

REVISITING SUSTAINABLE HUMAN RESOURCE MANAGEMENT: IDENTIFYING GAPS IN GREEN PRACTICES AND WORKFORCE DEVELOPMENT

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ABSTRACT

The main purpose of the study is to examine and uncover the shortcomings in contextual, methodological and conceptual basis of the literature, and to synthesize gaps, into an integrative conceptual framework that advances sustainable HRM, green HRM and workforce development practices. This study identifies 21 types of gaps from the existing literature. This article systematically revisits Sustainable HRM, Green HRM and Workforce Development practices, by identifying gaps across 35 research article from Scopus indexed, in the timeframe of 2015 to 2025. Moreover, these gaps were represented by using a frequency distribution table, and gaps occurring in more than 50% of the reviewed studies were considered as key gaps. Those key gaps were further discussed for deeper insights and proposes a conceptual framework linking antecedents of- green culture, leadership, institutional pressure, digital readiness, mechanisms of- green knowledge sharing, psychological climate, self-efficacy, and outcomes are- green creativity, sustainability performance, workforce development, bounded by the identified methodological and contextual limitations. The analysis translates these insights into practical implications for organisations covering HR systems, leadership development, knowledge sharing, and performance tracking, alongside recommendations for future research using longitudinal, multi-method designs.

Keywords: Sustainable Human Resource Management, Green Human Resource Management, Workforce, Research Gaps.

INTRODUCTION

In today's era there is increasing globalization and rising concerned for people and ecological problems (Hewapathirana et al., 2020). Green Human Resource Management entails the synthesis of organizational ecological aims with Human Resource practices rewards for sustainable performances and enforces HRM guidelines that foster the application of sustainable resources adopted in an organisation (Das & Singh, 2016). In current era, there is rapid growth in advanced technology, and this requires a creative and innovative workforce to meet these challenges. Green firms demonstrate enhanced sustainability performance in contrast to conventional practices adopted by competitors (Amjad et al., 2021). This study considers deeper insight into the adoption of sustainable organisational practices and aims to increase practitioners' knowledge (Gupta & Matharu, 2022) by identification of research gaps. This study emphasises sustainable working conditions and workforce well-being are necessary to improve performance within organisations. Regardless, scholars continue to

identifying new ideas for the workplace and to improving creative conditions for workers within organisations (Javed et al., 2018). This article also examines the emerging need for advance skills that benefit both organisations and workers welfare. Defining the research gaps at the convergence of Green Human Resource Management, Sustainable Human Resource Management and Workforce Development is essential because sustainability goals are ultimately accomplished through human capital, work attitudes and organisational behaviour. However, GHRM highlights environmentally responsible HR methods, while the Sustainability paradigm encompasses people (social), planet (environment) and, profits (economic), dimensions; considered separately, these domains offer limited insights into the effectiveness, scope and boundary conditions of green HRM and sustainability HRM practices across different context. The literature also points to a research-to-practice gap in Human Resource Management (Tkachenko et al., 2017). It becomes crucial to understand the implications of technology in HRM in order to reduce technological and digital gaps (Ekuma, 2024; Sharma & Srivastava, 2026), and to understand how new technologies are incorporated within organisations (Connelly et al., 2021). At the same time, workforce-focused research remains limited, indicating a need for further clarification and monitoring of workforce dynamics in this field (Yoon et al., 2024). This study systematically reviews 35 high-quality articles drawn exclusively from the Scopus database within time frame of 2015 to 2025. The literature review led to the identification of gaps, which were organized using a frequency distribution and percentage table. The analysis reveals nine key gaps occurring in more than 50% of the reviewed literature. These key gaps are discussed further to provide insight and recommendations for future research. Beyond cataloguing these gaps, the study uses them to build an integrative conceptual framework and translates that framework into concrete practical implications that organisations can act on, so that the review contributes to both scholarship and workplace practice.

OBJECTIVES

The objectives of this paper are:

1. To outline the key concepts of Sustainable HRM, Green HRM, Workforce Development and research gaps.
2. To identify the key gaps from existing research.
3. To discuss future research directions arising from the identified gaps.

METHOD

This study follows a systematic literature review approach and identifies gaps occurring in the context of sustainable HRM, green HRM and workforce development. Thirty-five peer-reviewed, Scopus-indexed articles published between 2015 and 2025 were identified for the gap analysis. The key concepts in the field of Sustainable HRM, Green HRM and Workforce Development were defined, and various types of gaps were identified and explained through an extensive literature review. Moreover, gaps were represented using a frequency distribution table, and gaps occurring in more than 50% of the studies were treated as key gaps. These key gaps were then discussed in depth to provide recommendations for future research.

Table.1 Identification of Studies via the Scopus Database

Parameter	Detail
Database	Scopus
Document Type	Article
Time frame	2015–2026
Language	English
Search string	ALL ("GREEN HRM" AND "Sustainable HRM" OR "Workforce") AND PUBYEAR > 2014 AND PUBYEAR < 2027 AND (LIMIT-TO (SUBJAREA, "BUSI") OR LIMIT-TO (SUBJAREA, "SOCI") OR LIMIT-TO (SUBJAREA, "ECON")) AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (PUBSTAGE, "final")) AND (LIMIT-TO (SRCTYPE, "j")) AND (LIMIT-TO (LANGUAGE, "English"))
Records identified	824
Records excluded	789
Records included in gap analysis	35

Source: Author's compilation, based on a Scopus database search conducted on 22 September 2025.

Table.2 Key Concepts and Definitions

Concept	Definition
Green Human Resource Management	Green Human Resource Management practices are developed to encourage employees to promote sustainability within the organisation for long-term growth and achievement (Rahman et al., 2025).
Sustainable Human Resource Management	Sustainable Human Resource Management is the synthesis of sustainability fundamentals — social, environmental and economic — with Human Resource Management practices, promoting long-term growth within organisations (Soekotjo et al., 2025).
Workforce	Workforce refers to forecasting the needs of an organisation by ensuring the right number of people with the right skills are available at the right time, promoting organisational growth (Dessler, 2020).

Source: Author's compilation.

Table.3 Definitions of Research Gaps

Concept	Definition
Generalizability Gap	This gap occurs when a study is limited to a specific group and it is unclear whether the findings apply to other people, places, or situations (Gamble & Hewlett, 2025).
Methodological Gap	This gap occurs when the research approach used is limited and some parts of the problem remain unclear (Fredlund et al., 2024).
Empirical Gap	This gap occurs when the available data is insufficient to test the ideas, theories, and assumptions of a study (Khettab, 2020).
Contextual Gap	This gap occurs when a study does not account for a specific sector, culture, or set of circumstances, making it unclear where the findings apply (Akter et al., 2021).
Theoretical Gap	This gap occurs when a theory is not fully explained and the topic remains unclear, requiring further examination (Arteaga et al., 2024).
Temporal Gap	This gap occurs when a study does not track change over time, making trends and causes difficult to observe (Sooksatra & Watcharapinchai, 2024).
Causal Inference Gap	This gap occurs when variables are related but a causal effect between them cannot be confidently established (Kristjanpoller et al., 2023).

Measurement / Validity Gap	This gap occurs when the measurement of constructs is imprecise, reducing the accuracy of results (Adcock & Collier, 2001).
Sampling / Population Gap	This gap occurs when a study considers a specific group of people that may not reflect the wider population (Shukla, 2020).
Moderation Gap	This gap occurs when a study does not consider factors that may influence a relationship, or the relationship's boundary conditions (Luo et al., 2021).
Mediation / Mechanism Gap	This gap occurs when a study shows an effect but cannot explain the mechanism through which it occurs (Bondy et al., 2005).
Practical / Application Gap	This gap occurs when findings exist but it is unclear how to apply them in real-world or workplace settings (Lim & Bowman, 2023).
Knowledge Gap	This gap occurs when research on a topic is scarce and important questions remain unanswered (Coker, 2020).
Scope / Omission Gap	This gap occurs when a study omits important aspects and cannot explain the full picture (Edwards et al., 2009).
Response Bias / CMB Gap	This gap occurs when respondents do not give honest or relevant answers, skewing the results (Jordan & Troth, 2019).
Geographical Gap	This gap occurs when a study considers only a specific place, so findings may not hold for other regions (Biswas & Praveen, 2021).
Integration / Holistic Gap	This gap occurs when a study addresses only part of a problem and cannot explain it as a whole (Kalaivani et al., 2024).
Technological / Digital Gap	This gap occurs when a study addresses only the technological or digital dimension, leaving other dimensions unclear (Bentley et al., 2024).
Policy / Governance Gap	This gap occurs when a study does not consider the rules and policies that shape important ethical or governance angles (Rassanjani & Meesonk, 2025).
Replication Gap	This gap occurs when a study's results have not been retested, leaving uncertainty about whether they hold true over time (Mocanu & Chan, 2021).

Source: Author's compilation.

Table.4 Description of the 35 Papers Studied

It presents a key description and the identified gaps for each of the 35 reviewed studies on Sustainable HRM, Green HRM and Workforce Development.

Paper Title	Year	Author(s)	Description	Gaps Identified
Leveraging green human resource management for sustainable tourism and hospitality: a mediation model for enhancing green reputation	2025	Al-Romeedy & Alharethi, (2025)	Examines how eco-friendly HR practices in tourism and hospitality promote a firm's green and sustainable performance.	Findings are limited and cross-sectional, based on employee perception, restricting deeper understanding of results.
Navigating ethical decision-making in digital transformation: ethical climate, digital competence, and person-organization fit in China's	2025	Bian et al., (2025)	Examines how digital transformation in China's banks shapes ethical decisions, culture and employees' digital competence.	Self-sourced design and a narrow sample of banks may cause response bias / common method bias.

banking sector				
Sustainability through green intellectual capital: the role of IT capability as a moderator in the service sector	2025	Akter et al., (2025)	Examines how green intellectual capital drives sustainability in the service and IT sectors.	Self-reported, cross-sectional design and a narrow model reduce the generalizability of findings.
Fostering sustainable development: the role of green HRM and green work engagement	2025	Alfadel et al., (2025)	Examines how green HR practices and employee engagement in eco-friendly practices jointly promote sustainable development.	Limited to a narrow context; culture and leadership are unexamined, indicating a need for longitudinal GHRM research.
Towards a sustainable workforce: integrating workplace spirituality, green leadership, and employee adaptability for green creativity	2025	Sultan Hussain, & (2025)	Examines how meaning at work, green leadership and employee adaptability foster greener, more creative behaviour.	Single context, limited theory application and self-reported design; culture, leadership and long-term effects remain unexplored.
Leveraging AI-driven insights to enhance sustainable human resource management performance: a moderated mediation model — evidence from UAE higher education	2025	Mahade et al., (2025)	Examines how AI-based methods in universities support sustainability-oriented HR performance.	Limited scope and coverage, methodological and data-quality issues, missing causal/temporal insight, and a theory-practice disconnect.
Effect of green organizational culture on employee green organizational commitment: a moderated-mediation model of employee green self-efficacy and organizational identity	2025	Li et al., (2025)	Examines how green workplace culture shapes employee behaviour toward environmental goals and belongingness.	Narrow scope with geographical and sectoral constraints; methodological limitations in establishing causality; missing variables and unexamined moderators.
From Strategic HRM to Sustainable HRM?	2025	Cooke, (2025)	A critical evaluation of existing research on how HRM strategy can support the common	Scarce data, non-standardized measurement, single-method approach, theoretical blind spots, context/geography bias,

Exploring a Common Good Approach Through a Critical Reflection on Existing Literature			good and long-term sustainability.	and a research-practice disconnect.
Green HRM as a Mediator: Strategic Management Accounting and Environmental Performance in the Jordanian Industry	2025	Al-Nimer, (2025)	Examines how HR practices mediate between management accounting and environmental performance in Jordanian industry.	Limits in establishing cause-and-time effects, unmeasured design/data collection, conceptual clarity issues, and need for replication.
From Motivation to Action: The Role of Green Human Resource Management and Public Service Motivation in Promoting a Circular Economy in Cambodia	2025	Ly, B., & Ly, R. (2025)	Examines how green HR methods motivate employees to translate intentions into circular-economy actions in Cambodia.	Population limited to a specific group (generalizability gap); insufficient empirical evidence for existing theory; methodological limitations.
Modeling workplace green performance: mediation of green learning goal orientation and moderation of problem-based learning	2025	Lin et al., (2025)	Examines how sustainability- and problem-based learning help employees perform better on green goals.	Design/causality limits, limited sampling and scope, missing variables, and measurement-related bias.
When the stars align: The effect of institutional pressures on sustainable human resource management through organizational engagement	2024	Cruz et al., (2024)	Examines how regulatory, societal and stakeholder pressures shape sustainable HR practices via organizational engagement.	Lack of conceptual/theoretical clarity, methodological and causal limitations, and unexplored context/population with insufficient empirical evidence.
Does employee participation in corporate social responsibility activities improve the environmental performance of international	2025	Dang et al., (2025)	Examines how employee participation in CSR activities improves contractors' environmental performance.	Limited scope/generalizability, methodological and sampling limitations, knowledge/theoretical gaps, unexplored boundary conditions, and limited evidence.

engineering contractors?				
Summarizing Artificial Intelligence (AI) Role in Green Human Resource Management (GHRM) Effectiveness	2025	Ibrhim & Abu (2025)	Examines how AI supports GHRM effectiveness for employees and organizations.	Evidence/knowledge gap, theoretical/conceptual gap, methodological limitations, limited industry context, and a practical/empirical gap.
Human Resource Analytics Adoption Among Employees in China's New Energy Sector: The Moderating Role of Change Management Communication Assessment	2023	Ramachandran et al., (2023)	Examines how communication supports employees' adoption of HR analytics in China's new energy sector.	Limited causal evidence, limited method/data, validity and generalizability limits, and unmeasured boundary conditions.
The Effect of Shared and Inclusive Governance on Environmental Sustainability at U.S. Universities	2025	Djukic-Min et al., (2025)	Examines how collective decision-making by faculty, staff and students supports stronger environmental outcomes.	Relies mainly on quantitative SEM with limited qualitative insight; limited empirical data; knowledge/theoretical and generalizability gaps.
Enhancing Predictive Urban Planning in European Smart Cities Through AI-Driven Digital Twin Technology: A Case Study of Greece	2025	Kalfas et al., (2025)	Examines how AI-powered digital twins support smart-city planning and sustainability.	Technical/integration gap, data-quality gap, standardization/evaluation gap, human-organizational skill gap, and ethical/accountability gap.
The Relationship Between Human Resource Management Practices and Organizational Innovation: The Mediated Role of Human Capital Within the Banking Sector in North Iraq	2025	Agha et al., (2025)	Examines how HR practices and employee knowledge drive organizational innovation in North Iraq's banking sector.	Time/causality gap, methodological gap, empirical/evidence gap, scope/generalizability gap, and theory-practice gap.
Sustainable Operations Strategy in the	2025	Setyadi et al., (2025)	Examines how combining lean operations with green	Limited empirical evidence, methodological gap, theoretical gap,

Age of Climate Change: Integrating Green Lean Practices into Operational Excellence			HR practices supports sustainable operations.	context/generalizability gap, and integration/implementation gap.
The Green Happy Productive Worker: Environmental Satisfaction as Mediator Between Green Human Resources Practices and Green Extra-Role Behaviors in Social Economy Organizations	2025	Pătraș et al., (2025)	Examines how HR practices shape employees' satisfaction with their workplace environment.	Method/measurement bias, limited data sources and short time frames, practical-impact gap, and scope/generalizability gap.
The Impact of Educational Economic Factors on Institutional Sustainability Performance: The Mediating Role of Green Management Practices	2025	Benlaria & Almawishir, (2025)	Examines how economic/educational factors and green management shape institutional sustainability performance.	Single-method design, unclear time/direction of effects, validity/measurement and response-bias limitations, and generalizability gap.
Integrating Sustainability into Human Resource Management: Building a Greener Workforce for the Future	2025	Papademetriou et al., (2025)	Examines the integration of sustainability and eco-conscious practice into HR to support organizational development.	Conceptual/theoretical limitations, limited empirical knowledge, narrow methodology, regional concentration, and underdeveloped practical actions.
A Conceptual Framework for Sustainable Human Resource Management: Integrating Ecological and Inclusive Perspectives	2025	Soekotjo et al., (2025)	Proposes a framework combining ecological and inclusive perspectives for sustainable HRM.	Context/population gap, theory/concept gap, empirical/evidence gap, narrow research design, and a knowledge-practice gap.
Green human resource management practices and sustainable development in	2025	Sharma et al., (2025)	Examines how green HR methods support sustainable development in India.	Reliance on existing theory, limited trend analysis over time, empirical/data gap, and context/generalizability gap.

India: A systematic literature review and future research agenda				
Green human resource management and Sustainable Development Goals in non-profit organisations	2025	Singh et al., (2025)	Examines how HR practices support non-profit organizations' contribution to the UN Sustainable Development Goals.	Population/context gap, empirical/evidence gap, theory/knowledge gap, methodological gap, and application/policy gap.
The impact of green human resource management practices on organisational sustainability through green knowledge sharing	2025	Khawaja & Janjua, (2025)	Examines how HR practices support organizational sustainability via green knowledge sharing.	Time/causality gap, measurement/validity gap, missing-factor gap, theoretical-depth gap, and scope/generalizability gap.
Impact of resilience and sustainability on workforce creative performance: looking through the lens of digital readiness	2025	Citraresmi et al., (2025)	Examines how digital readiness shapes creative performance among sustainability-focused employees.	Population gap, single-method gap, methodological-rigor gap, causality/time gap, and future-research gap.
Measuring the influence of green HRM, lean HRM, and agile HRM on sustainable manufacturing	2025	Ibrahim & Eitah, (2025)	Examines how green, lean and agile HR practices jointly support sustainable manufacturing.	Limited theoretical explanation, limited empirical findings, restricted research design, context/population gap, and practice-knowledge gap.
Exploring the moderating influence of sustainable creativity strategies on the relationship between a green innovation atmosphere and employee green creativity	2025	Song & Ramayah, (2025)	Examines how creativity strategies shape green innovation and employee creativity.	Scope/generalizability gap, limited real-world evidence, method/data gap, unexplained theory, and practice/implementation gap.
Does Green Human Resource Management Stimulate Employees' Green Behavior Through a	2025	Li et al., (2025)	Examines how GHRM promotes employees' eco-friendly behaviour and environmental responsibility.	Limited generalizability and scope, unexplored theory, methodological/measurement limitations, geographic concentration, and limited evidence.

Green Psychological Climate?				
Green HRM practices and corporate sustainability performance	2024	Ali et al., (2024)	Examines how green HR methods promote corporate ecological and sustainability performance.	Limited empirical data, unexplained theoretical phenomena, narrow methodology, limited population context, and knowledge gap.
Socially responsible human resource management for sustainable performance in a moderated mediation mechanism	2024	Mamun et al., (2024)	Examines how socially responsible HR practices strengthen sustainable organizational performance.	Generalizability/scope gap, methodological/sampling gap, empirical/data gap, theory/knowledge gap, and practical-research gap.
The Effect of Green Leadership Perception on Environmental Commitment, Awareness, and Employees' Green Behavior in Hotel Businesses: Research from a Generation Cohort Theory Perspective	2024	Orgun et al., (2024)	Examines the impact of green leadership on environmental commitment and behaviour in hotels.	Generalizability gap, limited geographical/population scope, methodological/sampling issues, and theoretical gap.
Guiding organizations toward sustainable success: The strategic role of leadership in environmental corporate governance in the wine industry	2024	Sánchez-García et al., (2024)	Examines how strategic leadership contributes to sustainability and environmental performance in the wine industry.	Methodological limitations, data/empirical gap, theoretical gap, knowledge gap, and scope limitation.
Green HRM practices and green work engagement: The roles of green knowledge sharing and green group cohesion	2024	Haque et al., (2024)	Examines how HR practices promote eco-friendly engagement through knowledge sharing on sustainability.	Generalizability/scope gap, empirical/data gap, methodological/sampling gap, context/perspective gap, and evidence/boundary gap.

Source- Author

5- FREQUENCY, COUNT AND PERCENTAGE FOR EACH TYPE OF GAP

Table-5 summarizes the frequency of types of gaps and their percentage for distribution of each gap

Type of Research Gap	Count	Percentage
Generalizability Gap	42	10.10
Methodological Gap	39	9.38
Empirical Gap	36	8.65
Contextual Gap	33	7.93
Theoretical Gap	31	7.45
Temporal Gap	27	6.49
Causal Inference Gap	24	5.77
Measurement / Validity Gap	22	5.29
Sampling / Population Gap	21	5.05
Moderation Gap	19	4.57
Mediation / Mechanism Gap	17	4.09

Practical / Application Gap	16	3.85
Knowledge Gap	15	3.61
Scope / Omission Gap	14	3.37
Response Bias / CMB Gap	13	3.13
Geographical Gap	12	2.88
Integration / Holistic Gap	11	2.64
Technological / Digital Gap	9	2.16
Policy / Governance Gap	8	1.92
Replication Gap	7	1.68
Total	416	

Source-Author

FINDINGS

The analysis of the studied literature review reveals that **generalizability gap** has the highest and prevalent frequency of percentage that is 42 count and 10.10%, indicating the lack of broader study in this field. This identification of gap is followed by **methodological gap** with 39 counts and 9.38%, **empirical gap** with 36 count and 8.65%, this reflects that empirical study is limited and data are self-reported. **Contextual gap** with 33 count and 7.93%, and **theoretical gap** with 31 counts and 7.45%, determines that there are no relevant cultural, sectorial, and institutional settings and there is weak theoretical analysis.

Additional gaps are **temporal gaps** with 27 counts and 6.49%, and **casual inference gap** with 24 counts and 5.77%, observing that there are limited changes over time and limited casual effect on factors. Other gaps such as **measurement/validity gap** with 22 counts and 5.29% and **sampling/population gap** with 21 counts and 5.05%, highlights weakness over time, that also effect cause and effect relationship. Gaps such as **moderation gap** with 19 counts and 4.57% and 19 counts, **mediation gap** with 17 counts and 4.09%, reveals that that there is limited mechanism exploration and the conditions are bounded. Finally the less frequent gaps that is **Practical / Application Gap, Knowledge Gap, Scope / Omission Gap, Response Bias / CMB Gap, Geographical Gap, Integration / Holistic Gap, Technological / Digital Gap, Policy / Governance Gap, and Replication Gap**, these gaps are below 4% and count is below 15, these gaps shows the emerging need for digital

knowledge, applied knowledge, governance consideration and stronger replication of the study. Existing literature shows theoretical and methodological limits that restricts the integrative adoption of leadership in organisations (Vogel et al., 2021).

6- DESCRIPTION OF GAPS THAT HAVE MAJOR EFFECT

1. **Generalizability Gap-** This gap doesn't capture how workforce dynamics evolve overtime, as this gap reinforced by cross-sectional studies. For bridging this gap the research should be done across different context and workforce, so that Green HRM and Sustainable HRM can be trusted and used widely.
2. **Methodological Gap-** It shows the limitations in the research design, data source, and analytical techniques this reduces the findings interpretations. This study uses the cross-sectional method, this makes difficult to determine cause-effect relationship and increase the response biasness. The longitudinal data and multiple data sources are not present in the study; it doesn't show that how Green HR practices evolves over time. To reduce this gap there is need for stronger research designs approaches for more reliable insights.
3. **Empirical Gap-** In this study GHRM and sustainable HRM, evidence is limited in sectors, regions, and single-source datasets, in which workforce context is unexplored. This study shows that real world practice is missing factor and there is need for richer empirical investigation that reflects how Green HRM operates in reality.
4. **Contextual Gap-** In this study the evidence is drawn from narrow context like; specific sectors, and cities. This study focuses mainly on regulatory frameworks, cultural norms, economic conditions, or organizational factors which have limited outcome.
5. **Theoretical Gap-** The study has insufficient testing of theory that could not explain why and how the relationship occur, does not have an advance model such as moderating mediation or multi-level theoretical perspective. It results in unclear conditions and explanation in relation to GHRM, sustainable HRM and workforce.
6. **Temporal Gap-** This study focus on evidence at a particular point of time and these results in unobserved Green HRM practices, workforce attitude, and sustainable outcome. It cannot explain that observed effects of factors are short-term or long-term; this allows future research to address this gap through longitudinal or multi method design and provide realistic insights towards sustainable development.
7. **Causal Inference Gap-** This gap occurs when the data is observed and collected at a particular point of time, this makes impossible to know the causality effect on relationship of factors such as GHRM and outcomes like green behaviour may reflect correlation, here it has no true cause and effect relationship evidence.
8. **Measurement Gap-** The study reveals that there are complex concepts such as green reputation or sustainability development, that are not widely measured and that do not reflect the reality. This may result in biased findings that can be response biasness, social limited awareness, less confident stakeholder outcomes. This gap can address ensuring multi-source, multi-dimensional and more objective measurement approaches to reduce biasness in results.
9. **Sampling Gap -**This study focuses on specific group such as employees from specific sector, region, organization size, or job factor, these results in irrelevant results leaving the reality of diverse organization and focusing on a small segment of workforce. This gap addresses the need for well-balanced samples and conclusions about Green HRM, sustainable practices, or workforce factors to reduce future biasness in results.

7- PROPOSED CONCEPTUAL FRAMEWORK

Beyond gaps, this review synthesises recurring themes across the 35 studies into an integrative organising framework (Schilke et al., 2018), that links Green HRM and Sustainable HRM practices to workforce and organisational outcomes. The framework organises the literature into four building blocks antecedents, mechanisms, outcomes, and boundary conditions (Scholten, Scott, & Fynes, 2024) and is intended as a reference model that future empirical studies, and organisations themselves, can adapt and test.

Antecedents

These are the underlying factors or conditions that give rise to a phenomenon, explaining why or from what it originates. In this study Organisational level drivers repeatedly identified across the literature include green organisational culture, green and ethical leadership, institutional and stakeholder pressure, digital and AI readiness, and workplace spirituality, and meaningful work. These antecedents set the conditions under which Green HRM and Sustainable HRM practices are adopted.

Mechanisms

Mechanism refers to the antecedents that translate into their effects, explaining how the relationship unfolds. The reviewed studies converge on a set of explanatory mechanisms through which antecedents translate into outcomes: green knowledge sharing, green psychological climate, employee green self-efficacy, environmental satisfaction, and organisational engagement and commitment. These mediating mechanisms explain how Green HRM practices are internalised by employees rather than remaining policy statements.

Outcomes

These are the consequences that result from the occurrence of the phenomenon. Reported outcomes include green creativity and extra role behaviour, environmental and sustainability performance, organisational innovation, green reputation, and workforce development in terms of skills, adaptability, and retention. Sustainable HRM is positioned as the integrating layer that connects these outcomes to the social, environmental, and economic dimensions of sustainability.

Boundary Conditions

These are the situational or moderating factors that determine when the relationship between antecedents and outcomes becomes stronger, weaker, or ceases to hold. In this study the gap analysis itself defines the boundary conditions under which this framework currently holds. The findings are largely cross sectional (temporal gap), sector and region specific (contextual and geographical gaps), based on single method, self-reported data (methodological and response-bias gaps), and rarely test moderators such as leadership style, organisational size, or digital maturity (moderation gap). The framework is therefore best read as a set of testable propositions rather than an established causal model.

This conceptual framework offers two contributions. First, it gives future researchers a structure for positioning new studies such as, testing green psychological climate as a mediator between green leadership and employee green behaviour in an under studied sector. Second, it gives organisations a practical lens to interventions aimed only at outcomes such as publishing a sustainability report that are unlikely to succeed unless the underlying antecedents and mechanisms such as culture, leadership, knowledge sharing, and employee psychological state are also addressed.

DISCUSSION

The study identifies nine gaps that occur in more than 50% of the reviewed literature carrying the highest impact in this field. These include the generalizability gap and sampling gap, which reveal that studies are mostly conducted within narrow contexts and similar populations, potentially producing findings that do not generalise well.

The contextual gap further shows that diverse sectors, cultures, and institutions remain underexplored. The methodological, empirical, and measurement gaps together indicate limited empirical testing and validity, which in turn contributes to the causal inference gap. The theoretical and temporal gaps reflect a lack of longitudinal evidence and the use of fragmented theory across the literature. Read alongside the proposed conceptual/organising framework, identified gaps indicate that the antecedents-mechanisms-outcomes pathway is well supported across studies, but rarely tested as a single, integrated, longitudinal model within one organisation or sector.

8- IMPLICATIONS

Identified nine key gaps (Section 6) and organised them into an antecedents-mechanisms-outcomes framework (Section 7), this section closes the loop by turning that analysis into direct guidance. The implications below are organised in two groups: practical implications for organisations, which apply the framework's antecedents and mechanisms to HR practice so that Green HRM and Sustainable HRM move from policy statements into strengthened, on-the-ground workforce development.

8.1 Practical Implications for Organisations

Drawing on the antecedents-mechanisms-outcomes framework, organisations can use the following actions to move Green HRM and Sustainable HRM from policy statements into practice:

First and foremost, embed sustainability into core HR systems by build green and sustainability criteria directly into recruitment, on-boarding, job descriptions, training curricula, and performance appraisal rather than treating sustainability as a separate, add-on initiative. Second, organisations should invest in green and ethical leadership development; it is a consistent antecedent of green employee behaviour. Organisations should include green leadership competencies in manager training and promotion criteria, and hold leaders accountable for team-level sustainability outcomes. Third, build green knowledge-sharing channels Create structured platforms (communities of practice, internal knowledge bases, cross-functional green teams) so that sustainability knowledge and best practice circulate across departments and are not confined to a single sustainability or CSR unit. Fourth, strengthen the psychological, not just procedural, dimension employee green self-efficacy and a supportive green psychological climate matter as much as formal policy. Organisations should communicate the personal and organisational relevance of sustainability goals, recognise green behaviour, and give employees genuine input into how green initiatives are designed. Fifth, track outcomes with a balanced, longitudinal scorecard because most existing evidence is cross-sectional, organisations should track green and workforce indicators (engagement, retention, green behaviour, environmental performance) over multiple review cycles rather than relying on one-off surveys or audits.

Altogether, these actions reflect the framework's central practice for sustainability outcomes that are unlikely to be sustained unless organisations also invest in the underlying culture, leadership, and knowledge-sharing mechanisms that make Green HRM meaningful to employees.

8.2 Implement and Sequencing the Actions

HR leaders can sequence them into three phases so that the framework becomes a working plan rather than a checklist:

Phase 1, Quick wins that build visibility

Add green criteria to existing recruitment and appraisal forms, launch one cross functional green knowledge-sharing channel, and set a baseline for green engagement and retention.

Phase 2, Building the mechanisms

Roll out green leadership competencies into manager training and promotion criteria, formalise the knowledge-sharing channels into standing communities of practice, and run the first round of the longitudinal scorecard.

Phase 3, embedding and governance

Formally link HR-driven green initiatives to the organisation's environmental governance and reporting structures, extend digital-skills training so employees can use data to monitor green performance themselves, and review whether practices still fit the organisation's sector, regulatory context, and culture rather than a borrowed template.

Altogether, these phasing mirrors the framework itself, Phase 1 addresses visible outcomes, Phase 2 builds the psychological and knowledge-sharing mechanisms that make those outcomes stick, and Phase 3 secures the antecedents, that are leadership, governance, and digital readiness this keeps the system self-sustaining.

CONCLUSION

Through an extensive literature review of 35 peer review, Scopus-indexed articles published between 2015 and 2025, and this study highlights the gaps occurring in sustainable HRM, green HRM and workforce development research, and synthesis the literature into an integrative organizing/conceptual framework linking antecedents, mechanisms, outcomes, and boundary conditions. The findings reveal that while HR practices in this area are growing but the literature remains fragmented with notable empirical and evidence validation gap. Moreover, the highest occurring gap in the study is generalizability gap, underscoring the need for research with broader applicability rather than narrow, context specific studies. Longitudinal studies are needed to understand the long-term dynamics of this field. By synthesising these gaps highlights the need for more integrative framework models, greater contextual diversity, and longitudinal research to bridge existing gaps and support actionable, sustainable HRM, green HRM, and workforce development practices for both scholars and organisations that implement them.

LIMITATIONS AND FUTURE STUDY

The consolidation of literature review from 35 papers reveals that, the study is limited single database, within a fixed time frame, exclusion of selected literature that reduces the generalizability of study. Future study should adopt longitudinal research study, mixed-method approach, and empirically examine how sustainable and green HRM practices are practically followed in workforce context and develop the sustainable outcome.

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