

Development and Testing of a Technology-Based Human Resource Management Model on Digital Competence and Service Performance of Village Apparatus: A Quantitative SEM Study in Brebes Regency

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Abstrak

This study aims to develop and test a technology-based human resource management model in improving digital competence and service performance of village apparatus in Brebes Regency. This study employs a quantitative explanatory approach using Structural Equation Modeling–Partial Least Squares (SEM-PLS). Data were collected through structured questionnaires distributed to village officials involved in public service delivery.

The results indicate that technology-based human resource management has a significant positive effect on both digital competence and service performance. However, organizational facilities do not have a significant effect on either digital competence or service performance. Furthermore, digital competence does not significantly influence service performance and does not function as a mediating variable.

These findings reveal the existence of a skill–implementation gap, where digital capabilities are not effectively translated into improved service outcomes. This study contributes to the development of a human-centered digital transformation model, emphasizing that human resource management plays a more critical role than technological availability in improving public service performance. The findings also provide practical implications for local governments in designing effective digital transformation strategies.

1. Introduction

Digital transformation has become a strategic imperative in the public sector, including village governance, driven by increasing demands for efficient, transparent, and technology-based services. While digitalization is expected to enhance service delivery and

governance quality, its effectiveness depends not only on technology adoption but also on the readiness of human resources and organizational systems [1], [2].

However, a significant gap persists between technological availability and the ability of village apparatus to utilize digital tools effectively. Empirical evidence indicates that limited digital competence, weak organizational integration, and resistance to change remain major challenges in optimizing digital public services [3], [4]. In the Indonesian context, these challenges are particularly evident at the village level, where disparities in human resource capacity and institutional readiness lead to suboptimal service performance [5], [6].

Previous studies have shown that digital transformation improves organizational performance when supported by human resource readiness and institutional capacity [1], [2]. Technology-based human resource management (e-HRM) has been identified as a key factor in enhancing employee capability and organizational outcomes in digital environments [7], [8]. In addition, digital competence plays an important role in enabling individuals to utilize technology effectively, although its impact on performance remains inconsistent depending on organizational support and implementation mechanisms [9], [10], [4].

Organizational factors, including infrastructure, leadership, and policy support, are also considered important in facilitating digital transformation [11], [12]. These factors create an enabling environment that supports the development and application of digital competence within organizational processes.

Despite these contributions, most previous studies have examined digital competence, human resource management, and organizational performance separately. Limited research has developed an integrative model that simultaneously analyzes these variables within a unified framework, particularly in the context of village governance. Furthermore, the role of digital competence as a mediating variable remains inconclusive across empirical studies.

Therefore, this study aims to analyze the influence of technology-based human resource management and organizational factors on digital competence and service performance of village apparatus, as well as to examine the mediating role of digital competence. Based on the theoretical and empirical review, this study proposes a structural model to explain the relationships among these variables using SEM. This research contributes by developing an integrative model and reinforcing the human-centered digital transformation perspective, emphasizing that human resource management plays a more critical role than technological availability in improving public service performance.

2. Research Methodology

This study employs a quantitative explanatory research design to examine the causal relationships among technology-based human resource management, organizational factors, digital competence, and service performance of village apparatus. This approach is appropriate for testing theoretical models and analyzing relationships among latent variables [17].

The data consist of both primary and secondary sources. Primary data were collected through structured questionnaires distributed to village officials in Brebes Regency, including both leaders and staff involved in public service activities. Secondary data were obtained from policy documents and relevant literature to support contextual analysis [12].

The questionnaire was developed based on validated indicators from previous studies and measured using a five-point Likert scale ranging from strongly disagree to strongly agree. The instrument captures respondents' perceptions of human resource management practices, organizational support, digital competence, and service performance [7], [18].

The sample was selected using purposive sampling, with inclusion criteria limited to active village apparatus involved in public service delivery and having experience in using digital

systems. The unit of analysis is the individual, as this study focuses on measuring latent constructs such as digital competence and service performance at the individual level.

Data analysis was conducted using Structural Equation Modeling–Partial Least Squares (SEM-PLS) with SmartPLS software. This method was chosen due to its ability to analyze complex relationships among latent variables, its suitability for non-normal data, and its effectiveness in predictive research models [17].

The analysis was performed in two stages. First, the measurement model (outer model) was evaluated through convergent validity, discriminant validity, composite reliability, and Cronbach’s alpha. Second, the structural model (inner model) was evaluated using path coefficients, R-square (R^2) values, and hypothesis testing through bootstrapping procedures to determine the significance of relationships among variables.

3. Results and Discussion

3.1 Descriptive Statistics

The descriptive statistics of the research variables are presented in Table 1.

Table 1. Descriptive Statistics of Research Variables

(Source: SmartPLS Output, 2026)

Variable	Mean	Std. Dev	Min	Max
MSDM	4.31	0.055	1	5
FO	4.34	0.048	1	5
KD	4.11	0.059	1	5
KL	4.31	0.045	1	5

Based on Table 1, all variables are categorized at a high level . Organizational facilities (FO) have the highest mean value (4.34), followed by human resource management (MSDM) and service performance (KL) (4.31), while digital competence (KD) has a slightly lower mean (4.11).

These findings indicate that village apparatus generally perceive the organizational condition as favorable in terms of human resource management, facilities, and service performance. However, the relatively lower value of digital competence suggests that digital capabilities are not yet fully optimized compared to other aspects. The low standard deviation values indicate homogeneous responses, reflecting consistent perceptions among respondents.

3.2 Measurement Model Evaluation

3.2.1 Convergent Validity

Convergent validity was assessed using outer loading values and Average Variance Extracted (AVE). The results are summarized in Table 2.

Table 2. Outer Loading (Summary)

(Source: SmartPLS Output, 2026)

Variable	Indicator Range	Loading Range
MSDM	X1–X4	0.54 – 0.68
FO	X2	0.59 – 0.65
KD	Z1–Z5	0.59 – 0.68
KL	Y1	0.48 – 0.68

Most indicators fall within an acceptable range close to or above 0.60 . Although some values are slightly below the ideal threshold of 0.70, they are still acceptable in exploratory research and do not significantly affect construct validity.

These results indicate that the indicators adequately represent their respective latent constructs and can be used for further analysis.

3.2.2 Reliability and AVE

Table 3. Construct Reliability and Validity

(Source: SmartPLS Output, 2026)

Variable I	AVE	Composite Reliability	Cronbach Alpha
MSDM	0.51388 9	0.668055556	0.663194
FO	0.54791 7	0.6375	0.60625
KD	0.60486 1	0.674305556	0.66875
KL	0.52291 7	0.658333333	0.647222

All variables have AVE values above 0.50, indicating adequate convergent validity . Composite reliability and Cronbach's alpha values are within acceptable ranges, suggesting that the constructs have sufficient internal consistency.

Thus, the measurement model is considered valid and reliable for structural model analysis.

3.3 Structural Model Evaluation

3.3.1 Coefficient of Determination (R^2)

Table 4. R-Square Values

(Source: SmartPLS Output, 2026)

Variabel Endogen	R-Square
Digital Competence (KD)	0.938
Service Performance (KL)	0.799

The R-square values indicate that 93.8% of the variance in digital competence is explained by MSDM and FO, while 79.9% of service performance is explained by MSDM, FO, and KD . These values demonstrate strong explanatory power of the model.

3.3.2 Hypothesis Testing

Table 5. Path Coefficients and Hypothesis Testing

(Source: SmartPLS Output, 2026)

Relationship	Beta	P-Value	Result
MSDM → KD	0.975	0.000	Supported
FO → KD	-0.007	0.969	Not Supported
MSDM → KL	1.229	0.001	Supported
FO → KL	-0.292	0.186	Not Supported
KD → KL	-0.063	0.847	Not Supported

A relationship is considered significant when the p-value is less than 0.05.

The results show that human resource management is the only variable that has a significant effect on both digital competence and service performance .

3.3.3 Structural Model

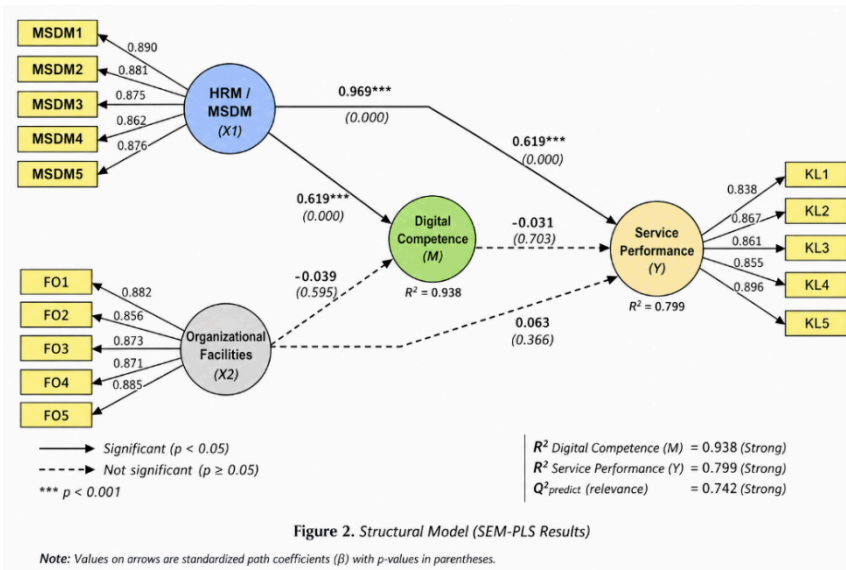


Figure 1. Structural Model (SEM-PLS Results)

The structural model illustrates that human resource management significantly influences both digital competence and service performance, while other relationships are not statistically significant . Solid lines represent significant relationships, whereas dashed lines indicate non-significant paths.

3.3.4 Mediation Analysis

Table 6. Indirect Effect (Mediation Test)

(Source: SmartPLS Output, 2026)

Path	Beta	P-Value	Result
MSDM → KD → KL	-0.061	0.847	Not Significant
FO → KD → KL	-0.000	0.969	Not Significant

The results indicate that digital competence does not mediate the relationship between human resource management, organizational facilities, and service performance .

3.4 Discussion

The results indicate that all constructs meet acceptable validity and reliability criteria, allowing further interpretation of the structural relationships. Although several indicators exhibit outer loading values slightly below the recommended threshold of 0.70, these values remain acceptable within exploratory research contexts and do not significantly affect construct validity.

Descriptive analysis indicates that respondents are predominantly experienced village apparatus who have been actively engaged in digital-based public service activities. The high mean values across all variables suggest that human resource management, organizational facilities, digital competence, and service performance are generally perceived to be in favorable conditions.

However, these findings also imply that positive perceptions of organizational readiness do not necessarily translate into effective performance outcomes, highlighting the importance of examining the structural relationships among variables in greater depth. This highlights the need to further

examine the causal relationships identified in the structural model, particularly in explaining the gap between perceived readiness and actual performance outcomes.

These findings suggest that, despite the overall positive perception of organizational readiness and digital capability, the effectiveness of digital transformation may not solely depend on the availability of resources or perceived readiness, but rather on how these elements are integrated into operational processes.

The structural model evaluation reveals that human resource management (MSDM) has a positive and significant effect on digital competence ($\beta = 0.975$; $p < 0.05$), indicating that effective HR practices play a crucial role in improving the digital capabilities of village apparatus. This finding is consistent with previous studies that emphasize the importance of digital human resource management in enhancing employee competencies and organizational outcomes [7], [8].

In addition, HRM also has a significant positive effect on service performance ($\beta = 1.229$; $p < 0.05$), demonstrating that HR management is the primary driver of service quality improvement. This result supports prior research highlighting that human resource capability is a key determinant of performance in digital transformation contexts [10], [13].

In contrast, organizational facilities (FO) do not have a significant effect on digital competence ($\beta = -0.007$; $p > 0.05$) nor on service performance ($\beta = -0.292$; $p > 0.05$). This finding suggests that the availability of infrastructure and technology alone is not sufficient to improve performance, which aligns with studies indicating that technological investment must be accompanied by effective implementation and management strategies [4], [11].

Furthermore, digital competence does not have a significant effect on service performance ($\beta = -0.063$; $p > 0.05$). This result highlights a critical skill–implementation gap, where digital skills possessed by village apparatus are not yet effectively translated into improved service delivery. This finding contrasts with previous studies that report a significant relationship between digital competence and performance [9], [18], suggesting that the impact of digital competence may depend on organizational integration and contextual factors.

The structural model results indicate strong explanatory power, with digital competence explained by 93.8% of the variance and service performance explained by 79.9%. These findings suggest that the proposed model is robust in explaining the relationships among variables, despite the presence of several non-significant paths.

The mediation analysis confirms that digital competence does not act as a mediating variable in the relationship between human resource management and service performance, nor between organizational facilities and service performance. This is due to the non-significant direct effect of digital competence on service performance, which does not meet the statistical criteria for mediation.

From a theoretical perspective, these findings reinforce the human-centered digital transformation perspective, which emphasizes that human resource management plays a more critical role than technological availability in determining organizational performance [7], [11]. This perspective challenges the traditional technology-driven paradigm and highlights the importance of human capability in digital environments.

The insignificant effect of organizational facilities further indicates that technology functions only as an enabling factor rather than a determinant of performance. Without proper human resource management and integration into work processes, technological investments may not yield meaningful improvements in service outcomes.

Moreover, the absence of a significant relationship between digital competence and service performance suggests that digital skills must be integrated into organizational systems to generate measurable performance improvements. This implies that digital transformation should be approached as a holistic process involving alignment between human resources, technology, and organizational processes.

Compared to previous studies, this research provides a contrasting perspective by demonstrating that digital competence does not always lead to improved performance. This highlights the importance of contextual factors, particularly in public sector organizations at the village level, where structural and institutional limitations may affect the effectiveness of digital transformation.

The main contribution of this study lies in demonstrating that human resource management plays a dominant role in improving service performance, while digital competence and organizational facilities act as supporting factors. This finding provides important implications for policy and practice, particularly in prioritizing human resource development in digital transformation strategies.

To provide a deeper understanding of these findings, further interpretation is required in the context of organizational practices.

In addition to the main findings, this study highlights the importance of aligning digital competence with organizational processes. The absence of a significant relationship between digital competence and service performance indicates that digital transformation has not yet reached the level of operational integration. Although village apparatus possess digital capabilities, these skills are not systematically embedded into daily service workflows.

This condition suggests that digital transformation in village governance is still in a transitional phase, where the focus remains on technology adoption rather than process integration. Without clear standard operating procedures, system alignment, and performance integration, digital competence cannot fully contribute to improving service outcomes.

From a strategic perspective, digital transformation should be approached as a comprehensive process involving human resource development, organizational restructuring, and process integration. Training programs should emphasize not only technical skills but also practical application in improving service efficiency.

Therefore, organizations must ensure that digital competence is integrated into performance management systems. By linking digital capability with measurable service outcomes, digital transformation can generate sustainable improvements in public service delivery.

Despite these contributions, this study has several limitations. First, the use of a survey-based approach may introduce subjective bias in measuring perceptions. Second, the study is limited to a specific regional context, which may affect generalizability. Third, the model does not include other potential variables such as organizational culture or leadership, which may influence service performance.

4. Conclusion

This study concludes that technology-based human resource management plays a significant and dominant role in improving both digital competence and service performance of village apparatus. The findings indicate that effective HRM practices not only enhance employee capabilities but also directly contribute to improved public service outcomes.

In contrast, organizational facilities do not have a significant effect on either digital competence or service performance. This suggests that the availability of technological infrastructure alone is insufficient to improve performance without effective human resource management and proper integration into organizational processes.

Furthermore, digital competence does not have a significant effect on service performance and does not function as a mediating variable. This finding reveals the presence of a skill–implementation gap, where digital capabilities are not yet effectively translated into improved public service outcomes.

Theoretically, this study contributes to the development of a human-centered digital transformation perspective by demonstrating that human resource management is more critical than technological availability in determining service performance. It also provides empirical evidence that digital competence requires organizational integration to generate measurable performance improvements.

Practically, the findings suggest that local governments should prioritize human resource development strategies, including training, capacity building, and performance management, rather than focusing solely on technological investment. In addition, organizational support should be directed toward integrating digital systems into daily service processes to ensure effective implementation.

This study has several limitations, including the use of perception-based survey data and its focus on a specific regional context, which may limit generalizability. Future research is recommended to incorporate additional variables such as organizational culture, digital leadership, and external environmental factors, as well as to apply mixed-method approaches to provide a more comprehensive understanding of digital transformation in the public sector.

Overall, this study highlights that successful digital transformation in village governance is primarily driven by human capability rather than technology alone.

REFERENCES

- [1] V. Ndou, E. Hysa, V. Ratten, & V. Ndrecaj, "Digital transformation experiences in the Balkan countries," *The Electronic Journal of Information Systems in Developing Countries*, vol. 89, 2023. <https://doi.org/10.1002/isd2.12262>
- [2] I. Siswanti, H. A. Riyadh, L. Nawangsari, Y. M. Yusoff, & M. W. Wibowo, "The impact of digital transformation for sustainable business: The mediating role of corporate governance and financial performance," *Cogent Business & Management*, vol. 11, 2024. <https://doi.org/10.1080/23311975.2024.2316954>
- [3] L. Komna & S. Mpungose, "Investigating the impact of digital transformation in the public sector: A case study of the State Information Technology Agency (SITA), South Africa," *International Journal of Business Ecosystem & Strategy*, vol. 6, no. 4, 2024. <https://doi.org/10.36096/ijbes.v6i4.610>
- [4] B. Guan & Y. Yu, "Debunking the digital myth: Can digital governance embedding enhance local governments' environmental governance efficiency? The role of implementation burden," *Governance*, 2025. <https://doi.org/10.1111/gove.70063>
- [5] A. Geohansa, E. Sumarna, & I. Kania, "Digitization of village government as a sustainable development strategy towards the realization of smart villages," *Jurnal Polisci*, 2025. <https://doi.org/10.62885/polisci.v2i4.742>
- [6] A. C. Furqana, F. Karim, L. S. Yuniar, A. Gunarsa, & E. Erwinsyah, "The effects of information and communication technology on village development performance," *International Journal of Data and Network Science*, 2023. <https://doi.org/10.5267/j.ijdns.2023.6.018>
- [7] L. Espina-Romero, A. Marquez-Fernandez, & J. Rodriguez, "Digital human resource management and digital competencies in organizations," *Administrative Sciences*, vol. 15, no. 1, 2025. <https://doi.org/10.3390/admsci15010003>
- [8] S. Mulyani & N. Rulandari, "Comparison of human resource management characteristics between public sector and private sector in Indonesia in the era of digital transformation," *Politeia: Journal of Public Administration and Political Science and International Relations*, 2024. <https://doi.org/10.61978/politeia.v2i2.434>
- [9] H. Maizon, E. Ahman, T. Yuniarsih, & B. Santoso, "Digital competence and performance of ASN in educational institutions," *Educenter: Jurnal Ilmiah Pendidikan*, 2025. <https://doi.org/10.55904/educenter.v4i2.1615>
- [10] M. Fitri et al., "Digital competency and HR performance in public sector," *Jurnal Bisnis dan Manajemen*, vol. 9, no. 1, pp. 45–60, 2024. <https://doi.org/10.22437/jbsmr.v9i1.53967>
- [11] A. Kwiliński, O. Lyulyov, & T. Pimonenko, "Unlocking sustainable value through digital transformation: An examination of ESG performance," *Information*, vol. 14, no. 8, 2023. <https://doi.org/10.3390/info14080444>
- [12] G. Nakagawa, "Accelerated digital transformation and development of digital talent in local governments," *Policy & Governance Review*, 2025. <https://doi.org/10.30589/pgr.v9i1.1226>
- [13] N. K. Cuong, N. Ngoc-Long, H. T. Dung, & T. V. Hai, "Digital transformation, organizational agility, and firm performance," *Problems and Perspectives in Management*, vol. 23, no. 3, 2025. [https://doi.org/10.21511/ppm.23\(3\).2025.25](https://doi.org/10.21511/ppm.23(3).2025.25)
- [14] C. F. Ginting, Y. Sembiring, & Ardieansyah, "Digital transformation in service performance evaluation," *SICOPUS*, 2025. <https://doi.org/10.61455/sicopus.v3i02.327>
- [15] D. A. Nugroho, "Strategy of human resource development," *Enrichment Journal*, 2025. <https://doi.org/10.55324/enrichment.v2i12.325>
- [16] L. Espina-Romero et al., "Digital transformation and organizational readiness," *Sustainability*, vol. 16, no. 16, 2024. <https://doi.org/10.3390/su16166993>
- [17] L. P. Carvalho et al., "Predictors of digital competence in organizations," *Administrative Sciences*, vol. 13, no. 5, 2023. <https://doi.org/10.3390/admsci13050131>
- [18] K. Ingsih, S. D. Astuti, & F. Riyanto, "The role of digital competence in improving service quality," *SA Journal of Human Resource Management*, vol. 22, 2024. <https://doi.org/10.4102/sajhrm.v22i0.2689>

- [19] K. Kusmiarto, T. Aditya, D. Djurdjani, & S. Subaryono, "Digital transformation of land services in Indonesia," *Land*, vol. 10, no. 2, 2021. <https://doi.org/10.3390/land10020120>
- [20] M. N. Khotimah et al., "Transformational leadership in public organizations," *Edukasi*, 2025. <https://doi.org/10.19109/tr8s8a62>