SMART HRM 4.0: THE DIGITAL TRANSFORMATION OF HUMAN RESOURCE MANAGEMENT IN TOURISM

Marijana Seočanac*
[0000-0001-7232-3624]

Faculty of Hotel Management
and Tourism in Vrnjačka Banja,
University of Kragujevac,
Vrnjačka Banja, Serbia

Abstract:

Industry 4.0 technologies, including artificial intelligence, robots, and the Internet of Things (IoT), have fundamentally reshaped human resource management (HRM). The adoption of these technologies has led to the emergence of smart HRM practices that have the potential to increase employee engagement and operational efficiency. This paper aims to investigate how HRM practices in tourism have changed as a result of new technologies and whether this has led to improvements in operational efficiency, employee engagement, and/or satisfaction. For this purpose, a bibliometric and content analysis was conducted on a sample of 18 papers identified in the Web of Science scientific database. The bibliometric analysis provided a general overview of scientific research, i.e., the dominant journals, authors, and countries in the field, as well as the main research topics. Content analysis was used to summarize the findings of previous research on technology implementation in the following HRM processes: 1) recruitment and selection and employee training and development, and 2) performance management and employee engagement. The findings of this study provide researchers and managers with an overview of the existing research and, by summarizing the main conclusions, provide guidelines for future research and the application of Industry 4.0 technologies in HRM processes in tourism.

Keywords:

fourth industrial revolution, industry 4.0, artificial intelligence (AI), HR, tourism and hospitality industry.

JEL Classification:

Z32, J24, O33

INTRODUCTION

The tourism is undergoing a profound transformation due to rapid technological advances. New technologies offered by the fourth industrial revolution (Industry 4.0), such as artificial intelligence (AI), augmented reality (AR), robotics, internet of things (IoT), big data analytics, and cloud computing (Ammirato *et al.* 2023; Pillai & Srivastava, 2024; Zhang & Chen, 2024), have brought significant changes

*E-mail: marijana.seocanac@kg.ac.rs

to the tourism (see Gáll, 2023). A survey on the top business priorities of companies in this industry in 2020 found that the priority of approximately 61% of the surveyed companies is the adoption of new technologies with the aim of providing better services for guests (Statista, 2021). As this is a labor-intensive sector that relies heavily on human resources to provide exceptional service, human resource management (HRM) is key to maintaining a competitive advantage (Agustian *et al.*, 2023). However, companies in this area often face significant challenges that force them to find innovative approaches that can adapt to the fast and constantly changing environment in which they operate (Nawaz *et al.*, 2024).

Smart human resource management 4.0 (Smart HRM 4.0) represents an advanced HRM practice, where Industry 4.0 technology is used to automate traditional HR functions in order to improve the HRM process (Pillai & Srivastava, 2024) and thus the quality of service and guest satisfaction. Traditional HRM practices are being enhanced by digital solutions that enable the transition from manual and time-consuming tasks to more efficient approaches to recruitment, training, performance management, and employee retention (Kambur & Yildirim, 2023). The digital transformation of HRM practices improves operational efficiency and helps to create a more competitive workforce, on which the success of organizations in this rapidly changing environment largely depends (Ruiz *et al.*, 2024).

The aim of this paper is to investigate the impact of digital transformation on HRM in the tourism. Specifically, it seeks to investigate which HRM practices have been reshaped by new technologies and how, and whether, this has led to improvements in operational efficiency, engagement, and/or employee satisfaction. As Tan *et al.* (2024) noted, the focus of previous studies has largely been on the negative effects of technology on business performance and employees, while its positive aspects have been overlooked. Therefore, this paper aims to emphasize the positive impact of new technologies on the HRM process, drawing on scientific evidence. In addition, recommendations for HRM will be derived from the findings of previous studies, offering practical contributions, as well.

HRM EVOLUTION

Depending on the changes in the terminology used and the role that the HRM function plays in the company, different phases in the evolution of this function can be distinguished. Personnel management is the forerunner of HRM and dates back to the 19th century. This pre-HRM phase was characterized by the purely administrative nature of the tasks. The task of personnel specialists was to register employees, prepare payrolls, and ensure compliance with labor laws. Since women often worked in this department, this function was often referred to as the "Cinderella" function (Bach, 2005), thus devaluing their routine work. Personnel management was in use until 1970, after which not only the name of this function changed, but also its role in the organization. In its early form, HRM still had an operational role, but with the organization's understanding of the value of employees, it also acquired a strategic perspective. Influenced by Maslow's hierarchy of needs, the role of this function was to motivate and engage employees, whom the organization began to view as a valuable asset, in order to gain a competitive advantage that competitors could not easily replicate (Bratton & Gold, 1994; Torrington *et al.*, 2020). From the mid-1980s and into the 1990s, HRM was seen as a strategic partner to the organization, hence the term *strategic HRM* became prevalent. The HRM strategy was aligned with the corporate strategy in order to improve the overall performance of the company. In the first and second decades of the 21st century, the term talent management gained prominence (Bogićević Milikić, 2017). The task was to acquire, develop, and retain employees, who are considered the most valuable asset for a company's success (Sivathanu & Pillai, 2020). While the function has not changed significantly, the speed at which the above-mentioned tasks are performed has changed. Technology has played an important role and enabled organizations to improve the performance of the HR department, i.e., to manage their human capital more effectively, efficiently and strategically (Lin, 2011).

In the early stages, personnel information was managed completely manually. When employees applied for a job, they submitted paper applications with basic information such as name, age, social security number, address, education, and work experience. This information was then kept in physical folders in the HR department and supplemented with new information/documents as needed (e.g., information on promotions, disciplinary measures, training, job performance, benefits), which employees had to update themselves. Such a system was inefficient, labor-intensive, and error-prone. Physically isolated from each other, employee information could not provide timely and valuable insights for strategic decision-making, so it served only an administrative purpose. The need to physically store documents ended with the advent of HRIS (Human Resource Information Systems), which replaced paper folders with software in which technicians input and update all personnel-related information as required. In this way, employee information could also serve a strategic purpose. Over time, this system is being improved by integrating different systems (e.g., decision support systems) and even elements of artificial intelligence, which is why they become extremely important for decision-making (Kovach *et al.,* 2002). A simple database available in one place is being replaced by cloud-based platforms that enable access to information and collaboration from anywhere and at any time. In addition, big data analytics provide HR with insights into employee trends and performance, enabling talent management and informed decision-making (Sivathanu & Pillai, 2020).

The fusion of HRM with Industry 4.0 has brought a completely new way of managing human resources, allowing HR professionals to focus on more strategic tasks that add value to the organization. By embracing advanced technologies, HRM has become more efficient and strategic (Pillai & Srivastava, 2024). Technology based on artificial intelligence has helped reduce the time spent on recruiting talent by assisting recruiters in the selection and initial interviews, but also by completely replacing them with robots that can conduct hundreds of interviews. In addition, it has enabled the improvement of old recruitment and selection methods and the introduction of new ones, such as gamified simulations of the work environments (Krasulak, 2015; Uma *et al.*, 2023). Employee development and training has been tailored to the individual employee and improved through gamification and virtual reality. Smart AI technologies also offer numerous opportunities for employee retention by recognizing trends that lead to employee turnover (Sivathanu & Pillai, 2020). For example, the technology enables the monitoring of employee well-being and the development of strategies to improve it when needed (Pillai & Srivastava, 2024). Then, sentiment analysis enabled by machine learning monitors employee communication and "by understanding the general mood of a population of employees, whether globally, by department or location, a company can better serve those workers and meet their needs" (Eubanks, 2022, p. 63). Timely and unbiased rewards are also facilitated by new technologies that monitor the performance of all employees and alert managers when someone has delivered an outstanding performance that deserves recognition, or when performance falls short of expectations and action is needed to improve performance (Stone *et al.*, 2015).

Considering the current state of HRM in terms of technology adoption and the significant benefits that technology has already brought, this paper examines whether HRM in the tourism has fully embraced the technological advances offered by Industry 4.0. As previously mentioned, the adoption of HRM 4.0 offers the potential to automate routine tasks, allowing HR managers to dedicate more time to strategic initiatives, which is particularly important for the tourism, where improving operational efficiency can lead to significant cost savings and improved service quality.

METHODOLOGY

In order to achieve the aim of this study, a bibliometric and content analysis was carried out. To collect relevant papers, the systematic approach proposed by Ammirato *et al.* (2023) was used (Figure 1). After conducting an extensive literature review, the author identified keywords related to Industry 4.0 and HRM. Following their study, the same specific search terms were applied in this paper to ensure comprehensive coverage of papers. The search was carried out in the scientific database Web of Science (WoS), which returned 5,604 papers. After applying criteria such as the English language, publication in scientific journals, and relevance to the study, the search was narrowed down to 28 papers. After a manual review of the titles and abstracts, 18 papers were finally selected for bibliometric and content analysis.

As part of the bibliometric analysis, performance analysis (including journals, authors, and countries) and citation analysis were conducted. Additionally, keyword analysis was used to identify key topics in the observed articles and form clusters of related keywords, and ultimately guide the content analysis. The keyword analysis was performed with VOS viewer software version 1.16.20 (van Eck & Waltman, 2014).

Figure 1. The research workflow
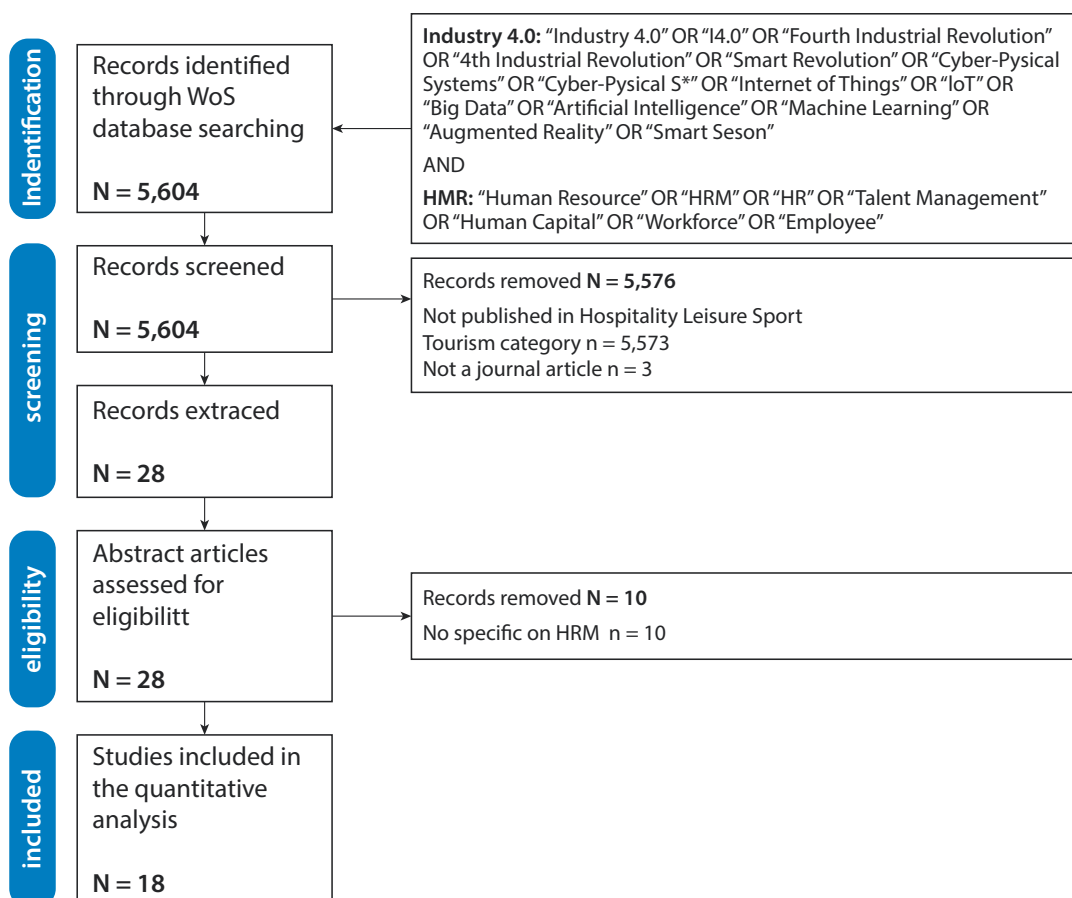
*Source: Author, based on Ammirato et al. (2023)*

RESULTS AND DISCUSSION

Bibliometric analysis

The results of the Web of Science search show that only 0.43% of the papers on Smart HRM 4.0 are related to tourism, which indicates that this topic is under-researched in tourism. The first paper was published in 2010, after which there were no papers on this topic for eight years. In 2019, writing on this topic resumed and in the following three years, two papers were published per year. In 2022, the number of published papers increases to three, but in the following year it drops to just one paper. The sharpest increase in the number of publications was recorded in 2024 when seven papers were published in the first eight months. Figure 2 shows the evolution of the number of publications.

Figure 2. Number of papers by years
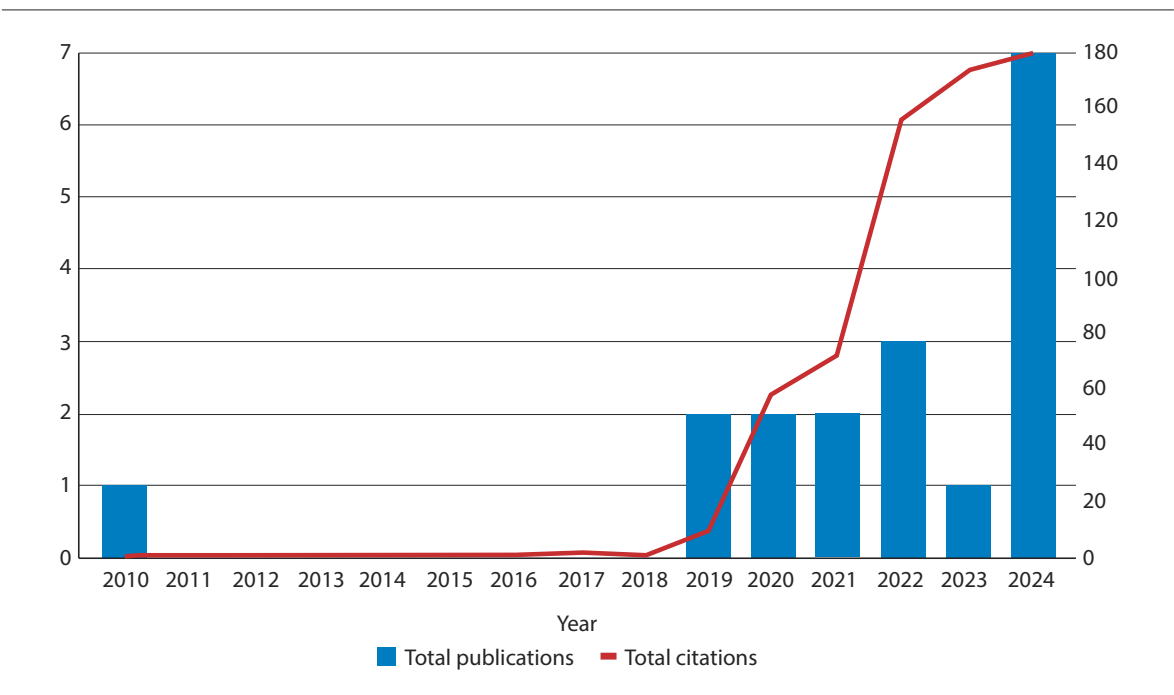
Source: Author

Performance analysis

The papers were published in 10 different journals. Out of these, seven journals published only one paper on Smart HRM 4.0 in tourism. The list of journals that have published more than one paper, with details of the number of papers published and the number of citations, can be found in Table 1. The *International Journal of Contemporary Hospitality Management* (JIF = 9.1), which is listed in the Social Sciences Citation Index (SSCI), is the journal in which the most papers on Smart HRM 4.0 in tourism have been published and most frequently cited. In addition to the five papers published in this journal, six other papers were published in SSCI-indexed journals, which means that more than 60% of the papers that formed the sample for this study met high standards for academic rigor and quality.

Table 1. Journals that published more than one paper

Journal name	Indexing	Number of papers	Number of citations
International Journal of Contemporary Hospitality Management	SSCI	5	258
Worldwide Hospitality and Tourism Themes	ESCI	4	23
Current Issues in Tourism	SSCI	2	4

Source: Author

A total of 46 authors have dealt with the topic of Smart HRM 4.0 in tourism. Out of these, 42 authors, or 91% belong to the "transients" category, i.e., the category of authors who have published only one paper on the observed topic; the remaining 9% belong to the "aspirants" category or the category of authors who have published two to four papers (Crane, 1969). Table 2 shows the authors belonging to the latter category.

Table 2. The most productive authors

Author	Country	Number of papers	Number of citations
Kong, H. Y.	China	3	108
Jiang, X. Y.	China	2	99
Yu, J. H.	China	2	15
Yuan, Y.	China	2	102

Source: Author

Authors from 17 countries have dealt with the observed topic. Table 3 lists the countries of affiliations from which the authors published the most papers and shows that the knowledge is predominantly Western-derived. However, the Republic of China is the leading country in the study of smart HRM 4.0 in tourism in terms of the number of publications and citations. This could be explained by the current "Made in China 2025" program, an initiative for digital transformation across industries.

Table 3. Author's countries of affiliation

Country of affiliation	Number of papers	Number of citations
China	6	400
USA	4	364
England	3	165
Turkey	2	0

Source: Author

Citation analysis

Table 4 shows the five papers with the highest number of citations. In terms of both the total number of citations and the number of citations per year, the paper by Li *et al.* (2019) entitled "Hotel employee's artificial intelligence and robotics awareness and its impact on turnover intention: The moderating roles of perceived organizational support and competitive psychological climate" is the most cited paper.

Table 4. Papers with the highest number of citations

| Author	Author/s	Journal	Total citations	TC/years
Hotel employee's artificial intelligence and robotics awareness and its impact on turnover intention: The moderating roles of perceived organizational support and competitive psychological climate	Li, J., Bonn, M. A., & Ye, B. H. (2019)	*Tourism Management*	288	48
Influences of artificial intelligence (AI) awareness on career competency and job burnout	Kong, H., Yuan, Y., Baruch, Y., Bu, N., Jiang, X., & Wang, K. (2021)	*International Journal of Contemporary Hospitality Management*	93	23.25
How will service robots redefine leadership in hotel management? A Delphi approach	Xu, S., Stienmetz, J., & Ashton, M. (2020)	*International Journal of Contemporary Hospitality Management*	70	14
Ultimate transformation: How will automation technologies disrupt the travel, tourism and hospitality industries?	Ivanov, S. (2019)	*Zeitschrift Für Tourismuswissen-schaft*	56	9.33
Labor shortage solution: Redefining hospitality through digitization	Morosan, C., & Bowen, J. T. (2022)	*International Journal of Contemporary Hospitality Management*	40	13.33

Source: Author

Keyword analysis

A total of 116 keywords were identified in the observed papers. The keyword "hospitality" was the most frequently used, appearing in eight papers, followed by "artificial intelligence" and "robots", each appearing in five papers. Figure 3 shows the two clusters of keywords appearing in at least two papers, which were formed based on their relationships within the observed papers.

Figure 3. Keyword clusters
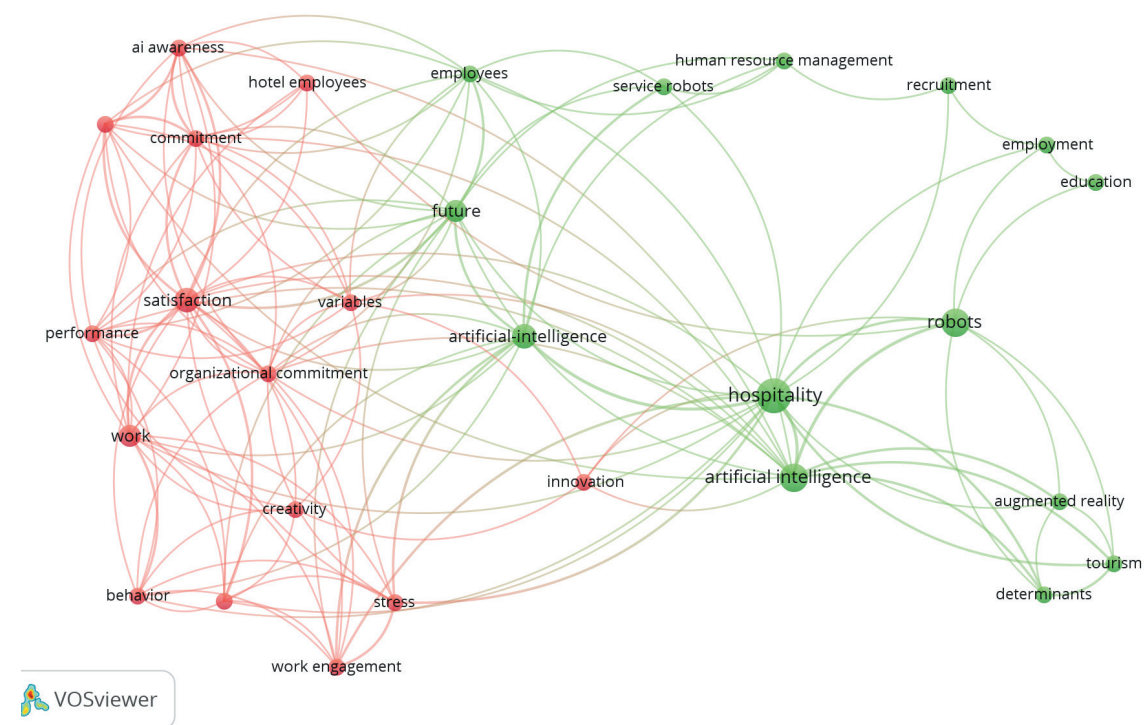
Content analysis

The clusters identified in the previous step were used for the subsequent content analysis. The aim is to complement the previous quantitative analysis and to provide an insight into the directions of previous research and the findings to which the authors have come. Each cluster was named based on the dominant topics that formed the cluster. Although the phrase "artificial intelligence" and related technologies emerged as central keywords in both clusters, the cluster names were primarily determined based on keywords reflecting specific aspects of human resource management. While certain terms used in naming the clusters (such as "selection", "training" and "development") do not explicitly appear as individual keywords in the visual cluster map, a detailed examination of the observed scientific articles revealed that the technologies appearing as keywords are addressed in these contexts. Specifically, articles with keywords such as "augmented reality" or "service robots" address the processes of employee training and development; articles with the keyword "recruitment" also deal with the process of employee selection. Similarly, articles containing keywords such as "satisfaction", "commitment" and "performance" deal with concepts that are key to performance management and employee engagement. The names of the clusters therefore reflect not only explicit keywords but also implicit thematic content in the analyzed publications.

Topic 1: Recruitment and selection, and employee training and development

The integration of advanced technologies such as résumé scanning systems and ChatGPT into the travel industry recruitment process enables faster and more consistent processing of candidate data, freeing recruiters from routine and repetitive tasks and allowing them to focus on more strategic tasks. In this way, both technologies save recruiters time and effort and improve their efficiency (Dickson & Nusair, 2010; Elmohandes & Marghany, 2023). For example, ChatGPT can help organizations generate job descriptions and advertisements or conduct initial screening of candidates (Elmohandes & Marghany, 2023), while a résumé scanning system can help sort and store résumés and select the most suitable applicants based on keywords they assign to each résumé (Dickson & Nusair, 2010). However, the training data on which AI technologies are based can lead to a bias in favor of candidates whose data matches that on which these systems were trained. In addition, they cannot adequately assess certain aspects that are important to the hiring process, such as the candidate's emotional intelligence, which is why human involvement is necessary. Also, when the hiring process is fully automated, the "human touch" is lost, which can make candidates feel less valued (Elmohandes & Marghany, 2023). This automation also leads to a decline in employment opportunities as the number of entry-level jobs, such as receptionists and cleaners, decreases as they are replaced by robots and artificial intelligence (Ivanov, 2019).

As new technologies, such as AI and AR, lead to the reshaping of traditional ways of doing work and require new skills from employees, the role of HRM is to foster an environment in which employees can adapt to the rapid changes in the workplace, but also grow and develop their skills (Bottrill, 2022; Simmons & McLean, 2020). HRM must help employees see AI not as a threat but as a tool for their professional development because the perception that employees have of AI will play an important role in their career resilience and informal learning (Kong *et al.,* 2024a). In addition, HRM must promote a culture of continuous knowledge sharing and competence improvement, support employees in the learning process, and help reduce the tensions that arise when working with advanced technology (Guan *et al.*, 2024). Although the tourism industry is facing increasing automation, it is inherently human-centered. This means that in addition to developing technical (hard) skills, HRM should also ensure that employees are equipped with soft skills such as creativity, emotional intelligence, and ethical decision-making (Simmons & McLean, 2020).

Topic 2: Performance management and employee engagement

Business models based on information technology are a strategic response to the labor shortage in the tourism as well as the inconsistent employee`s performance (Morosan & Bowen, 2022). Tasks traditionally performed by humans are being transferred to technologies such as AI (marketing and data analytics), robots (managing tasks such as guest check-in), IoT (supporting operational efficiency in areas such as guest preferences), and AR/VR (enhancing the guest experience) (Dalgic & Dalgıç, 2024). On the other hand, less revolutionary, inconsistent services are being solved by digitizing traditional processes to maintain established standards (Morosan & Bowen, 2022). Modern technology offers not only the possibility of standardization, but also innovation of business processes and outcomes. The autonomy supported by AI promotes innovation and exploration among employees, but this requires prerequisites such as employee trust in AI and proactive personality traits. The role of HRM is to foster these conditions and select employees who have the potential to improve work outcomes with AI (Kong *et al.*, 2024b).

When done right, the integration of new technologies into everyday operations can lead to greater job satisfaction among employees and greater commitment to the organization (Yilmazdogan, 2024). Employees who feel appreciated and valued despite technological change and who are proactively recognized by their supervisors for promotion to higher positions on the hierarchical ladder perceive technology as an opportunity that they should use to realize their basic psychological needs, leading to an increase in work productivity (Tan *et al.*, 2024). A crucial role in maintaining a stable and productive workforce is played by HRM, which must strike a balance between the adoption of new technologies and strategies that support and improve employee engagement and well-being (Li *et al.*, 2019). However, in addition to the expected increase in organizational efficiency and productivity, the use of modern technology poses various and evolving challenges, such as high costs and significant changes in organizational culture and structure. These are some of the potential issues that decision-makers should pay particular attention to before deciding to implement this technology in their organization (Xu *et al.,* 2020).

CONCLUSION

This paper investigated the current state of research and knowledge on the application of Industry 4.0 technologies in the HRM process in tourism. To achieve this, a bibliometric and a content analysis were employed. Based on the results of the study, certain conclusions can be derived. *Firstly*, Industry 4.0 technology is transforming HRM practices in the tourism, driving innovation and improving operational efficiency. These improvements offer significant benefits for HRM, such as streamlining the recruitment process, automating routine tasks, and improving decision-making. Secondly, they also bring certain challenges that are essential for sustainable growth in the tourism industry, such as improving the skills of the workforce, addressing concerns about job loss due to automation, and fostering collaboration between technology and employees. The integration of new technologies requires employees to develop proactive skills such as adaptability, critical thinking, and digital literacy, so lifelong learning initiatives must be prioritized to ensure employees are able to navigate a complex technology-driven environment. Therefore, a key aspect of this transformation is the evolving focus on the business-to-employee (B2E) model, which prioritizes a more personalized and technology-driven employee experience. By integrating Industry 4.0 technologies (e.g., artificial intelligence, virtual reality), HRM can offer tailored learning programs, performance management tools, and employee well-being initiatives. A B2E approach not only improves employee engagement and satisfaction but also enables companies to attract and retain top talent in an increasingly competitive market.

As tourism businesses increasingly embrace Industry 4.0, HRM will play a key role in managing the relationship between people and technology, ensuring that technology complements, rather than replaces, human input. This balance is where the success of the tourism industry lies. Companies that succeed in aligning their HR strategies with new technologies will not only improve their performance but also have a more resilient and adaptable workforce ready for future business challenges and opportunities. Bottrill (2022) cited in his article that "tourism has not had a particularly good reputation for being innovative. After all, it took thirty years after humans landed on the moon to figure out to put wheels on a suitcase". Such slow progress should not occur in HRM. Like wheeled suitcases transformed the travel experience, the new technology should transform HRM without unnecessary delays.

The *contribution* of this study for scholars is reflected in the discovery of research trends and the summary of the knowledge on the application of Industry 4.0 technologies in the HRM processes, which, to the author's knowledge, has not yet been explored in the context of tourism. By systematically reviewing the recommendations of previous studies on how HRM should manage the interaction between technology and employees and what benefits the use of technology can bring to the HRM processes, the study also makes a practical contribution.

The study is not without *limitations*. The main limitation is the use of only one database for extracting the papers. Another limitation could be the selection of keywords that were used to search for the papers. Future research should also include papers from databases such as Scopus and Google Scholar and consider revising the keyword list with new keywords that allow a larger number of relevant papers to be included.

ACKNOWLEDGMENT

REFERENCES

Agustian, K., Pohan, A., Zen, A., Wiwin, W., & Malik, A. J. (2023). Human resource management strategies in achieving competitive advantage in business administration. *Journal of Contemporary Administration and Management (ADMAN), 1*(2), 108–117. https://doi.org/10.61100/adman.v1i2.53

Ammirato, S., Felicetti, A. M., Linzalone, R., Corvello, V., & Kumar, S. (2023). Still our most important asset: A systematic review on human resource management in the midst of the fourth industrial revolution. *Journal of Innovation & Knowledge, 8*(3), 100403. https://doi.org/10.1016/j.jik.2023.100403

Bach, S. (2005). Personnel management in transition. In S. Bach (Ed.), *Managing Human Resources: Personnel Management in Transition* (4th ed.). Blackwell.

Bogićević Milikić, B. (2017). Organization of the HRM function within a matrix structure. In N. Janićijević, A. Grubor, J. Končar, & G. Petković (Eds.), *Menadžment i marketing – trendovi i uticaji na efikasnost tržišta Republike Srbije [Management and marketing – trends and influences on the market efficiency of the Republic of Serbia]* (pp. 1–16). Belgrade: Faculty of Economics.

Bottrill, C. (2022). Human capital futures: An educational perspective. *Journal of Tourism Futures, 8*(2), 254–258. https://doi.org/10.1108/jtf-04-2021-0101

Bratton, J., & Gold, J. (1994). *Human resource management: Theory and practice*. London: The Macmillan press.

Crane, D. (1969). Social structure in a group of scientists: A test of the "invisible college". *American Sociological Review, 34*(3), 335–352.

Dalgic, A., & Dalgıç, A. S. D. (2024). Technological workforces of events: Where and how to use them? *Worldwide Hospitality and Tourism Themes*. https://doi.org/10.1108/whatt-06-2024-0122

Dickson, D. R., & Nusair, K. (2010). An HR perspective: The global hunt for talent in the digital age. *Worldwide Hospitality and Tourism Themes, 2*(1), 86–93. https://doi.org/10.1108/17554211011012612

Elmohandes, N., & Marghany, M. (2023). Effective or ineffective? Using ChatGPT for staffing in the hospitality industry. *European Journal of Tourism Research, 36,* 3617. https://doi.org/10.54055/ejtr.v36i.3286

Eubanks, B. (2022). *Artificial intelligence for HR: Use AI to support and develop a successful workforce* (2nd ed.). Kogan Page.

Gáll, J. (2023). Artificial intelligence in the hotel industry in Slovakia. *Hotel and Tourism Management, 11*(2), 117–128. https://doi.org/10.5937/menhottur2302117G

Guan, X., Xu, X., Gong, J., & Liu, X. (2024). Facing AI with knowledge: An investigative study on the utilisation of service robots and employee knowledge management behaviours. *Current Issues in Tourism*, 1–17. https://doi.org/10.1080/13683500.2024.2392748

Ivanov, S. (2019). Ultimate transformation: How will automation technologies disrupt the travel, tourism and hospitality industries? *Zeitschrift Für Tourismuswissenschaft, 11*(1), 25–43. https://doi.org/10.1515/tw-2019-0003

Kambur, E., & Yildirim, T. (2023). From traditional to smart human resources management. *International Journal of Manpower, 44*(3), 422–452. https://doi.org/10.1108/ijm-10-2021-0622

Kong, H., Jiang, X., Zhou, X., Baum, T., Li, J., & Yu, J. (2024a). Influence of artificial intelligence (AI) perception on career resilience and informal learning. *Tourism Review, 79*(1), 219–233. https://doi.org/10.1108/tr-10-2022-0521

Kong, H., Yin, Z., Chon, K., Yuan, Y., & Yu, J. (2024b). How does artificial intelligence (AI) enhance hospitality employee innovation? The roles of exploration, AI trust, and proactive personality. *Journal of Hospitality Marketing* & *Management, 33*(3), 261–287. https://doi.org/10.1080/19368623.2023.2258116

Kovach, K. A., Hughes, A. A., Fagan, P., & Maggitti, P. G. (2002). Administrative and strategic advantages of HRIS. *Employment Relations Today, 29*(2), 43–48. https://doi.org/10.1002/ert.10039

Krasulak, M. (2015). Use of gamification in the process of selection of candidates for the position in the opinion of young adults in Poland. *Jagiellonian Journal of Management, 1*(3), 203–215. https://doi.org/10.4467/2450114XJJM.15.015.4472

Li, J., Bonn, M. A., & Ye, B. H. (2019). Hotel employee's artificial intelligence and robotics awareness and its impact on turnover intention: The moderating roles of perceived organizational support and competitive psychological climate. *Tourism Management, 73*, 172–181. https://doi.org/10.1016/j.tourman.2019.02.006

Lin, L. (2011). Electronic human resource management and organizational innovation: The roles of information technology and virtual organizational structure. *The International Journal of Human Resource Management, 22*(2), 235–257. https://doi.org/10.1080/09585192.2011.540149

Morosan, C., & Bowen, J. T. (2022). Labor shortage solution: Redefining hospitality through digitization. *International Journal of Contemporary Hospitality Management, 34*(12), 4674–4685. https://doi.org/10.1108/ijchm-03-2022-0304

Nawaz, N., Arunachalam, H., Pathi, B. K., & Gajenderan, V. (2024). The adoption of artificial intelligence in human resources management practices. *International Journal of Information Management Data Insights, 4*(1), 100208. https://doi.org/10.1016/j.jjimei.2023.100208

Pillai, R., & Srivastava, K. B. (2024). Smart HRM 4.0 for achieving organizational performance: A dynamic capability view perspective. *International Journal of Productivity and Performance Management, 73*(2), 476–496. https://doi.org/10.1108/ijppm-04-2022-0174

Ruiz, L., Benitez, J., Castillo, A., & Braojos, J. (2024). Digital human resource strategy: Conceptualization, theoretical development, and an empirical examination of its impact on firm performance. *Information* & *Management, 61*(4), 103966. https://doi.org/10.1016/j.im.2024.103966

Simmons, E., & McLean, G. (2020). Understanding the paradigm shift in maritime education. *Worldwide Hospitality and Tourism Themes, 12*(1), 90–97. https://doi.org/10.1108/whatt-10-2019-0062

Sivathanu, B., & Pillai, R. (2020). Technology and talent analytics for talent management – A game changer for organizational performance. *International Journal of Organizational Analysis, 28*(2), 457–473. https://doi.org/10.1108/ijoa-01-2019-1634

Statista. (2021, July). *Main business priorities of travel and hospitality companies worldwide in 2020*. Retrieved August 24, 2024, from https://www.statista.com/statistics/1249370/key-business-priorities-of-travel-and-hospitality-companies-worldwide/

Stone, D. L., Deadrick, D. L., Lukaszewski, K. M., & Johnson, R. (2015). The influence of technology on the future of human resource management. *Human Resource Management Review, 25*(2), 216–231. https://doi.org/10.1016/j.hrmr.2015.01.002

Tan, K., Gim, G. C. W., Hii, I. S. H., & Zhu, W. (2024). STARA fight or flight: A two-wave time-lagged study of challenge and hindrance appraisal of STARA awareness on basic psychological needs and individual competitiveness productivity among hospitality employees. *Current Issues in Tourism, 27*(13), 2151–2169. https://doi.org/10.1080/13683500.2023.2224550

Torrington, D., Hall, L., Taylor, S., & Atkinson, C. (2020). *Human resource management* (11ᵗʰ ed.). Pearson Education Limited.

Uma, V. R., Velchamy, I., & Upadhyay, D. (2023). Recruitment analytics: Hiring in the era of artificial intelligence. In P. Tyagi, N. Chilamkurti, S. Grima, K. Sood, & B. Balusamy (Eds.), *The adoption and effect of artificial intelligence on human resources management* (pp. 155–174). Emerald Publishing Limited. https://doi.org/10.1108/978-1-80382-027-920231008

van Eck, N. J., & Waltman, L. (2014). Visualizing bibliometric networks. In Y. Ding, R. Rousseau, & D. Wolfram (Eds.), *Measuring scholarly impact: Methods and practice* (pp. 285–320). Springer. https://doi.org/10.1007/978-3-319-10377-8_13

Xu, S., Stienmetz, J., & Ashton, M. (2020). How will service robots redefine leadership in hotel management? A Delphi approach. *International Journal of Contemporary Hospitality Management, 32*(6), 2217–2237. https://doi.org/10.1108/ijchm-05-2019-0505

Yilmazdogan, O. C. (2024). Elevating workforce stability: Augmented reality and artificial intelligence solutions for overcoming employee turnover challenges in hospitality and tourism. *Worldwide Hospitality and Tourism Themes*. https://doi.org/10.1108/whatt-07-2024-0156

Zhang, J., & Chen, Z. (2024). Exploring human resource management digital transformation in the digital age. *Journal of the Knowledge Economy, 15,* 1482–1498. https://doi.org/10.1007/s13132-023-01214-y

PAMETNI HRM 4.0: DIGITALNA TRANSFORMACIJA UPRAVLJANJA LJUDSKIM RESURSIMA U TURIZMU

Rezime:

Tehnologije industrije 4.0, uključujući veštačku inteligenciju, robote i internet inteligentnih uređaja (IoT), suštinski su preoblikovale upravljanje ljudskim resursima (HRM). Usvajanje ovih tehnologija dovelo je do pojave pametnih HRM praksi, koje imaju potencijal da povećaju angažovanje zaposlenih i njihovu operativnu efikasnost. Ovaj rad ima za cilj da istraži kako su se prakse upravljanja ljudskim resursima u turizmu promenile, kao rezultat novih tehnologija i da li je to dovelo do poboljšanja operativne efikasnosti, angažovanja zaposlenih i/ili unapređenja zadovoljstva. U tu svrhu sprovedena je bibliometrijska i analiza sadržaja na uzorku od 18 radova identifikovanih u naučnoj bazi podataka *Web of Science*. Bibliometrijska analiza dala je opšti pregled naučnih istraživanja, odnosno dominantnih časopisa, autora i zemalja u ovoj oblasti, kao i glavne istraživačke teme. Analiza sadržaja je korišćena za sumiranje nalaza prethodnih istraživanja implementacije tehnologije u sledećim procesima upravljanja ljudskim resursima: 1) regrutovanje i selekcija i obuka i razvoj zaposlenih i 2) upravljanje učinkom i angažovanje zaposlenih. Nalazi ove studije daju istraživačima i menadžerima pregled postojećih istraživanja i, sumirajući glavne zaključke, daju smernice za buduća istraživanja i primenu tehnologija Industrije 4.0 u HRM procesima u turizmu.

Ključne reči:

četvrta industrijska revolucija,
industrija 4.0,
veštačka inteligencija (AI),
ljudski resursi,
turizam i hotelijerstvo.

JEL klasifikacija:
Z32, J24, O33