A Study on HR Analytical Tools and Techniques

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Abstract
HR Analytics simplifies data collection, interpretation, measurement, and forecasting in organizations by combining statistical techniques for data collection, interpretation, measurement, and forecasting. It aims to enhance the utilization of data analytics in HR management actions, specifically in relation to tools and techniques with reference to employee attrition. Recent literature has reported that implementation of HR analytics helps in identifying employee attrition patterns, hiring timelines, productivity costs, and the impact of learning and development on performance. While the study suggests that a modern, innovative, and competitive workplace is being driven by performance expectations, which is why HR analytics is becoming more and more important in firms, it will also examine the advantages and challenges of HR analytics. This is a theoretical paper, and the purpose of this paper is to study the literature available on HR analytics tools and types of HR analytic techniques. The study is done based on secondary data from published research papers, journals, blogs, and websites from the period of 2017-2023.

Keywords: HR Analytics, Attrition, Data Analytics, People Analytics

Introduction

HR has changed from a transactional, maintaining documents to one that emphasizes operational efficiency and employee progress (Porath, 2023). This evolution in HR can be attributed to the advancement of technology, which has forced HR to convert obsolete to disruptive techniques (Varma & Chavan, HR Analytics Need and Importance – A Theoretical Perspective, 2020). Data-driven recruitment strategies helps in expanding the talent search thereby creating a larger prospect tool making it easier to select the best applicants to target for a certain role (Kaivola, 2018). Besides it also aids business to evaluate how effectively employees are using the resources and information provided to them during training sessions (Gohain & Saikia, 2021).

Businesses are beginning to understand the value of data analytics, the quantitative skills needed to understand it, and the capacity to analyse the data to make sense of it based on patterns and evidence (Oracle, 2019). HR Analytics turns raw data into comprehensive reports that save time and money, assess employee job satisfaction levels, spot trends, and boost engagement (Jabir, Falih, & Rahmani, 2019). This also aids in identifying workable solutions to lower employee attrition rates and raise retention rates (Oriedo, 2020).

HR analytics have an impact on every aspect of the HR function, including hiring, development, succession planning, retention, engagement, pay, and benefits (Varma & Chavan, A Case of HR Analytics - To understand effect on employee turnover, 2019). Data analytics makes it simpler to comprehend employee demands, identify top achievers and those who require additional training, and assess effective and inefficient HR practices (Gohain & Saikia, 2021).

HR today determines the value of human capital in enterprises and also plays the job of anticipating through analytics and providing organisations with a futuristic viewpoint (Biriowu & Kalio, 2020). To evaluate the value for the business, HR is attempting to employ metrics that can be created in every HR setting (Singh, Rajbhar, & Puskar, 2017).

Literature Review

HR Analytics is a methodology that integrates and assesses employee numbers and excellence using statistical tools and techniques (Opatha, 2020). This aids in the development of more insightful future decision-making while also evaluating the HR department's efficiency in achieving organisational objectives (Heuvel & Bondarouk, 2017). The influence of HR practices and activities on organisational performance was measured using a variety of innovative methods and approaches throughout the first half of the 2000s, such as HR scorecards or workforce scorecards. A change towards the creation of a

more scientific and evidence-based approach to HR was later seen after the exposure of HR accounting and utility analysis in the middle of 2000 (Tomar & Gaur, 2020).

HR Analytics has become an essential tool for identifying variables that require in-depth intervention, aiding in the improvement of employee behaviour understanding, and building an ecosystem capable of sustaining high performance (Pandey, Balusamy, & Chilamkurti, 2023). Analytics in HR, support the organization's efforts to attract, keep, and retain talent. Due to this, businesses have been heavily investing in IT systems that support a variety of HR operations, including hiring, performance management, legal, employee engagement, and talent development. (Varma & Chavan, A Case of HR Analytics - To understand effect on employee turnover, 2019)

HR Analytics aims to function as a tool that integrates multiple statistical techniques to enable data collection, analysis, measurement, and forecasting (Tomar & Gaur, 2020). Despite the fact that many large firms have accepted HR analytics and begun using it to make better hiring decisions, many still disregard it (Chowdhury, et al., 2023). The organisations must carefully assess the widely accepted significance of utilising analytical tools for their benefit (Wankhade, Rao, & Kulkarni, 2022). With the use of these statistical tools, an HR analyst can obtain current employee data and make well-informed decisions that advance the objectives of higher-level management (Chaudhary, 2023). Analytics aid in the evaluation and projection of data pertaining to significant HR variables, such as employee effectiveness and worth (Ragimol, Sudha, & Peterkumar, 2021).

The three categories of HR Analytics—descriptive, predictive, and prescriptive—offer various perspectives on the company's data and ought to be included in any HR professional's toolkit in today's organisations (Blanks, 2019). Implementing HR analytics can provide answers to queries regarding trends in employee attrition, the length of time it takes to hire new employees, the cost involved until a person is fully productive, the effect of learning and development on employee performance, and other similar issues (Andreev, 2023)

Prior to preparing the organisation for the adoption of HR Analytics, the responsible authorities must first assess the pattern and analytics tool available, and then look at the resources and money that are available, and plan thereafter (Cho, Choi, & Choi, 2023). Businesses are making the use of big data a routine activity that promotes new viewpoints and helps with decision-making (Provost & Fawcett, 2013). The management of companies and employees have been greatly enhanced by machine learning, sentiment analysis, and network analysis (Feng, 2023). In addition to describing or diagnosing, HR professionals are leveraging analytics to predict, prescribe, and minimise certain important drawbacks while fostering a new vision of a tech-savvy workforce (Saxena, Bagga, & Gupta, 2021).

Four fundamental types of HR Analytics techniques exist, each with a specific goal (Jabir, Falih, & Rahmani, 2019):

• Descriptive (What happened?)
• Diagnostic: (Why did it happen?)
• Predictive (What will happen?)
• Prescriptive (How can we make it happen?) (Jabir, Falih, & Rahmani, 2019)
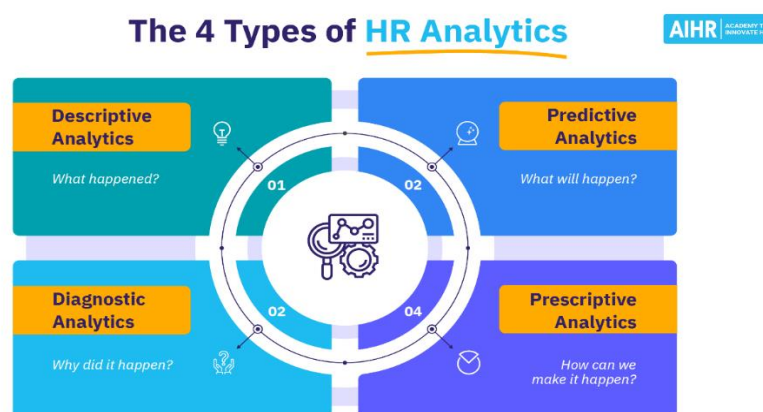
Source: (Boatman, 2022)

• Descriptive (What happened?)

In order to comprehend previous incidents, trends, and patterns, historical data must be examined. This is the first step in the data analytics process. In descriptive analytics, data is visualised and presented in an understandable manner through the use of tools like tables, graphs, and charts (Gupta & Sharma, 2022). With the use of descriptive analytics, companies may examine past data to spot trends and patterns, gauge their development, streamline procedures, boost decision-making, enhance revenue, anticipate issues, and make interpreting numerical data easier (Wolniak, 2023).

• Diagnostic: (Why did it happen?)

Organisations can effectively use diagnostic analytics to comprehend the underlying causes and factors of particular outcomes or events. Organisations can find patterns, correlations, and underlying reasons that explain past events by utilising statistical approaches to analyse historical data (Wolniak & Grebski, THE CONCEPT OF DIAGNOSTIC ANALYTICS, 2023).

• Predictive (What will happen?)

A potent tool, predictive analytics makes use of previous data and statistical models to predict future actions and results (Kalvakolanu, Madhavaiah, & Balaji, 2019). It helps businesses to get insightful information, make wise choices, and expand their operations. Predictive analytics may reveal hidden links and offer a greater insight of company operations, customer behaviour, market trends, and other significant elements by analysing behaviours, relationships, and trends in data (Wolniak & Grebski, Functioning of predictive analytics in business, 2023). However, in a study conducted by Deloitte in 2018 on 'High-Impact Talent Analytics: Building a World-Class HR Measurement and Analytics Function', only 14% of HR firms in the survey are employing advanced or predictive analytics; the remaining 86% are still largely focused on creating basic reports and talent metrics dashboards (Gupta & Shaikh, 2018).

• Prescriptive (How can we make it happen?)

Businesses can utilise prescriptive analytics to guide their decision-making process so that the intended results can be optimised, and unfavourable ones are averted (Pessacha, et al., 2020). Beyond forecasting future events, it makes recommendations for the best course of action to accomplish desired objectives while taking possible risks and uncertainties into account (Lepenioti, Bousdekis, Apostolou, & Mentzas, 2021). Data gathering, analysis, optimisation, forecasting, decision support, execution, and tracking are often steps in the implementation process (Jyothi & Rosaline, 2021). Businesses can improve customer happiness, spur innovation, and transition from reactive to proactive, progressive plans based on a thorough understanding of data and analytics by utilising prescriptive analytics (Wolniak & Grebski, The Basis of Prospective Analytics in Business, 2023).

How 4 types of Analytics are relevant in HR

All four levels of descriptive, diagnostic, predictive and prescriptive put together aid in better decision making and businesses genuinely benefit by implementing the data and analytics strategy (Ramalakshmi & Babu, 2021). A gap in any one of the stages makes the entire strategy inefficient. Therefore, it is imperative that all four levels of analytics should be implemented across the organisation. (Pluralsight, 2019). HR Analytics may advance tremendously in an organisation and open doors for speedier growth if used correctly, at the right moment, and in the right business (Tomar & Gaur, 2020).

As a result of analytics, every department of a company is changing the way it conducts business, but most HR departments are having trouble utilising analytics to their fullest potential to maximise employee productivity (Gupta & Shaikh, 2018). Despite the fact that many businesses ignore HR analytics and other under utilised organisational strategies related to HR analytics, the rise in performance expectations has elevated HR Analytics to the top of the list in the race to create a modern, creative, and competitive workplace. (Kale, Aher, & Anute, 2022).

Research Questions and Objectives

The study is focused on the following areas of research.

1. To study various HR Analytical tools and techniques
2. To understand the underlying factors of HR analytics and patterns influencing attrition rates

The purpose of this paper is to present a thorough literature analysis of the HR analytical tools that businesses employ and how those tools impact HR Analytics when examining patterns that influence attrition rate. It attempts to assist businesses in comprehending the fundamental problem to resolve issues related to HR Analytics implementation in businesses.

Research Methodology

This research aims to provide an understanding of HR Analytics in Industry using secondary data from books, articles, academic journals, blogs, and websites. The study is primarily based upon secondary data.

Using a systematic literature review approach, we examined thirty research papers on the literature related to HR Analytics, its application, and obstacles in order to conduct our study. The key sources for these materials were Emerald, Springer, ScienceDirect, IEEE Access, Science Press, UGC Care, RSP Science Hub, SHRM Articles, various LMS, Mary Ann Liebert, Inc., CrossRef, Google Scholar, Portico, Index Copernicus, Research Gate, and IJMIE.

The search criteria while searching for these resources was based on keywords like: HR analytics, human capital, barriers, people analytics, human resource analytics, HR metrics, descriptive study, diagnostic analytics, business analytics, data analysis, predictive analytics, HR analytics, Talent based on the titles and abstracts of related research.

We limited our analysis to papers published between 2017 and 2023 to make sure the data was current. After a thorough analysis, 30 publications that were pertinent to the research were selected, out of the 50 papers that were initially included based on the keywords. A few works from the years 2013–14 were also examined and included based on their applicability.
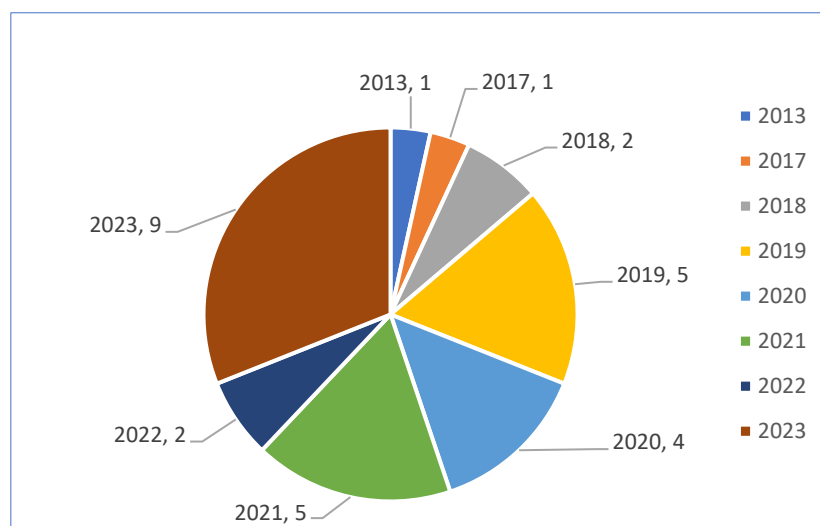

Figure: Year Wise No. of Papers Referred
Source: Author's Work

Results

The literature for the subject is logically arranged into five overarching themes:

Theme 1: Use of HR Analytics to improve HR Efficiency

There has been study on usage of HR Analytics as a methodology used to improve HR Efficiency. (Opatha, 2020), (Heuvel & Bondarouk, 2017), (Tomar & Gaur, 2020), (Pandey, Balusamy, & Chilamkurti, 2023), (Varma & Chavan, A Case of HR Analytics - To understand effect on employee turnover, 2019).

The research indicates that HR analytics is a methodology that uses statistical tools to assess employee numbers and performance, aiding in informed decision-making and evaluating HR efficiency in achieving organizational objectives. It has evolved from innovative methods like HR scorecards to a more scientific approach, identifying variables for intervention and improving employee behavior understanding. HR analytics supports organizations in attracting, retaining, and managing talent, leading to increased investment in IT systems for HR operations.

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Theme 2: Use of HR Analytics as a tool to evaluate data to make informed decisions and evaluate them.
Research papers also mention HR Analytics is a statistical tool used to collect, analyze, and forecast data to make informed hiring decisions and evaluate HR variables, addressing issues like employee attrition and productivity costs. (Tomar & Gaur, 2020), (Chowdhury, et al., 2023), (Wankhade, Rao, & Kulkarni, 2022), (Chaudhary, 2023), (Ragimol, Sudha, & Peterkumar, 2021), (Blanks, 2019), (Andreev, 2023)

HR Analytics is a tool that integrates statistical techniques for data collection, analysis, measurement, and forecasting. It helps organizations make informed hiring decisions and evaluate HR variables like employee effectiveness and worth. The three categories of HR analytics—descriptive, predictive, and prescriptive—offer different perspectives on company data. Implementing HR analytics can help address issues like employee attrition, hiring time, productivity costs, and learning and development impact.

Theme 3: Importance of evaluating resources and budgets before adopting HR Analytics.
Few studies also emphasize on evaluation of resources and budgets by organizations for HR Analytics adoption, utilizing big data, machine learning, sentiment analysis, and network analysis to enhance management and decision-making (Cho, Choi, & Choi, 2023), (Provost & Fawcett, 2013), (Feng, 2023), (Saxena, Bagga, & Gupta, 2021).

To adopt HR Analytics, organizations must assess available tools, resources, and budgets. Big data, machine learning, sentiment analysis, and network analysis enhance management and decision-making. HR professionals use analytics to predict, prescribe, and minimize drawbacks, fostering a tech-savvy workforce.

Theme 4: Study of four main categories of HR analytics techniques, each with a distinct objective
It has been widely written about the main categories of HR Analytics techniques, viz; Diagnostic: (Why did it happen?), Descriptive: (What happened?), Prescriptive (How can we make it happen?) and Predictive (What will happen?) (Jabir, Falih, & Rahmani, 2019), (Gupta & Sharma, 2022), (Wolniak, 2023), (Wolniak & Grebski, THE CONCEPT OF DIAGNOSTIC ANALYTICS, 2023), (Kalvakolanu, Madhavaiah, & Balaji, 2019), (Wolniak & Grebski, Functioning of predictive analytics in business, 2023), (Gupta & Shaikh, 2018), (Pessacha, et al., 2020), (Lepenioti, Bousdekis, Apostolou, & Mentzas, 2021), (Jyothi & Rosaline, 2021), (Wolniak & Grebski, The Basis of Prospective Analytics in Business, 2023)

Descriptive analytics is a crucial step in data analytics, utilizing tools like tables, graphs, and charts to visually present and analyze historical data, enabling companies to identify trends, improve decision-making, increase revenue, and anticipate issues. Diagnostic analytics examines past data to find patterns, correlations, and underlying causes to assist companies understand the drivers and causes behind events. Predictive analytics uses historical data and statistical models to forecast future actions, aiding businesses in making informed decisions and expanding operations by revealing hidden links and analyzing data trends. Prescriptive analytics optimizes business decision-making by predicting future events and making recommendations, improving customer satisfaction, fostering innovation, and transitioning from reactive to proactive planning.

Theme 5: Implementation of Relevance of four main categories of HR analytics techniques and challenges faced.
Findings from various research reveal that the implementation of all four levels of analytics across the organization is crucial, however can be difficult (Ramalakshmi & Babu, 2021), (Pluralsight, 2019), (Tomar & Gaur, 2020), (Afzal, 2019), (Gupta & Shaikh, 2018), (Kale, Aher, & Anute, 2022).

The four levels of descriptive, diagnostic, predictive, and prescriptive analytics are crucial for better decision making and business growth. Implementing all four levels across the organization can significantly advance HR analytics. Implementing HR analytics can be difficult with challenges including silos, a lack of expertise, suspicion, investment, a lack of analysts, confidence, poor data quality, and an abundance of information. Analytics are revolutionizing business, but HR departments struggle to maximize employee productivity. Despite ignoring HR analytics, performance expectations have pushed it to the top for a modern, creative, and competitive workplace.

The papers under study offer valuable insight into the complexities of HR Analytics and its consequences upon implementation. The findings have significant inferences for organizations in designing efficient execution of HR Analytics using four categories. The papers also mention the support system required along with the support of other functions like IT and the cost implications thereof. It also emphasizes resistance by organisations to implement HR Analytics for the want of skilled people to comprehend it and the data privacy concerns.

Conclusion

The studies indicate that HR analytics is a process that measures employee numbers and performance using statistical techniques to evaluate HR efficiency and support well-informed decision-making. It has developed from cutting-edge techniques like HR scorecards to a more methodical strategy that improves comprehension of employee behaviour and identifies variables for intervention.

The utilisation of HR analytics by organisations facilitates personnel acquisition, retention, and management, hence driving up IT system investment for HR operations. It provides HR analytics in four different categories: diagnostic, prescriptive, predictive, and descriptive. The research also emphasizes that employee attrition, hiring time, productivity expenses, and the influence on learning and development can all be addressed by implementing HR analytics and putting all four levels into practice. HR analytics is essential for maximizing employee productivity even if it confronts obstacles like groups, expertise, funding, and data quality. Despite the challenges, HR analytics has the potential to transform the company.

HR has shifted from a transactional approach to focusing on operational efficiency and employee progress due to technology advancements. HR analytics, including descriptive, predictive, and prescriptive techniques, aids in decision-making and achieving organizational goals. Descriptive analytics visually presents historical data, enabling companies to identify trends, improve decision-making, and increase revenue. Diagnostic analytics examines past data to understand drivers and causes. Predictive analytics uses historical data to forecast future actions, improving decision-making, customer satisfaction, innovation, and proactive planning. Prescriptive analytics improves business decision-making by predicting future events and thereby offering recommendations.

Implementing these techniques in modern organizations enhances decision-making, improves customer satisfaction, and drives innovation. Investing heavily in IT systems for HR operations is crucial. HR Analytics can enhance organizational growth, but challenges like skills shortages, investment, and data quality hinder its full utilization, despite its importance for employee productivity.

HR analytics uses statistical tools to assess employee performance, aid decision-making, and evaluate HR efficiency. It supports attracting, retaining, and managing talent, leading to increased investment in IT systems. Organizations must evaluate resources and budgets for HR Analytics adoption, utilizing big data, machine learning, sentiment analysis, and network analysis to enhance management and decision-making.

The study highlights the potential benefits of integrating HR analytics, suggesting that organizations should be convinced of their benefits, as data-driven human resources prioritize data over intuition. HR Analytics is a tool used to improve HR efficiency by collecting, analyzing, and forecasting data for informed hiring decisions and addressing HR variables like employee attrition and productivity costs. Techniques include diagnostic, descriptive, prescriptive, and predictive. Implementing all four levels of analytics across an organization is crucial but can be challenging. A thorough assessment of the literature can yield important new insights and conclusions about the breadth of HR Analytics deployment on a broad scale and its consequences going forward.

Recommendations for Future Research

Further study may focus on case studies from various industries using HR Analytics tools. Researchers interested in HR Analytics may base their research on the keywords mentioned here. The research could focus on the comparative effectiveness of various tools technologies in organisations within the same sector or across sectors.

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