

THE STRATEGIC ROLE OF HR ANALYTICS IN EVIDENCE-BASED HUMAN RESOURCE MANAGEMENT

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Abstract

This paper examines the growing importance of HR analytics as a strategic tool for improving organizational decision-making and workforce management. The study reviews the concept of HR analytics, its main types, sources of HR data, and the practical benefits it offers to organizations. Particular attention is given to the use of descriptive, predictive, and prescriptive analytics in recruitment, employee retention, performance management, training, and workforce planning. The paper also discusses common challenges associated with HR analytics implementation, including data quality, privacy concerns, limited analytical expertise, and insufficient managerial support. In addition, the study compares several statistical software packages frequently used in HR analytics, including SPSS, Stata, SAS, R, and Python. The findings indicate that HR analytics enables organizations to move from intuition-based HR practices toward evidence-based decision-making by transforming employee data into actionable insights. Effective use of HR analytics can improve organizational performance, strengthen talent management processes, and support long-term strategic objectives.

Keywords: HR analytics; evidence-based HRM; workforce analytics; predictive analytics; employee performance; talent management; human capital; statistical software

Introduction

Organizations increasingly rely on data-driven approaches to manage their workforce and improve business performance. Traditional human resource management often depended on managerial experience and intuition; however, the availability of large volumes of employee-related data has created new opportunities for analytical decision-making. HR analytics has emerged as an important discipline that combines human resource management with statistical analysis and business intelligence to support strategic workforce decisions.

HR analytics allows organizations to identify patterns in employee behavior, evaluate the effectiveness of HR practices, forecast future workforce trends, and develop more targeted interventions. Applications of HR analytics include recruitment, employee retention, performance evaluation, compensation management, training effectiveness, and workforce planning. By converting HR data into measurable insights, organizations can better align human resource activities with overall business objectives.

Despite its advantages, implementing HR analytics remains challenging for many organizations. Issues related to data quality, integration of information from different systems, employee privacy, analytical capability, and managerial support can limit the successful use of analytics in HR functions. Furthermore, organizations must select appropriate analytical tools and software that match their technical capabilities and business needs.

The purpose of this paper is to examine the strategic role of HR analytics in evidence-based human resource management. The study reviews the main types of HR analytics, explores key data sources used in analytical processes, discusses implementation challenges, and compares commonly used statistical software packages that support HR analytics activities.

Importance of HR analytics

HR Analytics is a process of gathering and analyzing human resource data to enhance HRM strategies in the organisation (MacIntosh and Doherty, 2010). Kirtane (2015) mentioned in the research that HRM practices consist of HR practices, HR analytics and HR Metrics. Lochab et al. (2018) described HR analytics as a “methodology for understanding and evaluating the causal relationship between HR practices and organizational performance outcomes”. While Jain and Nagar (2015) explained HR analytics as a “mixture of quantitative and qualitative data and information that derives important insights which help to support in making decisions by the management”. According to Jabir et al. (2019) HR analytics helps to understand people management decisions and reasons of employees’ behaviour as well as provide fundamentals for solving business problems using existing information.

In recent years most businesses realized the importance of reliable evidence-based people management practices that include analytics, decision-making, and problem-solving (Reddy and Lakshmikeerthi, 2017). HR analytics is an important instrument that helps to increase the efficiency of all related aspects by using logical and numerical explanations. The main goal of HR analytics is to enhance performance of employees and organisation in a whole. According to Reena et al. (2019) HR analytics helps organisation to make right decisions that in turn help to attract, retain and improve the employee performance. HR analytics cover all areas of the HRM function such as recruitment, training and development, retention and engagement, rewards and compensation. HR analytics could be consider as more credible and reliable information due to the fact that it concludes with statistically sufficient data and evidence that can be used as a support in the decision making process and developing HR strategies.

There are three types of HR analytics discussed in the literature: descriptive, predictive and prescriptive analytics (Fred and Kinange, 2015). *Descriptive analytics* helps to define and understand the historical data (Abdul Quddus,

2019). This type of analysis describes the relationship of current and previous data and what is already exist in the organisation. Descriptive statistics is used for identifying turnover and absence rate, cost per hire etc (Abdul Quddus, 2019). *Predictive analytics (forecasting)* describes future trends, relationships and impacts bases on the past events. This type of analysis is about probabilities and possible influence. It includes statistical methods such as regressions and correlation analysis, independent sample T test etc.. As an example, predictive analytics can be used to predict leaving intention of employees, to hire the right candidates, to retain top talent, etc. *Prescriptive analytics* uses for decision making and help to understand what should be done in the future.

According to Kirtane, (2015) HR analytics provide the development of the company by balancing social, environmental, and economic factors in the short and long term. Ben-Gal (2018) in his research described following HR analytics purposes:

- gather, analyse and understand the large volumes of employees related data for future predictions of employees behaviour;
- make meaningful HR related decisions based on the analysis that in turn will improve organizational performance;
- help to predict needs of organization and its employees;
- help to develop and retain employees;
- help to effectively implement organizational strategies.

HR analytics helps top management to make decisions rely on information about recruitment, retention, training, rewards, career planning and organizational effectiveness and efficiency. However, the following advantages of HR analytics were also discussed in the literature (Kirtane, 2015; Fred and Kinange, 2015; Reddy and Lakshmikeerthi, 2017; Reena et al., 2019):

- Provide evidence-based recommendation on how to run the company from a human perspective;
- Improve Return on Investment of human resources;
- Improve talent acquisition;
- Indicate employee turnover and factors that might influence on employees leaving intention;
- Predict future HR model based on such aspects as turnover, absenteeism, involvement, engagement and others;
- Provide resources to evaluate employees investment to the company;
- Predict workforce needs and understand how to cover the vacant positions;
- Improve employees' performance;
- Recognize factors that increase employees' satisfaction and efficiency;
- Develop effective training and development programme based on training need of employees;
- Assist in decision making;
- Provide ability to justify human capital investments.

While HR analytics has many advantages for the organisation, literature also highlights the dark side of the method. Malla (2018), Kiran et al (2018) and Jabir et al. (2019) in their research determined the main HR analytics obstacles:

- Collecting, integrating, evaluating and presenting data in a clear and meaningful way;
- Privacy, security and data compliance (ethic issue);
- Data accessibility and quality;
- Shortage of top management support;
- Funding, investment on the analytical process;

- Shortage of experts that can understand and deploy the analytical systems.

Data for HR analysis can be collected through questionnaires, interviews and using financial and other business reports. HR analytics solution is based mainly on two types of data: internal and external.

Internal data is the data collected from HR department (Lalwani, 2021):

- Employee tenure
- Employee compensation (Salary and promotion history)
- Employee training records
- Performance appraisal data
- Recruitment process
- Employee databases
- High-value, high-potential employees
- Attendance records
- Employee work history

External data is the data collected outside of the organization. However, Lalwani, (2021) considering external data that is gathering also from different departments of the organisation:

- Company financial data
- Organisation-specific data
- Historical data and demographic data
- Traveling
- Employee surveys
- Customer Relationship Management data

Information for HR analysis can be also collected from different sources, such as:

- HR database – describes staff across a wide range of people-management activities such as employee personal details, performance, diversity data, and promotion information;
- Employee attitude survey data – annual employee attitude surveys, usually related to employee engagement data;
- Customer satisfaction survey data – usually run by marketing department. Gives information about customer preferences and experience;
- Sales performance data – provides information on sales performance and revenues of the organization. Helps to analyze how employees meet targets;
- Operational performance data – helps to understand organization efficiency and successful running of the business.

According to the literature HR analytics enhance efficiency of the organization by developing employee performance and contribution, predicting staff requirements and defines ways to cover the vacant positions, and connect human resources to strategic and financial goals of the organisation. HR analytics provides statistically valid information and evidences that can be used in the process of creating new HR decisions during the implementation of existing HR strategies and other measures. HR analytics has strong positive influence on increasing HR strategic value. HR analytics professional should have a solid knowledge of the business, data collection and mining abilities, analytical skills, communication and presentation skills and others. Due to the fact that employees are the most valuable resource it is critical that the organisation make the right people-oriented decisions.

Statistical Software Supporting HR Analytics

The increasing adoption of HR analytics has created a growing demand for reliable statistical software capable of processing and interpreting complex workforce data. While analytical methods provide the foundation for evidence-based human resource management, specialized software enables these methods to be applied efficiently and accurately. Modern statistical packages offer a variety of techniques for descriptive, predictive, and inferential analysis, allowing organizations to identify trends, evaluate HR initiatives, and support strategic decision-making. Since each software package differs in terms of functionality, ease of use, cost, and analytical capabilities, selecting the most appropriate tool is an important consideration for both researchers and practitioners. Table below presents a comparative overview of several widely used statistical software packages and their characteristics.

Software	Key strengths	Main limitations	Typical HR applications
SPSS	Easy to use, graphical interface, broad statistical procedures	Commercial license, limited automation	Employee surveys, performance analysis
Stata	Advanced statistical modelling, strong panel data analysis	Command-based interface	Workforce forecasting, labour market research
SAS	Powerful for large datasets, enterprise-level analytics	Expensive, steep learning curve	Large organizations, predictive HR analytics
R	Free, highly flexible,	Requires	HR research,

	excellent visualization	programming skills	predictive modelling
Python	Machine learning, automation, integration with AI	Programming knowledge required	Predictive analytics, employee turnover models

Table highlights that each statistical software package offers unique advantages for HR analytics. SPSS and SAS are well suited for organizations seeking comprehensive analytical tools with user-friendly interfaces, while R and Python provide greater flexibility and advanced analytical capabilities but require programming skills. Stata offers a balance between ease of use and advanced statistical methods, making it popular in academic and research settings. Therefore, the choice of software should be based on organizational needs, available resources, and the analytical expertise of users. Ultimately, effective HR analytics depends not only on the software selected but also on the quality of data and the ability to transform analytical results into informed business decisions.

Conclusion

HR analytics has become an essential component of modern human resource management. Rather than relying solely on intuition, organizations can use analytical methods to make more informed decisions about recruitment, employee development, retention, compensation, and workforce planning. The review presented in this paper demonstrates that descriptive, predictive, and prescriptive analytics each contribute to a deeper understanding of workforce dynamics and organizational performance.

The study also shows that the effectiveness of HR analytics depends not only on the availability of data but also on data quality, analytical expertise, appropriate

technology, and support from organizational leadership. Statistical software such as SPSS, Stata, SAS, R, and Python provides different levels of functionality and flexibility, allowing organizations to choose tools that best fit their analytical requirements.

Overall, HR analytics strengthens the strategic value of the HR function by transforming employee information into actionable business insights. Organizations that successfully integrate analytics into their HR practices are better positioned to improve employee performance, optimize human capital investments, and achieve long-term organizational goals.

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