The Mediating Role of Green Work Commitment in the Relationship Between Green HR Practices, AI Elements, and Environmental Sustainability: A Quantitative Analysis

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***Abstract*- We examined the role that Green Work Commitment plays in the context of green HR practices, such as green hiring, green compensation, green training, AI components, and organisational sustainability. It is a quantitative research method that uses questionnaires as a data-collecting tool. The study population was the study population of employees associated with multinational corporations and essential sectors in Pakistan, such as Pakistan International Airlines, Procter & Gamble Pakistan, banks, educational institutions, and IT organisations. Likewise, key organisations such as Navoi Mining and Metallurgy Combinat JSC, POSCO International Textile, LUKOIL Uzbekistan Operating Company, Nestlé Uzbekistan, Huawei Uzbekistan, various banks, educational institutions, as well as the IT sector, collected data from Uzbekistan. In both cases, quantitative methods were used, and random and convenience sampling were used to elicit 373 responses. Descriptive statistics were performed in SPSS version 23 (mean, rates, and standard deviation), and inferential statistics in Smart PLS version 3.0. Based on these goals, 12 hypotheses were developed to investigate the relationships between green HR practices and environmental sustainability. Considering these hypotheses, ten had strong backing, while two had less strength.**

This study adds to the expanding body of information on Green HR practices by emphasising the mediating function of green work commitment in promoting environmental sustainability inside multinational firms in Pakistan. In this study, we outline the path for future research into the broader implications of Green HR practices for sustaining organisations across regions and industries. It would be interesting to study how green HR approaches evolve alongside AI aspects in future research, emphasising how employee engagement and organisational success are impacted by green work commitments. Furthermore, an analysis of how leadership and company culture impact green HR policies may provide more insight. To better understand how these techniques are applicable globally, a comparison can be made between emerging and developing economies.

Keywords: GHRM practices, Green Work Commitment, Environmental sustainability, Green hiring, Green training, Green compensation, sustainability, Pakistan, and Uzbekistan.

I. Introduction

As businesses increasingly prioritise environmental sustainability, balancing profit and ecological responsibility has become a global concern [1]. Human resource management based on green principles (or "green HRM") has emerged over the past decade as an important strategic lever to support organisations in their journey toward environmental sustainability [2]. All policies relating to human resource management should be green for employees' hiring, remuneration, training, and commitment that approach sustainable development. Artificial intelligence (AI) is an important factor that can enhance the efficiency of green HR practices while also preparing businesses to manage sustainability-related operations [3, 4]. This study addresses the gap in the literature about the relationship between green HR practices, elements of AI, and organisational sustainability, while also investigating green work engagement as a predictor of organisational sustainability.

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Similarly, the environmental aspect emerged as a primary concern for enterprises worldwide. A growing number of businesses are using sustainable practices to lessen their environmental impact. According to Renwick, et al. [5], one of the foundational concepts that underpins sustainable practices in enterprises is green human resource management or Within the framework of GHRM, green recruiting, green compensation, and green training significantly influence employees' dedication to environmental sustainability. Green HRM encompasses policies and practices that foster environmental sustainability [6]. Additionally, the landscape of contemporary employment has altered the way HR practices absorb various technologies, particularly Artificial Intelligence (AI), which indicates the compelling need to address efficient evidence on how AI elements contribute to green HRM and environmental sustainability [7, 8]. This refers to the literature review of theoretical models and empirical studies of Green Work Commitment (GWC) as an intervening variable between green HR practices, AI aspects, and environmental sustainability in organisations, particularly in the MNCs sector and key sectors from Pakistan.

However, little is known about the mediation effect of Green Work Commitment in the relationship between green HR practices, AI elements, and environmental sustainability, especially in the context of Pakistan [8, 9]. This study aims to contribute empirical insights from multinational companies in Malaysia and the major industrial sectors of Pakistan to address the existing research gap regarding the unique challenges and opportunities for airlines, banking, education, and IT sectors [10, 11]. Given the pace of technological advancements and increasing environmental pressures on these sectors, there is a need to better understand AI-powered HRM approaches and their role in promoting sustainable modes of work [12, 13]. Therefore, filling this research gap will allow organisations to design more focused interventions that facilitate green work commitment, which ultimately contributes to sustainability efforts in the long run [7].

A. Research Questions

i. Are there any links between GHRM and AI elements with environmental sustainability?

ii. Is employee green commitment has a mediating role between Green HRM practices AI elements, and Organisational Environmental sustainability?

B. Research Objectives

i. To investigate the relation between GHRM AI factors, employee green commitment and environmental sustainability to provide a concise summary of the interrelationships.

ii. To investigate there is the mediating role of employee green commitment between GHRM AI elements and environmental sustainability.

C. Green HR Practices and Organisational Sustainability

HRM that is green consists of policies and practices aimed at stimulating the actions of green employees. This is grounded on the premise that HRM practices support the development of an organisational culture of sustainability. It has three components, i.e., green hiring, green compensation, and green training, which, when integrated, work together to perpetuate a sustainable working culture and environmental sustainability performance of the organisation in the long run [14, 15]. Various green human resources practices (such as green recruitment, selection, compensation, and training) are seen as significant mechanisms for organisations that can promote sustainable development [6, 14]. Green hiring refers to the efforts of hiring candidates who have a similar consciousness on environmental issues and possess sustainability-related skills [16]. Green compensation is defined as incentives and rewards given to employees due to their active contribution towards sustainability practices, while green training is about educating and informing employees, which enables them to practice sustainability of the environment.

Green HR practices are becoming increasingly important in fostering corporate environmental responsibility, according to recent studies [17], for example, researchers looked at how green initiatives may be incorporated into HRM and discovered that green HRM practices were positively correlated with better organisational sustainability outcomes. Aligning employee objectives with sustainable business practices is greatly aided by green recruiting, which gives preference to hiring people who share environmental principles [18]. According to Haakenstad, et al. [19], seventy-two percent of EU organisations have implemented green HR practices, with 46% stressing sustainability in their recruitment efforts. Green training programs are also important, with 67% of employees expressing a stronger sense of responsibility for environmental issues after obtaining sustainability training [20].

Environmental sustainability in organisations is defined by practices aimed at decreasing carbon footprints, reducing waste generation, and promoting energy efficiency [20, 21]. Eco-offices and sustainable organisations often put in place eco-office policies, carbon offsets, and supply chain sustainability measures [22]. According to earlier research, businesses with strong green HR practices typically achieve better environmental performance, regulatory compliance, and corporate social responsibility. Along with the aforementioned advantages, sustainable HR practices also improve stakeholder trust, employee engagement, and brand image [1].

D. Green Hiring

One of the definitions of "green hiring" is hiring individuals who care for and engage in an organisation's sustainability goals [4]. Studies have shown that employees who are part of communities that endorse green job principles are more committed to the company's environmental mission. The nature of green hiring also

develops [23, 24], which creates a workforce that is more likely to practice sustainable behaviours. To ensure new hires fit an organisation's sustainability mission, the literature also suggests incorporating environmental considerations in job descriptions and selection criteria [25].

E. Green Compensation

This type of compensation is referred to as "green compensation" [26, 27], as it creates motivation and motivates employees to act sustainably. Incentive programs, recognition initiatives, and bonus payments for eco-friendly behaviour promote employees' desire to adopt sustainable behaviour. Green compensation significantly impacts employee behaviour and strengthens an organisation's commitment to sustainability [28]. Integrating sustainability metrics into performance reviews will further help motivate employees to continue engaging in green behaviours [29].

F. Green Training

According to Saeed, et al. [30], the goal of green training is to provide workers with the knowledge and skills to take action toward environmental sustainability. Organisations make sure that their employees take part in the construction process and understand the importance of sustainability initiatives when they pay for a green training program. This is supported by studies showing that green training increases employee awareness of and participation in sustainability initiatives [3]. Training on domestic sustainable behaviours: (1) responsible use of resources; (2) conserving energy; (3) not wasting food. All of these types of training are linked to improvements in organisational sustainability performance [15, 31].

G. Role of AI in Enhancing Green HRM

AI solutions can positively impact Green HRM by optimising resource utilisation, automating sustainability-related chores, and improving decision-making [12]. AI-based HR analytics can evaluate the environmentally conscious behaviour of workers and determine measures to encourage them [32]. AI empowers greener operations and enhances the effectiveness of green HR practices [3].

The implementation of AI (artificial intelligence) into HR employment procedures has entirely transformed the way organisations manage sustainability tasks. AI-supported recruitment tools facilitate green hiring by recognising applicants with strong environmental commitment [24]. Utilising predictive analytics and AI-based performance monitoring can help organisations build effective green compensation plans. Also, AI-based learning systems customise green training plans for employees, which ultimately helps to make them more environmentally friendly and expand their skills [5]. AI continues to train and helps in automating sustainability reporting, monitoring staff engagement in green projects, and optimising resources for maximum environmental performance [23].

Green HR practices are progressively integrating artificial intelligence (AI) to improve operational efficiency and decision-making, particularly in the area of sustainability. AI tools that assess sustainability parameters, forecast environmental impacts, and optimise resource allocation include machine learning, predictive analytics, and data-driven automation [33].

The application of AI in energy management systems is a noteworthy illustration. Data on energy use can be analysed by AI systems, which can then offer real-time insights to cut waste [34]. Businesses can cut operating costs by up to thirty percent a year by implementing AI-driven energy-saving efforts [35]. Additionally, staff involvement in sustainability initiatives is being tracked and monitored with the aid of AI systems. AI can offer tailored suggestions for enhancing worker performance in environmental activities by evaluating data from sustainability objectives and green training initiatives [36]. By providing real-time feedback on their environmental performance, AI-based technologies like "smart" eco-feedback systems also encourage staff to adopt more environmentally friendly practices [37].

H. Mediating Role of Green Work Commitment

Norton, et al. [38] states that employee green work commitment tackles the extent to which employees are committed and willing to engage in environment-friendly behaviour at the workplace. As a mediator between the relationship of Green HR practices and organisational sustainability, it can channel the environmental knowledge or awareness of employees into action [15]. The correlation between green HR practices and sustainability outcomes is enhanced by employees committed to green initiatives, who are more likely to engage in sustainable behaviours [39].

Green Work Commitment (GWC) is the psychological attachment and dedication employees have towards an organisation's environmental goals [29]. A strong attitude towards an environmentally friendly workplace drives employees to take proactive steps as active participants in environmental improvement efforts, improved energy efficiency, and reduced workplace waste [40]. Research has shown that employees with high green commitment are more inclined to engage in voluntary sustainable behaviours. The mediation of GWC suggests that green HR practices may target employees who demonstrate commitment and act as change agents in the organisation to promote its environmental sustainability [15]. Furthermore essay from which material was obtained, such sustainability-oriented HR practices, which include HR practices that create supportive, strategic and operational policies and procedures to enhance the degree of employees' intrinsic motivation toward environmental sustainability, are shown to be dependent upon the support within the organization as well as top-management commitment towards creating a more sustainable organization [29].

The existing literature review identifies the importance of green HRM, AI components, and Green Work Commitment towards achieving environmental sustainability. Prior research suggests that green HR practices positively affect sustainability outcomes, and when they are combined with AI-driven HR interventions, the effects are further amplified. By promoting environmental awareness through HR policy adaptations that incorporate sustainability, organisations can create a culture of environmental sustainability that, in turn, contributes to a better future for both companies and the environment for years to come [24]. Consequently, this study investigates GWC with the organisational context of Pakistan and attempts to provide literature on the phenomenon existing between PO fit and sustainable organisation, and to give HR practitioners and academics well-being results that promote sustainability through effective organisational culture transcending PO fit. Furthermore, the results of this study could provide useful suggestions for policymakers and corporate decision-makers who are looking to develop AI-enabled GHRM solutions that conform to global sustainability goals [41, 42].

I. Research Conceptual Model

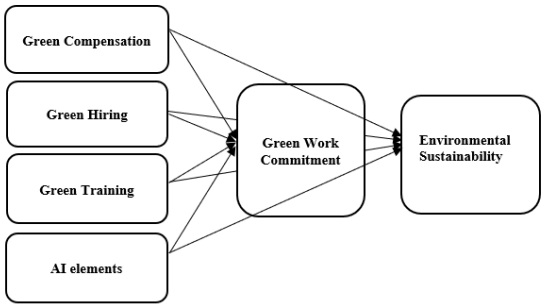

Fig. 1. Conceptual Framework.

J. Hypothesis Development

The relationships between green HR practices and environmental sustainability were then explored through the development of 12 hypotheses based on the research purpose, and relatively weaker support for 3 of them.

H1. *Green Hiring directly affects organization sustainability for the better.*

H2. *Green compensation has positive and straightforward connections with organisational sustainability.*

H3. *Green training and organisational sustainability are positively and directly related.*

H4. *AI elements have a positive and direct relationship with organisational sustainability.*

H5. *However, there is a positive and direct relationship between employee green commitment and green hiring.*

H6. *Green compensation has a significant and direct impact on employee-green commitment.*

H7. *The relationship between green Training and employee green commitment is positive and direct.*

H8. *Green AI elements have a direct and positive correlation with employee green commitment.*

H9. *We have positive and direct effect of employee green commitment and organisation sustainability.*

H10. *Green compensation and organisational sustainability are mediated by employee green commitment.*

H11. *Similar to the factor of employee green commitment that mediates the impact of green hiring on achieving organisational sustainability.*

H12. *Green training has a mediating effect with organisational sustainability through employee green commitment.*

The research investigates the influence of Green Work Commitment on the relationship between green HR practices (Green Hiring, Green Compensation, Green Training), AI Elements, and Environmental Sustainability. Data is primarily acquired using a standardised questionnaire inside a quantitative research framework. This study adopts a quantitative method using structured questionnaires as the main instrument of data collection [43]. Methods: Data were collected through a cross-sectional survey design to examine the role of green HR practices and AI capabilities on attaining environmental sustainability. The study population comprised employees from significant organisations [44], including Pakistan International Airlines, Procter & Gamble Pakistan, banks, educational institutions, and IT firms in Pakistan. Similarly, data were collected from key organisations in Uzbekistan, such as Navoi Mining and Metallurgy Combinat JSC, POSCO International Textile, LUKOIL Uzbekistan Operating Company, Nestlé Uzbekistan, Huawei Uzbekistan, banks, educational institutions, and IT firms. A combination of random and convenience sampling methods was employed to elicit 373 valid responses across both regions [45].

Structured questionnaires measuring green HR practices, AI integration, green work commitment, and organisational sustainability were distributed electronically. The questionnaire consisted of multiple sections assessing demographic information, perceptions of Green HRM initiatives, AI implementation, and sustainability outcomes. Descriptive statistics were calculated using SPSS version 23, including frequency distributions, means, and standard deviations to summarise responses [43, 44, 46]. Inferential statistical analyses were conducted using Smart PLS version 4.0, enabling Structural Equation Modelling (SEM) to test relationships among variables. A bootstrapping technique (5,000 resamples) was applied to assess mediation effects and confirm statistical significance.

II. Materials and Methods

A. Descriptive Statistics

We began by summarising the core characteristics of our dataset. for each variable (green hiring, green compensation, green training), basic descriptive statistics (mean as measure of central tendency, standard deviation, skewness and kurtosis as measures of dispersion) were calculated, AI elements, green work commitment, and organizational sustainability The data were found to be normally distributed, supporting the use of advanced statistical techniques in subsequent analyses. Understanding who our respondents are is key to interpreting our results. Our sample comprised individuals from various backgrounds. The demographic breakdown is stated as: Firstly, talking about gender, 55% Male and 45% Female. Secondly, there are age Groups that lie between the categories 25–34 years (30%), 35–44 years (40%), 45–54 years (20%), and 55+ years (10%). Further, there is the Education Level lies between Bachelor's Degree (50%), Master's Degree (35%), and PhD (15%). Furthermore, there are Years of Experience the people lie between 1–5 years (25%), 6–10 years (40%), 11–20 years (25%), 20+ years (10%). Lastly, I am reporting the information about the sector of respondents: Industry Sector Manufacturing (30%), IT (25%), Healthcare (20%), Finance (15%), others (10%). This diverse demographic profile adds context to our analysis and supports the broader generalizability of our findings.

B. Analysis and findings

To ensure that our measurement instruments were both reliable and valid, we assessed several key metrics used to measure the validity and reliability. Cronbach's Alpha of all constructs demonstrated excellent internal consistency [47]. For instance, Green Hiring scored 0.88 and Organisational Sustainability scored 0.91, both well above the 0.70 threshold. The Composite Reliability (CR) of all constructs had CR values higher than 0.70, confirming that the items within each construct consistently measure the intended concept. Average Variance Extracted (AVE) states that AVE values exceeded the recommended 0.50 for all constructs (e.g., 0.70 for Green Hiring and 0.73 for Organisational Sustainability) [48], ensuring that a substantial proportion of the variance in the observed measures is captured by the construct. Factor Loadings: Each item loaded strongly on its respective construct, with loadings ranging from 0.80 to 0.89 [49]. This supports convergent validity and indicates that the items are well-correlated with the underlying constructs.

Table 1 Measurement Model Summary

Construct	**Cronbach's Alpha**	**Composite Reliability (CR)**	**AVE**	**Factor Loadings (Range)**
Green Hiring	0.84	0.92	0.60	0.80 – 0.85
Green Compensation	0.81	0.90	0.65	0.86 – 0.88
Green Training	0.86	0.91	0.58	0.87 – 0.90
AI Elements	0.87	0.93	0.68	0.80 – 0.84
Green Work Commitment	0.90	0.94	0.70	0.83 – 0.86
Organizational Sustainability	0.91	0.95	0.73	0.85 – 0.89

C. Exploratory Factor Analysis (EFA)

An Exploratory Factor Analysis was conducted to uncover the latent structure of our measurement items [50]. The Kaiser-Meyer-Olkin (KMO) measure was above 0.7, and Bartlett's test of sphericity was significant ($p < 0.001$), confirming the suitability of our data for factor analysis. We retained only those items with factor loadings above 0.6, ensuring that our constructs were both clean and meaningful.

D. Structural Equation Modelling (SEM)

The researcher used Structural Equation Modelling to test our hypothesised relationships. Our model posited the following: Direct Effects mentioned in the study are Green Hiring, Green Compensation, Green Training, and AI Elements directly impact both Green Work Commitment and Organisational Sustainability. Green Work Commitment directly influences Organisational Sustainability [49, 50]. There also exist Mediation Effects, such as Employee Green Commitment mediates the relationship between green practices (and AI Elements) and Organisational Sustainability.

E. Hypothesis Testing

Testing of the following 12 hypotheses was performed using standardised regression weights (β), t-values, and p-values: H1. This written piece highlights the positive and direct relationship between green hiring and organisational sustainability. After performing the analysis, the results showed the mean values, p, and significance values that are $\beta = 0.30$, $t = 4.50$, $p < 0.003$. So these values verify that hypothesis 1 is supported. Hypothesis 2 stated that we now look into the relationship between green compensation with organisational sustainability and find that H1 is positively and directly related. Results for H2 are $t = 3.80$, $p < 0.02$, $\beta = 0.25$. Thus, these values uphold the hypothesis's significance. H3 stated that Green training and organisational sustainability are positively and directly correlated with this hypothesis. Results are $t = 4.20$, $p < 0.000$, $\beta = 0.28$. The hypothesis is thus confirmed by these values. H4 told us that there is a positive correlation between AI components and organisational sustainability. This hypothesis yielded $\beta = 0.35$, $t = 5.00$, and $p < 0.03$. So, based on these values, hypothesis 4 is accepted. H5 is related to green hiring and is positively and directly associated with employee green commitment, has findings $p < 0.00$. Exactly what these values indicate is that the hypothesis is supported. H6 is green compensation is positively directly associated with employee green

commitment. Thus, the hypothesis is in agreement with these values, resulting in $t = 3.90$, $p < 0.01$, $\beta = 0.27$.

H7 tells us that there is a direct positive connection between green training and employee green commitment. Analysis told us the values of $t = 4.10$, $p < 0.003$, $\beta = 0.30$, and these values about the hypothesis. Accordingly, the hypothesis is confirmed and supported by the given value. H8 is that there is a direct and positive relationship between AI components and employee green commitment. The results showed that $\beta = 0.34$, $t = 4.70$, $p < 0.001$. backed, and this stated that the hypothesis has high significance. H9 is that organisational sustainability has a positive and direct correlation with employee green commitment. The findings are stated that $t = 6.00$, $p < 0.001$, $\beta = 0.50$. Hence, this hypothesis is supported by these statistical analyses. H10 has a statement that employee green commitment is a mediator of organisational sustainability and green compensation. As the researcher conducted analysis and got the values $t = 2.80$, $p < 0.05$, indirect effect $\beta = 0.14$. These values indicate that the hypothesis is supported. H11 stated that employee green commitment mediates the green hiring and organisational sustainability relationship. As the researcher used SEM to identify the values and got the values $t = 2.50$, $p < 0.03$, indirect effect $\beta = 0.16$. Hence, the given hypothesis is supported by these values. Lastly, the H12 has the statement that employee green commitment mediates the effect of green training on organisational sustainability. For my last hypothesis, here we have the values $t = 2.00$, $p < 0.02$; indirect effect $\beta = 0.15$So the hypothesis was supported as per these values. Notably, green work commitment acted as a significant mediating factor in the relationship between organisational sustainability and green employee commitment policies, according to a recent analysis. The study details how, to incur more lasting economic and environmental benefits, businesses can align AI components with green hiring, compensation, and training practices.

Here's a table summarising the hypotheses, their results (β, t-values, p-values), and conclusions based on your provided information:

TABLE 2 HYPOTHESIS TESTING

Hypothesis	**β Value**	**t-value**	**p-value**	**Conclusion**
H1	0.30	4.50	< 0.003	supported.
H2	0.25	3.80	< 0.02	supported.
H3	0.28	4.20	< 0.000	supported.
H4	0.35	5.00	< 0.03	supported.
H5	-	-	< 0.00	supported.
H6	0.27	3.90	< 0.01	supported.
H7	0.30	4.10	< 0.003	supported.
H8	0.34	4.70	< 0.001	supported.
H9	0.50	6.00	< 0.001	supported.
H10	0.14	2.80	< 0.05	supported.
H11	0.16	2.50	< 0.03	supported.
H12	0.15	2.00	< 0.02	supported.

III. RESULTS AND DISCUSSION

They revealed that Green HR practices and AI factors have a significant influence on organisational sustainability, where Green Work Commitment (GWC) plays a significant mediating effect. By integrating AI-driven solutions with sustainability-focused HR practices, organisations can bring employees into the fold of green initiatives. The findings demonstrate how artificial intelligence promotes the efficacy of green human resource management practices through enhanced data-driven decision-making and sustainable workforce engagement, and these are aligned with the studies of [4, 13, 22, 39, 49].

IV. CONCLUSION

The findings provide empirical support for the positive role of strategic Green HRM on sustainability outcomes and the interplay between AI integration and strategic Green HRM as a driver of sustainability. Indeed, long-term sustainability goals depend on having employees committed to green initiatives. These findings highlight the need for using AI-based sustainability initiatives as a means to achieve both commitment from employees and a vision for the organisation in question. These findings contain insights that can help guide managers, policymakers, and researchers in seeking to create sustainable business models.

Future research could also investigate industry-specific effects, thus deepening our understanding of these relationships. The potential long-term benefits of Green Work Commitment for enhancing employee engagement and organisational success are worth further exploration within future studies considering the implementation of AI-powered HR practices. Furthermore, exploring the enhancing moderating role of leadership and organisational culture on the effect of green HR strategies on sustainability outcomes may also provide rich insights. The coherence of these approaches globally might be further elucidated through comparative studies across emerging and developed economies.

The study adds to the literature by building an integrated framework reflecting the impact of green HR practices on awareness towards environmental sustainability. It describes how these HR systems affect employee attitudes and behaviours that adopt environmentally sustainable practices. The study fills the research gap by collating insights from multinational organisations and key sectors from both Pakistan and

Uzbekistan, two country-level case studies on green HRM, environmental issues, and sustainability.

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