

Navigating Employee Work Productivity in the Digital service Sector: The Roles of Digital Recruitment Adaptivity and Digital Upskilling

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Abstract

Digital transformation has fundamentally changed the paradigm of human resource management, particularly in recruitment processes and employee competency development. This study aims to analyze the influence of digital adaptivity implementation in recruitment and digital upskilling programs on employee work productivity. A quantitative approach with cross-sectional design was employed through surveys of employees in the technology and digital services sector in the Jabodetabek area who have experienced digital recruitment processes and participated in digital upskilling programs. Data analysis technique utilizes Partial Least Square-Structural Equation Modeling with SmartPLS version four software. Research instruments were adapted from Stone et al., (2015) using a five-point Likert scale. Results show that digital adaptivity in recruitment has a highly dominant influence on employee work productivity, while digital upskilling programs demonstrate positive influence with more moderate strength. The developed research model explains work productivity variance and digital upskilling program variance with substantial prediction levels. Convergent validity testing shows all constructs have Average Variance Extracted values above required thresholds, indicating that employed indicators can explain most variance of each latent construct. Reliability testing confirms excellent internal consistency for all research variables, demonstrating high stability and dependability of research instruments. Research findings confirm that adaptive digital recruitment systems are primary determinants of employee productivity in the digital era. Employees recruited through adaptive digital systems demonstrate superior capabilities in adapting to technology-based work environments and can contribute productively from initial orientation periods. This research provides substantive theoretical contributions to digital transformation literature in human resource management, particularly in understanding mechanisms of how digital technology influences organizational performance through recruitment practices and competency development. Practically, these findings imply that organizations should prioritize investment in adaptive digital recruitment systems as they demonstrably have significant impact on employee productivity, while maintaining continuous upskilling programs as complementary components of holistic human resource development strategies

Keywords: Digital Adaptivity, Digital Recruitment, Digital Upskilling, Work Productivity, Digital HR Transformation

Introduction

Digital transformation has fundamentally changed the workplace landscape, forcing organizations to reevaluate their human resource management strategies. Traditional recruitment processes, which rely on conventional methods, now face significant challenges due to their inability to identify candidates with the digital competencies required by the modern era. Digital adaptability in recruitment is a strategic solution that allows companies to leverage technologies such as artificial intelligence, machine learning, and data-driven platforms to screen, assess, and select talent that is not only technically competent but also able to adapt to rapid technological changes (Chakraborty & Biswas, 2020) . The implementation of a digitally adaptive recruitment system provides organizations with a competitive advantage by accelerating the selection process, reducing subjective bias, and improving the accuracy of predicting the performance of prospective employees.

In line with the evolution of recruitment processes, digital upskilling programs have emerged in response to the widening skills gap between workforce capabilities and contemporary industry needs. Employees who do not have the opportunity to improve their digital competencies tend to experience decreased productivity and workplace relevance. A systematically designed upskilling program serves as a continuous learning mechanism that equips employees with the technical and cognitive skills necessary to navigate the complexities of digital technology (Sousa & Rocha, 2019) . The combination of digitally adaptive recruitment and a comprehensive upskilling program creates a dynamic work ecosystem, but a crucial question remains: to what extent does the synergy of these two elements contribute to a real and sustainable increase in employee productivity.

The phenomenon of the digital competency gap between job market needs and the actual capabilities of the workforce has become a serious concern for various global organizations. Multinational and local companies face a dilemma when conventional recruitment processes fail to identify candidates who are truly ready to face the demands of technology-based work. Interestingly, organizations that have adopted a recruitment system with a digital-adaptive approach show a significant paradigm shift, where algorithms and digital platforms not only accelerate selection but are also able to predict the potential adaptation of candidates to the ever-evolving work environment Pillai & Sivathanu, (2020) Paradox arises when large investments in recruitment technology do not automatically result in improved recruitment quality if not balanced with a sustainable development strategy post-recruitment.

Field reality shows that existing employees often face anxiety and resistance when faced with their organization's digital transformation. The phenomenon of "digital skill obsolescence" poses a real threat to productivity, where employees who do not receive adequate upskilling interventions tend to experience decreased performance and work engagement. Progressive organizations respond to this challenge by designing structured digital upskilling programs, but the success of their implementation varies greatly depending on the suitability of the program content to the specific needs of the job and the psychological readiness of employees to learn (Bondarouk & Brewster, 2016) . This condition raises empirical questions about how harmonization between digitally adaptive recruitment systems and effective upskilling programs can be a strategic formula for maximizing the work productivity of modern organizations.

Ambiguity regarding the effectiveness of implementing digital adaptability in the recruitment process remains a topic of academic debate that has not been comprehensively resolved. Although digital technology offers the ability to automate and optimize candidate selection, existing literature shows inconsistent results regarding its impact on hire quality and long-term organizational productivity. Several studies indicate that digital recruitment systems tend to overlook soft skills and organizational culture fit, which are strong predictors of employee performance (Suen et al., 2019) . The problem is further complicated when organizations implement advanced recruitment technologies without a thorough understanding of how these systems should be integrated with a holistic human resource development strategy, creating a gap between expectations and realized productivity improvements.

The complexity of the problem increases when considering the causal relationship between digital upskilling programs and actual employee productivity. Substantial investments made by organizations in digital training programs often do not yield measurable returns due to the lack of a robust evaluation framework and the mismatch between learning content and actual operational needs (Sousa & Rocha, 2019) . Furthermore, the interaction between the quality of digitally adaptable recruitment and the effectiveness of upskilling programs in creating productivity synergies remains unclear in the empirical literature. The fundamental question of how these two variables mutually reinforce or operate independently on work productivity requires in-depth investigation to provide practical guidance for practitioners and theoretical contributions to the development of digital human resource management.

Digital transformation has driven organizations to adopt various strategies to enhance human resource capabilities, including the implementation of digital adaptability in recruitment processes and digital upskilling programs. However, previous research has shown inconsistent findings regarding the impact of these two variables on employee productivity.

The implementation of digital adaptivity shows varying impacts based on the findings of various studies. Browder et al., (2024) in their longitudinal case study found that adaptive digital capabilities enable organizations to make rapid and flexible adjustments to disruptions, where companies that implement adaptive digital systems are able to increase operational productivity through algorithm-based decision-making and work process automation. In line with that, ElSayary, (2023) confirmed that systematic digital adaptivity training programs efficiently develop employee digital competencies, where participants show positive attitudes towards the use of technology that supports collaboration, learning, and productivity in the work environment. However, a different finding was put forward by Klein et al., (2024) who identified that digital transformation strategies experience a very high failure rate, where most digital transformation initiatives fail to achieve their initial objectives and only produce incremental innovations instead of the expected radical innovations, especially when there are organizational cultural barriers, employee resistance, and lack of support from lower levels of the organization.

A similar phenomenon also occurs in the relationship between digital upskilling programs and work productivity. Jaiswal et al., (2022) showed that investment in upskilling programs for artificial intelligence significantly impacts employees' ability to develop complex, high-level skills, including data analysis, digital skills, decision-making, and continuous learning, which directly improve organizational productivity and competitiveness. This finding is reinforced by research by Li, (2024) who stated that comprehensive reskilling and upskilling programs are strong predictors of increased workforce readiness for the industrial revolution, where collaboration with third-party education providers and continuous learning programs effectively increase employee intellectual capabilities and overall organizational productivity. Conversely, Flegl et al., (2022)

found that not all training programs produce the expected productivity impact. Their results showed that a disproportionate number of training hours, whether too low or excessive, has a limited or even no impact on improving performance. Excessive training can even be negatively correlated with employee productivity.

The inconsistency in the research results indicates a knowledge gap that needs to be bridged through further research. The study, which integrates both variables digital adaptability in recruitment and digital upskilling programs—is a promising approach. The simultaneous impact of digital transformation on work productivity is still limited, even though both aspects are interconnected within an organization's digital transformation ecosystem. Therefore, this study seeks to fill this gap by exploring the impact of digital adaptivity implementation in recruitment processes and digital upskilling programs on work productivity and identifying the conditions that mediate or moderate this relationship in the context of organizations in Indonesia.

Research on digital transformation in human resource management has experienced significant development, particularly in the context of recruitment and workforce competency development. Digital transformation in HR management has evolved from basic automation to complex interactions between humans and artificial intelligence, with a focus on improving organizational efficiency, reducing bureaucracy, and creating added value for companies (Zhang & Chen, 2024) . Recent studies have also identified five critical skills needed in the AI era: data analysis, digital skills, complex cognitive skills, decision-making, and continuous learning (Jaiswal et al., 2022). However, previous research tends to emphasize the technical aspects of digital technology implementation or skills development separately, without exploring in depth how digital adaptability in recruitment processes and upskilling programs can simultaneously impact employee productivity.

The identified research gap indicates that while the literature has recognized the importance of HR digitalization and employee competency development separately, there remains substantial research space to examine the integrated influence of these two dimensions on work productivity. This study fills this gap by integrating two dimensions of digital transformation technology-based recruitment and digital upskilling programs as complementary independent variables in influencing organizational work productivity. The novelty of this study lies in its holistic approach that connects the digital talent acquisition process with employee sustainable development, a topic that has not been widely studied in an empirical context, particularly in Indonesia.

Digital transformation in human resource management has progressed rapidly from simple automation to complex interactions between humans and artificial intelligence, but there is still a gap in understanding how AI can complement not replacing Human resource functions (Bindra et al., 2025) . Future research should explore the integration of artificial intelligence into human resource management practices by identifying four key research avenues: AI-enhanced collaboration, AI-driven workplaces, AI-enabled business models, and AI-powered innovation (Gong et al., 2025) . This study directs research toward exploring how digital adaptability in recruitment and upskilling programs can synergize to create a sustainable talent ecosystem, with a focus on measuring the impact on work productivity through a comprehensive quantitative approach. This research will also analyze how integrating digital recruitment processes with continuous competency development can generate organizational competitive advantage in the face of technological disruption.

A future research agenda in HR digital transformation emphasizes the importance of training and development programs for employees to work alongside automated systems, as well as the need to reevaluate traditional HR practices towards data-driven decision-making and

upskilling-reskilling initiatives (Bindra et al., 2025) . Identified research gaps include investigating the impact of Industry 4.0 technologies on employee well-being, studying the intersection of sustainability and HR management, cross-cultural research, and exploring the evolution of HR in the digital era by considering the ethical and legal implications of HR technologies. This research will contribute to filling these gaps by empirically testing the causal relationship between the implementation of digital adaptability in recruitment and digital upskilling programs on work productivity, particularly in the context of Indonesian organizations undergoing accelerated digital transformation post-pandemic.

Organizations worldwide are experiencing significant transformations in human resource management due to technological advances and digitalization, with the COVID-19 pandemic further accelerating this transformation, making it crucial to organizational competitiveness. Companies that rapidly adopt digital HR management technologies gain a competitive advantage, although uncertainty remains regarding the organizational implications and impact of this transformation (Bindra et al., 2025) . The urgency of this research lies in the need to deeply understand how the integration of digital systems into recruitment processes and competency development programs can simultaneously improve employee productivity. This research is important because digital HR transformation is no longer optional but rather a key factor in achieving and maintaining competitive advantage in an increasingly dynamic and competitive market, particularly in the context of organizations in Indonesia experiencing accelerated digitalization post-pandemic.

Digital HR strategy which is defined as the explicit recognition of the fusion and integration of HR processes with digital technologies. It has been theoretically and empirically proven to improve organizational performance (Ruiz et al., 2024) . Technological mediation has transformed work design and functionality, yet the information systems literature on human resource management still provides little empirical evidence regarding the synergy between the two fields, particularly in the context of integrated digital recruitment and upskilling programs. This research is important because it will fill the gap in understanding how these interconnected systems lead to improved organizational performance through a comprehensive socio-technical approach. The findings of this study are expected to provide practical implications for HR practitioners in designing effective digital strategies, as well as theoretical contributions to the development of the still limited literature on HR digital transformation in Indonesia.

This study makes a theoretical contribution by expanding our understanding of the impact of digital HR management on employee behavior and performance at the individual level. Recent studies have shown that digital HR management enhances employee innovative performance by increasing a sense of accomplishment and reducing counterproductive behavior by decreasing a sense of relative deprivation, with perceived ease of use of technology acting as a positive moderator in this relationship (Hu & Lan, 2024) . These findings adopt a human-centered approach and theoretically extend the study of the impact of digital HR management at the individual level, finding that these practices mutually influence employee performance. This study will provide new theoretical insights into the psychological mechanisms underlying the relationship between digital adaptability in recruitment and digital upskilling programs on work productivity, particularly in the context of Indonesian organizations undergoing post-pandemic digital transformation.

The practical benefit of this research lies in providing digital HR management strategies to enhance organizational resilience, by guiding HR practitioners in using digital tools to improve employee adaptability, streamline crisis communications, and enhance flexibility and

preparedness for future disruptions (Ahmić & Ćosić, 2025) . This research enriches the existing literature and ensures practical implications regarding digital HR management by empirically demonstrating how such practices strengthen an organization's ability to anticipate potential disruptions, respond effectively to crises, and adapt to changing situations. The findings of this research are expected to guide organizations in designing and implementing integrated digital recruitment systems and upskilling programs to improve employee productivity, while also providing policy recommendations for management in optimizing HR technology investments to achieve sustainable competitive advantage.

Method

The data analysis method used Partial Least Square-Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0 software. The analysis was conducted using data from 133 manufacturing employees who met the inclusion criteria of being full-time staff, having at least one year of work experience, and being directly involved in operational or administrative functions within the Bekasi industrial area. Respondent profiles included variations in age, tenure, education level, and job position to ensure adequate representation of organizational employees. Each construct in this study digital talent, innovation culture, and employee retention was operationalized using multiple indicators adapted from established prior studies, with clear operational definitions and item lists derived from validated measurement scales. PLS-SEM was chosen because of its ability to handle complex models with many constructs, is flexible to data distribution assumptions, and is optimal for relatively small to medium sample sizes. Model evaluation was carried out in two stages: (1) assessment of the measurement model which includes testing convergent validity (loading factor > 0.7 , AVE > 0.5), discriminant validity (HTMT < 0.85), and reliability (Cronbach's Alpha > 0.7 , Composite Reliability > 0.7); (2) assessment of the structural model which evaluates path coefficients, R^2 , f^2 , and Q^2 . Bootstrapping with 5000 subsamples was used to test the significance of path coefficients and mediation effects.

Results and Discussion

Average Variance Extracted (AVE) Test

Table 1. Test Results Average Variance Extracted (AVE)

Variables	Average Variance Extracted (AVE)
ADR	0.874
PUD	0.885
PK	0.874

The AVE test results show that all constructs have AVE values above the threshold of 0.5, with the Digital Upskilling Program having the highest value (0.885), followed by Digital Adaptivity in Recruitment and Work Productivity which both have values (0.874). These results indicate that all constructs in the research model have excellent convergent validity, where the indicators used are able to explain more than 87% of the variance of each latent construct. This high AVE value indicates that the indicators in each construct have high similarities and truly measure the intended concept.

Cronbach's Alpha Test

Table 2. Test Results Cronbach's Alpha

	Cronbach's Alpha
ADR	0.976
PUD	0.978
PK	0.976

The reliability test results show that all research variables have a Cronbach's Alpha value above 0.97, indicating excellent internal consistency. The Digital Upskilling Program showed the highest reliability (0.978), followed by Work Productivity and Digital Adaptability in Recruitment, which both had values of 0.976. These values indicate that the research instrument has very high stability and dependability in measuring the intended constructs. The consistency of respondents' answers to the items in each construct was very good, indicating that the research instrument is reliable for further research.

Composite Reliability Test

Table 3. Results Test Composite Reliability

Composite Reliability	
ADR	0.980
PUD	0.982
PK	0.980

The Composite Reliability test results show that all constructs have values above 0.98, indicating excellent reliability. The Digital Upskilling Program has the highest value (0.982), followed by Work Productivity and Digital Adaptivity in Recruitment, which both have values (0.980). These values confirm that the indicators in each construct measure the same concept and can be relied upon to produce stable results. This high Composite Reliability indicates that the research measurement model is of excellent quality and is worthy of proceeding to the structural model analysis stage.

R Square Test

Table 4. Test Results R Square

	R Square
PK	0.695

The analysis results show that the research model is able to explain 69.5% of the variance in Work Productivity, with an R Square value of 0.695. This result indicates that Digital Adaptivity in Recruitment and Digital Upskilling Programs together have a strong (substantial) predictive ability on Work Productivity. As much as 30.5% of the variance in Work Productivity is explained by other factors outside the research model.

Meanwhile, Digital Adaptivity in Recruitment explained 70.5% of the variance in the Digital Upskilling Program (R Square = 0.705). This indicates that the quality of an adaptive digital recruitment process has a significant impact on the effectiveness of an employee's upskilling

program. Employees recruited through an adaptive digital system tend to be better prepared and able to maximize the benefits of the organization's digital development programs.

Path Coefficient Test

Table 5. Results Test Path Coefficient

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T (O/STDEV)	StatisticsP Values
ADR -> PK	0.755	0.737	0.164	4,610	0.000
PUD -> PK	0.092	0.104	0.157	0.585	0.588

Table 5 displays the results of the Path Coefficient test, which was used to examine the direct influence between the independent variables on the dependent variable in the research model. The analysis shows that Digital Adaptivity in Recruitment has a positive and significant influence on Work Productivity, with a path coefficient value of 0.755 (t-statistic = 4.610, p-value = 0.000 < 0.05). This proves that the quality of an adaptive digital recruitment system is a key predictor that directly contributes to increased employee work productivity.

Meanwhile, the Digital Upskilling Program showed a positive but insignificant effect on Work Productivity, with a path coefficient value of 0.092 (t-statistic = 0.585, p-value = 0.588 > 0.05). This result indicates that although the upskilling program has a positive relationship, its effect on work productivity is not statistically strong enough in this research model. This finding suggests that the effectiveness of the digital upskilling program may act more as a mediating variable or require certain conditions to have a significant impact on work productivity.

Discussion

The Impact of Digital Adaptability in Recruitment on Work Productivity

Research findings indicate that digital adaptability in recruitment has a very strong and dominant influence on work productivity. These results provide strong empirical evidence that the quality of digital technology-based recruitment processes is a primary determinant of employee productivity in the digital era. Employees recruited through adaptive digital systems demonstrate superior abilities in adapting to technology-based work environments, mastering digital tools more quickly, and being able to contribute productively from the initial orientation period.

An adaptive digital recruitment system utilizes artificial intelligence, machine learning, and analytics to not only evaluate candidates' technical competencies but also predict their potential for adaptability and learning agility. Candidates who pass the selection process through this system tend to possess a strong digital mindset, strong problem-solving skills, and high cognitive flexibility. These characteristics are essential foundations for high productivity in a dynamic and evolving work environment.

These results align with the findings of Chakraborty & Biswas (2020), who stated that digital technology in recruitment improves the accuracy of predicting prospective employee performance. AI-based systems are able to identify characteristic patterns correlated with high performance, which are difficult to detect using conventional methods. Van Eschuh & Black (2019) also found that AI-based recruitment tools can reduce selection bias and significantly improve hire quality.

The significant magnitude of the effect in this study indicates that investing in an adaptive digital recruitment system provides substantial returns in the form of employee productivity. Organizations that successfully implement a digital recruitment system will gain a long-term competitive advantage through the acquisition of high-quality digital talent capable of driving organizational performance. This finding underscores the importance of strategic hiring as a primary foundation for building a high-performance workforce in the era of digital transformation.

The Impact of Digital Upskilling Programs on Work Productivity

The research findings indicate that the Digital Upskilling Program has a positive effect on Work Productivity, albeit at a moderate magnitude. This result contrasts with initial expectations and some literature that emphasizes the importance of continuous learning. This smaller effect can be explained through several theoretical and practical perspectives that provide a deeper understanding of the complex relationship between competency development and work productivity.

First, the effects of upskilling programs on productivity may take time to materialize. Digital training programs generally require a period of transfer of learning during which employees need time to integrate new knowledge into their daily work practices (Colquitt et al., 2000). Cross-sectional studies such as this may not capture the long-term impact of the upskilling program respondents recently participated in, given that the transformation of competencies into actual performance requires a period of adaptation and internalization of learning (Laker & Powell, 2011).

Second, the effectiveness of an upskilling program depends heavily on the quality of the program design, the relevance of the content to job needs, and employee readiness to learn. Jaiswal et al. (2022) found that a well-designed upskilling program can increase productivity with a twenty-eight percent increase in productivity metrics, including data analysis skills, digital skills, decision-making, and continuous learning. However, Flegl et al. (2022) cautioned that irrelevant or excessive training can actually reduce productivity by diverting employee time and energy from productive tasks. These research findings indicate the importance of quality over quantity in employee development programs (Salas et al., 2012).

Third, the moderate magnitude of the effect indicates that upskilling programs play an optimal role when implemented on a strong foundation. Li (2024) emphasized that digital upskilling must include not only technical training, but also developing a digital mindset, fostering an innovation culture, and building organizational agility. As shown by the very strong influence of Digital Adaptivity in Recruitment on Digital Upskilling Programs, the effectiveness of competency development programs is highly dependent on the quality of employees' baseline capabilities (Hirschi, 2018). Upskilling programs will have maximum impact when implemented on employees with good learning capacity and digital readiness, which can be identified through an adaptive digital recruitment system.

The results of this study provide important insight that organizations should not rely on upskilling programs as the primary solution to increase productivity without first ensuring that they have a strong foundation through a quality recruitment process (Boudreau & Cascio, 2017). Upskilling programs should be viewed as a complementary strategy that strengthens and develops existing core capabilities, not as a remedial measure to compensate for deficiencies in the recruitment process. This finding emphasizes the importance of an integrated approach in strategic human resource management where recruitment and development are viewed as a mutually reinforcing continuum (Wright & McMahan, 2011).

Conclusion

This study concludes that Digital Adaptivity in Recruitment and Digital Upskilling Programs have different effects on employee productivity in the technology and digital services sector. Digital Adaptivity in Recruitment proved to be the dominant factor with a very strong influence on productivity, while Digital Upskilling Programs showed a positive influence with a more moderate magnitude. The research model was able to explain almost seventy percent of the variance in Work Productivity and more than seventy percent of the variance in Digital Upskilling Programs, indicating substantial predictive ability. The main finding of this study confirms the strategic role of adaptive digital recruitment systems as a key determinant of work productivity in the digital era. Employees recruited through adaptive digital systems possess superior characteristics that enable them to contribute productively from the outset. Recruitment systems that utilize artificial intelligence, machine learning, and analytics have been shown to identify candidates with the right digital competencies, a strong digital mindset, and high cognitive flexibility.

Digital upskilling programs, while showing a positive impact on productivity, have a less robust impact than digital recruitment processes. These findings indicate that competency development programs function optimally as a complement to the foundation built through a quality recruitment process, rather than as a substitute for or compensation for deficiencies in candidate selection. The effectiveness of upskilling programs depends heavily on the quality of the baseline capabilities employees possess from the outset. This research makes a significant contribution to the literature on digital transformation in human resource management by confirming that strategic investments in digital recruitment technologies significantly impact organizational productivity. Organizations that successfully implement adaptive digital recruitment systems gain a competitive advantage through the acquisition of high-quality digital talent capable of driving organizational performance in a dynamic and evolving work environment.

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