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Challenges of Blockchain Implementation in HRM to Improve Transparency of Sustainability Reporting

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Abstract

This qualitative study investigates the multifaceted challenges of implementing blockchain technology within Human Resource Management (HRM) to enhance sustainability reporting transparency among Jakarta multinational corporations. As global and local pressure mounts for verifiable ethical practices, blockchain's promise of immutable data integrity confronts complex socio-technical realities. Through in-depth interviews with 28 HR leaders, technology experts, and sustainability officers, the research identifies five interconnected barriers: (1) profound technical integration difficulties with legacy HR systems, (2) limited efficacy in verifying initial data authenticity across Jakarta's complex supply chains, (3) tensions between regulatory agility in Indonesia's evolving compliance landscape and blockchain's inherent inflexibility, (4) deep-seated stakeholder resistance rooted in transparency anxieties and cultural reluctance, and (5) the sustainability-energy paradox where blockchain's environmental footprint contradicts ESG goals. Findings reveal that while blockchain strengthens auditability, its successful adoption demands addressing Jakarta-specific infrastructural constraints, fostering cultures of trust, and prioritizing human oversight alongside technological solutions. The study advocates for strategic, context-sensitive approaches to blockchain deployment, positioning it as one tool within a broader ecosystem of ethical governance, not a standalone solution for HR-driven sustainability transparency.

Keywords: *Blockchain; Technology; Sustainability Reporting; Transparency; Socio-Technical Implementation*

INTRODUCTION

Contemporary organizations worldwide, particularly in vibrant urban centers such as Jakarta, are encountering increasing pressure to exhibit a genuine commitment to ethical and sustainable practices. Stakeholders ranging from investors and regulators to employees and the increasingly aware citizens of Jakarta demand more than rhetoric; they require verifiable evidence of positive social and environmental impact (George et al., 2021). This tangible pressure converges directly on Human Resource Management (HRM), as it holds critical data on workforce practices, supply chain labor conditions, diversity, equity, inclusion (DEI), and training core elements underpinning credible Environmental, Social, and Governance (ESG) or sustainability reports (Stahl et al., 2020). The integrity and transparency of this HR-sourced data are paramount for organizations seeking legitimacy in their sustainability narratives.

Blockchain technology emerges as a compelling but complex solution in this pursuit of verifiable transparency. Its fundamental assurance of unchangeability, decentralized validation, and improved traceability presents a possible solution to worries about "greenwashing" and data tampering in sustainability reporting (Hasan et al., 2022). For HRM functions managing decentralized data across complex multinational or multi-site operations an everyday reality for many large enterprises headquartered or significantly operating in Jakarta blockchain theoretically offers a secure and tamper-proof ledger for critical sustainability metrics such as ethical recruitment verification, fair wage distribution tracking, safety compliance records, and skills development certifications (Treiblmaier, 2023)

However, implementing blockchain within HRM systems, particularly to enhance sustainability reporting transparency, presents significant challenges beyond its theoretical appeal. As a rapidly growing megacity and a crucial business hub in Southeast Asia, Jakarta presents a unique context where global technological ambitions meet local infrastructural, regulatory, and cultural

realities (Wijaya & Sugiarto, 2022). While multinational corporations in Jakarta may be at the forefront of adopting global standards, they simultaneously grapple with integrating novel technologies like blockchain into often fragmented legacy HR systems and navigating Indonesia's evolving sustainability reporting landscape (Siregar & Pratama, 2023).

Preliminary explorations and emerging discourse highlight persistent barriers: significant technical hurdles in achieving interoperability between blockchain platforms and established HR Information Systems (HRIS), the paradoxical environmental burden of energy-intensive blockchain networks conflicting with sustainability goals themselves, and crucially, deep-seated organizational resistance stemming from concerns over data privacy, stakeholder reluctance towards radical transparency, and the complexities of compliance within Indonesia's specific and developing regulatory frameworks for sustainability (Shafique et al., 2023; Upadrista et al., 2024). These challenges underscore that the path to leveraging blockchain for transparent HR-driven sustainability is not merely a technical upgrade but a profound organizational transformation.

This qualitative study, set against Jakarta's dynamic and intricate backdrop, aims to investigate these diverse challenges thoroughly. By engaging directly with the lived experiences and insights of HR leaders, technology experts, and sustainability officers within multinational corporations operating in the city, the research delves into the concrete realities of implementing blockchain within HRM to enhance sustainability reporting transparency. It aims to move beyond technological hype, providing a grounded understanding of the barriers and enablers, thereby contributing practical knowledge for organizations navigating this intricate intersection of digital innovation, human resource management, ethical accountability, and the unique demands of operating in Jakarta's evolving business ecosystem.

METHOD

This research utilizes a qualitative method, acknowledging technology implementation's intricate, socially constructed aspects in organizational settings (Braun & Clarke, 2022). To thoroughly investigate the various challenges of incorporating blockchain technology into HRM for improved sustainability reporting transparency in Jakarta's distinct ecosystem, a methodology centered on grasping human experiences, perceptions, and interpretations is crucial. Qualitative inquiry allows us to move beyond technical specifications and delve into the lived realities, organizational dynamics, and contextual barriers key stakeholders face navigating this intersection of innovation, ethics, and regulation in a dynamic megacity environment (Creswell & Poth, 2018). This approach is particularly suited to uncovering the nuanced social and procedural hurdles that quantitative methods might overlook, providing rich, contextual insights directly relevant to practitioners and policymakers in Jakarta.

Data collection centered on semi-structured, in-depth interviews with purposively selected participants across multinational corporations (MNCs) operating significant HR and sustainability functions within Jakarta. Recognizing the multifaceted nature of the challenge, we engaged three critical stakeholder groups: (1) HR Leaders. Responsible for data governance and system implementation; (2) Technology Experts. Providing insights on technical feasibility and integration, and (3) Sustainability Officers. Focused on reporting requirements and ethical verification needs. Aiming for 25-30 participants was essential to reach theoretical saturation, capturing varied perspectives from key industries in Jakarta (Saunders et al., 2018). Interviews, conducted primarily in English or Bahasa Indonesia (with professional translation/transcription as needed), lasted 45-75 minutes, guided by a flexible protocol exploring the three key dimensions: technical barriers, ethical supply chain verification, and compliance challenges. Digital recordings were transcribed verbatim, forming the primary data corpus. Supplementary document analysis of relevant internal reports and public sustainability disclosures from participating Jakarta-based MNCs provided contextual triangulation (Bowen, 2009).

Data analysis followed a reflexive thematic analysis approach (Braun & Clarke, 2022), emphasizing an iterative process of immersion, coding, theme development, and refinement. Initial familiarization involved repeated reading of transcripts. Inductive coding identified meaningful units of text related to implementation experiences, perceived challenges, and contextual factors. These

codes were then organized into potential themes through collaborative discussion among the research team, constantly comparing data within and across stakeholder groups and different corporate contexts within Jakarta. The analysis focused on the interplay among technological potential, organizational culture, regulatory pressures specific to Indonesia, and the socio-economic realities of Jakarta. Rigor was ensured through prolonged engagement with the topic and context, triangulation of stakeholder perspectives and data sources, peer debriefing among researchers, thick description in reporting findings, and maintaining a reflexive journal to acknowledge researcher positionality and potential biases throughout the process (Lincoln & Guba, 1985; Nowell et al., 2017). Ethical approval was obtained before commencement, emphasizing informed consent, confidentiality, anonymization of participants and organizations, and secure data handling, respecting the sensitivity of discussing technological challenges and corporate practices within the Jakarta business community (Haryanto et al., 2022).

RESULTS AND DISCUSSION

The potential of blockchain for unalterable HR data clashed dramatically with the reality of Jakarta's corporate technology environment. Participants universally highlighted the profound challenge of integrating blockchain with entrenched legacy HR Information Systems (HRIS). As one HR Director from a significant financial institution lamented, “Our core HR system is a 15-year-old monolith; grafting on a decentralized ledger feels like connecting a spaceship to a horse cart”. This was a technical glitch and a significant operational and cultural disconnect. Data formats were incompatible, APIs were either unavailable or restricted, and the fundamental idea of decentralized control conflicted with the centralized data governance models commonly found in many MNCs in Jakarta. The perceived cost and complexity of overhauling or developing sophisticated middleware were significant deterrents, fostering a noticeable sense of inertia.

While blockchain's potential for verifying ethical practices in the supply chain resonated strongly with Sustainability Officers, its practical application revealed significant limitations. Participants acknowledged the technology's strength in creating tamper-proof records for specific, verifiable endpoints such as authenticated training certificates for factory auditors or hashed records of third-party ethical audit summaries stored off-chain. “Knowing that audit A for Supplier X on date Y has not been altered is valuable”, noted a Sustainability Head in manufacturing. However, the research uncovered a critical gap: blockchain cannot inherently verify the initial truthfulness or completeness of the data entered. Concerns were profound regarding data capture at the often-opaque lower tiers of Jakarta-connected supply chains, particularly in remote regions. How could blockchain ensure accurate, real-time reporting on working hours or safety incidents without trustworthy input mechanisms and cultural buy-in from numerous small suppliers? The technology provided a secure ledger; however, establishing initial trust and a comprehensive data flow from various, fragmented sources remained a profoundly human and systemic challenge that blockchain currently cannot address.

The evolving nature of sustainability regulations globally and particularly within Indonesia presents a unique compliance challenge further intensified by blockchain's immutability. Participants expressed a fundamental tension between the need for adaptable reporting and blockchain's fixed data structure. Regulations change interpretations, sometimes requiring us to re-categorize past data. How do we reconcile that with an immutable ledger? I asked a legal counsel involved in ESG compliance. While blockchain offers undeniable audit trails that are beneficial for proving the integrity of historical data, its inflexibility poses risks. Concerns also centered on navigating Indonesia's specific data privacy laws alongside blockchain's transparency.

One of the most surprising and significant findings was the intense stakeholder resistance rooted in fears of heightened transparency. This was not just simple technophobia but a complicated network of worries regarding power, reputation, and control. HR leaders worried about immutable records of sensitive personnel decisions or diversity metrics being exposed, even internally, fearing misinterpretation or misuse. Line managers expressed discomfort with potentially immutable performance data linked to sustainability goals. Crucially, suppliers were often reluctant to share granular HR data onto a shared ledger, fearing commercial disadvantage or reputational damage from

inevitable operational imperfections. “Transparency sounds good in sustainability reports, but the reality of exposing every wart in our HR practices is terrifying for many stakeholders”, confessed an HR VP. This resistance underscored a significant disconnect: although organizations pursued blockchain to showcase ethical practices externally, the internal and extended stakeholder ecosystem frequently harbored concerns about the transparency necessary to realize it. This situation exposes a considerable cultural and trust barrier that technology cannot resolve independently.

A striking paradox emerged, especially relevant for organizations committed to environmental sustainability goals. The significant energy consumption associated with specific blockchain consensus mechanisms was frequently cited as a central point of contention. Sustainability officers were acutely aware of the irony: “How can we justify using a technology that might increase our carbon footprint, to report on reducing it?”. This was not just a technical detail; it represented a potential misalignment with core environmental values and could damage external credibility. Furthermore, the research revealed concerns about strategic prioritization. “Should we direct our limited resources and attention here right now?” questioned a CEO. “Or are there more immediate, high-impact sustainability initiatives within our HR practices and supply chain that require funding?” This inquiry highlighted the uncertainties surrounding blockchain's current practical Return on Investment (ROI) and its strategic relevance for promoting tangible sustainability outcomes in Jakarta, extending beyond its allure for auditability.

The findings illustrate blockchain in HR for sustainability reporting in Jakarta as a technology full of theoretical promise yet caught in a web of complex, interrelated challenges. Technical integration is arduous, its ability to ensure ethical sourcing is partial, compliance agility is constrained, stakeholder resistance is deep-seated, and its environmental cost creates a fundamental paradox. While providing undeniable benefits for data immutability and audit trails, realizing its full potential for transparent sustainability reporting requires navigating technological hurdles and significant organizational, cultural, and strategic shifts within the unique dynamics of Jakarta's multinational business environment, the pragmatic realities on the ground temper the allure of the technology.

Discussion

The findings illuminate a profound dissonance between blockchain's theoretical allure for transparent sustainability reporting and the intricate socio-technical realities faced by multinational corporations in Jakarta. Although the technology provides an unchangeable ledger, effectively addressing greenwashing issues (Hasan et al., 2022), its application in the intricate, people-focused field of HRM unveils challenges beyond simple technical obstacles. The substantial obstacles posed by outdated HRIS highlight a crucial void in the digital transformation discussion: technological advancements must be linked to current infrastructural investments and organizational resistance (Wijaya & Sugiarto, 2022). Jakarta's corporate environment, defined by a combination of international standards and local legacy systems, heightens this friction. The high costs and complexities reported reflect financial constraints and a strategic dilemma for HR and technology leaders, forcing difficult choices about resource allocation for foundational system upgrades versus cutting-edge, yet potentially disruptive, innovations like blockchain (Treiblmaier, 2023).

Furthermore, the partial efficacy of blockchain in ethical supply chain verification exposes a fundamental limitation often overlooked in optimistic discourse. While providing robust proof of data non-alteration once recorded (Shafique et al., 2023), the technology remains inherently agnostic to that data's initial veracity and comprehensiveness. While technology can safeguard records, maintaining the integrity of initial human actions and reporting, particularly regarding sensitive subjects such as labor practices in complex Indonesian supply chains, remains a significant social and managerial challenge that blockchain cannot solve (George et al., 2021). Achieving genuine ethical transparency necessitates a socio-technical system in which technology supports, rather than substitutes, careful human oversight and ethical engagement with suppliers.

The tension between regulatory agility and blockchain's immutability presents another critical paradox for Jakarta-based MNCs navigating Indonesia's evolving sustainability reporting landscape (Siregar & Pratama, 2023). The findings confirm that while blockchain enhances auditability for

historical data, its inflexibility clashes with the dynamic nature of ESG frameworks and Indonesia's developing regulatory requirements. The challenges of aligning immutable ledgers with rights such as data rectification within Indonesia's emerging data privacy regulations highlight a significant legal and ethical design issue. This necessitates careful architectural choices and recognition that blockchain implementations must be future-proofed for regulatory changes (Upadrista et al., 2024). The fear of locking in compliance approaches highlights a need for adaptable governance models around the technology, emphasizing that blockchain systems must be designed with regulatory evolution in mind, not as static solutions.

Perhaps the most revealing finding is the deep-seated stakeholder resistance rooted in transparency anxieties. This moves the discussion beyond technology acceptance models into organizational power dynamics, psychological safety, and cultural attitudes towards disclosure (Stahl et al., 2020). The reluctance from HR professionals, line managers, and suppliers to embrace immutable transparency reflects legitimate concerns about reputational risk, misinterpretation of imperfect data, and loss of control. It emphasizes that true transparency necessitates cultivating a culture of psychological safety, trust, and a common purpose regarding sustainability goals. These cultural changes are essential for successful blockchain implementation, rather than mere results (Treiblmaier, 2023). Pushing technology without addressing these human and cultural foundations risks failure or superficial adoption.

Ultimately, the sustainability-energy paradox presents a critical ethical and strategic dilemma. The ecological impact of specific blockchain activities starkly opposes the fundamental environmental objectives of sustainability reporting (Hasan et al., 2022). This paradox urges organizations to assess how their technology choices align with sustainability goals. It demands a shift from technological determinism to strategic selectivity (Upadrista et al., 2024). Organizations in Jakarta need to carefully evaluate whether blockchain, considering its current energy consumption and its various challenges, is the most effective and truly sustainable investment for achieving their specific HR-related sustainability aims, compared to other initiatives. The findings indicate that, at this point, many Jakarta MNCs might achieve a greater sustainability impact by allocating the substantial resources needed to tackle blockchain's complex challenges towards more fundamental or directly impactful human and operational activities.

CONCLUSION

This qualitative exploration within Jakarta's multinational corporate landscape reveals that while blockchain technology holds significant theoretical promise for enhancing the transparency and credibility of HR-driven sustainability reporting, its practical implementation faces a complex web of interconnected challenges that extend far beyond technical feasibility. The immutable ledger offers a compelling data integrity and auditability solution, potentially mitigating greenwashing concerns. However, the profound difficulties in integrating with entrenched legacy HR systems, the inherent limitations in verifying the initial truthfulness of ethically sensitive data (particularly within Jakarta's diverse and extended supply chains), the tension between regulatory agility and blockchain's inflexibility in Indonesia's evolving compliance landscape, the deep-seated stakeholder resistance rooted in transparency anxieties, and the paradoxical environmental footprint of the technology itself collectively present formidable barriers. These findings underscore that blockchain is not a plug-and-play solution; its adoption for sustainable HR transparency is fundamentally a socio-technical challenge, where existing organizational infrastructures deeply constrain technological potential, cultural attitudes towards disclosure, and the practical realities of managing human systems within Jakarta's unique business environment.

As a result, organizations aiming to utilize blockchain for transparent sustainability reporting must take a strategic and nuanced approach. Emphasizing foundational steps such as modernizing core HR data systems, cultivating a culture of trust and psychological safety regarding data sharing, and enhancing direct human oversight alongside ethical supplier relationships may produce more immediate and authentic sustainability outcomes than prematurely imposing complex blockchain integrations. Future initiatives should emphasize focused pilot applications where blockchain's capabilities in provenance tracking correspond with specific, verifiable sustainability metrics, while

also carefully evaluating energy-efficient consensus mechanisms and hybrid data architectures that balance immutability and regulatory flexibility. Ultimately, achieving genuinely transparent and ethical HR practices involves understanding that technology, like blockchain, is a mere tool; its success depends on its integration within a broader ecosystem characterized by strong governance, a cultural commitment to ethical behavior, and a human-centered sustainability approach that resonates with the Indonesian context. The pathway ahead requires thoughtful reflection on the technological potential and the significant human and organizational realities influencing their adoption in Jakarta's vibrant corporate environment.

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