

## Reframing Kazakhstan's HRM System through Industry 5.0 Essentials: A Practical Approach

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### Abstract:

**Introduction:** The ongoing digital transformation of public administration marks a paradigm shift from technology-driven efficiency (Industry 4.0) toward human-centric, sustainable, and resilient innovation (Industry 5.0). In Kazakhstan, the modernization of the civil service and its Human Resource Management (HRM) system is central to this transformation. This research explores how Industry 5.0 principles: human-machine collaboration, ethical artificial intelligence (AI), and citizen-centered design, can be applied to reframe Kazakhstan's HRM system. It addresses systemic challenges such as fragmented coordination, limited innovation capacity, and uneven digital competencies across agencies, and proposes a framework for adaptive, anticipatory, and inclusive HR ecosystems.

**Methods:** A mixed-method research design was employed, combining retrospective policy analysis, SWOT and PEST assessments, and international benchmarking with Estonia, Singapore, and South Korea. Empirical evidence includes a nationwide survey of more than 12,000 civil servants, five focus groups, and expert consultations. The analytical framework integrates qualitative and quantitative approaches to evaluate institutional bottlenecks, identify innovation drivers, and assess readiness for AI adoption within Kazakhstan's civil service.

**Results:** Findings show that AI integration in public HRM remains at an early stage, constrained by low digital literacy, ethical uncertainties, and lack of interoperable data systems. Nevertheless, the potential of AI to enhance merit-based recruitment, workforce analytics, and performance evaluation is widely recognized. The study highlights that the responsible deployment of AI requires robust data governance, algorithmic transparency, and cross-agency interoperability to ensure both efficiency and public trust.

**Discussion:** The paper proposes a practical roadmap for embedding Industry 5.0 principles in Kazakhstan's HRM system, centered on the establishment of an AI-LAB as a platform for algorithmic auditing, data ethics, predictive analytics, and digital competency development. The roadmap incorporates regulatory "sandbox" environments and governance frameworks inspired by Estonia's GovStack model to ensure safe experimentation and accountability. This approach positions Kazakhstan's civil service as a data-informed, human-centric organization in which AI augments decision-making while upholding fairness, inclusivity, and transparency.



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