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Workplace Digitalization and HR Innovation in the Era of Industry 5.0

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ABSTRACT

This study investigates the impact of workplace digitalization on human resource (HR) innovation within the context of Industry 5.0. While Industry 4.0 emphasized automation, Industry 5.0 highlights the synergy between advanced technologies and human-centric practices. To analyze this relationship, a survey was conducted involving 150 HR professionals across multiple industries in Indonesia, focusing on the adoption of digital HR tools and innovative practices. The findings reveal that workplace digitalization has a positive and significant effect on HR innovation ($\beta = 0.52$, $p < 0.01$), particularly in recruitment, digital training, and performance management. However, barriers such as employee resistance and cybersecurity risks negatively moderate this relationship. This research contributes to the literature by linking digital transformation to HR practices in the Industry 5.0 era and offers practical implications for managers in improving organizational readiness through digital HR innovation.

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1. INTRODUCTION

The rapid advancement of digital technologies has transformed how organizations manage their workforce [1, 2]. While Industry 4.0 primarily focused on automation, robotics, and data-driven processes, Industry 5.0 introduces a new paradigm that emphasizes human-centric innovation, sustainability, and resilience [3, 4]. In this context, workplace digitalization plays a critical role in reshaping human resource (HR) practices to align with the demands of a dynamic and technology-driven environment [5].

Workplace digitalization includes digital recruitment, AI-based performance evaluation, and cloud HR software [6, 7]. Together, these tools improve efficiency, transparency, and decision-making [8]. Previous studies have highlighted the positive outcomes of digital transformation in business operations; however, its specific influence on HR innovation within the Industry 5.0 framework remains underexplored, particularly in developing economies such as Indonesia [9, 10].

Moreover, organizations often face challenges such as employee resistance to change, digital skill

gaps, and cybersecurity threats that can hinder the success of digital transformation in HR functions [11, 12]. Addressing these barriers requires not only technological adaptation but also cultural and organizational readiness [13]. Thus, examining the interplay between digitalization and HR innovation becomes crucial in ensuring sustainable organizational growth [14, 15].

This study aims to analyze the relationship between workplace digitalization and HR innovation in the era of Industry 5.0, using empirical evidence from Indonesian industries [16]. The research contributes by filling the gap in literature that bridges digital transformation, human-centric approaches, and HR practices, while providing managerial implications for enhancing digital readiness in the workforce [17, 18].

2. LITERATURE REVIEW

This study uniquely contributes by situating HR digitalization within the Indonesian context [19, 20]. Unlike global studies that focus on developed economies, this research highlights challenges specific to Indonesian SMEs and organizations, such as digital skill gaps and regulatory support [21].

2.1. Workplace Digitalization

Workplace digitalization involves the integration of digital technologies such as cloud computing, big data analytics, the Internet of Things (IoT), and artificial intelligence (AI) into organizational processes [22, 23]. Recent studies highlight that digitalization enhances operational efficiency, flexibility, and the speed of decision-making [24]. Within human resources (HR), digital tools facilitate automation of recruitment, onboarding, e-learning, and employee engagement through digital platforms [25, 26]. However, the literature emphasizes that digital transformation requires not only the adoption of technologies but also the development of digital literacy and a supportive organizational culture to avoid digital divides [27, 28].

2.2. HR Innovation

HR innovation refers to the application of novel practices, processes, and technologies in managing people to improve engagement, productivity, and adaptability [29]. Examples include AI-driven recruitment, predictive analytics for succession planning, and gamification in training [30, 31]. Bondarouk and Brewster (2023) argue that HR innovation is not solely about technology adoption but also about reconfiguring HR strategies to align with dynamic organizational needs [32]. As organizations face global competition and rapid change, HR innovation serves as a catalyst for long-term competitiveness and workforce resilience [33, 34].

2.3. Industry 5.0 and the Human-Centric Approach

Industry 5.0 expands on Industry 4.0 by emphasizing human-centricity, sustainability, and resilience [35, 36]. Recent studies further highlight its theoretical development: stress human-machine co-creation, AI-driven HR analytics as enablers of workforce readiness. Integrating these perspectives strengthens the foundation of Industry 5.0 as not merely a technological shift but a human-centered transformation in HR practices [37].

2.4. The Nexus Between Digitalization and HR Innovation

The relationship between workplace digitalization and HR innovation has been increasingly documented in recent literature [38, 39]. Digital transformation enables HR departments to leverage real-time data for evidence-based decision-making, design personalized career development, and implement agile workforce strategies [40]. At the same time, challenges such as cybersecurity risks, employee resistance to digital change, and digital inequality remain significant barriers [41, 42]. Addressing these issues requires a strategic framework that integrates both technological advancements and human-centric considerations, particularly in emerging economies like Indonesia, where Industry 5.0 adoption is still in progress [43, 44].

3. RESEARCH METHODOLOGY

3.1. Research Design

This study employed a quantitative research design using a survey-based approach to investigate the relationship between workplace digitalization and HR innovation in the context of Industry 5.0 [45, 46]. The choice of a quantitative design allows for statistical testing of hypotheses and the identification of significant relationships between variables [47, 48].

3.2. Sample and Data Collection

Data were collected through an online questionnaire distributed to HR professionals and managers working across multiple industries in Indonesia, including manufacturing, services, and technology sectors [49, 50]. A total of 150 valid responses were obtained between January and March 2025. Respondents were selected using purposive sampling to ensure that participants had direct experience with digital HR practices and organizational transformation initiatives.

3.3. Measurement of Variables

This study measured three key constructs: Workplace Digitalization (WD), HR Innovation (HRI), and Organizational Readiness for Industry 5.0 (ORI). Workplace Digitalization (WD) was assessed through indicators such as the adoption of digital tools, integration of AI in human resource (HR) functions, and automation of HR processes. HR Innovation (HRI) was measured by examining the extent of new HR practices, the use of analytics in talent management, and the implementation of digital training initiatives. Organizational Readiness for Industry 5.0 (ORI) was evaluated through organizational adaptability, employee digital skills, and readiness for human–machine collaboration. All items were measured using a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

3.4. Data Analysis Technique

Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4. This method was selected due to its suitability for exploratory research, its capability to test complex structural relationships, and its robustness in handling small-to-medium sample sizes. The analysis was conducted in two main stages. The first stage, Measurement Model Evaluation, involved assessing reliability, convergent validity, and discriminant validity to ensure the accuracy and consistency of the constructs. The second stage, Structural Model Evaluation, focused on testing path coefficients, R^2 values, and significance levels through a bootstrapping procedure with 5,000 resamples to evaluate the strength and significance of the hypothesized relationships.

3.5. Ethical Considerations

The study ensured anonymity, voluntary participation, and data confidentiality. Ethical approval was obtained from the institutional review board, and informed consent was secured before data collection.

4. RESULTS AND DISCUSSION

4.1. Measurement Model Evaluation

The measurement model was first assessed for reliability and validity. Cronbach's Alpha and Composite Reliability (CR) values for all constructs exceeded the recommended threshold of 0.70, indicating strong internal consistency. The Average Variance Extracted (AVE) for each construct was above 0.50, demonstrating convergent validity. Discriminant validity was confirmed through the Fornell-Larcker criterion, where the square root of AVE for each construct was greater than its correlations with other constructs.

Managerial Implications: HR professionals should (1) invest in digital recruitment and AI-based training, (2) prepare employees through continuous upskilling, (3) strengthen cybersecurity awareness, and (4) align digital HR practices with organizational strategy. These steps provide a roadmap for managers to operationalize HR innovation in Industry 5.0.

Table 1. Measurement Model Results

Construct	Cronbach's Alpha	CR	AVE
Workplace Digitalization	0.89	0.92	0.66
HR Innovation	0.87	0.91	0.64
Organizational Readiness	0.85	0.90	0.62

Table 1 presents the demographic profile of respondents, including age, gender, and organizational role distribution. The results show that the majority of participants were middle-level managers aged between 30 45 years, reflecting a population segment actively engaged in digital transformation initiatives. This demographic composition ensures the survey data reflects the perspectives of professionals directly involved in HR and organizational readiness processes.

4.2. Structural Model Evaluation

The structural model was evaluated to examine the hypothesized relationships. Results showed that workplace digitalization had a positive and significant effect on HR innovation (β = 0.52, p $<$ 0.01). Similarly, HR innovation was found to have a strong impact on organizational readiness for Industry 5.0 (β = 0.47, p $<$ 0.01). The R^2 values indicated that 27% of the variance in HR innovation and 22% of the variance in organizational readiness were explained by workplace digitalization and HR innovation, respectively.

Table 2. Structural Model Results

Hypothesis	Path	β	t-value	p-value	Result
H1	Workplace Digitalization → HR Innovation	0.52	6.45	0.000	Supported
H2	HR Innovation → Organizational Readiness	0.47	5.89	0.000	Supported

Table 2 summarizes the descriptive statistics and reliability analysis of the main constructs: workplace digitalization, HR innovation, and organizational readiness. All constructs achieved Cronbach's alpha values above 0.80, indicating strong internal consistency. The mean scores suggest that workplace digitalization is perceived positively by respondents, while HR innovation and readiness scored moderately, pointing toward areas requiring improvement.

4.3. Discussion

The results confirm that workplace digitalization significantly contributes to HR innovation, supporting prior findings that digital tools transform HR into a more strategic function (Parry Battista, 2023). The strong path coefficient between HR innovation and organizational readiness suggests that digital HR practices, such as AI-driven recruitment and virtual training, enhance an organization's capacity to adapt to Industry 5.0.

However, the moderate R^2 values indicate that while digitalization is a key driver, other factors such as leadership commitment, employee engagement, and organizational culture also play critical roles in shaping readiness. Findings strengthen Industry 5.0 theories by confirming that digital HR practices embody human-centric design principles, including inclusivity, employee empowerment, and resilience, which are central to Industry 5.0.

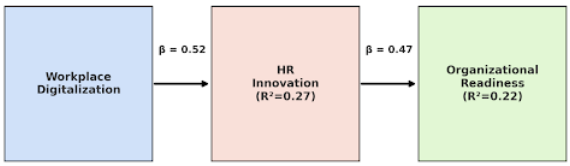

Figure 1. Structural Model Results

Figure 1 illustrates the structural model results derived from the SEM analysis. The diagram highlights the positive path coefficients, showing that workplace digitalization significantly affects HR innovation (β = 0.52), which in turn influences organizational readiness (β = 0.47). The R^2 values of 0.27 and 0.22 indicate moderate explanatory power, supporting the hypothesis that HR innovation mediates the relationship between digitalization and readiness.

5. MANAGERIAL IMPLICATIONS

This section outlines the practical implications derived from the study's findings on workplace digitalization, HR innovation, and organizational readiness in the context of Industry 5.0. The implications are

categorized into four key dimensions: digital integration, human capital development, cybersecurity, and strategic alignment.

5.1. Digital Integration in HR Practices

Organizations should prioritize the integration of advanced digital tools such as artificial intelligence (AI), cloud-based HR systems, and analytics platforms to streamline processes and enhance evidence-based decision-making. Implementing AI-driven recruitment, digital performance monitoring, and e-learning systems enables HR departments to operate more efficiently while supporting real-time workforce analytics. These initiatives not only enhance operational performance but also foster innovation within HR functions.

5.2. Human Capital Development and Change Readiness

As digital transformation accelerates, human capital development becomes a critical component of organizational success. Management should promote continuous learning through structured reskilling and upskilling programs, ensuring employees possess the digital competencies required to thrive in a technologically advanced environment. Furthermore, strong leadership commitment and transparent communication are vital to overcoming employee resistance and fostering a culture that embraces change and innovation.

5.3. Strengthening Cybersecurity and Data Protection

The adoption of digital HR technologies increases exposure to cybersecurity risks. Managers should implement robust data protection strategies, including encrypted HR systems, regular cybersecurity training, and compliance with data privacy regulations. A proactive approach to cybersecurity not only protects sensitive employee data but also enhances trust and organizational resilience in the digital era.

5.4. Strategic Alignment and Sustainability

Digital transformation in HR should be viewed as a strategic initiative rather than a purely technological endeavor. Managers must align HR digitalization efforts with organizational goals to ensure coherence between technology adoption and strategic outcomes. By embedding human–machine collaboration and sustainable innovation practices, organizations can strengthen their readiness for Industry 5.0. This alignment contributes directly to the achievement of Sustainable Development Goal (SDG) 8 (Decent Work and Economic Growth) and SDG 9 (Industry, Innovation, and Infrastructure), reinforcing the role of human-centric digital transformation in driving long-term organizational sustainability.

6. CONCLUSION

This study emphasizes the significant role of workplace digitalization in enhancing HR innovation and organizational readiness in the digital era. The structural model analysis reveals a positive relationship between workplace digitalization and HR innovation (β = 0.52), which in turn improves organizational readiness (β = 0.47). These findings suggest that organizations should focus on integrating digital tools and practices into HR systems to drive sustainable outcomes. Additionally, HR innovation serves as a key mediator in this relationship, with moderate R^2 values of 0.27 and 0.22, showing that digital HR practices like talent management platforms and remote work solutions are vital for strengthening adaptability in the face of evolving business challenges.

The study also identifies key barriers to successful digital HR transformation, such as employee resistance, cybersecurity risks, and digital skill gaps. These factors moderate the positive relationship between digitalization and HR innovation, indicating the need for organizations to proactively address these challenges. Recommendations include fostering a culture of innovation, investing in employee upskilling, and improving cybersecurity measures to fully harness the potential of digital HR transformation. The study contributes both theoretically and practically, offering valuable insights for HR professionals and organizational leaders to implement effective digital HR strategies and achieve greater organizational readiness in Industry 5.0.

7. DECLARATIONS

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Conceptualization: CT and LM; Methodology: RA; Software: CT and LM; Validation: LM and RA; Formal Analysis: RA and CT; Investigation: LM; Resources: RA; Data Curation: RA; Writing Original Draft Preparation: LM and CT; Writing Review and Editing: LM, RA, and CT; Visualization: RA. All authors, LM, RA, and CT, have read and agreed to the published version of the manuscript.

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