Neurotechnologies and Human Talent Management: A Bibliometric Exploration, Ethical Considerations, and Future Directions

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ABSTRACT- The present research develops a bibliometric review of the scientific production regarding neuroscience applications in Human Talent Management (HTM), with the purpose of identifying the most relevant trends, authors, academic sources, publishing institutions and future research lines in this area. A bibliometric review was conducted by the PRISMA methodology. A total of 35 articles from the Scopus and Web of Science databases were selected for review. The analysis was executed using Bibliométrix in R, with the objective of determining collaborative networks, sources, and thematic clusters with respect to neurosciences and HTM. The analysis identified four distinct clusters: (1) Human Talent Management; (2) Neurotechnologies in Human Talent Management; (3) AI and neurotechnologies in HTM; and (4) Neuroethics in HTM processes. In consideration of the findings, the primary research directions concerning neurotechnologies and their implementation in the domain of HTM were delineated. It is concluded that the application of neurosciences to HTM processes is an emerging and little-studied topic, however, with a promising annual growth rate. There are notable lacunae in the extant literature pertaining to neuroethics and the integration of AI and neurotechnologies with HTM processes, which point to the need for future research in these areas.

Keywords: Neurotechnologies; Human Talent Management (HTM); Neuroscience; Bibliometrix; Neuroethics

I. INTRODUCTION

The impact of the global pandemic of Coronavirus (SARS-CoV-2) has been significant in prompting digital transformation in companies, driving improvements in the management of the Human Talent Management (HTM) department and encourage the need to adapt quickly to changes in processes [1], technology, work models, and also becoming an opportunity to improve organizational competitiveness and thus be able to make decisions more efficiently [2].

Academic research has demonstrated the efficacy of neuroscience in evaluating stress and engagement levels during job interviews [3]. This assessment is facilitated by the utilization of neurotechnologies, including electroencephalography, galvanic skin response, and emotional sensors [3], [4], [5]. Furthermore, the integration of facial recognition algorithms for facial expressions, prosody, verbal content and voice analysis has enabled the performance of evaluations in job interviews[6].

Neuroscience holds considerable implications for the comprehension of human behavior within the context of recruitment as a component of talent acquisition strategy [7]. The utilization of neuroscience technologies has the potential to enhance the identification of talent by offering insights into candidates' cognitive and emotional responses, thereby facilitating more informed hiring decisions[8].

The present study offers a theoretical contribution to the field by addressing the knowledge gap concerning the utilization of neurotechnologies in HTM processes, such as recruitment and selection, where numerous challenges remain to be addressed[9].

The objective of this bibliometric research is to identify the scientific production regarding the applications of neurosciences in HTM, with a view to identifying the most relevant trends, authors, academic sources, publishing institutions and future research lines in this area.

This bibliometric study is essential for identifying the intellectual foundations, emerging trends, and under-explored research clusters within the field. By doing so, it will guide future research with greater precision and academic relevance[10]. To this end, the following research question is hereby proposed: How has the scientific literature evolved in addressing the applications of neurosciences in HTM, and what patterns emerge in terms of influential authors, sources, institutions, and future research directions based on bibliometric evidence?

The following article is organized into five primary sections. The initial section of this text serves to introduce the subject matter and its pertinence to the domain of HTM. The second section of the text presents a thorough review of the extant literature, providing a comprehensive contextual framework for understanding the role of neurosciences in HTM. The third section delineates the methodology employed for the bibliometric analysis. The fourth section of this study presents the results, including the most relevant findings, identified research clusters and sub-clusters, as well as emerging trends and future research directions. The fifth section is devoted to a critical discussion of the study's findings and the main conclusions that were derived from the research.

II. LITERATURE REVIEW

A. From Brainwaves to Hiring Decisions: Technological Applications in HTM

Recent advancements in the field of applied neuroscience have prompted the integration of neurotechnologies within the realm of HTM, particularly in the domains of recruitment and selection processes [5], [11], [12]. Neurophysiological tools such as electroencephalography (EEG), eye-tracking, and

galvanic skin response (GSR) allow practitioners to capture cognitive and emotional responses during interviews, enabling more accurate and bias-reduced assessments of candidates[3], [13]. These tools facilitate the discernment of subconscious reactions that are not readily identifiable through conventional self-report instruments [14]. Furthermore, the potential of brain-based evaluations to enhance leadership development is being investigated by assessing neural patterns associated with empathy, decision-making, and resilience[11], [15]. However, the application of neuroscience in HTM remains predominantly focused on operational processes, with limited exploration of its potential for strategic planning and long-term talent development [9], [12].

B. Ethical Blind Spots and Governance Gaps in Neuro-Based Talent Practices

As neurotechnologies become more prevalent in the workplace, ethical concerns regarding data privacy, autonomy, and informed consent have gained significant prominence [16], [17]. Neurodata, due to its sensitive nature, may reveal information beyond what a person explicitly discloses, raising concerns about mental privacy and potential misuse by employers [18], [14]. Researchers have underscored the absence of clear organizational protocols and legal guidelines to regulate the use of brain-related data in HR processes [19], [20]. A proposal has been put forth for a new approach, which is to use stakeholder-inclusive, design-based ethical inquiry as a method to explore and anticipate potential ethical tensions that may arise when implementing neurotechnologies in real-world settings [21]. Furthermore, scholars contend that neuroethics in HRM must take into account inequalities in access to technology and the risk of algorithmic or cognitive bias exacerbating discrimination [6], [22].

C. Algorithmic Interpretations of the Mind: Risks and Promises of AI-Neuro Integration

The intersection of artificial intelligence (AI) and neuroscience in HTM represents an emerging domain with transformative implications for candidate profiling, performance evaluation, and workplace personalization [23]. Multimodal systems, driven by AI and biometric sensors, are being adopted more frequently to predict job fit and evaluate social-emotional cues, such as tone of voice or facial micro-expressions, during asynchronous interviews [24]. However, authors have posited that these systems may become susceptible to the embedding and reinforcement of biases, particularly when trained on non-representative datasets or when deployed without transparency [25]. Research has underscored the imperative for comprehensive explainability and accountability frameworks to govern these hybrid AI-neurotech applications [26]. Despite the potential for enhanced efficiency and objectivity, the field remains devoid of rigorous empirical studies that would substantiate the efficacy of these systems in real-world organizational settings [12].

D. Strategic Integration of Neurotechnologies in HTM

The strategic integration of neurotechnologies into HTM remains an emergent field, often overshadowed by more immediate operational applications such as recruitment, screening, or interview [27]. While these tools have demonstrated value in enhancing efficiency and objectivity, few studies have explored their potential for long-term strategic outcomes related to leadership, well-being, or organizational adaptability [28]. The alignment of neurodata and analytics with organizational key performance indicators (KPIs) remains under-theorized, hindering efforts to evaluate the long-term strategic value of these technologies [29]. AI-driven talent analytics, as a parallel technological approach, offers evidence for integrating predictive tools to support workforce forecasting, skill gap analysis, and dynamic talent allocation, reinforcing the value of data-aligned strategies [30]. However, challenges persist in ensuring the ethical, regulatory, and infrastructural readiness for implementation on a large scale, particularly in emerging economies and contexts of low digital maturity (Bosi, 2025).

III. METHODOLOGY

Considering the recent proliferation of academic studies on a global scale, which generate voluminous amounts of information, bibliometric studies have emerged as a potent statistical instrument for the analysis and dissemination of information[31].

In the present research, the PRISMA methodology[32] and bibliometric analysis were used in two databases: Scopus and Web of Science (WoS). This bibliometric study utilizes Scopus and WoS due to their high coverage, rigorous indexing criteria, and recognized reliability in ensuring the quality and traceability of scientific production [33]. Each database was consulted separately, and the results were exported in BibTeX (.bib) format. As the internal structures of the two databases differ, the use of R software [34] and the specialized bibliometric package Bibliometrix [31] was necessary to standardize and combine the data obtained. Thereafter, the amalgamated data were exported in Excel (.xlsx) format for analysis through the Biblioshiny interface [35], a web platform included in bibliometrics that facilitates bibliometric visualization and analysis.

A. Research strategy

The bibliographic data used in this study were extracted from two of the most relevant databases worldwide. Implementing the Scopus and WoS strategies resulted in more substantial documentary coverage, ensuring a comprehensive and representative overview of the state of the art [36]. The following databases were excluded: Google Scholar was excluded due to its lack of standardized indexing and structured export formats. IEEE Xplore was excluded due to its technical focus rather than managerial focus. PubMed was excluded due to its predominantly biomedical scope, which lies outside the objectives of this study. In both selected platforms, a keyword

search strategy is executed by means of the Boolean functions: AND, OR, NOT. The selection of keywords was meticulously executed to encapsulate three interwoven facets of the research subject. First, core neurotechnologies and methods applied in organizational and recruitment contexts (e.g., "neuroscience," "neurotechnology," "EEG," "eye-tracking," "GSR"). Secondly, terms associated with human resource management processes, such as "recruitment," "talent management," "human resources," and "hiring," are also included. Thirdly, the ethical, organizational, and adoption-related perspectives (e.g., "ethics," "acceptance," "resistance to change," "organizational adoption") should be considered. Despite the incorporation of an exploratory string that encompassed the term "nanotechnology," this was subsequently excluded in subsequent iterations due to its lack of direct alignment with the scope of neurotechnology in talent management.

The period 1999–2026 was chosen for the filters because the earliest indexed studies linking neuroscience to human resource management appeared in the late 1990s. The range up to 2026 ensures coverage of current studies and forthcoming articles that have already been indexed online and are available ahead of print. English and Spanish were selected as language filters to maximize coverage of international publications while including regional contributions from Latin America and Spain, where research on the application of neuroscience to business is emerging. The following search terms were utilized:

- TITLE-ABS-KEY ("neuroscience" OR "neurometrics" OR "neurotechnology" OR "EEG" OR "eye-tracking") AND ("recruitment" OR "human resources" OR "hiring" OR "talent acquisition") AND PUBYEAR > 1999 AND PUBYEAR < 2026 AND (EXCLUDE by several areas)
- TITLE-ABS-KEY ("nanotechnology" OR "biometric technology" OR "EEG" OR "GSR" OR "eye-tracking") AND ("human resources" OR "recruitment" OR "talent management") AND ("future directions" OR "trends" OR "prospects" OR "emerging technologies" OR "innovation in hr")
- ("neuroscience" OR "biometric technology" OR "applied neurosciences") AND ("interview" OR "HR practices" OR "talent selection") AND ("ethics" OR "acceptance" OR "perceptions" OR "organizational adoption" OR "resistance to change") – Limitedo to: Business, Management and Accounting
- ("job interview" OR "employment interview" OR "recruitment interview") AND ("neuroscience" OR "EEG" OR "electroencephalography" OR "facial expression analysis" OR "face reading" OR "GSR" OR "galvanic skin response" OR "eye-tracking")
- Neuroethics – Limitedo to: Business, Management and Accounting

In order to ensure reproducibility, the systematic search was conducted between 01st and 30th April 2025 in both databases. The complete search queries are reported verbatim as entered in the databases, including all Boolean operators and filters applied. No further modifications were made to the strings, and the only restrictions applied were by year (1999–2026), language (English and Spanish), and subject area (Business, Management, and Accounting).

B. Inclusion and exclusion criteria

The selection of articles was governed by clearly defined inclusion, exclusion, and eligibility criteria, in accordance with the PRISMA guidelines. A total of 4,363 records were identified from Scopus and Web of Science (WoS). Of these, 4,216 were excluded by automatic database filters based on year, language, subject area, and document type. The remaining 147 records were screened manually, and 90 were excluded because they belonged exclusively to the health sciences or were not aligned with this study's objectives. After removing 22 duplicates, 35 articles were included in the final sample for analysis (see the PRISMA flow diagram in Figure 1). All articles are listed in table 1:

TABLE I
TOTAL OF ARTICLES ANALIZED ACCORDING TO RESEARCH SUBJECTS

Subject researched	N° articles	Articles (Authors and year)
Neuroethics and Neurotechnologies	19	Breuer et al. (2024)[37], Fukushi (2024)[38], Goncalves et al. (2024)[39], Rusti et al. (2023)[40], Lindebaum et al. (2018)[41], Bowman et al. (2018[42]), Ramos et al. (2018)[43], Arentshorst et al. (2015)[44], Weh (2024)[45], Pagan et al. (2024)[46], Knopf et al. (2023)[47], Coenen (2020)[48], Adamczyk & Zawadzki (2020)[49], Rainey et al. (2020)[50], Mecacci & Haselager (2019)[51], Meacham & Prado Casanova (2018)[52], Bulley et al. (2018)[53], Kalichman et al. (2012)[54], Schermer (2009)[55].
Human Talent Management and Neurotechnologies	16	(Gusev et al., 2023)[56], Çelik & Türker (2022)[57], Balconi et al. (2022)[3], Martín-Luengo et al. (2022)[58], Zito et al. (2021)[4], Arslan Aydin et al. (2021)[59], Sandoval & Castillo (2021)[60], Teacu Parincu et al. (2020)[61], Wang et al. (2019)[62], Lindebaum (2013)[63], Salvatore et al. (2025)[64], Mantello et al. (2023)[65], Balconi et al. (2022)[3], Pfiffelmann et al. (2020)[66], Hoenen et al. (2018)[67], Hollandsworth et al. (1978)[68].
Total	**35**	

A series of specific filters were applied in order to exclude editorials, letters, notes and summaries. Only studies written in English, Spanish and one document in Russian were included in the search. The search period was open to and including the year 2025. The following subject areas were excluded from the study: A range of disciplines is represented, including medicine, biochemistry, computer science, engineering, and mathematics. Should further details of the criteria be required, the following online resource (see criteria matrix) is available for consultation. The following is the flow in the PRISMA protocol that was performed in the research:

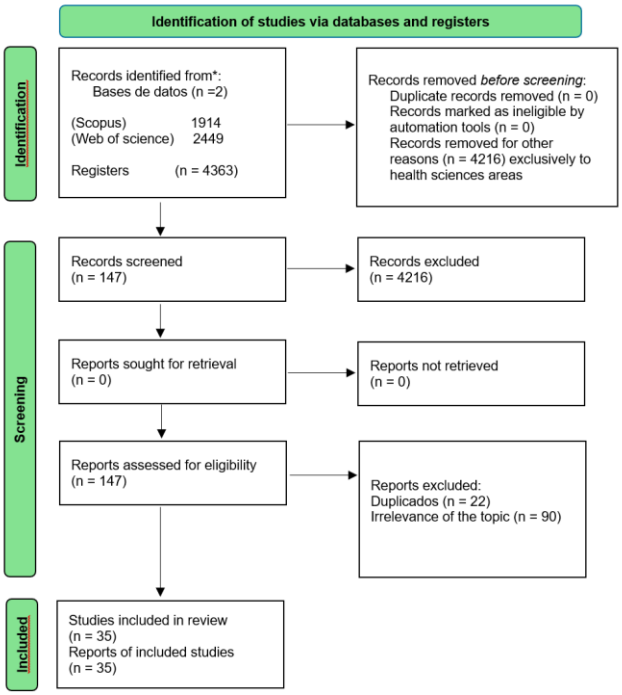

Fig. 1 *PRISMA protocol adapted used in the study*

IV. ANALYSIS OF RESULTS

A. Summary

The present research reviewed the scientific production on neurosciences applied to Human Talent Management (HTM) processes published between 1978 and 2025. A total of 35 articles were analyzed and selected on the basis of their relevance to the central theme, as published in 25 journals, written by 115 authors, with an average citation per paper of 2.7. A total of five papers have been identified as having single authorship, with no contributions from coauthors.

B. Annual publications and trend over time

The inaugural scientific publication was produced in 1978; however, it was not until 2009 that another article was discovered. Following 2009, a greater annual scientific production is evident. The years 2018, 2020 and 2024 are hypothesized to be those in which the greatest scientific production will be observed in the central topic of study. The year with the highest production has been documented as having six scientific publications, which denotes that the topic is still in an emerging stage.

C. Main journals

A total of 25 journals were identified in the bibliometric analysis. The journals that contributed the most articles were Nanoethics, Science and Engineering Ethics and Journal of Responsible Innovation. The latter journal is presented as the most relevant with respect to impact indices (h_index=2, g_index=3, m_index=0.25). However, the journal with the highest total citations is Journal of Management Inquiry with a total of 33 citations.

D. Articles with the highest impact

Of the 35 papers under consideration, the top ten most-cited papers stand out for their significant contributions to the field. To avoid bias toward older publications, normalized indicators (citations per year) were calculated in addition to total citation counts. This comparison reveals notable differences: Lindebaum et al. (2013) have the highest total citations (33), but their normalized rate is only 1.00 per year. This reflects the accumulation effect over time rather than current influence. Conversely, more recent studies, such as those by Gonçalves (2024) and Teacu (2020), despite having lower absolute citation counts (eight and seven, respectively), have much higher normalized rates (four and five per year), which underscores their stronger immediate impact. This dual perspective reveals that total citations reward longevity while normalized values better capture the intensity and relevance of newer research contributions (see Table II).

TABLE II
TOP 10 MOST CITED ARTICLES

Paper	DOI	Total citations	Total Citations/Year Normalized
Lindebaum, 2013[12]	10.1177/1056492612462766	33	1,00
Ramos K, 2018[43]	10.1080/23299460.2017.1319035	10	2,86
Goncalves M, 2024[39]	10.1080/23311975.2024.2333063	8	4,00
Lindebaum D, 2018[22]	10.5465/Amle.2016.0220	8	2,29
Zito M, 2021[4]	10.3389/Fpsyg.2021.673012	7	2,33
Teacu A, 2020[11]	10.2478/Picbe-2020-0099	7	5,00
Balconi M, 2022[3]	10.3390/Info13070312	4	2,29
Arentshorst M, 2015[44]	10.1093/Scipol/Scv004	4	1,00
Bowman D, 2018[42]	10.1080/23299460.2018.1433928	3	0,86
Rusti C, 2023[40]	10.1109/IJCB57857.2023.10449225	2	1,00

Note: Taken from Bibliometrix [35]

E. Most relevant institutions and countries with the highest scientific production

Concerning the most relevant institutions with regard to neuroscience and its application in the HTM, Middle East Tech University and Arizona State University are identified as the most prominent. The nation that has conducted the most research in this area is the United States, followed by Italy, Turkey, and Russia. A paucity of scientific production is evident in Central America, Mexico, and a considerable portion of the

African and Asian continents. The scientific production from Australia is also highlighted, and finally, Colombia is the only Latin American country, as shown in the following figure:

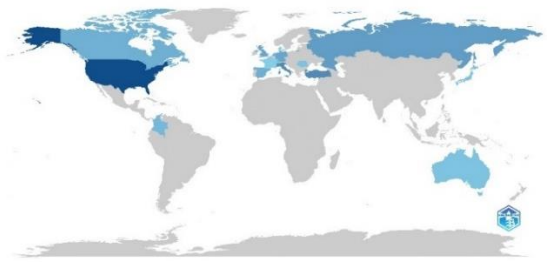

Fig. 2 Scientific production by country
Note: Taken from Bibliometrix [35]

F. Most common terms

A Wordle analysis was performed on the summaries, revealing that the most prevalent terms center on neurotechnologies, brain reading, human resources, the recruitment process, and ethical principles, among others. The following figure provides a comprehensive overview of the data:

Fig. 3 *Most common terms*
Note: Taken from Bibliometrix [35]

G. Tematic maps

The identified topics manifest a diverse structure, grouped into four major clusters. The initial three themes—Human Talent Management, Neuroscience, and Neurotechnologies—are introduced as areas of study, accompanied by a discussion of theoretical developments and extant research. Conversely, neuroethics is characterized as a nascent field of study, situated in the preliminary stages of research and investigation.

This distribution indicates the thematic trends in the implementation of neuroscience in human talent management and represents an approach to possible future lines of research.

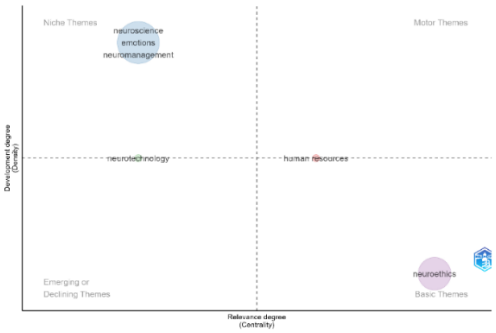

Fig. 4 *Thematic map*
Note: Taken from Bibliometrix [35]

With respect to the thematic relationship between the clusters, the co-occurrence map presents a clear hierarchy, where neurotechnologies emerge as the central theme, and around it the main themes are linked, especially those connected to job interviews and the ethical implications of applying neuroscience techniques and brain reading to evaluate behavior and make hiring decisions.

Fig. 5 *Co-occurrence Network map (field: AB; N-grams: 2)*
Note: Taken from Bibliometrix [35]

H. Human Talent Management and Neuroscience: applications and evidence

Documentary evidence indicates a strong current of neuroscience applications in human talent management, mainly focused on diverse applications in recruitment and selection of personnel. Nonetheless, there exist further domains in which the scientific study of the nervous system has yielded practical applications. One such example is the realm of leadership and neuroleadership, wherein research has been undertaken to ascertain how cerebral activity can facilitate the discernment of leadership qualities, including the capacity for effective decision-making and emotional intelligence[11], [41].

Conversely, the field exhibits a discernible presence of neuroethical subjects, albeit to a more modest degree. These subjects pertain to the safeguarding of the privacy of individuals involved in diverse neuroscience-related processes, to formulate regulatory frameworks aimed at averting the misuse of sensitive data.

The following online resource (RL-01) is available for consultation to access the complete classification of articles related to HTM.

I. Neurotechnologies in Human Talent Management

A review of the literature indicates the employment of a variety of neuroscientific technologies in the context of human talent management. The most frequently utilized tools include electroencephalography (EEG), galvanic skin response (GSR), facial recognition, and eye tracking (ET).

The primary objective of employing these neuroscientific tools is to obtain more reliable responses devoid of rational bias. By measuring direct or indirect brain activity, a more reliable response can be obtained that is free of bias, stigma, or any other variable that may influence decision-making processes or behavior.

J. Neuroethics in HTM processes

Neuroethics has emerged as a significant domain within HTM, particularly in contexts involving the recruitment and selection of personnel, where ethical dilemmas arise. A review of the extant literature reveals several predominant approaches.

A particular emphasis is placed on the safeguarding of neurophysiological data, encompassing the protection of the information and privacy of individuals who participate in interviews and collaborate with organizations. Proposed regulatory frameworks are designed to address the principles of accuracy, reliability, and anonymity. The text also covers the importance of incorporating informed consent/assent in each process[43], [51].

The following discussion centers on the presence of bias and equity in processes involving neurotechnologies. The issue of unequal access to neurotechnologies due to cost or other factors is addressed. Furthermore, it has been asserted that the implementation of neurotechnologies has the potential to exacerbate existing biases in recruitment and selection processes, particularly in the context of vulnerable populations[37], [47].

The ethics of neuroleadership are a subject of considerable debate. The use of techniques such as functional magnetic resonance imaging (fMRI) or neurofeedback to identify individuals with superior cognitive abilities has been called into question due to the absence of definitive evidence supporting their efficacy in professional settings[12], [41].

Finally, some authors have underscored the necessity for regulatory frameworks that engage a range of professionals to formulate legislation governing the neural space of individuals[54].

K. Artificial intelligence (AI) and neuroscience in the context of HTM

The integration of artificial intelligence (AI) with neuroscience in the context of HTM is a nascent topic, with a paucity of literature addressing this research approach. In [45] is stated the degree of potential inherent in this fusion is stated, particularly about the recruitment and selection of personnel, as well as organizational development through learning systems that adopt a neuroscience approach.

The absence of specific procedures or integrations in the literature indicates a paucity of research in this area, necessitating further investigation to elucidate the potential benefits and drawbacks of this combination.

L. Empirical evidence from the articles analyzed

This study has identified the empirical research contained in the set of articles analyzed. The findings indicate a mounting interaction between neurotechnologies and personnel recruitment and selection processes, as well as research on assessment and socialization. The research carried out has demonstrated the use of neurotechnologies, such as electroencephalograms (EEG), eye tracking, and galvanic skin response (GSR), with the aim of quantifying various cognitive and affective responses during decision-making processes.

In the domain of job interviews and within the framework of neuroethical discourse, extant scientific literature posits that neuropsychological assessments possess the capacity to discern behaviors and signals that elude detection through self-reports or observational methodologies. As demonstrated in [69] and [70], numerous studies have emphasized the utilization of hyperscanning techniques and multimodal approaches. These studies have also emphasized the role of interpersonal attunement and emotional synchronization in face-to-face interactions versus digital interactions. In contrast, [4] and [57] have indicated that implicit biases and stress responses have the capacity to influence the outcomes of recruitment processes. This has practical implications for the principles of fairness and transparency in assessment processes. A more thorough examination of this information is available in the following online resource (RL-02).

V. DISCUSSION AND REMARKABLE CONCLUSION

The advent of neuroscience applications in the domain of Human Talent Management (HTM) signifies a paradigm shift in the way organizations comprehend and enhance human behavior within workplace environments. This study, grounded in a bibliometric methodology, analyzed a total of 35 scientific articles and addressed how the literature has evolved in this domain by identifying the key trends, contributing authors, relevant sources, and thematic gaps. By undertaking this comprehensive review, the study offers a thorough examination of the intellectual landscape surrounding the integration of neurotechnologies, artificial intelligence, and ethical considerations in HTM practices, with a particular focus on recruitment, leadership, and organizational development.

A. Discussion

This research aimed to identify scientific literature on neuroscience applications in HTM to detect influential authors, institutions, and journals and to identify future research trends. The research question focused on how literature in this field has evolved and what patterns emerge regarding key contributors and knowledge gaps.

Geographically, the analysis revealed a strong predominance of contributions from the United States, Italy, Turkey, and Russia, with notable representation from Australia and Colombia.

Colombia is the only Latin American country that contributes to this field. Conversely, research from Central America, Mexico, Africa, and large parts of Asia was notably absent. This geographical asymmetry limits the generalizability of the findings and suggests cultural, economic, and technological disparities in the adoption and study of neurotechnologies [12], [14], [17].

Of the 25 analyzed journals, the Journal of Responsible Innovation and the Journal of Nanoethics stood out for their contributions at the intersection of neuroethics and human resource management (HRM), while the Journal of Management Inquiry led in terms of citation impact, with 33 citations attributed to [12]. This emphasizes the prevalence of ethically focused discussions in influential literature, particularly concerning mental privacy and the ethical use of neurodata in hiring processes [16], [17].

The most highly cited authors in this field is Lindebaum [12], [22], who has extensively explored the ethical implications of using neuroscience in leadership research, and Ramos [17], whose work on neuroethics in the context of the NIH BRAIN Initiative has shaped fundamental perspectives. Significant contributions also came from Zito [4] who focused on EEG and bioelectrical measures in job interviews, and from Gonçalves[14], who examined consumer privacy in neuromarketing and its HR implications.

Despite the growing number of publications, particularly in 2018, 2020, and 2024, the field remains fragmented. Most authors have only published once, hindering the formation of sustained research agendas and collaborative networks. This fragmentation is reflected in the field's thematic structure, consisting of four primary clusters: (1) human talent management, (2) neurotechnologies in human talent management (HTM), (3) artificial intelligence (AI) and neurotechnologies in human resource management (HRM), and (4) neuroethics.

A recurring concern in the literature is the lack of empirical studies validating the use of neurotechnologies, such as EEG, GSR, facial recognition, and eye tracking, in real-world HR contexts [3], [4]. Most studies are theoretical or experimental with small samples in controlled settings. There is a significant gap in qualitative and interdisciplinary approaches that can capture the nuanced implications of these technologies in organizational environments.

Furthermore, although the integration of AI with neuroscience is promising in terms of predictive analytics and candidate profiling, it has been criticized for reinforcing algorithmic biases and lacking transparency [6], [25]. The literature also emphasizes the urgent need for regulatory frameworks and ethical guidelines because current legal structures are insufficient to protect neurophysiological data and ensure informed consent [18], [21].

C. Conclusion

This study makes a significant theoretical contribution by mapping the evolution and structure of the scientific literature on neuroscience in human-technology interaction (HTM), identifying progress as well as persistent gaps. Thematically, the findings emphasize the operational focus of current applications, primarily recruitment and selection, while revealing the insufficient exploration of strategic HR functions, including leadership development, organizational change, and employee well-being [11], [22].

Key theoretical implications include the necessity of developing integrative models that account for the personal, organizational, and contextual variables that influence the adoption of neurotechnologies. Additionally, the relationship between neuroethics and legal doctrines, such as neuro-rights, remains unclear and under-theorized, particularly in emerging economies.

Practical Implications and Policy Recommendations

The analysis in this study reveals a clear need for neurotechnologies to be adapted to HTM processes ethically. Therefore, organizations are recommended to establish protocols for informed consent, data minimization and anonymization, and external audits to ensure transparency and fairness in neurodata processing (Mecacci & Haselager, 2019; Knopf et al., 2023; Weh, 2024). Organizations should also verify the diversity of algorithmic training bases and promote internal frameworks for mental privacy protection aligned with the neurodights and neuroethics approaches proposed in recent literature (Ramos et al., 2018; Lindebaum et al., 2018; Bosi, 2025). Integrating these principles will enable neurotechnological innovation to progress without compromising cognitive autonomy or equity in human resource processes.

This study has a few limitations. First, only articles in English, Spanish, and Russian were considered, and the search was restricted to Scopus and WoS. These limitations may have excluded relevant literature from other regions or fields.

Future research should explore the strategic integration of neurotechnologies beyond recruitment and focus on aligning them with key performance indicators (KPIs), workforce planning, and talent forecasting. Furthermore, future studies should investigate ethical implementation frameworks, particularly in contexts with low digital maturity, and evaluate organizational readiness for such technologies.

To sum it up, this study emphasizes the need for ethical, evidence-based integration of neurotechnologies in HR management, highlighting the fact that neuroscience in HTM is an emerging yet underdeveloped field.

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