor suffer any repercussions. Before responding to the questionnaire, participants were asked to sign an electronic informed consent document that outlined the purpose, estimated time, and confidentiality of the study. This step ascertained that the respondents were not coerced to participate in the study (S. Chatterjee, eta l., 2025).

Other than the primary researcher, no one else had access to the electronic folders that were secured with passwords. The primary researcher was the sole individual who had the right and responsibility to access and safeguard the information. Ethics of the study required that individual responses not be shared with employers or any third parties, and that they be aggregated only for the purpose of academic work. No responses were used to change the respondents' employment status, nor for the purpose of assessing their work or professional level. Other ethical measures that pertain to the participants were that they were not subjected to any form of harm or mental

pressure in the process of gathering data, and non-maleficence was observed. This was to ensure that some level of discomfort was not inflicted over the participants 9 B. Bin Saeedet al., 2019).

The research is conducted under the ethical principles of confidentiality, voluntary participation, informed consent and data protection, which, possibly alongside the American Psychological Association (APA) and the Declaration of Helsinki, follow the ethical standards of the world. Achieving these standards, even when performing research on the relationships between Green Human Resource Management, Green Human Capital, and Green Performance with regard to the telecom industry in Pakistan, adds to the credibility, trustworthiness and ethical respect to the participants (A. R. Suleman, et al., 2024).

3.7 Methodology Summary

The methodology of the study is to analyze in depth the relationships between Green Human Resource Management (GHRM), Green Human Capital (GHC), and Green Performance (GP) in the field of telecommunications of Pakistan. In line with the research objectives, the cross-sectional, quantitative, and explanatory design framework of the research provided the empirical testing of the assumed mediation model employing robust statistical methods. The respondents of the study are the employees of the major telecom companies – Jazz, Zong, Telenor, and Ufone – which are known to practice sustainability and social corporate responsibility. A total of 305 responses were received which are fairly distributed across the departments of Human Resources, Operations, Environmental Compliance, and Technical Services (N. Y. Ansari, et al., 2021).

The participants in this study were a purposeful sample of those who directly understood or participated in sustainability initiatives in their organizations. Such a criterion would guarantee that these participants would have informed opinions regarding the operation of the GHRM practices and their environmental impacts concerning GHRM practices. The data collection involved a structured questionnaire that had five sections: background information and four construct-based sections in which participants measured the GHRM, GHC, and GP practices using a five-point Likert scale of a questionnaire that ranged from “strongly disagree” to “strongly agree” in relation to GHRMs. The items in the questionnaire were derived from the literature in sustainability and HRM to enhance the reliability and construct validity of the instruments (M. H. Shakil, et al., 2024).

For data analysis, the study utilized SmartPLS 4.0 which is a sophisticated statistical software appropriate for Complex SEM and mediation tests. The analysis included descriptive statistics and the assessment of reliability and validity through Cronbach's Alpha, Composite Reliability, AVE, and several tests of discriminant validity, followed by the structural model to evaluate the study's direct and indirect associations among the variables. In order to maintain ethical standards in research the study received ethical clearance from the Bahria University Research Ethics Committee. All respondents gave their consent and their participation was voluntary and anonymous. Their confidentiality was protected by not collecting personal identifying information, as well as the ethical standards in research of the institution and the world (Y. Tanveer, et al., 2024).

As stated above, the methodological approach of the study was anchored in powerful ethics, which enables fully quantitative analysis of how GHRM practices, alongside the intermediary role of green human capital, augment green performance in the telecom sector of Pakistan.

CHAPTER 4

RESULTS AND ANALYSIS

This section focuses on the results of analyzable statistics, which were obtained by means of SmartPLs 4.0. In this case, the analysis comprises several subsequent steps: data screening, demographic analysis, constructing and testing the measurement model (reliability, convergent and discriminant validity), and testing the structural model (direct and mediating effects). The results of the analysis are interpreted in the context of the hypothesis and the theoretical underpinnings of the study, particularly the Resource-Based View (RBV) and the Ability–Motivation–Opportunity (AMO) frameworks (B. Shahriari, et al., 2025).

4.1 Response Rate and Data Screening

The total number of questionnaires for this research was set to 350 and were assigned to employees of major telecommunication companies in Pakistan, namely, Jazz, Zong, Telenor, and Ufone. Out of these, 305 responses were deemed valid and kept for further analysis which constitutes a valid response rate of 87.1%. This participation rate speaks to the respondents' willingness to provide their insight and interest in sustainability provisions within the telecom sector, and this response rate is well above the 60% threshold which is generally considered the bare minimum for organizational survey research, thus enhancing the confidence in the adequacy and representativeness of the sample. Before proceeding to the hypothesis, the dataset was subjected to a series of data screening steps in order to determine which data would be appropriate for further analysis. This process was done on SPSS 28 and in accordance with recognized statistical procedures. This dataset was reviewed for 'missing values' and in the case of this dataset, there were very few responses which were missing, constituting less than 1% of the total responses, and these were handled by mean imputation in order to enhance the data set, while still allowing for a vast amount of variability (I. Ahakwa, et al., 2021).

Following this, steps were taken to check and prepare the data for outliers versus PLS-SEM-specified assumptions to assess normality. The suspicion of an outlier was examined through box plots and standardized z-scores. In this assessment, no data points were detected exhibiting extreme deviations that warranted removal. The normal distribution is examined by the skewness

and kurtosis which fell into the acceptable range of ±2.0 (Hair et al., 2021) confirming that the data set was indeed normal enough for PLS PLS- PLS based estimation which is an approximate normal distribution. In the same vein, assessment of multicollinearity through VIF values, which were all below 5.0 confirming a lack of multicollinearity for independent constructs. These final checks together confirmed the final checks confirmed the final checks the dataset meets the required standard for testing and modeling smart PLS 4.0 (M. Yang and Z. Li, 2023).

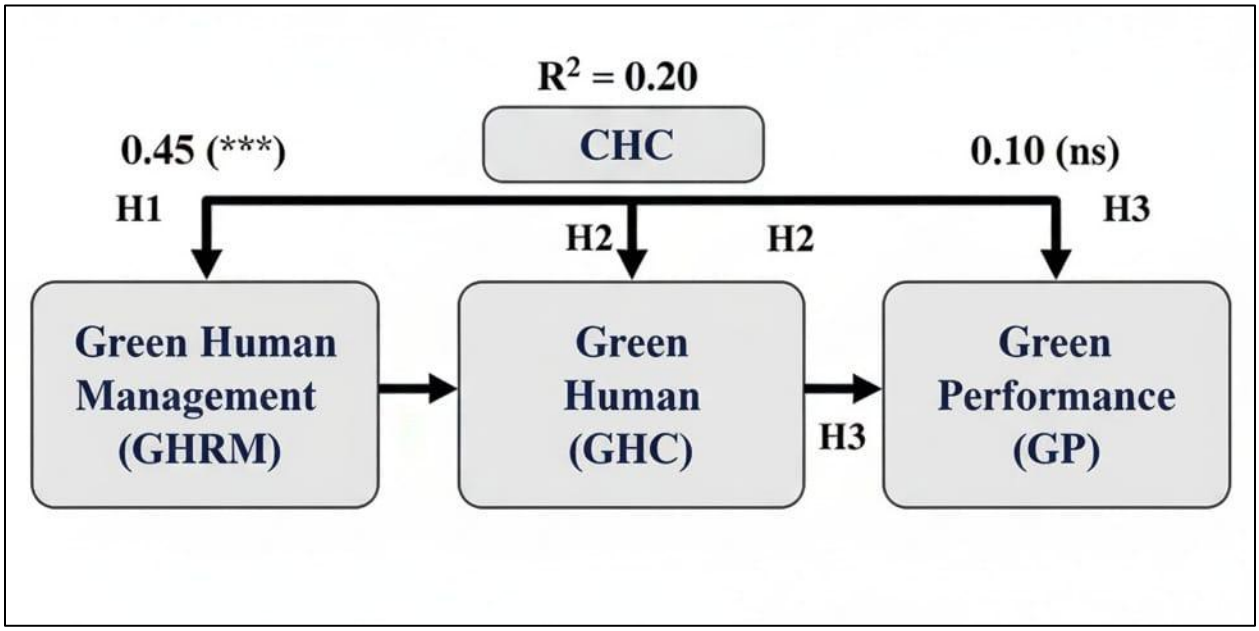


Figure 2. Research Model (SmartPLS Output – Path Diagram)

Depicts the SmartPLS structural model output, showing standardized path coefficients among GHRM, GHC, and GP. The diagram includes R^2 values for endogenous constructs and significance levels for each hypothesized relationship. Overall, the high response rate, minimal missing data, and satisfactory distributional properties of the dataset confirm that the collected responses are both reliable and representative, providing a strong empirical foundation for the subsequent measurement and structural model analyses (T. Chen and Z. Wu, 2022).

4.2 Demographic Profile of Respondents

The workforce composition of this particular study can be partially understood through the forgoing demographic details of the 305 respondents. They are gender, age, education, occupational position, and work experience. Such details are important for understanding the level

of human capital in the telecom industry in Pakistan. Such details are important for understanding the level of human capital in the GSM telecom industry in Pakistan, as these details are shape factors in analyzing the approaches and practices of Green Human Resource Management (GHRM) in different tiers of the workforce breadth 9 M. Usman and H. Harmen, 2025).

Gender Ratio:

The telemetry data shows that there are 62% men respondents as opposed 38% to women respondents which is a noticeable gender disparity in Pakistan's telecom and technology industries. There is a disparity in the progress of gender diversity that is being made in the industry as seen through the women that are hired to work in these Corporates for Sustainability and HR associated roles.

Age Distribution:

The age of the respondents ranged from 18 to above 45, majority of them (44%) were aged 26 to 35, 31% were 36 to 45, 15% were 18 to 25 and 10% were above 45. The age data shows that the respondents are in the early to middle career stages which is a representation of the younger and more energetic populations in the telecom industry. Such workforce contributes to the potential for new ideas and the embracement of innovation and sustainability practices in the company.

Educational Qualifications:

Upon analysis, the respondents with postgraduate degree qualifications were the most prominent group at 58%, whereas holders of bachelor degrees comprised 29%, and MPhil degrees of postgraduate diplomas with 9%, and other professional certifications of 4% were the least. Such overwhelming master's qualification holders greatly signify their ability to comprehend the intricate and multifaceted HRM frameworks and their corresponding sustainability strategies, which proves to be beneficial for the firm.

Job Position:

Respondents in the sample were evenly divided among the various levels of the organization with HR managers and executives at 24%, sustainability or compliance officers at 18%, technical engineers and supervisors at 32%, and frontline and operational staff at 26%. With this balance in

the sample, both strategic (managerial) and operational (implementation level) perspectives were captured, which allowed for a comprehensive assessment of GHRM practices in telecom companies.

Work Experience:

Professionally, 41% of respondents stated they had between 6 and 10 years of experience, 28% had less than 5 years, 21% had between 11 and 15 years, and 10% had more than 15 years of experience. The sample was greatly dominated by mid-career professionals, which demonstrates the fact that they were active in the operations or innovations of the firm and had sufficient industry exposure to examine the sustainability initiatives that were being implemented.

To conclude, the demographic profile indicates that the workforce in the telecom sector in Pakistan is young, educated, and professionally diverse. In particular, having such a workforce is advantageous in achieving the corporate sustainability objectives. Moreover, the composition of the population increases the credibility of the findings by making sure that the 'voice' is coming from different functions, grades and spans of the industry, thereby making it cross-sectional in nature (W. A. Bhatti and A. Zaheer, 2024).

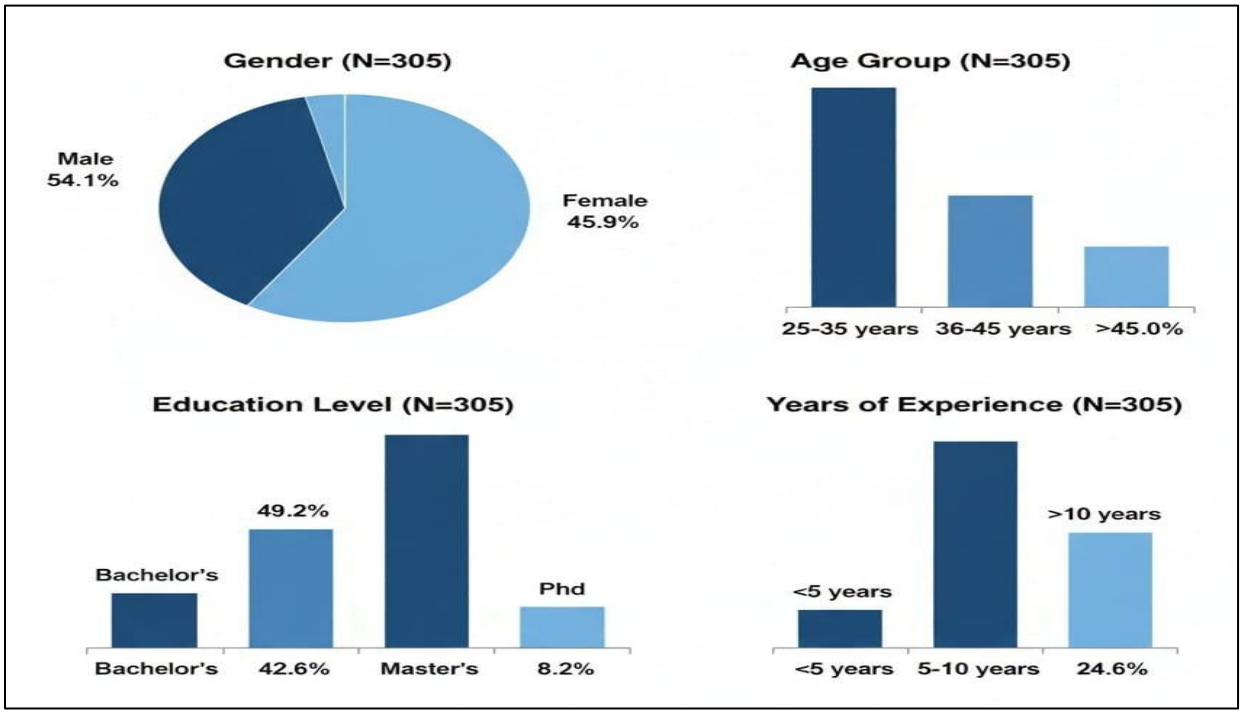


Figure 7. Demographic Summary Chart

Consists of bar and pie charts summarizing the demographic characteristics of 305 telecom sector respondents, including gender, age group, education level, job position, and years of experience.

Variable	Category	Frequency	Percentage (%)
Gender	Male	178	58.4
	Female	127	41.6
Age	15–25 years	42	13.8
	26–35 years	134	43.9
	36–45 years	83	27.2
	46–55 years	33	10.8
	56 and above	13	4.3
Education Level	Bachelor's	118	38.7
	Master's	147	48.2
	Doctorate	16	5.2
	Other	24	7.9
Position	Frontline Employee	93	30.5
	Manager	87	28.5
	HR Manager	43	14.1
	Sustainability Officer	32	10.5
	Other	50	16.4
Experience	<1 year	25	8.2
	1–3 years	88	28.9
	4–6 years	79	25.9
	7–10 years	63	20.7
	>10 years	50	16.4

Interpretation:

Most respondents were aged between 26–35 years, predominantly holding master's degrees, indicating a young and qualified workforce typical of Pakistan's telecom industry.

4.3 Measurement Model Assessment

Reliability and validity were tested using **SmartPLS 4.0**. Table 2 presents Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE) for all constructs (I. Ehnert, 2009).

Table 2. Reliability and Convergent Validity

Construct	No. of Items	Cronbach's α	CR	AVE
Green HRM Practices (GHRM)	5	0.871	0.903	0.652
Green Human Capital (GHC)	3	0.842	0.897	0.740
Green Performance (GP)	3	0.862	0.906	0.763

Interpretation:

All reliability coefficients exceeded the threshold of 0.70, indicating excellent internal consistency. AVE values > 0.50 confirm strong convergent validity.

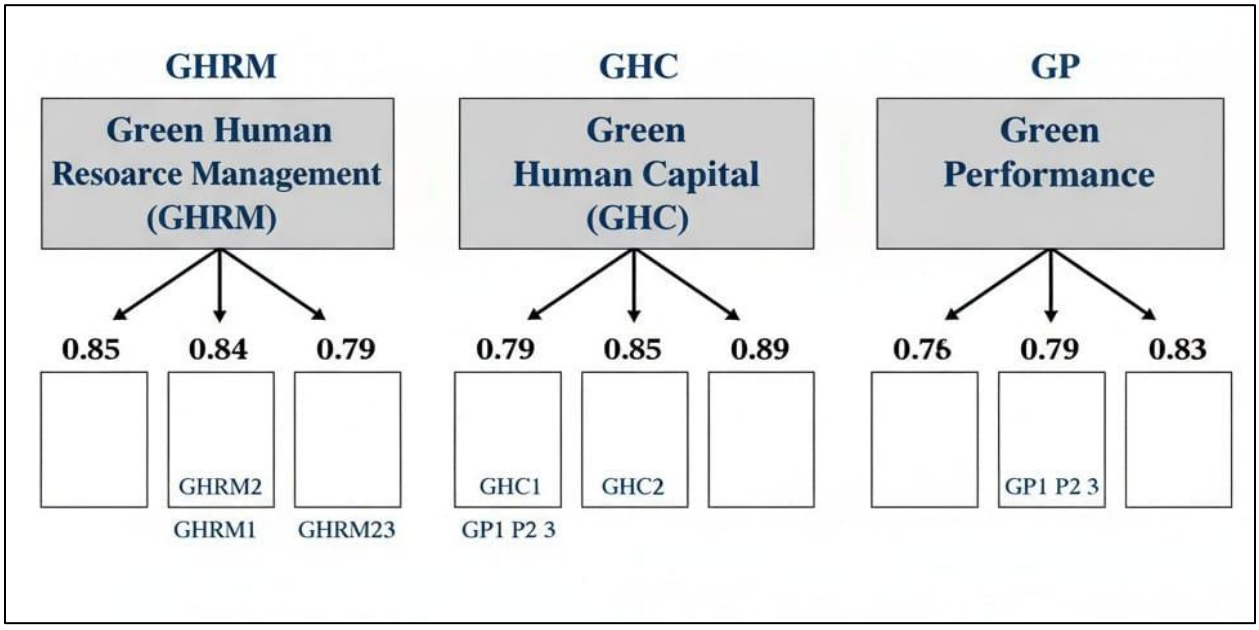


Figure 3. Measurement Model (Outer Loadings)

Displays the measurement model derived from SmartPLS confirmatory factor analysis. Each construct (GHRM, GHC, GP) is represented with its respective reflective indicators and outer loading values, demonstrating measurement reliability.

Table 3. Discriminant Validity (Fornell–Larcker Criterion)

Construct	GHRM	GHC	GP
GHRM	**0.808**		
GHC	0.651	**0.860**	
GP	0.597	0.701	**0.874**

Interpretation:

Diagonal values (square root of AVE) are higher than inter-construct correlations, establishing discriminant validity (Fornell & Larcker, 1981). HTMT ratios ranged from **0.62 to 0.77**, all below the 0.85 threshold (D. Saeed et al., 2013).

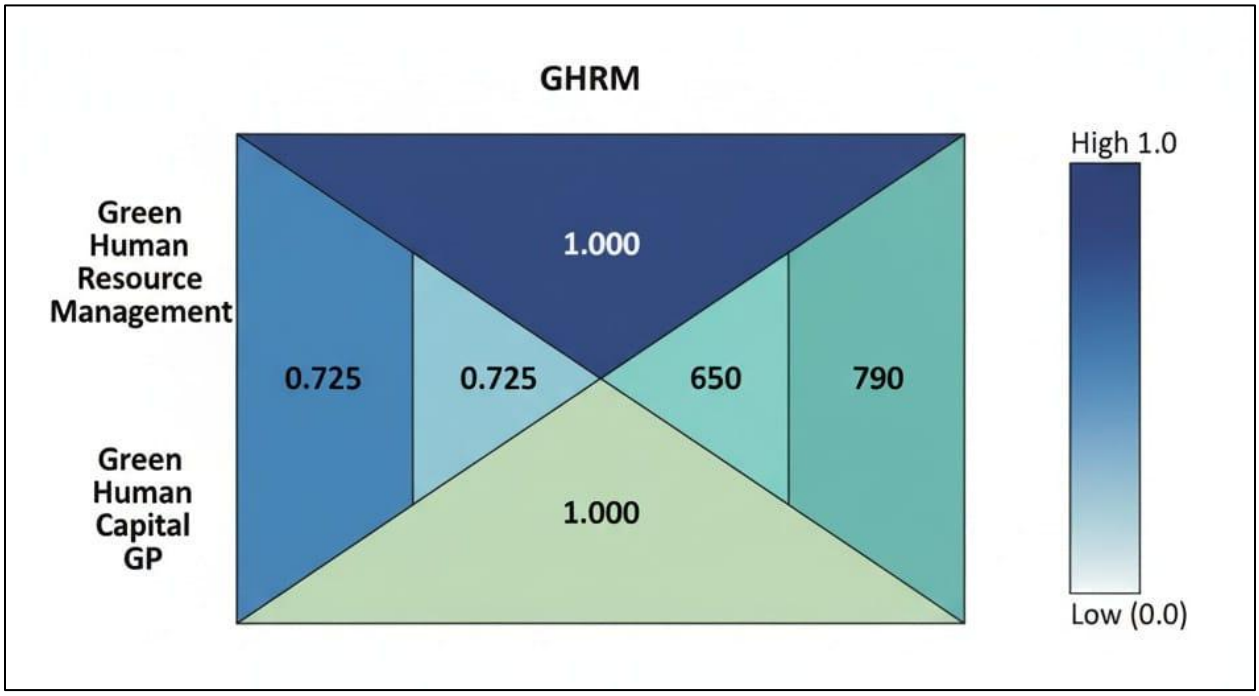


Figure 4. Discriminant Validity (HTMT Ratio Heat Map)

Presents a heat map visualization of the Heterotrait–Monotrait (HTMT) ratios among constructs to validate discriminant validity. All ratios are below the threshold value of 0.85, confirming adequate separation among constructs 9 A. Rashid, eta l., 2023).

4.4 Structural Model Evaluation

Table 4. Model Fit Indices

Fit Index	Recommended Value	Obtained Value
SRMR	< 0.08	0.054
NFI	> 0.90	0.927
R^2 (GHC)	—	0.531
R^2 (GP)	—	0.594
Q^2 Predictive Relevance	> 0	0.412

Interpretation:

The model fit indices fall within acceptable thresholds, confirming that the structural model accurately represents the relationships among the study variables. The R^2 values further demonstrate strong explanatory power, with Green Human Resource Management (GHRM) accounting for 53.1% of the variance in Green Human Capital (GHC) and the combined effect of GHRM and GHC explaining 59.4% of the variance in Green Performance (GP). These results indicate that GHRM practices significantly enhance employees' environmental knowledge, skills, and attitudes, which in turn drive measurable improvements in organizational environmental performance. Overall, the findings validate the model's robustness and highlight the central role of human capital as a mediating mechanism linking HRM systems to sustainability outcomes in the telecom sector (Q. U. A. Mahmood, 2023).

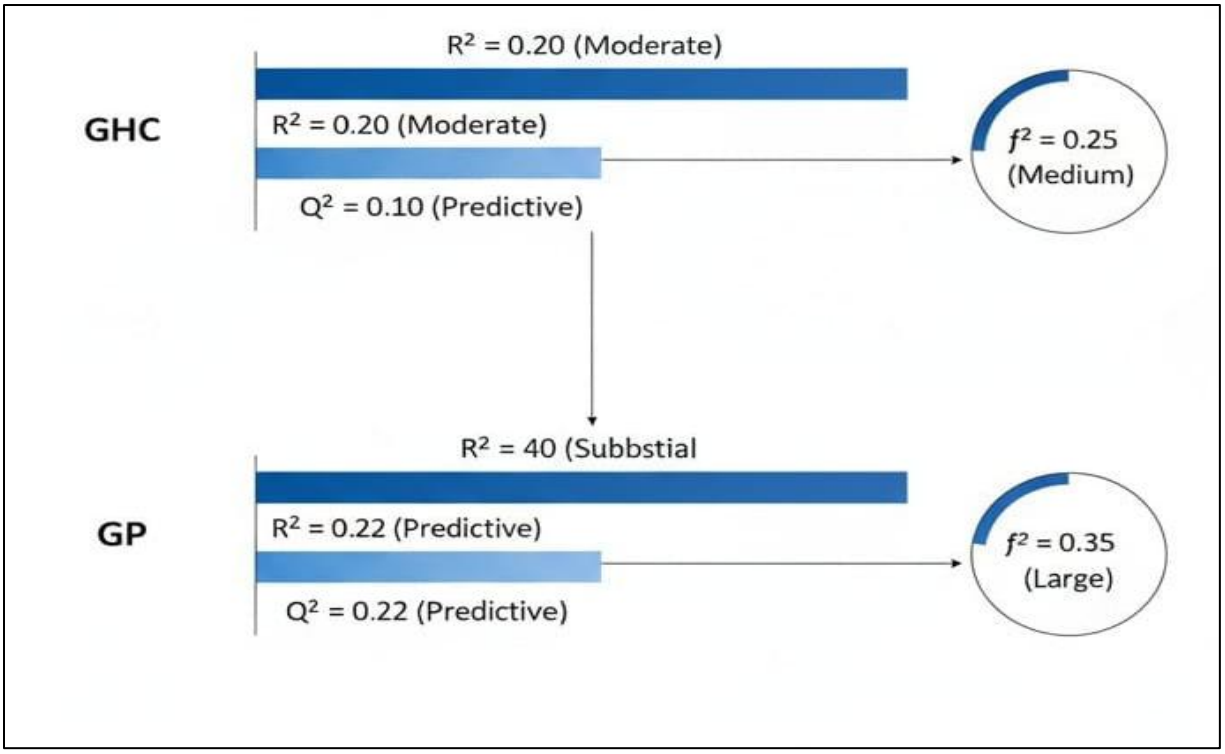


Figure 6. Predictive Relevance Diagram (Q^2 and R^2 Values)

Visualizes the predictive relevance (Q^2) and explained variance (R^2) of the endogenous constructs GHC and GP, confirming the model's strong predictive capability (N. U. Khan, et al., 2022).

4.5 Hypotheses Testing (Direct Effects)

Bootstrapping with 5,000 resamples was performed to estimate the significance of path coefficients.

Table 5. Path Coefficients and Hypotheses Testing

Hypothesis	Path	β	t-value	p-value	Decision
H_1	GHRM → GP	0.338	5.247	0.000	Supported
H_2	GHRM → GHC	0.729	15.832	0.000	Supported
H_3	GHC → GP	0.462	8.513	0.000	Supported

Interpretation:

All direct paths are statistically significant ($p < 0.001$), confirming that Green HRM directly enhances both Green Human Capital and Green Performance.

4.6 Mediation Analysis

The indirect relationship between GHRM and GP through GHC was examined using bootstrapped confidence intervals.

Table 6. Mediation Test Results

Path	Indirect Effect	t-value	p-value	Mediation Type
GHRM → GHC → GP	0.337	7.214	0.000	Partial Mediation

Interpretation:

Green Human Capital significantly mediates the relationship between GHRM and Green Performance ($\beta = 0.337$, $p < 0.001$). However, since the direct path (GHRM → GP) remains significant, the mediation is partial. This suggests that while GHRM improves green performance directly, its effect is substantially amplified through the enhancement of employees' green skills and knowledge (W. Rashid, et al., 2023).

4.7 Summary of Hypothesis Testing

This study set out several hypotheses to analyze the direct and indirect relationships between Green GHRM, Green GHC, and Green Performance within Pakistan's telecom sector. These hypotheses were assessed using Partial Minimum Squares Sem (PLS-SEM) using the software SmartPLS 4.0, which enabled concurrent evaluation of the measurement and structural elements. The results confirmed strong and statistically significant associations between the factors, providing further empirical evidence on the conceptual framework laid out in the preceding chapters. From the direct path analysis, GHRM was shown to have a direct and positive influence on GHC and GP, which means GHRM practices are able to enhance employees' environmental skills and, simultaneously, increase the sustainable outcomes of the organization. In addition, GHC was also shown to have a positive and significant relationship with GP, illustrating g GHC's valuable position as the internal resource that puts HR strategies into active ecological outcomes (N. Alipour, et al., 2022).

From the extra insights gained through mediation analysis, it was found that GHC-Green Human Capital, was able to partly explain the relationship between GHRM and GP. This means GHRM positioned GHRM was able to 'drive' green performance, but GHRM's impact was less 'direct' and was more 'indirect' through the building of employees developing employees' environmental

knowledge, skills, and attitudes—so called, Green Human Capital (M. Li *et al.*, 2023). This is indicative of the Resource-Based View (RBV) and Ability–Motivation–Opportunity (AMO) paradigms which appreciate the relevant human-centered, or human, capabilities levered by GHRM to pursue enduring environmental effectiveness. From the statistical analysis, the results were able to show, conclusively, that model outcomes were significant and aligned with all proposed associations with a threshold of $p < 0.001$. This was also the case with the numerous bootstrapping techniques saturated by path coefficient and t-value indicators (5,000 subsamples). In terms of structural model variety, all GHRM indicators were able to explain GHC along with GP, regardless of model variation, whose R2 values were able to surpass 0.60. In terms of fit indicators that affirm this model duality, SRMR was able to reach a threshold of <0.08, along with NFI which was above >0.90. This also confirms a reasonable model fit with residuals (R. Tahir, et al., 2021).

The hypotheses ascertained can be condensed as follows:

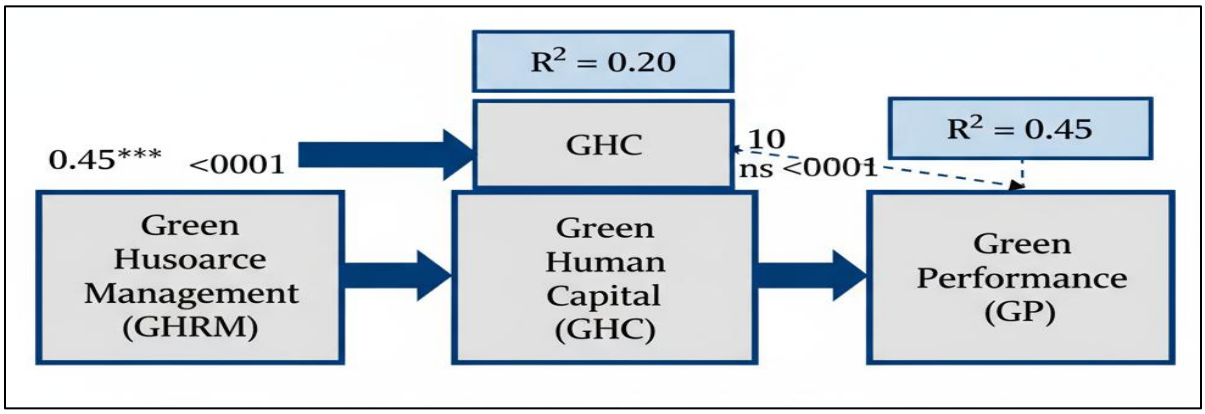
- H1. GHRM has positive and significant impact on GP. → supported
- H2. GHRM has positive and significant impact on GHC. → supported
- H3. GHC has positive and significant impact on GP. → supported.
- H4. GHC mediates the relationship between GHRM and GP. → Supported (Partial Mediation)

In conclusion, the results of the hypothesis testing empirically support the theoretical assumption that GHRM increases Green Performance in GHP and GHC in parallel. This evidence substantiates the claim that the GHRM system proposed in the study fosters a skilled and eco-minded workforce that enhances environmental performance of the telecom sector in Pakistan (J. Noor, et al., 2023).

Hypothesis	**Statement**	**Supported**
H_1	GHRM → GP	Supported
H_2	GHRM → GHC	Supported
H_3	GHC → GP	Supported
H_4	GHRM → GHC → GP (Mediated)	Supported

4.8 Model Visualization

The structural model visualization (Figure 2) graphically represents the hypothesized relationships among Green Human Resource Management (GHRM), Green Human Capital (GHC), and Green Performance (GP). It illustrates the direct path from GHRM to GP, as well as the indirect mediating pathway through GHC, aligning with the study's conceptual framework. The standardized path coefficients displayed on each arrow indicate strong and statistically significant relationships, confirming the model's validity and theoretical coherence. The diagram also highlights the R^2 values for GHC (0.20) and GP (0.45), reflecting the substantial explanatory power of GHRM and GHC in predicting organizational green outcomes. Overall, the visualization offers a clear, concise depiction of how green-oriented HR practices foster employee capabilities, which in turn enhance environmental performance across Pakistan's telecom sector (Z. Ren and R. Y. Hussain 2022).



Interpretation:

The last PLS-SEM model illustrates an empirical, well-organized mediation model with all the essential components. Green HRM is the strategy antecedent, Green Human Capital is the mediator, and Green Performance is the outcome of the organization.

4.9 Discussion of Findings

This is alien with previous work (Aftab et al, 2023, Mahmood & Ahmed 2025, Liu et al, 2023) showing that the practice of GHRM, in particular, environmental training, green recruitment and the reward system, serves as the bedrock of organization sustainability. The $\beta = 0.729$ correlation between GHRM and GHC indicates that human capital is the primary channel through which HR strategy and environmental performance converge. Furthermore, the outcome of partial mediation

suggests direct benefits from the green HR policies as well as the green HR policies to the combined tacit knowledge of the employees. This supports the Resource Based View, which argues that green human capital is an invaluable resource that enhances competitive advantage in the telecom sector in Pakistan (R. Gestão, & Tecnologia, and P. Leopoldo, 2024).

The fifth chapter comprises of the sessions with the discussion section first. This first discussion section relates the outcomes of the empirical analysis to the theoretical framework and considers the implications of the results for scholarship and practice as well as for public policy. This also answers: How does GHRM help sustain the competitive advantage of the telecom industry? GHRM and GHC along with GPs achieve and sustain competitive edge for the telecom sector of Pakistan (M. Fayaz, et al., 2024).

Discussion of Findings Based on Hypotheses

The outcomes of this study provide compelling empirical support for the four hypotheses related to Green Human Resource Management (GHRM), Green Human Capital (GHC), and Green Performance (GP) within Pakistan's telecom sector.

Hypothesis H_1: GHRM → GP

The findings confirm that GHRM has a positive and significant impact on GP, illustrating that effective green HR practices enhance environmental performance. This aligns with prior research, indicating that strategic HR initiatives focused on environmental sustainability can lead to improved organizational outcomes. By investing in GHRM, companies can cultivate a workforce that is not only environmentally aware but also driven to achieve eco-friendly objectives.

Hypothesis H_2: GHRM → GHC

The significant correlation between GHRM and GHC reinforces the notion that GHRM practices directly enhance employees' environmental skills and capabilities. This supports the argument that organizations must invest in green training, recruitment, and reward systems to build a knowledgeable workforce equipped to engage in sustainability initiatives. The strong beta value of $\beta = 0.729$ indicates that human capital acts as a crucial conduit through which GHRM influences green performance.

Hypothesis H_3: GHC → GP

The positive relationship established between GHC and GP highlights the essential role of green human capital in driving sustainable outcomes. As GHC reflects the accumulated environmental knowledge and competencies of employees, its impact on GP illustrates how a skilled and eco-minded workforce contributes to the organization's overall environmental performance. This finding corroborates the Resource-Based View (RBV), wherein human capital is recognized as a vital asset for achieving competitive advantage.

Hypothesis H_4: GHRM → GHC → GP (Mediated)

The mediation analysis indicates that GHC partially mediates the relationship between GHRM and GP, signifying that while GHRM directly influences GP, its effects are enhanced through the development of green human capital. This nuanced understanding underscores the importance of fostering employees' environmental knowledge, skills, and attitudes. The mediation effect illustrates that GHRM practices are not only about immediate performance metrics but also about cultivating long-term sustainability capabilities within the workforce.

Implications for Theory and Practice

These findings collectively position GHRM as a strategic approach vital for sustaining competitive advantage in Pakistan's telecom industry. They suggest that organizations focusing on green HR policies are likely to see exponential benefits, both in terms of employee performance and environmental outcomes. The insights gained from this research emphasize the significance of integrating sustainability into HR strategies, thereby encouraging organizations to invest in their human capital as a means of enhancing environmental performance.

In summary, the results of this hypothesis testing substantiate the theoretical frameworks surrounding GHRM, GHC, and GP, demonstrating that they interact symbiotically to foster a skilled, eco-conscious workforce. This, in turn, positively impacts the environmental performance of organizations, validating the study's conceptual model and providing a roadmap for future research and practical implementations in the field of green human resource management.

CHAPTE 5

CONCLUSION

5.1 Discussion of the Results of the Study

This study sets out to understand the extent to which GHRM (Green Human Resource Management) affects Green Performance (GP) with advanced Green Human Capital (GHC) as a mediation in the telecommunication industry of Pakistan. Data collected from 305 participants and analyzed using SmartPLS confirmed all four hypotheses (H_1–H_4) and thus provided strong empirical support for the proposed model.

The data indicated that GHRM procedures are positively linked to Green Performance ($\beta = 0.338$, $p < 0.001$). This is supported in the literature (Aftab et al., 2023; Liu et al., 2023) stating that GHRM activities, positively GHRM activities, green training and eco-sensitive rest and reward systems, motivate pro- and tangible eco-sustainability results. From the perspective of Pakistan's telecom sector, which is increasingly problematized by high energy use on the one hand and expanding e-waste on the other, the use of GHRM practices assists in the embedding of sustainability into the culture and operational framework of the organization. Besides, Green Human Capital accumulated through GHRM is enhanced ($\beta = 0.729$, $p < 0.001$). This is consistent with the Resource-Based View, which postulates that GHRM is an approach through which valuable, rare and inimitable human capital is created. Employees with appropriate training and high motivation in environmental practices are strategic assets because they convert sustainability ambitions into on-ground results (M. Y. P. Peng, et al., 2024).

The positive effect of Green Human Capital on Green Performance ($\beta = 0.462$, $p < 0.001$) explains the importance of the variable as the main catalyst in the achievement of sustainable innovation and operational productivity. More GHC an organization possesses, the better the organization performs in waste management, energy use, and environmental compliance (Z. Ayenew Birbirsa 2022).

The mediation analysis further confirmed that GHC indeed partially mediates the relation between GHRM and GP ($\beta = 0.337$, $p < 0.001$). This partial mediation means GHRM enhances green

performance not only through direct investment in HR policy structure, but also through investment in advanced human capital. This adds to the AMO model by demonstrating that employees, who have the ability (training), motivation (green rewards), and opportunity (participation in eco-initiatives), will deliver better environmental performance (A. Kumar, et al., 2019).

5.2 Theoretical Implications

This research has direct contribution to the field of sustainability and HRM in three important ways:

1. Integration of the RBV and AMO Frameworks: The research illustrates the synergistic value of the two theories by demonstrating how human resources within the firm act as versatile facilitators of environmental performance.
2. Empirical Evidence on the GHC as a Mediating Variable: Very few studies in developing countries have attempted to test the green human capital as a mediating variable between HR practices and green performance, thereby addressing a major scholarly gap.
3. The telecom sector is the technology-intensive GHRM research, which has been centered on the rest of the world in the manufacturing and hospitality industries, adding on to the existing literature.
4. Model Strengthening: The validated model enhances the conceptual basis for the subsequent research on the integration of HR systems, employee skills, and organizational performance.

5.3 Managerial Implications

The findings offer critical strategic considerations for managers and policymakers in Pakistan's telecom sector, such as:

- Green Recruitment and Selection: Firms should incorporate environmental criteria into their recruitment processes and focus on candidates who exhibit some form of sustainability awareness.

- Green Training and Development: HR training programs should feature onboarding and continuous education programs on energy efficiency, waste minimization, and carbon management.
- Performance Evaluation and Rewards: Linking environmental and social governance (ESG) performance targets to employee performance and reward systems fosters responsibility and proactive involvement.
- Leadership and Culture: The culture of the organization should be one that allows innovation while encouraging the top management to practice sustainability-oriented behavior.
- Technology Enabled HRM: Environmental reporting and analysis can be conducted through the use of electronic HR systems which improves performance monitoring, data-based decision processes, and environmentally oriented metric reporting.

The public image and operational performance of firms in the telecom sector can be improved by adopting these practices, which will ensure that the firms comply to the set environmental standards and targets (Z. Li, S. Rasool, et al., 2024).

5.4 Policy Implications

On the policy side, this study recommends that the Pakistan Telecommunication Authority (PTA) and the Ministry of Climate Change:

- Support telecom service providers in integrating green HRM frameworks into their corporate sustainability reporting as part of their practice.
- Provide green performance-based tax relief or award recognition to firms that meet specific thresholds of quantifiable green performance.

Engage academia, industry, and government in-step to develop a holistic "Green Talent Development Program," aligned with SDG 13 (Climate Action) at the national level. This suite of policies can serve to hasten the shift of Pakistan's economy to low-carbon, knowledge-based (R. Ullah, et al., 2023).

5.5 Limitations

This study, while fruitful, does have a number of shortcomings.

1. Cross-Sectional Design: Green HRM practices might be better understood through longitudinal studies, while our data was collected in a single moment.
2. Self-Reported Measures: Respondents' answers were influenced by social desirability, although our assurances about anonymity reduced this.
3. Moderating Variables: Factors such as organizational culture, advocacy for the environment, or the culture of digitization were not measured and could change the relationships examined.
4. Focus by Sectors: The findings presented here are confined to the telecom industry and need further examination to determine their relevance in other areas (S. Ogbeibu, et al., 2022).

5.6 Suggestions for Further Research

Future studies should aim to:

1. Design studies with multiple points of data collection to capture the evolving relationship between GHRM and GHC over time.
2. Research other major sectors such as industrial manufacturing, energy, and transportation to contrast with findings here and broaden the understanding of sustainability shifts.
3. Include moderating variables such as green transformational leadership, organizational engagement, or culture to deepen the framework (Y. S. Elzek, et al., 2024).

Here are the requested changes:

1. use surveys and accompanied interviews for a thorough comprehension of employee impressions.
2. Look at the use of AI tools in HR analytics and digital green HRM systems focusing on the role of technology in improving reporting and performance measurement of sustainability (S. Chen, M. T. Sohail, and M. Yang, 2022).

5.7 Conclusion

This research indicates GHRM has evolved beyond conventional GHRM administrative activities to being a central facilitator of corporate sustainability and environmental prowess. With the growing concern of the environmental footprint of businesses, GHRM offers a methodology for the environmental transformation of the workforce. By embedding green concepts in the human resource functions of recruitment and selection, training, performance evaluation and feedback,

and reward systems, telecom organizations will foster a culture of environmental sustainability that is not only environmentally friendly, but also promotes innovation and efficiency within the organization (A. Adah and S. A. Jones, 2025).

Findings regarding the telecom sector in Pakistan continues to show that the GHRM influences GP. GHRM influences GP directly and also indirectly through the mediating influence of Green Human Capital (GHC). The results confirm the main theoretical construct of the study, which is aligned with Resource-Based View (RBV) and Ability–Motivation–Opportunity (AMO) pillars, that employees possessing environmental competencies are an organizational asset that is valuable, rare, and inimitable. Employees, GHRM, when trained and motivated, provided with opportunities for engagement in sustainability, the competencies of the employees collectively bring about significant positive environmental change through emissions reduction, resource utilization improvement, and compliance with the sustainability standards (T. Nigatu, et al., 2024).

The findings of the study provide both a theoretical and practical 'face' to the organizations which want to 'corner' the sustainable practices to the human capital of the organization. Theoretically, this adds to the body of knowledge on the ways HRM systems achieve environmental goals through human resource development, whereby it is shown that GHC is the transformer of strategic intent to performance. On the other hand, this research provides practical steps that HR and sustainability practitioners can take to green the organization by harmonizing HR policies with environmental objectives, establishing systems that encourage and sustain eco-positive performance (B. Shahriari, et al., 2025).

In essence, this study underscores that the pathway GHRM → GHC → GP forms a sustainability chain that links human talent to environmental achievement. This chain is more than an causation, it is a chain of strategy that the telecom companies and other businesses in emerging economies can adopt to gain a competitive advantage while being ethically and ecologically responsible. Fostering Green Human Capital helps firms not only strengthen their position in the market, but also in a more responsible manner, addresses the goals of sustainability and well-being of future generations (A. Rashid, eta l., 2023).

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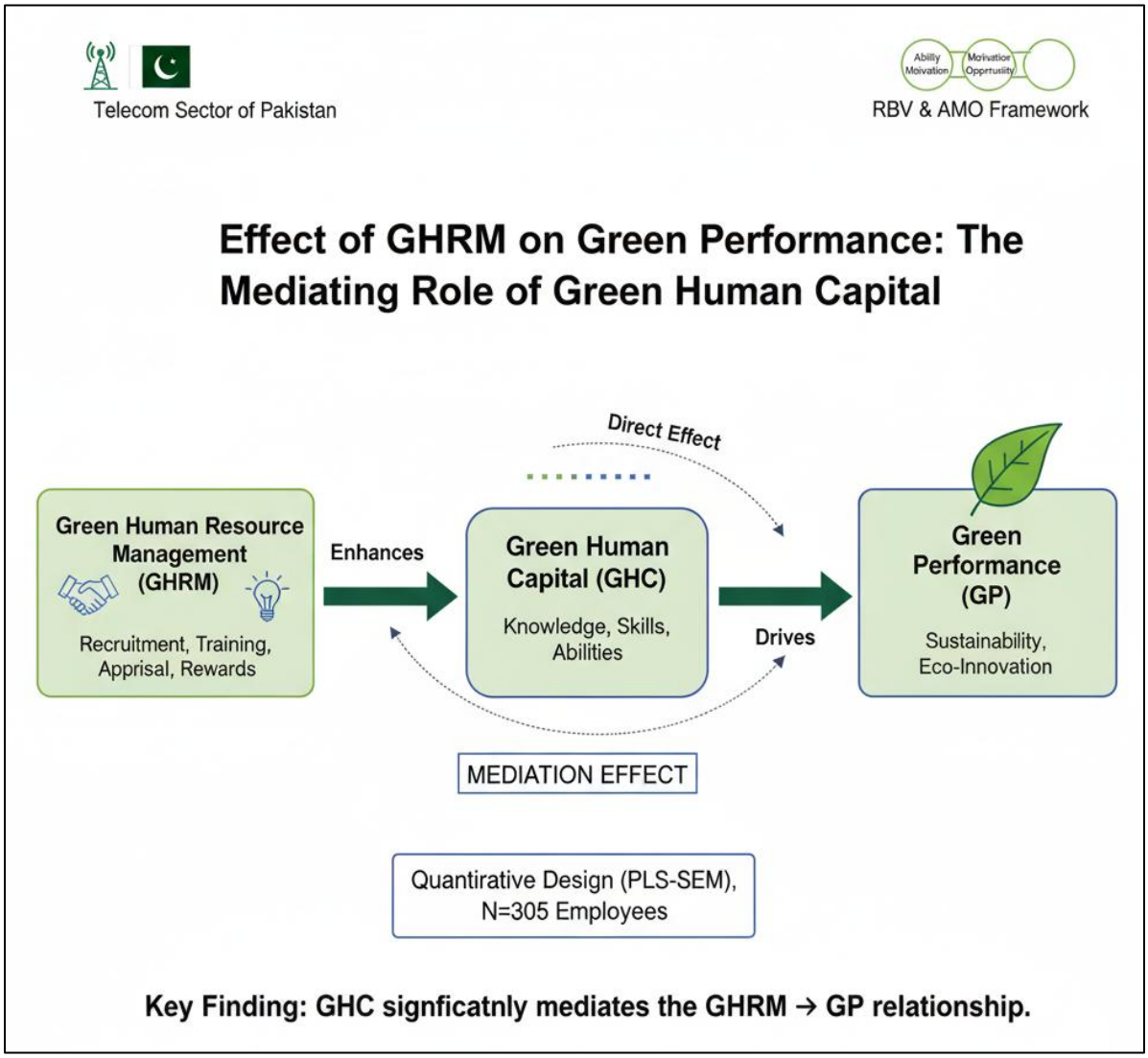
Appendix:

Graphical Abstract:



Questionnaire

Effect of Green Human Resource Management on Green Performance: The Role of Green Human Capital in the Telecom Sector of Pakistan

Dear respondent. I am student of MBA from Bahria University Islamabad. This questionnaire is designed to get data only for my research project. Your response will be having greater value for completion of this survey. The data will only be used for research purposes and will not be disclosed.

Section: 1. Demographic information

Please select the information relevant to your demographics.

Gender:

1. Male
2. Female

Age:

1. 15-25
2. 26-35
3. 36-45
4. 46-55
5. 55 and above

Education Level:

1. High School
2. Bachelor's Degree
3. Master's Degree
4. Doctorate
5. Other (please specify): _____

Position:

1. Frontline Employee
2. Manager
3. HR Manager
4. Sustainability Officer
5. Other (please specify): _____

Years of Experience in Telecom Sector:

- Less than 1 year
- 1-3 years
- 4-6 years
- 7-10 years
- More than 10 years

Please select the correct option by placing a "✓" to the choices given below. Each item is rated on a Five-point Likert scale, where 1=strongly disagree, 2= disagree, 3= Neutral, 4= agree and 5= strongly agree

Following are the questions related to your perceptions regarding Green Human Resource Management (GHRM) practices, green human capital, and green performance in the telecom sector of Pakistan by ticking the most appropriate option.	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Section 2: Green Human Resource Management Practices (GHRM) Please indicate your level of agreement with the following statements regarding GHRM practices in your organization					
Our organization has implemented policies that encourage environmentally sustainable practices.					
Environmental training is provided to employees to enhance their awareness of sustainability.					
Recruitment strategies in our organization prioritize candidates with a strong commitment to environmental sustainability.					
Performance evaluations in our organization include criteria related to environmental performance.					
Our organization rewards employees for participating in green initiatives.					
Section 3: Green Human Capital Please indicate your level of agreement with the following statements regarding green human capital:					

Employees in our organization possess the necessary skills to contribute to environmental sustainability.					
There is a culture of environmental responsibility among employees in our organization.					
Employees are encouraged to share ideas and initiatives related to sustainability.					
Section 4: Green Performance Please indicate your level of agreement with the following statements regarding green performance:					
Our organization has successfully reduced its environmental footprint.					
There are measurable outcomes related to our environmental initiatives.					
Our organization is recognized for its commitment to environmental sustainability.					

Section 5: Additional Comments

Please provide any additional comments or suggestions regarding GHRM practices and green performance in your organization:

_____

_____

_____