

Artificial Intelligence and the Changing Nature of Managing Human Resources: A Bibliometric Study

Elizabeth Ramberg, TBS Education, University Toulouse Capitole, e.ramberg@tbs-education.org

Kevin Carillo, TBS Education, k-carillo@tbs-education.fr

Secil Bayraktar, TBS Education, s.bayraktar@tbs-education.fr

Introduction

Artificial intelligence is changing the functioning of organizations as much as it changes the nature of work (Vrontis et al., 2021). AI streamlines work processes, augments work, and expands the capabilities of organizations both internally and externally (Martin, 2019; Rana et al., 2021). Despite being technology focused, the center of this change is people: AI is changing how people work, collaborate, and make decisions. Meanwhile, organizations have started using AI in how they manage human resources such as algorithmic management in platform work (Möhlmann et al., 2021), gamification in recruitment (Shree & Singh, 2019; Tansley et al., 2016), augmented reality in manufacturing (Sahu et al., 2021), and algorithmic decision making in interviews (Hickman et al., 2022). We argue that information systems and human resource management researchers must join forces now to better understand how AI is altering people management and better bridge the gap between theory and practice. For researchers to continue to contribute to research in meaningful ways, we must first gain an understanding on what research has to say in terms of how AI is changing the management of employees (Donthu et al., 2021). *Who produces the existing research on AI and personnel management? Which AI topics have evolved over time and where is the conversation going? What should IS and HRM researchers study to continue the conversation?* Using performance analysis, science mapping, and network analysis on 413 articles from two databases, Web of Science and Scopus, this bibliometric study will provide these answers and develop a research agenda helping practitioners by showing the important areas of research.

Literature Review

Artificial Intelligence and the Management of Human Resources

Artificial intelligence has uses across human resource management and is found in areas of HRM such as recruitment and selection (Mirowska & Mesnet, 2021; Pan et al., 2021; Tansley et al., 2016), people analytics (Gal et al., 2020; Giermindl et al., 2021), training (Maity, 2019), gig work (Duggan et al., 2020; Möhlmann et al., 2021) and human resources planning (Berk et al., 2019). Robots and other algorithmic controlled technology have replaced some job aspects but also augment work providing enhanced work capabilities. Beneficially, this can reduce repetitive tasks and allow workers more time to focus on creative or strategic tasks. Recruitment and selection utilize algorithmic decision making

to evaluate applicants CVs as well as video interviews. Machine learning has shown to be able to predict negative outcomes such as turnover (Sajjadi et al., 2019) and absenteeism (Lawrance et al., 2021) when used in people analytics. Research has found that this is not without ethical and potential discriminatory issues (e.g. Lukacik et al., 2022) though paradoxically, other research had found that Asynchronous Video Interviews (AVIs) can reduce bias that is problematic in traditional interviews (e.g. Mirowska & Mesnet, 2021). In addition, studies have looked at the adoption of AI by both applicants' and employees' acceptance of it (Langer et al., 2020).

Related Work

Existing reviews on artificial intelligence and human resource management are narrow in scope (e.g., Sahlin & Angelis, 2019), often being focused on HR analytics only (e.g., McCartney & Fu, 2021; Qamar & Samad, 2021) without including AI keywords. In addition, most reviews tend to be systematic literature reviews or less methodologically structured content analysis (e.g., Pereira et al., 2021; Vrontis et al., 2021). In addition, articles included in these reviews tend to be published only through 2018 to early 2020 which means they are likely to not include the 54% of articles published from 2020-2022 (data source: this study). Although these are of much value, there is not a recent review that shows the full state of academic literature on AI & HRM. This study aims to do so by performing bibliometric analysis using an expanding search term list and inclusive of early-access 2022 articles.

Method and Preliminary Results

This bibliometric study uses the top two bibliographic citation databases: Web of Science and Scopus, and follows standards set by recent bibliometric studies and guidelines (e.g., Donthu et al., 2021). A list of keywords and keyword combinations was developed using existing reviews and articles on artificial intelligence in human resource management. Keyword combinations were made of an AI keyword (e.g., artificial intelligence, algorithmic decision making, automation, etc.) AND HRM keyword (e.g., human resources, recruitment, or workforce management, etc.). Additional combined terms were searched, such as "Algorithmic HRM" and "Predictive hiring algorithms". An initial search was made resulting in 22,897 documents in Web of Science and 9,056 in Scopus. Following bibliographic study standards, these were then limited to the business and management categories, articles only, and the English language resulting in 525 documents in WoS and 389 in Scopus. Results were then manually combed through to ensure they matched the inclusion criteria then duplicates were removed, resulting in 413 articles.

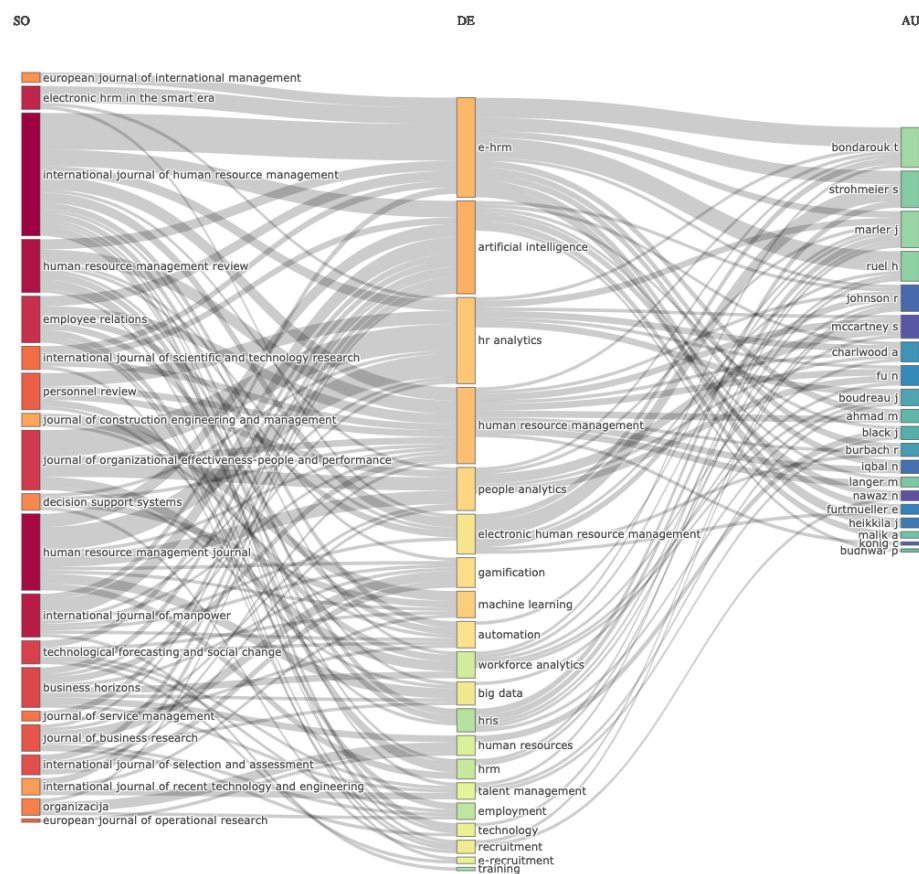
Using the resulting data files, analysis was executed using the Bibliometrix R-Tool (Aria & Cuccurullo, 2017), VOSviewer (Van Eck & Waltman, 2010), and other analysis software. Preliminary results showed that the 413 articles were written by 965 authors coming from 197 different sources (journals) published from 1985-2022. The previous 5-year period (2019-2022) included 71.1% of published articles showing enormous growth in the last few

years.

Performance Analysis

Figure 1 shows a three-fields plot (Sankey plot) with the top 20 sources (left), keywords (middle), and authors (right). A larger box shows more links, for example International Journal of Human Resource Management includes the highest amount of the top keywords showing diversity in topics. Authors have less of a variety in keyword / topic choice as shown by the smaller rectangles and decreased links.

Figure 1: Three-Fields Plot: Keywords, Sources, and Authors

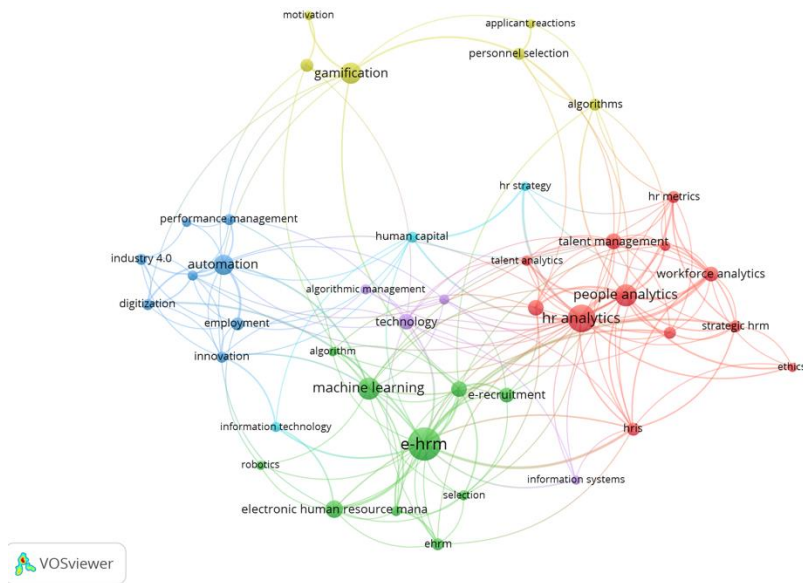


Science Mapping

Figure 2 shows a network visualization of the co-occurrence of author supplied keywords performed with VOSViewer. It shows that there are 6 clusters: analytics, recruitment, automation, algorithms, information systems, and human capital. This allows the reader to see existing topic relationships.

Further science mapping and citation analysis has and will be completed on the documents, sources, authors, and references using Bibliometrix and VOSViewer.

Figure 2: Keyword Co-occurrence Network



Discussion and Potential Contributions

Our preliminary analysis provides insight into the existing state of literature on artificial intelligence and the changing nature of the management of human resources. Firstly, the study has shown the enormous growth of research on the topic especially in the last five years agreeing with existing reviews (Vrontis et al., 2021). This points to the interest and necessity of this topic to be studied. Although authorship skews to the United States, authors from other countries are publishing both as single country publications and multiple country publications – bringing different perspectives and different data samples. Top sources include journals from information systems, operations management, and human resource management pointing to the interdisciplinary nature of this topic. Gamification and algorithmic management are emerging as key types of AI, especially in relation to training and people analytics. Later rising themes of AI's effect on changing the way people work, point to a more promising view, beyond just the dark sides (e.g., Trocin et al., 2021). With the completed analytics and findings, the final paper will develop a detailed research agenda for scholars. This will contribute to the academic community by aiding in future research development and help decrease the theory-practice gap further benefiting practitioners.

References

- Aria, M., & Cuccurullo, C. (2017). bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, 11(4), 959–975.
- Berk, L., Bertsimas, D., Weinstein, A. M., & Yan, J. (2019). Prescriptive analytics for human resource planning in the professional services industry. *European Journal of Operational Research*, 272(2), 636–641. <https://doi.org/10.1016/j.ejor.2018.06.035>
- Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, 133, 285–296. <https://doi.org/10.1016/j.jbusres.2021.04.070>
- Duggan, J., Sherman, U., Carbery, R., & McDonnell, A. (2020). Algorithmic management and app-work in the gig economy: A research agenda for employment relations and HRM. *Human Resource Management Journal*, 30(1),

- 114–132. <https://doi.org/10.1111/1748-8583.12258>
- Gal, U., Jensen, T. B., & Stein, M.-K. (2020). Breaking the vicious cycle of algorithmic management: A virtue ethics approach to people analytics. *Information & Organization*, 30(2). <https://doi.org/10.1016/j.infoandorg.2020.100301>
- Giermendl, L. M., Strich, F., Christ, O., Leicht-Deobald, U., & Redzepi, A. (2021). The dark sides of people analytics: Reviewing the perils for organisations and employees. *European Journal of Information Systems*, 1–26. <https://doi.org/10.1080/0960085x.2021.1927213>
- Hickman, L., Bosch, N., Ng, V., Saef, R., Tay, L., & Woo, S. E. (2022). Automated Video Interview Personality Assessments: Reliability, Validity, and Generalizability Investigations. *Journal of Applied Psychology*. <https://doi.org/10.1037/apl0000695>
- Langer, M., König, C. J., & Hemsing, V. (2020). Is anybody listening? The impact of automatically evaluated job interviews on impression management and applicant reactions. *Journal of Managerial Psychology*, 35(4), 271–284. <https://doi.org/10.1108/JMP-03-2019-0156>
- Lawrance, N., Petrides, G., & Guerry, M.-A. (2021). Predicting employee absenteeism for cost effective interventions. *Decision Support Systems*, 147. <https://doi.org/10.1016/j.dss.2021.113539>
- Lukacik, E.-R., Bourdage, J. S., & Roulin, N. (2022). Into the void: A conceptual model and research agenda for the design and use of asynchronous video interviews. *Human Resource Management Review*, 32(1), 100789. <https://doi.org/10.1016/j.hrmr.2020.100789>
- Maity, S. (2019). Identifying opportunities for artificial intelligence in the evolution of training and development practices. *Journal of Management Development*, 38(8), 651–663. <https://doi.org/10.1108/JMD-03-2019-0069>
- Martin, K. (2019). Ethical Implications and Accountability of Algorithms. *Journal of Business Ethics*, 160(4), 835–850. <https://doi.org/10.1007/s10551-018-3921-3>
- McCartney, S., & Fu, N. (2021). Promise versus reality: A systematic review of the ongoing debates in people analytics. *Journal of Organizational Effectiveness: People and Performance*, ahead-of-print. <https://doi.org/10.1108/JOEPP-01-2021-0013>
- Mirowska, A., & Mesnet, L. (2021). Preferring the devil you know: Potential applicant reactions to artificial intelligence evaluation of interviews. *Human Resource Management Journal*, 1–20. <https://doi.org/10.1111/1748-8583.12393>
- Möhlmann, M., Zalmanson, L., Henfridsson, O., & Gregory, R. W. (2021). Algorithmic Management of Work on Online Labor Platforms: When Matching Meets Control. *MIS Quarterly*, 45(4), 1999–2022. <https://doi.org/10.25300/MISQ/2021/15333>
- Pan, Y., Froese, F., Liu, N., Hu, Y., & Ye, M. (2021). The adoption of artificial intelligence in employee recruitment: The influence of contextual factors. *International Journal of Human Resource Management*, 1–23. <https://doi.org/10.1080/09585192.2021.1879206>
- Pereira, V., Hadjielias, E., Christofi, M., & Vrontis, D. (2021). A systematic literature review on the impact of artificial intelligence on workplace outcomes: A multi-process perspective. *Human Resource Management Review*, 100857. <https://doi.org/10.1016/j.hrmr.2021.100857>
- Qamar, Y., & Samad, T. A. (2021). Human resource analytics: A review and bibliometric analysis. *Personnel Review*, 51(1). <https://doi.org/10.1108/PR-04-2020-0247>
- Rana, N. P., Chatterjee, S., Dwivedi, Y. K., & Akter, S. (2021). Understanding dark side of artificial intelligence (AI) integrated business analytics: Assessing firm's operational inefficiency and competitiveness. *European Journal of Information Systems*, 1–24. <https://doi.org/10.1080/0960085x.2021.1955628>
- Sahlin, J., & Angelis, J. (2019). Performance management systems: Reviewing the rise of dynamics and digitalization. *Cogent Business & Management*, 6(1). <https://doi.org/10.1080/23311975.2019.1642293>
- Sahu, C. K., Young, C., & Rai, R. (2021). Artificial intelligence (AI) in augmented reality (AR)-assisted manufacturing applications: A review. *International Journal of Production Research*, 59(16), 4903–4959. <https://doi.org/10.1080/00207543.2020.1859636>
- Sajjadijani, S., Sojourner, A. J., Kammeyer-Mueller, J. D., & Mykerezzi, E. (2019). Using machine learning to translate applicant work history into predictors of performance and turnover. *Journal of Applied Psychology*, 104(10), 1207–1225. <https://doi.org/10.1037/apl0000405>
- Shree, S., & Singh, A. S. (2019). Exploring Gamification for Recruitment through Actor Network Theory. *South Asian Journal of Human Resources Management*, 6(2), 242–257. <https://doi.org/10.1177/2322093719863912>
- Tansley, C., Hafermalz, E., & Dery, K. (2016). Talent development gamification in talent selection assessment centres. *European Journal of Training and Development*, 40(7), 490–512. <https://doi.org/10.1108/EJTD-03-2016-0017>
- Trocin, C., Hovland, I. V., Mikalef, P., & Dremel, C. (2021). How Artificial Intelligence affords digital innovation: A cross-case analysis of Scandinavian companies. *Technological Forecasting and Social Change*, 173, 121081. <https://doi.org/10.1016/j.techfore.2021.121081>
- Van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, 84(2), 523–538.
- Vrontis, D., Christofi, M., Pereira, V., Tarba, S., Makrides, A., & Trichina, E. (2021). Artificial intelligence, robotics, advanced technologies and human resource management: A systematic review. *International Journal of Human Resource Management*, 1–30. <https://doi.org/10.1080/09585192.2020.1871398>