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Green Human Resource Management and AI Adoption in SMEs: A Conceptual Study of Sustainable Workforce Transformation in Indonesia's Emerging Market

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Abstract: *This conceptual paper examines how the integration of Green Human Resource Management (GHRM) and Artificial Intelligence (AI) can drive sustainable workforce transformation in Indonesia's emerging market context, with specific reflection on small and medium-sized enterprises (SMEs) in Makassar, South Sulawesi. Responding to the parallel pressures of digitalization and sustainability, the study adopts a conceptual–descriptive design based on an integrative review of literature published between 2018 and 2024 on GHRM, AI in HRM, sustainable HRM, and SME transformation in emerging economies. Drawing on approximately 20 core scholarly and policy sources, the paper develops the GHRM–AI Sustainable Workforce Framework, which links leadership commitment, green HR practices, AI-enabled HR processes, and employee green–digital capabilities to economic, environmental, and social outcomes. The framework proposes that leadership commitment to sustainability and responsible AI use shapes the design of green HR processes, AI technologies amplify the effectiveness and measurability of these processes, and employee capabilities mediate their impact on triple-bottom-line performance. Contextual reflection on SMEs in Makassar highlights both opportunities such as growing digital adoption and policy support and constraints, including limited HR structures, capability gaps, and financial and infrastructural barriers. The paper contributes theoretically by extending GHRM discourse into the domain of AI-enabled digital transformation and practically by offering a strategic roadmap for SMEs, policymakers, and practitioners seeking to align HR strategies with sustainability and digital agendas. It also outlines directions for future empirical research to test, refine, and operationalize the proposed framework in diverse organizational and regional settings.*
Keywords: *Green Human Resource Management, Artificial Intelligence, Sustainable Workforce, Emerging Market, SMEs, Makassar*

INTRODUCTION

The twenty-first century has witnessed an unprecedented convergence between technological innovation and sustainability imperatives, reshaping how organizations manage people, resources, and performance. Human Resource Management (HRM), traditionally focused on staffing, development, and performance, is increasingly expected to contribute to environmental and social outcomes alongside economic goals (Jabbour & de Sousa Jabbour, 2019; Renwick et al., 2018). In this context, Green Human Resource Management (GHRM) has emerged as a strategic approach that embeds environmental objectives into HR policies and practices, positioning employees as key agents of organizational sustainability. At the same time, rapid

advances in Artificial Intelligence (AI) are transforming HR processes through automation, analytics, and algorithmic decision-making (Meijerink et al., 2021; Tambe et al., 2019). The intersection of GHRM and AI thus represents a critical frontier for understanding how organizations can build sustainable and future-ready workforces.

For emerging economies such as Indonesia, the dual agenda of digital transformation and sustainability is particularly salient. National policy initiatives, including the *Making Indonesia 4.0* roadmap and industrial sustainability programs, explicitly promote the integration of advanced technologies with green industrial practices (Ministry of Industry of the Republic of Indonesia, 2021). Parallel efforts to accelerate digital transformation among small and medium-sized enterprises (SMEs) signal the strategic role of this sector in supporting inclusive, innovation-driven growth (Ministry of Cooperatives and SMEs of Indonesia, 2023). However, the realization of these policy ambitions depends not only on infrastructure and technology, but also on the capacity of organizations to transform their human resource practices shaping competencies, behaviours, and cultures that are simultaneously digital and sustainable (García et al., 2022; World Economic Forum, 2023).

GHRM provides a useful lens for this transformation by integrating environmental considerations across HR functions such as recruitment, training, performance appraisal, and rewards (Jabbour & de Sousa Jabbour, 2019; Renwick et al., 2018). Empirical studies indicate that green HR practices can foster pro-environmental employee behaviour, strengthen organizational commitment to sustainability, and enhance environmental performance (Khan & Islam, 2020; Suharti & Dewi, 2022). Nonetheless, many GHRM frameworks have been developed in relatively stable and resource-rich contexts, often underestimating the constraints faced by SMEs in emerging markets. Limited financial resources, informality in HR systems, and low awareness of environmental management frequently hinder the institutionalization of GHRM in such settings (Agustina & Kurniawan, 2020; Nurdin & Latif, 2021). This suggests the need for new conceptual approaches that recognize how digital tools especially AI-enabled HR systems can support or accelerate the implementation of GHRM in resource-constrained organizations.

AI adoption in HRM has gained prominence as organizations seek to improve efficiency, accuracy, and strategic decision-making in workforce management. AI applications such as e-recruitment platforms, predictive analytics, chatbots, and AI-supported learning systems are

increasingly used to optimize talent acquisition, performance monitoring, and competency development (Ali & Zaid, 2022; Singh & Sharma, 2023). While these technologies offer substantial opportunities, they also raise concerns around data privacy, algorithmic bias, transparency, and the potential dehumanization of HR processes (Lee & Kumar, 2023; Meijerink et al., 2021). For SMEs in emerging markets, additional challenges include uneven digital literacy, fragmented infrastructure, and limited investment capacity (OECD, 2022). This complexity underscores the importance of framing AI adoption within a broader ethical and sustainability-oriented HRM perspective, rather than treating it solely as a technical or efficiency-driven innovation (Shukla & Singh, 2020; Tambe et al., 2019).

Recent conceptual work has begun to highlight the potential synergies between GHRM and AI. Scholars argue that AI can enhance GHRM by enabling more precise measurement of environmental performance, automating resource-intensive administrative tasks, and supporting data-driven decisions that align HR policies with sustainability goals (Ali & Zaid, 2022; Shukla & Singh, 2020). For example, AI-supported HR analytics can identify training needs related to environmental practices, monitor employee participation in green initiatives, and evaluate the sustainability impacts of HR interventions (Singh & Sharma, 2023). At the same time, GHRM can provide normative and procedural guidance to ensure that AI is deployed in ways that respect environmental and social values, foregrounding principles of fairness, transparency, and accountability in HR decision-making (Lee & Kumar, 2023; Renwick et al., 2018). Despite this promising conceptual convergence, empirical and context-sensitive studies that explicitly integrate GHRM and AI within a unified framework remain scarce, particularly in the SME sector and in non-Western contexts.

The Indonesian context and specifically the city of Makassar in South Sulawesi offers an instructive setting for examining this integration. Makassar has emerged as a regional economic hub with a dynamic SME ecosystem in sectors such as culinary, creative industries, and services (Halim & Nur, 2023; Sari & Amiruddin, 2020). These enterprises increasingly adopt digital tools for marketing, payment systems, and operations, yet their engagement with structured sustainability practices and advanced HR technologies is still fragmented (Dewi & Suharto, 2022; Ministry of Cooperatives and SMEs of Indonesia, 2023). Studies in Eastern Indonesia point to a growing awareness of green innovation and digital readiness among SMEs, but also emphasize

significant gaps in strategic planning, HR capability development, and policy support (Dewi & Suharto, 2022; Halim & Nur, 2023; Nurdin & Latif, 2021). Against this backdrop, there is a clear need for conceptual guidance on how SMEs can simultaneously pursue digital and green transformations through integrated HR strategies.

Addressing this gap, the present conceptual study develops the "GHRM–AI Sustainable Workforce Framework" to explain how leadership commitment, green HR processes, AI-enabled HR technologies, and employee green–digital capabilities can interact to generate sustainability outcomes in SMEs operating in emerging markets. The framework is informed by contemporary literature on GHRM, AI in HRM, sustainable HRM, and SME transformation in Indonesia and comparable economies (Ali & Zaid, 2022; García et al., 2022; Jabbour & de Sousa Jabbour, 2019; OECD, 2022; Zhao & Li, 2024). Specifically, the study proposes that leadership commitment to sustainability and responsible AI adoption shapes the design of green HR processes; AI technologies then amplify the effectiveness of these processes by enhancing data-driven decision-making; and employees' green–digital capabilities mediate the relationship between HR practices and triple-bottom-line outcomes. Reflecting on the SME context in Makassar, the study offers contextually grounded propositions that may guide future empirical research and inform policy interventions aimed at fostering sustainable workforce transformation in Indonesia's emerging market landscape.

By articulating this integrated perspective, the article contributes to three strands of literature. First, it extends GHRM scholarship by explicitly incorporating AI-enabled HR systems into discussions of sustainable workforce development. Second, it enriches the burgeoning discourse on AI in HRM by foregrounding environmental and social accountability as central design principles rather than peripheral concerns. Third, it advances the understanding of SME transformation in emerging markets by situating HR innovation within the specific institutional, infrastructural, and cultural conditions of Indonesian cities such as Makassar. These contributions are expected to provide a conceptual foundation for future empirical investigations and practical initiatives aimed at aligning digitalization with sustainability in HRM.

METHOD

Research Design

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This study employed a conceptual–descriptive research design, which is appropriate for synthesizing fragmented theoretical constructs and developing an integrative conceptual framework. Unlike empirical research that generates primary data, conceptual research relies on interpreting, comparing, and integrating existing scholarly work to construct new theoretical insights. As Snyder (2019) explains, conceptual literature reviews are essential for identifying theoretical gaps, clarifying constructs, and proposing new relationships among variables. Similarly, Jaakkola (2020) emphasizes that conceptual research plays a vital role in theory advancement by organizing existing knowledge into a coherent structure, thereby enabling scholars to formulate new propositions and frameworks. Thus, this methodological approach is well suited for examining the intersection between Green Human Resource Management (GHRM), Artificial Intelligence (AI), and sustainable workforce transformation in emerging markets.

Data Sources and Literature Search Strategy

The study systematically collected secondary data from peer-reviewed academic articles, policy documents, and institutional reports published between 2018 and 2024. A structured search was conducted using major academic databases, including Scopus, Web of Science, ScienceDirect, and Google Scholar. The search strategy followed guidelines recommended for narrative and integrative literature reviews (Snyder, 2019; Torraco, 2005), using relevant keywords such as *"Green HRM," "Artificial Intelligence in HRM," "sustainable workforce," "SMEs," "emerging markets,"* and *"Indonesia digital transformation."* This search resulted in approximately 50 publications; after applying inclusion and exclusion criteria, 20 core studies were retained as the conceptual basis for framework development.

Inclusion and Exclusion Criteria

To ensure the methodological rigor of the literature selection process, this study applied explicit inclusion and exclusion criteria. Publications were included if they: (1) focused on GHRM, AI adoption in HRM, sustainable HR practices, or workforce transformation; (2) were published between 2018 and 2024; and (3) offered conceptual or empirical insights relevant to SMEs or emerging markets. Conversely, studies were excluded if they lacked methodological clarity, did not address HRM or sustainability dimensions, or focused exclusively on large multinational corporations without implications for SMEs. Such systematic filtering aligns with

recommendations by Xiao and Watson (2019), who argue that transparent selection criteria enhance the credibility and replicability of conceptual research.

Analytical Procedure

The analytical process followed a three-stage conceptual synthesis, which reflects best practices in literature-based theory development (Torraco, 2005; Webster & Watson, 2002).

1. The identified literature was examined to map key constructs such as green recruitment, green training, AI-enabled HR analytics, leadership commitment, and employee capability development.
2. Thematic integration was conducted to compare how different studies conceptualized the relationships among GHRM, AI adoption, and sustainability outcomes. Through iterative reading and memo-writing, overlapping themes were grouped into broader conceptual dimensions leadership, sustainable HR processes, AI technologies, employee green–digital capability, and triple-bottom-line outcomes.
3. Conceptual model termed the GHRM–AI Sustainable Workforce Framework was constructed. This model articulates the dynamic interactions among the identified dimensions and proposes theoretically grounded propositions explaining their relationships. Such integrative model-building is consistent with the methodological guidelines for conceptual research outlined by Gilson and Goldberg (2015), who highlight the importance of synthesizing diverse insights to create new theoretical contributions.

Contextual Anchoring in Makassar SMEs

Although this study is conceptual, contextual reflection was incorporated by reviewing secondary data on SMEs in Makassar, South Sulawesi. Reports from BPS, Ministry of Cooperatives and SMEs, and academic studies informed the contextual understanding of digital readiness, sustainability practices, and HR challenges faced by SMEs in Eastern Indonesia. Anchoring conceptual insights within real-world contexts enhances the relevance and applicability of conceptual frameworks, a practice supported by Snyder (2019) and Torraco (2005), who note that contextual grounding strengthens the practical value of conceptual research.

Methodological Rigor and Limitations

To enhance methodological rigor, the study employed multiple strategies: (1) diverse and reputable data sources; (2) structured search strategies; (3) transparent inclusion criteria; and (4)

an iterative synthesis process. However, the method also has limitations. As a conceptual study, it does not generate empirical evidence and therefore requires future empirical validation through surveys, interviews, or case studies. Xiao and Watson (2019) note that conceptual models often serve as preliminary frameworks that guide subsequent empirical testing. Nevertheless, these limitations offer promising directions for future research, including quantitative verification using Structural Equation Modeling (SEM) or qualitative multi-case studies in SMEs across Indonesia.

RESULTS AND DISCUSSION

Conceptual Foundation of Integrating GHRM and AI

The integration of Green Human Resource Management (GHRM) and Artificial Intelligence (AI) represents an important conceptual evolution in the development of sustainable workforce systems. GHRM is grounded in the expectation that organizations embed environmental responsibility into human resource policies and practices, including recruitment, training, employee engagement, and performance appraisal. Scholars argue that GHRM enables employees to become active contributors to ecological stewardship while enhancing organizational legitimacy in a sustainability-driven global environment (Amjad et al., 2021; Chaudhary, 2019). Through these practices, organizations not only comply with environmental regulations but also cultivate a workforce that internalizes pro-environmental values and behaviours, a shift essential for achieving long-term sustainability outcomes.

At the same time, AI technologies have transformed HR operations by introducing automated decision-making, predictive analytics, intelligent screening tools, and virtual learning platforms. These innovations support HR professionals in reducing administrative workloads, optimizing recruitment accuracy, predicting workforce trends, and delivering personalized training programmes. Research indicates that AI significantly enhances HR efficiency and strengthens organizational capacity to respond to rapid market changes (Brougham & Haar, 2018; Huang et al., 2021). Moreover, AI-enabled HR analytics can identify skill gaps, predict turnover risks, and support evidence-based workforce planning, reinforcing HRM's strategic role in organizational development.

Despite its advantages, AI adoption raises substantial ethical and organizational concerns. Issues such as algorithmic bias, data privacy, transparency, and fairness in automated decision

systems have been widely documented (Kim et al., 2022). In HRM settings, biased algorithms may inadvertently disadvantage certain applicant groups, while opaque decision-making processes undermine employee trust. Scholars emphasize that AI must therefore be deployed within ethical boundaries that protect employee dignity and ensure equitable treatment across the workforce (Bissola et al., 2020). These ethical risks are particularly pronounced in emerging markets, where digital literacy and algorithmic governance frameworks remain underdeveloped.

The conceptual convergence between GHRM and AI offers a promising response to these challenges. GHRM provides a normative foundation capable of guiding responsible AI integration, ensuring that technological innovation aligns with environmental stewardship and human-centred sustainability principles. For example, AI can support green recruitment by identifying candidates with strong environmental values, while digital learning platforms can disseminate sustainability-focused training at scale. AI-driven analytics can also measure and monitor employee participation in green initiatives, thus enhancing the accuracy and efficiency of environmental performance evaluations. When aligned with GHRM objectives, AI becomes a mechanism for strengthening not replacing human capabilities in fostering sustainable workplace cultures (Rana et al., 2023).

This synergy forms the conceptual basis of the GHRM–AI Sustainable Workforce Framework developed in this study. The framework reflects the methodological principles of integrative conceptual research, which call for synthesizing diverse bodies of literature to generate new theoretical insights (Torraco, 2005; Webster & Watson, 2002). By examining both environmental sustainability and technological innovation through a unified lens, the framework positions leadership commitment, sustainable HR processes, AI technologies, and employee green–digital capability as interconnected drivers of sustainability outcomes. Such integrative theorizing aligns with contemporary approaches to organizational research, which emphasize the need for holistic systems thinking when addressing complex, multi-dimensional challenges in the future of work (Wang et al., 2018; Xiao & Watson, 2019; Zorn, 2010).

Overall, the conceptual foundation presented here demonstrates that GHRM and AI are not opposing forces but complementary levers for accelerating sustainable workforce transformation. GHRM ensures that AI adoption is guided by ecological responsibility and ethical values, while AI enhances the efficiency, precision, and scalability of sustainability-oriented HR practices. Together, they offer a strategic pathway for building resilient, adaptive, and ethically grounded

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workforces equipped to navigate the complexities of twenty-first-century organizational environments.

The GHRM–AI Sustainable Workforce Model: Components and Propositions

To understand how Green Human Resource Management (GHRM) and Artificial Intelligence (AI) function as complementary drivers of sustainable workforce development, this study introduces the GHRM–AI Sustainable Workforce Cycle, presented in Figure 1. The model reflects the circular and mutually reinforcing relationships among leadership commitment, sustainable HR processes, AI-based HR innovations, employee green–digital capabilities, and organizational sustainability outcomes. This conceptualization aligns with recent calls for integrated frameworks that link digital transformation with environmental sustainability in human resource systems (De Stefano, 2022; Misra & Srivastava, 2021).

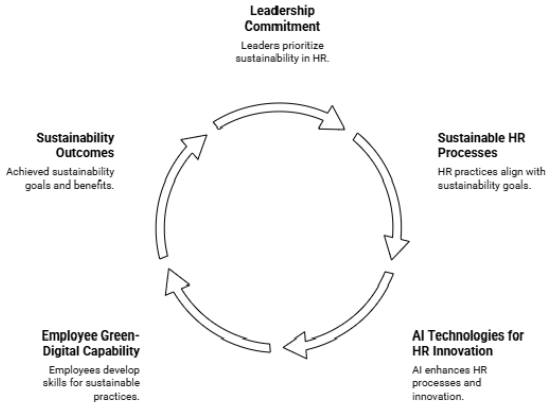

Figure 1. *The GHRM–AI Sustainable Workforce Cycle*

The model begins with leadership commitment, which establishes the strategic direction for environmental responsibility and digital transformation. Leaders not only determine resource allocation but also shape organizational openness to technological innovation, ethical AI use, and sustainability-oriented cultural change. Research affirms that leadership commitment is a key antecedent of both GHRM adoption and digital readiness, particularly in SMEs where managerial attitudes strongly influence organizational practices (Jabbour & de Sousa Jabbour, 2020; Khan et al., 2021). In contexts where financial and technological resources are constrained, leadership becomes the determining factor in whether green and AI-driven initiatives are pursued consistently and meaningfully.

The second component, sustainable HR processes, translates environmental goals into concrete HR practices. These include green recruitment that prioritizes applicants with sustainability values, green training programmes that enhance environmental literacy, and evaluation systems that incorporate sustainability metrics. Such processes shape employee behaviour and embed environmental consciousness into everyday work practices. As indicated by recent studies, integrating sustainability objectives into HR activities strengthens employee engagement and fosters long-term ecological responsibility (Haddock-Millar et al., 2020; Shah, 2019). AI elevates the impact of these processes by providing automated candidate screening aligned with green criteria, data-driven training recommendations, and analytics to assess environmental performance.

The third element of the framework is AI technologies for HR innovation, which introduce enhanced capabilities for managing human capital. AI-driven systems improve HR efficiency by reducing paperwork, automating administrative routines, and supporting evidence-based decision-making. Technologies such as machine learning–supported recruitment tools, predictive performance analytics, and digital learning systems enable more precise and responsive HR strategies. Scholars argue that AI strengthens HRM agility and fosters innovative work environments while also reducing environmental burdens associated with traditional HR practices (Marler & Boudreau, 2017; Tambe et al., 2020). Nevertheless, the framework stresses that AI must be implemented ethically, respecting principles of transparency, privacy, and fairness, to prevent negative social consequences and build employee trust in AI-enhanced HR systems.

Central to the model is employee green–digital capability, the mediating factor that determines how effectively organizations benefit from the integration of GHRM and AI. Employees who possess both environmental awareness and digital proficiency are better equipped to adopt sustainable behaviours, utilize AI tools competently, and participate in continuous improvement initiatives. Hybrid skills have become increasingly important in the era of digital transformation, with researchers highlighting that workforce capability development is essential for achieving sustainable performance (Nawaz et al., 2021; Yusoff et al., 2020). This capability allows employees to navigate AI-enabled systems while maintaining a commitment to ecological responsibility, thereby reinforcing the effectiveness of sustainable HR processes.

The cycle concludes with sustainability outcomes, the measurable economic, environmental, and social benefits produced through the integration of GHRM and AI. Economic benefits include efficiency gains, reduced operational costs, and improved workforce productivity. Environmental outcomes involve reduced waste generation, lower emissions, and resource conservation. Social outcomes include enhanced employee well-being, inclusive work environments, and strengthened community relations. As several studies suggest, organizations that integrate green practices with technological innovation experience stronger triple-bottom-line performance and long-term resilience (Jackson et al., 2020; Ojo et al., 2022). These outcomes, when achieved collectively, reinforce organizational legitimacy and competitiveness, particularly in emerging markets where sustainable digital transformation provides a path toward future-ready economic growth.

Contextual Implications for SMEs in Makassar, South Sulawesi

Applying the GHRM–AI Sustainable Workforce Model to the context of small and medium-sized enterprises (SMEs) in Makassar, South Sulawesi reveals a number of contextual opportunities, structural constraints, and sector-specific implications for sustainable digital transformation. Makassar, as an economic hub in Eastern Indonesia, has experienced rapid growth in service, culinary, creative, and trade sectors, many of which have adopted digital tools to enhance operational efficiency. Point-of-sale applications, digital payment systems, online delivery services, and social media–based marketing have become common features of SME operations across the city. However, despite this growing digital orientation, sustainability practices within SMEs remain largely fragmented, informal, and secondary to short-term business survival. Studies on Indonesian SMEs indicate that sustainability adoption often lags behind digital adoption due to resource constraints, limited managerial capabilities, and insufficient regulatory guidance (Hidayat et al., 2022; Pratiwi & Santoso, 2021).

The conceptual model underscores that leadership commitment is a decisive factor shaping how SMEs engage with GHRM and AI. Many SME owners in Makassar operate with lean managerial structures, meaning leadership decisions directly influence digital investments, workforce development priorities, and openness to sustainability integration. Leadership awareness of the strategic value of sustainability and AI remains highly uneven across sectors, reflecting findings from broader research on SME ecosystems in emerging economies (Rahman &

Daneshvar, 2022). In SMEs where leaders demonstrate openness to innovation and environmental responsibility, early adoption of GHRM–AI initiatives becomes far more feasible.

Another contextual implication relates to the limited HR systems characteristic of SMEs. Many SMEs in Makassar do not have formal HR departments, resulting in ad hoc recruitment, limited training, and minimal performance evaluation processes. This structural informality poses challenges for implementing GHRM practices such as green recruitment, environmental training, or sustainability-oriented performance assessments. Nevertheless, AI-enabled tools offer potential solutions by automating recruitment screening, providing digital learning modules, and enabling simplified performance dashboards. Digital HR technologies can help SMEs overcome the absence of formal HR units, a possibility supported by recent research on AI adoption in small firms (Leong et al., 2021; Maroufkhani et al., 2020).

The digital literacy gap among SME employees further influences the feasibility of adopting the GHRM–AI model. While younger workers in Makassar's creative and retail industries tend to adapt quickly to digital systems, older employees or workers with limited formal education may struggle to use AI-driven HR tools or digital learning platforms. Building employee green–digital capability thus becomes critical for ensuring the successful implementation of the model. This aligns with findings that capability development especially in digital and sustainability domains is a primary determinant of SME innovation capacity in Southeast Asia (Lim et al., 2022; Wijayanti & Gunawan, 2023).

Financial constraints constitute another contextual barrier. Many SMEs operate with tight budgets and short-term planning horizons, making it difficult to invest in AI solutions or structured sustainability programmes. Nonetheless, affordable AI-based HR tools, cloud platforms, and government-provided digital training resources are gradually reducing entry barriers. The model suggests that when sustainability initiatives are integrated with digital tools, SMEs can reduce operational costs for example, by decreasing paper usage, optimizing energy consumption, and improving labour scheduling through predictive analytics.

An essential enabler emphasized by the model is the role of institutional partnerships. Collaborations with universities can provide SMEs access to research-based sustainability frameworks, digital training resources, and student-assisted technology adoption programmes. Partnerships with government agencies such as the Cooperatives and SMEs Office or Smart City

Programme can facilitate access to funding, digital infrastructure, and sustainability-related incentives. Technology providers, including local start-ups offering AI-enabled HR tools, can support SMEs in building tailored solutions that match their operational capacities. These forms of collaboration align with the broader argument that ecosystem-based support is critical for advancing sustainability and digitalization in SMEs (Castillo et al., 2022; Manzoor et al., 2021).

The integrative model resonates with methodological insights from conceptual research, which emphasize the importance of contextual grounding and practical applicability in emerging markets (Torraco, 2005; Xiao & Watson, 2019). Applying the model in Makassar demonstrates that successful integration of GHRM and AI is not merely a technological challenge but a cultural and institutional one. It requires alignment between leadership values, workforce capabilities, digital tools, and sustainability objectives.

Ultimately, adopting the GHRM–AI Sustainable Workforce Cycle enables SMEs in Makassar to strengthen their competitiveness while simultaneously reducing environmental footprints and fostering social well-being. As global and national markets increasingly prioritize sustainability-oriented organizations, SMEs that integrate green and digital strategies are better positioned to achieve resilience, legitimacy, and long-term performance.

CONCLUSION

This conceptual study has argued that integrating Green Human Resource Management (GHRM) and Artificial Intelligence (AI) offers a powerful pathway for sustainable workforce transformation in Indonesia's emerging market context, particularly among SMEs in Makassar, South Sulawesi. By developing the GHRM–AI Sustainable Workforce Framework, the paper positions leadership commitment, sustainable HR processes, AI-enabled HR systems, and employee green–digital capabilities as interdependent drivers of triple-bottom-line outcomes. GHRM provides the normative and environmental foundation, ensuring that HR policies and practices cultivate ecological responsibility and social accountability, while AI enhances precision, scalability, and data-driven decision-making in HRM. Taken together, these dimensions move sustainability and digitalization beyond rhetorical commitments toward an integrated, strategic approach to workforce management that supports resilience, competitiveness, and long-term organizational legitimacy.

At the same time, the analysis underscores that realizing this integration is particularly challenging for SMEs in Makassar, which operate under constraints of limited resources, informal HR structures, uneven digital literacy, and fragmented sustainability practices. The framework therefore highlights the crucial roles of leadership vision, capability building, and ecosystem support through partnerships with universities, government, and technology providers in overcoming these barriers. Conceptually, this study contributes to the literatures on GHRM, AI in HRM, and SME transformation by articulating how green and digital agendas can be jointly advanced rather than treated as separate reform trajectories. Practically, it offers a roadmap for SME owners, policymakers, and practitioners seeking to align workforce strategies with both environmental priorities and digital innovation. Future research should empirically test the proposed relationships using quantitative and qualitative designs, compare different regions and sectors, and explore how contextual factors such as institutional support, cultural norms, and regulatory frameworks shape the trajectories of GHRM–AI integration in Indonesia and other emerging economies.

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