

Review Article on the Dual Paradox of Ai in Human Resource

**Prof. Shubham Rohidas Kadam¹, Asmita Arun Desai²,
Sweety kumari Sharma³, Supriya Rajendra Todkar⁴**

¹Professor, Management, Asian College Of Science And Commerce

Abstract

AI delivers significant efficiency gains across business functions.

1. INTRODUCTION

Artificial Intelligence has become an integral component of modern organisational operations. Companies now deploy AI systems for recruitment, customer service, data analysis, communication, and decision support. These applications accelerate processes and reduce repetitive administrative work. However, every major technological advance simultaneously generates new organisational, ethical, and environmental challenges.

This research examines two interrelated paradoxes.

The first is the Human Resource paradox. Organisations use AI to screen résumés, assess skills, schedule interviews, and communicate with candidates. At the same time, job seekers use generative AI to prepare résumés, customise applications, draft cover letters, and practise interview responses. This creates a feedback loop that has been conceptualised as an “AI recruiting arms race” (Black & van Esch, 2021).

The second is the infrastructure paradox. Although AI appears digital, it depends on extensive physical infrastructure—servers, data centres, electricity, cooling systems, networking equipment, and storage. The computational intensity of AI workloads has driven rapid expansion of this infrastructure, increasing demand for energy and water while also creating employment in technical and skilled-trade roles.

The central research question is: How can organisations capture the efficiency benefits of Artificial Intelligence while responsibly managing its impacts on human resource management and physical infrastructure?

2. RESEARCH PROBLEM

Rapid AI adoption improves process speed, scale, and consistency. At the same time, excessive dependence introduces risks related to recruitment fairness, candidate authenticity, privacy, and the quality of human decision-making. Parallel expansion of AI infrastructure increases demand for electricity, cooling, water, and electronic components, generating both environmental pressures and new forms of employment.

The research problem is therefore: “How can organisations balance the efficiency provided by Artificial Intelligence with its impact on human resource management and physical infrastructure?”

3. OBJECTIVES OF THE STUDY

1. To understand the role of AI in modern Human Resource Management.
2. To examine the benefits of AI in recruitment and employee management.
3. To identify emerging challenges such as AI-generated applications, deepfakes, and algorithmic bias.
4. To understand the resource requirements of AI-based data-centre infrastructure.
5. To examine environmental concerns associated with energy, cooling, water, and electronic waste.
6. To identify employment opportunities created by the growth of data centres.
7. To suggest practical management strategies for responsible and sustainable use of AI.

5. SCOPE OF THE STUDY

The study focuses on two primary domains:

- A. Artificial Intelligence in Human Resources: AI-based recruitment, résumé screening, skill assessment, candidate communication, AI-generated applications, deepfake and identity concerns, algorithmic and proxy bias, employee monitoring, and human oversight.
- B. AI Infrastructure and Data Centres: Electricity requirements, cooling systems, water use, environmental impact, electronic waste, data-centre employment (technical and skilled-trade roles), and sustainable data-centre practices.

6. REVIEW OF LITERATURE

The literature reviewed for this study covers research on AI-enabled recruitment, algorithmic bias, AI-assisted applications, large language model behaviour, data-centre energy consumption, water requirements, and sustainable AI infrastructure.

Black and van Esch (2021) examined the increasing use of AI-enabled recruiting and highlighted the transformation of recruitment practices through artificial intelligence. Their work provides a foundation for understanding the growing interaction between recruitment technology and the competition for talent.

Research on algorithmic hiring has also identified concerns regarding bias and unequal outcomes. Wilson and Caliskan (2024) examined gender, race, and intersectional bias in résumé screening and demonstrated that language-model-based systems can reproduce patterns of bias.

Recent research has further examined the possibility of self-preference in AI-assisted recruitment. Xu, Li and Jiang (2025/2026) investigated whether large language models prefer AI-generated résumés when used as evaluators, providing evidence relevant to the emerging AI-versus-AI recruitment cycle.

Bommasani et al. (2026) examined algorithmic monocultures in hiring and highlighted how widespread dependence on similar algorithmic systems can create systemic risks in employment decision-making.

On the infrastructure side, the International Energy Agency has documented the rapidly increasing electricity requirements associated with data centres and AI. Research by Xiao et al. (2025) further examined the environmental impact of AI servers, including water requirements and pathways towards more sustainable AI infrastructure.

The literature therefore indicates that AI creates significant operational benefits while simultaneously generating human, ethical, environmental, and infrastructure-related challenges. This study brings these two dimensions together through a dual-paradox framework.

7. RESEARCH METHODOLOGY

This study employs a qualitative, multi-source secondary research design. A systematic literature review was conducted of peer-reviewed journal articles, arXiv preprints, conference proceedings (AIES, FAccT), and authoritative reports from the International Energy Agency (IEA), U.S. Department of Energy / Lawrence Berkeley National Laboratory, and Nature Sustainability, covering the period 2021–2026.

Search terms included algorithmic hiring bias, LLM self-preference, data-centre energy demand, AI water footprint, and green data-centre practices. Sources were screened for methodological quality, quantitative evidence, and relevance to management practice. Key findings were extracted, triangulated, and synthesised within a dual-paradox conceptual framework.

The design prioritises management insight over primary engineering measurement. Limitations arising from rapid technological change, geographic variation in resource intensity, and the absence of new primary fieldwork are acknowledged and addressed through source triangulation.

8. FINDINGS AND ANALYSIS

8.1 AI IN HUMAN RESOURCE MANAGEMENT

8.1.1 AI-Based Recruitment and Efficiency Gains

Recruiters often receive hundreds or thousands of applications for a single opening. AI systems assist by scanning résumés, identifying relevant skills, matching candidates to requirements, organising applications, scheduling interviews, and handling repetitive administrative tasks. This frees HR professionals for higher-value human interaction.

AI also supports structured skill-based assessments, 24/7 candidate communication via chatbots, and multilingual platforms that expand access to global talent pools.

8.1.2 The “AI versus AI” Recruitment Cycle

Organisations increasingly use AI to process applications. Candidates simultaneously use generative AI to prepare résumés, customise applications, write cover letters, and practise assessments. The resulting cycle is:

Candidate uses AI → higher volume of polished applications → HR deploys AI filters → candidates further optimise with AI → recruitment becomes progressively more automated. This has been termed the “AI recruiting arms race” (Black & van Esch, 2021). Empirical evidence shows that large language models exhibit strong self-preference bias: models prefer résumés they themselves generated over human-written equivalents at rates of **67–82%**. In simulated hiring pipelines across 24 occupations, candidates using the same LLM as the evaluator are **23–60%** more likely to be shortlisted than equally qualified applicants submitting human-written résumés (Xu, Li & Jiang, 2025/2026).

8.1.3 Deepfake and AI-Assisted Fraud Risks

Generative AI can produce highly realistic text, images, voices, and video. Organisations therefore face challenges in verifying candidate identity, document authenticity, originality of assessment responses, and the absence of unauthorised assistance during online interviews or tests. Stronger identity-verification and skill-validation processes are required.

8.1.4 Algorithmic and Proxy Bias

AI systems learn patterns from historical data. When that data contains bias, the systems can reproduce or amplify it. Production embedding models favour White-associated names in **85.1%** of cases and

disadvantage Black male candidates in up to 100% of comparisons (Wilson & Caliskan, 2024). Real-world algorithmic monocultures exacerbate these patterns: analysis of 3.4 million applicants and 4 million applications across 156 employers found that **25.87%** of applications from Black candidates and **14.74%** from Asian candidates were directed to positions showing adverse impact under U.S. employment-discrimination standards (Bommasani et al., 2026).

Proxy bias persists even when protected attributes are removed, because location, educational institution, and career history can serve as indirect signals.

8.1.5 Human Dependency and Workplace Surveillance

Complete reliance on AI rankings can reduce independent human review. AI is also used for employee monitoring, including working hours, system activity, and task completion. While such systems provide operational insight, excessive monitoring raises concerns about privacy, trust, employee experience, and organisational culture. Clear policies on responsible monitoring are essential.

8.2 THE PHYSICAL INFRASTRUCTURE OF AI

8.2.1 AI Requires Physical Infrastructure

AI systems depend on servers, data centres, electricity, cooling, networking, storage, and human expertise. Data centres underpin digital payments, cloud computing, video communication, social media, business applications, and AI services.

8.2.2 Energy Requirements

Global data-centre electricity consumption reached approximately **415 TWh** in 2024 (about 1.5% of world electricity demand) and is projected to roughly double to **945 TWh** by 2030 under the IEA Base Case, with AI as the primary driver (International Energy Agency, 2025/2026). The environmental impact depends heavily on the carbon intensity of the electricity source.

8.2.3 Water and Cooling

Computing equipment generates heat that must be removed. U.S. AI-server deployment between 2024 and 2030 is projected to produce an annual water footprint of **731–1,125 million m³**, with indirect water associated with electricity generation often constituting approximately 70% of the total (Xiao et al., 2025). Strategic siting, efficient cooling, and water recycling are critical management issues.

8.2.4 Electronic Waste

Servers, storage devices, and networking equipment have finite useful lives. Responsible AI infrastructure requires equipment reuse where feasible, proper recycling, extended life cycles, and environmentally sound disposal.

8.2.5 The Employment Paradox

Data-centre construction and operation create demand for electrical maintenance, HVAC and cooling systems, plumbing, networking, cybersecurity, equipment maintenance, facility management, and environmental management. Growth of AI infrastructure therefore generates employment for both specialised technical professionals and skilled tradespeople.

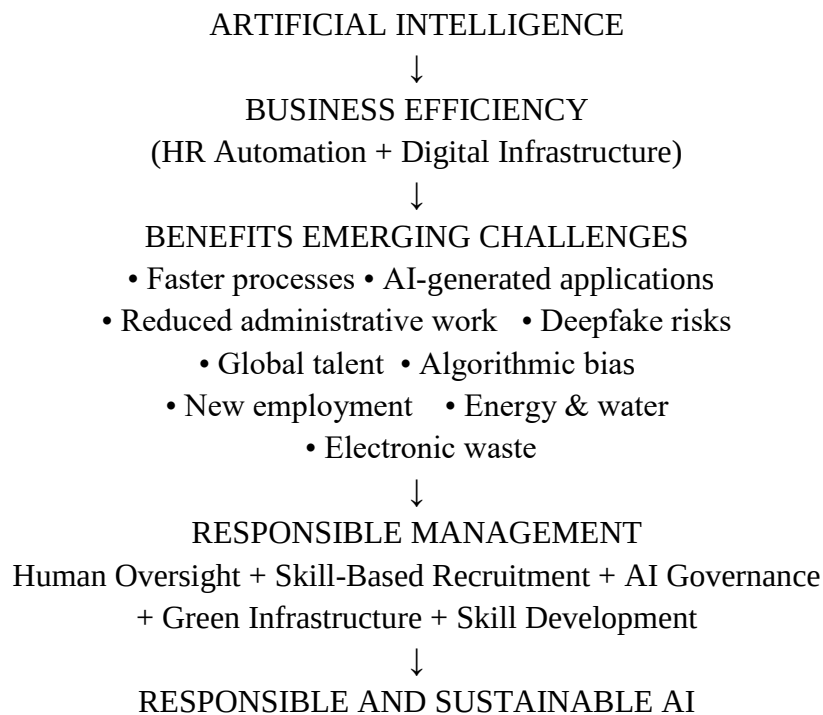
9. DISCUSSION OF FINDINGS

The findings demonstrate that AI creates benefits and challenges simultaneously.

In Human Resource Management, AI improves recruitment efficiency and reduces repetitive administrative work. However, the increasing use of AI by both employers and candidates can create an AI-versus-AI cycle in which both sides continuously adapt to each other.

The findings also indicate that AI-based recruitment can introduce concerns related to self-preference, algorithmic bias, proxy discrimination, candidate authenticity, and reduced human involvement. The infrastructure findings demonstrate that AI is not purely digital. AI depends on significant physical resources, including electricity, water, cooling infrastructure, hardware, and skilled labour. Therefore, the organisational impact of AI should be considered across both its human and physical dimensions.

10. CONCEPTUAL FRAMEWORK



11. MANAGEMENT SOLUTIONS

11.1 Human-in-the-Loop Recruitment

AI analysis → structured human review → final decision by qualified professionals.

11.2 Skill-Based Recruitment

Emphasise practical assignments, work samples, structured interviews, and job-related assessments.

11.3 Blind Screening

Where appropriate, remove information not relevant to job performance to reduce certain forms of bias.

11.4 Candidate Verification

Implement robust identity verification, supervised assessments, and skill-validation methods for high-stakes roles.

11.5 Responsible AI Governance

Conduct regular audits for fairness, accuracy, privacy, security, and transparency. Maintain human oversight for critical decisions.

11.6 Green Data Centres

Adopt renewable energy, energy-efficient hardware, advanced cooling, water recycling, extended equipment life cycles, and proper e-waste management.

11.7 Skill Development

Prepare workers for roles in data-centre operations, HVAC, electrical systems, networking, cybersecurity, facility management, and environmental management.

12. KEY FINDINGS

1. AI substantially reduces repetitive HR work and accelerates recruitment and candidate communication.
2. Bilateral AI use by candidates and employers creates a measurable self-preference and volume-driven arms race.
3. Generative AI introduces new challenges of authenticity and identity verification.
4. AI systems can reproduce and amplify bias present in historical data and through algorithmic monocultures.
5. Human oversight remains essential for critical recruitment decisions.
6. AI depends on large-scale physical infrastructure whose global electricity demand is projected to roughly double by 2030.
7. Water requirements of AI servers are substantial and geographically variable; indirect water often dominates.
8. Data-centre growth creates employment opportunities in technical and skilled-trade occupations.
9. Sustainable AI requires simultaneous attention to software practices and the environmental and resource impacts of infrastructure.

13. LIMITATIONS OF THE STUDY

- AI technology evolves rapidly; findings may require updating.
- Data-centre resource consumption varies significantly by location, design, and cooling technology.
- AI recruitment systems differ across organisations and vendors.
- The study adopts a management perspective rather than detailed technical engineering analysis.
- Primary fieldwork with HR professionals, candidates, and data-centre operators would provide additional depth.

14. FUTURE SCOPE OF THE STUDY

- Actual AI recruitment practices and candidate experiences in specific national contexts.
- Effectiveness of methods for detecting AI-assisted fraud.
- Impact of AI recruitment systems on diversity and inclusion outcomes.
- Comparative energy and water performance of different cooling technologies.
- Regional employment effects of AI infrastructure expansion.
- Design and implementation of sustainable, resource-efficient data centres.

15. CONCLUSION

Artificial Intelligence is neither an unqualified benefit nor an inevitable problem. It is a powerful technology that is reshaping organisational processes. In Human Resources, AI can make recruitment faster and more efficient, yet its dual use by employers and candidates creates challenges of authenticity, algorithmic bias, and over-reliance on automated systems.

At the same time, AI depends on physical infrastructure whose expansion generates environmental pressures while also creating new forms of employment.

The central management challenge is not to halt AI adoption, but to govern it responsibly. Organisations must combine technological capability with human judgment, algorithmic accountability, and environmental stewardship.

The core message of this research is: “AI may be digital, but its impact is human and physical.”

The future of AI should be evaluated not only by how intelligent the technology becomes, but by how responsibly its consequences for people and the planet are managed.

16. STRUCTURED EVIDENCE SUMMARY

Research Dimension	Evidence / Indicator	Reported Value	Source
AI recruitment	LLM self-preference	67–82%	Xu, Li & Jiang (2025/2026)
AI recruitment	Shortlisting advantage when evaluator and candidate use same LLM	23–60%	Xu, Li & Jiang (2025/2026)
Algorithmic bias	Embedding-model preference	85.1%	Wilson & Caliskan (2024)
Algorithmic hiring	Black applications showing adverse impact	25.87%	Bommasani et al. (2026)
Algorithmic hiring	Asian applications showing adverse impact	14.74%	Bommasani et al. (2026)
Data centres	Global electricity consumption	415 TWh (2024)	IEA (2025)
Data centres	Projected global electricity consumption	945 TWh (2030)	IEA (2025/2026)
AI servers	Annual U.S. water footprint	731–1,125 million m ³	Xiao et al. (2025)

17. REFERENCES

- Black, J. S., & van Esch, P. (2021). AI-enabled recruiting in the war for talent. *Business Horizons*, 64(4), 513–524. <https://doi.org/10.1016/j.bushor.2021.02.015>
- Bommasani, R., Bana, S. H., Creel, K. A., Jurafsky, D., & Liang, P. (2026). Algorithmic monocultures in hiring. *Proceedings of the 2026 ACM Conference on Fairness, Accountability, and Transparency*. <https://algorithmichiring.github.io/>
- International Energy Agency. (2025). *Energy and AI*. IEA. <https://www.iea.org/reports/energy-and-ai>
- International Energy Agency. (2026). *Key questions on energy and AI*. IEA. <https://www.iea.org/reports/key-questions-on-energy-and-ai>

5. Wilson, K., & Caliskan, A. (2024). Gender, race, and intersectional bias in resume screening via language model retrieval. *Proceedings of the AAAI/ACM Conference on AI, Ethics, and Society*, 7(1), 1578–1590. <https://doi.org/10.1609/aies.v7i1.31748>
6. Xiao, T., Fuso Nerini, F., Matthews, H. D., Tavoni, M., & You, F. (2025). Environmental impact and net-zero pathways for sustainable artificial intelligence servers in the USA. *Nature Sustainability*, 8, 1541–1553. <https://doi.org/10.1038/s41893-025-01681-y>
7. Xu, J., Li, G., & Jiang, J. Y. (2025/2026). AI self-preferencing in algorithmic hiring: Empirical evidence and insights. *arXiv preprint arXiv:2509.00462*. <https://doi.org/10.48550/arXiv.2509.00462>