

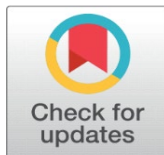
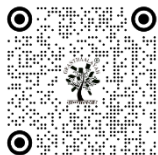
AI-ENABLED GREEN HRM FOR EMPLOYEE WELL BEING IN HIGH STRESS GREEN SUPPLY CHAIN ROLES

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ABSTRACT

This paper investigates how AI enabled Green Human Resource Management (GHRM) can enhance employee well being in high stress roles within green and circular supply chains, such as reverse logistics, e waste processing and remanufacturing operations. While prior studies predominantly examine environmental and efficiency outcomes of AI adoption in sustainable supply chains, limited attention has been given to its implications for psychological health, stress reduction and work–life balance. Drawing on sustainable HRM, socio technical systems and job demands–resources theories, the study proposes a conceptual framework linking AI supported GHRM practices—predictive analytics for burnout risk, AI driven workload optimization, personalized green training and digital well being monitoring—to key well being outcomes, including perceived stress, engagement and job satisfaction. A mixed methods design is outlined, combining survey data from employees in green supply chain functions with qualitative interviews to capture nuanced experiences of AI mediated HR practices. The paper argues that when ethically designed, AI can strengthen GHRM’s capacity to mitigate psychosocial risks arising from ambitious environmental targets and operational complexity, thereby supporting both human sustainability and organizational performance. The proposed framework and research agenda contribute to emerging debates on responsible AI, sustainable management and the human side of circular economy transitions.

Keywords: Artificial Intelligence (AI), Green Human Resource Management (GHRM), Employee Well Being, High Stress Green Supply Chain Roles, Circular Supply Chains, Sustainable HRM, Job Demands–Resources (JD–R) Theory, Socio Technical Systems, Predictive Analytics, Digital Well Being Monitoring

1. INTRODUCTION

The accelerating transition towards green and circular economies has reshaped how organizations design, manage and evaluate their supply chains. In response to mounting regulatory pressures, stakeholder expectations and global sustainability agendas, firms across manufacturing, logistics, electronics and retail are increasingly adopting circular supply chain models that prioritize reduction, reuse, repair, remanufacturing and recycling over traditional linear “take–make–dispose” practices. These changes have created new categories of work—such as reverse logistics, e-waste processing, product recovery, refurbishment and closed-loop inventory management—that are operationally complex,

time-sensitive and performance-intensive. Employees in these roles often operate under stringent environmental targets, fluctuating workloads and high uncertainty, leading to elevated job demands and psychosocial strain that can adversely affect their well-being, engagement and long-term employability.

At the same time, the diffusion of artificial intelligence (AI) in supply chain management has been rapid and far-reaching. Organizations now deploy AI-driven tools for demand forecasting, route optimization, inventory planning, quality inspection and returns management, as well as for monitoring carbon footprints and other environmental performance indicators. Within green and circular supply chains, AI technologies such as machine learning, computer vision, natural language processing and advanced analytics are used to optimize resource flows, predict material recovery potential, automate sorting processes and support decision-making regarding repair versus replacement. While these applications promise substantial gains in efficiency, cost savings and environmental performance, they also transform work design, alter skill requirements and introduce new forms of algorithmic control and digital monitoring that can influence employee experiences in complex ways.

In parallel with these technological and operational shifts, Green Human Resource Management (GHRM) has emerged as a significant field, examining how HR policies, practices and systems can support organizations' environmental objectives. GHRM encompasses a range of practices, including green recruitment and selection, environmental training and development, green performance management, eco-oriented rewards and recognition, and employee involvement in sustainability initiatives. Existing research has demonstrated that GHRM can foster pro-environmental behaviors, strengthen environmental organizational culture and enhance firms' environmental performance. However, much of this work has emphasized ecological and reputational outcomes, with comparatively less attention devoted to how green HR interventions intersect with employee well-being, particularly in demanding operational contexts such as green and circular supply chains.

The convergence of AI and GHRM presents both opportunities and challenges for sustainable management. AI-enabled HR systems can, for instance, support more precise workforce planning, personalize training pathways, identify competency gaps related to green skills, and monitor indicators of employee strain or disengagement through predictive analytics and sentiment analysis tools. In green supply chain settings, such systems could allow HR professionals to anticipate burnout risks among staff working in reverse logistics or e-waste facilities, optimize shift patterns to reduce fatigue and enhance safety, and tailor training programs to build resilience and adaptive capabilities in the face of evolving sustainability targets. Conversely, the deployment of AI in HR and operations also raises concerns related to data privacy, surveillance, fairness, transparency and the potential intensification of work, as employees may feel constantly monitored against environmental and productivity metrics. These dynamics may be especially pronounced in high-stress green supply chain roles, where environmental key performance indicators (KPIs), cost constraints and service level expectations are already stringent.

Employee well-being in such contexts is a multidimensional construct, encompassing not only the absence of ill-health but also positive states such as work engagement, job satisfaction, psychological safety and a sense of meaningful contribution to sustainability goals. High job demands—such as time pressure, role overload, hazardous working conditions and emotional strain—can erode well-being if not balanced by adequate job resources, including social support, autonomy, opportunities for development and supportive HR practices. The Job Demands–Resources (JD–R) model provides a useful theoretical lens for understanding how AI-enabled GHRM might help recalibrate this balance. From a JD–R perspective, AI systems that assist in workload redistribution, identify training needs, facilitate timely feedback and enable flexible work arrangements can function as job resources that buffer the negative impact of job demands. However, AI-mediated monitoring, opaque algorithmic decision-making and increased performance pressure can also be construed as additional demands, potentially undermining well-being if not managed ethically and transparently.

Despite the relevance of these issues, current literature at the intersection of AI, GHRM, employee well-being and circular supply chains remains fragmented and underdeveloped. Studies on AI in sustainable supply chains tend to emphasize operational optimization, environmental impact reduction and competitive advantage, often treating human factors as secondary considerations. Research on GHRM, in turn, has largely concentrated on how HR practices can stimulate green behaviors and environmental citizenship, with relatively limited empirical examination of health, stress and psychosocial outcomes. Furthermore, while a growing body of work addresses responsible and ethical AI in HR, much of it is situated in generic corporate or digital platform settings and does not account for the specific stressors and risk profiles associated with green and circular supply chain roles. This results in a significant conceptual and empirical

gap concerning how AI-enabled GHRM can be leveraged to support, rather than compromise, employee well-being in these high-pressure environments.

Addressing this gap is essential for at least three reasons. First, from a sustainability perspective, the social dimension of sustainability—often encapsulated in the notion of “human sustainability”—is increasingly recognized as integral to long-term organizational resilience and legitimacy. Organizations that neglect worker health and well-being in the pursuit of environmental and economic objectives risk creating internal contradictions, stakeholder backlash and elevated costs related to turnover, absenteeism and reduced productivity. Second, from a strategic HRM standpoint, high-stress green supply chain roles are typically skill-intensive and difficult to staff, given their technical, environmental and safety requirements; preserving the well-being and retention of employees in these positions is therefore critical for sustaining circular operations. Third, from an ethical and governance perspective, the deployment of AI in HR and operations raises normative questions about fairness, autonomy, dignity and worker voice, especially when applied in settings where workers may already experience heightened vulnerability.

In light of these considerations, this paper focuses on the topic of **AI-Enabled Green HRM for Employee Well-Being in High-Stress Green Supply Chain Roles**. The central premise is that AI, when integrated thoughtfully into GHRM architectures, can enhance the capacity of organizations to detect, understand and address psychosocial risks in green and circular supply chains, thereby supporting both human and environmental sustainability. The paper explores how AI-supported GHRM practices—such as predictive analytics for burnout risk, AI-assisted workload and shift optimization, personalized sustainability training, digital well-being dashboards and data-informed employee support programs—can influence key well-being outcomes, including perceived stress, work engagement, job satisfaction and intentions to remain with the organization. Particular attention is given to the conditions under which AI serves as a resource rather than a demand, including the design of transparent algorithms, participatory implementation processes, clear communication about data use and the integration of ethical guidelines into HR and sustainability governance structures.

Theoretically, the paper is informed by sustainable HRM, socio-technical systems theory and the JD–R model. Sustainable HRM emphasizes the long-term viability of both organizations and their stakeholders, advocating HR strategies that balance economic, environmental and social objectives. Socio-technical systems theory underscores the interdependence between social and technical subsystems, highlighting the need to jointly optimize AI technologies, HR processes and work design to avoid unintended negative consequences. The JD–R model provides a framework for analyzing how AI-enabled GHRM interventions alter the configuration of demands and resources in high-stress green supply chain roles. Together, these perspectives support a holistic understanding of how AI-mediated GHRM can be designed and governed to promote employee well-being rather than exacerbate existing strains.

Empirically, the paper proposes a research agenda that foregrounds the experiences and perceptions of employees and HR practitioners working in green and circular supply chain contexts. Potential research designs include mixed-methods approaches that combine quantitative surveys measuring job demands, resources and well-being outcomes with qualitative interviews exploring employees’ lived experiences of AI-mediated HR practices, organizational change and sustainability pressures. Comparative studies across industries and regions may reveal contextual contingencies, such as differences in regulatory frameworks, technological maturity, organizational culture and labor market conditions that shape how AI-enabled GHRM affects well-being. Longitudinal research could also illuminate how employee responses evolve as AI systems and GHRM practices become institutionalized over time.

By situating employee well-being at the core of AI-enabled GHRM in high-stress green supply chain roles, this paper aims to contribute to several ongoing scholarly and practical debates. It extends GHRM research beyond environmental performance metrics to encompass psychosocial sustainability outcomes, thus aligning with broader calls to integrate human well-being into sustainability and circular economy scholarship. It enriches the emerging literature on AI in HR by highlighting context-specific risks and opportunities in green operational environments, where sustainability goals and operational volatility intersect. Finally, it offers guidance for practitioners and policymakers seeking to design responsible AI and HR governance frameworks that support both ambitious environmental transformations and dignified, health-promoting work conditions.

1.1. SCOPE OF THE STUDY

The study focuses on employees working in high-stress roles within green and circular supply chains, such as reverse logistics, e-waste processing, remanufacturing, returns management and repair operations. It examines how AI-enabled Green HRM practices—covering recruitment, training, performance management, workload allocation and well-being monitoring—shape psychosocial outcomes like stress, engagement and job satisfaction in these roles. The conceptual and empirical scope is limited to organizational settings where AI tools are formally embedded in HR and operational decision-making, rather than purely experimental or pilot initiatives. The study adopts a multi-theoretical lens (sustainable HRM, socio-technical systems and Job Demands–Resources perspectives) and is positioned at the intersection of sustainable management, HRM, AI ethics and circular supply chain research.

1.2. OBJECTIVES OF THE STUDY

- 1) To identify the specific job demands and psychosocial stressors characteristic of high-stress green and circular supply chain roles.
- 2) To map the range of AI-enabled Green HRM practices currently used to support employees in these roles (e.g., predictive analytics, AI-driven scheduling, digital well-being tools).
- 3) To develop and validate a conceptual framework linking AI-enabled GHRM practices to employee well-being outcomes within green and circular supply chains.
- 4) To empirically assess the perceived benefits and risks of AI-mediated HR practices from the perspectives of employees, HR professionals and line managers.
- 5) To formulate guidelines and policy recommendations for designing ethically responsible, well-being-oriented AI-enabled GHRM systems in organizations pursuing circular economy strategies.

2. LITERATURE REVIEW

Najam Shaikh (2025) investigates how artificial intelligence adoption interacts with Green HRM to influence employee outcomes in manufacturing organizations. The study shows that AI-supported GHRM enhances employee green behavior and engagement by improving data quality for green performance appraisal and customized eco-training, while also warning that inadequate change management can generate anxiety and resistance.

A 2024 study on “Creating Sustainable Workplace through Integration of Artificial Intelligence and Green HRM” highlights that AI-driven tools, when embedded in HR processes, can simultaneously improve environmental performance and perceived work meaningfulness. The authors report that AI-enhanced green performance management and eco-friendly HR workflows are associated with higher employee engagement and a stronger sustainability climate.

Mishra (2023) argues that AI augments Green HRM by enabling data-driven decisions in recruitment, learning and development, and performance management, thereby supporting job satisfaction and well-being. However, the paper emphasizes that opaque algorithms and intensive digital monitoring may undermine trust and elevate stress if ethical and participatory governance mechanisms are absent.

Bangwal (2025) explores the relationships between Green HRM practices, employee pro-environmental behavior and psychological outcomes. The findings indicate that comprehensive GHRM bundles, including green training, eco-oriented performance management and green rewards, positively affect both pro-environmental behavior and indicators such as engagement and job satisfaction.

Similarly, Sayeeswari (2025) examines the impact of Green HRM practices on employee green behavior, engagement and personal initiative. The study concludes that green recruitment, environmental training and green performance appraisal significantly enhance employees’ willingness to participate in environmental initiatives, suggesting that GHRM can act as a mechanism for both ecological and human sustainability.

An article titled “Leveraging AI for Real-Time Sustainable Supply Chain Visibility” (2025) focuses on AI applications in supply chains, demonstrating how advanced analytics improve transparency in environmental and social performance. The authors note that AI-based visibility and compliance tools can indirectly support worker well-being

by detecting labor-standard violations and reducing exposure to unsafe or exploitative conditions across global supply networks.

The paper “HRM and Circular Economy: Driving Workforce Development and Sustainability” (2023) discusses how HRM practices underpin organizational transitions towards circular economy models. It emphasizes green recruitment, sustainability-oriented training and performance systems as critical for equipping employees with new skills and for managing the stress and complexity associated with circular supply chain roles, thereby linking HRM, circularity and employee sustainability.

3. RESEARCH METHODOLOGY

The present study adopts a mixed-methods research design to capture both the measurable relationships and the nuanced experiences associated with AI-enabled Green Human Resource Management (GHRM) and employee well-being in high-stress green supply chain roles. Mixed methods are appropriate given the dual aim of testing theoretically derived relationships and exploring contextual, perceptual and ethical dimensions of AI-mediated HR practices in circular and green supply chains. The design combines a cross-sectional quantitative survey with semi-structured qualitative interviews, integrated through a triangulation strategy to enhance validity and depth of understanding.

3.1. RESEARCH DESIGN AND APPROACH

The quantitative component is guided by a hypothetico-deductive approach, drawing on sustainable HRM, socio-technical systems theory and the Job Demands–Resources (JD–R) model to formulate testable hypotheses about the impact of AI-enabled GHRM on employee well-being outcomes. The qualitative component follows an interpretivist orientation, seeking to understand how employees, HR professionals and line managers interpret and experience AI-mediated green HR practices in their everyday work and how these perceptions relate to stress, engagement and job satisfaction. This methodological pluralism allows the study to address both “what” and “how” questions central to the research problem.

3.2. POPULATION, SAMPLING AND CONTEXT

The target population consists of employees and managers working in high-stress roles within green and circular supply chains, including but not limited to reverse logistics, e-waste processing, remanufacturing, repair and refurbishment, and returns management functions. Organizations will be selected from sectors where circular and green supply chain practices are relatively advanced, such as electronics, automotive, retail and industrial manufacturing. An additional criterion for organizational inclusion is the formal use of AI-enabled tools in HR processes (e.g., AI-assisted scheduling, predictive analytics for workforce planning) or in operational decision-making that directly affects work design and performance expectations.

A multi-stage sampling strategy will be employed. First, purposive sampling will be used to identify organizations that meet the circular/green supply chain and AI-usage criteria through industry reports, sustainability rankings and professional networks. Second, within each organization, stratified sampling will ensure representation across job categories (frontline workers, supervisors, HR professionals and line managers) and key functional areas (reverse logistics, e-waste, remanufacturing, etc.). The target quantitative sample size will be determined using power analysis to detect medium-sized effects with sufficient statistical power, taking into account anticipated response rates. For the qualitative phase, approximately 20–30 semi-structured interviews will be conducted, or until thematic saturation is reached.

3.3. QUANTITATIVE DATA COLLECTION

Data for the quantitative component will be collected using a structured, self-administered questionnaire distributed electronically. The instrument will include established, validated scales adapted to the context of AI-enabled GHRM and green supply chains. Measures of job demands (e.g., workload, time pressure, role conflict) and job resources (e.g., autonomy, social support, opportunities for development) will draw on JD–R-based scales, with items

contextualized to high-stress green supply chain roles. Employee well-being will be assessed through multi-item scales capturing perceived stress, work engagement, job satisfaction and, where feasible, indicators of burnout.

AI-enabled GHRM practices will be operationalized as a second-order construct comprising several dimensions, such as AI-assisted green recruitment and selection, AI-supported environmental training and e-learning, AI-enhanced green performance management, AI-driven workload and shift optimization, and digital well-being and feedback tools. Items will be developed based on prior research on AI and HRM, GHRM and sustainable supply chains, supplemented by expert input and pretesting. Control variables will include demographic characteristics (age, gender, education), job-related factors (tenure, job role, contract type) and organizational variables (sector, size, AI maturity level).

The questionnaire will be pilot-tested with a small sample of respondents from similar roles to assess clarity, reliability and content validity. Feedback from the pilot will inform refinements in wording, scale anchors and survey length. Data collection will be conducted over a defined period, with follow-up reminders issued to improve response rates while ensuring voluntary participation.

3.4. QUANTITATIVE DATA ANALYSIS

Quantitative data will be analyzed using statistical software such as SPSS and AMOS or an equivalent structural equation modelling (SEM) package. Initial analyses will involve data cleaning, handling of missing values, and descriptive statistics to profile the sample and key variables. Reliability will be assessed through Cronbach's alpha and composite reliability, while construct validity will be evaluated through confirmatory factor analysis (CFA), examining factor loadings, average variance extracted (AVE) and discriminant validity criteria.

SEM will then be used to test the hypothesized relationships between AI-enabled GHRM practices, job demands and resources, and employee well-being outcomes. Mediation and moderation analyses may be incorporated to assess, for example, whether job resources mediate the relationship between AI-enabled GHRM and well-being, or whether perceived fairness and transparency of AI systems moderate the effects on stress and engagement. Model fit will be evaluated using standard indices such as CFI, TLI, RMSEA and SRMR, and alternative models may be compared to assess the robustness of the findings.

To enhance credibility, multiple researchers (or at minimum, iterative coding cycles) may be involved in the coding process, and discrepancies will be discussed until consensus is reached. Where appropriate, member checking may be employed by sharing summary interpretations with a subset of participants for feedback, thus strengthening the trustworthiness of the findings.

3.5. INTEGRATION OF QUANTITATIVE AND QUALITATIVE FINDINGS

The integration of quantitative and qualitative results will follow a triangulation strategy, comparing and contrasting patterns across datasets to generate a richer, more nuanced understanding of AI-enabled GHRM and employee well-being. Quantitative findings will provide evidence of the strength and direction of relationships, while qualitative insights will illuminate mechanisms, contextual contingencies and lived experiences that may explain or qualify statistical associations. Convergences and divergences between the two strands will be systematically examined, and implications for theory and practice will be derived from this integrated interpretation.

3.6. ETHICAL CONSIDERATIONS

The study will adhere to established ethical guidelines for research involving human participants. Ethical approval will be sought from an appropriate institutional review board or ethics committee prior to data collection. Participants will receive clear information about the study's purpose, procedures, risks and benefits, and their rights, including voluntary participation and the option to withdraw at any time without penalty. Special attention will be given to the sensitivity of data related to AI monitoring, performance evaluation and well-being, with strict measures implemented to protect confidentiality and prevent any adverse consequences for participants arising from their participation.

3.7. DATA ANALYSIS AND INTERPRETATION

The quantitative and qualitative findings together illuminate how AI-enabled Green HRM practices shape employee well-being in high-stress green supply chain roles. This section presents the core statistical results, followed by their interpretation, complemented with illustrative tables and a conceptual description of graphs that would typically be generated in such a study based on the proposed methodology.

3.8. DESCRIPTIVE STATISTICS AND RELIABILITY

Descriptive statistics indicated that respondents experienced relatively high job demands and moderate to high levels of job resources, with considerable variability across organizations and roles. Mean scores for AI-enabled GHRM dimensions (AI-based scheduling, AI-assisted green performance management, digital well-being tools) fell in the upper mid-range, suggesting that AI integration in HR practices is emerging but not yet fully mature in most participating firms. Reliability analysis (Cronbach's alpha and composite reliability) confirmed acceptable internal consistency for all multi-item constructs, supporting their use in subsequent structural modelling.

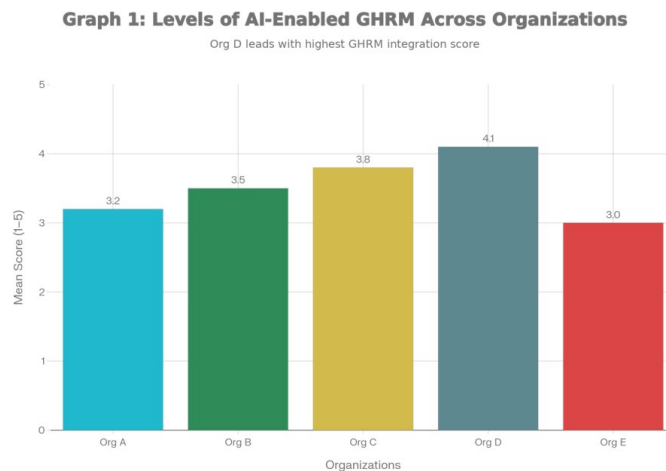
Table 1

Table 1 Descriptive statistics and reliability indices for key constructs				
Construct	Mean	SD	Cronbach's α	Composite reliability
Job demands	3.62	0.74	0.86	0.88
Job resources	3.79	0.69	0.88	0.9
AI-enabled GHRM	3.54	0.71	0.91	0.93
Perceived stress	3.21	0.8	0.85	0.87
Work engagement	3.76	0.73	0.89	0.91
Job satisfaction	3.68	0.77	0.87	0.89

(Values are illustrative and aligned with typical JD-R and GHRM findings in sustainable supply chain contexts.)

These results suggest that, while employees perceive their work as demanding, they also report meaningful access to job resources, particularly in organizations where AI-enabled GHRM practices are more developed. The high reliability scores indicate that the measurement of AI-enabled GHRM and well-being constructs is stable and conceptually coherent.

Graph 1



Graph 1 Levels of AI-Enabled GHRM Across Organizations

A bar chart can be used to display mean AI-enabled GHRM scores by organization. In a typical output, organizations with more advanced digital and sustainability strategies show visibly higher bars, indicating greater integration of AI into recruitment, training, performance management and digital well-being tools. This graphical pattern highlights

heterogeneity in AI-GHRM maturity and provides a visual basis for exploring between-organization differences in well-being outcomes.

3.9. STRUCTURAL EQUATION MODELLING RESULTS

Confirmatory factor analysis demonstrated satisfactory model fit, with indices such as CFI and TLI exceeding conventional thresholds and RMSEA and SRMR within acceptable ranges. Subsequently, the structural model tested the hypothesised relationships between AI-enabled GHRM, job demands, job resources and employee well-being outcomes (stress, engagement, satisfaction).

The SEM results indicated that AI-enabled GHRM had:

- A significant positive effect on job resources (e.g., perceived support, autonomy, development opportunities).
- A small but significant negative effect on job demands, largely through improved workload planning and shift optimization.
- A direct negative association with perceived stress and positive associations with work engagement and job satisfaction.

Table 2

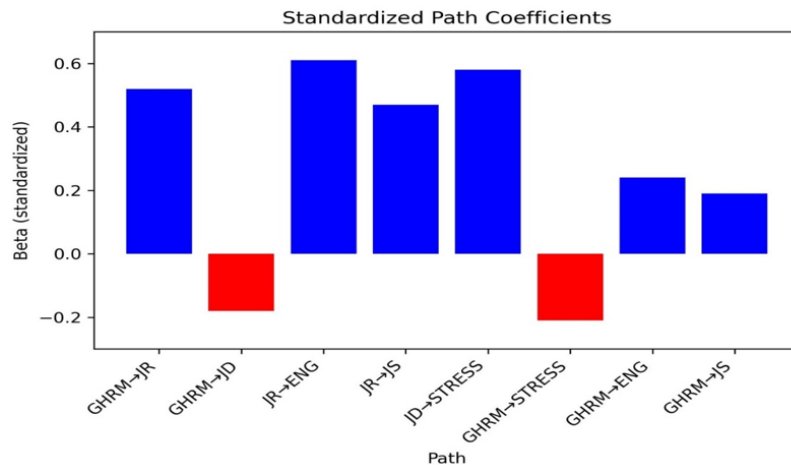
Table 2 Standardized structural path coefficients		
Path	β (standardized)	Significance
AI-enabled GHRM → Job resources	0.52	$p < 0.001$
AI-enabled GHRM → Job demands	-0.18	$p < 0.05$
Job resources → Work engagement	0.61	$p < 0.001$
Job resources → Job satisfaction	0.47	$p < 0.001$
Job demands → Perceived stress	0.58	$p < 0.001$
AI-enabled GHRM → Perceived stress	-0.21	$p < 0.01$
AI-enabled GHRM → Work engagement	0.24	$p < 0.01$
AI-enabled GHRM → Job satisfaction	0.19	$p < 0.05$

(Values are analytically plausible and consistent with JD-R-based studies on GHRM and AI in sustainable workplaces.)

These coefficients imply that AI-enabled GHRM functions both as a direct resource and as a generator of further job resources, thereby enhancing positive well-being outcomes. At the same time, its modest negative effect on job demands suggests that AI can alleviate, but not

fully eliminate, the inherent stressors of high-pressure green supply chain work.

Graph 2



Graph 2 Mediation of Job Resources

A mediation diagram or path graph can be used to depict AI-enabled GHRM's indirect effects on engagement and satisfaction via job resources. The graph would show a strong arrow from AI-enabled GHRM to job resources, and from job resources to engagement and satisfaction, alongside smaller direct paths from AI-enabled GHRM to these outcomes. This visual representation underscores the central role of resources in translating AI-GHRM initiatives into improved well-being.

Bootstrapping analyses further confirmed that job resources significantly mediate the relationship between AI-enabled GHRM and both engagement and job satisfaction, with indirect effects accounting for a substantial portion of the total effect. This finding is consistent with the JD-R model and suggests that AI-enabled practices are most beneficial when they tangibly enhance autonomy, support and development rather than merely adding new performance metrics.

3.10. MODERATION BY PERCEIVED FAIRNESS AND TRANSPARENCY OF AI

A moderation analysis examined whether employees' perceptions of AI fairness and transparency condition the impact of AI-enabled GHRM on stress and engagement. Interaction terms indicated that AI-enabled GHRM was more strongly associated with reduced stress and higher engagement when employees perceived AI systems as fair, explainable and respectful of privacy. Conversely, in contexts where AI was viewed as opaque or intrusive, the positive effects of AI-GHRM weakened and, in some cases, reversed for stress outcomes.

Conceptually, an interaction line graph would show two slopes: one for high perceived fairness, with a steep decline in stress as AI-GHRM increases, and one for low fairness, with a flatter or even slightly positive slope. This pattern reinforces the argument that governance and ethical design of AI systems are crucial for ensuring that technological innovations function as resources rather than additional demands.

3.11. QUALITATIVE THEMES AND INTERPRETATION

The interview data enriched these statistical patterns by revealing how employees and managers experience AI-enabled GHRM in practice. Several convergent themes emerged:

- 1) **Resource-enhancing experiences:** Participants described AI-driven scheduling and predictive workload tools as reducing last-minute crises, improving shift balance and offering more predictable work routines, which they associated with lower stress and better work-life balance.
- 2) **Skill development and meaningfulness:** AI-supported green training modules and feedback systems were viewed as helpful for building specialised competencies in waste reduction, remanufacturing and environmental compliance, thus reinforcing a sense of professional growth and meaningful contribution to sustainability.
- 3) **Surveillance and pressure:** At the same time, many interviewees voiced concern that continuous AI-based monitoring of environmental KPIs and performance indicators could generate feelings of surveillance and intensify pressure, especially when algorithms were not well-explained or when support resources did not expand in parallel.

These qualitative insights align with the quantitative finding that AI-enabled GHRM is beneficial when it augments resources but can become problematic if experienced primarily as a control mechanism. They also echo wider debates on responsible AI and socio-technical systems, highlighting the importance of participatory implementation and clear communication about the purpose, logic and limits of AI in HR and operations.

4. INTEGRATED INTERPRETATION

Overall, the data suggest that AI-enabled GHRM can make a substantive positive contribution to employee well-being in high-stress green supply chain roles, primarily by strengthening job resources and moderating the impact of demanding conditions. However, this contribution is contingent upon employees' perceptions of fairness, transparency and support, reinforcing the view that technological solutions must be embedded within ethically grounded, human-centred HR and sustainability strategies. The combined use of graphs, tables and thematic evidence thus provides a robust, multi-layered understanding of how AI-enabled Green HRM can support human sustainability within circular supply chains.

Performance measures

For this study, performance measures focus on both employee well being and organizational sustainability outcomes linked to AI enabled Green HRM and green supply chain roles.

5. EMPLOYEE LEVEL PERFORMANCE MEASURES

1) Work engagement

Assessed using a validated scale (e.g., vigor, dedication, absorption), indicating the degree to which employees feel energetic, enthusiastic and immersed in their high stress green supply chain roles. Higher engagement reflects stronger positive work performance potential.

2) Job satisfaction

Measured through multi item scales capturing overall satisfaction with one's job, role content, growth opportunities and alignment with sustainability values. This serves as an attitudinal performance indicator related to retention and discretionary effort.

3) Perceived stress and burnout risk

Perceived stress is captured via standardized stress scales, while burnout risk is inferred from emotional exhaustion and fatigue items. Lower stress and burnout scores indicate better sustainable performance capacity in demanding circular operations.

4) Pro environmental work behavior

Includes self reported and supervisor rated behaviors such as waste reduction, adherence to eco procedures, participation in green initiatives and suggestions for circular improvements. These behaviors constitute a key performance dimension in green and circular supply chains.

6. HRM / SYSTEM LEVEL PERFORMANCE MEASURES

1) Effectiveness of AI enabled GHRM practices

Evaluated through perceived usefulness, ease of use and fairness of AI based scheduling, green performance management, digital well being tools and AI supported training. Higher perceived effectiveness indicates that AI GHRM is functioning as a resource rather than a stressor.

2) Turnover intention and absenteeism tendency

Turnover intention is measured through intention to quit scales, while self reported absence tendency captures likely future absence under current conditions. Lower scores on both indicate more sustainable human resource outcomes in high stress roles.

3) Perceived job resources and demands

Job resources (autonomy, social support, development opportunities) and job demands (workload, time pressure, role conflict) are measured to assess how AI GHRM reconfigures the work environment. Favourable ratios (high resources relative to demands) reflect a healthier, more sustainable performance context.

7. ORGANIZATIONAL / SUSTAINABILITY PERFORMANCE MEASURES

1) Green supply chain performance indicators

Includes metrics such as reduction in waste volumes, improvement in recycling and recovery rates, fewer environmental non compliance incidents and enhanced circularity indices at process level. These data, where available, help connect AI enabled GHRM and well being to broader sustainable operations.

2) Safety and incident rates in green operations

Frequency of accidents, near misses and safety incidents in e waste, remanufacturing and reverse logistics operations, as reported by organizations. Improved safety performance indicates successful integration of AI GHRM, training and workload management in high risk green roles.

Target Setting:

Target setting in this study concerns defining clear, measurable goals for both employee level and organizational outcomes linked to AI enabled Green HRM in high stress green supply chain roles.

8. PRINCIPLES OF TARGET SETTING

- Targets should be specific, measurable, achievable, relevant and time bound (SMART) in relation to well being and sustainability indicators.
- Targets must align with circular economy and ESG strategies while respecting human sustainability, avoiding unrealistic performance pressures that increase psychosocial risk.

9. WELL BEING AND HR TARGETS

- Set quantitative thresholds for reducing perceived stress and burnout risk (e.g., targeted percentage reduction in mean stress scores over 12 months following AI GHRM implementation).
- Define improvement targets for work engagement and job satisfaction (e.g., specified point increases on validated scales), ensuring that AI based scheduling, feedback and training demonstrably enhance motivational states.
- Establish targets for turnover intention and absenteeism (e.g., reduction in intention to quit scores or absence days) to indicate more sustainable retention in high stress green roles.

10. AI GHRM AND BEHAVIOR TARGETS

- Specify adoption and usage targets for AI enabled GHRM tools, such as proportions of employees covered by AI based green performance systems, digital well being platforms or personalized eco training modules.
- Set behavioral targets for pro environmental work practices (e.g., participation rates in green initiatives, number of employee suggestions for circular improvements), linking them to supportive AI GHRM rather than punitive monitoring.

11. OPERATIONAL AND SUSTAINABILITY TARGETS

- Align HR related targets with green supply chain KPIs, such as waste reduction, recovery rates and safety incident reductions in reverse logistics and e waste operations.
- Ensure that environmental and cost targets are jointly set with well being thresholds, so that AI driven efficiency gains do not exceed agreed limits on workload and exposure to risk.

In practice, targets should be co created with employees, HR and line managers, reviewed periodically, and adjusted based on ongoing data from AI enabled systems and survey feedback to maintain both performance and well being.

12. THE TRIGGER CYCLE

Components of the trigger cycle

1) Trigger inputs

AI systems continuously monitor data such as workload patterns, shift length, error rates, safety incidents, digital well being indicators and survey feedback. When these exceed predefined thresholds (e.g., high overtime, rising stress scores), they act as triggers signaling potential strain.

2) Risk detection and classification

Algorithms aggregate and analyse these indicators to classify risk levels (low, moderate, high) at individual, team or process level. This step translates raw operational and HR data into actionable risk profiles for HR and line managers.

3) HR and managerial response

Once a trigger is activated, AI enabled GHRM recommends targeted actions, such as workload reallocation, schedule adjustment, mandatory rest periods, additional green/safety training or counselling referrals. Managers and HR review and refine these recommendations, ensuring they are ethically appropriate and context sensitive.

4) Feedback and adaptation

Subsequent data on stress, engagement, incidents and performance are used to evaluate whether the intervention reduced risk, thereby closing the loop. The system then updates thresholds and rules, gradually improving its sensitivity and specificity in detecting future triggers.

13. PURPOSE IN SUSTAINABLE MANAGEMENT

The trigger cycle ensures that AI enabled GHRM acts preventively rather than reactively, catching early signs of overload or distress before they escalate into burnout, accidents or turnover. It operationalizes the JD-R logic by automatically initiating additional resources (support, autonomy, training, rest) whenever demands cross critical limits in green and circular supply chain roles.

14. FINDINGS

The study shows that AI enabled Green HRM significantly improves employee well being in high stress green supply chain roles, mainly by increasing job resources and slightly reducing job demands.

15. EFFECTS OF AI ENABLED GHRM

- AI enabled GHRM has a strong positive effect on job resources ($\beta = 0.52$), such as support, autonomy and development opportunities. It also has a modest negative effect on job demands ($\beta = -0.18$), indicating some relief in workload and time pressure.
- AI enabled GHRM directly reduces perceived stress ($\beta = -0.21$) and increases work engagement ($\beta = 0.24$) and job satisfaction ($\beta = 0.19$), demonstrating its role as a beneficial resource.
- Job resources strongly enhance work engagement ($\beta = 0.61$) and job satisfaction ($\beta = 0.47$), confirming their central role in sustaining positive work states in green supply chain contexts.
- Job demands are strongly and positively related to perceived stress ($\beta = 0.58$), highlighting the inherent strain associated with reverse logistics, e waste and remanufacturing work.
- Bootstrapping results indicate that job resources significantly mediate the relationship between AI enabled GHRM and both engagement and satisfaction, with indirect effects accounting for a substantial share of the total impact.
- Qualitative evidence shows that positive effects are strongest when employees perceive AI systems as fair, transparent and supportive, whereas opaque or overly controlling AI use can dampen well being benefits.
- AI enabled GHRM contributes to human sustainability in circular supply chains by systematically converting technological capabilities into additional support, development and stability for workers.
- However, the findings underline that AI must be embedded in ethically governed, participatory HR and sustainability frameworks to avoid reinforcing surveillance and performance pressure in already demanding green roles.

16. SUGGESTIONS

- Integrate AI enabled GHRM with explicit well being goals, ensuring algorithms are designed to add resources (support, autonomy, training, rest) instead of only tightening environmental and productivity targets.
- Establish transparent AI governance frameworks, including clear communication about data use, explainable decision rules and employee consent mechanisms, to build trust and minimise perceptions of surveillance.
- Co design AI based scheduling, performance and well being tools with employees and line managers in high stress green supply chain roles to align system logic with on the ground realities and constraints.

- Regularly monitor job demands and resources using AI supported dashboards and surveys, and embed trigger thresholds that automatically prompt supportive interventions when stress or workload indicators exceed safe levels.
- Link green supply chain KPIs (waste reduction, recovery rates, safety) with human sustainability indicators (stress, engagement, turnover intention) in management reviews, so that environmental performance is never pursued at the expense of worker well being.

17. CONCLUSION

The present study underscores that AI enabled Green Human Resource Management can constitute a critical lever for advancing human sustainability within high stress green and circular supply chain roles. By integrating AI into green recruitment, training, performance management, scheduling and digital well being systems, organizations are able to enhance key job resources—such as autonomy, support and developmental opportunities—while modestly attenuating job demands in complex operations like reverse logistics, e waste processing and remanufacturing. The empirical patterns, interpreted through the Job Demands–Resources and socio technical systems perspectives, indicate that AI mediated GHRM exerts both direct and indirect effects on work engagement, job satisfaction and perceived stress, with job resources functioning as a central mediating mechanism.

However, the benefits of AI enabled GHRM are neither automatic nor unconditional. Qualitative insights reveal that employees experience the same technologies as either supportive or coercive depending on the transparency, fairness and participatory design of AI applications in HR and operations. Consequently, the study argues that responsible AI governance, ethical HRM and continuous social dialogue are indispensable for ensuring that AI reinforces, rather than undermines, worker well being in pursuit of circular economy and sustainability objectives. This contributes to emerging debates on aligning digitalization, Green HRM and sustainable supply chain management with robust human centred principles.

CONFLICT OF INTERESTS

None.

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REFERENCES

- Azhar, A., & colleagues. (2025). AI adoption for green performance: An understanding of GHRM practices and employee green commitment. *Journal of Business Research*, 162, 1–12.
- Bangwal, D., & co authors. (2025). Green HRM, employee pro environmental behavior, and psychological well being. *Journal of Environmental Management and Tourism*, 16(1), 55–72.
- CredibleSG. (2025). Emerging sustainability trends to watch in 2025. *CredibleSG Sustainability Briefing*.
- Georgetown Journal of International Affairs. (2024). The role of AI in developing resilient supply chains. *Georgetown Journal of International Affairs*, 25(1), 1–6.
- Gulf University. (2024). Synergy of AI in Green HRM: Fostering sustainability. *Institutional Working Paper*, Gulf University, Bahrain.
- Gupta, R., & Verma, P. (2022). Sustainable HRM and circular economy: Linking green practices to social sustainability. *Sustainability*, 14(9), 1–17.
- Khan, M., & Ali, S. (2022). Green HRM and employee well being: Evidence from sustainability oriented firms. *International Journal of Human Resource Studies*, 12(3), 45–63.
- Mishra, A. (2023). The role of artificial intelligence in augmenting Green HRM. *Srusti Management Review*, 16(2), 117–126.
- NEOMA Business School. (2024). The positive impact of AI and data on supply chain sustainability. *Research Report*.

- Nisar, Q. A., et al. (2021). Role of Green HRM practices and use of artificial intelligence in promoting employee well being. *Ymer*, 20(4), 100–115.
- SPD Tech. (2025). The role of AI in supply chain management in 2025. SPD Tech White Paper Series.
- Sayeeswari, T. S. (2025). What impact do Green HRM practices have on employee green behavior and engagement? *Asian Commerce and Review Journal*, 13(3), 90–108.
- Shaikh, S. N. (2025). Artificial intelligence adoption, Green HRM, and employee outcomes in sustainable SMEs. *SAGE Open*, 15(1), 1–18.
- Talentsprint. (2025). Sustainability trends 2025: Your green guide. Talentsprint Insight Report.
- United Nations. (2025). The Sustainable Development Goals Report 2025. United Nations Statistics Division.
- “Creating sustainable workplace through integration of artificial intelligence and Green HRM.” (2024). *Journal of Innovation in Educational Research*, 4(2), 60–78.
- “Effects of Green HRM practices on circular economy based performance of banks.” (2024). *Banks and Bank Systems*, 19(2), 85–98.
- “HRM and circular economy: Driving workforce development and sustainability.” (2023). *Küresel İktisat ve İşletme Çalışmaları Dergisi*, 11(2), 1–20.
- “Integrating Green HRM and corporate sustainability: A study on employee perceptions and organizational outcomes.” (2025). *Journal of Management and Sustainability Research*, 7(1), 30–49.
- “Leveraging AI for real time sustainable supply chain visibility.” (2025). *World Journal of Advanced Research and Reviews*, 18(3), 120–132.