Smart cities, smarter decisions: The algorithmic governance of human resource management

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Abstract
The integration of Artificial Intelligence (AI) in smart cities and Human Resources Management (HRM) is profoundly transforming organizational decision-making, presenting both significant opportunities and complex ethical challenges. This research explores essential governance mechanisms for AI in HRM, aiming to ensure justice, transparency, and accountability within these urban ecosystems. This study systematically defines and proposes robust AI governance mechanisms specifically tailored for HRM in smart cities, focusing on core ethical imperatives like fairness and responsibility in algorithmic decisions. It builds upon existing literature on smart cities, algorithmic governance, and AI in HRM, integrating insights on digital transformation. A critical literature review highlighted inherent tensions between technological efficiency and ethical requirements, specifically addressing algorithmic biases, potential discrimination, and the loss of human autonomy in HR decisions. Findings underscore the urgent need for a hybrid governance model balancing human intelligence and oversight with powerful algorithmic capabilities to leverage benefits while proactively managing risks. This cross-cutting approach offers critical and strategic perspectives for ethical and responsible talent management via AI. These insights are relevant for practitioners navigating digital shifts and policymakers developing AI regulatory frameworks for urban and corporate settings. The article's originality consists of its comprehensive integration of smart city dynamics with AI ethics in HRM. It provides a unique and timely framework bridging these domains, offering novel insights for future research and responsible implementation.

Keywords: algorithmic governance, artificial intelligence, organizational decision-making, smart cities, talent management.

1. Introduction
Global urbanization is an irreversible dynamic, leading to rapid urban population growth and exerting significant pressure on resources and the environment [1]. This reality compels cities to adopt more sustainable and efficient development models, giving rise to the concept of Smart Cities. These ecosystems integrate Information and Communication Technologies (ICT) and Artificial Intelligence (AI) to optimize services and improve quality of life, relying on intensive data collection and usage for informed urban decision-making [1, 2]. Morocco, with its ambitious Smart City projects, is fully committed to this urban modernization, recognizing the strategic role of ICT and AI in its territorial development.

In parallel, AI is profoundly revolutionizing Human Resources Management (HRM). It optimizes recruitment by efficiently sorting applications, automates time-consuming tasks to free HR professionals for higher-value strategic roles, and customizes the employee experience through tailored training and career paths [3, 4]. This integration marks a structural redefinition of the HR function, shifting it from an administrative to a strategic role.

However, the powerful capacity of AI in HRM to process vast volumes of data to improve performance comes with significant ethical challenges [5]. Issues such as algorithmic biases, implicit discrimination, and the potential loss of decision-making autonomy for HR professionals emerge as strategic and social imperatives [6, 7]. The opacity of algorithmic "black-boxes," combined with this loss of autonomy, creates an accountability vacuum. Thus, the central research question of this study is: **What governance mechanisms can frame the use of AI in HR decisions to preserve justice, transparency, and accountability in smart cities?** The inherent tension between technological efficiency and ethical imperatives is exacerbated in smart cities, where algorithmic decisions can have a systemic impact on vast populations.

With this in mind, this research aims to analyze the applications and benefits of AI in HRM; to identify the specific ethical challenges its deployment raises within smart cities; and to propose hybrid and responsible governance mechanisms ensuring justice, transparency, and accountability.

This article explores the governance mechanisms needed to frame the use of AI in HRM within smart cities. It critically examines the forms of algorithmic power at play in companies operating in smart cities and proposes avenues for more responsible, equitable, and well-being-centered HRM. It will analyze the emergence of algorithmic decision-making through the lens of digital governance and organizational digital transformation, drawing on relevant conceptual frameworks and outlining future research directions.

2. Theoretical foundations and conceptual framework

2.1. Smart cities and algorithmic governance

Smart cities are urban ecosystems integrating ICT and AI to optimize services, improve quality of life, and promote sustainable governance [1, 8]. They leverage big data for informed decisions. In Morocco, Casablanca Smart City and Rabat Green City illustrate this dynamic, aiming for urban efficiency and modernization of services, including hospital logistics [9].

Algorithmic governance frames the design and use of algorithmic systems, ensuring their fairness, transparency, and accountability [10]. It questions the power of algorithms over human decisions [11]. Key issues are accountability, transparency, equity, and privacy protection [10]. Without robust frameworks, an "algocracy" [12] can emerge, where automated decisions prevail without oversight.

2.2. Applications of AI in HRM

AI in HRM is a key component of digital transformation, optimizing the entire employee lifecycle [3]. Its applications are diverse and span areas such as recruitment and selection, including CV screening, chatbots, and predictive profile analysis [13]. It also extends to performance management with real-time feedback tools and objective tracking [14], as well as development and training through competency needs identification and personalized paths [4]. AI also optimizes HR administration through automation of routine tasks such as payroll and leave management [15] and enhances the employee experience via customization of the work environment and virtual assistant support [4]. These applications transform HR processes towards more agile and data-driven approaches.

3. Strategic advantages and benefits of AI in HRM

The integration of AI in HRM offers substantial benefits, redefining managerial practices.

3.1. Optimization of operational efficiency

AI significantly increases the operational efficiency of HR departments. Automation of repetitive tasks (pre-screening, schedule management, payroll) reduces time and costs [16]. AI tools can analyze thousands of resumes in minutes. For Moroccan companies undergoing digital transformation, these gains are crucial for modernizing HR and optimizing recruitment in a dynamic market. AI streamlines workflows, minimizes errors, and frees HR for strategic missions.

3.2. Improving employee experience and engagement

AI enables unprecedented customization of the HR experience. Analysis of individual data allows for tailored training recommendations, relevant internal mobility opportunities, or personalized social benefits. 24/7 HR chatbots offer instant answers, improving employee satisfaction and autonomy. This personalization contributes to better employee engagement, increased talent retention, and a strengthened employer brand. In Morocco, where valuing human capital is essential, AI supports the creation of attractive work environments.

3.3. Predictive competency management and talent development

AI transforms competency management by enabling proactive needs anticipation. It analyzes labor market trends, individual performance, and technological developments to identify future competency gaps. Based on this, AI recommends personalized training paths for employee upskilling (improving existing competencies) and reskilling (acquiring new competencies) [14]. This ensures that the organization always has the necessary talent, reduces external recruitment costs, and promotes employee employability. For Morocco, this is essential to adapt the workforce to the demands of a changing economy.

3.4. Strategic decision support and needs anticipation

AI transforms HR into a strategic partner. Through predictive analytics, AI converts massive data into valuable insights [14]. It anticipates future competency needs, identifies risks of key talent departure, or optimizes compensation strategies. For example, AI can predict which employees are likely to leave the company. This anticipation allows for proactive actions (retention, training, recruitment). It frees HR professionals for strategic missions, such as human capital development and managerial innovation in Morocco [17] directly contributing to overall performance.

4. Ethical challenges of AI in HRM and their amplification in smart cities

While AI offers undeniable potential, its application in HRM, particularly in smart cities, raises major ethical challenges.

4.1. Intrinsic issues of AI in HRM

The ethical concerns of AI stem from its design [5]. Biases in data and algorithms are paramount: discriminatory historical data will lead to AI that reproduces and amplifies these biases [18]. Amazon's recruiting tool, biased against women, is a clear example [18].

The opacity of "Black-Box" models, whose processes are complex and difficult to interpret [19], compromises transparency and contestability. The sensitivity of HR decisions (recruitment, promotion, termination) makes AI risky for fundamental rights without ethical guarantees.

These challenges lead to concrete risks: discrimination and inequity (racial, gender, social) can be reinforced [20]. A loss of HR decision-making autonomy and the dehumanization of processes can occur, reducing the management of human nuances [21]. Privacy and surveillance are also concerns, as AI in HRM massively collects personal and behavioral data, risking intrusion into private life [22].

Table 1. Benefits and Risks of AI in HRM by Area

HR Area	Key AI Benefits	Major Ethical Risks
Recruitment & Selection	Efficiency, speed, reduction of initial biases.	Algorithmic biases, opacity, dehumanization.
Performance Management	Real-time feedback, identification of gaps.	Excessive surveillance, pressure, opacity of metrics.
Development & Training	Personalization of paths, **competency** needs identification.	Biases in recommendations, collection of sensitive data.
HR Administration	Task automation, error reduction.	Lack of transparency, technological dependence.
Employee Experience	Customization of environment, improved engagement.	Privacy concerns, feeling of surveillance.

Source: Authors

4.2. Amplification of challenges in smart cities and the Moroccan context

The ethical challenges of AI in HRM are amplified in smart cities, moving from the organizational to the urban systemic scale. A biased HR algorithm can affect thousands of people. If the same algorithms or data are reused in urban services (employment, housing), biases can spread, creating "cities of bias" that exacerbate inequalities [23].

The Moroccan context adds complexities. The persistent digital divide [24] and the importance of the informal sector risk excluding part of the population from access to employment if AI is adopted without inclusion. Smart cities using sensors and cameras (as in Rabat for security) [9] coupled with HR data create unprecedented potential for mass surveillance, raising questions about the privacy of citizen-employees. Finally, the lack of specialized competencies in AI and AI ethics in Morocco [25] combined with the absence of a specific AI regulatory framework (beyond Law 09-08) [26], limits the ability to identify and correct these biases.

5. Towards hybrid and responsible AI governance in HRM

Faced with ethical and systemic challenges, robust and responsible governance mechanisms are imperative for AI in HRM, placing humans at the center.

5.1. Governance principles and "Human-in-the-Loop" (HITL)

The solution lies in hybrid governance that places humans at the center of the AI-assisted decision-making process, the "Human-in-the-Loop" (HITL) [27]. AI should be a supporting tool, not a substitute for human judgment. HR professionals retain the power of

supervision, critical interpretation, and final decision-making, especially for high-impact cases. This approach allows for bias correction and ethical nuance. In Morocco, companies like Intelcia explore AI to "augment" their employees' competencies [28], freeing them for strategic roles [29].

For ethical AI, several strategies are essential: bias mitigation through data diversity and audits [30]; strengthening the explainability (XAI) of AI systems to make their decisions understandable [19]; and implementing clear accountability mechanisms, including ethics committees and recourse channels [10].

Table 2: AI Governance Mechanisms in HRM for Justice, Transparency, and Accountability

Target Ethical Principle	Key Governance Mechanism	Application in HRM / Smart City
Justice / Equity	Algorithmic bias audits, Fairness by design, Diversification of training data.	Regular review of AI recruitment tools to ensure no discrimination. Monitoring of promotion algorithms for equal opportunities in large urban administrations or companies.
Transparency / Explainability (XAI)	Explicability of algorithmic decisions, clear documentation of AI systems.	Provide clear justifications for automated application rejections. Allow HR professionals to understand AI performance evaluation criteria.
Responsibility / Accountability	Clear assignment of responsibilities, AI ethics committees, recourse channels.	Appoint an AI ethics officer in HRM. Establish procedures for employees or citizens to dispute AI-assisted HR decisions.
Human Oversight (HITL)	Continuous human supervision, final validation of decisions, human feedback loops.	HR recruiters validate AI pre-selections before interviews. HR managers interpret AI performance analyses before any disciplinary action.

Source: Authors

5.2. Regulatory and ethical framework in Morocco

An adapted legal and ethical framework is indispensable for framing AI in Morocco. The Moroccan Law 09-08 on personal data protection [26] is a basis, but requires extension for specific AI challenges (bias, opacity, surveillance). Morocco has recognized these issues, with discussions on a draft framework law on AI [31] and the creation of a National AI Governance Agency (Angi), aligned with UNESCO principles [32].

5.3. Evolving role of HR professionals and digital competency development

The success of hybrid governance relies on the development of new competencies [33]. HR professionals must acquire technical competencies in AI, but especially ethical competencies (identifying biases) and strategic competencies (interpreting data, making nuanced decisions). The rapid evolution of AI demands a culture of continuous learning. However, Morocco faces a lack of structured and specialized training in AI ethics and augmented HRM [29]. Bridging this gap and embedding ethical values are fundamental.

6. Conclusion

This research analyzed the integration of AI in HRM within smart cities, a key field for Morocco. We highlighted the substantial benefits of AI for urban optimization and HR transformation (efficiency, personalization, competency management, decision support).

However, major ethical challenges (bias, opacity, discrimination, loss of autonomy) emerge, amplified by the systemic context of smart cities and Moroccan specificities (digital divide, informal sector, surveillance). It is important to note that this study, based on a critical literature review, does not claim an exhaustive empirical exploration of local specificities or real-time coverage of all regulatory developments, thus constituting its main research limitations.

The study concludes on the imperative of hybrid and responsible AI governance, placing humans at the center (HITL). Such governance, combined with transparency (XAI), accountability mechanisms, and a robust regulatory framework, is essential for AI to serve humanity. The development of HR competencies and ethical anchoring are also crucial.

For Morocco, key perspectives include strengthening its regulatory framework by adopting a specific AI legislative framework, investing significantly in competency development through training HR professionals in AI ethics, and promoting HITL implementation to ensure human supervision of AI decisions in organizations. Additionally, demanding clear mechanisms for transparency and accountability for HR and urban algorithms, along with fostering multi-stakeholder collaboration to co-construct a national strategy for responsible AI, will be vital for the country's progress.

This research, based on a critical literature review, opens future avenues for comparative studies of AI regulations (e.g., EU AI Act), empirical analyses of Moroccan HR competencies, longitudinal studies on the impact of AI on well-being at work, and a qualitative exploration of Moroccan citizen-employees' perceptions. By resolutely committing to an ethical and responsible AI governance path, Morocco has the opportunity to position itself as a regional leader in the development of smart cities and augmented HRM that respects human rights.

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