THE FOUR PILLARS OF HR ANALYTICS: RESEARCH AND PRACTICE, ENGAGING EMPLOYEES, LEVERAGING KNOWLEDGE, AND DRIVING STRATEGIC DEVELOPMENT AND TCCM ANALYSIS

RIDHIMA KHAJURIA[1], ARTI MAINI[2] and
SYEDA SHAZIA BUKHARI[3]

[1]Research Scholar, School of Business,
Shri Mata Vaishno Devi University, Katra, India.
Email: khajuriaridhima10@gmail.com
[2,3]Assistant Professor, School of Business,
Shri Mata Vaishno Devi University, Katra, India.
Email: [2]arti.maini@smvdu.ac.in, [3]Shazia.bukhari@smvdu.ac.in

Abstract

Human Resource (HR) Analytics is increasingly recognized for its significant impact on organizational performance, aiding in the development of innovative methods to enhance HR management (HRM) functions and their alignment with business outcomes. This study aims to synthesize existing literature on HR Analytics and assess its contributions to business organizations. A total of 144 documents were identified, of which 47 were peer-reviewed articles. The PRISMA guidelines were rigorously applied to ensure a precise selection and exclusion of documents, thus enhancing the reliability and validity of the review process. Of the reviewed documents, 36 articles were thoroughly analysed, resulting in the identification of four key research themes within the field of HR Analytics: *Research and Practice, Employee Engagement, Information and Knowledge Management,* and *Strategic HR Development.* Each theme reflects a unique application of HR Analytics, highlighting its multi-dimensional and multi-level capabilities within organizational contexts. This thematic analysis underscores the distinct roles HR Analytics plays in each area, ranging from improving employee engagement to informing strategic HR decisions. Furthermore, this review identifies gaps in current research, particularly the need for empirical studies that could deepen the understanding of HR Analytics' impact across these domains. Future research directions are proposed to address these gaps and further explore the practical applications of HR Analytics in enhancing organizational effectiveness.

Keywords: HR Analytics, Systematic Literature Review, Thematic Analysis, Talent Analytics, People Analytics, Workforce Analytics.

JEL Qualification: M12

1. INTRODUCTION

The relentless pursuit of performance optimization has propelled "analytics" to the forefront of organizational strategy. While fields like marketing and finance have long embraced its transformative power (Davenport, 2010), its application within Human Resource Management (HRM) remains a nascent but rapidly evolving space.

HRA have witnessed a paradigm shift, moving from reliance on basic metrics to harnessing the sophisticated insights (Roberts, 2013). At its core, HRA leverages information technology to conduct comprehensive analyses of both internal data from HR departments and external data from broader organizational and market contexts.

This data-driven approach enables organizations to make informed, evidence-based decisions about their workforce (Marler & Boudreau, 2017). Through the processes of data collection, cleaning, organization, and analysis, HRA consolidates large datasets from multiple sources,

providing predictive insights into critical areas such as employee performance, training and development needs, and turnover risk.

By offering these insights, HRA functions as a strategic tool that contributes to optimizing workforce management and aligning HR goals with broader organizational objectives. As a result, HR Analytics has become central to enhancing an organization's strategic positioning, giving leaders a competitive edge by enabling proactive talent management and effective resource allocation.

Despite its rising popularity, HRA presents an intriguing dichotomy. While its impact on HRM practices is evident, its effectiveness has provoked considerable scholarly debate (Angrave et al., 2016; Marler & Boudreau, 2017). Concerns have emerged regarding HRA's ability to consistently guide decision-making in a way that aligns with overarching organizational goals.

Additionally, some scholars question whether analytical tools genuinely contribute to sound HRM practices, suggesting that their practical benefits may be overstated (Angrave et al., 2016). This blend of promise and potential pitfalls underscores the importance of critically assessing HRA's current role within the organizational landscape.

To address this need, this study will undertake a systematic review of peer-reviewed literature on HR Analytics. This comprehensive approach aims to evaluate the current state of HR analytics and its impact on organizational performance and sustainability. By synthesizing existing academic insights, this review will offer a nuanced analysis of HRA's applicability, highlighting its strengths and limitations in practice. Ultimately, this study aims to deepen the understanding of HRA's potential as a powerful tool for advancing organizational success, contributing to both strategic HRM and sustainable business practices.
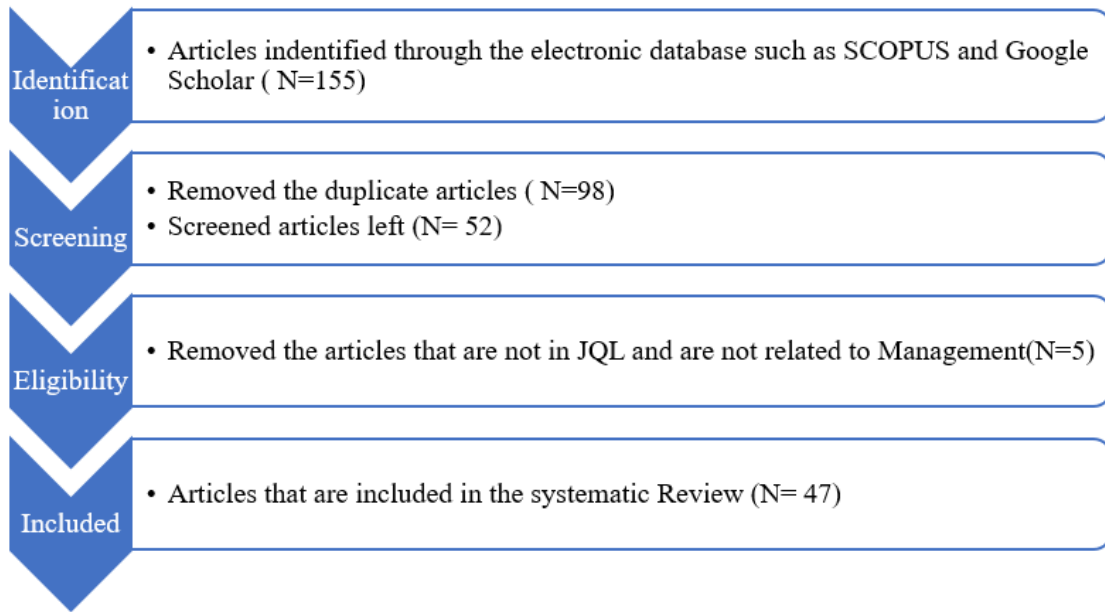
2. RESEARCH METHODOLOGY

Past studies and criteria for their inclusion

This study adheres to the PRISMA guidelines (The PRISMA Group, 2009) to systematically identify, screen, and evaluate studies for inclusion in the review. A comprehensive search was conducted within the SCOPUS electronic database, utilizing targeted keywords such as "Human Resource Analytics," "People Analytics," "Workforce Analytics," "Talent Analytics" combined with "Business" and "Management."

The inclusion criteria were restricted to peer-reviewed academic articles and doctoral dissertations, ensuring the credibility and relevance of the sources. To qualify for inclusion, each document had to examine Human Resource Analytics within the context of HRM, either through a conceptual framework or an empirical study.

The systematic search process yielded numerous articles, which were subsequently organized and analysed using an Excel spreadsheet to facilitate rigorous assessment and comparison. This approach enabled a structured and thorough evaluation of each document's contribution to understanding the role and impact of HR Analytics on HRM practices and organizational performance.

Identification
- Articles indentified through the electronic database such as SCOPUS and Google Scholar (N=155)

Screening
- Removed the duplicate articles (N=98)
- Screened articles left (N= 52)

Eligibility
- Removed the articles that are not in JQL and are not related to Management(N=5)

Included
- Articles that are included in the systematic Review (N= 47)

The methodology used in the paper is suggested by Barends et al., (2014).   It recommends that each paper should be evaluated based on the data collection used to answer specific research questions (Marler and Boudreau, 2017). All 41 papers were examined for their appearance on the 66th edition of Journal Quality List (JQL), 15 February. The JQL has been developed to help academics determine which journals fulfil the relevant standards and to evaluate their articles' performance. Five peer-reviewed articles were deleted as a result of failure to appear in JQL journals. Peer reviewed thirty-six articles remained. The number of articles by year is summarised in Figure 1.
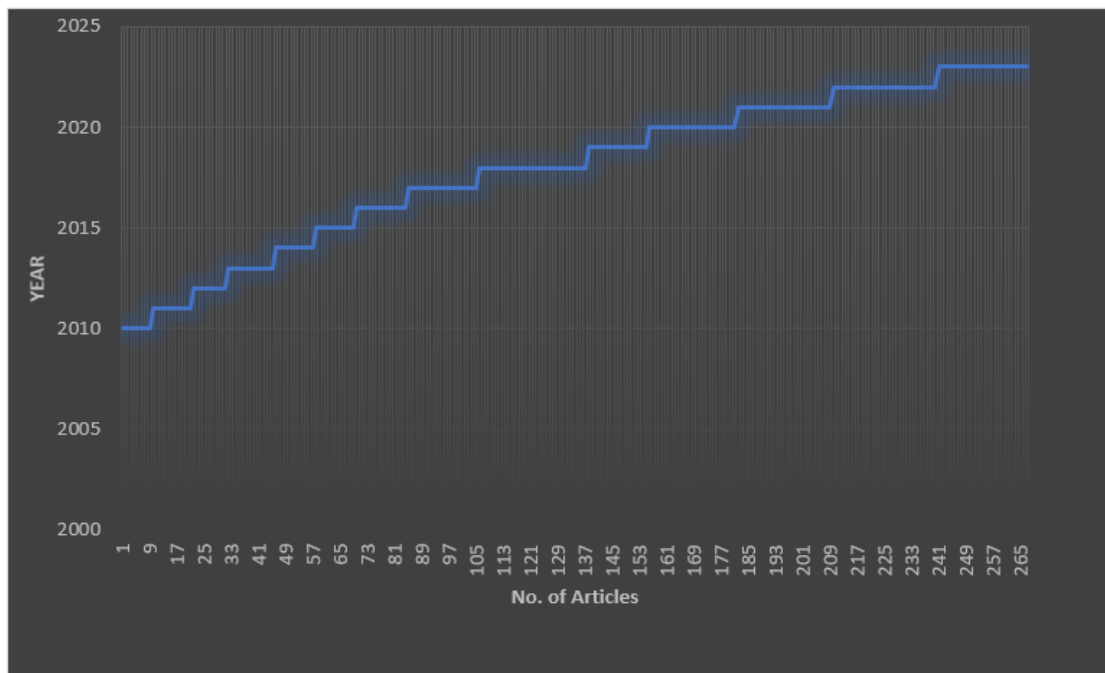

Figure 1: HR Analytics articles published over the year

According to the sample of literature, the first article was published in 2011. From 2011 to 2015, few articles were published in that period. Then there was noticeable increased interest in HRAas the number of papers published after 2016 increased compared to previous years. The number of articles has shown steady growth after 2016. The quality and overall value of each study were calculated on the basis of being an academic or non-academic publication, a database where the source is indexed, a database category of the source, and a peer-reviewed publication.
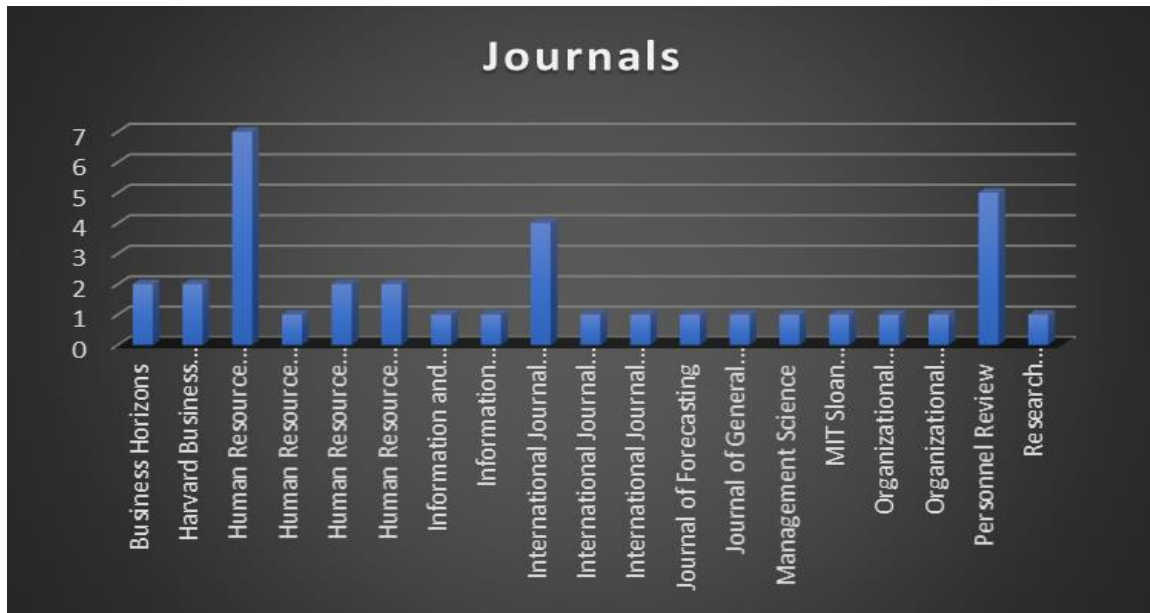

Figure 2: Peer-reviewed publications on HR Analytics

Figure 2 is a graphical representation of the journal wise publications on HR Analytics.
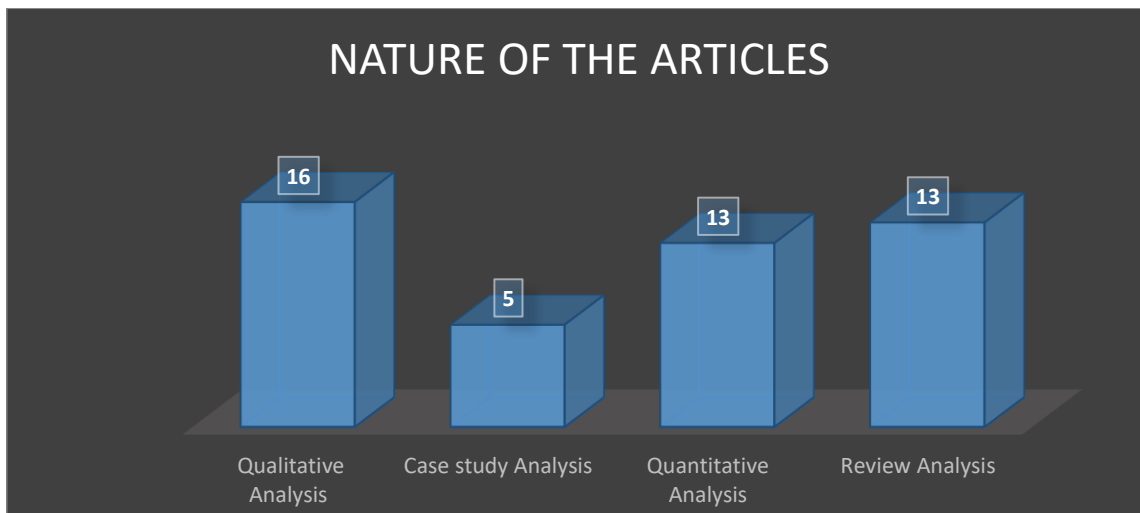

Figure 3: Distribution of Qualitative, Empirical, Review papers and Case study analysis in the literature

Figure 3 is a graphical depiction of the 47 articles segregated from the data type. Of these, 16 are qualitative papers, 13 are empirical papers, 13 review papers and 5 case study analysis.

For their contribution to organisations, the thirty-six articles were evaluated. The contents of the thirty-six articles are classified and summarized in table 1.

Table 1: Classification and main contribution of studies.

No.	Authors	Title	Year	Journal	Nature	Area	Contribution to Organization
1	Davenport, T.H., Harris, J., Shapiro, J.	Competing on Talent Analytics	2010	Harvard Business Review	Case Study Analysis	Research and Practice	Highlights best practices in people analytics management.
2	Aral, S., Brynjolfsson, E., Wu, L.	Three-Way Complementarities: Performance Pay, HRA, and IT	2012	Management Science	Quantitative Analysis	Information and Knowledge	Examines complementarities between IT, performance pay, and HR analytics.
3	Ulrich, D., Dulebohn, J.H.	Are We There Yet? What's Next for HR?	2015	HR Management Review	Review Analysis	Strategic Development of HR Analytics	Discusses HR analytics techniques to avoid becoming a passing fad.
4	Rasmussen, T., Ulrich, D.	Learning from Practice: Avoiding Fad Traps in HR Analytics	2015	Organizational Dynamics	Case Study Analysis	Research and Practice	Explores factors potentially hindering HR analytics success.
5	Khan, S.A., Tang, J.	The Paradox of HRA: Mindfulness of Employees	2016	Journal of General Management	Quantitative Analysis	Employee Engagement	Investigates the relationship between HR analytics personnel's attributions and commitment.
6	Angrave, D., Charlwood, A., Kirkpatrick, I., Lawrence, M., Stuart, M.	HR and Analytics: Big Data Challenges	2016	HR Management Journal	Review Analysis	Strategic Development of HR Analytics	Critiques current HR analytics practices and identifies gaps.
7	Baesens, B., De Winne, S., Sels, L.	Is Your Company Ready for HR Analytics?	2017	MIT Sloan Management Review	Case Study Analysis	Strategic Development of HR Analytics	Evaluates organizational readiness for HR analytics adoption.
8	Marler, J.H., Boudreau, J.W.	An Evidence-Based Review of HR Analytics	2017	Int. Journal of HRM	Review Analysis	Research and Practice	Provides a literature review of HR analytics research.
9	Gobble, M.M.	The Datafication of Human Resources	2017	Research Tech Management	Case Study Analysis	Information and Knowledge	Explores challenges faced by HR personnel due to analytics growth.
10	Vargas, R., Yurova, Y.V., Ruppel, C.P., Tworoger, L.C., Greenwood, R.	Individual Adoption of HR Analytics	2018	Int. Journal of HRM	Quantitative Analysis	Employee Engagement	Examines individual decisions in adopting HR analytics.
11	Safarishahrbijari, A.	Workforce Forecasting Models: A Systematic	2018	Journal of Forecasting	Review Analysis	Employee Engagement	Investigates HR analytics contributions to employee

		Review					engagement.
12	McIver, D., Lengnick-Hall, M.L., Lengnick-Hall, C.A.	Strategic Approach to Workforce Analytics	2018	Business Horizons	Qualitative Analysis	Strategic Development of HR Analytics	Analyses the effectiveness of HR analytics.
13	Huselid, M.A.	Science and Practice of Workforce Analytics	2018	HR Management	Review Analysis	Strategic Development of HR Analytics	Reviews current HR analytics implementations.
14	Simón, C., Ferreiro, E.	Collaboration in Workforce Analytics	2018	HR Management	Quantitative Analysis	Research and Practice	Examines scholar-practitioner collaboration in HR analytics.
15	Levenson, A.	Using Workforce Analytics for Strategy Execution	2018	HR Management	Qualitative Analysis	Strategic Development of HR Analytics	Explores how HR analytics enhances organizational strategy.
16	Kryscynski, D., Reeves, C., Stice-Lusvardi, R., Ulrich, M., Russell, G.	Analytical Abilities in HR Professionals	2018	HR Management	Quantitative Analysis	Strategic Development of HR Analytics	Investigates data science's impact on organizational strategies.
17	Schiemann, W.A., Seibert, J.H., Blankenship, M.H.	Human Capital Analytics and Business Success	2018	HR Management	Qualitative Analysis	Research and Practice	Assesses frameworks impacting organizational ROI.
18	Wang, L., Cotton, R.	Social Capital in Workforce Analytics	2018	HR Management	Quantitative Analysis	Research and Practice	Highlights workforce analytics' positive effects on strategy execution.
19	Leonardi, P., Contractor, N.	Better People Analytics	2018	Harvard Business Review	Qualitative Analysis	Research and Practice	Discusses the growing importance of people analytics.
20	Chalutz Ben-Gal, H.	ROI-Based Review of HR Analytics	2019	Personnel Review	Review Analysis	Research and Practice	Provides practical tools for HR analytics implementation.
21	Hamilton, R.H., Sodeman, W.A.	Challenges in Big Data HR Analytics	2019	Business Horizons	Review Analysis	Strategic Development of HR Analytics	Explores HR analytics' role in hiring and industry transformation.
22	Durai, D.S., Rudhramoorthy, K., Sarkar, S.	HR Metrics as an Ongoing Process	2019	HRM Int. Digest	Qualitative Analysis	Information and Knowledge	Identifies components for successful HR ICT systems.
23	Wang, N., Katsamakas, E.	Network Data Science in HR Analytics	2019	Info Resources Management Journal	Quantitative Analysis	Information and Knowledge	Examines large-scale employee data management.
24	Greasley, K., Thomas,	HR Analytics in	2020	HR Management	Qualitative	Research and	Investigates evidence-based

	P.	Metricised HRM		Journal	Analysis	Practice	approaches in HR.
25	Piazza, A., Abrahamson, E.	Fads in Management Practices	2020	Int. Journal of Management Reviews	Review Analysis	Research and Practice	Reviews the lifecycle of management practices.
26	Ryan, J.C.	People Analytics for Faculty Turnover	2020	Personnel Review	Quantitative Analysis	Employee Engagement	Discusses bibliometrics for analyzing faculty turnover.
27	Brandt, P.M., Herzberg, P.Y.	Predicting Application Success via LIWC	2020	Int. Journal of Selection & Assessment	Quantitative Analysis	Research and Practice	Explores predictive analytics in CV evaluation.
28	Newman, D.T., Fast, N.J., Harmon, D.J.	Algorithmic Fairness in HR Decisions	2020	OB and Human Decision Processes	Quantitative Analysis	Information and Knowledge	Examines procedural justice in data-driven HR decisions.
29	Gal, U., Jensen, T.B., Stein, M.-K.	Virtue Ethics in People Analytics	2020	Information & Organization	Qualitative Analysis	Information and Knowledge	Advocates ethical considerations in analytics practices.
30	McCartney, S., Murphy, C., McCarthy, J.	Competency Models for HR Analysts	2020	Personnel Review	Qualitative Analysis	Employee Engagement	Assesses individual competencies in HR analytics.
31	Ellmer, M., Reichel, A.	Staying Close to Business: HR Analytics and Decision-Makers	2021	Int. Journal of HRM	Qualitative Analysis	Strategic Development of HR Analytics	Proposes strategies for making HR analytics outputs more relevant to business leaders.
32	Qamar, Y., Samad, T.A.	HRA: A Review and Bibliometric Analysis	2021	Personnel Review	Review Analysis	Research and Practice	Highlights current trends and research gaps in HR analytics.
33	Margherita, A.	Systematizing HR Analytics Research	2021	HRM Review	Case Study Analysis	Employee Engagement	Examines the benefits of training and support in HRA implementation.
34	Tursunbayeva, A., Pagliari, C., Di Lauro, S., Antonelli, G.	Ethics in People Analytics	2021	Personnel Review	Review Analysis	Research and Practice	Reviews ethical risks and opportunities in people analytics.
35	Larsson, A.-S., Edwards, M.R.	Insider Econometrics and HR Analytics	2021	Int. Journal of HRM	Review Analysis	Information and Knowledge	Explores longitudinal intra-firm research in HR practices valuation.
36	Kim, S., Wang, Y., Boon, C.	Sixty Years of Research on HR Tech	2021	HR Management	Review Analysis	Information and Knowledge	Conducts a comprehensive review of HR tech and analytics research.
37	McCartney, S., Fu, N.	Promise vs. Reality in People Analytics	2022	Journal of Organizational Effectiveness	Review Analysis	Research and Practice	Highlights the need for alignment between HRA's potential and practical implementation.
38	Amir, R., Garg, P.	Adoption of HRA in	2022	Transnational	Quantitative	Strategic	Explores factors impacting HRA

				India		Marketing Journal	Analysis	Development of HR Analytics	adoption among HR professionals in India using the UTAUT framework.
39	Polzer, J.T.	The Rise of People Analytics	2022	Research in Organizational Behavior	Review Analysis	Research and Practice	Examines how HRA impacts communication, collaboration, and decision-making.
40	Cayrat, C., Boxall, P.	Challenges in HR Analytics	2022	Journal of Organizational Effectiveness	Quantitative Analysis	Information and Knowledge	Highlights challenges in data quality and integration and benefits of predictive analytics in improving HR efficiency.
41	Belizón, M.J., Kieran, S.	Legitimacy Processes in HRA	2022	HR Management Journal	Qualitative Analysis	Strategic Development of HR Analytics	Identifies strategic commitment, data infrastructure, and project focus as key legitimization processes.
42	Singh, S., Mudli, A.	Organizational Trust and HRA Outcomes	2023	Int. Journal of Knowledge Management Studies	Quantitative Analysis	Information and Knowledge	Emphasizes the importance of trust in facilitating information sharing and HR knowledge integration.
43	Wirges, F., Neyer, A.-K.	Process-Oriented Understanding of HRA	2023	Review of Managerial Sciences	Qualitative Analysis	Employee Engagement	Suggests redefining roles for effective HRA implementation and application.
44	Dhankar, K., Singh, A.	Employees' Adoption of HRA	2023	Evidence-Based HRM	Quantitative Analysis	Strategic Development of HR Analytics	Develops a theoretical framework based on career construction and technology readiness theories for HRA adoption.
45	Thakur, S.J., Bhatnagar, J., Farndale, E., Aeron, P.	HRA, Problem-Solving, and Firm Performance	2024	Personnel Review	Quantitative Analysis	Strategic Development of HR Analytics	Analyzes how HRA enhances organizational capabilities through dynamic problem-solving.
46	McCartney, S., Fu, N.	Enacting People Analytics	2024	HR Management	Qualitative Analysis	Employee Engagement	Investigates the complementary effects of analytical and storytelling skills on people analysts' job performance.
47	Rasmussen, T., Ulrich, M., Ulrich, D.	Moving People Analytics from Insight to Impact	2024	HR Development Review	Qualitative Analysis	Strategic Development of HR Analytics	Discusses how HR analytics shapes future strategies and resolves organizational challenges.

3. CONTRIBUTION OF HR ANALYTICS

The assessment of the studies leads to the identification of major themes, see Table 1, which reflect the contribution of HRA to the organization. The following sections describes the four themes identified.

3.1 Research and Practice

Underlying the role of HRA in promoting research and practice, a total of 14 articles were identified. The majority of the articles were qualitative. Specifically, under this theme, research and current practices that are being performed in HRA are discussed. In practice, HRA starts with acquiring the data and ends with real-time deployment in the department of Human Resources (Davenport, 2010). HRA helps in creating an environment that allows the HR department to go from being reactive to proactive. Few authors have emphasized the advantages of imposing HRA on HR Departments (Davenport, 2010), while others have raised awareness and furnished concerns about it becoming a fad in the future (Angrave et al., 2016 and Rasmussen and Ulrich, 2015). A deeper gap between academics and practice has been reflected upon by the studies (Greasly and Thomas, 2021). The reasons indicated by the studies include first, underestimation of past researchers and its absence in practice due to lack of understanding on the part of practitioners. Second, the concern of the HR manager about the interest of senior management in only quantitative data overlooking the nature of HR-related decisions which include a lot of subjectivity (Greasly and Thomas, 2021; Mcarthy and Fu, 2022). Hence, a gap between academic research and practice of HRA can be set to be visible. The adoption is slower than was anticipated by academics (Marler and Boudreau, 2017). There is also a gap in academic research whereby more scientific empirical studies are required on HRA (Chalutz Ben-Gal, 2019). The legality of HRA in terms of data protection is still in haze (Tursunbayeva et al., 2021). It is necessary to highlight the advantages of HR Analytics, both inside and outside the organisation so that the low adoption rates can be improved (Leonardit and Contractor, 2018).

3.2 Employee Engagement

Eight articles come under this theme which highlight the different faced by the organizations while engaging with employees. Studies describe the application of HRA in increasing employee engagement and employee commitment (Khan and Tang, 2016). The past studies indicate the following points for engaging employees using HR Analytics. First, HRA can help identify the training needs which will not only support organizational goals but also keep the motivation level of employees high (Vargas et al., 2018; Hota, 2021). Second, HRA can use to identify the linkages between the turnover and mobility of employees (Ryan, 2020). Third, HRA can be used to incorporate the information into the employee evaluation process driving employee engagement. Fourth, HRA can ensure the use of data at the right time for employee related decisions. Thus, avoiding data being obsolete (McCarthy, 2020). Finally, HRA can be used in analysing job rotations and employee retention, thus, contributing to the phenomena of employee engagement (Safarishahrbijari, 2018).

3.3 Information and knowledge

This theme is highlighted in a total of Ten articles that focus on how the Human Resource Department's activities have greatly changed since HRA was introduced and how they contribute to the organisation's 'Information and Knowledge'. In some studies, information and decision-making advantages of HRA have been highlighted. While in others, the challenges of its implementation have been presented (Larsson and Edwards, 2021; Kim et al., 2021; Gobble, 2017). For example, data volume management, storage and cleaning of data,

and debugging are requirements for knowledge extraction under HRA (Gobble, 2017). The studies also reflect upon the use of HR metrics along with HRA leading to improved efficiency and better decision making (Durai et al., 2019). The network data science approach is used specifically to gain a rich understanding of employee contributions and their productivity in different roles using a variety of algorithms. Such insights can be used for profound examination and optimisation of working patterns to improve the organization's overall performance (Wang and Katsamakas, 2021). HRA uses Intra Firm people data in order to identify the value of the HR investment. It helps to understand the flow of information within and between the departments. HRA provides insight into contextual factors and how HRM may influence performance (Larsson and Edwards, 2021; Singh and Mudli, 2023). HRA presents its own challenges with all the advantages. It is ethical as well as perceptive. First, employees regard decisions that are driven by data in all scenarios as unfair. Even if people are more likely to make mistakes or prejudices, instead of data-driven decisions, they are still willing to accept human made decisions (Newman et al., 2020). Second, the ethical challenges faced by HR Analysts are algorithmic opacity, over data acquisition, and the impact of the use of HRA if the handling of data is not careful (Gal et al., 2020; McCartney and Fu, 2024). To deal with this, a hybrid approach can be used where quantitative data includes qualitative data reflecting the subjective knowledge or experiences of the employees. It will help in creating the confidence of the employees in the algorithm-based decision-making process.

3.4 Strategic Development of HR

Several studies have emphasized the importance of HRA in improving organizational efficiency and strategic development and have demonstrated its positive contribution. 15 articles fall under this theme, which indicates that HRA helps in monitoring and regulating workflows to improve the functioning of the company (McIver et al., 2016). The above-mentioned theme includes areas like First, HRA is capable of taking proactive steps towards future hiring trends (Rasmussen and Ulrich, 2015). Second, assessing talent requirements in advance. Third, there are opportunities to manage human capital more effectively (Rasmussen and Ulrich, 2015). Fourth, to create psychological profiles that can be used to predict future performance, potential in leadership, or counterproductive behaviours (Hamilton and Sodeman, 2019). Fifth, in improving the experience for both employees and customers (Baesens et al., 2016; Rasmussen et.al., 2024). Sixth, in promoting workplace diversity and inclusion (Ellmer and Reichel, 2021). Seventh, in improving the organization's global position (Levenson, 2018).

4. TCCM ANALYSIS

While peer-reviewed literature on HR Analytics (HRA) remains limited, relying solely on a Systematic Review may not capture the full scope of this evolving field. To address this, the TCCM framework (Theory, Context, Characteristics, and Method) is utilized, offering a more comprehensive analysis and filling in the gaps that may be overlooked by traditional reviews. The TCCM framework provides insights into existing research gaps and points to potential directions for future investigation (Knight et al., 2004; Paul & Rosado-Serrano, 2019). Table 2 showcases the reviewed articles and highlights their contributions to the literature through the TCCM approach.

TABLE 2: TCCM Analysis

No.	Authors	Title	Year	Journal	Theories	Context (Countries & Industries)	Characteristics	Methodology
1	Davenport, T.H., Harris, J., Shapiro, J.	Competing on Talent Analytics	2010	Harvard Business Review	Human-Capital Investment Analysis, Talent Value Model	A&T, Google, Best Buy (USA)	Workforce Forecast	Case Study Analysis
2	Aral, S., Brynjolfsson, E., Wu, L.	Three-Way Complementarities: Performance Pay, HRA, and IT	2012	Management Science	Principal-Agent Model, HCM Framework	189 Firms (USA)	Appraisal Management, IT, HR Analytics	Quantitative, Logistic Regression
3	Ulrich, D., Dulebohn, J.H.	Are We There Yet? What's Next for HR?	2015	HR Management Review	Outside & Inside Approach	Not Specified	Leadership, Employee & Customer Satisfaction, ROI	Review
4	Rasmussen, T., Ulrich, D.	Learning from Practice: Avoiding Fad Traps in HR Analytics	2015	Organizational Dynamics	Not Specified	Not Specified	Operational Performance, Turnover, Leadership Quality	Case Study Analysis
5	Khan, S.A., Tang, J.	The Paradox of HRA: Mindfulness of Employees	2016	Journal of General Management	Not Specified	China	Employee Attribution, Data Privacy	Quantitative, Regression Analysis
6	Angrave, D., Charlwood, A., et al.	Why HR is Set to Fail the Big Data Challenge	2016	HR Management Journal	Systematic Review	Not Specified	HR Analytics, HRIS, Big Data	Review
7	Baesens, B., De Winne, S., Sels, L.	Is Your Company Ready for HR Analytics?	2017	MIT Sloan Management Review	Not Specified	USA	Employee Network Engagement	Case Study Analysis
8	Marler, J.H., Boudreau, J.W.	An Evidence-Based Review of HR Analytics	2017	Int. Journal of HRM	Integrative Peer-Reviewed Synthesis	Not Specified	HR Analytics, Workforce Analytics,	Review

						Strategic HRM	
9	Gobble, M.M.	The Datafication of Human Resources	2017	Research Tech Management	Not Specified	Not Specified	Talent Analytics, People Analytics	Case Study Analysis
10	Vargas, R., et al.	Individual Adoption of HR Analytics	2018	Int. Journal of HRM	Diffusion of Innovations	USA	Individual Factors, Innovation Theory	Quantitative, PLS Path Modeling
11	Safarishahrbijari, A.	Workforce Forecasting Models	2018	Journal of Forecasting	Systematic Review	Not Specified	Manpower Planning	Review
12	McIver, D., et al.	A Strategic Approach to Workforce Analytics	2018	Business Horizons	Strategic HRM Framework	Not Specified	Agile Development, Workforce Analytics	Qualitative, Agile Process
13	Huselid, M.A.	Workforce Analytics in Science & Practice	2018	HR Management	Systematic Review	Not Specified	HR Measurement, Workforce Metrics	Review
14	Simón, C., Ferreiro, E.	Scholar-Practitioner Collaboration in Workforce Analytics	2018	HR Management	Not Specified	Fashion Retail (Spain)	Academic-Industry Collaboration	Quantitative, Cluster & Regression
15	Levenson, A.	Improving Strategy Execution with Workforce Analytics	2018	HR Management	Human Capital Analytics	Not Specified	Decision-Making, Strategic HRM	Qualitative
16	Kryscynski, D., et al.	Analytical Abilities in HR Professionals	2018	HR Management	LAMP Framework	Not Specified	HR Technology, Strategic HRM	Quantitative
17	Schiemann, W.A., et al.	Human Capital Analytics for Business Success	2018	HR Management	People Equity Framework	Not Specified	HR Measurement, Human Capital	Qualitative

18	Wang, L., Cotton, R.	Social Capital in Workforce Analytics	2018	HR Management	Workforce Differentiation Theory	Not Specified	Core Competencies, Human Capital	Quantitative, OLS Regression
19	Leonardi, P., Contractor, N.	Better People Analytics	2018	Harvard Business Review	Relational Analytics	Not Specified	People Analytics, Data Analytics	Qualitative
20	Chalutz Ben-Gal, H.	ROI-Based Review of HR Analytics	2019	Personnel Review	Systematic Review	Not Specified	HR Management, Quantitative Methods	Review
21	Hamilton, R.H., Sodeman, W.A.	Big Data in HR Analytics	2019	Business Horizons	Systematic Review	Not Specified	Workforce Analytics, Stakeholder Management	Review
22	Durai, D.S., et al.	HR Metrics: A Continuous Journey	2019	HRM Int. Digest	Not Specified	Not Specified	HR Metrics, Decision-Making	Qualitative
23	Wang, N., Katsamakas, E.	Network Data Science in People Analytics	2019	Info Resources Management Journal	Network Data Science Approach	USA	Data Science, Employee Engagement	Quantitative, Network Analysis
24	Greasley, K., Thomas, P.	Onto-Epistemology in HR Metrics	2020	HR Management Journal	Actor-Network Theory	Manufacturing, Recovery Service, Police Force	HR Metrics, Employee Well-Being	Qualitative, Thematic
25	Piazza, A., Abrahamson, E.	Fads in Management Practices	2020	Int. Journal of Management Reviews	Lifecycle of Management Practices	Not Specified	Six Sigma, Business Process Re-Engineering	Review
26	Ryan, J.C.	People Analytics in Faculty Turnover	2020	Personnel Review	Employee Turnover Theory	Not Specified	HR Analytics, Faculty Termination	Quantitative, ANOVA & Tukey's HSD
27	Brandt, P.M., Herzberg, P.Y.	Predicting Application Success with LIWC	2020	Int. Journal of Selection & Assessment	Not Specified	Education (Netherlands)	Text Analysis, People Analytics	Quantitative, PCA, Regression
28	Newman, D.T., et al.	Fairness in Algorithmic HR Decisions	2020	OB & Human Decision Processes	Not Specified	HR Consulting (Germany)	Procedural Justice, People Analytics	Quantitative, ANOVA

29	Gal, U., et al.	Virtue Ethics in People Analytics	2020	Info & Organization	Virtue Ethics Approach	Not Specified	Employee Ethics, People Analytics	Qualitative
30	McCartney, S., et al.	Competency Models for HR Analysts	2020	Personnel Review	HCR Framework, KASOs	USA, UK, Canada, Ireland, Australia	HR Competencies, Strategic HRM	Qualitative
31	Ellmer, M., Reichel, A.	Staying Close to Business: HR Analytics and Decision-Makers	2021	Int. Journal of HRM	Thematic Analysis	German MNC (Media Industry)	HR Analytics, Epistemic Practice	Qualitative
32	Qamar, Y., Samad, T.A.	HRA: A Review and Bibliometric Analysis	2021	Personnel Review	Bibliometric Review	Not Specified	Literature Trends in HR Analytics	Review
33	Margherita, A.	Systematization of HR Analytics Topics	2021	HRM Review	Human Capital Theory, ROI	Not Specified	Benefits and Challenges of HRA	Case Study
34	Tursunbayeva, A., Pagliari, C., Di Lauro, S., Antonelli, G.	Ethics in People Analytics	2021	Personnel Review	Systematic Review	Not Specified	Risks and Ethical Opportunities in HRA	Review
35	Larsson, A.-S., Edwards, M.R.	Insider Econometrics in HR Analytics	2021	Int. Journal of HRM	Systematic Review	Not Specified	Personnel Economics, HR Metrics	Review
36	Kim, S., Wang, Y., Boon, C.	60 Years of HR Technology and Analytics	2021	HR Management	Systematic Review	Not Specified	AI, HR Analytics	Review
37	McCartney, S., Fu, N.	Promise vs. Reality in People Analytics	2022	Journal of Organizational Effectiveness	Systematic Review	Not Specified	Aligning HRA Potential and Practical Application	Review
38	Amir, R., Garg, P.	HRA Adoption in India	2022	Transnational Marketing Journal	UTAUT Framework	India	Factors Affecting HRA Adoption	Quantitative
39	Polzer, J.T.	Rise of People Analytics	2022	Research in Organizational Behavior	Systematic Review	Not Specified	Behavioral Impact of HRA	Review

40	Cayrat, C., Boxall, P.	Challenges and Risks in HR Analytics	2022	Journal of Organizational Effectiveness	PLS-SEM	40 Large Companies	Predictive Analytics Efficiency	Quantitative
41	Belizón, M.J., Kieran, S.	Legitimacy Processes in HRA	2022	HR Management Journal	Process Theory	Not Specified	Strategic Commitment, Data Infrastructure	Qualitative
42	Singh, S., Mudli, A.	Organizational Trust and HRA Outcomes	2023	Int. Journal of Knowledge Management Studies	PLS-SEM	Not Specified	Trust, Information Sharing in HRA	Quantitative
43	Wirges, F., Neyer, A.-K.	Process-Oriented Understanding of HRA	2023	Review of Managerial Sciences	Process Theory	Not Specified	Role Definition in HRA Implementation	Qualitative
44	Dhankar, K., Singh, A.	Employees' Adoption of HRA	2023	Evidence-Based HRM	Career Construction Theory	Not Specified	Talent Planning, Technology Readiness	Quantitative
45	Thakur, S.J., Bhatnagar, J., Farndale, E., Aeron, P.	HRA, Problem-Solving, and Performance	2024	Personnel Review	PLS-SEM	Not Specified	Dynamic Capabilities in HRA	Quantitative
46	McCartney, S., Fu, N.	Enacting People Analytics	2024	HR Management	HCR and Complementarity Framework	Not Specified	Analytical and Storytelling Skills in HRA	Qualitative
47	Rasmussen, T., Ulrich, M., Ulrich, D.	Moving HRA from Insight to Impact	2024	HR Development Review	Grounded Theory	Not Specified	Future Shaping through HRA	Qualitative

4.1 Theory (T)

Examining the theoretical frameworks applied in HRA studies reveals that "Systematic Review" is one of the most frequently used methods for assessing the literature and exploring new methodologies within the field (Qamar & Samad, 2021; Angrave et al., 2016; Tursunbayeva et al., 2021; Marler & Boudreau, 2017; Larsson & Edwards, 2021; Safarishahrbijari, 2018; Hamilton & Sodeman, 2019; Chalutz Ben-Gal, 2019; Kim et al., 2021; Huselid, 2018). The Human Capital Management (HCM) Theory is also widely referenced, as it underscores HR practices aimed at improving cost-effectiveness across HR functions like recruitment, talent management, and performance evaluations (McCartney et al., 2020; Davenport et al., 2010; Levenson, 2018; McIver et al., 2018; Margherita, 2021). Integrating HCM with Strategic HRM practices reflects HRA's capacity to drive both operational efficiency and strategic business alignment.

4.2 Context (C)

Under the "Context" component, a notable research gap is evident in studies focusing on specific geographic regions. Although some research has examined HRA in the United States and Europe (McCartney et al., 2020; Baesens et al., 2017; Ellmer & Reichel, 2021; Wang & Katsamakas, 2019; Brandt & Herzberg, 2020; Newman et al., 2020; Davenport et al., 2010; Aral et al., 2012; Vargas et al., 2018), only a limited amount of research has emerged from Asia, with China represented by a single study (Khan & Tang, 2016). Given that countries such as South Korea, Taiwan, China, and India are recognized as emerging data economies (Chakravorty et al., 2019), there is substantial potential for exploring HRA within these national and regional contexts. Such studies could enrich our understanding of HRA's impact under varying cultural and regulatory conditions, offering insights into the adaptability of HRA across global contexts.

4.3 Characteristics (C)

The primary "Characteristics" highlighted in the TCCM analysis include the application of HRA in areas like workforce forecasting, talent management, decision-making, performance management, leadership, and strategic HR implementation (Hamilton & Sodeman, 2019; Chalutz Ben-Gal, 2019; Angrave et al., 2016; Marler & Boudreau, 2017; McCartney et al., 2020; Larsson & Edwards, 2021; Margherita, 2021; Safarishahrbijari, 2018; Huselid, 2018; Kim et al., 2021; Levenson, 2018; Davenport et al., 2010; Qamar & Samad, 2021; McIver et al., 2018). While these studies illustrate HRA's utility, some raise ethical concerns, especially around HRA's objectivity and the reduction of human judgment in decision-making processes. Such observations reinforce the Systematic Review findings, underscoring the complexity of integrating HRA into organizational practices.

4.4 Methodology (M)

In terms of "Methodology," Review and Qualitative Analysis dominate the approaches used in the current body of HRA literature, with relatively few studies employing Case Studies or Quantitative Analysis (Kim et al., 2021; Huselid, 2018; Marler & Boudreau, 2017; Qamar & Samad, 2021; McIver et al., 2018; Safarishahrbijari, 2018; Margherita, 2021; Angrave et al., 2016; McCartney et al., 2020; Chalutz Ben-Gal, 2019; Tursunbayeva et al., 2021; Larsson & Edwards, 2021; Levenson, 2018). Quantitative studies often rely on Regression Analysis or Partial Least Squares (PLS) Regression for predictive modelling (Khan & Tang, 2016; Wang & Cotton, 2018; Vargas et al., 2018; Ryan, 2020; Aral et al., 2012; Newman et al., 2020; Brandt & Herzberg, 2020; Simón & Ferreiro, 2018). A smaller subset of studies employs Thematic Analysis, signalling a potential trend towards developing models that could later undergo

empirical validation (Durai et al., 2019; Ellmer & Reichel, 2021; Greasley & Thomas, 2020). While still nascent, these methodological developments indicate a promising shift toward creating validated, data-driven frameworks within HRA research.

5. CONCLUSION

The purpose of this paper is to conduct a comprehensive literature review to evaluate HR Analytics' (HRA) contributions to organizational performance. By analysing HRA's applications within corporations, this review seeks to illuminate the ways in which HRA can facilitate improved outcomes, as well as the challenges it faces. The evaluation identified 47 documents that collectively present an overview of HRA's current role in corporate settings.

Although there is limited research published in top-tier journals, the search revealed a substantial body of literature that meets satisfactory quality standards across various sources. This body of work encompasses a range of studies on the advantages, challenges, and potential applications of HRA, though relatively few publications address the advanced technology components. The role of HRA in organizational contexts is still emerging and lacks a fully developed conceptual framework. Nonetheless, it is recognized as a distinctive and valuable resource with the potential to provide companies with competitive advantages (Schiemann et al., 2018).

This study identified four predominant themes within the HRA literature: *research and practice, employee engagement, information and knowledge,* and *strategic development*. Each theme demonstrates HRA's distinct, multi-level applications across organizational functions. For instance, within *Research and Practice*, studies indicate that while HRA adoption rates remain moderate, it remains a focal point on both the academic and corporate agendas. To bridge the gap between academic research and practical application, it is essential to adopt a more empirical approach and develop training programs that equip HR professionals with the skills needed to transition smoothly to data-driven HR practices. Additionally, academic studies could incorporate subjective knowledge to reduce potential biases in HRA research.

In the *Information and Knowledge* theme, HRA enhances data-driven decision-making (Durai et al., 2019), although challenges remain with algorithm-led decision-making, as some employees resist decisions perceived as overly automated. Managing data within HRA involves refining data filtering processes, strengthening knowledge integration across departments, fostering attitudes that prioritize information security, and enhancing HRA's applications for managing personal data (Larsson & Edwards, 2021). The growing body of research in this theme suggests a promising trend toward greater acceptance and integration of HRA in information management.

HRA also plays an increasingly critical role in *Strategic Development*. With access to vast data sets, HR professionals can make more informed, effective, and competitive policy decisions regarding talent management (Hamilton & Sodeman, 2019). However, while HRA offers valuable insights for strategic talent decisions, implementing these insights poses challenges, particularly in equipping HR staff with advanced analytics training (Angrave et al., 2016). Organizations must commit to providing strategic support and training for HR professionals to enhance their decision-making capabilities (Levenson, 2018). A growing number of studies emphasize the strategic importance of HRA, and there is a consensus that future research should focus on advancing HRA's strategic applications for greater organizational impact.

The TCCM Analysis shows the research on HRA was published between 2010 and 2024, indicating the field's growth. It is being used in many different nations and sectors of the

economy to enhance decision-making in areas such as workforce planning and talent management. Big data analysis, surveys, and case studies are examples of research methodologies. However, the methodological trend has shifted over the years from review to quantitative and qualitative. Further studies discussing the implications of implementing HR Analytics are currently being conducted. HRA has advantages, but implementation, algorithmic bias, and data privacy are issues. HR professionals require both analytical and storytelling skills in order to use HRA effectively. HRA plays a major role in the involvement of employees and in helping organizations understand that employees will be more involved with the system once they realise that the organization is supporting them in enhancing their attributes (Khan and Tang, 2016). Contextual elements such as existing beliefs of the employees, cultural aspects, and nationality can create hindrances (McCartney, 2020). HRA is a new reality in at least two forms due to its characteristics. Firstly, HRA has expanded the environment in which organizations, as a competitive resource, operate with more information than ever before available. Secondly, HRA allows information to be extracted in real-time for better decision-making on a large volume of data by using new analysis and data processing methods that rely on technology development (Margherita, 2021).

Introducing HRA in an organization can be difficult, but the results are favourable to its adoption. Furthermore, companies may include HRA in interdisciplinary teams so that it can be diffused in the system smoothly. This will enhance interdisciplinary communication and create better data flow channels. Like someone said, great power comes with great responsibility. The same applies to HRA as it comes with its own challenges, such as the difficulty of including subjective human knowledge in the algorithms and creating a system that is error and bias free.

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