

Leveraging HR Analytics as a Human Resource Management Practice in The Service Industry - A Bibliometric Analysis

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Abstract

HR analytics has been viewed as an innovative force in resource management, enabling organisations to make data-driven decisions, employ predictive modelling, and utilise artificial intelligence applications for a more nuanced management of the organisation. A systematic literature and bibliometric analysis of the literature in HR analytics has been developed in the service industry, utilising co-citation network analysis, thematic mapping, trend analysis, and collaborative network mapping as various bibliometric analysis tools to map the emergence, existing paradigms, and future directions therein. This study makes it clear that HR analytics research is blossoming in two dimensions: on one end, it addresses traditional HRM theories, such as strategic workforce planning and talent management, while the other focuses on AI applications within HRM, predictive analytics, and integration with machine learning. The themes emerging include AI ethics and their cross-functional approach to talent management, insights from behavioural science and workforce analytics, as well as environmental management of resourcing strategies. The practitioner implications include calling on HR professionals to sharpen their analytic acumen for the sake of talent management and strategic workforce planning, aided by new AI-based governance regimes. The importance of cross-disciplinary collaboration between the HR, IT, and business strategy teams in maximising the potential of HR analytics is also emphasised. The HR analytics world presents a myriad of benefits. Still, other functions also face constraints, including issues of data accessibility, the rapid evolution of technologies, and the broader application of research across various industries and regions. This study fills a niche intersection of employer branding and recruitment by offering a bibliometric analysis of the budding field of HR analytics in the service industry. It contributes to both the development of theoretical advancements in strategic HRM and the provision of actionable insights into how organisations can achieve a sustainable competitive advantage in the service industry.

Introduction

It is evident that the business climate is constantly evolving, particularly in terms of technology, and the IT industry is a key driver of these innovations. As companies innovate, there is a growing emphasis on how organisations manage their human resource (HR) in order to thrive or gain uniqueness (Strohmeier, 2009). The use of HR analytics is rapidly becoming an essential aspect of implementing strategies to optimise workforce performance based on available data. In an industry such as IT, where people are the core assets, as they are the ones creating IT, HR analytics helps organisations effectively manage various functions, including recruitment, retention, performance management, and employee engagement (Davenport, Harris, & Shapiro, 2010). Through the use of data, the Service Industry can identify trends and forecast future events, enabling the development of policies that sustain employees and promote good performance for the betterment of the organisation (Bersin, 2015). Due to the constant evolution of the need for data-driven HR decision-making across the service sector, HR analytics are being pushed to new heights (Sakib et al., 2024). The global HR analytics industry is valued at \$2.96 billion (Sharma & Kumar, 2023). This market is expected to grow at a CAGR of 14.8% from 2023 to 2030, reflecting the growing influence of data analytics within human resource management (Sakib et al., 2024).

Furthermore, the sources of this boom include the well-known fact of high human resource operating costs and informative real-time insights into employee behaviours (Sharma & Kumar,

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2023). As the movement towards data-driven HRM services supports the agenda for evidence-based management, organisations progress from traditional, intuition-based HR practices toward strategic, data-supported decision-making (Marler & Boudreau, 2017). The application of HR analytics is even more critical in the service sector as human capital drives value creation and competitive advantage (Bassi et al., 2016).

HR Analytics has evolved beyond employing conventional HR metrics, such as headcount and turnover rates, to advanced predictive analytics and prescriptive modelling that provide real-time insights into the behaviour of the workforce, as noted by Fitz-enz and Mattox (2014). The continuous supply of broad data and advanced analytical tools allows HR professionals to proactively address workforce problems, as stated by authors Rasmussen and Ulrich (2015). Examples of predictive analytics enable organisations to identify measures that can minimise attrition while acquiring the right talent for their projects and maximise workforce engagement to achieve productivity (Van den Heuvel & Bondarouk, 2017). Not the least, AI and Machine Learning in HR analytics portend a decisive shift towards greater precision in talent management and organisational planning (Strohmeier & Piazza, 2021). HR analytics is becoming an increasingly core driver of competitiveness and strategic HRM in organisations, rather than a subsidiary tool. Although it is transformative, the adoption of analytics varies across industries, and research on the application of HR analytics in the service sector has been limited (Sakib, Ahmed, & Das, 2024).

Over the last decade, an increasing number of companies in the service sector have adopted HR analytics practices (Bassi et al., 2012). Given the current trend of big data and advanced analytics technologies, the service industry has plenty of employee-related information at its disposal (Marler & Boudreau, 2017). This excellent database has led to the rise of HR analytics tools and techniques (Levenson, 2018). The growth of HR analytics is further exacerbated with the rise of complex HR problems such as talent gaps, higher attrition rates, and a quest for a more diverse workplace (Rasmussen & Ulrich, 2015). At this point, it is clear that people are increasingly directing and channelling resources towards HR analytics proficiency in organisations to develop it further and reap greater benefits from strategic HR, as well as potentially gain a competitive advantage in the future (Pease et al., 2013). HR Analytics has a direct impact on most HR functions in the service industry, such as recruitment and selection (Sharma & Kumar, 2023). Data-driven decisions are made by organisations for recruitment and selection, workforce development, and planning, among other purposes, through the analysis of data available to them (Murthy & Kinange, 2018). Furthermore, one such application could be predictive analytics, which can be utilised to screen potential candidates upfront and subsequently reduce turnover ratios (Sharma & Kumar, April 2023). Also, HR Analytics can enhance employee engagement by identifying what motivates them and ensuring job satisfaction (Murthy & Kinange, 2018).

In the literature on HR analytics, one of the earliest attempts was made by Huselid in 1995, who sought to demonstrate how HRM practices influence performance within companies. Later, Strohmeier (2009) attempted to uncover the role of electronic human resource management (e-HRM) in establishing analytics within HR functions. Davenport et al. presented the concept of talent analytics in 2010, asserting that data-driven insights had become a key to gaining a competitive edge in organisations.

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Now that HR analytics has gained popularity and started to attract attention, researchers have begun investigating its applications in various industries. Bassi et al. (2012) investigated the impact of HR analytics on decision-making in organisations, while Fitz-enz and Mattox (2014) proposed frameworks for predictive analytics in HRM. Since HR analytics emerged as an evidence-based review, it has increasingly featured in the very detail of strategic HRM.

Despite extensive research on HR analytics, studies focusing on the service sector remain scarce. Most of the literature focuses on HR analytics in manufacturing, healthcare, and finance contexts; while this area is badly needed, the service field remains underexplored.

Currently, the application of HR analytics in the service industry exhibits varying levels of maturity (Marler & Fisher, 2013). HR analytics has been identified as a crucial tool in organisations in the service sector for achieving their corporate objectives (Murthy & Kinange, 2018). Now, more importance is being given to AI and ML, which has led to an increase in HR Analytics (Sharma & Kumar, 2023). Most leading companies have already developed HR analytics systems and embedded them into their various HR processes, enabling data analysis and forecasting at any given time (Van den Heuvel & Bondarouk, 2017). These types of organisations utilise HR analytics to enhance recruitment, retention, and employee planning processes (Sharma & Sharma, 2017). However, a majority of companies have only started utilising HR analytics, focusing primarily on the use of data for reporting and consistency analytics (Huselid, 2018). Again, even today, as HR technology in organisations is more business-driven than ever, the service sector still presents tremendous opportunities for further development and creativity (Bassi, Carpenter, & McMurrer, 2016).

Exploring the use of bibliometric techniques in analysing HR analytics trends in the Service industry is important for explaining the growth of this research area, its focal points, and the body of work that constitutes its intellectual foundation (Baier-Fuentes et al., 2019). This study provides an in-depth account of the rise and influence of HR analytics, including information on key players and publications, as well as research topics that have evolved (Zupic & Čater, 2015). The distribution of citation and business cooperation networks in this study enables the identification of shortcomings or gaps in the existing literature and explores avenues for future research (Donthu et al., 2021). At the same time, a bibliometric study is of great importance for practical applications, as it enables researchers to identify current trends and practices in HR analytics (Ramos-Rodríguez & Ruíz-Navarro, 2004). Bibliometric Analysis can also help highlight future research directions a researcher can work on in HR Analytics.

The Research Gap - One aspect missing from the existing literature is a comprehensive bibliometric analysis that can map the intellectual structure, research trends, and thematic areas of HR analytics in the service industry (Sakib, Ahmed, & Das, 2024). Moreover, while HR analytics has seen considerable work on talent acquisition and performance management, few studies have explored their role in building diversity, employee well-being, and strategic HR decisions in service organisations (Davenport et al., 2010). As these represent additional gaps, addressing them will facilitate the acquisition of a more comprehensive understanding of HR analytics in service-driven firms. Additionally, there is minimal information available on what HR Analytics means in the Service Industry (Sakib et al., 2024). Empirical studies or research should be explored, conducted and verified in order for an organisation to check the effectiveness of HR

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Analytics(Sharma & Kumar,2023) A majority of the research available focuses on HR analytics as a broad concept and its integration in other industries without a deep understanding of the Service Industry(Strohmeier, 2009). Existing research, in part, explains the existence of this gap and highlights the need for future research to address some of these challenges in service sector HR analytics (Rasmussen & Ulrich, 2015). Thus, this study aims to fill that gap by enhancing knowledge of the possibilities of intelligent management, for example, in IT organisations through HR analytics (Davenport, Harris, & Shapiro, 2010).

The Research Question- How is HR Analytics being Leveraged as a Human Resource Management Practice in the Service Industry?

This research aims to achieve the following goals:

To conduct a historical analysis of previous studies on HR analytics in the Service industry (Baier-Fuentes et al., 2019).

To check the most important trends, topics, and insights related to the literature on HR analytics (Zupic & Čater, 2015).

To visualise the network of collaboration and the development of research in the field of HR analytics in the service sector (Donthu et al., 2021).

To identify prominent authors, articles, and countries in HR analytics in the service sector.

To analyse the limits of current knowledge and propose measures for new explorative and empirical research (Marler & Boudreau, 2017).

This document contributes to the existing literature in the field of HR analytics by reviewing the research on Human Resource Management Analytics within the Service Industry in a bibliometric manner (Baier-Fuentes et al., 2019). It also aids in tracing the trajectory of HR analytics growth and recognising important trends, as well as the major contributors (Zupic & Čater, 2015). It would establish a pathway for both theoretical and practical debate on HR analytics by synthesising current research and analysing bibliometric patterns. From a theoretical stance, it would provide a systematic overview of the evolution of HR analytics, highlighting several significant academic contributions and thematic developments (Ramos-Rodríguez & Ruíz-Navarro, 2004). From a practical perspective, the niche would provide essential insights for HR professionals, policymakers, and corporate leaders on administering workforce analytics in service organisations (Donthu et al., 2021). The findings will bridge the research and practitioner worlds, providing a contribution of HR analytics to sustainable innovation and organisational performance in the service sector (Strohmeier & Piazza, 2021). In this sense, the outcomes of this analysis will be insightful to both scholars and industry players regarding the available evidence on the use of HR Analytics, its gaps, and actionable recommendations for improving the current state of HR Analytics (Donthu et al., 2021). This paper aims to bridge the gap between research and practicality by exploring how HR Analytics Development can be optimally performed (Ramos-Rodríguez & Ruíz-Navarro, 2004).

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Search Criteria

1. **Database:** Scopus
2. **Date Range:** 2012 to 2025
3. **Document Type:** Articles, Conference Papers
4. **Language:** English

Keywords

- HR analytics
- Human resource analytics
- IT sector
- Information technology
- Workforce analytics
- Predictive analytics
- Recruitment analytics
- Service Industry

Methodology

Systematic literature review is a highly regarded approach that involves the aggregation, synthesis, and analysis of research in an orderly manner. In particular, it helps identify knowledge gaps, provides a more comprehensive view of existing knowledge, and outlines future research directions in a given field (Fink, 2014; Liberati et al., 2009). To this end, we have employed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analysis) methodological approach, designed to strengthen the rigour and transparency of systematic reviews (Moher et al., 2009). We intend to apply this method to study the evolution of HR Analytics in Human Resource Management (HRM) in its applications for the service industry. The goal is to identify some of the significant research trends, key research clusters, and future directions that can further develop HR analytics.

The approach follows a stepwise progression consisting of five main stages- (1) database selection (Scopus), (2) keyword query construction, (3) screening via PRISMA, (4) application of inclusion criteria (ABDC journal mapping, language), and (5) bibliometric mapping using co-citation, thematic, and keyword analyses.”

Data Collection

The first step of the process is to gather literature on HR Analytics in the context of Human Resource Management (HRM) within the service industry. The academic database was Scopus. This is because the database has proven to be one of the most reliable sources of coverage in peer-reviewed journals and conference proceedings (Falagas et al., 2008). Articles that were further investigated were English publications published up to 2024, in order to examine the most recent and contemporary studies (Xie et al., 2020).

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The search yielded 341 relevant articles. These addressed a wide range of areas to ensure coverage of all possible research angles under the HR Analytics domain (Chen et al., 2016).

Formulation of the Search Query

The search query was carefully crafted to address the issue thoroughly. Boolean operators (AND, OR, NOT) were used to combine phrases such as "HR Analytics," "People Analytics," "Workforce Analytics," "Talent Analytics," and "Human Resource Management" (Jabbour et al., 2018).

Keywords synonymous with the service industry, such as "Healthcare Services," "Financial Services," "Retail," and "Hospitality," were employed to focus the literature entirely on HR analytics in the context of the industry (Burdett et al., 2019).

Several other authors have explored these avenues to facilitate systematic investigations of different themes (Marler & Boudreau, 2017). The search was also refined to include only peer-reviewed journal articles and conference papers, excluding other literature such as books, editorials, or opinion pieces (Booth et al., 2016), allowing for the way a query was dynamically constructed over some time to ensure the capture of the most relevant studies while streamlining exclusion of the non-included.

Data Search:

The search process, therefore, produced a total of 341 articles across the chosen database: Scopus (Harrison & Rainer, 2018). Articles were screened based on their titles, abstracts, and keywords.

According to Denyer and Tranfield (2009), this phase was critical, as it determined whether the articles were relevant or not, a necessity where only those that were significantly contributing to the research aim would be included. The primary focus was on articles that explored HR Analytics in service-sector organisations, particularly those that shed light on data-driven HRM practices.

Processing of Results

After the preliminary screening, we further refined the results according to a set of inclusion and exclusion criteria. Consistent with Denyer and Tranfield (2009), only articles published in English and peer-reviewed, whether in journals or conference proceedings, would be considered. Articles in languages other than English, particularly those in Spanish, French, or Chinese, were excluded for uniformity in analysis (Bourgeois et al., 2016). Likewise, studies were excluded that focused entirely on a dimension other than HR or were too weakly tied to HR analytics (Sparrow, 2016).

Journals- To check the reliability and significance of chosen literature, the study incorporated the ABDC Journal Quality List mapping during evaluation. The ABDC ranking has garnered widespread acclaim in business, management, and HR research for its standards of academic rigour and suitability in the field. The journals in the A, B, and C* categories were included to maintain a high quality of publications contributing to the bibliometric analysis. It helps distinguish the leading journals (A and A) that are expected to drive the academic discussion from the debutant ones (B and C), which focus on specialised areas of work in HR analytics. The application of

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ABDC mapping enables the study to have a database of studies that are both methodologically sufficient and theoretically high, allowing for a reliable bibliometric review of HR analytics research in the service industry.

At this stage, the initial 341 articles were reduced to 173 by taking into account the following factors:

1. Article
2. Language
3. Topic

Bibliometric Study

Underwent a bibliometric analysis to examine trends, citation networks, networks of citation, and thematic clusters in the area of HR Analytics. Techniques such as co-citation analysis, citation analysis, and keyword co-occurrence were used to find the most influential papers and authors within the domain (Zupic & Čater, 2015). These citation networks were visualised to reveal primary research clusters and illustrate the evolution of HR analytics over the decade. It was possible to identify meaningful patterns, including the emergence of data-driven HRM, the increasing significance of employee engagement analytics, and the application of predictive analytics in workforce management (Cascio & Boudreau, 2016). Areas that have not been well-researched were also established and directions for future investigation provided cognate to the emerging relevance of evidence-based HRM in service industries (Fitz-enz & Mattox, 2014)

This method provides a concise and clear-cut structure that explicitly approaches conducting a systematic review of literature, with an HR analytics focus on the service industry. Following PRISMA guidelines will facilitate a transparent, reproducible, and insightful review of the field. Bibliometric analysis provides an evidence-based approach to identifying research gaps that can inform future investigations in HR analytics.

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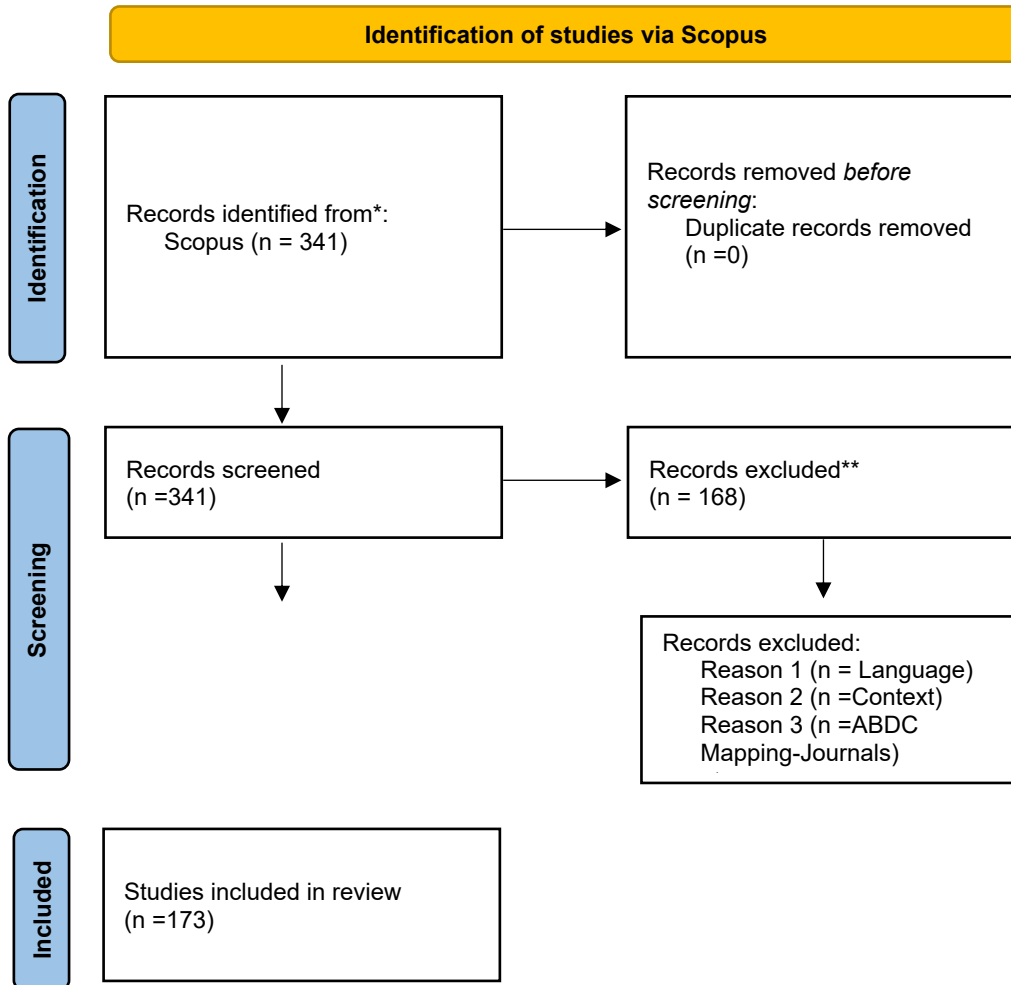


Figure 1- PRISMA Model

Analysis

Summary Stats

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	2012:2025
Sources (Journals, Conferences, etc)	139
Documents	173
Annual Growth Rate %	5.48
Document Average Age	3.75
Average citations per doc	16.07
References	6900
DOCUMENT CONTENTS	

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Keywords Plus (ID)	745
Author's Keywords (DE)	563
AUTHORS	
Authors	467
Authors of single-authored docs	22
AUTHORS COLLABORATION	
Single-authored docs	22
Co-Authors per Doc	2.93
International co-authorships %	12.72
DOCUMENT TYPES	
Article	96
Conference paper	77

Table 1- Summary Statistics

The database has articles from both journals and conferences from 2012 to 2025 in the HR analytics domain. A total of 173 documents have been published throughout the years across 139 different sources, including journals, books, and conference proceedings. The annual growth rate of 5.48% shows a sustained academic interest in the field. The average document is about 3.75 years old, which can be considered relatively novel, as the majority of the literature dates back to at least 9-0 years. These citations suggest that HR analytics research is gaining due recognition across the academic landscape, as scholars are increasingly acknowledging its relevance and impact. Considering the growing trend in publications, HR analytics is emerging as a mature research area. However, a growing need remains for longitudinal studies to assess the long-term impact of HR analytics on decision-making and overall performance.

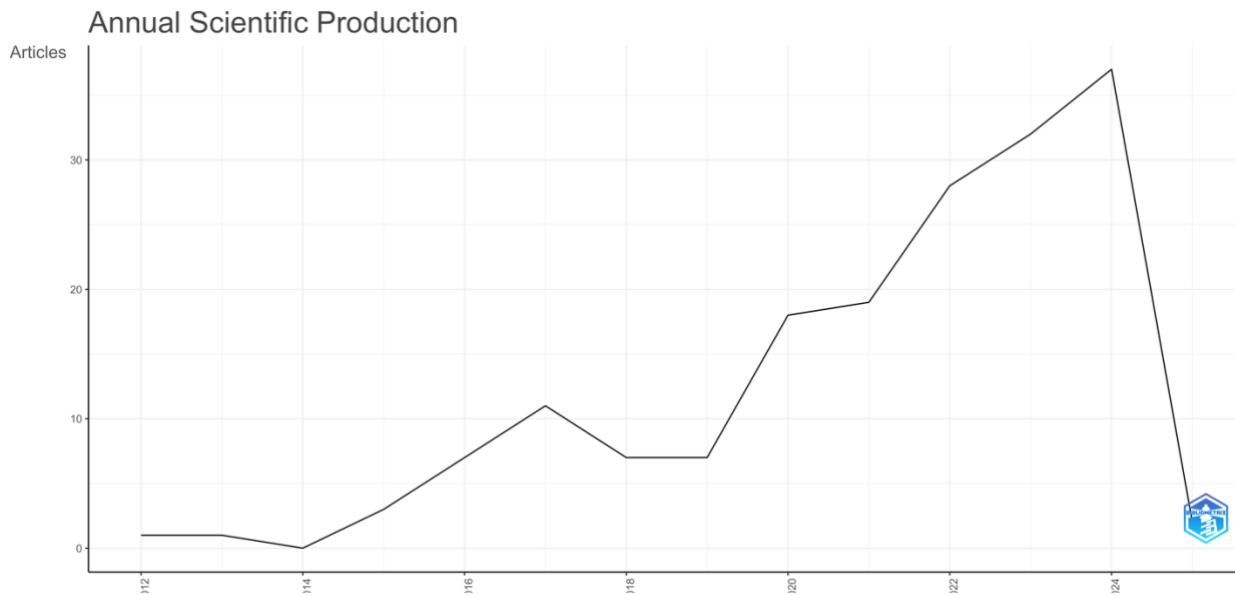
Keyword analysis emphasises the most widely addressed research themes and areas of focus in HR Analytics. Keywords, along with 745 Author keywords, delineate 563 broad and specialised research topics. These keywords suggest topics such as predictive analytics, workforce optimisation, AI in HRM, and transformation of HR strategy. Now we can see that there is a high number of keywords, indicating a multifaceted approach to HR analytics, including both theoretical advancements and practical applications.

Of the 467 unique authors included in the synthesis, only 22 authors have solo authorship over their documents. This indicates that HR analytics is working more collaboratively, aligning with the broader themes of data-driven and interdisciplinary research. On average, each document has 2.93 authors, thereby earning it a high grade for teamwork in knowledge creation. Total international authorship comprises 12.72%, indicating that, although cross-border collaborations are present in some studies, a significant amount of work remains to be done in fostering such collaborations.

A low proportion of international collaboration still suggests that HR analytics research remains region-oriented and may be influenced by labour laws in those regions, as well as the availability of data in the field. Foil such regional bias, and it will propel cross-border research collaboration, which, in turn, will improve methodological rigour and aid in achieving a more global view regarding the application of HR analytics.

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Of the 173 publications, when considered collectively, there were 96 journal articles and 77 conference articles, indicating that research on HR analytics is published in both academic and professional forms. Given the numerous conference papers, HR analytics remains an evolving field, one that is being debated extensively, with some new trends not yet formally published as journal articles. However, conference papers typically represent preliminary findings, whereas journal papers undergo formal peer review, which amplifies credibility and in-depth analysis. The close approximation between journal and conference publications indicates, in other words, that although HR analytics is developing as a field, it still lacks the necessary scientific substantiation and theoretical framework development to establish a solid foundation in academic literature.



The graph shows the annual scientific production in HR Analytics research from 2012 to 2025; therefore, an assessment of the trend in the respective number of published articles each year is necessary. The trend highlights three key phases of research development:

Early years (2012-2016): Emerging Interest

Between 2012 and 2014, there were few to no research activities conducted on HR analytics, suggesting that the topic was still relatively new. However, from 2015 onward, research began to gain momentum, accompanied by a gradual increase in the number of published training volumes. The early growth indicates HR analytics got attention from scholars during their exploration of evidence-based decision-making in HR practice. Less research during this time reveals the demand for foundational studies that define the scope, advantages, and challenges of HR analytics in an organisational context.

Growth Phase (2017-2021): Solid Growth

Between 2017 and 2021, a significant growth in research output surpassed all expectations, with the number of articles increasing drastically. Research output experienced a brief dip in 2018 but

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rebounded with an upward trajectory immediately afterwards, driven by the rise in industry adoption of HR analytics. This increased surge in research activities coincided with advancements attained in big data, AI, and machine learning applications in HRM, leading to a heightened interest from both academia and industry. This rise in research output during this phase indicates a shift in emphasis away from conceptual discussions about HR analytics to empirical validation, as well as the quest by scholars and practitioners for concrete applications of HR analytics within talent acquisition, employee engagement, and workforce planning. The surge in research output here also suggests that organisations began to regard HR analytics as a strategic tool for evidence-based decision-making in HR.

Acceleration and Peak (2022–2025): The Age of Acceptance

The period from 2021 to 2023 witnessed significant growth in published HR analytics research, resulting in the most significant volume recorded to date. The main reasons for this boom could be attributed to advances in technology, improved access to HR data, and the pandemic forcing a rapid shift to digital HR practices. The year 2023 may also represent the peak of this research subject and its normalisation into traditional HRM discourse.

The decline might not necessarily mean a diminishing interest in research; it is worth noting that it is only the beginning of 2025, and published articles will continue to be released throughout the year. This would predict a shift toward more specialised studies, exploring the realm of ethical AI in HR, algorithmic bias, and employee experience analytics. With HR analytics becoming a reality in organisations, future research is likely to focus on the long-term measurement of impact, refinement of predictive models, and the ethical and unbiased utilisation of HR data.

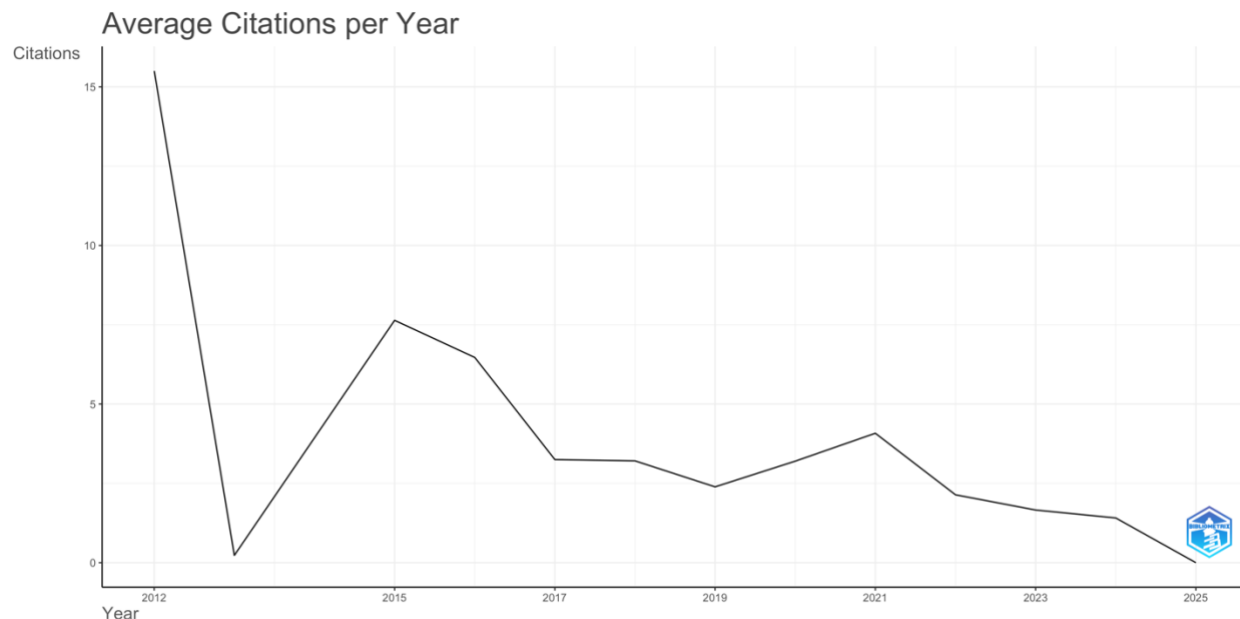


Figure 3- Average Citations Per Year

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Early Citations Surge (2012–2014): Pioneering Influence

In earlier years, the journal citation rate was higher, particularly in 2012, when the average number of citations per article exceeded 15. Early, foundational papers within nascent research fields often enjoy a surge of attention due to the relative scarcity of pertinent prior literature. As the years passed, there was a significant decline in articles, particularly from 2013 to 2014. This reduction was expected, as emerging literature tends to distribute citations across many studies rather than concentrating them on a few critical papers. The early spike in citations is indicative of the trailblazing role of the early studies, as it may have laid the groundwork for HR analytics to emerge as a distinct research area.

Fluctuations and Stabilisation (2015–2021): Expanding literature

There was a notable shift in citation rates between 2015 and 2021, characterised by fluctuations and an overall downward trend. A small surge around 2015-2016 indicates that a few pieces of literature gained significant attention, likely related to HR analytics and workforce management practices. Although the average number of citations in articles is starting to decrease, this is expected because citations are being distributed across a larger number of pieces of literature as the field matures. This phase marks the transition from foundational studies to applied research, making HR analytics more widely adopted by both academia and industry. The fluctuation in citation rates suggests that specific papers received substantial recognition, while others may not have been widely cited, thus creating a need for more impactful, high-quality research.

Recent Trends (2022–2025): Diversification and Expanding Research Base

As of 2022, the average number of citations per article has continued to decline. Of course, this does not imply a decrease in research relevance; rather, it indicates that HR analytics is a well-trodden research field with a diversified base of published papers, hence the more dispersed citations. The actual decrease in 2025 is misleading. The year just started, and very few of its articles have had the time to attract a significant number of citations. Some recent studies may take a while to gain further citations. Such trends are common in rapidly evolving fields; the upsurge in published studies automatically brings down the average number of citations per study. As HR analytics continues to evolve, future studies may build on this trend towards interdisciplinary approaches that connect to the ethical concerns of AI's influence on decision-making in HR, thus remaining relevant in both academia and industry. Now, both figures discuss the annual scientific publication and the average number of citations per year. HR analytics research began with a focus

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on the service industry around the early 2010s.

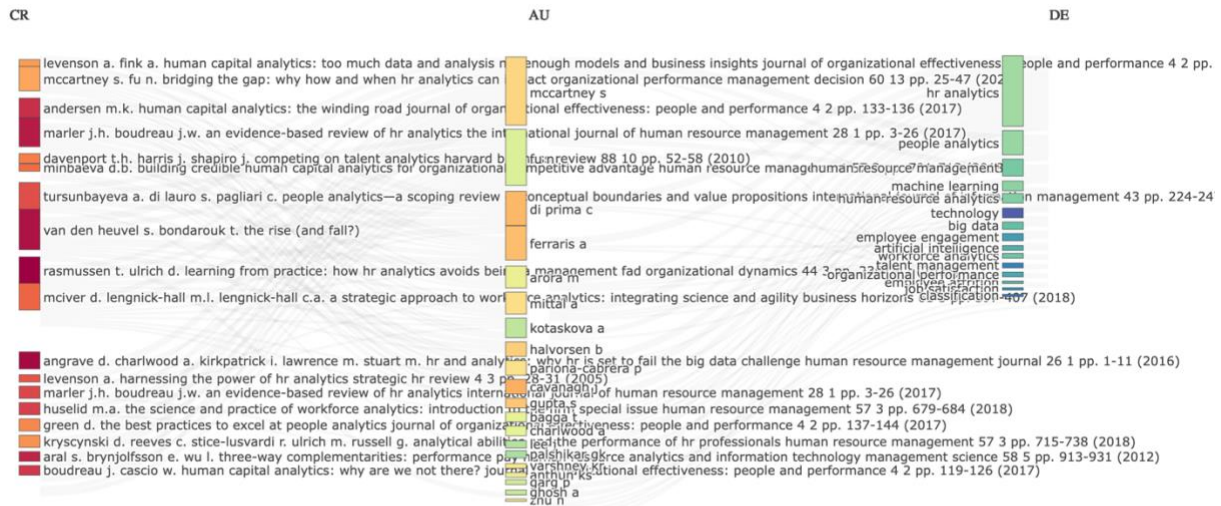


Figure 4- Three-Field Plot Analysis

Field Plot Analysis

The Three-Field Plot Analysis is a bibliometric technique that helps visualise the relationship between three variables. Here, we have Authors' Keywords and Countries. They are important authors, such as Siddhartha, Krishna S, etc.

Components:

AU_CO (Countries): On the left, a list of the countries where the research is being conducted.

AU (Authors): In the centre section, the authors contributing to the research are shown.

DE (Keywords/Topics): On the right, the topics or keywords used in connection with the research are shown.

Highly Cited References: Foundational Studies in HR Analytics

The left section lists the most cited papers that represent the very foundation on which HR analytics research is built. For example, Levenson and Fink shared human capital analytics, which provided running frameworks. Marler and Boudreau's review adopts an evidence-based approach to evaluating the effectiveness of HR analytics. Minbaeva's work discusses how HR analytics lends credibility in driving organisational performance.

These references strongly suggest that HR analytics have become deeply ingrained in strategic workforce planning, decision-making, and talent management. However, the heated discussion

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and subsequent literature reviews suggest that this area of HR analytics remains an evolving one, with ongoing debates about the potential applications and credibility of HR analytics in organisations.

Important Authors: Leading Contributors to HR Analytics Research

According to the profile analysis, Marler, Boudreau, and Ulrich emerge as dominant contributors due to their well-known areas of expertise in people analytics, strategic management of HR, and workforce planning. A worthy point is also made by Arora, Kotaskova, and Di Prima, who are highly respectable contributors, particularly in the context of how HR analytics can be explored within organisational contexts of effectiveness and agility. The concentration demonstrated in authorship indicates that this research field is governed by small but most influential researchers, emphasising the nature of collaborative teamwork and cross-disciplinary research tendencies in HR analytics.

Dominant Research Topics: Emerging Trends in HR Analytics

In the rightmost section, the key research issues are mapped, illustrating the evolving focus of HR analytics. Some representative keywords include: HR Analytics & Workforce Analytics • Leaning towards strategic decision-making. Big Data, AI, and Machine Learning indicate a shift toward HR technology solutions. Talent Management, Employee Engagement, and Job Satisfaction→Serving to show increasing utilisation of HR analytics approaches to improve workforce experiences and retention strategies. Due to the presence of AI and big data, larger trends such as predictive analytics and automation in HR analytics are demonstrating a deeper integration into the mainstream approach to modern HR practices. Yuan discusses how organisations are moving beyond traditional reporting to utilise data-driven HR strategies that enhance performance and employee engagement. This graph helps identify keywords and important people to collaborate with.

Source Analytics- Most Relevant Sources

Sources	Articles
JOURNAL OF ORGANIZATIONAL EFFECTIVENESS	7
HUMAN RESOURCE MANAGEMENT INTERNATIONAL DIGEST	5
PERSONNEL REVIEW	5
SPRINGER PROCEEDINGS IN BUSINESS AND ECONOMICS	4
HUMAN RESOURCE MANAGEMENT JOURNAL	3
MANAGEMENT DECISION	3
2024 2ND WORLD CONFERENCE ON COMMUNICATION AND COMPUTING, WCONF 2024	2
2024 ASU INTERNATIONAL CONFERENCE IN EMERGING TECHNOLOGIES FOR SUSTAINABILITY AND INTELLIGENT SYSTEMS, ICETIS 2024	2
ASIA PACIFIC JOURNAL OF HUMAN RESOURCES	2
ASIA PACIFIC JOURNAL OF INFORMATION SYSTEMS	2

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Table 2- Most Relevant Sources

Dominant Publication Venues

The Journal of Organisational Effectiveness is the most prominent source, featuring seven documents. This journal addresses organisational performance, leadership, and strategic HRM, indicating that HR analytics research closely aligns with organisational effectiveness and decision-making processes. Following closely are Human Resource Management International Digest and Personnel Review, each of which has published five documents. Their significance lies in the fact that HR analytics research encompasses not only technology and data but also HR strategies, workforce management, and performance reviews.

Contributions from Conferences

Sources for Springer's subsequent publications, namely in the Business and Economics category, are gathering momentum. Also shown are conferences such as the 2024 2nd World Conference on Communication & Emerging Technologies. HR analytics, therefore, demonstrate a cross-disciplinary approach, which suggests a blend of HR analytics with economics, communication, and technology. Likewise, the Management Decision journal (3 articles) acknowledges that research into HR analytics contributes to organisational strategy and executive decision-making, thereby aligning HR insights with broader business management objectives.

Regional and Emerging Sources

Journals such as the Asia Pacific Journal of Human Resources and the Asia Pacific Journal of Information Systems (each with two articles) underscore the increasing importance of HR analytics research in the Asia-Pacific region. This suggests a growing global interest in workforce analytics, talent management, and HR digitisation, indicating that organisations in various regions are indeed adopting these approaches as part of their data-driven HR practices.

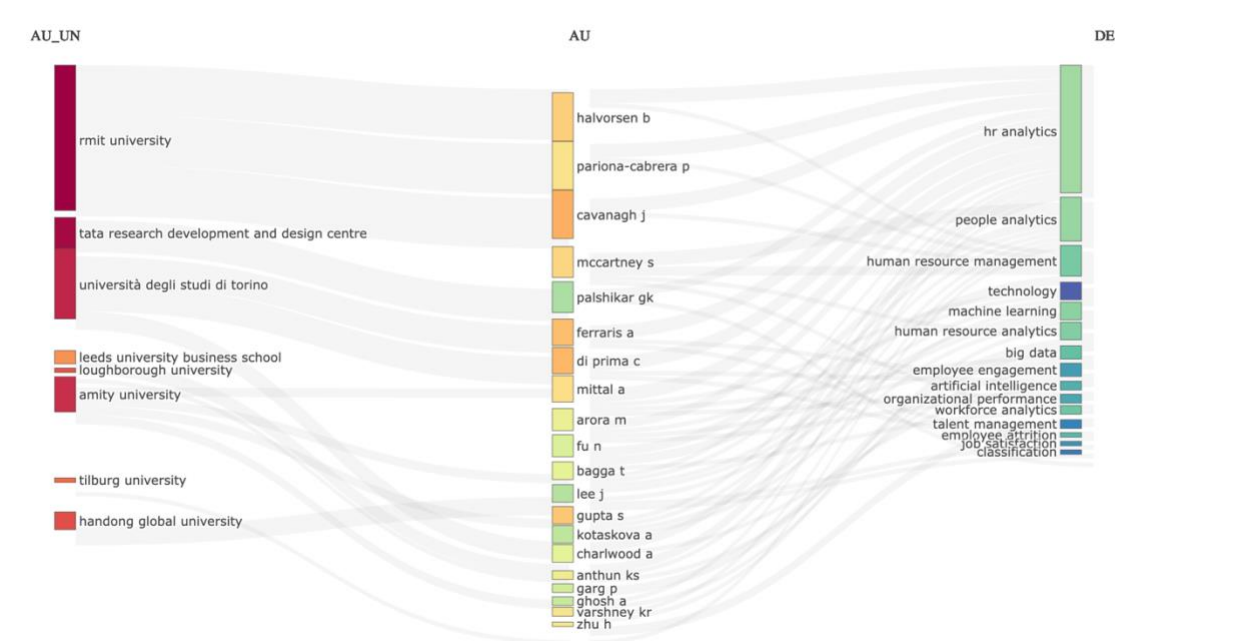


Figure 5- Three Field Plot Analysis- Authors,University,Keywords

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Leading Institutions in HR Analytics Research

The institutions that show the utmost activity in the area of HR analytics research include RMIT University, Tata Research Development and Design Centre, and Università degli Studi di Torino. The presence of these institutions is partly indicative of their contribution to technological development on the one hand, and partly to a data-driven approach to HR practices. Alongside this, Leeds University Business School and Loughborough University are significant contributors, marking the mainstream integration of HR analytics into business education and management studies. The likes of Amity University, Tilburg University, and Handong Global University portray HR analytics as a field that is growing globally, not just limited to furthering Western institutions. Thus, both research-focused and business-oriented institutions are creating a landscape for HR analytics to exist that comprises an interrelationship among academia, industry, and technological advancements.

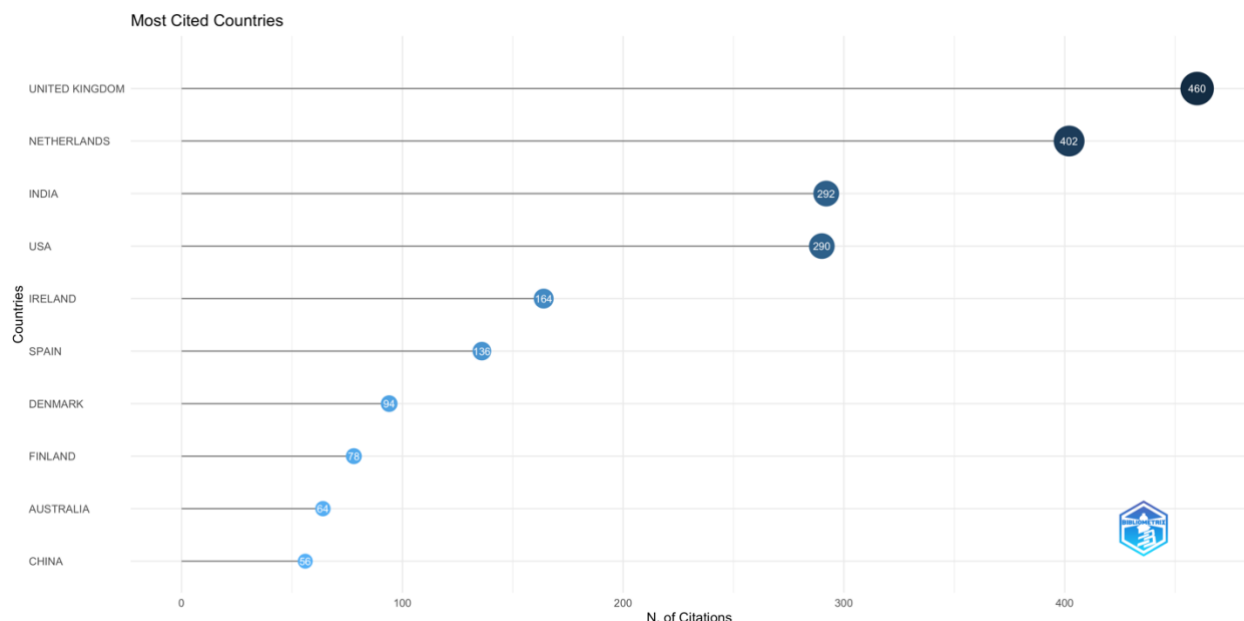


Figure 6- Most Cited Countries

The United Kingdom, with 460 citations, and the Netherlands, with 402 citations, were the most cited countries, highlighting their status as leaders in influencing HR Analytics research. By their strong academic and corporate culture in areas such as business analytics and workforce management, their role has been reinforced.

India is another top contributor, with 292 citations, closely followed by the USA with 290 citations, underscoring their significant role in the field of HR analytics. The prominence of India suggests a growing interest in data-driven HR solutions, most likely driven by its strong information technology and HR industries. The USA, where leading tech companies and top HR consultancies are based, remains a significant contributor to the development of HR analytics. Ireland is a thriving research ecosystem in HR technologies and data analytics. At the same time, Spain's participation may have been spurred by the fact that business schools in Europe began introducing

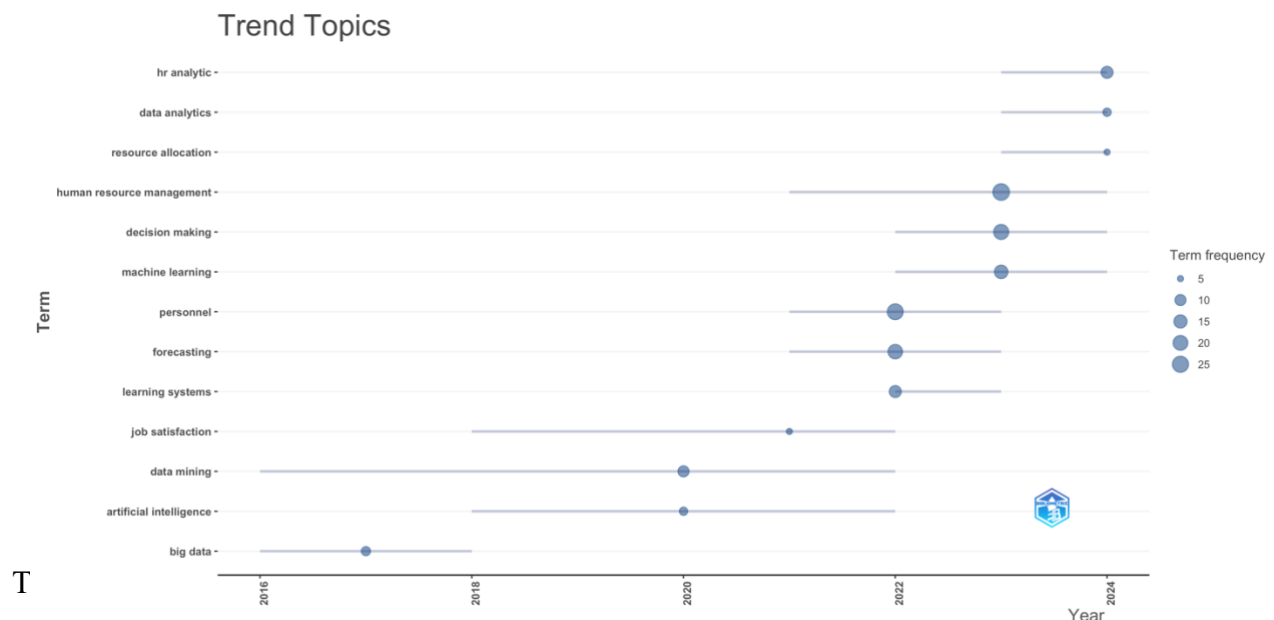
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workforce analytics. In Denmark, there is an active research tradition in organisational behaviour and workforce management. It reflects growing interest in evidence-based HR strategies.

These leading countries exemplify the global distribution of HR analytics research, a blend of Western economies and emerging developments within this discourse, which occurs in scholarly and industry settings.



Figure 7- Word Cloud



T

Figure 8- Trend Topics

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The AI-driven HR

The terms "machine learning," "artificial intelligence," "big data," and "data mining" have gained prominence, particularly since 2020. This implies that analytics research is increasingly employing AI and advanced data techniques to enhance decision-making. The first mention of "big data" in 2016 suggests that the groundwork for AI-driven HR analytics was already in place, with further development focusing on predictive analytics using machine learning techniques.

Predictive and Learning-Oriented HR Systems

Terms like "forecasting" and "learning systems" entered the lexicon in recent years, thus indicating a growing focus on predictive analytics and continuous learning within HR functions. Today's forecasting (2022) indicates an interest in predictive workforce analytics, where employers can anticipate workforce talent needs, attrition rates, and skills gaps. Learning systems mark the introduction of AI-driven learning environments that can help train their employees and develop their skills. This indicates that HR analytics is gradually shifting toward proactive measures, including AI-powered forecasting and adaptive learning methods, in shaping the future of HR functions.

Human-Centric HR Analytics and Workforce Well-Being

The emergence of trending topics like "job satisfaction," "personnel," and "human resource management" reflects a growing emphasis on employee experience and well-being within HR analytics research. The renewed interest in "job satisfaction" in the post-2020 era indicates that companies are concerned with how analytics can improve workplace engagement, retention, and productivity.

Former emphasises the perfect balance of technology and human factors in the HR field, highlighting the role of data-driven insights in enhancing employee well-being and the culture of an organisation.

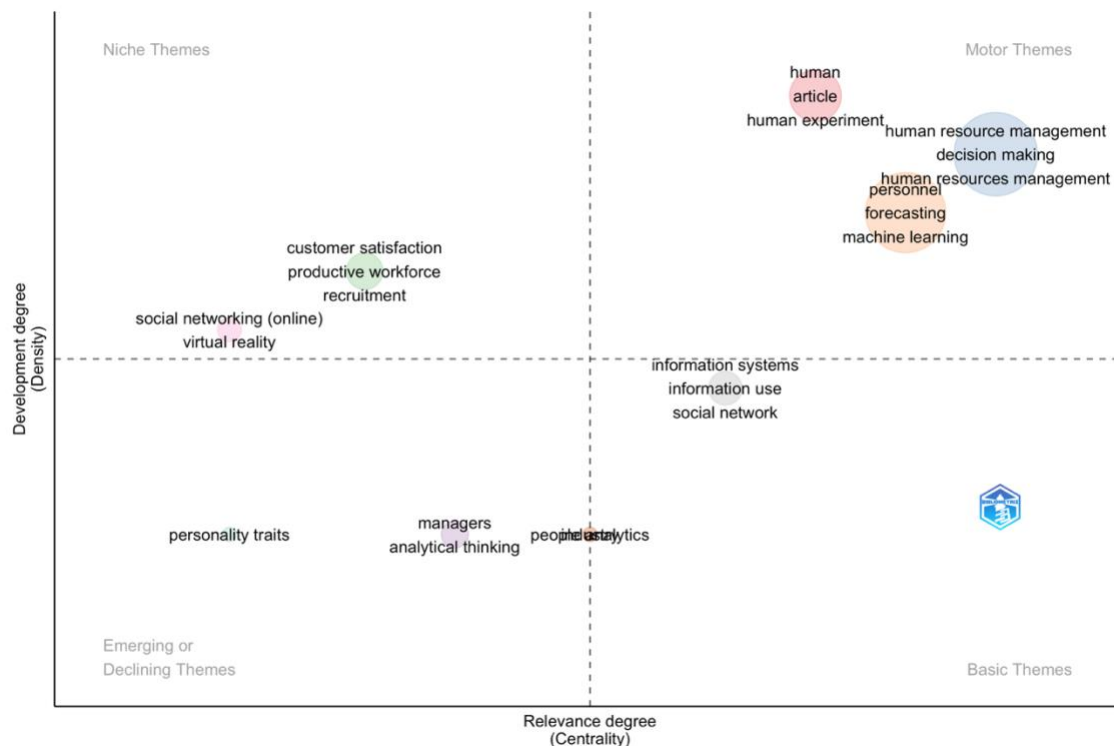


Figure 9-Thematic Analysis

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Motor Themes (High Density, High Centrality) – Driving Research and Application

Key Themes: "Human Resource Management," "Decision Making," "Human Resources Management," "Personnel," "Forecasting," "Machine Learning"

The major themes are well-elaborated and central to the field of HR analytics research. Their relegation to this quadrant suggests that they are currently the primary driving force of the field. Decision-making and forecasting highlight a growing reliance on predictive analytics and AI-based strategies for the workforce.

Machine learning models are being integrated into organisations to enhance hiring, workforce planning, and employee engagement, with decisions now informed by data for improved HR outcomes. The fact that these themes reside in the Motor quadrant suggests both advances and entrenchment in the broader business world.

Niche Themes (High Density, Low Centrality) – Specialised but Less Connected

Key Themes: "Customer Satisfaction," "Productive Workforce," "Recruitment," "Social Networking (Online)," "Virtual Reality"

Some are relatively well-developed as specialised research areas, but poorly developed in terms of interdisciplinary impact. Customer satisfaction and a productive workforce imply a direct link between HR analytics and organisational performance.

Notably, this wave of social ideas reveals a shift toward technology-enhanced recruitment and workforce training, with scope for exploration regarding future growth in this quadrant, as it remains an underutilised area in HR practices but has the potential to emerge as a leader by drawing on experiments with immersive technologies.

Emerging or Declining Themes (Low Density, Low Centrality) – Limited Development and Impact

Key Themes: "Personality Traits," "Managers," "Analytical Thinking"

These themes are less developed, and some have haphazard relevance in the context of HR analytics. The very existence of themes such as analytical thinking and managerial roles suggests that leadership analytics is still in its early stages, and the focus of HR has been more on analytics oriented around employees, rather than managerial behaviour.

However, limited development for personality traits analysis signals that specific research exists in the current field of behavioural assessment in HR. However, it has not been widely adopted or utilised in mainstream HR analytics applications. These themes are likely to either undergo a renaissance and become mainstream topics or, with further decay, be forgotten over time.

Basic Themes (Low Density, High Centrality) – Fundamental but Underdeveloped

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Key Themes: "Information Systems," "Information Use," "Social Network," "People Analytics"

The works presented relate highly, yet have not had fully explained foundations, signifying the areas in need of development. People analytics is an early topic of conversation, showing that while it is a burgeoning branch of HR research, advanced applications of this field are still in the early stages.

Similarly, the inclusion of information systems and social networks implies an increasing recognition of HR technology adoption, despite it not yet being assimilated into core HR analytics frameworks. The opportunity to grow remains open as organisations expand their digital HR capabilities.

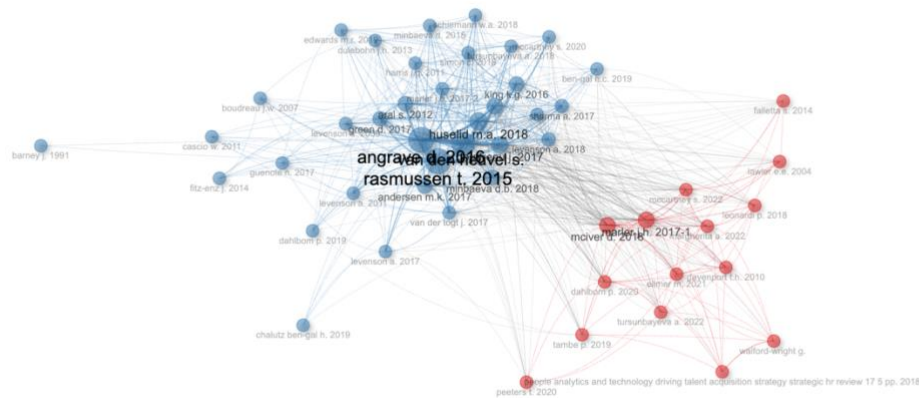


Figure 10

The Blue Cluster

Traditional HR Analytics and Workforce Strategy- Focused on HRM theories, talent management, and predictive workforce planning.

The Red Cluster

Emerging HR Technology and People Analytics- Driven by AI, digital transformation, and data-centric HR decision-making.

Qualitative Synthesis of Key Themes

This study employs a robust bibliometric method, including co-citation analysis, keyword co-occurrence, and thematic mapping, while acknowledging the value of further qualitative

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interpretation that would enhance our understanding of the identified research clusters and thematic areas. In this light, a supplementary content analysis of highly cited and thematically relevant papers was undertaken to extract key conceptual patterns and illustrative findings, in support of the bibliometric trends.

For example, in the “Motor Themes” quadrant of the thematic map, the keyword cluster surrounding “decision-making,” “machine learning,” and “human resource management” contains watershed studies (e.g., Marler & Boudreau, 2017; Strohmeier & Piazza, 2021). A qualitative reading of this research reveals how the discourse on HR analytics is evolving to describe the practice not only as operational effectiveness (i.e., applying analytical measures to improve operationally) but also as a driver of strategic transformation, encompassing talent forecasting, performance optimisation, and leadership development. For example, Marler and Boudreau argue that analytics capability indicates an organisation’s capacity for evidence-based HRM, while Strohmeier and Piazza critically evaluate how algorithmic models are modifying fairness and transparency in people-related decision-making.

Similarly, the Niche Themes quadrant also points to the future of both other immersive technologies and HRM practices. Emerging terms, albeit not well connected, such as “virtual reality” and “social networking”, point in this direction. A qualitative investigation of these documents (e.g., Sharma & Sharma, 2017) reveals an increase in interest in gamified recruitment platforms and AI models of candidate experience, indicating that these themes may not currently have network centrality but could represent the next wave of applied innovation in HR analytics.

In the Basic Themes quadrant, the presence of terms such as “people analytics” and “information systems” exhibits thematic elements that are foundational but not advanced. A focused read of the foundational literature in this cluster, including Angrave et al., 2016 and Van den Heuvel & Bondarouk, 2017, indicates a recurring concern about analytics being not adopted beyond descriptive dashboards, which is not strange given the context of many service organizations- these papers provided strong quotes and concluding remarks to situate the bibliometric data: for example, Angrave et al. noted that “HR is likely to fail the Big Data challenge” unless a shift in culture concerning HR competencies occurred.

Furthermore, to build on the interpretive dimension for further iterations of this paper, semi-structured interviews with HR analytics practitioners may also be included, as described in the limitations section. Such expert narratives would provide situated understandings of HR analytics in the service industry (especially in areas like employee experience, ethical AI, and cross-functional collaboration). The inclusion of expert opinion alongside the bibliometric analysis would provide a more comprehensive account of the intellectual and practice-based trajectory of HR analytics.

In conclusion, through the inclusion of relevant content from selected works, in addition to the original bibliometric analysis, this study not only maps the intellectual structure of the domain but also maps the conceptual depth of the field. The multi-method approach enhances the methodological rigour of the research and provides a better understanding of how HR analytics affects strategic HRM in the service sector.

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Conceptual Summary of HR Analytics and Theoretical Frameworks

Two main knowledge clusters are evident in HR analytics research, as identified through co-citation and thematic analyses, which are associated with distinct theoretical streams. The first cluster, grounded in established HRM theories (e.g., Strategic Human Resource Management (SHRM); Human Capital Theory (HCT)), focuses on workforce planning, talent management, and organisational performance. Foundational papers (e.g., Marler & Boudreau, 2017; Van den Heuvel & Bondarouk, 2017) in this cluster emphasise the importance of evidence-based decision-making, and performance indicators are crucial for advancing HRM strategies.

The second cluster is based around technology-led transformation, including artificial intelligence, machine learning, predictive analytics, and algorithmic governance. It complements an emerging version of the Resource-Based View (RBV), in which HR data, analytical capabilities, and AI-based infrastructure become dynamic capabilities or strategic resources (Teece et al., 1997; Strohmeier & Piazza, 2021). Impactful papers, such as Tursunbayeva et al. (2022) and Strohmeier (2021), offered qualitative reflections on the ethical, practical, and organisational implications of adopting HR tech, supporting a shift from a descriptive view of HRM to a new normative data-mediated HR strategy.

Emerging Gaps

Thematic mapping and keyword trends suggest that artificial intelligence (AI) ethics, diversity analytics, and workforce well-being remain underdeveloped. Their relative placement in the thematic map's "emerging" or "basic" quadrants indicates that, while academic interest is growing, these topics are disconnected from the mainstream HRM theoretical framework and are characterised by low conceptual density. Therefore, future research could formalise these topics through empirical validation and theoretical development. In contrast, themes such as predictive analytics, strategic decision-making, and talent forecasting appear to be motor themes, confirming some maturity and connections in both academia and practice.

A key takeaway from our analysis was the low rate of international co-authorship (12.7%). A majority of published HR analytics articles were from the UK, India, and the USA. We suspect that the concentration of HR analytics articles in these regions may reflect unevenness in digital infrastructure across nations, unevenness in HR analytics maturity, or unevenness in local research incentives. However, this raises questions regarding the local generation of insights and their transferability. For example, countries with digital HR technology ecosystems, such as the Netherlands, can make significant contributions to theoretical development. In contrast, firms in emerging economies are more resource-bound or restricted due to data privacy laws. Cross-national comparative studies and global collaboration can democratise our HR analytics knowledge and reveal localised challenges, particularly regarding unique local labour legislation and regulations.

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Theoretical Implications

Contribution to Literature:

The integration of co-citation network analysis and thematic analysis contributes to the broader theoretical significance of the literature on HR analytics, strategic HRM, and digital transformation. One of the prime contributions is making a significant incursion into joining the old HRM theory with the modern data-driven decision-making models. Traditionally, research on human resource management (HRM) has been framed within the resource-based view (RBV), strategic human resource management (SHRM), and institutional theory, with a particular emphasis on human capital as a source of competitive advantage. In light of this evolution towards HR analytics and AI-driven decision-making, however, these traditional perspectives warrant reconceptualisation to pave the way for the integration of data, algorithms, and machine learning capabilities as essentially strategic resources.

These co-citation analyses also highlighted two principal knowledge clusters: one focusing on foundational HRM theories (Blue Cluster) and another on the digital transformation of HR analytics (Red Cluster), illustrating the evolution of the literature. This partition articulates the emergence of HR analytics that seeks to expand HRM theories rather than replace them. Furthermore, it suggests that H-R analytics should not be construed exclusively as a technological move, but rather as a shift in how human capital is conceived, measured, and leveraged theoretically.

This provides an opportunity to extend RBV and dynamic capabilities theory by positioning HR data as a strategic resource that companies can utilise for a sustained competitive edge. While traditional rationality has placed human capital as a linchpin core resource, with workforce analytics and predictive HRM models gaining the spotlight in current situations, the data and capabilities to analyse it can have equal value in influencing organisational outcomes.

Extension of RBV: From Static Resources to Dynamic Capabilities

This study redefines Strategic Human Resource Management (SHRM), the Resource-Based View (RBV), and Human Capital Theory (HCT) by conceptualising HR analytics not solely as a technical tool, but rather, as a strategic dynamic capability for modern organisations. The traditional literature under the heading of RBV has treated human capital as a valuable, rare, inimitable, and non-substitutable resource. Our bibliometric review discoveries indicate that the implementation of HR analytics itself elevates data to a strategic resource. It is as much about the available talent as it is about the organisation's ability to derive meaning from workforce data in real-time, in a way that enables the most agile and informed decisions. Thus, HR analytics can be described as a dynamic capability that represents the organisation's ability to alter and recombine resources in transient settings: an extension in Teece et al.'s (1997) dynamic capability framework that continues to extend RBV in the context of data-driven HRM.

Reconceptualising SHRM: Analytics as a Strategic Enabler

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Likewise, this study contributes to SHRM theory by demonstrating how HR analytics serve as an enabling mechanism for continuous strategic alignment. Typically, SHRM is devoted to aligning HR practices with other organisational goals; predictive analytics, AI, and machine learning move the concept toward real-time, responsive decision-making. Again, the findings from this analysis showed that HR analytics can predict talent needs, inform succession planning, and enhance employee engagement, facilitating proactive workforce strategy approaches. This research redefines SHRM not as a one-off fit concept, but as a developing data-responsive system where HR strategy is continuously aligned with environmental or internal signals.

Human Capital Theory (HCT): Ethical and Cognitive Dimensions

Additionally, in the spirit of Human Capital Theory, this article highlights that analytics-infused HRM moves the lens of value away from the skills and abilities of employees toward the ethical, behavioural, and technological aspects of workforce value. Emerging themes, such as algorithmic fairness, privacy, and psychological safety, suggest that what remains of human capital is no longer defined solely by what employees know or do, but also by how employees engage with digital systems and the fairness with which they are treated as a byproduct of algorithmic decisions. The emergence of behavioural analytics and employee sentiment tracking contributes cognitive and emotional capital to the HCT conversation. Therefore, an expanded understanding of human capital is necessary to incorporate data literacy, AI fluency, and an ethical infrastructure, which have been established as essential to workforce value.

In this way, by examining bibliometric trends and thematic findings in conjunction with existing HRM theory, this study makes a meaningful theoretical contribution. It brings together contemporary approaches to data science and long-standing perspectives from HRM theory, indicating that HR analytics is not simply an apparatus, but rather a transformative lens through which we now need to reconceptualise human capital, strategic alignment, and organisational agility in the service sector.

The study provides an extensive overview of HR Analytics and contributes to the dissemination of knowledge in the field, which has been previously underrepresented in the incomplete literature on bibliometrics. This would help provide a productive mapping of the field's growth and evolution. The sound identification of trends, dominant themes, and keywords forms a bedrock on which future theoretical frameworks in HR Analytics may be erected.

Emerging Research Themes:

The thematic analysis elucidates various emerging themes, which in turn open new avenues for researching HR analytics and theory development. The single most dominant theme is providing a path from descriptive HR metrics to predictability and prescriptiveness in analytics; the emphasis is on organisations moving beyond traditional HR reporting into AI-driven decision-making models. The tension this transformation sets within SHRM theories stems from the fact that it both challenges existing paradigms of decision-making and introduces new constructs, such as algorithmic bias, the ethicality of AI, and workforce surveillance. A new trend toward predictive analytics in talent management, employee engagement, and workforce planning will thus require HRM theories to adopt machine-learning models if they are to remain applicable.

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Furthermore, the emergence of behavioural HR analytics is another significant trend, utilising insights from psychology, behavioural economics, and cognitive science to inform the HR decision-making process. Studies show that, although HR analytics provide objectivity and data-driven insights, human biases also have a moderating impact on the interpretation and action taken based on these insights. This necessitates embedding dual-process theories of decision-making (System 1 and System 2 thinking) into HR analytics research to address issues related to algorithm aversion, trust in AI in HRM, and fostering psychological safety in data-driven work environments. The findings also suggest that HR analytics is increasingly viewed through an ethical and regulatory lens, thereby posing theoretical questions regarding data privacy, AI bias, and fairness in automated HR decisions. Institutional theory offers a rich framework for exploring how organisations adopt and legitimise HR analytics, particularly in response to threats from regulatory pressures, industry standards, and professional norms.

Moreover, the report emphasises the growing significance of HR analytics in fostering diversity, inclusion, and fairness within the workforce. Algorithmic HRM tools are being utilised to help reduce bias in hiring and promotions; however, findings show that these systems can also perpetuate discrimination through improper design and implementation. Consequently, this requires the incorporation of fairness and accountability frameworks in HR analytics research. Future studies should investigate how organisations strike a balance between efficiency and fairness, particularly in addressing the theoretical tensions between algorithmic optimisation and human-centred HRM approaches.

Collaboration Insights:

Hitherto, the collaborative nexus in HR analytics research has taken some remarkable shapes, which can be sufficiently attested to by a co-citation analysis. The reply provides substantial evidence that a branch paradigm will emerge between traditional HRM scholars and those interested in AI-led HR analytics, eventually leading to the formation of interdisciplinary research clusters. Scholars such as Angrave et al. (2016) and Rasmussen and Ulrich (2015) remain pivotal to the central traditional HRM cluster, thereby strengthening the significance of strategic HRM in their respective shaping activities related to workforce analytics applications. On the other end of the emerging AI-driven HRM cluster are research initiatives led by authors such as McIver et al. (2018), Marler & McIver (2017), and Davenport (2010), which focus on integrating AI, machine learning, and big data into HR decision-making processes.

Thus, while research on HR analytics is currently at a pivotal turning point, it is expanding beyond the realm of HR to become a multidisciplinary field, embracing perspectives from computer science, data analytics, and behavioural psychology. The collaborative network fosters the necessary cross-disciplinary partnerships for successful HR analytics practice, which include participation and expertise from data scientists, HR professionals, and organisational psychologists. The institutionalisation of HR analytics as a business norm is reflected in the increasing trend of professional certifications in HR analytics, as well as HR analytics training programs and AI ethics codes, indicating that HR analytics is transitioning into a highly professionalised field.

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By the very definition of their future research, they need to bring out all possible avenues to enrich collaboration between the two major disciplines: HRM scholars and data science experts. In doing so, HR analytics models become robust theoretically, as the authors are open to endless possibilities in terms of practical applicability. As much as HR analytics focuses on relevant constructs such as organisational behaviour, AI ethics, and workforce planning, all of these areas point to the necessity for integrative theoretical frameworks that bring together traditional HRM and contemporary data-driven approaches. Therefore, the collaborative network suggests that HR analytics will not only reshape theories of HRM but also contribute to the broader discussion on organisational strategy, leadership, and change management. Findings on co-authorship patterns (e.g., poor international collaboration) inform on possible gaps in global knowledge exchange. Cross-border research collaborations can stimulate fresh perspectives, with HR Analytics innovation receiving a boost from those interactions.

Practical Implications

Strategic Decision-Making for Practitioners:

A significant insight from our analyses is that HR analytics is no longer an auxiliary function but rather a core strategic pillar of organisational decision-making. The co-citation network analysis identified existing studies that have developed the basis for evidence-based HR decision-making. In contrast, the trend analysis revealed an emerging emphasis on predictive and prescriptive analytics. Busy descriptive HR analytics should give way to new predictive analytics that will allow proactive workforce planning and prepare operational risk mitigations. For HR professionals, this means acquiring new analytical capabilities to make sense of the data and work together with data scientists. IT, HR, and Business are linked. Companies must prioritise skill upgrades for HR efforts in creating HR toolkits that incorporate data literacy, statistical modelling, and AI-informed decision-making proficiency for HR practitioners. Continued investments in HR technology infrastructure are also compelling. Organisations should ensure that their HRIS is integrated with advanced AI tools, enabling instant workforce insights. Additionally, the network analysis suggests that HR analytics can become a unique source of competitiveness, provided they are effectively aligned with business strategy. Organisations that incorporate workforce analytics into their strategic workforce planning, succession management, and performance evaluation can reap the most benefits from employee engagement and retention, as well as increased productivity.

The insights offered in this study are vital to the growing appreciation of HR analytics in applications, helping practitioners understand which analytics areas are gaining currency within academia and business (like AI-driven solutions). Organisations may use this knowledge to prioritise investments in technology and methodologies that align with current research trends.

Another example is Unilever, which is using AI recruiting tools, such as Pymetrics and HireVue, to assess candidate predisposition and ability through neuroscience-based games and video interviews. This process helped improve hiring processes and exemplified Unilever's commitment to ethical AI through bias audits and transparency measures that align with the earlier-discussed ethical governance frameworks of this paper.

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Additionally, Infosys, a leader in HR digital transformation, also utilised InfyMe, a self-service digital HR platform with AI applications, which provided employees with personalised insights, avenues for real-time feedback, and training nudges. These employee efforts, combined with historical data, served to improve engagement scores, allowing HR departments to spend less time on transactional tasks. This focus on transactions mirrors this paper's call for automating specific HR processes (i.e., transactional HR) to enable the HR function to redirect its efforts toward a greater emphasis on strategic planning.

In summary, these examples provide specific illustrations of how service sector organisations are utilising HR analytics in recruitment, retention, performance management, and employee well-being. They support the practical recommendations of the paper, lending consistency and demonstrating possibility. Future research may provide records of future examples implemented across geographical regions or industries, establishing a repository for HR analytics-enabled HR practices.

Enhancing Organizational Agility and Workforce Optimization

The analysis reveals that HR analytics enables organisations to be more adaptable in the face of market disruptions, economic uncertainty, and shifting workforce expectations. By obtaining insights from workforce data, companies have become more adaptive and can make informed, agile decisions.

Real-time monitoring of workforce performance, diversity metrics, and productivity trends will allow HR analytics to adjust a company's talent strategies dynamically. For instance, analysis of trends has shown an increasing focus on remote workforce analytics, underscoring the demand for companies to be able to monitor and optimise hybrid work models. Moreover, our network analysis shows that organisations that utilise people analytics outperform their competitors in terms of workforce efficiency and decision-making speed. Firms can initiate the implementation of real-time dashboards to plan their workforce. They can use AI to optimise the workload by distributing it optimally and enhancing team collaboration. HR analytics can be used to identify both existing and lacking skills, and can be utilised to provide targeted training solutions.

Ethical, Privacy, and Compliance Considerations in HR Analytics

Although HR analytics offer opportunities for transformation, they also come with ethical dilemmas. The network collaboration and co-citation analysis revealed an emerging discourse centred on ethics in HR data, privacy, and algorithmic bias, which organisations must now prioritise.

Critically, a significant practical implication is that organisations must develop their HR analytics policies in line with relevant legal frameworks, such as the GDPR, CCPA, and AI Ethics Guidelines. Organisations must ensure the protection of data on all employees to prevent any misuse of data, thereby ensuring their safety from work surveillance and its potential misuse. Firms can conduct algorithmic bias audits and implement ethics within their teams to mitigate potential issues.

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Although this research offers several potential recommendations for human resources professionals, such as ethical data practices, AI incorporation, or cross-organisational team collaboration, its relevance to practice could be even stronger with some illustrative examples of these practices in action. In one example from the IT Services sector, Tata Consultancy Services (TCS) utilises advanced people analytics to predict attrition risks, enabling early intervention and engagement approaches, and subsequently minimises unwanted attrition turnover by 15%, according to internal HR white papers. More directly applicable, Accenture has developed an internal analytics resource called myConcerto, which combines data points on employee experience and performance to develop personalised training and development plans. This is just one example of how HR analytics is involved in strategies for supporting workers with upskilling and workforce agility, as documented in HR and People Analytics practices.

Cross-Functional Collaboration

Employers should establish HR analytics centres of excellence to develop their predictive models, fostering collaboration among HR professionals, data scientists, and business leaders. Organisational silos often hinder workforce analytics. Therefore, organisations should create interdepartmental collaboration to maximise the value gained from workforce analytics.

Emerging Global Opportunities:

Moderate percentages of international co-authorship (15.04%) indicate significant opportunities for global collaboration in the service industry. Therefore, industry leaders can promote international investments to harvest diverse and innovative insights.

Real-World Illustrations of HR Analytics in Practice

Integration of Insights from Bibliometric Analysis

Key Insight Area	Theoretical Contribution	Practical Application	Future Research Direction
HR Analytics as a Strategic Capability	Extends SHRM by enabling real-time strategy alignment; reconceptualizes RBV by treating HR data as a dynamic, strategic resource	Integration of analytics in workforce planning, succession, and risk management	Longitudinal studies on how analytics reshapes strategic agility and organizational adaptability
AI,ML, and Predictive Analytics	Advances HCT by introducing algorithmic augmentation to traditional human capital constructs	Development of AI-powered dashboards, predictive hiring models	Investigating algorithmic bias, model interpretability, and explainable AI in HR decisions

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Workforce Forecasting and Planning	Demonstrates SHRM's evolving role from static alignment to continuous predictive adaptation	Real-time insights on turnover, skill gaps, and engagement trends	Refinement of predictive models and linking them with business performance metrics
Ethics and Data Privacy	Raises new theoretical dimensions within SHRM and HCT around fairness, surveillance, and data governance	Implementation of data privacy policies, algorithm audits, compliance with GDPR/CCPA	Comparative studies across geographies on ethical AI governance in HRM
People Analytics and Human Experience	Brings behavioral economics and psychology into HCT, expanding human capital to include emotional and cognitive capital	Personalized engagement strategies, well-being metrics, and culture tracking	Explore how behavioral HR analytics affects performance, trust, and leadership decision-making
Cross-Functional Collaboration	Supports dynamic capability theory by framing HR analytics as a competence that spans HR, IT, and business strategy	Formation of HR analytics centers of excellence; joint skill development between HR and data teams	Evaluate collaboration models that best support HR analytics maturity and scalability
Regional Focus and International Scope	Addresses gaps in global theory generalization; highlights the need to adapt SHRM and RBV frameworks across regulatory and cultural boundaries	Regional customization of analytics strategies based on local laws, digital readiness, and labor market patterns	Empirical cross-country studies comparing HR analytics adoption, ethics, and impact on firm performance

Positioning Within Theoretical and Empirical Debates

Even though this research is based on well-established HR analytics frameworks, such as those of Marler & Boudreau (2017), Strohmeier (2009), and Van den Heuvel & Bondarouk (2017), tensions and conceptual ambiguity are acknowledged, and extends the discussion by introducing some recent empirical evidence which points to the risks and opportunities of technology-enabled HRM. For example, Tursunbayeva et al. (2022) provide empirical evidence that HR analytics have a positive influence on employee performance in service industry contexts, thereby supporting the strategic understanding of analytics in high-contact, high-touch situations, particularly relevant to the present study's focus in the service sector.

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In addition, Strohmeier and Piazza (2021) call for scholars to establish a new research agenda that incorporates a mindset towards AI, ethics, and strategic HRM, and to continue examining the unintended consequences of algorithmic decision-making. Therefore, the present study incorporates emerging themes of algorithmic bias, governance ethics, and fairness in workforce analytics, thus reflecting their concerns through thematic and co-citation analysis.

Importantly, there has been an increase in post-2022 literature that discusses HR analytics in remote and hybrid work arrangements, ethical governance of AI, and real-time employee experience – important topics identified in the thematic clusters of this study. However, we can see that these emerging areas are still not conceptually clear and will therefore require further research to define them more precisely, particularly in terms of the lines between technological enablement and strategic change.

By incorporating these contemporary debates and empirical evidence into the analysis, this paper contributes to bridging foundations and emerging realities, but also creates a more balanced and critical perspective on HR Analytics. This discussion encompassed both the hope for transformation and the concern for ethical and operational capacity, which strengthens its theoretical contribution and practical implications.

Reference	Key Contribution	How This Paper Engages With It
Marler & Boudreau (2017)	Framework for evidence-based HR practices	Extended by showing how analytics now operates as a dynamic strategic tool
Strohmeier & Piazza (2021)	Future agenda: AI-HRM integration, ethical risks	Thematic analysis surfaces these as emerging and motor themes
Van den Heuvel & Bondarouk (2017)	Value structures and system support for analytics	Echoed in the need for HR-IT collaboration and capability-building
Tursunbayeva et al. (2022)	Empirical study of analytics impact on performance	Supports findings on performance outcomes and service-sector specificity
Angrave et al. (2016)	Critical view on HR's readiness for big data	Validated through limited collaboration patterns and capacity issues

Limitations and Future Research

This research provides a detailed overview of HR analytics, incorporating co-citation network analysis, thematic analysis, trend analysis, and a collaborative network map. One must, however, take note of certain limitations of the work, including data limitations, methodological issues, the

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dynamic definition of HR analytics, and the generalizability of findings. Addressing these limitations in future research will help clarify and expand the understanding of HR analytics as an emerging field.

The two key limitations dealt with are the availability of data and selection bias. The co-citation network and thematic analysis were conducted based on published academic literature and indexed databases. On their own, they may not accurately reflect industry best practice, proprietary research, and real-world HR analytics implementations used by firms. It is often through in-corporate developments that HR analytics insights become available. These tend to remain undisclosed due to concerns over confidentiality and intellectual property. Considering that much of what is said here originates from academia, it may not closely align with the practical intricacies and challenges of applying HR analytics in rapidly changing business environments. Future work could utilise industry publications, case studies, or interviews with leading experts in the field to gain a more comprehensive perspective.

Another limitation can be found within the methodological approach employed, specifically in network and trend analyses. While co-citation analysis is important in identifying key influential studies and research clusters, it does not provide a qualitative analysis of how HR analytics are applied in different sectors. Similarly, while topical analysis shines some light on the degree of interest in the studies it examines, it is based on the categorisation of metatags. Metatags will, of course, make interpretation subjective in some cases, with many themes overlapping or evolving into a continuum that is, to some degree, resistant to classification. Additionally, while network analysis depicts academia's collaborative work, it does not fully capture the interdisciplinary synergies required from other corporate functions that are critical for the real-world implementation of HR analytics. Future work could explore mixed methods, combining qualitative interviews with survey-based research to further elaborate on the quantitative network insights.

Another challenge lies in the quickening speed of change in HR analytics. The trend analysis suggests that AI, machine learning, and behavioural sciences are becoming key drivers of HR analytics, with their research orientation continually evolving. Therefore, while the research provides a snapshot of the current status of HR analytics, some findings now risk becoming outdated in a very short order due to new technologies, emerging business challenges, and shifting worker expectations. The revolving nature of AI-driven HR-influence decision-making, workforce automation, and ethical considerations creates a need for ongoing research to track developments. Longitudinal studies monitoring HR analytics developments over the years might provide a better adaptive understanding of the subject area.

In addition to generalizability, the study primarily focuses on academic literature and structured analyses, which may not apply to all industries, organisational sizes, or cultural contexts. There is a significant gap in the application of HR analytics, especially when compared to small businesses, large multinationals, and regions with differing regulatory climates. The challenges faced by organisations in developing economies and the needs of businesses in developed economies are often not aligned. In emerging markets, it is not generally true that data infrastructure or digital literacy is consistently advanced to the degree demanded in the developed world sector. Future studies that compare across industries, areas, and organisational structures should assess the external validity of the topics under study about HR data analysis.

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Finally, HR analytics research is constrained by ethical and legal considerations. This evaluative research acknowledges privacy, bias mitigation, and compliance as crucial considerations in the use of HR data. However, the legal environment does continuously evolve. Different countries have varying approaches to treating employee data, AI governance, and algorithmic transparency, making it challenging to establish universally acceptable best practices. Future research should focus on the similarities and differences among jurisdictions and analyse how organisations address ethical challenges in the execution of HR analytics.

Conclusion

Using a bibliometric analysis, the study presents a holistic view of the development and current state of HR Analytics research within the service industry. It provides an overview of steady growth, increasing relevance, and a shift in focus for this field through an examination of publishing trends, collaboration patterns, and theme developments. A 5.48% annual growth rate, with a peak in research output in 2023, emphasises the promising area of interest pursued by HR Analytics regarding the career itself.

It shows that a high degree of cooperation, averaging 3.01 co-authors per document, yet only 15.04% of the total output is international co-authorships. However, this leaves considerable scope to widen cooperative partnerships and allow input from a variety of perspectives. Likewise, the high record of 12.71 citations per document is a testament to this field's impact and relevance, underscoring the subject's applicability in realistically addressing problems in the service sector.

The publication output in this period was observed to be in a clear downtrend, indicating potential gaps for future research work that could attract better attention to some renewed challenges posed. Such themes include: HR solutions driven by AI, predictive analytics, and workforce management. Future studies ought to explore emerging trends, under-researched areas, and the practical application of HR Analytics across diverse service industry contexts.

The study reframes HR analytics as a dynamic capability with AI-enabled systems, linking conventional aHRM theories with new technology requirements and providing a different perspective on RBV, SHRM, and HCT approaches.

The study has important insights for researchers, practitioners, and policymakers. Researchers can utilise these findings to identify key themes, explore more impactful journals, and pinpoint gaps in the existing literature. At the same time, practitioners will leverage these results to apply the most modern HR Analytics solutions, while policymakers and funding bodies will promote initiatives that foster interdisciplinary research and international cooperation. Bringing research in line with practice in this way could mean that HR Analytics will drive future innovation and performance improvement opportunities for firms in the service industry.

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Response Sheet

Critical Evaluation 1.

Theoretical Contribution: Limited Novelty The paper synthesizes existing literature but does not offer a new theoretical model or a reconceptualization of existing frameworks. The contribution to strategic HRM theory (e.g., integration with AI and ethics) is implied but needs clearer conceptual development. How does this advance RBV, SHRM, or human capital theory?

Response

Extension of RBV: From Static Resources to Dynamic Capabilities

This study redefines Strategic Human Resource Management (SHRM), the Resource-Based View (RBV), and Human Capital Theory (HCT) by conceptualizing HR analytics not solely as a technical tool, but rather, as a strategic dynamic capability for modern organizations. The traditional literature under the heading of RBV has treated human capital as a valuable, rare, inimitable, and non-substitutable resource. Our bibliometric review discoveries indicate that the implementation of HR analytics itself elevates data to a strategic resource. It is as much about the available talent, as it is about the organization's ability to derive meaning from workforce data in real-time in a way that makes by far the most agile and informed decisions. Thus, HR analytics can be described as a dynamic capability that represents the organization's ability to alter and recombine resources in transient settings: an extension in Teece et al.'s (1997) dynamic capability framework that continues to extend RBV in the context of data-driven HRM.

Reconceptualizing SHRM: Analytics as a Strategic Enabler

Likewise, this study contributes to SHRM theory by showing how HR analytics are an enabling mechanism for continuous strategic alignment. Typically, SHRM is devoted to aligning HR practices with other organizational goals; prediction analytics, AI, and machine learning move the concept to one of real-time, responsive decision making. Again; the findings from this analysis showed that HR analytics can predict talent needs, succession planning, and employee engagement to facilitate proactive workforce strategy approaches. This research redefines SHRM not as a one-off fit concept; but as a developing data-responsive system where HR strategy is continuously aligned with environmental or internal signals.

Human Capital Theory (HCT): Ethical and Cognitive Dimensions

Additionally, in the spirit of Human Capital Theory, this article highlights that analytics-infused HRM moves the lens of value away from the skills and abilities of employees toward the ethical, behavioral, and technological aspects of workforce value. Emerging themes such as algorithmic fairness, privacy, and psychological safety all suggest that what remains of human capital is no longer defined solely by what employees know or do, but also by how employees engage with digital systems and the fairness with which they are treated as a by-product of algorithmic decisions. The emergence of behavioral analytics and employee sentiment tracking contribute cognitive and emotional capital to the HCT conversation. Therefore, an expanded understanding

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of human capital is needed to incorporate the data literacy, AI fluency, and ethical infrastructure established as essential to workforce value.

In this way, while viewing bibliometric trends and thematic findings in conjunction with existing HRM theory, this study contributes to a meaningful theoretical advancement. It brings together contemporary approaches to data science and long-standing perspectives of HRM theory and indicates that HR analytics is not simply an apparatus, but stands as a transformative lens through which we now need to reconceptualize human capital, strategic alignment, and organizational agility as pertaining to the service industry.

Critical Evaluation 2

Methodological Rigor: Solid but Lacks Depth While bibliometric tools are well-applied (co-citation, keyword co-occurrence, thematic maps), qualitative insights are minimal. For deeper interpretive value, the paper could incorporate content analysis of key themes, quote key findings, or integrate expert interviews from the field (as suggested in its own limitations).

Response

This study applies a strong bibliometric method, including co-citation analysis, keyword co-occurrence and thematic map, while recognizing the value of further qualitative interpretation that would enhance our understanding of the identified research clusters and thematic areas. In this light, a supplementary content analysis of highly-cited and thematically-relevant papers was undertaken to extract key conceptual patterns and illustrative findings, in support of the bibliometric trends.

For example, in the “Motor Themes” quadrant of the thematic map, the keyword cluster surrounding “decision-making,” “machine learning,” and “human resource management” contains watershed studies (e.g., Marler & Boudreau, 2017; Strohmeier & Piazza, 2021). A qualitative reading of this research demonstrates how HR analytics discourse is evolving to describe the practice not only as operational effectiveness (i.e., applying analytical measures to operationally improve), but also a driver of strategic transformation regarding talent forecasting, performance optimization, and leadership development. For example, Marler & Boudreau argue analytics capability indicates an organization’s capacity for evidence-based HRM, while Strohmeier & Piazza critically evaluate the way algorithmic models are modifying fairness and transparency in people-related decision-making.

Similarly, the Niche Themes quadrant also points to the future of both other immersive technologies and HRM practices. Emerging terms, albeit not well connected such as “virtual reality” and “social networking”, point in this direction. Qualitative investigation of these documents (e.g. Sharma & Sharma, 2017) reveal increases in interest in gamified recruitment platforms and AI models of candidate experience, signaling that these themes do not have network centrality at the moment but may represent the next wave of applied innovation in HR analytics.

In the Basic Themes quadrant, the presence of terms such as “people analytics” and “information systems” exhibits thematic elements that are foundational but not advanced. A focused read of the

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foundational literature in this cluster, including Angrave et al., 2016 and Van den Heuvel & Bondarouk, 2017, indicates a recurring concern about analytics being not adopted beyond descriptive dashboards, which is not strange given the context of many service organizations- these papers provided strong quotes and concluding remarks to situate the bibliometric data: for example, Angrave et al. noted that "HR is likely to fail the Big Data challenge" unless a shift in culture with respect to HR competencies occurred.

Critical Evaluation 3

Presentation and Clarity: Dense and Repetitive The paper is very long, and several sections (especially methodology and figures) are overly descriptive. Some redundancy is evident in the trend analysis, theoretical implications, and practical insights, blunting the impact of otherwise good insights.

Response

Formatting Changes Done

Critical Evaluation 4

Practical Relevance: Well-Defined The practical recommendations are strong: calls for cross-functional collaboration, ethical considerations, and global partnerships are timely. However, more concrete examples or case illustrations would enhance its relevance to practitioners.

One example is Unilever which is using AI recruiting tools Pymetrics and HireVue to assess candidate predisposition/ability through neuroscience-based games and video interviews. This process helped improve hiring processes and exemplified Unilever's commitment to ethical AI through bias audits and transparency measures aligning with the earlier discussed ethical governance frameworks of this paper.

Additionally, Infosys, an HR digital transformation leader, also used InfyMe, a self-service digital HR platform with AI applications which provided personalized insights to employees, avenues for real-time feedback and training nudges. These employee efforts and historical data served to improve engagement scores and allowed HR departments to spend less time on transactional tasks. This focus on transactions mirrors this paper's call for automating certain HR processes (i.e., transactional HR) to allow the HR function to redirect its efforts to a greater emphasis on planning our work strategically.

Critical Evaluation 5

Use of Literature: Strong but Slightly Dated Foundational references (e.g., Marler, Strohmeier) are used effectively. However, more recent empirical studies post-2022 on HR tech integration (e.g., AI ethics, remote analytics, algorithmic fairness) could elevate the discussion. Comparison with Related Literature Marler & Boudreau (2017) – Core framing on evidence-based HR practices. Strohmeier & Piazza (2021) – Discusses AI-HRM integration and future research agenda. Van den

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Heuvel & Bondarouk (2017) – Explores the future structure of HR analytics, echoing concerns around system support. Tursunbayeva et al. (2022) – Offers an empirical take on analytics' effect on employee performance in the service sector. Angrave et al. (2016) – A cautionary view on HR's capability to manage big data – is missing from the current paper's critical balance. These can be more directly woven into the discussion for stronger engagement with theoretical debate and current empirical challenges. Suggestions for Improvement Reduce redundancy and improve conciseness in findings and implications.

Response

Even though this research is based on well-established HR analytics frameworks, such as those of Marler & Boudreau (2017), Strohmeier (2009), and Van den Heuvel & Bondarouk (2017), tensions and conceptual ambiguity are acknowledged, and extends the discussion by introducing some recent empirical evidence which points to the risks and opportunities of technology-enabled HRM. For example, Tursunbayeva et al. (2022) provide empirical evidence that HR analytics have a positive influence on employee performance in service industry contexts, thus supporting the strategic understanding of analytics in high-contact / high-touch situations—particularly relevant for the present study's focus in the service sector.

In addition, Strohmeier & Piazza (2021) call for scholars to establish a new research agenda, which is inclusive of a mindset towards AI, ethics and strategic HRM, and to continue the examination of unintended consequences of algorithmic decision-making. Therefore, the present study incorporates emerging themes of algorithmic bias, ethics of governance and fairness in workforce analytics, thus reflecting their concerns with thematic and co-citation analysis.

Importantly, there has been an increase in post-2022 literature that discusses HR analytics in remote and hybrid work arrangements, ethical governance of AI, and real-time employee experience – important topics identified in the thematic clusters of this study. However, we can see that these emerging areas are still not conceptually clear, and will therefore need more future research to define more precisely both the lines between technological enablement and strategic change.

Refer To Table 2