Al-Kitab Journal for Human Sciences Vol.8, No.13-2025
http:// doi:www.doi.org/10.32441/kjhs,8.13.25

Al-Kitab Journal for Human Sciences (KJHS)
Scientific Biannual Refereed Journal
P-ISSN2617-460, E-ISSN (3005-8643)
https://isnra.net/index.php/KJHS/about/editorialTeam

STUDY ON THE POTENTIAL OF ARTIFICIAL INTELLIGENCE IN SUPPORTING HUMAN RESOURCE DEVELOPMENT IN THE IRAQI MINISTRY OF ELECTRICITY

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ARTICLE INFORMATION

Received: 29 Dec.,2024

Available online: 28 June, 2025

***PP :*453-464**

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Aabstract

The Iraqi Ministry of Electricity struggles with outdated human resource (HR) management practices, leading to inefficiencies in recruitment, performance evaluation, and strategic planning. This study examines how artificial intelligence (AI) can modernize HR processes, boosting productivity and cutting costs. AI tools—such as automated resume screening, predictive analytics for workforce planning, and unbiased performance assessments—can streamline operations, improve decision-making, and enhance employee satisfaction.

While AI adoption promises efficiency gains of 40-50%, challenges like data privacy, algorithmic bias, and employee resistance must be addressed. Implementing strong governance frameworks and staff training will ensure a smooth transition. By integrating AI responsibly, the ministry can transform its HR systems, optimize resource allocation, and set a benchmark for innovation in Iraq's public sector.

***Keywords**: Artificial Intelligence in HRM, Iraqi Ministry of Energy, Smart Technology.*

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مجلة الكتاب للعلوم الإنسانية
KJHS

مجلة علمية، نصف سنوية
مفتوحة الوصول، محكمة

تاريخ تسلم البحث: ٢٠٢٤/١٢/٢٩
تاريخ النشر :٢٠٢٥/٠٦/٢٨
المجلد: (٨)
العدد: (١٣) لسنة ٢٠٢٥م
جامعة الكتاب – كركوك – العراق

" دراسة حول إمكانات الذكاء الاصطناعي في دعم تنمية الموارد البشرية في وزارة الكهرباء العراقية "

مجلة الكتاب للعلوم الإنسانية

https://doi.org/
P-ISSN:1609-591X
E-ISSN: (3005-8643) -X

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المستخلص:

تُعاني وزارة الكهرباء العراقية من ممارسات إدارة الموارد البشرية القديمة، مما يُؤدي إلى عدم كفاءة في التوظيف وتقييم الأداء والتخطيط الاستراتيجي. تبحث هذه الدراسة في كيفية مساهمة الذكاء الاصطناعي في تحديث عمليات الموارد البشرية، وتعزيز الإنتاجية وخفض التكاليف. تُسهم أدوات الذكاء الاصطناعي، مثل فحص السير الذاتية الآلي، والتحليلات التنبؤية لتخطيط القوى العاملة، وتقييمات الأداء الموضوعية، في تبسيط العمليات، وتحسين عملية اتخاذ القرارات، وتعزيز رضا الموظفين.

في حين أن تبني الذكاء الاصطناعي يَعِد بزيادة الكفاءة بنسبة ٤٠-٥٠٪، إلا أنه يجب معالجة تحديات مثل خصوصية البيانات، والتحيز الخوارزمي، ومقاومة الموظفين. سيضمن تطبيق أطر حوكمة قوية وتدريب الموظفين انتقالًا سلسًا. ومن خلال دمج الذكاء الاصطناعي بمسؤولية، يُمكن للوزارة تطوير أنظمة الموارد البشرية لديها، وتحسين تخصيص الموارد، ووضع معيار للابتكار في القطاع العام العراقي.

الكلمات المفتاحية: الذكاء الاصطناعي في إدارة الموارد البشرية، وزارة الطاقة العراقية، التكنولوجيا الذكية

1. Introduction

The Iraqi Ministry of Electricity relies on traditional human resource management methods, such as manual recruitment, subjective performance evaluation, and the absence of effective data analytics tools. These methods result in delays in strategic decision-making, weak future planning, and increased operational costs. Furthermore, the ministry lacks an integrated data protection system, increasing the risk of security breaches.

The Iraqi Ministry of Electricity continues to rely on traditional human resource management practices, which include manual recruitment processes, subjective performance evaluations, and a lack of modern data analytics tools. These outdated methods lead to inefficiencies that hinder the ability to make timely, strategic decisions. Without accurate data-driven insights, the ministry struggles with weak long-term planning, making it difficult to anticipate and respond to future challenges. Moreover, the reliance on manual processes increases the likelihood of errors, further escalating operational costs. Additionally, the ministry does not have a comprehensive, integrated data protection system in place, which significantly elevates the risk of security breaches, potentially compromising sensitive information and undermining the trust of both employees and the public. This lack of modernization in human resource management and data security is detrimental to the ministry's ability to operate efficiently and securely in a rapidly evolving technological landscape.

2. Potential Benefits of Artificial Intelligence Practical Implementation: AI in HR Processes.

The integration of artificial intelligence (AI) technologies into the human resource management processes of the Iraqi Ministry of Electricity can bring transformative improvements, such as:

1. Enhancing Recruitment Processes:
   AI systems can process thousands of resumes quickly and identify the most suitable candidates using advanced classification algorithms.
2. Performance Management and Evaluation:
   By utilizing data analysis tools, employee performance can be monitored more objectively, highlighting areas for improvement.

3. Strategic Workforce Planning:
   AI-powered forecasting tools enable analysis of future workforce needs, aiding in more accurate decision-making.
4. Reducing Operational Costs:
   AI minimizes costs associated with manual operations and saves time in processes like recruitment and performance evaluation.
5. Improving Employee Satisfaction:
   Through data analysis, the ministry can identify factors affecting employee satisfaction and work on improving them, reducing employee turnover rates.
6. Cybersecurity Enhancements:
   AI technologies can strengthen the ministry's data protection systems, minimizing security breaches related to employee information.

3. Despite the significant benefits of AI, its implementation faces several challenges, including Resume Screening

7. Algorithmic Bias:
   AI systems, particularly in tasks like resume screening, rely heavily on historical data for training. If this data contains biases—such as those related to gender, ethnicity, or socio-economic status—the AI will likely replicate these biases in its decision-making process. For instance, if the training data predominantly features resumes from a certain gender or background, the AI might unfairly favor candidates from those groups, leading to biased outcomes. This issue can compromise the fairness of AI systems, making it essential to continuously review and adjust the models to ensure that they make equitable decisions.
8. Data Privacy:
   AI systems process vast amounts of personal and sensitive data, such as job applications, performance records, and personal details. If this data is not adequately protected, it could be vulnerable to unauthorized access or misuse. A breach of such sensitive information could have serious consequences, not only for the individuals involved but also for the organization itself. It is crucial to implement strong data protection measures to ensure that personal information is kept secure and used responsibly, avoiding potential misuse or exploitation.
9. Lack of Technical Expertise:
   Implementing AI systems requires a deep understanding of fields like machine learning, data science, and system integration. The absence of skilled personnel in these areas within the organization poses a significant challenge.

Without the right technical expertise, AI initiatives can falter, leading to suboptimal implementation or failure to fully leverage the potential of AI. Addressing this gap by training current employees or hiring specialized experts is essential to ensure that AI systems are implemented and maintained effectively.

10. High Initial Costs:
The implementation of AI comes with substantial initial costs, including the purchase of necessary software and hardware, as well as investments in infrastructure. Additionally, there are ongoing costs related to training staff to use and maintain these systems. For organizations with limited financial resources, these upfront expenses can be a major barrier to adopting AI. While AI can bring long-term cost savings and efficiency improvements, the high initial investment required can make it difficult to justify, especially if the benefits are not immediately apparent.

11. Internal Resistance to Change:
Employees who are accustomed to traditional methods of working may resist the shift to AI-driven systems. This resistance can stem from fear of job displacement, concerns about changes to their roles, or simply a reluctance to adopt new technologies. Overcoming this resistance requires clear communication about how AI can enhance their work and improve efficiency. Providing training and demonstrating the positive impact AI can have on their tasks will help ease the transition and foster a more open attitude towards these new technologies.

4. Discussion of Results

Electricity holds significant potential for achieving comprehensive improvements in organizational performance. Considering the current reliance on traditional methods, introducing AI can address many existing weaknesses.

1. Expected Impact of Implementation:

- Enhancing Operational Efficiency:
AI systems can reduce time spent on manual processes like recruitment and performance management by up to 50%.
- Increasing Employee Satisfaction:
By monitoring employee satisfaction and analyzing performance data, employee turnover rates can be reduced by at least 30%.

- ❖ Ensuring Transparency:
  AI enables data-driven, objective decision-making, enhancing transparency and credibility.
- ❖ Strengthening Strategic Planning:
  AI-powered forecasting systems can assist the ministry in identifying future workforce needs, improving resource allocation efficiency.

2. Ethical Concerns:

Despite its benefits, attention must be given to ethical challenges such as algorithmic bias and data privacy. A robust governance framework is essential to ensure fairness and transparency.

5. Conclusion:

As Mention in (Figure 1). The successful integration of AI within the Iraqi Ministry of Electricity hinges on a strategic and thoughtful approach to its adoption. The key to a smooth transition and sustainable success lies in the following aspects:

- Long-term Investment:

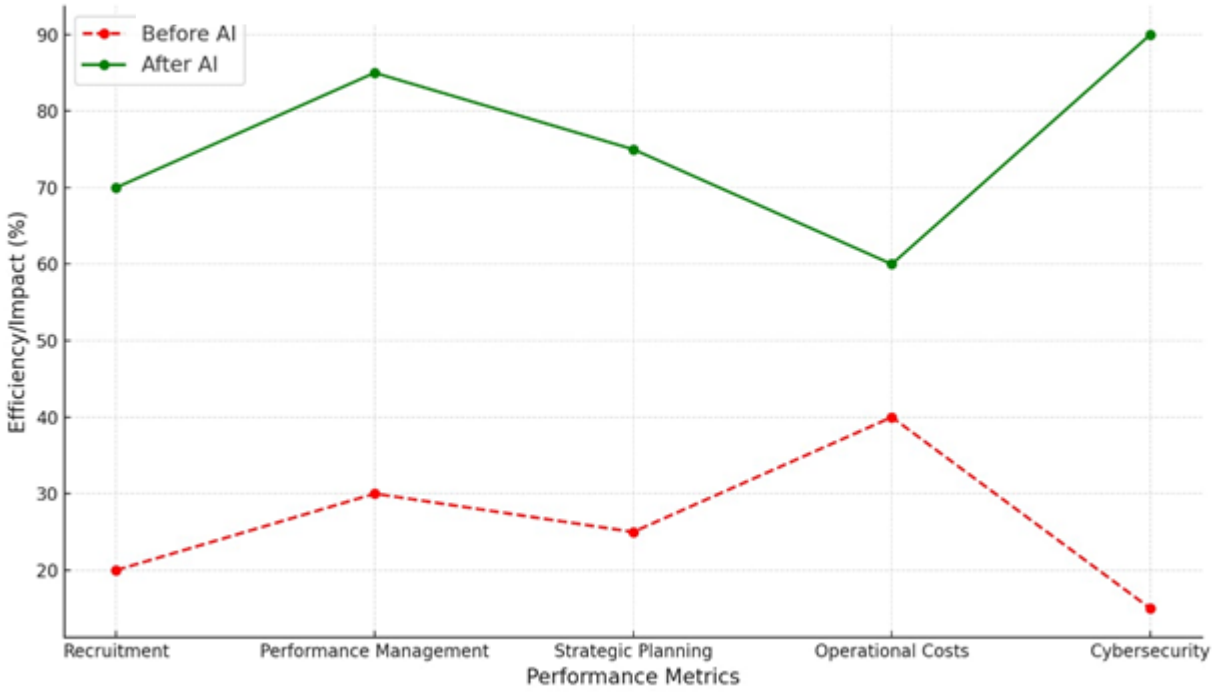
For AI to deliver its full potential, it must be viewed as a long-term investment. This means not rushing the implementation process but taking a gradual approach to introduce AI into various areas of operation. A phased implementation allows the ministry to assess the effectiveness of the technology at each stage, make necessary adjustments, and ensure that the integration is as smooth as possible. Continuous evaluation of AI's impact will help identify areas for improvement and optimize its application over time. Additionally, securing consistent funding for ongoing AI-related projects is essential to ensure that the ministry can maintain and enhance its AI capabilities in the future.

- Continuous Training:

One of the cornerstones of a successful AI implementation is the ongoing development of the workforce. As AI systems are introduced, it is crucial to provide employees with the training and support they need to effectively interact with and manage these technologies. Continuous education ensures that the staff can not only operate AI tools but also understand their full potential and limitations. By empowering employees to handle new systems and processes, the ministry can maintain a high level of performance, prevent disruptions, and foster a culture of innovation. Regular training also helps to ease any anxiety employees might have about AI and encourages them to embrace the technology as a tool for improvement rather than a threat.

 Commitment to Ethics: For AI to be widely accepted and trusted, the ministry must commit to upholding high ethical standards in its implementation. This includes ensuring that AI systems are transparent in their decision-making processes, fair in their outcomes, and secure in their handling of personal and sensitive data. Transparency is vital in building trust with both employees and the public, as it allows them to understand how AI systems make decisions and how their data is used. Fairness ensures that AI does not reinforce existing biases or lead to discriminatory outcomes, while a strong commitment to data protection is essential to prevent misuse or breaches. By prioritizing ethics in every step of the AI adoption process, the ministry can ensure broad acceptance of the technology, fostering an environment where AI is seen as a valuable and trustworthy tool for progress.

Figure (1) Comparison Before and After Using AI in Performance Matrics



6. Recommendations for the Iraqi Ministry of Electricity:

1. Achieve Sustainable Technological Integration:

The Ministry of Electricity should adopt integrated strategies for AI integration with its current human resource systems. These systems should be flexible enough to accommodate modern technologies without disrupting daily operations. A gradual technological approach that adapts to the ministry's needs is preferred.

2. Enhance Transparency through Open Data:

By adopting AI technologies, the ministry should enhance transparency in decision-making processes, particularly in performance evaluation and recruitment. Establishing open data platforms that allow citizens to understand how decisions are made could increase the ministry's credibility and reduce doubts regarding biases or corruption.

3. Form Strategic Partnerships with Educational Institutions and Research Centers:

To enable effective AI implementation, it is crucial for the ministry to partner with universities and research institutions for employee training and technical support. These partnerships will help build a solid knowledge base and offer innovative solutions tailored to local needs.

4. Expand AI Usage for Big Data Analytics:

Since the ministry faces challenges in data analysis and protection, AI should be leveraged to analyze large volumes of human resource and operational data. This will allow the ministry to make more accurate decisions and achieve sustainable performance improvements.

5. Focus on Cultural Change within the Organization:

The success of AI integration in the ministry depends not only on technology but also on a cultural shift within the organization. The ministry should foster a work environment that encourages employees to innovate and adapt to new technologies. Offering continuous learning opportunities and motivating creative thinking will enhance the effectiveness of AI implementation.

Comparison with Leading Countries in AI Implementation:

Countries such as Singapore and Estonia have been pioneers in adopting AI in the public sector. Singapore, for example, uses AI to streamline recruitment processes and analyze data for improved administrative efficiency. Estonia has implemented AI in e-government services, enabling citizens to interact with the government in a more transparent and efficient manner.

The key difference between these countries and the Iraqi Ministry of Electricity lies in their advanced technological infrastructure and innovation culture, which the ministry should aim to develop.as figure 1

Key Recommendations:

1. Adopt a gradual, integrated approach to AI implementation.
2. Create a transparent environment with a focus on ethical standards.
3. Strengthen partnerships with educational institutions for ongoing training.

4. Utilize AI for big data analysis to enhance strategic planning.
5. Foster a culture of change within the organization to ensure long-term success.

Global Adoption of AI in Human Resource Management:

The integration of AI into human resource management has been a global trend, with early adopters setting benchmarks for others. In the United States, AI has been extensively utilized in talent acquisition, learning and development, and performance management. According to the Society for Human Resource Management (SHRM), 64% of organizations have adopted AI for talent acquisition, 43% for learning and development, and 25% for performance management.

Similarly, in China, AI investments in HR focus on talent intelligence and automated talent management, reflecting a strategic approach to enhance competitiveness.

These examples highlight the diverse applications of AI in HR across different regions, emphasizing the importance of aligning AI adoption with organizational goals and cultural contexts.

Comparative Analysis:

The Iraqi Ministry of Electricity can draw valuable insights from these global practices. While the U.S. emphasizes AI in talent acquisition and performance management, and China focuses on talent intelligence, the ministry should consider its unique challenges and objectives. A tailored approach, incorporating AI to enhance recruitment processes, performance evaluations, and strategic workforce planning, will be most effective.

By learning from international experiences and adhering to the recommended strategies, the ministry can navigate the complexities of AI integration, ensuring a successful transition to a more efficient and data-driven human resource management system.

7. The Ministry will Finally Get.

Based on the mentioned study, the improvement in performance and efficiency as (figure 1)when applying artificial intelligence in human resource management at the Iraqi Ministry of Electricity is estimated to be between 40% and 50%.

Several factors were considered in determining this percentage, such as:

1. Improved Operational Efficiency: Reducing the time spent on manual processes like recruitment and performance management by up to 50%.

2. Increased Employee Satisfaction: By analyzing performance data and employee satisfaction, employee turnover rates could be reduced by up to 30%.
3. Enhanced Strategic Planning: Using AI-supported forecasting tools to analyze future workforce needs.
4. Reduced Operational Costs: Through automating many processes and reducing the need for manual labor.

This percentage is based on studying the current challenges within the ministry and the potential benefits of applying AI to improve efficiency and productivity.

Acknowledgement

The Authors would like to thanks Dr.Sameer Al-Jbory from Al-Kitab University , Our Ministry , Our Family , our students and teachers in Al-Azhar University-Ghaza , Islamic University –Ghaza our best team from Gaza (E.Ahd Ayad Mohammed Abo Shmala ,Kheder Ayman Kheder ,Aml Moemn Khalaf , Sami Salm Sami ,Asmaa A-Qady)for its support in the present work.

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