

Exploring Big Data Technology in Human Resources Decision-Making

Lizhi Wang *, Xi Li, Yulun Zhang

School of Business, Belarusian State University, Minsk, Belarus

* Corresponding author Email: wlz1379937002@outlook.com

Abstract. With the widespread application of big data technology, human resources decision-making faces new opportunities and challenges. This paper explores the application of big data technology in human resources management and its potential impact, providing an in-depth analysis of the transformation of the role of HR managers in the era of big data. Firstly, the application of big data enables HR professionals to make more effective strategic business decisions by eliminating biases in decision-making and providing profound real-time insights. This, in turn, attracts and retains talented individuals, enhancing business efficiency. Secondly, big data plays a crucial role in the recruitment process, assisting management in avoiding recruitment errors. Personalized data analysis helps identify talents that match specific job requirements, ultimately improving long-term performance. Furthermore, the application of big data technology facilitates organized internal mobility of human resources within a unit. By analyzing employee data, organizations can gain better insights into employees' work capabilities and development potential, offering diverse opportunities for career development to enhance employee satisfaction, loyalty, and maintain competitiveness.

Keywords: Big Data; HR; Technology.

1. Introduction

In the present-day context, for effective work, human resource managers must stay abreast of the latest technological developments[1-2]. The current backdrop of digital transformation coupled with emerging technologies is leading to the restructuring and transformation of many enterprises. Big data is at the core of these transformations[3].

Big data is being applied across various domains, from education and transportation to healthcare and even recruitment. Data is essentially information, and the more data there is, the more effectively it can be used to optimize business processes[4-5]. With the growing integration of artificial intelligence and big data, the use of big data has become commonplace in today's business world, operations, customer service, marketing, and human resources[6]. Leveraging its powerful analytical and predictive capabilities, big data technology assists human resource management professionals in better understanding the staffing needs of their organizations and optimizing job placements based on actual employee situations. This aims to effectively reduce labor costs, avoid resource overload, and enhance the utilization of human resources, as shown in Table 1.

Table 1. Big data industry diagram

AREA	The impact of big data applications	Proportion in current industry
Education	Personalized learning, student performance prediction	0.24
Transportation	Intelligent traffic management, congestion prediction	0.25
Healthcare	Disease prediction, patient management,	0.25
Recruitment	Intelligent recruitment, talent matching	0.22
Employee	Salary giving, Personal information	0.24

2. The Role of Big Data Technology in Human Resources Decision-Making

In tandem with these transformative shifts in the business landscape, the application of big data technology plays a pivotal role in shaping human resource decisions. As we delve into the profound impact of big data, it's crucial to recognize its five key dimensions—volume, low value density, variety, velocity, and veracity. These dimensions significantly contribute to making more informed strategic business decisions. Beyond the sheer volume of information, the concept surpasses traditional analytical methods in the face of current market trends. It is not just about the influx of substantial data into organizations; rather, it entails the real-time storage, analysis, and visualization of this data[7]. This necessity for real-time information is paramount for a comprehensive understanding of both internal and external occurrences within an organization. Consequently, the emergence of big data technology has seen businesses increasingly leveraging it to achieve various objectives, including more effective marketing, optimized operations, increased sales, or other accomplishments crucial for corporate success.

Firstly, artificial intelligence and big data contribute to eliminating biased decision-making, helping HR professionals take effective actions by reducing manual analysis and providing recommendations based on data rather than human emotions. Therefore, armed with the profound and real-time insights provided by artificial intelligence, HR professionals will be able to attract, retain, and hire talented individuals to enhance business efficiency[8].

Secondly, regarding the transformation of the role of HR managers in the era of big data, it should be noted that these data are crucial in the recruitment process. When managers are seeking new employees, they can use data from recruitment websites and social networks to find individuals who meet the specific qualifications for a given position. The use of big data can help avoid poor recruitment decisions. If the likelihood of hiring the wrong individuals can be reduced, significant cost savings for the organization can be achieved in the long run. Finding suitable employees is not just about defining a simple list of criteria. Big data allows organizations to identify what truly matters for their specific needs[9]. Companies should conduct their own big data analysis for recruitment and training purposes tailored to their unique goals, rather than relying on qualifications highly valued by other companies. For example, a company using big data might discover that individuals with relevant work experience are less likely to stay with the organization for an extended period, and the duration of previous employment does not affect current job performance.

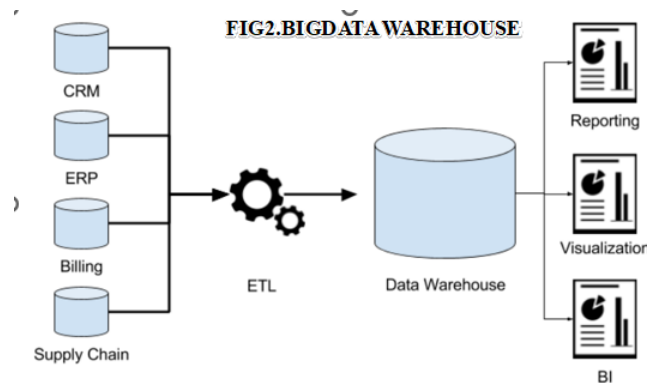


Fig 1. Warehouse Example in BIGDATA

Finally, the application of big data technology can also facilitate organized internal mobility of human resources within a unit. By analyzing employee data, organizations can understand the work capabilities and development potential of their employees, providing diverse development opportunities and encouraging orderly movement and promotion within the organization[10]. This helps individuals to maximize their abilities and contribute effectively, ultimately enhancing employee satisfaction, loyalty, and maintaining the competitiveness of the organization. the construction diagram of the big data data warehouse. In the context of big data, the combination of

data warehouse and ETL (extract, transform, load) process provides important support for human resource management, as shown in Fig 1.

3. Current Challenges in Human Resource Management in the Context of Big Data

As technology continues to advance, big data technology has become a crucial tool for human resource management in employment organizations. However, the application of big data technology to optimize human resource management processes has introduced new challenges. On one hand, dealing with large amounts of sensitive information, including personal identities and health conditions, poses a significant challenge in ensuring the privacy and security of data[11].

Furthermore, the application of big data technology may give rise to issues related to data collection and integration. In the big data environment, data originates from multiple sources and systems, including social media and employee management systems. Integrating these heterogeneous data sources while ensuring data consistency and accuracy is a complex and daunting challenge. On the other hand, insufficient analytical capabilities and talent retention pose significant problems for current human resource management. Even with vast amounts of data, if an organization lacks sufficient analytical capabilities to extract valuable information from the data, the potential value of big data in human resource management cannot be fully realized. This may result in data overload, leading to resource wastage. Additionally, human resources need to utilize data analysis to understand employee needs. Traditional recruitment and selection methods often rely heavily on subjective judgments and experience assessments, lacking scientific data support and resulting in assessments that lack objectivity and fairness.

4. Diverse Data Optimization and Future Challenges

When considering the nature of big data, the diversity of data types is a key aspect. A comprehensive big data system may include various data forms such as XML documents, raw log files, text files, images, videos, audio, and traditional structured data. This is widely referred to as one form of big data, and to store and process some of these data types, especially images, videos, and audio files, systems need to be able to scale quickly and effortlessly. Big data is typically a resource that covers multiple data types, with the potential for large scale and rapid updates. It also includes new methods for storing, processing, managing, and analyzing the data required for business decision-making. These new technologies provide opportunities for business leaders and human resource departments to seek advantages from big data[12].

In recent years, human resource managers have been fully leveraging big data, realizing that data analysis can significantly reduce risks, improve performance, and have a profound positive impact on organizational efficiency and decision-making processes. As part of personnel analysis, experts collect and analyze data on existing and potential employees, primarily aiming to optimize the costs of the enterprise. With more organizations adopting big data solutions, they are looking for new ways to prevent resource wastage, including personnel costs.

As artificial intelligence continues to change the way management decisions are made and growth expectations are planned, more executives, including human resource managers, are recognizing the benefits of using intelligent tools and platforms to help manage business activities. With the growth in the number of employees, human resource departments have had to rapidly adopt new technologies to accelerate decision-making in an unstable business environment. A wealth of data about personnel, from skills to performance ratings, age, tenure, education, previous positions, etc., helps provide a comprehensive view of the current composition, performance, and improvement of overall resources, thereby promoting the development of employees, products, and services.

With such vast data resources, human resource professionals can assess and improve practices, including recruitment, learning and development, and productivity. Considering the trends outlined in this article, we emphasize that many human resource managers still lack sufficient knowledge and

understanding of how to introduce innovation, especially artificial intelligence, into business processes, making the transition to digitization more challenging. In the coming years, companies that overlook the potential of big data may find themselves on the competitive edge, and if understanding of the adoption of artificial intelligence resources remains at a surface level, their survival may be threatened.

5. Conclusion

In the current environment, big data has been widely applied across various fields, encompassing education, transportation, healthcare, and recruitment, among others. Data, fundamentally serving as a carrier of information, becomes more effectively utilized to optimize various processes in the economic domain with its increasing volume. Today, it can be confidently asserted that artificial intelligence and big data are closely interconnected. In the realms of business, operations, customer service, marketing, and human resources, big data has become a commonplace tool.

In summary, it is noteworthy that big data plays a crucial role in human resource management, addressing two key issues. Firstly, it provides up-to-date information about employees and workflow, allowing managers to gain deeper insights into the internal operations of the organization. Secondly, big data assists professionals in acquiring valuable information about events that may occur in the future, enabling them to formulate timely mechanisms to prevent, exacerbate, or optimize these events, thereby providing more accurate bases for decision-making.

The intelligent use of big data and data analysis has become an essential tool for today's business human resource professionals, which is not surprising. The smart utilization of big data presents numerous opportunities for further research, including enhancing productivity, providing personalized learning opportunities, and improving talent acquisition strategies. This underscores the crucial importance of fully harnessing the potential of big data in today's competitive business environment for enhancing organizational efficiency and human resource management.

References

- [1] Zhou Ping. Research on innovation of enterprise management decision-making under the background of big data [J]. *Enterprise Reform and Management*, 2023, (24): 58-61.
- [2] Chang Yimeng. Research on collaborative innovation of big data technology and enterprise strategic management [J]. *China Collective Economy*, 2024, (02): 68-71.
- [3] Deng Aihua. Enterprise human resources performance management under the background of big data [J]. *Shanghai Enterprise*, 2024, (01): 65-67.
- [4] Qu Yijie. Application of big data and artificial intelligence technology in corporate financial management [J]. *Shanghai Enterprise*, 2024, (01): 140-142.
- [5] Meng Jiajia. Human resources management innovation based on data-driven [N]. *Shanxi Daily*, 2022-11-08(010).
- [6] Wang Su. Research on digital optimization strategy of human resources management of MS company [D]. Jilin University, 2023.
- [7] Blagodeteleva NK. Advancing the career of an HR manager in the light of rethinking the functions of personnel management in a changing world. *Samoupravleniye = Self-management*. 2020;(3(120):23-26. (In Russ.)
- [8] Shitilina DA. A model for evaluating big data on the example of the business process "personnel management" in a retail company. *Audit = Audit*. 2021;(8):32-34. (In Russ.)
- [9] zymin, yu; Hunian, lee. Redactions in the age of big data. [S.l.], n. 3 (473), p. 294-300, june 2023. ISSN 2782- 4829.
- [10] Gong Peixin. Current situation and innovative countermeasures of enterprise human resources management [J]. *Chinese Business Circle*, 2024, (01): 54-55.
- [11] Zhao Dandan, Shi Na. Characterization, crux and countermeasures of the development of human resources service industry from a digital perspective [J]. *Shopping Mall Modernization*, 2024, (01): 72-74.
- [12] Chen Hongran. Research on enterprise human resource management strategies in the era of big data [J]. *Exhibition Economics*, 2023, (23): 157-160.