Bibliometric Analysis of Artificial Intelligence Integration in HRIS for Strategic Upskilling

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Abstract: The integration of artificial intelligence (AI) into Human Resource Information Systems (HRIS) has revolutionised workforce management, enabling strategic upskilling and aligning employee capabilities with organisational goals. This study employs a bibliometric analysis to explore the academic landscape of AI integration in HRIS, focusing on its transformative potential in talent acquisition, performance management, and personalised learning. Drawing from a dataset of 535 publications from 2014 to 2024, the analysis highlights key trends, including the growing emphasis on AI-driven training and interdisciplinary research collaborations. Influential authors, institutions, and thematic areas are identified, providing insights into the evolution of this field. Findings reveal that while AI-enabled HRIS enhances operational efficiency and workforce agility, challenges such as ethical considerations, data privacy, and the lack of longitudinal studies persist. This study underscores the need for empirical case studies and cross-disciplinary approaches to address these gaps. By mapping influential research and uncovering emerging themes, this paper contributes to a deeper understanding of AI's role in HRIS, offering a foundation for advancing both academic inquiry and practical implementation in strategic workforce development.

Keywords: Artificial intelligence, Human resource, Machine learning, Strategic upskilling, Workforce development

1 Introduction

The integration of artificial intelligence (AI) into Human Resource Information Systems (HRIS) is rapidly influencing strategic upskilling practices across sectors, particularly in small and medium-sized enterprises (SMEs). Research has shown that the adoption of AI-powered HRIS can lead to significant enhancements in workforce productivity and operational efficiency. For instance, Ahmi and Mohd Nasir [1] conducted a systematic review indicating that such integration can improve employee productivity by approximately 29% and decision-making efficiency by 20% in SMEs. These findings emphasise the transformative role of AI in streamlining HR operations, ultimately supporting strategic upskilling initiatives that are critical for adapting to evolving market demands.

Furthermore, the role of AI in enhancing human-robot interaction (HRI) reflects a broader trend of using intelligent systems to augment employee capabilities and decision-making processes. Exploration of the strategic and ethical use of AI solutions indicates the necessity of effective utilisation in educational contexts, which parallels HR functions where ethical considerations affect technology adoption [2]. Additionally, Ali and Rafi [3] illustrates how adaptive AI systems can enrich human-robot collaboration, thereby enhancing workplace efficiency by aligning robotic assistance with human preferences and behaviours. This approach highlights how AI can not only augment existing HRIS functionalities but also facilitate new avenues for employee development through tailored support systems.

Moreover, work on autonomous robots in healthcare underscores the potential of AI technologies in sensitive applications, thereby aligning with strategic HR goals to foster a supportive work environment [4-5]. The capacity of these technologies to replicate human-like interactions may be advantageous in training staff and enhancing their skills in customer-oriented roles, particularly as organisations strive to maintain high standards of care in service delivery.

The implications of AI in HRIS are also evident in the literature that focuses on the psychological and behavioural dimensions of AI integration. Hmoud and Várallyai [6] examined the determinants of trust in adopting AI-powered HR systems, suggesting that enhancing user trust is essential for successful implementation and long-term adoption. This notion is reinforced by the findings of Tenakwah and Watson [7], who explore how creative AI can improve HRI design, further suggesting that thoughtful integration of AI can lead to more engaging and user-centric HR applications.

Finally, the growing trend of using AI within HRIS reflects a shift towards more data-driven decision-making processes in human resources, where predictive models aid in employee management and strategic planning. Machine learning has provided a significant impact in developing systems that not only respond to employee needs but also anticipate them, thus fostering a proactive approach to workforce management [8-9]. This evolution potentially positions AI as a cornerstone in the strategic upskilling landscape, allowing for the cultivation of a highly adaptable and skilled workforce.

In summary, the bibliometric analysis of the integration of AI in HRIS showcases a multifaceted approach to enhancing workforce capabilities through strategic upskilling. The collected studies emphasise the operational efficiencies gained from AI integration while also highlighting the critical need for ethical considerations and trust-building measures that will sustain these technologies in workplace environments.

2 Literature Review

The advent of AI is reshaping various sectors, with profound implications for Human Resource Management (HRM) and the adoption of strategic upskilling practices. A review of the literature highlights the dual role of AI in optimising HR functions and enhancing employee performance, offering a comprehensive overview of the transformative potential and challenges associated with integrating these technologies.

The strategic integration of AI into HR practices has been shown to create significant efficiencies in operations. For instance, Hernandez [10] note that AI can automate routine human resource processes, enabling HR professionals to focus on more strategic initiatives that promote innovation and creativity within the organisation. This aligns with findings from Jayalakshmi and Jayanthi [11], who argue that the implementation of AI in HR results in improved operational efficiency, allowing teams to engage in more strategic talent management activities rather than mundane administrative tasks. Advances in AI applications can thus positively affect employee engagement through personalised experiences and real-time feedback, which reinforce the effectiveness of HR strategies aimed at upskilling.

Hoggenmueller et. al [12] emphasise the crucial role of AI in capturing strategic value from HR data, which an area previously underexplored. Their analysis demonstrates how AI applications enhance knowledge management within organisations, aiding in more informed decision-making. This theme is echoed as exploration of generative AI [13], illustrating how strategic approaches in adopting such technologies can enhance operational capabilities across industries. Furthermore, Jatobá et. al [14] highlight the impact of tailored upskilling initiatives that integrate AI, which significantly contribute to enhancing employee performance and adaptability. The synthesis of empirical data from multiple industries illustrates the importance of continuous learning and adaptability in the workforce, driven by AI adoption.

The ethical implications surrounding the integration of AI in HR practices cannot be overlooked. Böhmer and Schinnenburg [15] discusses how AI innovations can optimise HR decision-making while concurrently addressing the concerns regarding biases introduced by algorithms in recruitment and management processes. This ethical framework is essential as organisations navigate the complexities of AI implementation in their HR systems. Vemuri [16] provide a systematic review that quantifies the overall impact of AI on employee engagement, emphasising the need for organisations to remain vigilant and ethically grounded while leveraging AI technology.

Additionally, Aithal et. al [17] highlight the necessity for a robust strategic planning framework that aligns AI integration with broader business goals, emphasising proactive workforce preparation as organisations move into the AI era. They note that HR leaders must employ strategic management principles to establish a collaborative environment where humans and AI can coexist and complement each other's strengths.

Current studies on AI in HRM emphasise the critical need for a multidisciplinary approach encompassing organisational psychology, technology adoption theory, and strategic management. This comprehensive perspective enables organisations to effectively harness AI capabilities while ensuring human capital remains at the centre of decision-making processes. The literature points toward a gradual shift in HR where data-driven AI tools are increasingly being used to foster workforce agility, innovation, and enhanced performance [18-19].

In conclusion, the literature on AI integration in HRM highlights both opportunities and challenges associated with this transition. Effective AI utilisation can lead to substantial improvements in operational efficiency, strategic insight, and employee engagement. However, addressing ethical concerns and ensuring a seamless collaborative environment between technology and human resources is paramount for the sustainable success of AI initiatives in HRM.

3   Method

Figure 1 illustrates a structured approach to conducting a bibliometric analysis of the literature on artificial intelligence in HRIS using the PRISMA framework. The primary objective of this research is to uncover trends, influential authors, thematic connections, and emerging patterns in this evolving field. In this analysis, we used specialised software tools, including VOSviewer and Bibliometrix (R), to perform citation analysis, keyword co-occurrence analysis, and author collaboration network mapping. These tools facilitated the visualisation of citation networks and the identification of significant research trends, providing valuable insights into the development of AI in HRIS.

Additionally, we will detail the inclusion and exclusion criteria for the literature search, specifying that studies were selected based on relevance to AI and HRIS, with a date range constraint (e.g., 2000-2023). We will also address potential biases and limitations, such as the reliance on Scopus as the sole database, which could impact the generalisability of our findings. This methodology follows established best practices, with appropriate citation of the PRISMA framework and its updated 2020 version, as well as consistent citation of bibliometric studies like Ahmi and Mohd Nasir [1], ensuring methodological transparency and rigor.

The analysis begins with a clearly defined topic, focusing on the integration of AI within HRIS. This specific focus allows for a comprehensive examination of how AI is transforming HR practices through advanced information systems, enabling a detailed mapping of the research landscape to identify influential works, recurring themes, and emerging trends. The scope is limited to the past decade, from 2014 to 2024, to capture the most recent advancements and relevant trends in AI applications within human resource management.

Scopus was selected as the primary database for its extensive collection of high-quality, peer-reviewed journal articles. This ensures that the findings are grounded in reputable sources, providing a reliable foundation for analysing research trends and patterns. The search was conducted across all

fields within the database to maximise coverage, resulting in a robust dataset suitable for several bibliometric analyses, including citation analysis, keyword co-occurrence, author collaboration networks, and institutional contributions.
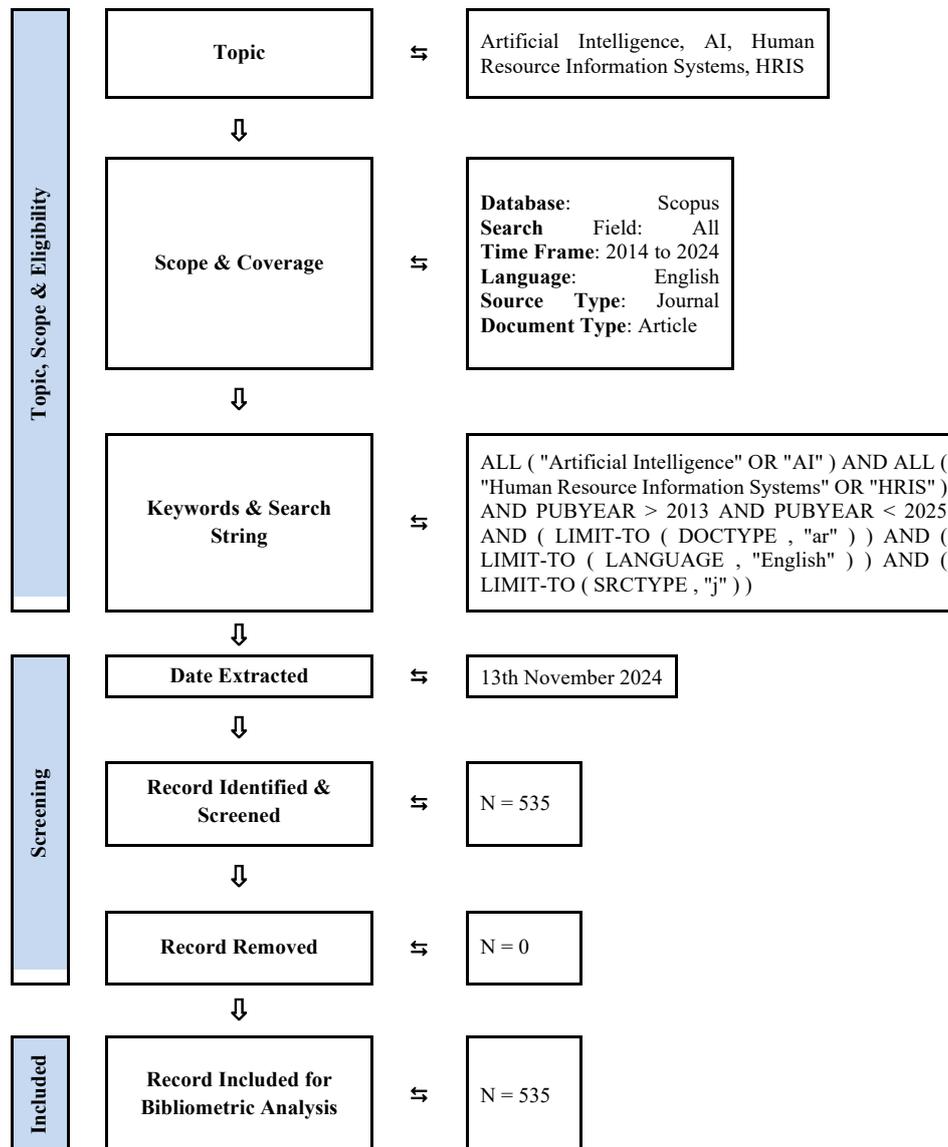

Figure 1: Flow diagram of the search strategy for keyword Artificial Intelligence, AI, Human Resource Information System and HRIS.

The inclusion criteria for the study were based on (1) relevance to AI integration in HRIS and strategic upskilling, (2) inclusion of only peer-reviewed journal articles, and (3) English-language publications. Non-research articles, such as conference papers or editorials, as well as studies not directly related to AI in HRIS, were excluded from the analysis.

In terms of limitations, we acknowledge potential biases, such as language bias (limiting the study to English-language articles) and database limitation, as only Scopus was used. This may exclude influential studies indexed in other databases like Web of Science or Google Scholar. However, Scopus was chosen for its comprehensive collection of peer-reviewed content, and the exclusion of other databases is noted as a limitation.

The search string combines both broad and specific terms, including "Artificial Intelligence", "AI", "Human Resource Information Systems", and "HRIS". This approach is designed to capture a

comprehensive dataset while filtering out unrelated studies. Additional parameters such as publication years, document types, and language further refine the results, ensuring a well-defined dataset ideal for bibliometric mapping. This meticulous selection process enables meaningful analyses, such as thematic clustering, co-citation analysis, and author collaboration networks.

Data extraction was conducted on November 13, 2024, resulting in the identification of 535 records. All identified records were retained without exclusions, creating an inclusive and expansive dataset, which is critical for a thorough bibliometric analysis. This inclusivity supports a more detailed mapping of scholarly relationships, publication trends, and collaboration networks, facilitating a deeper understanding of the field's structure and development.

All 535 records were included in the bibliometric analysis to capture the full breadth and depth of the research domain. Analysing these records allows for the exploration of patterns such as citation frequency, author prominence, and keyword trends. This complete dataset serves as a foundation for holistic analysis, enabling a thorough examination of influential studies, prominent authors, and central themes within AI and HRIS research.

This structured and transparent methodology not only supports the goals of bibliometric analysis but also contributes significantly to the academic discourse on artificial intelligence in human resource systems. By mapping publication trends, identifying knowledge gaps, and highlighting influential research clusters, this study advances understanding in the field and provides a valuable resource for future researchers interested in the transformative potential of AI within HRIS. Through this bibliometric approach, this research charts the progression of AI applications in human resource management, revealing insights that drive innovation and inform best practices.

4 Results

The search results from the Scopus query on "Artificial Intelligence" and "Human Resource Information Systems (HRIS)" provide a broad range of research exploring the intersection of AI and HR technology. The literature includes studies on AI's transformative impact within HRIS, showcasing how AI technologies, such as machine learning and predictive analytics, are being integrated into HR functions to enhance efficiency and strategic capabilities.

Key areas covered in these studies include AI-driven HRIS applications in talent acquisition, employee performance management, and skill development. Many articles highlight the potential of AI to streamline HR processes, improve decision-making, and support workforce upskilling through personalised learning recommendations. Additionally, the results reveal emerging discussions on the ethical and operational challenges of implementing AI in HRIS, particularly concerning data privacy, algorithmic bias, and organisational adaptability.

This body of research reflects the growing significance of AI in modern HR management, underlining both the benefits and complexities of adopting AI-powered HRIS solutions in dynamic business environments.

A   Year of Publications/Evolution of Published Studies

Table 1 shows the distribution of publications over a span of years from 2014 to 2024, providing insight into publication trends related to the topic. The highest number of publications is observed in 2024 with 155 publications (28.97%), followed by 2023 with 115 publications (21.50%) and 2022 with 103 publications (19.25%). This suggests a growing interest in the field, with a notable rise in publications over the last three years (2022-2024). These three recent years (2022-2024) account for approximately 69.72% of the total publications, indicating an upward trend in research activity.
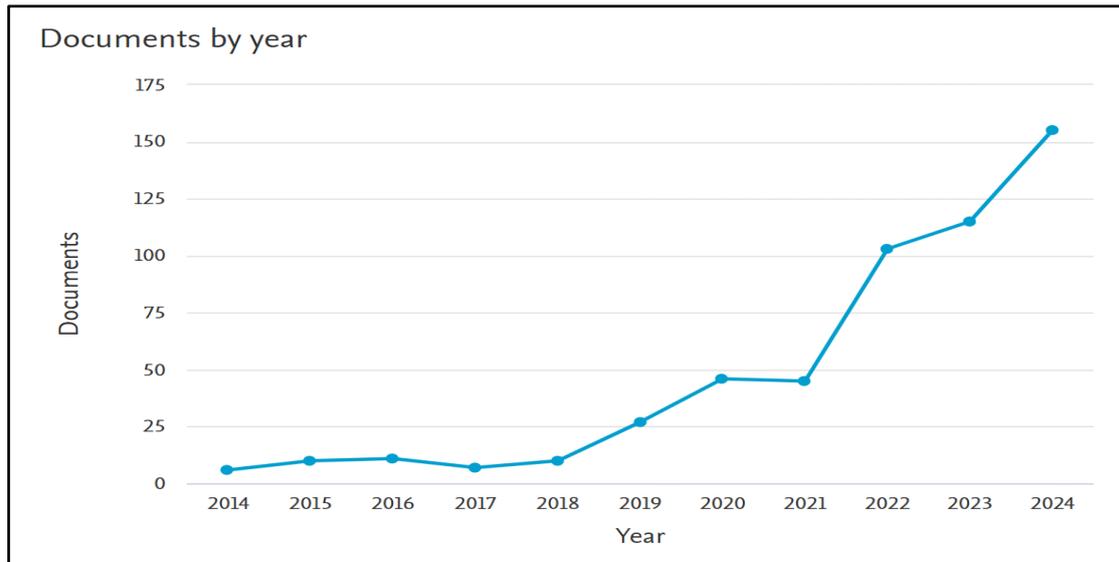
Figure 2: Document published over a span of years from 2014 to 2024

Years of 2020 and 2021 have relatively moderate publication numbers, with 46 publications (8.60%) and 45 publications (8.41%), respectively. This period might reflect a steady interest, perhaps influenced by global events such as the COVID-19 pandemic, which led to increased adoption of digital and AI-related technologies, particularly in HR systems.

From 2014 to 2019, publication numbers are significantly lower. The years 2014 to 2018 each have less than 2% of the total publications, with 2019 showing a slight increase at 5.05%. The cumulative percentage shows that by the end of 2019, only 91.78% of the total publications were reached, suggesting that this area of research began gaining traction mainly in recent years.

The cumulative percentage column provides a cumulative distribution, showing the percentage of total publications up to each year. By 2022, over 69.72% of the total publications had been reached, indicating a significant concentration of research within a few recent years. The data culminates at 100% in 2024, suggesting that the field is currently experiencing its peak in research output.

The trend indicates a robust increase in research on AI integration in HRIS, especially from 2022 onwards. The data shows that this area has gained significant momentum, with more than two-thirds of the research output concentrated in the last three years. This trend is likely to continue as AI applications in HRIS and workforce development remain relevant topics for both academia and industry.

B   Subject Area

Table 2 provides an overview of the subject areas related to the research on AI integration in HRIS, with each area's contribution to the total publications. Computer Science leads with 219 publications (20.35%), which is expected given that AI technologies are a core part of computer science research.

Business, Management, and Accounting follows closely with 215 publications (19.98%). This high representation suggests a strong interest in how AI-driven HRIS impacts business operations, workforce management, and organisational strategies.
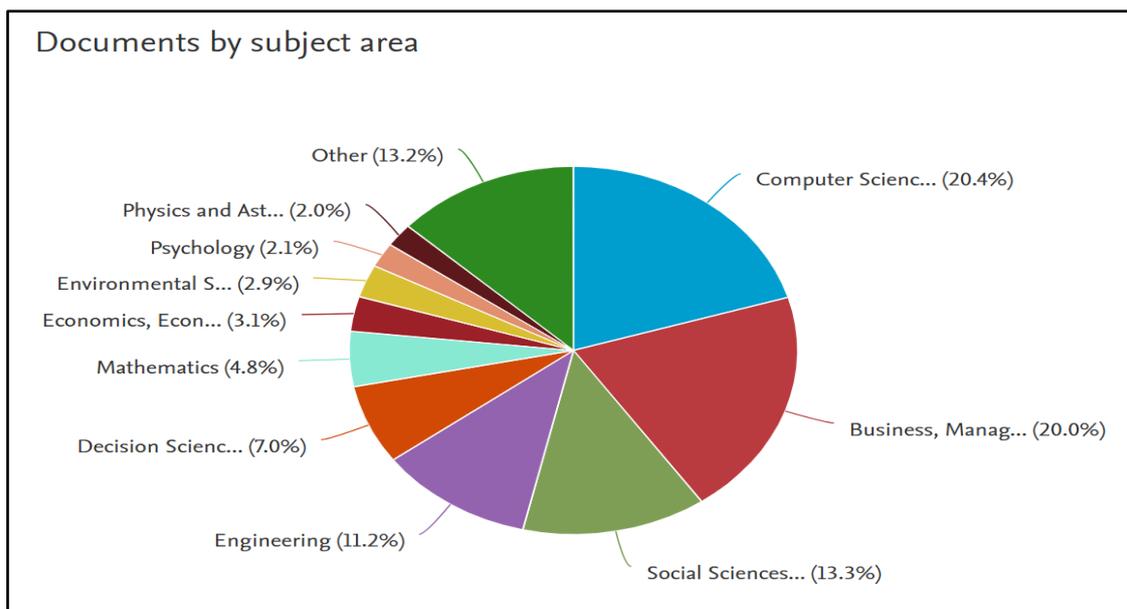
Figure 3: Document by subject area related to the research on AI integration in HRIS

Social Sciences ranks third with 143 publications (13.29%), highlighting the interest in the social implications of AI in HR, such as its effects on workforce behaviour, ethics, and organisational culture. Engineering accounts for 121 publications (11.25%), indicating that engineering principles are involved, perhaps in developing and implementing AI-based HR systems.

Decision Sciences has 75 publications (6.97%), reflecting interest in data-driven decision-making within HRIS, including predictive analytics and decision-support systems facilitated by AI. Mathematics (4.83%) and Economics, Econometrics and Finance (3.07%) show moderate representation, suggesting the application of mathematical models and economic analysis in AI-based HR systems. Environmental Science (2.88%) might represent studies on the sustainability aspects of AI in HRIS or HR's role in environmental sustainability within organisations.

The data reveals that Computer Science and Business, Management, and Accounting are the dominant fields for research on AI in HRIS, reflecting the technical and business-centric nature of the topic. Social Sciences and Engineering also play substantial roles, demonstrating interest in both the social and technical applications of AI-driven HR systems.

The distribution of publications across diverse subject areas highlights the interdisciplinary nature of AI integration in HRIS. While the primary focus is on technical and business aspects, there is growing attention in social sciences, decision-making, and psychology, indicating a holistic interest in both the practical applications and societal impacts of AI in HR. This trend suggests that as AI continues to evolve in HR, research will likely expand into other areas, further broadening its interdisciplinary reach.

C   Most Active Source Titles

The most active source title is Sustainability Switzerland, contributing 10 publications (3.10%). This may indicate a focus on sustainable approaches to workforce development and the role of AI in sustainable HR practices. The journal's interest likely aligns with broader themes of sustainable organisational growth and the impact of technology on long-term human resource sustainability.

Table 1: Most active source title related to the research on AI integration in HRIS

Source Title	Total Publications	Percentage (%)
Sustainability Switzerland	10	3.10
Heliyon	7	2.17
Kybernetes	7	2.17
Applied Sciences Switzerland	6	1.86
Global Knowledge Memory and Communication	6	1.86
International Journal of Data and Network Science	6	1.86
International Journal of Manpower	6	1.86
International Journal of Organizational Analysis	6	1.86

Heliyon and Kybernetes both have 7 publications each (2.17%). Heliyon is a multidisciplinary journal, which suggests that the research on AI and HRIS is attracting interest from a wide range of scientific fields. Kybernetes, known for its focus on systems and cybernetics, indicates interest in the systems approach to AI integration within HR processes.

Applied Sciences Switzerland, Global Knowledge Memory and Communication, International Journal of Data and Network Science, International Journal of Manpower, and International Journal of Organizational Analysis each contributed 6 publications (1.86%). These journals cover diverse topics, including applied sciences, organisational knowledge, manpower studies, and organisational analysis, showcasing the multidisciplinary nature of research on AI in HRIS.

SA Journal of Human Resource Management and Sensors each have 5 publications (1.55%). SA Journal of Human Resource Management aligns closely with HR-related topics, underscoring its relevance to research on workforce development and upskilling. Sensors, a journal typically focuses on sensor technology, may indicate some niche research on data collection and analysis in HRIS systems, potentially using IoT and sensor data to support AI-based HR decisions.

The distribution of publications across a variety of journals reflects the interdisciplinary nature of research on AI in HRIS and strategic upskilling. While journals focused on sustainability, organisational analysis, and HR management are prominently featured, contributions from sources in applied sciences, cybernetics, and business process management also play a significant role. This spread indicates that research on AI-driven HRIS and workforce development is relevant across fields, from sustainable management practices to technological applications and process improvement.

D   *Geographical Distribution of Publications*

Figure 5 provides an insightful view of the geographical distribution of publications, highlighting the most influential countries contributing to research on AI and HRIS. This table ranks the top 20 countries based on their total publication output and the percentage each country contributes to the total number of publications.

China leads with 80 publications, contributing 10.44% of the total, followed by India with 71 publications (9.27%), and the United States with 41 publications (5.35%). These top three countries demonstrate a significant share of the research output, suggesting a strong focus on AI in HRIS within these regions. The predominance of China and India reflects the rising emphasis on digital transformation and AI applications within Asia, where rapid technological advancements and a large workforce may drive interest in AI-enhanced HR systems.

Documents by country or territory
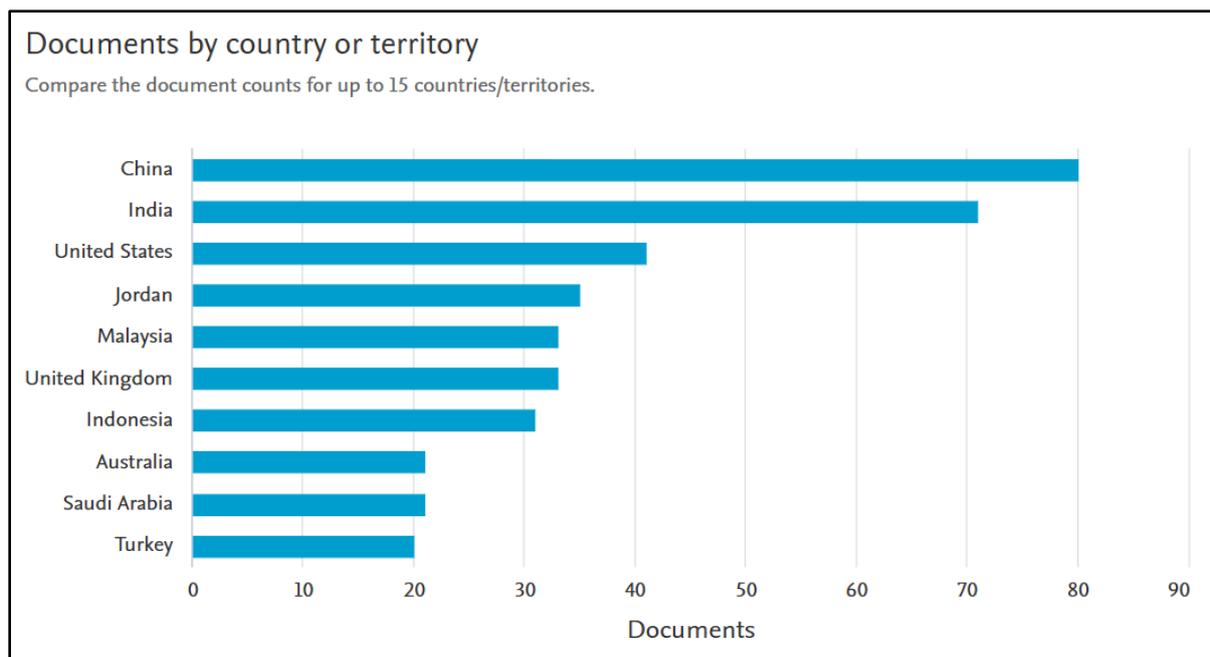Compare the document counts for up to 15 countries/territories.

Figure 5: Documents by country or territory for insightful view of the geographical distribution of publications

Countries such as Jordan, Malaysia, and Indonesia also make notable contributions, with publication percentages ranging from 4.05% to 4.57%. The presence of these countries highlights the growing interest in AI applications in HR management across diverse economic and cultural contexts, particularly in emerging markets where the adoption of intelligent technologies is increasingly seen as a means to improve organisational efficiency.

This geographic distribution reveals that interest in AI for HRIS is not confined to a single region but spans both developed and developing nations, indicating a universal recognition of AI's potential in transforming HR processes. The distribution pattern also suggests potential areas for collaboration and cross-country studies, as each country may bring unique perspectives and insights to the field, enriching the global research landscape. This geographical analysis provides a comprehensive understanding of where research is concentrated, allowing for better identification of leading regions and potential gaps in the study of AI in HRIS.

E   Keywords Analysis

Figure 6 provides an overview of the top keywords used by authors, shedding light on the primary themes and focus areas within the literature on AI in HRIS. This table highlights the frequency of specific terms, reflecting the core topics and methodologies that dominate this research field.

The most prominent keyword, "artificial intelligence", appears in 47 publications, representing 8.83% of the total. This high frequency emphasises the central role of AI in the research, aligning with the main focus of exploring AI's impact on HRIS. "Human resource management" is the second most common keyword, with 32 occurrences (6.02%), indicating a strong interest in how HR practices and systems are evolving through the integration of intelligent technologies.

Other keywords like "e-HRM" (4.14%), "machine learning" (3.95%), and "UTAUT" (3.76%) reveal additional areas of focus. The inclusion of e-HRM suggests an emphasis on electronic or digital HR management practices, while machine learning highlights the importance of specific AI techniques within HR applications. UTAUT (Unified Theory of Acceptance and Use of Technology) is often used to study technology acceptance, suggesting that researchers are interested in how HR professionals and employees perceive and adopt AI-driven systems.

Figure 6: Network visualisation map of the author keywords overview of the top keywords used

Overall, the top keywords in Table 5 reflect a strong emphasis on AI and its specific applications in HR management, from technology acceptance and machine learning techniques to data analytics and regional studies. These keywords provide a snapshot of the dominant research themes, suggesting that the field is heavily oriented toward understanding and implementing AI-driven transformations in human resource practices. This keyword analysis not only identifies key topics but also underscores the interdisciplinary nature of this research, connecting AI, data analytics, and HR management within the broader context of digital transformation.

F   Authorship

Table 2 lists the most productive authors in the field of artificial intelligence and HRIS, highlighting those who have contributed the highest number of documents to the literature. This table provides insights into the authors who are actively advancing research and expanding the body of knowledge in this domain.

Table 2: Most productive authors in the field of AI and HRIS

Author's Name	No. of Documents	Percentage (%)
Damaševičius, Robertas	7	3.55
Rajiani, Ismi	6	3.05
Alkhwaldi, Abeer F.	5	2.54
Al-okaily, Manaf	4	2.03
Maskeliūnas, Rytis	4	2.03
Nejat, Goldie	4	2.03
Al Kurdi, Barween	3	1.52
Pillai, Rajasshrie	3	1.52

Robertas Damaševičius emerges as the most productive author, with seven documents, accounting for 3.55% of the total publications. Damaševičius's high productivity indicates a strong commitment to research in AI and HRIS, suggesting that his work spans multiple studies, potentially exploring diverse aspects of this field, including applications, challenges, and theoretical advancements.

Following Damaševičius, Ismi Rajiani has authored six documents, contributing 3.05% to the total. Rajiani's productivity signifies an active research presence, likely addressing various dimensions of AI in HR systems. This level of output suggests that Rajiani may have contributed foundational studies, practical insights, or case studies that add breadth to the literature on AI in HR.

Abeer F. Alkhwaldi has produced five documents, representing 2.54% of the total. Alkhwaldi's contributions may include empirical research, methodological insights, or applied studies in AI and HRIS, enhancing the field's understanding through a diverse set of publications. This consistent output reflects Alkhwaldi's role in broadening the scope of knowledge in this area.

Both Manaf Al-Okaily and Rytis Maskeliūnas have contributed four documents each, each accounting for 2.03% of the total publications. Al-Okaily, already recognised as a highly cited author, demonstrates productivity alongside impact, indicating that his work is both extensive and influential in shaping research on AI and HRIS. Maskeliūnas's publications, though fewer in number than Damaševičius or Rajiani, reflect steady productivity, likely adding valuable perspectives or specific case studies to the research landscape.

The presence of these authors highlights a group of dedicated researchers who are actively driving inquiry and discussion within the field. Their productivity signifies a sustained focus on the intersection of AI and HRIS, contributing to a more comprehensive and multifaceted understanding of the topic. This analysis of productivity complements citation metrics, indicating not only which authors are influential but also which ones are consistently contributing new research, thereby expanding the intellectual foundations of the field.

G Text Analysis

Figure 7 presents an analysis of the most frequently co-occurring terms in the literature on AI and HRIS. Term co-occurrence analysis is valuable in bibliometric studies as it reveals connections between concepts and highlights the main themes and focuses within a field. This table provides a snapshot of the terms that commonly appear together with other keywords, offering insights into the topics and contexts that researchers emphasise in this domain.

The term "human" is the most frequently co-occurring term, with 41 occurrences, accounting for 5.52% of the total. This high frequency underscores the centrality of the human element in AI and HRIS research, reflecting the core focus on how technology impacts human roles, experiences, and interactions within organisations. "Article" and "decision-making" follow, each with 31 occurrences (4.17%). The presence of "article" suggests that researchers may frequently reference specific studies, indicating a focus on reviewing or building upon existing literature. "Decision-making", on the other hand, points to a critical area within HRIS where AI plays a transformative role, as decision-support systems are a prominent application of AI in human resource management.

"Human resource management" and "humans" appear frequently as well, with 25 and 24 occurrences, respectively, emphasising the focus on HR management as a primary application area for AI. These terms reinforce the central theme of exploring AI's impact on managing human capital and optimising HR processes. The term "artificial intelligence" has 23 occurrences (3.10%), which, although slightly lower than expected, aligns with the study's focus on AI applications in HRIS. The appearance of this term in co-occurrence indicates a broad engagement with AI as a fundamental concept, likely paired with more specific terms related to its applications or impacts.

Overall, the co-occurrence analysis of terms provides a deeper understanding of the main topics within the literature on AI and HRIS. The frequent appearance of terms related to human roles, decision-making, and specific HR functions suggests that researchers are particularly focused on how AI enhances or transforms human-centred processes within HR. This term analysis underscores the multifaceted impact of AI on human resources, from decision support and resource management to gender considerations and human-robot interaction, offering a comprehensive view of the diverse research directions within this field.
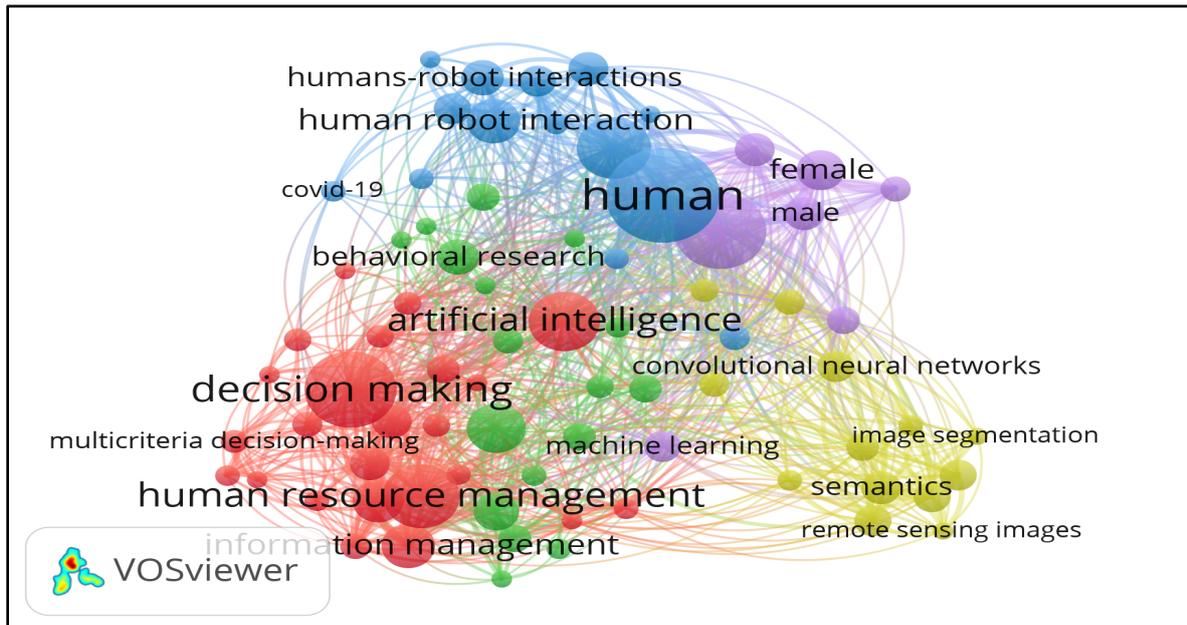
Figure 7: Network visualisation map of a term co-occurrence links with keywords in the literature on AI and HRIS

H   Citation Analysis

Figure 8 highlights the most cited authors in the field of AI and HRIS, providing insight into the researchers whose work has made significant impacts within this domain. The table lists the authors by their total number of citations and the percentage each contributes to the overall citation count.

Alhamad holds the top position with 200 citations, making up 11.97% of the total. This high level of citation suggests that Alhamad's work is highly influential, potentially offering foundational concepts, theoretical frameworks, or empirical findings that have resonated widely across the research community. The prominence of this recent publication reflects the relevance of Alhamad's contributions to current discussions on AI and HRIS.

Pillai follows closely with 172 citations, representing 10.29% of the citations. Pillai's work, published a few years prior, indicates a sustained impact, likely covering significant insights or innovative approaches in AI's application to HRIS that have continued to inform subsequent studies. Vahdat (2022), with 85 citations, contributes 5.09% of the total. Although relatively new, Vahdat's work has already gained substantial recognition, suggesting that it addresses a timely or novel aspect of AI in HRIS. This level of citation for a recent publication highlights its immediate impact on the field.

Qamar, Kim, and Shet are closely ranked, with citations ranging from 72 to 77, collectively contributing notable percentages between 4.31% and 4.61%. These authors' works, published in the same year, point to a productive period in the field, where new findings and discussions on AI in HRIS attracted significant attention. The topics covered by these authors likely include diverse aspects of AI applications and challenges in HR systems, contributing to the growing body of knowledge.

This list of most cited authors reveals the intellectual foundations of AI in HRIS, identifying key figures who have shaped the field through influential publications. The range of publication years indicates a blend of foundational and recent contributions, showing both the evolution of ideas and the immediate impact of recent innovations. These authors' works collectively enhance understanding of how AI transforms HR processes, offering theoretical, practical, and empirical insights that inform ongoing research.
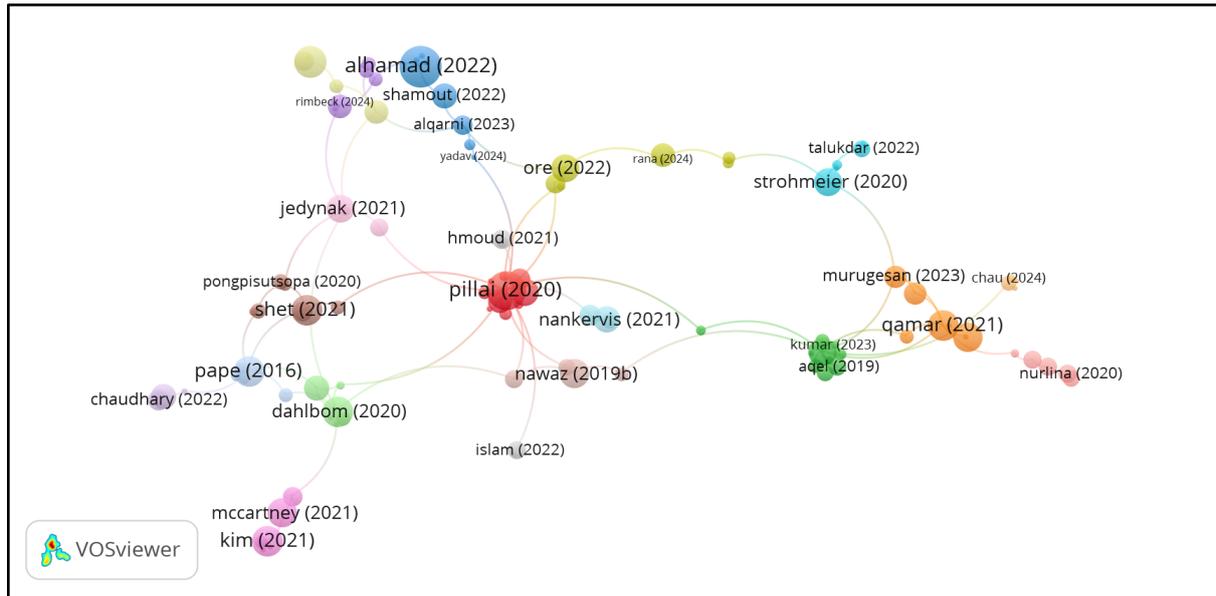
Figure 8: Network visualisation map of the citation by documents in the field of AI and HRIS

I   *Most Influential Institutions*

Table 3 lists the most influential institutions in the field of AI and HRIS, ranked by the total number of publications. The table provides insight into the academic centres that lead research in this area, showing the geographical and institutional distribution of contributions.

Table 3: Most influential institutions in the field of AI and HRIS

Institution	Total Publications	Percentage (%)
Jadara University, Jordan	335	31.81
Silesian University of Technology, Poland	118	11.21
Vytautas Magnus University, Lithuania	106	10.07
Mutah University, Jordan	100	10.64
University of South Wales, United Kingdom	92	8.74
University of Tehran, Iran	78	7.41
The University of Jordan, Amman, Jordan	43	4.08
Op Jindal Global University, India	38	3.61
Department of Informatics and Telecommunications, Greece	27	2.56
Amity University, India	22	2.08

Jadara University in Jordan stands out as the most influential institution, with 335 publications, accounting for 31.81% of the total publications in this dataset. This dominant presence suggests that Jadara University plays a significant role in advancing research on AI and HRIS, possibly serving as a regional hub for innovation and scholarly activity in this field. The institution's substantial output indicates a strong focus and expertise in the subject, likely attracting researchers and resources dedicated to studying AI's applications in HR systems.

Silesian University of Technology in Poland and Vytautas Magnus University in Lithuania follow with 118 (11.21%) and 106 (10.07%) publications, respectively. These institutions have established themselves as influential contributors, indicating that Europe is actively engaging in AI and HRIS research. The presence of these universities underscores the importance of European institutions in global research on AI applications in HR, suggesting a commitment to exploring advanced technological applications within organisational contexts.

In summary, this table highlights a diverse set of institutions leading research in AI and HRIS, with notable contributions from Jordan, Europe, India, and other regions. The geographical distribution underscores a global engagement with the subject, indicating that the research area benefits from a wide array of perspectives and regional insights. The prominent role of Jordanian institutions, along with significant contributions from European and Indian universities, suggests strong regional research hubs driving the development of knowledge in AI and HRIS. This analysis of influential institutions reveals the academic centres that shape the discourse, methodologies, and innovations within this evolving field.

5 Discussion

The bibliometric analysis of AI integration in HRIS for strategic upskilling reveals key trends, influential contributors, and research gaps in this emerging field. Core themes include AI-driven decision-making, upskilling, machine learning, and HR analytics, emphasising the strategic role of AI in workforce transformation. AI's integration in HRIS enhances both operational efficiency and strategic capabilities, enabling HR to focus on personalised learning, skills assessment, and aligning employee development with organisational goals.

Influential authors, such as Alhamad and Pillai, and institutions like Jadara University (Jordan) and Silesian University of Technology (Poland), highlight the global nature of this research. These contributors provide foundational frameworks and best practices, including the use of machine learning models and case studies, which guide organisations in effective AI-HRIS implementation. AI's impact extends beyond functional improvements to support organisational agility and adaptability.

However, gaps remain in understanding ethical implications, employee acceptance, and regional variations. Future research should address these by exploring sector-specific applications, long-term impacts on skills development, and the socio-psychological effects of AI on workforce dynamics. This analysis underscores AI's potential in HRIS to foster a resilient, agile workforce and highlights areas for further exploration to ensure responsible and effective integration in diverse organisational contexts.

6 Conclusion

This bibliometric analysis provides a comprehensive overview of the academic landscape on AI integration in HRIS for strategic upskilling, highlighting key trends, influential contributors, and dominant research themes. Findings underscore AI's transformative role in HR practices, particularly in enhancing decision-making, supporting personalised learning, and aligning workforce development with strategic goals.

However, with the rapid evolution of technologies, the potential of Generative AI (GenAI) should not be overlooked. GenAI, with its ability to create innovative learning modules, simulate personalised development paths, and provide scalable upskilling solutions, is emerging as a significant tool in strategic workforce management.

In future work, it would be valuable to explore the intersection of GenAI and HRIS in more detail, particularly in terms of its potential for driving targeted upskilling initiatives and automating personalised employee development. Incorporating GenAI into HR systems may offer even more robust, dynamic solutions for addressing skill gaps and enhancing employee capabilities. Thus, the expanding role of GenAI holds great promise for future research on the optimisation of workforce development strategies through AI technologies.

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Conflict of Interest Statement

Reference

[1] A. Ahmi and M. H. Mohd Nasir, "Examining the trend of the research on eXtensible Business Reporting Language (XBRL): A bibliometric review," *Int. J. Innov. Creat. Change*, vol. 5, no. 2, pp. 1145–1167, 2019.

[2] A. Ahmi and R. Mohamad, "Bibliometric analysis of global scientific literature on web accessibility," *Int. J. Recent Technol. Eng.*, vol. 7, no. 6, pp. 250–258, 2019.

[3] A. Ali and N. Rafi, "Enhancing human resource management through advanced decision-making strategies: Harnessing the power of artificial intelligence for strategic, data-driven, and judicious choices," *Migr. Lett.*, vol. 21, no. S8, pp. 881–889, 2024, doi: 10.59670/ml.v21iS8.9488.

[4] A. Ghaffar *et al.*, "AI strategy in healthcare CHRM: Analyzing the influence organization effective performance evidence from the private hospitals of Lahore Pakistan," *JHRR*, vol. 4, no. 1, pp. 639–645, 2024, doi: 10.61919/jhrr.v4i1.339.

[5] A. Vogan *et al.*, "Robots, AI, and cognitive training in an era of mass age-related cognitive decline: A systematic review," *IEEE Access*, vol. 8, pp. 18284–18304, 2020, doi: 10.1109/ACCESS.2020.2966819.

[6] B. Hmoud and L. Várallyai, "Artificial intelligence in human resources information systems: Investigating its trust and adoption determinants," *Int. J. Eng. Manag. Sci.*, vol. 5, no. 1, pp. 749–765, 2020, doi: 10.21791/IJEMS.2020.1.65.

[7] E. Tenakwah and C. Watson, "Embracing the AI/automation age: Preparing your workforce for humans and machines working together," *Strateg. Leadersh.*, vol. 53, no. 1, pp. 32–48, 2024, doi: 10.1108/SL-05-2024-0040.

[8] H. Sun *et al.*, "Graphene-based dual-function acoustic transducers for machine learning-assisted human–robot interfaces," *Infomat*, vol. 5, no. 2, 2022, doi: 10.1002/inf2.12385.

[9] J. Hernandez, "Compassionate care with autonomous AI humanoid robots in future healthcare delivery: A multisensory simulation of next-generation models," *Biomimetics*, vol. 9, no. 11, p. 687, 2024, doi: 10.3390/biomimetics9110687.

[10] J. Hernandez, "Compassionate care with autonomous humanoid robots in future healthcare delivery: A multisensory simulation of next-generation models," *Preprints.org*, 2024, doi: 10.20944/preprints202409.0068.v1.

[11] K. Jayalakshmi and N. Jayanthi, "AI-powered HR: Enhancing employee experience and engagement," 2024, pp. 281–294, doi: 10.2991/978-94-6463-433-4_20.

[12] M. Hoggenmueller *et al.*, "Creative AI for HRI design explorations, 2023, doi: 10.1145/3568294.3580035.

[13] M. Indrasari and E. Pamuji, "Enhancing employee performance through strategic initiatives," *J. Bus. Manag. Econ. Dev.*, vol. 2, no. 01, pp. 383–396, 2023, doi: 10.59653/jbmed.v2i01.548.

[14] M. Jatobá *et al.*, "Intelligent human resources for the adoption of artificial intelligence: A systematic literature review," *J. Organ. Change Manag.*, vol. 36, no. 7, pp. 1099–1124, 2023, doi: 10.1108/JOCM-03-2022-0075.

[15] N. Böhmer and H. Schinnenburg, "Critical exploration of AI-driven HRM to build up organizational capabilities," *Employee Relat.*, vol. 45, no. 5, pp. 1057–1082, 2023, doi: 10.1108/ER-04-2022-0202.

[16] N. Vemuri, "Enhancing human-robot collaboration in Industry 4.0 with AI-driven HRI," *PST*, vol. 47, no. 4, pp. 341–358, 2023, doi: 10.52783/pst.196.

[17] P. Aithal and S. Aithal, "Optimizing the use of artificial intelligence-powered GPTs as teaching and research assistants by professors in higher education institutions: A study on smart utilization," *Int. J. Manag. Technol. Soc. Sci.*, pp. 368–401, 2023, doi: 10.47992/IJMTS.2581.6012.0326.

[18] R. Reznikov, "Leveraging generative AI: Strategic adoption patterns for enterprises," *Model. Dev. Econ. Syst.*, no. 1, pp. 201–207, 2024, doi: 10.31891/mdes/2024-11-29.

[19] S. Sundari *et al.*, "Artificial intelligence (AI) and automation in human resources: Shifting the focus from routine tasks to strategic initiatives for improved employee engagement," *East Asian J. Multidiscip. Res.*, vol. 3, no. 10, pp. 4983–4996, 2024, doi: 10.55927/eajmr.v3i10.11758.

[20] S. Vishwanath, "The future of work: Implications of artificial intelligence on HR practices," *TJJPT*, vol. 44, no. 3, pp. 1711–1724, 2023, doi: 10.52783/tjjpt.v44.i3.562.

[21] T. Mohlala *et al.*, "Strategic innovation in HRIS and AI for enhancing workforce productivity in SMEs: A systematic review," *Preprints.org*, 2024, doi: 10.20944/preprints202409.1996.v1.