E-ISSN: 3026-3239
Vol. 5, No. 2, July - December (2026), pp.353-364

THE EFFECT OF DIGITAL HEALTH TRANSFORMATION AND DIGITAL COMPETENCE ON HEALTHCARE WORKER PERFORMANCE WITH INNOVATION AS A MEDIATING VARIABLE AT DR. HAULUSSY REGIONAL GENERAL HOSPITAL, AMBON

Semuel Souhoka[1*]
Universitas Pattimura

Ryalno Stefano Noya[2]
Universitas Pattimura

Venezia Thalia Metekohy[3]
Universitas Pattimura

Correspondence : Semuel Souhoka (semuel.souhoka@lecturer.unpatti.ac.id)

Abstract

This study aims to analyze the effect of Digital Health Transformation and Digital Competence on healthcare worker performance, both directly and indirectly through innovation as a mediating variable, at Dr. Haulussy Regional General Hospital, Ambon. The study used a quantitative approach with a sample of 82 non-physician healthcare workers. Data were collected through questionnaires and analyzed using Partial Least Squares–Structural Equation Modeling (PLS-SEM) with SmartPLS. The results show that Digital Health Transformation and Digital Competence have a positive and significant effect on healthcare worker performance and innovation. Innovation also has a positive and significant effect on healthcare worker performance. In addition, innovation was found to mediate the effect of Digital Health Transformation and Digital Competence on healthcare worker performance. These results indicate that improving healthcare worker performance is supported not only by the application of digital technology and individual competence but also by the ability to generate and implement innovation at work. Therefore, the development of digital transformation, digital competence, and innovation needs to be a priority in improving healthcare worker performance.
Keywords: Digital Health Transformation; Digital Competence; Innovation; Healthcare Worker Performance

INTRODUCTION

The development of digital technology has brought major changes to the management of healthcare organizations. Hospitals are required to adapt by implementing digital-based service systems, which involve not only technological devices but also changes in work processes, information systems, communication patterns, patient data management, and the ability of human resources to use technology. Through the Global Strategy on Digital Health 2020–2027, the World Health Organization (WHO, 2025) emphasizes that successful digital health transformation requires the integration of human resources, technology, organization,

E-ISSN: 3026-3239
Vol. 5, No. 2, July - December (2026), pp.353-364

and governance. Digital transformation is therefore not merely the procurement of devices and applications but a process of organizational change that requires a workforce ready to use technology optimally.

Vial (2019) describes digital transformation as organizational change triggered by the combined use of information, computing, communication, and connectivity technologies to enhance organizational value and capabilities. In hospitals, Digital Health Transformation is realized through electronic medical records, hospital management information systems, digital patient registration, and technology that supports coordination and decision-making. However, digital systems do not automatically speed up work when applications are not integrated, system access is disrupted, or healthcare workers do not fully understand how to use them. The key issue is therefore not only whether hospitals have adopted technology but whether that technology actually improves the work processes of healthcare workers.

The success of digital systems also depends on Digital Competence, namely the ability to use technology effectively, critically, safely, and responsibly. The DigComp 2.2 framework (Vuorikari et al., 2022) covers five areas: information and data literacy, communication and collaboration, digital content creation, safety, and problem solving. In hospitals, healthcare workers differ in their mastery of technology; some are accustomed to information systems, while others still need assistance. These differences can affect the speed of task completion, the accuracy of data entry, coordination between units, and the protection of patient data.

Digital transformation and digital competence also need to be supported by innovation. Janssen (2000) defines innovative work behavior as an individual's action in generating, promoting, and realizing new ideas that benefit the job, the group, or the organization. In hospitals, innovation may take the form of simplified procedures, better coordination, and the use of technology to solve work problems. Yet heavy routines, limited time, reliance on old procedures, and limited organizational support can prevent such ideas from developing. Meanwhile, healthcare worker performance is central to the success of hospital services. Koopmans et al. (2011) explain that individual performance comprises task performance, contextual performance, adaptive performance, and counterproductive work behavior, so performance is judged not only by task completion but also by supportive behavior and adaptability.

At Dr. Haulussy Regional General Hospital, Ambon, these four aspects require attention. Digital systems are expected to speed up work and improve coordination, but challenges remain in adjusting to digital procedures, integrating information between departments, and adapting systems to each unit's needs. Healthcare workers also differ in their

E-ISSN: 3026-3239
Vol. 5, No. 2, July - December (2026), pp.353-364

ability to operate applications, manage data, and overcome system problems, while work routines and limited time constrain the development of new ideas. These conditions suggest that technology alone is not enough to improve performance: it must be supported by digital competence and turned into innovation. Innovation is therefore assumed to mediate the effect of Digital Health Transformation and Digital Competence on healthcare worker performance.

Previous studies support these relationships. Gunawan (2023) found that Digital Competence positively affects work innovation and healthcare worker performance, with innovation mediating the relationship. Jeilani and Hussein (2025) showed that the adoption of digital health technologies positively affects healthcare worker performance, and Nandini et al. (2026) found that digital competence positively affects innovative work behavior among healthcare employees. However, few studies have tested organizational-level digital transformation and individual-level digital competence together in one model with innovation as the mediator, particularly in regional public hospitals. The novelty of this study lies in this integration, and it is expected to contribute empirically to human resource management and digital transformation management in healthcare organizations.

LITERATURE REVIEW

Digital Health Transformation

Digital transformation is organizational change through digital technology that affects strategy, structure, work processes, and value creation (Vial, 2019). In the health sector, it integrates digital technology into service systems, information management, administration, and decision-making, and WHO (2025) positions it as an instrument for strengthening health systems and service quality. In this study, Digital Health Transformation is defined as the level of application and integration of digital technology in hospital service processes and work management that enables healthcare workers to perform their duties more effectively, in an integrated manner, and responsively to service needs.

Digital Competence

Digital competence encompasses the knowledge, skills, and attitudes required to use digital technology effectively and responsibly, covering information and data literacy, communication and collaboration, digital content creation, safety, and problem solving (Vuorikari et al., 2022). In hospitals, it includes operating electronic medical records, using service applications, managing patient data, and protecting data confidentiality. In this study, Digital Competence is defined as the ability of healthcare workers to understand, use, manage,

E-ISSN: 3026-3239
Vol. 5, No. 2, July - December (2026), pp.353-364

and make use of digital technology effectively, safely, and responsibly to support their professional duties.

Innovation

Innovation includes not only creating something new but also improving existing methods, procedures, and work processes. Janssen (2000) describes innovative work behavior as consisting of idea generation, idea promotion, and idea realization. Innovation matters because digital technology does not produce change if it is used only to run existing procedures. In this study, innovation is defined as the ability of healthcare workers to generate, develop, promote, and implement new ideas to improve work processes and the effectiveness of health services.

Healthcare Worker Performance

Koopmans et al. (2011) explain that individual work performance consists of task performance, contextual performance, adaptive performance, and counterproductive work behavior. In hospitals, performance supports service quality, patient safety, and operational effectiveness. In this study, healthcare worker performance is defined as the level of work results achieved in carrying out professional duties, based on quality, quantity, timeliness, work behavior, and adaptability to change.

Hypothesis Development

Digital transformation can improve performance by giving healthcare workers faster access to information, reducing repetitive administrative work, and increasing task accuracy (Vial, 2019; Jeilani & Hussein, 2025). Digital competence enables healthcare workers to access information, communicate, maintain data security, and solve problems with technology, which supports more accurate and faster work (Vuorikari et al., 2022; Gunawan, 2023).

H1: *Digital Health Transformation has a positive effect on healthcare worker performance.*

H2: *Digital Competence has a positive effect on healthcare worker performance.*

Digital transformation creates new work processes that open opportunities for healthcare workers to find new ways of working (Vial, 2019), while digital competence, particularly problem solving and creative use of technology, supports innovative behavior (Vuorikari et al., 2022; Nandini et al., 2026). Innovation, in turn, enables healthcare workers to improve procedures, strengthen coordination, and solve work problems through new approaches (Janssen, 2000).

H3: *Digital Health Transformation has a positive effect on innovation.*

H4: *Digital Competence has a positive effect on innovation.*

E-ISSN: 3026-3239
Vol. 5, No. 2, July - December (2026), pp.353-364

H5: *Innovation has a positive effect on healthcare worker performance.*

Technology and digital skills can become a source of new ideas; when these ideas are applied at work, service processes become more effective and performance improves. Innovation is therefore expected to be the mechanism linking digital transformation and digital competence with performance (Janssen, 2000; Gunawan, 2023).

H6: *Innovation mediates the effect of Digital Health Transformation on healthcare worker performance.*

H7: *Innovation mediates the effect of Digital Competence on healthcare worker performance.*

METHOD

This study used a quantitative explanatory design to analyze the effect of Digital Health Transformation (X1) and Digital Competence (X2) on Healthcare Worker Performance (Y), with Innovation (Z) as the mediating variable, at Dr. Haulussy Regional General Hospital, Ambon. Digital Health Transformation was measured through the digitalization of work processes, digital system integration, the use of digital technology, and information management and adaptation to digital change. Digital Competence was measured through digital information literacy, digital communication and collaboration, the ability to use technology, and digital safety and problem solving. Innovation was measured through the ability to generate, develop, promote, and implement new ideas. Performance was measured through task execution, quality and accuracy of work, contribution to the work environment, and adaptability.

The population consisted of 446 non-physician healthcare workers. Using the Slovin formula with a 10% margin of error, 82 respondents were selected by simple random sampling. Data were collected through questionnaires and analyzed using Partial Least Squares–Structural Equation Modeling (PLS-SEM) with SmartPLS, covering evaluation of the measurement model (outer model), the structural model (inner model), and hypothesis testing through bootstrapping to determine direct and indirect effects.

E-ISSN: 3026-3239
Vol. 5, No. 2, July - December (2026), pp.353-364

RESULTS AND DISCUSSION

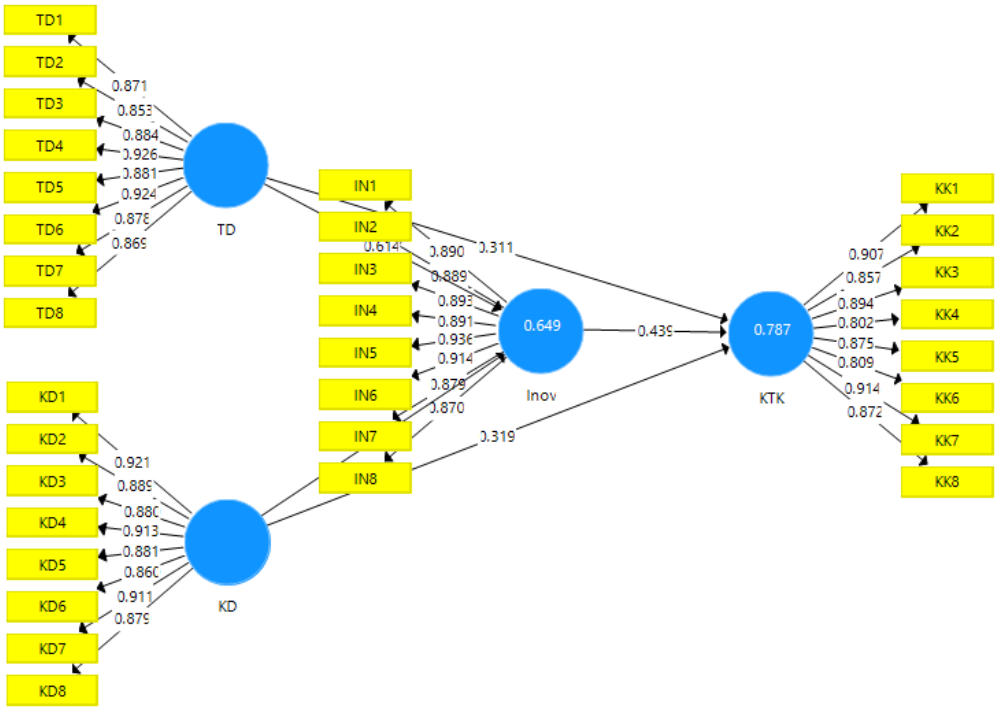


Figure 1. Results of the PLS-SEM Model

Note: TD = Digital Health Transformation; KD = Digital Competence; Inov = Innovation; KTK = Healthcare Worker Performance. Source: SmartPLS data processing results.

Evaluation of the Measurement Model (Outer Model)

Convergent Validity

The results show that all indicators had outer loading values above 0.70. The outer loadings ranged from 0.853 to 0.926 for Digital Health Transformation, 0.866 to 0.921 for Digital Competence, 0.870 to 0.936 for Innovation, and 0.802 to 0.914 for Healthcare Worker Performance. Thus, all indicators met the convergent validity criterion.

Construct Reliability and Validity

Table 1. Construct Reliability and Validity Test Results

Variable	Cronbach's Alpha	rho_A	Composite Reliability	AVE
Innovation	0.965	0.965	0.970	0.802
Digital Competence	0.963	0.966	0.969	0.796
Healthcare Worker Performance	0.953	0.955	0.960	0.752
Digital Health Transformation	0.961	0.962	0.967	0.786

Source: SmartPLS data processing results.

Based on Table 1, all variables had Cronbach's alpha and composite reliability values above 0.70. The AVE values of all constructs were also above 0.50. These results indicate that all variables met the criteria for reliability and convergent validity.

E-ISSN: 3026-3239
Vol. 5, No. 2, July - December (2026), pp.353-364

Discriminant Validity

Discriminant validity was tested using the Fornell–Larcker criterion and the heterotrait–monotrait ratio (HTMT).

Table 2. Fornell–Larcker Criterion Results

Variable	Innovation	Digital Competence	Healthcare Worker Performance	Digital Health Transformation
Innovation	0.895			
Digital Competence	0.544	0.892		
Healthcare Worker Performance	0.834	0.635	0.867	
Digital Health Transformation	0.711	0.248	0.703	0.886

Source: SmartPLS data processing results.

Based on Table 2, the square root of the AVE of each construct is greater than its correlations with the other constructs. Thus, based on the Fornell–Larcker criterion, all constructs met discriminant validity.

Table 3. HTMT Test Results

Variable	Innovation	Digital Competence	Healthcare Worker Performance	Digital Health Transformation
Innovation	–			
Digital Competence	0.560	–		
Healthcare Worker Performance	0.867	0.656	–	
Digital Health Transformation	0.736	0.254	0.733	–

Source: SmartPLS data processing results.

The HTMT results show that all values for the relationships between variables were below the 0.90 threshold. The highest HTMT value, 0.867, was found for the relationship between Innovation and Healthcare Worker Performance. Thus, based on the HTMT criterion with a 0.90 threshold, all constructs met the discriminant validity criterion.

Evaluation of the Structural Model (Inner Model)

Coefficient of Determination (R-Square)

Table 4. R-Square Test Results

Endogenous Variable	R-Square	Adjusted R-Square
Innovation	0.649	0.640
Healthcare Worker Performance	0.787	0.779

Source: SmartPLS data processing results.

E-ISSN: 3026-3239
Vol. 5, No. 2, July - December (2026), pp.353-364

The results show that Innovation had an R-square value of 0.649. This means that Digital Health Transformation and Digital Competence explain 64.9% of the variance in Innovation, while the remaining 35.1% is explained by factors outside the research model. Meanwhile, Healthcare Worker Performance had an R-square value of 0.787. This means that Digital Health Transformation, Digital Competence, and Innovation explain 78.7% of the variance in Healthcare Worker Performance, while the remaining 21.3% is explained by factors outside the research model.

Effect Size (F-Square)

Table 5. F-Square Test Results

Relationship between Variables	F-Square	Category
Innovation → Healthcare Worker Performance	0.318	Medium
Digital Competence → Innovation	0.410	Large
Digital Competence → Healthcare Worker Performance	0.319	Medium
Digital Health Transformation → Innovation	1.007	Large
Digital Health Transformation → Healthcare Worker Performance	0.213	Medium

Source: SmartPLS data processing results.

The f-square results show that the effect of Digital Health Transformation on Innovation (1.007) and of Digital Competence on Innovation (0.410) fall into the large effect category. Meanwhile, the effects of Innovation on Healthcare Worker Performance (0.318), Digital Competence on Healthcare Worker Performance (0.319), and Digital Health Transformation on Healthcare Worker Performance (0.213) fall into the medium effect category.

Hypothesis Testing (Bootstrapping)

Hypotheses were tested through a bootstrapping procedure by examining the path coefficients, t-statistics, and p-values. A relationship was considered significant if the t-statistic was greater than 1.96 and the p-value was less than 0.05.

E-ISSN: 3026-3239
Vol. 5, No. 2, July - December (2026), pp.353-364

Direct Effects

Table 6. Direct Effect Test Results

Relationship between Variables	Original Sample	T-Statistics	P-Values	Decision
Innovation → Healthcare Worker Performance	0.439	4.606	<0.001	Accepted
Digital Competence → Innovation	0.392	5.121	<0.001	Accepted
Digital Competence → Healthcare Worker Performance	0.319	4.344	<0.001	Accepted
Digital Health Transformation → Innovation	0.614	11.107	<0.001	Accepted
Digital Health Transformation → Healthcare Worker Performance	0.311	3.946	<0.001	Accepted

Source: SmartPLS data processing results.

The results show that all direct relationships had positive and significant coefficients. Innovation has a positive and significant effect on Healthcare Worker Performance. Digital Competence has a positive and significant effect on both Innovation and Healthcare Worker Performance. Likewise, Digital Health Transformation has a positive and significant effect on Innovation and Healthcare Worker Performance. Thus, all direct effect hypotheses are accepted.

Indirect Effects

Table 7. Indirect Effect Test Results

Relationship between Variables	Original Sample	T-Statistics	P-Values	Decision
Digital Competence → Innovation → Healthcare Worker Performance	0.172	3.659	<0.001	Accepted
Digital Health Transformation → Innovation → Healthcare Worker Performance	0.269	4.617	<0.001	Accepted

Source: SmartPLS data processing results.

The indirect effect results show that Innovation mediates the effect of Digital Competence on Healthcare Worker Performance with a coefficient of 0.172 ($p < 0.001$). Innovation also mediates the effect of Digital Health Transformation on Healthcare Worker Performance with a coefficient of 0.269 ($p < 0.001$). Thus, both indirect effects are positive and significant. Because the direct and indirect effects are both positive and significant, Innovation acts as a complementary partial mediator in the relationship between Digital Competence and Digital Health Transformation and Healthcare Worker Performance.

Discussion

Direct Effects of Digital Health Transformation and Digital Competence on Performance. Digital Health Transformation has a positive and significant effect on

E-ISSN: 3026-3239
Vol. 5, No. 2, July - December (2026), pp.353-364

Healthcare Worker Performance. The use of hospital information systems and electronic medical records helps healthcare workers obtain information more quickly, facilitates coordination, and increases work effectiveness. This is consistent with Vial (2019), who views digital technology as a driver of process change and value creation, and with Jeilani and Hussein (2025). Digital Competence also has a positive and significant effect on performance, indicating that healthcare workers who can access information, use service applications, manage digital data, and overcome technological problems adapt more easily to changes in work systems. This finding is in line with the DigComp 2.2 framework (Vuorikari et al., 2022) and with Gunawan (2023), who reported a similar effect at the Makassar City Regional General Hospital. For the hospital, improving performance therefore requires not only providing devices and applications but also integrated, easy-to-use systems and continuous training, mentoring, and awareness of patient data security.

Effects of Digital Health Transformation and Digital Competence on Innovation. Digital Health Transformation has the largest effect in the model, namely on Innovation ($f^2 = 1.007$), followed by Digital Competence on Innovation ($f^2 = 0.410$). Digital technology opens opportunities for healthcare workers to develop new ideas, improve procedures, and find more effective ways of working, in line with Vial (2019) and Janssen's (2000) concept of innovative work behavior. The effect of Digital Competence on Innovation is consistent with the DigComp 2.2 framework, which positions problem solving as a core digital competence, and with Gunawan (2023) and Nandini et al. (2026). Digital competence should therefore be developed not only as application skills but also as the ability to use technology to find solutions and improve service processes.

Effect of Innovation on Performance. Innovation has a positive and significant effect on Healthcare Worker Performance. Applying new ideas, such as simplifying procedures, improving service methods, and strengthening coordination, helps healthcare workers work more effectively. This finding supports Janssen (2000) and Gunawan (2023), while Khan et al. (2026) showed a related link between innovative work behavior and hospital-level performance. The hospital should therefore give healthcare workers room to voice and apply improvement ideas.

The Mediating Role of Innovation. Innovation partially and complementarily mediates both relationships. For Digital Health Transformation, the direct effect on performance was 0.311 and the indirect effect through Innovation was 0.269; for Digital Competence, the direct effect was 0.319 and the indirect effect was 0.172, all significant. Thus, digital transformation and digital competence improve performance both directly and through

E-ISSN: 3026-3239
Vol. 5, No. 2, July - December (2026), pp.353-364

the innovations healthcare workers develop. Theoretically, technology drives changes in work processes (Vial, 2019), digital competence provides the problem-solving capacity to act on them (Vuorikari et al., 2022), and innovative behavior turns new ideas into better work (Janssen, 2000). This is consistent with Gunawan (2023), who found that work innovation mediates the effect of digital competence on performance, although previous studies have not directly tested the mediation path from Digital Health Transformation through Innovation. In practice, the success of digital transformation at Dr. Haulussy Regional General Hospital should be judged by how far technology and digital skills lead to concrete improvements in work, so that technology becomes not just a work tool but a means of innovation.

CONCLUSION

All seven hypotheses were accepted. Digital Health Transformation and Digital Competence each have a positive and significant effect on Healthcare Worker Performance and on Innovation, and Innovation has a positive and significant effect on performance. Innovation also acts as a complementary partial mediator in the effects of both Digital Health Transformation and Digital Competence on performance. Improving the performance of healthcare workers at Dr. Haulussy Regional General Hospital, Ambon, therefore requires the integrated development of digital transformation, digital competence, and a work environment that encourages innovation.

The hospital is expected to continue improving the application of digital technology, provide training to develop healthcare workers' digital competence, and give healthcare workers opportunities to voice and implement innovative ideas. Future researchers are advised to add other variables that may influence healthcare worker performance and to expand the research setting and number of respondents.

REFERENCES

Gunawan, H. (2023). The effect of digital competence and knowledge management on health worker performance through work innovation at Makassar City Regional General Hospital. *LAJUMEN: Journal of Management and Business, 1*(1), 83–95. https://doi.org/10.61912/lajumen.v1i1.182

Janssen, O. (2000). Job demands, perceptions of effort-reward fairness and innovative work behaviour. *Journal of Occupational and Organizational Psychology, 73*(3), 287–302. https://doi.org/10.1348/096317900167038

E-ISSN: 3026-3239
Vol. 5, No. 2, July - December (2026), pp.353-364

Jeilani, A., & Hussein, A. (2025). Impact of digital health technologies adoption on healthcare workers' performance and workload: Perspective with DOI and TOE models. *BMC Health Services Research, 25*, Article 271. https://doi.org/10.1186/s12913-025-12414-4

Khan, Q., Shah, S. A., Khan, N., Zeb, S. S., Shoukat, M. H., & Ullah, T. (2026). How patient and professional characteristics mediate between innovative work behavior and hospital performance: The moderating role of AI use. *International Journal of Pharmaceutical and Healthcare Marketing, 1*–24. https://doi.org/10.1108/IJPHM-10-2025-0226

Koopmans, L., Bernaards, C. M., Hildebrandt, V. H., Schaufeli, W. B., de Vet, H. C. W., & van der Beek, A. J. (2011). Conceptual frameworks of individual work performance: A systematic review. *Journal of Occupational and Environmental Medicine, 53*(8), 856–866. https://doi.org/10.1097/JOM.0b013e318226a763

Nandini, N. L. K. T., Suardhika, I. N., & Aristana, I. N. (2026). The influence of digital competence on innovative work behavior through self-efficacy and perceived organizational support. *Social Science and Human Research Bulletin, 3*(7), 822–832. https://doi.org/10.55677/SSHRB/2026-3050-0714

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems, 28*(2), 118–144. https://doi.org/10.1016/j.jsis.2019.01.003

Vuorikari, R., Kluzer, S., & Punie, Y. (2022). *DigComp 2.2: The digital competence framework for citizens—with new examples of knowledge, skills and attitudes.* Publications Office of the European Union. https://doi.org/10.2760/115376

World Health Organization. (2025). *Global strategy on digital health 2020–2027.* World Health Organization. https://www.who.int/publications/i/item/9789240116870