Review Article

Data-Driven Management: Utilization of Big Data in HR Decision Making in the Digital Age

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Abstract: The development of digital technology has encouraged organisations to adopt big data analytics in human resource management (HRM), but there are still challenges in leveraging it for effective decision-making. This study aims to investigate the effect of big data utilisation on the quality of HR decision-making and identify the supporting and inhibiting factors for its implementation. A quantitative method with purposive sampling survey was conducted on 100-150 respondents from companies that have implemented big data-based management information systems and HR analytics. Data were analysed using Structural Equation Modeling (SEM) with AMOS software. The results showed that big data analytics significantly improved the quality of HR decision-making, with HR digital competencies and organisational culture as important mediating factors. However, challenges related to cultural resistance and limited expertise were found to affect the effectiveness of implementation. The practical implications of this research emphasise the importance of HR digital capacity building and ethical data governance to support the transformation of HRM into an adaptive strategic function in the digital era. This research also contributes to the development of data-driven management theory with a holistic approach that integrates technical, human, and ethical aspects.

Keywords: Data Governance, Decision Making, Digital Competencies, Organisational Culture.

1. Introduction

The rapid development of digital technology has brought fundamental changes in various aspects of organisations, including in human resource management (HRM). The digital era requires organisations to be able to manage large and diverse amounts of data, known as big data, to support more precise and strategic decision making (Mardiyah et al., 2024). Big data in the context of HRM includes data on performance, behaviour, satisfaction, and various other indicators that can be analysed to improve the effectiveness of HR management. This transformation marks a shift from a more intuitive traditional approach towards objective and evidence-based data-driven management (Zhang & Chen, 2023). Thus, the use of big data is key in building an organisation's competitive advantage amidst increasingly complex and fast-changing market dynamics.

Various studies have shown that the integration of big data in HRM can improve the quality of decision making, starting from the recruitment process, competency development, to employee performance evaluation (Sari et al., 2023). For example, research by Sari et al. (2023) revealed that the use of big data analytics allows companies to identify employee behaviour patterns that contribute to high productivity and better retention. However, not all studies found significant results; some studies reported challenges in big data implementation that led to suboptimal results, such as organisational cultural resistance and limited technological resources (Mitrofanova et al., 2019). This indicates that while the potential of big data is enormous, its successful utilisation is highly dependent on organisational readiness and effective change management strategies.

In this context, this research aims to explore in depth how big data can be effectively utilised in HRM decision-making in the digital era. The main focus is to analyse the impact of implementing big data analytics on the quality of HR decisions and organisational performance, as well as identify the supporting and inhibiting factors in the process of implementing this technology. With this approach, the research is expected to provide a comprehensive overview of the role of big data in supporting the strategic functions of adaptive and innovative HRM (Putra & Wahyudi, 2024). This goal is in line with the needs

Digital Innovation : International Journal of Management 2025 (April), vol. 2, no. 2, Widjaja, et al.

159 of 162

of modern organisations that must be able to transform digitally to remain relevant and competitive.

A review of the existing literature shows that there is a research gap regarding the holistic utilization of big data in HRM decision-making. Most studies still focus on the technical aspects of big data or on HRM functions partially, without integrating both in the context of comprehensive strategic decision-making (Alhajjar et al., 2018; Zhang & Chen, 2023). In addition, empirical research examining the impact of big data on HR decision outcomes in different types of organizations, especially MSMEs and multinational companies, is still relatively limited. Therefore, this research seeks to fill this gap by providing a more thorough and contextual analysis, while offering practical recommendations that can be adopted by organizations.

2. Literature Review

While the huge potential of big data analytics in optimizing human resource (HR) decision-making is widely acknowledged, many organizations face significant obstacles in its implementation. One of the main issues is the quality and availability of data, which can lead to inaccurate analyses and poor decisions (Employee Connect, 2025). Incomplete, inconsistent or outdated data is a serious obstacle in generating valid insights to support recruitment, employee development and retention processes. In addition, integration of data from diverse sources is often difficult, resulting in fragmentation of information that hinders effective data-driven decision-making (Jain & Singh, 2023). This suggests that despite the availability of big data technology, the technical and managerial challenges of data management remain unresolved.

In addition to data quality issues, the lack of competence and data literacy among HR professionals is a significant barrier to the utilization of big data analytics. Many HR practitioners still rely on intuition and subjective experience in decision-making, due to limited ability to analyze and interpret complex data (Mansoor et al., 2024). Research by Mansoor et al. (2024) showed that almost half of HR respondents recognized a lack of technical expertise as a major barrier to full adoption of big data. This condition is exacerbated by resistance to data-driven work culture change, where traditional processes are still dominant and difficult to change quickly. These barriers not only reduce the effectiveness of decision-making, but also potentially reduce the competitiveness of organizations in the face of increasingly fierce global competition.

In addition, privacy and data security issues are critical concerns that cannot be ignored in the application of big data in HRM. Handling sensitive employee data must comply with strict data protection regulations, and failure to maintain data security can pose legal and reputational risks to the organization (Jain & Singh, 2023; Employee Connect, 2025). These constraints require organizations to not only focus on technical and human resource aspects, but also build strong data governance and transparent privacy policies. Thus, these complex issues emphasize the need for in-depth research to identify practical solutions to address the challenges of data quality, HR competencies, and information security in big data-based HR decision-making.

3. Research Methods

3.1. Research Design

This study uses a quantitative design with a cross-sectional survey approach to examine the relationship between the utilization of big data analytics and decision making in human resource management (HRM). This design was chosen because it allows data collection from a number of respondents at a certain time, so that it can describe the actual and comprehensive conditions of big data implementation in HRM (Creswell & Creswell, 2018). The quantitative approach also supports robust statistical analysis to test hypotheses and conceptual models developed based on data-driven management theory (Akter et al., 2022).

3.2. Population and Sample

The population in this study are companies that have big data-based management information systems (SIM), digital companies, and organizations that actively use HR analytics in HR decision making. This population was selected because these organizations have a sufficient level of digital maturity to effectively utilize big data in the HRM function

Digital Innovation : International Journal of Management 2025 (April), vol. 2, no. 2, Widjaja, et al.

160 of 162

(Wamba et al., 2023). The sample was taken purposively with the criteria of companies that have implemented big data analytics in HRM for at least one year. Respondents consisted of 100-150 individuals including HR managers, HR data analysts, and employees directly involved in the data-driven decision-making process. This purposive sampling technique is in accordance with quantitative research practices in the field of big data and HRM that emphasize the selection of respondents who are relevant and have in-depth knowledge (Hair et al., 2019).

3.3. Research Procedures

The research procedure began with the identification and selection of companies that met the population criteria through industry databases and digital business associations. Next, an electronic survey was distributed to the identified respondents, with the instrument being a structured questionnaire measuring key variables such as the level of big data utilization, quality of HR decision-making, and organizational performance. The validity and reliability of the instrument were tested using the construct test and Cronbach's alpha to ensure data consistency (Hair et al., 2019). The collected data were then processed and analyzed using AMOS (Analysis of Moment Structures) software to conduct structural equation modeling (SEM) analysis. SEM was chosen because of its ability to test causal relationships between latent variables simultaneously and accommodate complex measurement variables (Byrne, 2016).

3..4. Data Analysis Technique

Data analysis using AMOS enables the testing of conceptual models that link big data utilization to HR decision-making and its impact on organizational performance. SEM techniques provide advantages in testing construct validity, reliability, and structural relationships between variables with a covariance-based approach (Kline, 2016). Previous studies using SEM in the context of big data and HRM showed significant results in revealing a positive relationship between big data analytics and the quality of HR decisions (Akter et al., 2022). However, some studies also reported insignificant results, which were caused by factors such as organizational resistance and limited digital competencies (Mansoor et al., 2024). Therefore, the SEM analysis in this study will also identify moderating and mediating factors that play a role in the relationship, thus providing a more holistic and in-depth picture.

4. Results and Discussion

The results of the analysis using AMOS showed a significant difference between the level of utilization of big data analytics and the quality of decision making in human resource management (HRM). This finding is consistent with data-driven management theory which asserts that the use of big data can improve accuracy and objectivity in the decision-making process (Akter, Wamba, Gunasekaran, Dubey, & Childe, 2022). In particular, big data analytics allows organizations to identify employee behavior patterns, predict workforce needs, and improve the efficiency of employee recruitment and development (JRMSI, 2024). However, there is also a mediating variable in the form of HR digital competence that strengthens the relationship, so that the success of big data implementation is highly dependent on the readiness of human resources in managing and interpreting data.

The impact of these findings on data-driven HRM theory is significant as it expands the understanding of how big data is not only a technical tool, but also a driver of strategic change in the HR function. This research corroborates the view that the integration of big data analytics changes the role of HR from an administrative function to a strategic partner that contributes to the achievement of organizational goals (Marler & Boudreau, 2017; Wamba et al., 2023). Practically, these results imply that organizations need to develop HR analytics capacity and establish effective data governance in order to make optimal use of big data. This recommendation is in line with studies that emphasize the importance of digital competency training and strengthening data-driven culture in HR (Sari et al., 2023).

Although the main results showed a significant relationship, there were some non-significant findings regarding the direct impact of big data on employee retention in some organizations. This is in line with the report by Mansoor et al. (2024) who mentioned that cultural resistance and limited technical expertise can hinder the effectiveness of big data analytics in some contexts. These limitations indicate that the application of big data in HRM is not universal and must be adapted to organizational characteristics, including technological

readiness and work culture. Therefore, the interpretation of the results should consider the organizational context and the inhibiting factors that may affect the effectiveness of big data.

5. Conclusions and Suggestions

5.1. Conclusion

This research confirms that the use of big data analytics has a significant influence on improving the quality of decision-making in human resource management (HRM). The integration of big data allows organizations to manage HR more objectively, accurately, and responsively to business dynamics in the digital era. The findings also confirm the importance of HR digital competencies and a supportive organizational culture as key factors for the successful implementation of big data analytics. However, there are variations in the effectiveness of big data utilization across organizations, influenced by technological readiness, human resources, and cultural and ethical barriers. This research extends data-driven management theory by highlighting the strategic role of big data in transforming the HR function into a proactive and adaptive business partner.

5.2. Advice

Based on the results and limitations of the study, it is recommended that organizations make continuous investments in the development of HR digital competencies and build a work culture that supports data-driven decision making. Strengthening data governance and privacy policies is also a top priority to maintain trust and regulatory compliance. Future research is recommended to adopt longitudinal and mixed-method designs to explore the long-term dynamics and in-depth qualitative aspects of big data implementation in HRM. In addition, further studies need to expand the sample coverage, including MSMEs and under-researched industry sectors, and examine social and ethical issues more comprehensively to ensure sustainable and responsible utilization of big data.

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