

The Role of AI in Driving Sustainable HRM: A Phenomenological Study on the Use of People Analytics for Corporate Carbon Footprint

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Abstract

This phenomenological study examines the role of artificial intelligence (AI) in advancing sustainable human resource management (HRM) practices, with a focus on reducing corporate carbon footprints through people analytics in Jakarta, Indonesia. As a megacity facing severe environmental degradation, Jakarta presents a critical context for exploring how AI-driven tools intersect with socio-cultural, ethical, and infrastructural realities. Through semi-structured interviews and focus group discussions with HR professionals and employees across diverse industries, the study reveals that while AI enhances precision in measuring emissions and optimizing eco-conscious workflows, its adoption is fraught with challenges. Key findings highlight tensions between technological efficiency and socio-economic inequities, ethical concerns over surveillance and algorithmic bias, and a pervasive "training gap" limiting AI's accessibility. Participants emphasized the importance of participatory AI design, where frontline workers co-develop tools aligned with local practices, and collaborative models bridging public-private sectors. The study argues that AI's potential in sustainable HRM hinges on balancing innovation with equity, ensuring tools are democratized, ethically governed, and integrated with human-centric values. By contextualizing these insights within Jakarta's urban dynamics and global sustainability frameworks, such as the UN Sustainable Development Goals (SDGs), the research contributes actionable strategies for policymakers and organizations aiming to harmonize technological advancement with environmental and social justice.

Keywords: Artificial Intelligence (AI), Sustainable Human Resource Management, People Analytics, Corporate Carbon Footprint, Phenomenological Study.

INTRODUCTION

The intersection of artificial intelligence (AI) and sustainable human resource management (HRM) has emerged as a critical frontier in addressing contemporary environmental challenges. As global temperatures rise and climate-related risks escalate, organizations face mounting pressure to adopt eco-conscious practices (IPCC, 2023). In Jakarta, a megacity grappling with severe environmental degradation and carbon emissions, the urgency for innovative solutions is palpable. Traditional HRM frameworks, often criticized for prioritizing efficiency over sustainability, now confront demands to align workforce strategies with environmental stewardship (Smith & Lee, 2021). This shift underscores the potential of AI-driven people analytics, a tool capable of transforming HRM into a catalyst for reducing corporate carbon footprints.

The integration of AI into HRM practices introduces unprecedented opportunities to measure, analyze, and optimize employee behaviors linked to environmental impact. For instance, AI can track energy consumption patterns in office operations or recommend sustainable commuting alternatives (Johnson, 2020). Yet, despite its promise, the ethical and practical implications of AI in HRM remain underexplored, particularly in developing economies like Indonesia. Jakarta's unique socio-economic landscape, marked by rapid urbanization and infrastructural strain, amplifies the complexity of implementing AI solutions without exacerbating inequalities (Sari et al., 2022). Such challenges necessitate a phenomenological inquiry to capture the lived experiences of organizations navigating this dual imperative of sustainability and technological adoption.

Previous studies highlight the transformative role of people analytics in fostering sustainable workplaces. For example, a longitudinal study by Green et al. (2022) demonstrated that data-driven HR interventions reduced carbon emissions by 18% in Southeast Asian manufacturing firms.

Similarly, a meta-analysis by Brown and Nguyen (2021) revealed that AI-enhanced decision-making in HRM correlated with improved resource efficiency and employee engagement in sustainability initiatives. However, these studies predominantly focus on quantitative metrics, neglecting qualitative insights into how stakeholders perceive and adapt to AI-driven changes. As noted by Johnson (2020), “the human dimension of AI adoption is often overshadowed by technical outcomes, risking a disconnect between policy and practice” (p. 45). This gap underscores the need for context-specific, human-centered research.

Community service initiatives in Jakarta have begun addressing sustainability through technology, yet their alignment with HRM remains limited. Programs such as the “Green Office Initiative” by local NGOs have promoted energy-saving practices but lack integration with HR analytics (Widodo & Pratama, 2023). Conversely, corporate training workshops on AI literacy have prioritized technical skills over sustainability competencies, reflecting a fragmented approach. These efforts highlight the untapped potential of synergizing AI, HRM, and environmental goals, a vision echoed in the United Nations’ Sustainable Development Goals (SDGs), particularly Goal 8 (Decent Work) and Goal 13 (Climate Action) (UN, 2023).

The phenomenological approach offers a vital lens to explore how Jakarta-based organizations interpret and enact AI-driven HRM for sustainability. By centering on subjective experiences, this study seeks to uncover the barriers, motivations, and ethical dilemmas shaping implementation. Such insights are crucial for designing inclusive strategies that balance technological innovation with socio-environmental equity. As climate scientist Dr. Aminah Rahayu argues, “Sustainability is not an algorithm; it is a collective ethos that must be nurtured through empathy and collaboration” (Rahayu, 2021, p. 12). This ethos must permeate HRM practices to ensure AI serves as a bridge, not a barrier, to planetary well-being.

This research aims to investigate the role of AI in advancing sustainable HRM practices within Jakarta’s corporate sector, focusing on the use of people analytics to mitigate carbon footprints. By employing a qualitative phenomenological methodology, the study will explore how HR professionals and employees perceive, adapt to, and co-create AI-driven strategies for environmental sustainability. The findings aspire to inform policy frameworks, enhance community-led sustainability programs, and contribute to the global discourse on equitable technological innovation.

METHOD

This study employs a qualitative phenomenological approach to explore the lived experiences of HR professionals and employees in Jakarta regarding the integration of AI-driven people analytics for reducing corporate carbon footprints. Phenomenology is chosen for its capacity to uncover the subjective meanings and ethical nuances of technological adoption within complex socio-environmental contexts (Smith, 2019). Data will be collected through semi-structured interviews and focus group discussions (FGDs) with purposively sampled participants from diverse industries in Jakarta, including multinational corporations, local enterprises, and sustainability-focused startups. This triangulation ensures a holistic understanding of how AI tools are perceived, implemented, and contested in daily HR practices. To anchor the research in Jakarta’s unique urban dynamics, field observations will also be conducted in workplaces actively utilizing people analytics, capturing contextual factors such as infrastructural limitations and cultural attitudes toward sustainability (Sari et al., 2022).

Data analysis will follow Braun and Clarke’s (2022) reflexive thematic analysis, emphasizing iterative coding to identify patterns in participants’ narratives while remaining attuned to emergent themes. NVivo software will assist in organizing codes and visualizing connections between AI adoption barriers, employee empowerment, and environmental outcomes. Ethical considerations, including informed consent and confidentiality, will be prioritized, with participants anonymized to encourage candid responses. Reflexivity will be maintained through researchers’ journals documenting personal biases and assumptions, ensuring transparency (Creswell & Poth, 2018). To enhance credibility, member checking will be conducted, allowing participants to review and validate preliminary findings. This participatory element aligns with the study’s humanistic

ethos, recognizing stakeholders as co-creators of knowledge rather than passive subjects (Johnson, 2020).

The study's limitations include potential subjectivity inherent in phenomenological research and the dynamic nature of AI technologies, which may evolve during the research period. However, rigorous peer debriefing and triangulation of data sources will mitigate these challenges. By centering Jakarta's socio-cultural and environmental context, this methodology aims to generate actionable insights for policymakers and organizations striving to harmonize AI innovation with climate resilience. As emphasized by Widodo and Pratama (2023), "localized qualitative inquiry is indispensable for designing inclusive sustainability strategies in rapidly urbanizing regions" (p. 85). Ultimately, this approach seeks to amplify the voices of those navigating the intersection of technology and sustainability, fostering solutions rooted in equity and collective agency.

RESULTS AND DISCUSSION

The integration of AI-driven people analytics into sustainable HRM practices in Jakarta reveals a complex interplay of optimism, ethical tension, and systemic challenges. Participants across industries reported that AI tools, such as energy consumption trackers and carbon footprint dashboards, enhanced their ability to align HR strategies with environmental goals. A senior HR manager at a multinational firm noted, "AI helps us visualize the impact of remote work policies on reducing office emissions data we couldn't capture manually." However, this technological efficiency often clashed with cultural norms prioritizing interpersonal decision-making. For instance, employees in traditional manufacturing sectors expressed skepticism about AI replacing human judgment in sustainability initiatives, echoing Smith and Lee's (2021) caution against "dehumanizing" climate action (p. 89). These findings underscore the dual-edged nature of AI: a catalyst for precision, yet a disruptor of trust.

A recurring theme was the socio-technical barriers hindering equitable AI adoption. Startups and tech-forward companies lauded AI's scalability, while smaller enterprises cited infrastructural limitations, such as unstable internet connectivity and high software costs, which excluded them from leveraging people analytics. A participant from a local SME remarked, "We want to reduce our carbon footprint, but AI feels like a luxury we can't afford." This disparity mirrors Jakarta's broader urban inequality, where rapid digitalization risks marginalizing resource-constrained organizations (Sari et al., 2022). Furthermore, employees highlighted a "training gap"; many lacked the digital literacy to interpret AI-generated insights, leading to resistance. As Johnson (2020) observes, "Technology alone cannot drive change; it must be paired with empowerment" (p. 42).

Ethical dilemmas emerged prominently, particularly regarding data privacy and algorithmic bias. HR professionals expressed discomfort over monitoring employee behaviors, such as commuting patterns, to calculate carbon footprints. One participant questioned, "Where do we draw the line between sustainability surveillance and employee autonomy?" This tension aligns with Rahayu's (2021) critique of AI ethics, emphasizing the need for "guardrails that protect dignity while pursuing planetary health" (p. 9). Additionally, biases in AI models such as overlooking informal waste management practices common in Jakarta risked perpetuating exclusionary sustainability narratives. Participants advocated for participatory AI design, where frontline workers co-develop tools reflecting local realities, a notion supported by Widodo and Pratama's (2023) community-centric frameworks.

Amid these challenges, the study uncovered pockets of transformative potential. Organizations that integrated AI with participatory approaches reported higher employee engagement. For example, a green tech company used AI to gamify carbon reduction targets, fostering team-based competitions that reduced emissions by 12% within six months. Employees described this as "meaningful tech" AI that amplified their agency rather than diminishing it. Such cases resonate with Green et al.'s (2022) findings on the motivational power of data-driven storytelling. Moreover, cross-sector collaborations, such as public-private partnerships for AI literacy workshops, emerged as critical enablers. A government official emphasized, "Sustainability is a collective journey; AI is just the compass."

Ultimately, the findings advocate for a balanced paradigm where AI serves as an enabler, not a replacement, for human-centric sustainability. Jakarta's journey illustrates that technological innovation must be rooted in cultural empathy and equity. As one participant poignantly stated, "AI can measure carbon, but it cannot measure our commitment to future generations." This humanistic ethos aligning with the United Nations' SDG 13 (Climate Action) calls for policies that prioritize inclusive access to AI tools, ethical governance frameworks, and continuous dialogue between technologists and communities. By bridging these divides, Jakarta's corporate sector can model a sustainable HRM framework that harmonizes planetary imperatives with the dignity of work.

Discussion

The findings illuminate the paradoxical role of AI in Jakarta's sustainable HRM landscape, where technological promise coexists with systemic inequities and ethical ambiguities. While AI-driven people analytics offers precision in measuring and reducing carbon footprints, its implementation often amplifies Jakarta's socio-economic divides. For instance, the disparity in AI adoption between multinational corporations and SMEs reflects broader urban inequalities, where access to technology mirrors patterns of resource distribution (Sari et al., 2022). This aligns with Johnson's (2020) assertion that sustainability technologies risk becoming "tools of exclusion" unless paired with equitable capacity-building (p. 48). The tension between efficiency and inclusivity underscores a critical lesson: AI's environmental benefits cannot be divorced from its social consequences. Without deliberate interventions, Jakarta's sustainability agenda may inadvertently privilege technologically endowed actors, marginalizing smaller players integral to the city's economic fabric.

Ethical concerns surrounding surveillance and autonomy further complicate AI's role in HRM. Participants' unease about monitoring employee behaviors echoes global debates on algorithmic governance, where the pursuit of sustainability risks encroaching on individual rights (Rahayu, 2021). Jakarta's case exemplifies this dilemma, as HR professionals navigate the thin line between fostering eco-conscious habits and infringing on privacy. These challenges resonate with Smith's (2019) call for "ethics-by-design" frameworks in AI development, ensuring tools prioritize human dignity alongside environmental outcomes. The study's emphasis on participatory AI design where employees co-create solutions offers a pathway to mitigate such risks. By centering local knowledge, as seen in Jakarta's informal waste management practices, AI systems can avoid perpetuating top-down, culturally disconnected sustainability models (Widodo & Pratama, 2023).

The "training gap" identified in the findings highlights a systemic flaw in technological adoption: innovation outpacing empowerment. While AI tools provide data-driven insights, their effectiveness hinges on users' ability to interpret and act on them. This aligns with Green et al.'s (2022) observation that data literacy is the "missing link" in sustainable HRM. Jakarta's experience suggests that AI adoption must be accompanied by holistic education initiatives, blending technical skills with sustainability ethics. For example, gamified carbon reduction strategies succeeded not merely due to AI's analytical prowess but because they engaged employees as active participants in climate narratives. Such approaches mirror the United Nations' (2023) SDG 4 (Quality Education), advocating for lifelong learning as a cornerstone of sustainable development.

Transformative potential emerged most vividly in collaborative models bridging sectors and hierarchies. Public-private partnerships for AI literacy workshops and cross-industry knowledge-sharing platforms exemplify how Jakarta's sustainability efforts can transcend silos. These findings reinforce Widodo and Pratama's (2023) argument that community-driven initiatives, when scaled through institutional support, can democratize technological benefits. However, the study also cautions against over-reliance on technical solutions. As one participant noted, "AI measures carbon, but not commitment," a sentiment underscoring the irreplaceable role of human agency in climate action. This duality calls for a "hybrid governance" model, where AI complements, rather than substitutes, grassroots activism and policy advocacy (Rahayu, 2021).

Ultimately, Jakarta's journey toward AI-integrated sustainable HRM demands a reimagining of innovation itself. Rather than viewing technology as a panacea, stakeholders must embrace it as one thread in a broader tapestry of cultural, ethical, and systemic change. The study's humanistic lens prioritizing voices often sidelined in tech-centric discourses aligns with the SDGs' emphasis on "leaving no one behind" (UN, 2023). For Jakarta, this means crafting policies that subsidize AI

access for SMEs, mandate ethical AI audits, and foster inclusive dialogues between technologists and workers. By anchoring innovation in empathy and equity, the city can model a sustainable future where technology serves as a bridge, not a barrier, to collective well-being.

CONCLUSION

This study underscores the dual potential of AI-driven people analytics as both a catalyst and a challenge in advancing sustainable HRM practices within Jakarta's corporate sector. While AI tools demonstrate remarkable efficacy in quantifying and reducing carbon footprints empowering organizations to align HR strategies with environmental goals their implementation reveals entrenched socio-economic disparities and ethical dilemmas. The optimism surrounding AI's precision is tempered by concerns over surveillance, algorithmic bias, and the exclusion of resource-constrained enterprises, reflecting Jakarta's broader urban inequalities. These findings echo global discourses on technological justice, emphasizing that sustainability cannot be achieved through innovation alone but requires deliberate efforts to bridge digital divides and prioritize human dignity (Rahayu, 2021; Sari et al., 2022). The tension between efficiency and equity calls for a reimagined approach to AI adoption, one that harmonizes data-driven insights with cultural empathy and participatory governance.

Moving forward, Jakarta's journey toward sustainable HRM demands policies and practices that democratize AI access, embed ethical safeguards, and foster collaborative learning. Public-private partnerships, subsidized AI training for SMEs, and inclusive design frameworks where employees co-create tools are critical to ensuring technology serves as a bridge rather than a barrier. As emphasized by the United Nations' SDGs, sustainability is a collective endeavor requiring synergy between technological innovation, education, and grassroots agency (UN, 2023). By anchoring AI integration in principles of equity and transparency, Jakarta can model a future where environmental stewardship and social justice coexist, proving that cities in the Global South can lead in redefining sustainable development. Ultimately, this study affirms that the true measure of progress lies not in algorithms alone, but in their ability to amplify humanity's shared commitment to planetary and generational well-being.

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