

Implementation of Digital Human Resource Management (E-HRM) to Improve Organizational Efficiency in the Industry 4.0 Era

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ABSTRACT

This study aims to explore the implementation of Digital Human Resource Management (E-HRM) in improving organizational efficiency in the Industry 4.0 era. E-HRM enables organizations to automate various HR processes such as recruitment, performance management, training, and administration, resulting in operational efficiency and cost reduction. This research employs a qualitative approach with a case study design, relying on in-depth interviews with four informants directly involved in the implementation of E-HRM in their organizations. The results indicate that E-HRM enhances the speed and accuracy of HR processes, enables data-driven decision-making through HR analytics, and reduces operational costs. Moreover, E-HRM also improves employee engagement and facilitates skill development. However, challenges such as resistance to change and limitations in digital skills among employees remain barriers that need to be addressed through continuous training and strong managerial support. This study provides insights into how E-HRM can enhance organizational efficiency, as well as strategies to overcome challenges in its implementation.

Keywords: E-HRM, Organizational Efficiency, Industry 4.0, Data-Driven Decision Making, Employee Development

INTRODUCTION

The Industry 4.0 era, characterized by the rapid development of digital technology, presents new challenges and opportunities for organizations in managing human resources (HR). In facing these changes, organizations are required to be more adaptive and efficient in carrying out their operations, one of which is through the implementation of digital systems, such as Digital Human Resource Management (E-HRM). E-HRM does not simply replace traditional managerial systems, but also modernizes the way organizations manage HR by using technology to improve operational efficiency and employee productivity (Alrousan et al., 2025). By integrating technology, E-HRM provides significant opportunities for companies to improve performance through the automation of HR processes, data analytics, and simplification of managerial structures and procedures (Khan, 2025; Amany, S., 2025).

In this digital era, organizations that are able to utilize technology effectively will have a competitive advantage, especially in human resource management. One important component of e-HRM is the automation of HR processes, including recruitment, performance management, training, and administration. Using digital systems makes



these processes faster, more accurate, and more efficient. This automation reduces manual workloads that previously required significant time and resources, and minimizes human error (Alrousan et al., 2025; Dyakiv et al., 2024). E-HRM also enables more data-driven decision-making by using HR analytics, which allows the collection and utilization of HR data for more targeted decisions that are responsive to organizational needs (Ruiz et al., 2024; Dyakiv et al., 2024; Bashir, U., et al., 2024).

The use of HR analytics is crucial for encouraging data-driven decision-making that better reflects real-world conditions. Data obtained from e-HRM systems can be used to plan more effective employee management policies and to monitor individual and team performance more accurately and transparently. This allows organizations to utilize more objective and relevant information to improve organizational performance rather than relying solely on intuition or past experience (Khan, 2025). Implementing e-HRM using analytical data allows companies to plan better strategies and identify potential problems earlier, allowing them to be addressed more quickly (González, L., et al., 2024).

E-HRM also has a significant impact on reducing operational costs. The use of digital platforms in HR management can eliminate the need for physical documents and reduce manual work time, which can increase operational costs (Alrousan et al., 2025; Halid et al., 2020). Previously time-consuming and costly administrative processes can now be simplified and accelerated. Furthermore, this reduction in operational costs not only benefits organizations in terms of budget efficiency but also creates a more dynamic work environment, where employees can focus more on value-added tasks and develop their competencies (Eliza, E., 2023).

E-HRM implementation also plays a significant role in increasing employee engagement (Lindiwe S., et al. 2023; Retno Ayu, P.S., 2024; Shaddiq, S., , K., & Irpan, M., 2023). In an increasingly digital workplace, digital platforms used in E-HRM facilitate communication and collaboration between employees and managers or among fellow employees. This increases engagement and a sense of belonging to the organization. Employees who are engaged and feel valued will be more motivated to work harder and make greater contributions to the organization. Furthermore, E-HRM also makes it easy for employees to access various information related to career development, training, or other programs that can improve their skills and competencies. This increases employee readiness and adaptation to changes occurring in the organization (Alrousan et al., 2025; Djunaedi, 2025; Albi, 2024; Liu, L., & Yang, Y., 2024).

Although e-HRM offers many benefits, its implementation is not always smooth. A major challenge often faced by organizations is employee resistance to change. Many employees are comfortable with legacy systems and are reluctant to adapt to new systems that are perceived as more complex or require higher digital skills. Furthermore, limited resources, whether human resources with sufficient digital expertise or adequate technological infrastructure, can also hinder e-HRM implementation (Sun & Jung, 2024). To address these challenges, organizations must be able to manage change effectively, provide adequate training for employees, and ensure that any changes made provide clear benefits to them (Balabanova, Y., 2024).

To address these challenges, organizations need to develop effective implementation strategies, such as providing digital training for employees, providing full management support, and conducting regular evaluations of the effectiveness of the implemented e-HRM system. Strong management support is essential for creating a culture of innovation that supports the adoption of new technologies and for ensuring the sustainability and success of e-HRM system implementation. Furthermore, developing an organizational culture that is more open to technology and change will also facilitate the transition to a more effective and efficient e-HRM system (Djunaedi, 2025; Albi, 2024).

The purpose of this study is to explore how the implementation of E-HRM can improve organizational efficiency, particularly in terms of process automation, data-driven decision-making, operational cost reduction, and increased employee engagement. This study also aims to identify the challenges faced by organizations in implementing E-HRM and the strategies that can be used to overcome these obstacles. Through this study, it is hoped to provide deeper insights into the benefits and challenges associated with implementing E-HRM in modern organizations. The novelty of this study lies in a more detailed understanding of how E-HRM can be a key factor in improving organizational efficiency in the Industry 4.0 era, as well as how organizations can design effective implementation strategies to optimize the use of technology in HR management.

METHOD

This research uses a qualitative approach with a case study design to understand the implementation of Digital Human Resource Management (E-HRM) in improving organizational efficiency in the Industry 4.0 era. The qualitative approach was chosen because it allows researchers to gain a deeper understanding of phenomena occurring in a broader context, as well as providing space for researchers to interact directly with informants in the data collection process. According to Moleong (2019), qualitative research aims to understand the social reality that occurs in the field through the perspectives of individuals involved in the event or phenomenon. Thus, this research will focus on understanding how the implementation of E-HRM can affect organizational efficiency through various perspectives of informants who have direct experience in implementing the system.

This research was conducted in several organizations in Surabaya that have implemented E-HRM. The researchers chose Surabaya as the research location because this city is a rapidly growing business center, with many organizations starting to adapt to the development of digital technology, including in HR management. This research relies on primary data obtained through in-depth interviews with informants selected by purposive sampling, namely those who have direct experience with the implementation of E-HRM in their organizations. The collected data will be analyzed using a qualitative data analysis approach, which includes data collection, reduction, presentation, and drawing conclusions according to the stages proposed by Miles and Huberman (2014).

The informants in this study consist of four individuals who have important roles in the e-HRM implementation process in their organizations. These four informants were selected based on their involvement in HR management and direct experience in implementing the digital system. The informants will be interviewed regarding their views on the benefits, challenges, and impact of e-HRM on their organizations' efficiency. The interview results will be analyzed to identify key themes that reflect e-HRM implementation in their respective organizational contexts.

Table 1: Informant Data

No	Name	Age	Work
1	Siti Rahma	34	Head of HR Department at Company A
2	Budi Santoso	40	Operations Manager of Company B
3	Dian Pratiwi	28	HR Manager at Company C
4	Rudi Haryanto	45	HR Director at Company D

RESULTS AND DISCUSSION

This study aims to explore the understanding of the application of Digital Human Resource Management (E-HRM) in improving organizational efficiency in the Industry 4.0 era. Through in-depth interviews with four informants directly involved in the implementation of E-HRM in their organizations, this study focuses on their experiences, as well as the impacts generated by the E-HRM system on operational efficiency, human resource management, and the challenges faced in this digital transition process.

1. Benefits of E-HRM in Improving Organizational Efficiency

Based on the interview results, the implementation of e-HRM in each informant's organization has been proven to provide various benefits in increasing organizational efficiency. Siti Rahma, Head of the HR Department at Company A, explained that one of the main benefits of e-HRM she experienced was increased speed and accuracy in the recruitment process.

*"Previously, the recruitment process took days or even weeks. With the E-HRM system, we can speed up the process, from initial selection to interviews."*he said.

A more efficient recruitment process not only saves time but also reduces the costs associated with hiring new employees. E-HRM enables more effective and systematic applicant data management and facilitates communication between HR teams and applicants (Alrousan et al., 2025; Khan, 2025; Dyakiv et al., 2024).

Budi Santoso, Operations Manager at Company B, added that the implementation of HR analytics in E-HRM enables more accurate and data-driven decision-making.

*"With accurate data, we can make more strategic decisions regarding performance management and employee development. Previously, we relied solely on subjective assessments, but with E-HRM, decisions are more evidence-based and more accountable."*he said.

HR analytics allows companies to evaluate employee performance more objectively and identify trends and patterns that can be used for future human resource development planning. This data can also be integrated with various other systems within the organization, providing a more comprehensive picture and aiding in formulating more appropriate policies (Alrousan et al., 2025; Khan, 2025; Ruiz et al., 2024; Dyakiv et al., 2024).

Dian Pratiwi, HR Manager at Company C, revealed that employee skills development and engagement are becoming easier to manage through the E-HRM platform.

*"We can monitor employee skill development in a more structured way and provide them with access to a variety of online training courses. This makes it easier for us to identify employee strengths and weaknesses and provide appropriate development solutions."*he said.

With digital platforms that provide organized training and courses, employees can improve their skills more efficiently and in line with organizational needs. This also results in increased employee engagement, which leads to a more active participation in the learning and development process (Alrousan et al., 2025; Khan, 2025; Djunaedi, 2025; Albi, 2024).

2. Challenges of E-HRM Implementation

The implementation of e-HRM has not been without its challenges. One of the biggest challenges faced is resistance to change from some employees, as expressed by Rudi Haryanto, HR Director at Company D.

"One of the biggest challenges is overcoming employee fears and hesitations about this change. Many feel more comfortable with the manual systems they've known for years." he explained.

Resistance to digital change is common in many organizations, especially among employees unfamiliar with technology. This highlights the importance of a clear communication strategy and a responsive approach to employee needs in navigating this technological shift (Sun & Jung, 2024; Dyakiv et al., 2024).

Another challenge is the lack of digital skills among some older staff members or those less exposed to technological developments. Siti Rahma stated,

"Some of our team struggled to adapt to the new system because they weren't used to digital technology. Even though we provided training, some people struggled to keep up with the pace of change."

This poses a significant challenge in implementing e-HRM, especially in organizations with diverse technological skill sets. Therefore, providing intensive training and ongoing support to enhance employees' digital capabilities is crucial (Sun & Jung, 2024; Dyakiv et al., 2024).

Another challenge that emerged was integrating E-HRM with existing systems. Budi Santoso added,

"We encountered some challenges when first integrating the E-HRM system with the software we were already using. Sometimes there were compatibility issues that hampered the implementation process."

This integration process requires careful planning and sufficient resources to ensure a smooth transition to the new system. Therefore, proper project management and IT team involvement are crucial in addressing these integration issues (Varadaraj & Wadi, 2021).

The implementation of e-HRM in organizations often faces various obstacles, particularly resistance from employees accustomed to long-standing manual systems. The shift toward digitalization often evokes fear and doubt, especially among those who are more comfortable with familiar methods. This resistance is common in many organizations, particularly among employees who are unfamiliar with technology. Therefore, it is crucial for organizations to develop clear and responsive communication strategies to encourage employees to be more open and accepting of technological change. Furthermore, providing effective information about the benefits and conveniences offered by e-HRM can reduce anxiety and increase employee readiness to adapt to the new system. This approach helps organizations create an environment that supports a smoother digital transition.

Besides resistance to change, another challenge in implementing e-HRM is the lack of digital skills among some employees, especially those who are older or less exposed to technological developments. In this regard, intensive training and ongoing support are essential to ensure that all employees can access and utilize e-HRM optimally. This process not only improves digital skills but also builds employee confidence in using the new system. Furthermore, technical challenges arise regarding the integration of e-HRM with existing systems. Compatibility issues with different software can hamper the implementation process, which requires careful planning and sufficient resources, as well as the involvement of the information technology (IT) team to ensure a smooth transition to the new system.

3. Successful Strategies in E-HRM Implementation

Despite the significant challenges, several successful strategies can be implemented to ensure the success of e-HRM implementation. Dian Pratiwi emphasized the importance of digital training and education as part of a strategy to address the skills gap among employees. "We provide digital training not only for the HR team but also for all employees so they can optimize this system. This helps them become more comfortable with technology and increases work productivity," she said. Continuous digital training that adapts to technological developments will enable employees to feel more competent in using e-HRM and reduce anxiety about change (Sun & Jung, 2024; Albi, 2024).

Budi Santoso explained that regular evaluations are also an effective strategy to ensure optimal E-HRM performance. "After implementation, we conduct regular evaluations to determine whether the E-HRM system has met the expected efficiency goals. This evaluation is important to identify any obstacles or deficiencies in the system's use," he explained. Regular evaluations allow organizations to adapt and improve existing systems and ensure they remain relevant to their needs (Khan, 2025; Shaddiq, S., K., & Irpan, M., 2023).

Rudi Haryanto also emphasized the importance of strong managerial support. *"Managers must lead by example in using this new technology. If management doesn't support change, it will be difficult for employees to accept the new system well."* he said.

Managerial support is crucial in creating a digital culture that supports organizational transformation. Managers need to provide clear direction and assist employees in this transition (Djunaedi, 2025).

Table 2: Impact of E-HRM Implementation on Organizational Efficiency

Aspects of Implementation	E-HRM Impact on Organizational Efficiency
Process Automation	Faster, more accurate and cost-effective processes
HR Analytics & Data	More accurate and data-driven decisions
Employee Development	Adaptation and innovation increase
Implementation Challenges	Strong training and managerial support is required.

The table above illustrates various important aspects of e-HRM implementation that directly contribute to increased organizational efficiency. Process automation, for example, has been shown to have a significant impact by accelerating previously time-consuming administrative processes. For example, in the recruitment process, e-HRM allows organizations to conduct the initial selection process through to interviews more quickly and efficiently. This reduces the time required in the recruitment phase and reduces costs typically associated with applicant management. Furthermore, automation in performance management and training reduces manual administrative burdens, freeing employees and HR teams to focus more on other strategic tasks. Therefore, e-HRM implementation not only improves time efficiency but also reduces unnecessary

operational expenses, making organizations more cost-effective and more responsive to market needs.

Challenges in implementing e-HRM remain, particularly related to resistance to change from some employees. Many are comfortable with legacy systems and are anxious about changes involving new technologies. Furthermore, limited digital skills among some employees pose another barrier to the transition to a more digital system. Therefore, it is crucial for organizations to develop appropriate strategies to overcome these obstacles, such as providing intensive training that can help employees understand and master the use of e-HRM systems. Full support from management is also essential to create an organizational culture that is open to technological change. With the right approach, these challenges can be overcome, and organizations can achieve maximum benefits from e-HRM implementation for long-term efficiency.

CONCLUSION

The implementation of Digital Human Resource Management (E-HRM) has been proven to have a significant impact on improving organizational efficiency in the Industry 4.0 era. Research shows that E-HRM facilitates the automation of various HR processes such as recruitment, performance management, and training, which speeds up processes, reduces costs, and improves accuracy in human resource management. The use of HR analytics and data enables more evidence-based decision-making, enabling organizations to design more strategic and targeted policies. Furthermore, the digital platforms used in E-HRM also support skills development and increase employee engagement, enabling them to adapt to change and innovate better. However, challenges in E-HRM implementation, such as resistance to change and limited digital skills among some employees, must be addressed through continuous training and full support from management. Organizations need to plan system integration well and ensure clear communication to minimize obstacles in the transition to digitalization. Therefore, achieving optimal organizational efficiency through E-HRM requires strong managerial support, regular evaluation of the implemented system, and an inclusive approach to addressing differences in digital skill levels among employees. Overall, this study shows that E-HRM not only accelerates HR processes, but also plays an important role in creating more adaptive and innovative organizations amidst rapid technological developments.

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