

Adaptation of Human Resource Management to the Development of Information and Communication Technology in the Digital Era

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Abstract

This study aims to analyze the adaptation of Human Resource (HRM) management to the development of Information and Communication Technology (ICT) in the digital era. Through a literature review, it was found that the integration of ICT in HRM improves operational efficiency, productivity, and competitiveness of organizations. Technologies such as HRM information systems, e-learning, and Electronic Human Resource Management (E-HRM) play an important role in improving data accuracy, decision making, and employee competence. However, challenges such as resistance to change, limited resources, and the need for digital literacy remain obstacles. This study highlights the importance of employee training, change management, and technology investment to optimize the benefits of ICT. Recommendations for further research include exploring the impact of artificial intelligence (AI) and comparative case studies to provide deeper insights.

Keyword: Human Resource Management, Information and Communication Technology (ICT), Operational Efficiency, Digital Literacy, E-HRM.

INTRODUCTION

The digital era has brought significant changes in various aspects of life, including human resource management (HRM). The development of information and communication technology (ICT) enables companies to enhance efficiency, effectiveness, and flexibility in managing their workforce (Davenport & Harris, 2017). Digital transformation demands organizations to adapt to more modern work systems, ranging from automation implementation, AI-driven data analysis, to hybrid work models that rely on internet connectivity (Marler & Boudreau, 2017).

These changes impact not only the recruitment and selection processes but also training strategies, competency development, and technology-based performance evaluation (Stone, Deadrick, Lukaszewski, & Johnson, 2015). According to research conducted by Bersin (2019), organizations that successfully adopt ICT in HRM can improve productivity and competitiveness in the global market. Conversely, organizations that fail to adapt to technological advancements risk falling behind and struggling to retain high-quality human resources (Westerman, Bonnet, & McAfee, 2014).

Although integrating technology into HRM offers numerous benefits, several challenges must be addressed, such as resistance to change, the need for increased digital literacy, and employee data security (Bondarouk & Ruël, 2013). Research by Parry and Strohmeier (2014) highlights that the success of technology adaptation in HRM heavily depends on an organization's readiness to manage change and educate employees on new technologies.

Based on this background, this study aims to analyze how HRM adapts to ICT developments in the digital era and identify the challenges and opportunities that arise in this process. By understanding the factors influencing successful adaptation, organizations can

optimize technology implementation in HRM to create a more efficient, innovative, and sustainable work environment.

RESEARCH METHODS

This study aims to analyze the adaptation of Human Resource Management (HRM) to the development of information and communication technology (ICT) in the digital era. The data used in this research is secondary, obtained from journals and scientific articles relevant to the research topic.

The research approach follows the Population, Intervention, Comparison, Outcome, and Study Design (PICOS) framework. The population/problem examined consists of organizations facing challenges and opportunities in adapting technology in HR management. The intervention includes ICT implementation strategies in HRM, such as process automation, the use of artificial intelligence in performance analysis, and the implementation of hybrid work models. The comparison is conducted by reviewing various HR management methods before and after technology adoption. The expected outcome is an understanding of the effectiveness and impact of technology implementation on work efficiency, employee productivity, and organizational competitiveness. The study design used is a literature review with a systematic analysis of previous research discussing ICT implementation in HRM.

The data sources for this study are obtained from journals and academic articles available through databases such as Garda Rujukan Digital (GARUDA). The selection of journals and articles is based on their relevance to the topic and the credibility of the sources. Data analysis is conducted using a thematic analysis approach, aiming to identify adaptation patterns, success factors, and challenges organizations face in the digital transformation of HR management.

Table 1. Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Population/Problem	A national journal that discusses the adaptation of HR management to the development of information and communication technology in the digital era.	National journals that are not relevant to the research topic or do not discuss the adaptation of HR management to information and communication technology.
Intervention	Application of information and communication technology in HR management to improve organizational efficiency, effectiveness and competitiveness.	The use of information and communication technology that has a negative impact on HR management or is not relevant to the research objectives.
Comparison	Not using a comparator or only reviewing one adaptation strategy.	Using comparators that are not relevant to the adaptation of HR management in the ICT context.
Outcome	There is a positive influence from the adaptation of information and communication technology on HR management, such as increased productivity, work flexibility, and operational efficiency.	There is no significant influence of technology implementation on HR management.

Study Design	- Descriptive research, systematic study/literature review, comparative research, correlational research, survey research, experimental research, action research, ex post facto research.	
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- Sampling methods include probability sampling (simple random sampling, systematic random sampling, stratified random sampling, cluster random sampling, multi-stage sampling) and nonprobability sampling (purposive sampling, snowball sampling, accidental sampling, quota sampling, saturated sampling techniques).
- Focus on information technology, communication, and HR management.
- Research instruments include tests, questionnaires, interviews, observations, documentation, forum group discussions (FGD), and experiments. | Research that does not comply with established methods or does not discuss information technology in the context of HR management.

These inclusion and exclusion criteria ensure that the study only uses relevant sources and can make a significant contribution to understanding how HR management adapts to developments in information and communication technology in the digital era.

RESULTS AND DISCUSSION

Results

General Characteristics of the Literature

This section presents literature with high credibility and relevance to the research objective, "Adaptation of Human Resource Management to the Development of Information and Communication Technology in the Digital Era." The literature used in this study has undergone a rigorous selection process based on predefined inclusion and exclusion criteria.

The results of the literature review in this study are presented in a table summarizing the key points of each selected article. Following the table, an analysis is provided, interpreting the meanings and emerging trends found in the reviewed literature. This analysis aims to understand the adaptation patterns of HR management to ICT developments, the challenges faced, and the opportunities organizations can leverage in navigating the digital era.

Table 2. Literature Analysis

No	Author Name	Title	Objective	Results
1	M. Mulyanto, I. (2021)	The Relationship between Teachers' Mastery of Information and Communication Technology and Teachers' Classroom Management Skills with Elementary School Students' Learning Achievement	Analyzing the relationship between teacher ICT mastery, classroom management skills, and student learning achievement.	Teachers' mastery of ICT has a significant influence on teaching effectiveness and student learning achievement.
2	A. Setiawan, B. Kurniawan (2020)	Utilization of Information Technology in Human Resource Management in	Examining the use of information technology to	Implementation of information technology in HR

		the Digital Era	improve the effectiveness of HR management in organizations in Indonesia.	management improves operational efficiency and the quality of decision making.
3	R. Wijaya, S. Hartono (2021)	Digital Transformation in Human Resource Management: A Case Study of Technology Companies in Indonesia	Exploring the digital transformation process in HR management in technology companies in Indonesia, as well as the challenges and opportunities faced.	Digital transformation requires adjustment of organizational culture and improvement of employees' digital competencies to achieve success.
4	L. Pratama, D. Sari (2020)	Implementation of Technology-Based Human Resource Management Information System in Indonesian Government Agencies	Discusses the implementation of technology-based HR management information systems in Indonesian government agencies and its impact on employee performance.	The implementation of a technology-based HR management information system increases data accuracy and efficiency of personnel administration processes.
5	F. Nugroho, M. Lestari (2020)	The Role of Information Technology in Developing Employee Competence in the Digital Era	Highlighting the role of information technology in developing employee competencies in the digital era, with a focus on companies in Indonesia.	The use of e-learning platforms and mobile applications is effective in improving employee skills and knowledge.
6	H. Susanto, E. Widodo (2021)	HR Management Adaptation Strategy to ICT Developments in the Indonesian Banking Sector	Analyzing HR management adaptation strategies to ICT developments in the Indonesian banking sector.	Banks that successfully integrate ICT into HR management show increased productivity and employee satisfaction.
7	Y. Rahmawati, T. Putra (2022)	The Impact of HR Process Digitalization on Employee Performance in the Manufacturing Industry	Examining the impact of HR process digitalization on employee performance in the	Digitalization of HR processes contributes positively to improving employee performance and

			Indonesian manufacturing industry.	operational efficiency.
8	S. Utami, G. Santoso (2020)	Implementation of E-HRM in Improving the Effectiveness of HR Management in Retail Companies	Evaluating the implementation of Electronic Human Resource Management (E-HRM) in improving the effectiveness of HR management in Indonesian retail companies.	E-HRM helps reduce administrative burden and allows more focus on employee development.
9	D. Kurniasari, I. Wahyudi (2021)	Challenges and Opportunities for Digitalization of Human Resource Management in Indonesian MSMEs	Identifying challenges and opportunities in digitalizing HR management in Indonesian Micro, Small, and Medium Enterprises (MSMEs).	MSMEs face the constraint of limited resources, but digitalization of human resources offers opportunities to increase competitiveness.
10	N. Hidayat, R. Puspitasari (2022)	The Influence of Mobile Application Usage in Employee Performance Management in Indonesian Startups	Analyzing the influence of mobile application usage in employee performance management in Indonesian startup companies.	The use of mobile applications facilitates performance monitoring and communication between management and employees, increasing responsiveness and accountability.

Discussion

1. Adaptation of HR Management to ICT Developments

Based on the literature analysis, the adaptation of human resource management (HRM) to the development of information and communication technology (ICT) has become a key factor in enhancing organizational efficiency, productivity, and competitiveness in the digital era. Several key findings from the reviewed literature indicate that the implementation of ICT in HRM has a positive impact, such as improving operational efficiency, data accuracy, and better decision-making (Setiawan & Kurniawan, 2020; Pratama & Sari, 2020). Additionally, digital transformation in HRM allows organizations to adopt more flexible work models, such as hybrid work, which can enhance employee satisfaction (Wijaya & Hartono, 2021).

2. Challenges in ICT Adaptation

Despite its significant benefits, ICT adaptation in HRM is not without challenges. Some identified challenges include resistance to change, resource limitations, and the need for

improved digital literacy (Bondarouk & Ruël, 2013; Kurniasari & Wahyudi, 2021). For instance, in the micro, small, and medium enterprises (MSMEs) sector, financial and technical resource constraints are the main barriers to adopting new technology (Kurniasari & Wahyudi, 2021). Furthermore, organizational culture change and the enhancement of employees' digital competencies are also crucial factors that need to be addressed (Wijaya & Hartono, 2021).

3. Opportunities to Leverage

On the other hand, ICT advancements also provide significant opportunities for organizations to enhance HRM effectiveness. The use of e-learning platforms and mobile applications, for example, has been proven effective in improving employee competencies (Nugroho & Lestari, 2020; Rahmawati & Putra, 2022). Additionally, implementing an Electronic Human Resource Management (E-HRM) system can reduce administrative burdens and allow a greater focus on employee development (Utami & Santoso, 2020). In the banking sector, the integration of ICT into HRM has improved employee productivity and satisfaction (Susanto & Widodo, 2021).

4. Impact on Organizational Performance

Research findings indicate that the digitalization of HR processes positively contributes to improving employee performance and operational efficiency (Rahmawati & Putra, 2022). The use of mobile applications in performance management, for example, facilitates performance monitoring and communication between management and employees, thereby increasing responsiveness and accountability (Hidayat & Puspitasari, 2022). Furthermore, the implementation of technology-based HRM information systems enhances data accuracy and the efficiency of administrative processes (Pratama & Sari, 2020).

5. Implications for Organizations

Based on these findings, organizations should consider several strategies to optimize ICT adaptation in HRM. First, they must ensure that employees have adequate digital literacy through training and competency development programs (Nugroho & Lestari, 2020). Second, organizations need to effectively manage cultural changes to reduce resistance to new technology (Wijaya & Hartono, 2021). Third, investing in the right technology, such as E-HRM and mobile applications, can help improve HRM efficiency and effectiveness (Utami & Santoso, 2020; Hidayat & Puspitasari, 2022).

6. Recommendations for Future Research

This study provides a general overview of HRM adaptation to ICT developments; however, there are several areas that can be further explored. For example, in-depth research on the specific impact of certain technologies, such as artificial intelligence (AI) and data analytics in HRM, could provide more comprehensive insights. Additionally, comparative case studies between organizations that successfully and unsuccessfully adopt ICT could offer valuable lessons for HRM practitioners.

CONCLUSION

The adaptation of HR management to ICT developments in the digital era enhances organizational efficiency, productivity, and competitiveness through the implementation of technologies such as information systems, e-learning, and E-HRM. However, challenges such as resistance to change, resource limitations, and the need for digital literacy must be addressed. Significant opportunities arise in improving employee competencies and operational efficiency. Organizations should focus on training, change management, and technology investment to maximize the benefits of ICT. Further research can explore the impact of AI and comparative case studies for deeper insights.

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