

Challenges of Using Artificial Intelligence in Human Capital Management at the Communications, Space, and Technology Commission in the Kingdom of Saudi Arabia

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Abstract: Due to evolving business environments and heightened competition, human capital management (HCM) is encountering new challenges in adopting advanced digital technologies like artificial intelligence (AI), necessitating a delicate balance between addressing these challenges and promoting organizational growth and development. The objective of this research is to pinpoint the challenges encountered when utilizing AI technologies in HCM within the Saudi Communications, Space, and Technology Commission (CST). This study utilizes a qualitative method that includes a literature review on the subject. The results showed various challenges hindering the implementation of AI in HCM on a global scale, which can be categorized into methodological, societal, and technological challenges. In the Saudi context, and within the CST, five main challenges of using AI in HCM were identified, including data privacy, data security, automation, social acceptance, and lack of professional competencies. According to the results of this research, it can be inferred that utilizing AI technology in HCM, if done properly, has the potential to unlock featured opportunities at the CST. It is recommended to conduct further research on developing a feasible framework for incorporating AI into HCM.

Keywords: Artificial intelligence, human capital management, challenges, Saudi Arabia, Communications, Space, and Technology Commission.

التحديات التي تواجه استخدام الذكاء الاصطناعي في إدارة رأس المال البشري في هيئة الاتصالات والفضاء والتكنولوجيا في المملكة العربية السعودية

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المستخلص: بسبب بيئات الأعمال المتطورة والمنافسة المتزايدة، تواجه إدارة رأس المال البشري تحديات جديدة في تبني التقنيات الرقمية المتقدمة مثل الذكاء الاصطناعي، مما يتطلب توازناً دقيقاً بين معالجة هذه التحديات وتعزيز النمو والتطوير التنظيمي. يهدف هذا البحث إلى تحديد التحديات التي تواجهها هيئة الاتصالات والفضاء والتكنولوجيا السعودية عند استخدام تقنيات الذكاء الاصطناعي في إدارة رأس المال البشري داخلياً. تستخدم هذه الدراسة طريقة نوعية تتضمن مراجعة الأدبيات حول هذا الموضوع. أظهرت النتائج تحديات مختلفة تعيق تنفيذ الذكاء الاصطناعي في إدارة رأس المال البشري على نطاق عالمي، والتي يمكن تصنيفها إلى تحديات منهجية ومجتمعية وتكنولوجية. في السياق السعودي، وداخل هيئة الاتصالات والفضاء والتكنولوجيا، تم تحديد خمسة تحديات رئيسية لاستخدام الذكاء الاصطناعي في إدارة رأس المال البشري، بما في ذلك خصوصية البيانات، وأمن البيانات، والأتمتة، والقبول الاجتماعي، ونقص الكفاءات المهنية. وفقاً لنتائج هذا البحث، يمكن استنتاج أن استخدام تقنية الذكاء الاصطناعي في إدارة رأس المال البشري، إذا تم بشكل صحيح، لديه القدرة على فتح فرص مميزة في هيئة الاتصالات والفضاء والتكنولوجيا. ومن المستحسن إجراء المزيد من الأبحاث حول تطوير إطار عمل قابل للتطبيق لدمج الذكاء الاصطناعي في إدارة رأس المال البشري.

الكلمات المفتاحية: الذكاء الاصطناعي، إدارة رأس المال البشري، التحديات، المملكة العربية السعودية، هيئة الاتصالات والفضاء والتكنولوجيا.

Introduction

The Fourth Industrial Revolution (4IR) has brought about cutting-edge technology, which is seen in the form of artificial intelligence (AI). In this modern era, the automation system continues to significantly impact societies and economies worldwide. AI is a cross-disciplinary field that brings together information, communication, technology, math, psychology, and philosophy, encompassing the capacity of a computer or robot to carry out tasks typically done by intelligent beings (Chilunjika et al., 2022). AI was first introduced by McCarthy in 1956 and later expanded by Turing as the incorporation of intelligent cognitive abilities into machines (Górriz et al., 2020). Even though AI is still in the process of ongoing development, numerous companies and organizations have recognized the potential for growth and utility of AI. AI technology can assist businesses of all scales in reaching their objectives (Qiu & Zhao, 2018).

AI enables companies to improve the use of their existing workforce, giving them a competitive edge (Baker, 2010). AI has become prominent in the past few decades, with advancements in technology allowing for the development of AI systems that mimic human intelligence and are equipped to make decisions (Galbusera et al., 2019). AI is recognized for its ability to offer solutions to various obstacles that organizations encounter in today's environment (Kaur & Gandolfi, 2023). Furthermore, computers play a prominent role in governance and human capital processes, as AI is aiming to enhance computers' ability to think and act similarly to humans (Alsaraireh et al., 2023).

Human capital management (HCM) originates from the rise of industrial welfare work starting in the 1890s (Fitzgerald, 2024). The transitioning from a directive management system to a technical management system has subsequently resulted in increased professionalism in this position. Organizations can enhance their competitive advantage by acquiring, expanding, and integrating human, organizational, and physical resources, which is possible through a focus on human capital practices. In this context, AI can be integrated with HCM to create new solutions for employee issues related to human capital (Sanyaolu & Atsaboghena, 2022). It is confirmed that the widespread use of AI has significantly enhanced both production efficiency and management efficiency. However, the introduction of AI technology presents both possibilities and obstacles for HCM and the growth of businesses (Qiu & Zhao, 2018).

In Saudi Arabia, under Vision 2030, the significance of improving human capital for sustainable and inclusive growth was highlighted. The Human Capacity Development Program and the King Salman Human Resources Development Program were launched with the goal of creating strong human capital in the government sector, according to this viewpoint. These programs consist of offering training courses to enhance skills and nurture talents, as well as enhancing employee productivity and efficiency by applying performance management standards and providing ongoing training. This also involves creating digital platforms that help achieve these objectives (KSA, 2016). Moreover, The Saudi Public Investment Fund, which is ranked among the top ten sovereign wealth funds globally, established the Saudi Company for Artificial Intelligence (SCAI) to offer creative solutions in sectors like health, education, energy, and administration, regardless of being government-owned or privately-operated. Furthermore, the establishment of the Saudi Data and Artificial Intelligence Authority (SDAIA) aims to advance AI innovation nationally through research and development, implementing the AI strategy, and enhancing education and awareness in collaboration with academia, public, and private sectors (SDAIA, 2021).

Although digital technology, such as AI, is becoming more important for companies to manage human capital, and despite the Saudi government's efforts to keep up with rapid advancements in technology to achieve Vision 2030 goals, there is a lack of local studies on using AI in managing human capital for Saudi companies, specifically the CST. Therefore, this research aims to investigate the challenges of implementing AI in HCM in CST of Saudi Arabia.

Problem Statement

AI applications in the network and communication sectors could decrease costs related to network infrastructure implementation and maintenance, enhance efficiency, elevate customer satisfaction, and facilitate the creation of innovative services (Balmer et al., 2020). HCM is crucial in enhancing the services of communication institutions and delivering top-notch experiences to customers. In this scenario, AI can be applied in HCM using digital recruitment tools to find potential candidates or remove certain positions or substitute for human resources (Idris & Al Harthi, 2023).

Digital transformation is seen as crucial for the success of communication companies in today's economic and geopolitical environment. In their efforts to enhance economic and operational efficiency, companies are embracing digital solutions, particularly AI technologies, which require the implementation of new strategies and practices to effectively incorporate digital technologies across all levels of the company (Chen et al., 2021; Golubev et al., 2021).

In Saudi Arabia, CST has placed significant emphasis on AI applications, which is evident in products like Mudrek, Too Bus, and Zaaer, all developed locally. CST partnered with NTDP, Huawei, and the Artificial Intelligence Governance Association to launch the 2024 Technology Innovation Challenge, aiming to foster growth in communication, space, and technology sectors through innovative solutions, raising awareness of emerging technologies and AI, and boosting the digital economy by supporting local companies specializing in new technologies (CST, 2024).

Given the information provided, the study aims to uncover the challenges that could arise when implementing AI in HCM within a significant organization (CST) in the Kingdom. Despite numerous research attempts focusing on enhancing administrative systems for HCM on a global scale, the researcher notes a lack of studies delving into the challenges specifically related to AI implementation in managing human resources within communications companies, both regionally and internationally. There is a pressing necessity to further develop this subject to align with the rapid advancements in technology and administration seen across various industries, especially the communications sector.

Accordingly, this study aims to answer the following main question: What are the challenges presented by the use of AI in HCM in the Saudi Communications and Space Technology Commission? This question has the following sub-questions:

- 1- Are there challenges facing the use of artificial intelligence in human capital management at the Communications and Space Authority in Saudi Arabia?
- 2- What are the effects of artificial intelligence applications in the communications and space sector in Saudi Arabia?
- 3- To what extent can the use of artificial intelligence contribute to the development of the communications and space sector in Saudi Arabia?

Study Purpose

This study aims to investigate the challenges that may face the use of artificial intelligence in HCM at the Saudi Communications, Space and Technology Commission in light of contemporary digital challenges.

Study Importance

This study, which draws on AI theories and HCM, aims to address the challenges of implementing AI in HCM in businesses, specifically at the Saudi Communications and Space Technology Commission. Recognizing these challenges enables leaders to improve HCM, aligning with current digital advancements that are quickly adapting to improve operational efficiency in different industries.

Definition of terms

- **Artificial Intelligence**

Artificial Intelligence is a field that seeks to imitate various components of human intelligence, such as learning, reasoning, perception, critical thinking, etc., through computer programs driven by logic (Sanyaolu & Atsaboghena, 2022). Russell and Norvig (2016) explain AI as an "intelligent agent" because machines can exhibit human-like intelligence through the use of machine learning models trained on large datasets. AI can be defined as a system's capacity to properly comprehend input, acquire knowledge from it, and utilize it to accomplish set goals and duties (Kaplan & Haenlein, 2019).

- **Human Capital Management**

Human capital refers to the knowledge, skills, energy, commitment, and innovation ability of individuals within an organization that are relevant to their job (Nel & De Beer, 2014). HCM entails a wide range of strategies for hiring, overseeing, fostering, and enhancing an organization's workforce. According to this definition, it is illustrated that management must take on employees who are seen as resources that can be developed and controlled to generate the highest possible profits for the organization's success (Kalitanyi & Goldman, 2021).

Literature Review

- **Artificial Intelligence**

Artificial intelligence is a sector of computer science that centers on developing systems capable of replicating human mental processes like learning, reasoning, and decision-making (Chowdhary, 2020). This area aims to create technologies that enable machines

to interact smartly with their surroundings, allowing them to carry out tasks that necessitate cognitive and logical abilities. AI enhances efficiency and productivity across different sectors through quicker and more precise data processing and analysis, thus aiding in making informed decisions and reaching set objectives. AI is utilized as a strategic tool for aiding innovation and development in various industries like healthcare, technology, and finance (Mhlanga, 2021).

AI plays a crucial role in driving digital transformation by boosting organizations' competitiveness and efficiency. It doesn't just enhance operations, it also allows businesses to analyze consumer behavior trends and gain strategic insights to better cater their marketing towards customizing services to meet market demands more effectively (Aldoseri et al., 2024). Additionally, AI helps enhance loyalty and trust in the brand by offering fast and efficient solutions to customer problems, thus improving the overall customer experience (Ameen et al., 2021). Its use also helps to improve efficiency and cut expenses, enabling organizations to focus on innovation and sustainable development (Ismanov et al., 2024). In summary, AI plays a crucial role in advancing society, generating beneficial effects on both the economy and society.

However, AI is confronted with several obstacles, including security and privacy issues, as the vast amount of data increases worries about potential breaches that may result in confidential information being exposed, ultimately diminishing users' confidence. The quality of data is crucial for AI to be effective; inaccurate or biased data can result in incorrect outcomes, creating issues in critical sectors like healthcare and finance. The potential effect of AI on the workforce is worrisome, as it may lead to the displacement of human employees in certain roles, necessitating the implementation of training and support programs for impacted workers. The ethical implications pertain to how intelligent systems decide and if they embody human values, according to Hagendorff and Wezel (2020). Developers and policymakers must collaborate in order to create strategies that promote the responsible and sustainable use of AI for the benefit of society.

- Human Capital

Human capital is the total of knowledge, skills, and experiences that individuals have and utilize to enhance productivity. This idea demonstrates the monetary worth that people can gain from their schooling, learning, and hands-on experiences (Goldin, 2024). Human capital comprises elements like education, technical and soft skills, intellectual abilities, and innovation, all influencing productivity and efficiency across different sectors (Brush et al., 2017). Human capital plays a crucial role in economic and social progress by empowering individuals to adjust to labor market changes and support institutional development effectively (Weinstein, 2022).

Human capital is seen as a critical asset in organizations and nations, playing a crucial role in promoting economic growth and sustainable development (Pasban & Nojdedeh, 2016). Talented and imaginative individuals are crucial for the organization's success and ability to compete, as they can leverage their expertise to develop inventive solutions and efficient processes that enhance operational efficiency (Pereira et al., 2020). Having highly skilled human resources is crucial for implementing new technology and accomplishing digital transformation, as advanced tools need knowledgeable individuals who can utilize them effectively to meet the organization's objectives. Furthermore, the investment in human capital is crucial for social development as it improves individuals' skills and helps generate valuable employment opportunities, ultimately increasing social and economic well-being (Ustaev et al., 2019).

Human capital is made up of various vital elements that help improve the skills of individuals and lead to success within organizations. These skills are essential for individuals to address changing business needs, while knowledge establishes a strategic base for organizational success (Kuzminov et al., 2019). It also involves skills that demonstrate the effective application of knowledge, as well as natural talents that empower individuals to solve problems and create new solutions (Semenova et al., 2021). Furthermore, education plays a vital role in transmitting knowledge and values, and learning improves the capacity of organizations to efficiently gather and share information. Expertise and know-how also encompass implicit knowledge garnered from hands-on experiences, and innovation that allows for unconventional thinking (Pochtovyuk et al., 2020). In summary, attracting human talent involves seeking the right skills and building capital by improving people's abilities, engaging them with creative approaches, and keeping them through ongoing training and growth.

- Artificial Intelligence in Human Capital Management

Human capital management has experienced significant changes due to technological advancements (Bondarouk et al., 2017; Connelly et al., 2021). HCM has been shifted to a more data-driven approach due to the utilization of algorithmic technologies (Cheng & Hackett, 2021). As a result of greater globalization and advancements in technology, the economic landscape has experienced major transformations. Human capital has had to rethink how tasks are performed with AI and the associated technologies of mobile, robotics,

and IoT as a critical aspect. The implementation of AI technologies in managing human resources has helped organizations to achieve and sustain a competitive edge in the market by attracting the right skilled professionals. AI technologies have introduced advanced features to all parts of the Human Resources function, causing a change in the way talent is supervised in a company (Kaur & Gandolfi, 2023).

With the adoption of algorithmic technologies, HCM is shifting towards becoming increasingly data-oriented (Cheng & Hackett, 2021). AI technologies offer many opportunities to improve functions related to Human capital (Kaur et al., 2021). Therefore, the connection between AI and human resources is closely intertwined, leading to improved efficiency and productivity across different sectors (Alam & Dewi, 2024). AI goes beyond just automating tasks, instead, serving as a tool that enhances people's abilities and career paths. By utilizing AI technologies, workers can enhance their skill in analyzing and addressing intricate issues, enabling them to innovate and offer fresh solutions. AI promotes the creation of a culture of ongoing education, requiring employees to stay current with fast-paced advancements and adjust to new technologies (Bashynska et al., 2023). This change boosts their abilities and leads to better teamwork, increased collaboration among teams, and ultimately enhances the organization's overall performance. Utilizing AI allows individuals to adapt their skills to align with evolving market demands, increasing their worth as workers and benefitting business sustainability (Arslan et al., 2022).

The evolution of the Human capital function has helped to enhance its role as a key strategic partner in achieving organizational objectives. Therefore, Human capital has progressed to be increasingly digital, strategic, and innovative in its function. However, like all changes, the process has been lengthy and faced obstacles (Kaur & Gandolfi, 2023).

- Review of previous studies

The existing recent studies on the challenges of AI use in HCM in companies and organizations were reviewed and summarized in Table 1. Previous studies have conducted detailed analyses of the challenges that face the implementation of AI in HCM activities in various countries including Arabic ones such as KSA (Nabi & Al-Otaibi, 2024), Egypt (Hussain, 2023; Sadek, 2022), Jordan (Moh'd-Khier Almassad, 2022) and Morocco (Rachid & Houda, 2024). The literature review considers specific sectors, such as the use of AI in HCM of telecommunication (Farooq et al., 2025; Moh'd-Khier Almassad, 2022), industrial manufacturing (Rismayadi, 2024), civil society organizations (Sadek, 2022) and education sector (Rachid & Houda, 2024). Some previous studies adopted the literature review approach (Budhwar et al., 2022; Chilunjika et al., 2022; Kaur & Gandolfi, 2023; Sanyaolu & Atsaboghena, 2022; Tambe et al., 2019), others used the interview for data collection (Rachid & Houda, 2024; Rismayadi, 2024). In addition, surveys were adopted by some studies (Farooq et al., 2025; Hussain, 2023; Moh'd-Khier Almassad, 2022; Nabi & Al-Otaibi, 2024; Sadek, 2022). It is worth noting that there are three studies published in Arabic (Hussain, 2023; Nabi & Al-Otaibi, 2024; Sadek, 2022).

The authors mentioned the benefits of using AI in HCM in different social, educational and economic activities. Furthermore, the challenges facing the successful implementation of AI in HCP functions were highlighted. However, only two studies focused on the challenges facing the use of AI in HCM in Saudi Arabia (Hussain, 2023; Nabi & Al-Otaibi, 2024). Therefore, the current study focuses on identifying the challenges militating against the implementation of AI in HCM at the Saudi CST. Studying a country such as KSA, in the context of economic development and digital transformation, will help analyze specific HCM activities and provide specific implications applicable to CST and the technology sector in general.

Table 1. Summary of previous studies.

Author	Country/Language	Topic	Aim/Method	Results
(Farooq et al., 2025)	Pakistan/English	AI in Customer Service, HR, and Administration	Investigating the factors influencing AI adoption in HRM (Pakistani telecom sector)/ A survey-based approach	There is a mediating role of trust that influences the adoption of AI in HRM.
(Rismayadi, 2024)	Indonesia/English	Opportunities and Challenges for Using Artificial Intelligence Technology in Human Resource Management	Identifying the challenges and opportunities of AI use in the context of HRM in the industrial manufacturing sector/ A	The research identified several challenges of AI adoption in HRM: The impact on lower-end jobs, increased equipment maintenance costs, and the

Author	Country/Language	Topic	Aim/Method	Results
			qualitative approach (interviews) with descriptive methods	need for highly qualified professionals.
(Rachid & Houda, 2024)	Morocco/English	Redefining Human Capital in the Age of Artificial Intelligence: Challenges and Opportunities	Exploring the nuanced implications of AI on HCM and development in sectors such as finance, education, technology, and public administration /A qualitative methodology (semi-structured interviews)	Challenges related to skill adaptation, ethical considerations, and cultural acceptance.
(Nabi & Al-Otaibi, 2024)	Saudi Arabia/Arabic	The Importance of AI in HRM and Social Development. Applied Study: Ministry of Human Resources and Social Development	Evaluating the use of AI technologies in HRM and social development of employees at the Ministry of Human Resources and Social Development in the Kingdom of Saudi Arabia and to identify obstacles to the use of this technology/A descriptive analytical approach using the questionnaire as a tool for collecting data.	Obstacles to using AI technologies in HRM: The lack of qualified competencies to use these technologies, the lack of financial allocations for training/ AI systems and the resistance to change to introduce these applications into the ministry's work by employees.
(Hussain, 2023)	Egypt & KSA/Arabic	Artificial Intelligence Techniques and Investment in Human Capital "A Comparative Study Between the Arab Republic of Egypt and the Kingdom of Saudi Arabia"	Exploring the aspects of investment in human capital within AI technologies in both the Arab Republic of Egypt and the Kingdom of Saudi Arabia/ A comparative approach applying questionnaires and content analysis.	Challenges facing the use of AI: Insufficient knowledge of AI applications, technological illiteracy, lack of training, limited technological competencies, lack of AI technologies, lack of social acceptance, lack of diversity in the field of AI research and industry
(Kaur & Gandolfi, 2023)	USA/English	Artificial Intelligence in Human Resource Management - Challenges and Future Research Recommendations	Examining the evolution of the HR function as a strategic partner by deploying technological developments related to AI./ A qualitative approach (Literature Review)	Challenges of AI in HRM: Ethical issues about job loss, digital literacy and learning agility, intricacy of HR phenomena, limited data sets, accountability linked to being fair and constraints regarding ethics and legality, possible negative employee reactions to decision taken by AI, cultural and organizational

Author	Country/Language	Topic	Aim/Method	Results
				barriers, employees skills, data security and privacy, and ethics about hiring procedures.
(Moh'd-Khier Almassad, 2022)	Jordan/English	The Impact of Artificial Intelligence on Employment in Supply Chain Departments for the Telecom Companies in Jordan	Exploring the effect of AI (efficiency, training and development, application, adaptability, and transitioning) on employment (job creation, selection and hiring, appointment, and competitiveness) in the automated supply chain department of the telecommunication companies in Jordan/ A descriptive approach using web-based surveys	Understanding the change in productivity and process efficiency and the potential affects in the labor market affected by AI allows policymakers in the telecommunication companies to design appropriate education and training programs that helps individuals make good choices about what careers to pursue.
(Sanyaolu & Atsaboghena, 2022)	United Kingdom/English	Role of Artificial Intelligence in Human Resource Management: Overview of its benefits and challenges	Assessing the benefits and challenges of AI in the HRM field/Literature review approach	Challenge of integrating AI into HR functions: The mindset of the employees, lack of technological skills of employees, data availability and database compatibility, ethical considerations,
(Chilunjika et al., 2022)	South Africa/English	Artificial intelligence and public sector human resource management in South Africa: Opportunities, challenges and prospects	Exploring the opportunities, challenges, and future prospects of integrating AI and Public Sector HRM in South Africa's public sector/ Secondary data, which was purposefully and systematically chosen for its usefulness to this study.	Challenges militating against the implementation of AI in the public sector HRM functions are: Lagging technological uptake and retrenchments.
(Budhwar et al., 2022)	Australia/English	Artificial intelligence – challenges and opportunities for international HRM: a review and research agenda	Exploring the adoption of AI applications in HRM functions in a global context/ Employing a systematic literature review approach	Challenges of AI adoption in HRM include: lack of transparency of decisions issues from AI, ethics, accountability, trust, fairness and legal implications, and employee job insecurity due to technological disruptions,
(Sadek, 2022)	Egypt/Arabic	Contributions of artificial intelligence applications to	Introducing artificial intelligence applications	Challenges that limit the applications of AI HR

Author	Country/Language	Topic	Aim/Method	Results
		human resource development in civil society organizations from the perspective of community organization method	to develop human resources in civil society organizations/Social survey using the descriptive approach in its forms and methods	development in civil society organizations are: Unstable electronic infrastructure and high physical requirements, limited competencies of individuals, social acceptance, increase automation, and lack of diversity in AI research and industry.
(Tambe et al., 2019)	USA & France/English	Artificial intelligence in human resources management: Challenges and a path forward	Considering the gap between the promise and reality of AI in HRM/Literature Review approach	Four challenges in using data science techniques in HR practices were identified: 1) complexity of HR phenomena, 2) constraints imposed by small data sets, 3) ethical questions associated with fairness and legal constraints, and 4) employee reaction to management via data-based algorithms

Methodology

This research uses a qualitative method with a literature review to investigate the difficulties of implementing AI in HCM at the Saudi CST. The pertinent population consists of literature concerning the subject, with data gathered from a variety of sources such as scientific journals and digital libraries in Arabic and English languages. The sample is not constrained by a certain quantity, but is carefully chosen from the appropriate sources. Data analysis requires combining and explaining findings from the research.

Results and discussion

In a global context, including the Saudi context (Hussain, 2023; Nabi & Al-Otaibi, 2024), the analysis of the literature revealed different challenges facing the AI adoption in HCM. These challenges can be classified into three categories, namely, methodological, societal and technological challenges (Hagendorff & Wezel, 2020).

- Methodological challenges

Hagendorff and Wezel (2020) mentioned that data sets that are manipulated and computed by AI systems don't correspond with the reality. In addition, data availability and database compatibility is also another challenge of AI use in HCM (Kaur et al., 2021; Sanyaolu & Atsaboghena, 2022; Tambe et al., 2019).

- Societal challenges

This concerns the lack of knowledge and trust about AI applications and consequences (Farooq et al., 2025; Hussain, 2023) as one of the identified challenges. In addition, social and cultural considerations, as well as the values embedded in AI technologies represent an important challenge for the application of AI in HCM, which is manifested in the impact on lower-end jobs, job loss and hiring procedures (Chilunjika et al., 2022; Kaur & Gandolfi, 2023; Rismayadi, 2024; Sadek, 2022), as well as the ethical considerations and employee engagement (Transparency, fairness, data privacy concerns, job loss, and ensuring ethical AI usage) (Budhwar et al., 2022; Kaur & Gandolfi, 2023; Rachid & Houda, 2024; Sanyaolu & Atsaboghena, 2022; Tambe et al., 2019).

One of the challenges that fall under societal category is the lack of qualified competencies to use AI technologies in HCM, as revealed by different authors (Chilunjika et al., 2022; Hussain, 2023; Kaur & Gandolfi, 2023; Moh'd-Khier Almassad, 2022; Nabi & Al-Otaibi, 2024; Rachid & Houda, 2024; Rismayadi, 2024; Sadek, 2022; Sanyaolu & Atsaboghena, 2022).

Another challenge that limits the scope of capabilities that AI applications can cover in HCM is the social acceptance of these applications, whether inside or outside the organization. as reported by some studies (Kaur & Gandolfi, 2023; Nabi & Al-Otaibi, 2024; Rachid & Houda, 2024; Sadek, 2022; Sanyaolu & Atsaboghena, 2022; Tambe et al., 2019).

The challenge of using AI in HCM lies in the complexity of determining what makes a "good employee" and making "employment decisions" (Kaur & Gandolfi, 2023; Tambe et al., 2019). The use of AI in HCM is becoming more prevalent in automating complex procedures, but the costs of maintaining AI equipment, infrastructure, and training employees present challenges for HCM's reliance on AI technologies (Nabi & Al-Otaibi, 2024; Rismayadi, 2024; Sadek, 2022). Moreover, the cost of the presumed automation facilitated by AI systems is frequently "unseen". This involves insecure employment in label factories, raw material suppliers, hardware manufacturers, energy suppliers, and more (Hagendorff & Wezel, 2020).

- Technological challenges

Currently, it is not feasible to detect every bug in software code, whether through human assistance or technology alone. This indicates that AI-related technologies will be susceptible to specific types of cyber-attacks (Hagendorff & Wezel, 2020). Hence, the challenges encountered by Human capital professionals mainly revolve around security concerns. Threats to confidentiality, integrity, and accessibility in human-computer interaction pose concerns about security issues for individuals and organizations, impacting human capital professionals (Kaur & Gandolfi, 2023).

- Challenges of using AI in HCM at CST

In Saudi Arabia, the Saudi Data & AI Authority (SDAIA) has been founded to help advance the country's Data & AI initiatives. To make the most of Data & AI for the Kingdom's economic and social growth, SDAIA has created the National Strategy for Data & AI (NSDAI, 2020) with the help of all stakeholders. The National Strategy for Data & AI is designed to meet the goals of Vision 2030 by expanding Data & AI usage and establishing a solid base for a robust local economy. Moreover, there are various programs in place to support the rollout of the National Strategy for Data & AI, with a focus on developing human resources. These include "Skills Initiatives" to improve the country's workforce by training individuals in Data & AI, and "Research & Innovation Initiatives" to cultivate top talents in cutting-edge environments for innovation in new urban areas (NSDAI, 2020).

As revealed by the National Strategy for Data & AI report of 2020, data & AI are already disrupting several sectors and will become a key factor in economic development. While a tremendous amount of opportunities is provided by AI solutions (disaster management, road safety, or energy consumption management), some challenges are emerging (data protection, automation, cybersecurity) (NSDAI, 2020), these later mentioned challenges of AI application in different Saudi sectors and work environments are in line with our finding from reported researches about the challenges facing AI implementation in HCM. The challenge of data protection and privacy are reported by different studies (Kaur & Gandolfi, 2023; Sanyaolu & Atsaboghena, 2022; Tambe et al., 2019). AI-driven automation negatively impacts jobs and employment (Budhwar et al., 2022; Kaur & Gandolfi, 2023; Moh'd-Khier Almassad, 2022; Sadek, 2022). Another important challenge of AI technology use, that is mentioned by the National Strategy for Data & AI report, is the cybersecurity, where concerted efforts are being made to make the system more secure, to address the challenges and issues related to data security that Human capital has to manage with the AI applications (Kaur & Gandolfi, 2023).

According to the 2020 National Strategy for Data & AI report, data & AI are currently causing significant changes in various industries and will play a crucial role in economic growth. Although AI solutions offer many opportunities such as disaster management, road safety, and energy consumption management, challenges like data protection, automation, and cybersecurity are also arising. These challenges in AI application across various Saudi sectors align with our research findings on challenges in implementing AI in HCM. Various studies (Kaur & Gandolfi, 2023; Sanyaolu & Atsaboghena, 2022; Tambe et al., 2019) highlight the difficulties related to safeguarding data and privacy. In addition, as revealed from our finding (Budhwar et al., 2022; Kaur & Gandolfi, 2023; Moh'd-Khier Almassad, 2022; Sadek, 2022), the use of artificial intelligence for automation has a detrimental effect on jobs and employment. The National Strategy for Data & AI report identifies cybersecurity as a major challenge in the use of AI technology, with efforts being made to enhance system security and address data security issues that human capital faces while managing AI applications (Kaur & Gandolfi, 2023).

Based on the above findings and related discussion, and considering the National Strategy for Data & AI report of 2020, and the objectives of the CST in the Kingdom, five main challenges can be identified that hinder the application of AI technology in HCM at

the CST, namely: data privacy, information security, labor issues related to increased automation, social acceptance and the shortage of skills and competencies among workers in the field of AI technologies.

Conclusion, Recommendations and limitations

Conclusion

The exploration of Artificial Intelligence and its integration into various sectors has unveiled a complex landscape of challenges and opportunities for human capital management and development. This study has delved into the different challenges facing the implementation of AI in HCM in different countries and sectors, with a particular focus on the Saudi context and more precisely the analysis of the challenges facing the use of AI in HCM at Saudi Communications and Space Technology Commission. The adoption of a qualitative approach with a literature review has revealed five main challenges related to the successful implementation of AI in JCM at the CST, namely, data privacy, cybersecurity, increased automation, cultural acceptance and AI staff skills shortage.

In conclusion, with the advent of AI shaping a new era, this research offers a fundamental insight into the difficulties AI brings to HCM at the CST. By adopting strategic, flexible, and moral strategies, CST can successfully navigate the challenges of AI integration, utilizing its ability to reshape human resources for the collective good of the workforce and society. Utilizing AI technology in managing human capital can lead to unexpected opportunities when implemented effectively. This will ensure that CST remains at the forefront of technological progress in both Saudi Arabia and internationally.

Recommendations

HCM is undergoing a shift in various industries, as businesses increasingly use AI-based applications to improve their data-driven strategies. Additionally, it is suggested that further in-depth research should be carried out on the implementation model of change, using the results of this study as a basis, for the integration of AI in HCM at the CST. In addition, a suggested framework is recommended for HCM to offer guidance in establishing a future research plan for AI applications.

Study Limitations

This study is limited by its qualitative theoretical approach and the specific setting of AI implementation in HCM in the communications sector in Saudi Arabia. Furthermore, the fast rate of technological advancements can lead to the data collected becoming obsolete, requiring continuous research.

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