

From physical records to the digital environment: The impact of digital transformation on the job performance of healthcare workers

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ABSTRACT

Digital transformation has a considerable impact on state institutions, forcing organizations and professionals to adapt to technological advancements. The objective of this study was to analyze the relationship between digital transformation and the job performance of employees at a hospital in the Junín region of Peru. The research is basic in nature and was developed using a quantitative approach with a correlational level. The population consisted of 552 administrative workers, and data was obtained from a sample of 227 employees who perform administrative activities within the hospital. Data analysis included descriptive statistics and the use of structural equation modeling with PLS -SEM estimation, employing SmartPLS 4.0 software. The results showed a positive and significant relationship between digital transformation and job performance. The dimensions of people, technology, processes, and quality showed significant effects on job performance, with statistically significant values ($p < 0.05$), confirming the robustness of the proposed structural model and its adequate fit. It is concluded that digital transformation significantly influences the job performance of administrative workers in the healthcare sector, contributing to process optimization, the strengthening of job skills, and improved organizational productivity. These findings highlight the importance of promoting comprehensive digital transformation strategies focused on human capital development and institutional efficiency.

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1. Introduction

The adoption of digital technologies is transforming the interaction between users and organizations (Churampi-Cangalaya et al., 2023). However, it also raises significant challenges such as the digital divide between countries and regions, data privacy and security, and the need to promote digital skills in the workplace. There are different gaps in the adoption of digital technologies within countries in Latin America and the Caribbean, which allow us to glimpse both the greatest opportunities and the biggest challenges they face (Verastegui & Rojas, 2020). Digitalization has become a global phenomenon that is profoundly transforming how organizations operate (Llorente & Cuenca, 2016). The rapid adoption of digital technologies in the workplace impacts how employees perform their daily tasks, collaborate, and contribute to achieving institutional goals, with international collaboration and the digital economy playing an increasingly important role in addressing the current and future challenges of digital transformation. At the national level, this study examines the state of digital transformation in Peru by presenting some governance and infrastructure development initiatives that are facilitating its promotion in the country. The relevance of public-private partnerships for successful digital transformation is also discussed.

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Digitalization has radically changed how organizations operate, having a significant impact on various dimensions of work (Godoy, 2024). First, the adoption of advanced technologies has modified work processes, leading to an urgent demand for adaptation among workers. Many employees are under pressure to learn new skills, which can be daunting and cause anxiety (Chicaiza et al., 2022). Furthermore, the automation of tasks has eliminated certain jobs, raising concerns about job security. This shift affects not only production workers but also those in administrative roles, where intelligent software and management tools have replaced human functions. Uncertainty about the future of work has increased, creating an atmosphere of distrust and fear among employees. On the other hand, digitalization has opened new doors for professional development (Leonardo & Ramon, 2023). The ability to work remotely has allowed many employees to enjoy a greater work-life balance. However, this flexibility also implied the expectation of constant availability, which could lead to burnout and reduced emotional well-being. Access to up-to-date data has allowed organizations to be better informed when making decisions, but it has also increased their workload (Inga-Ávila et al., 2022). Employees now face an avalanche of information that can leave them paralyzed or reduce their productivity. This cognitive overload is an increasingly widespread trend in the digital workplace. Information technology digitization also impacts organizational culture (Roncha & Echevarría, 2017). In some companies, it has fostered an environment of innovation and teamwork, where ideas circulate freely and members' contributions are valued. However, in others, internal rivalry has intensified, creating a tense and stressful atmosphere among colleagues (Buenrostro & Hernández, 2019). Continuous training has become essential in this new context. Companies that invest in training their employees in digital skills not only obtain better performance from them, but also increase their happiness within the organization (Dwi et al., 2024). However, many companies still do not offer their employees the training that will allow them to face the future and open a window of opportunity for them.

Diversity and inclusion are also important themes in the digital age (Ayala & Gonzales, 2015). Digitalization can reinforce existing inequalities, leaving certain groups, such as those with less access to technology, behind. Organizations must take the initiative to ensure that all their employees have the necessary tools to thrive in this changing environment. In short, ethics and privacy are issues that are emerging strongly within the context of digital transformation. While more and more employees are concerned about what is done with their data and how their performance is monitored (Coronel & Aquino, 2022), to maintain their trust, institutions must address these concerns openly (Vasquez, 2021). Digital transformation has become a strategic element for healthcare organizations; however, many hospitals continue to experience deficiencies in administrative processes, limited digital skills among staff, and low technological integration, negatively impacting job performance. This problem justifies the need to empirically analyze the relationship between digital transformation and job performance in order to generate scientific evidence to support organizational decision-making. In this context, the objective of this study is to determine the relationship between digital transformation and the job performance of administrative staff at a specialized, high-complexity hospital in the Junín region of Peru. The main contribution of this research lies in the validation of an explanatory model based on the dimensions of people, technology, processes, and quality, using structural equation modeling. This allows for a comprehensive and replicable approach to improving administrative management and job performance in public healthcare institutions.

2. Literature review

2.1 Structural equation models

Structural equation modeling (SEM) is a multivariate statistical technique that facilitates the analysis of relationships between latent and observed variables (Mercedes et al., 2022), often called covariance structure analysis (Vargas & Mora-Esquivel, 2017). These models allow for the evaluation of relationships (without implying causality) between variables (Medrano & Muñoz-Navarro, 2017). They also combine various statistical techniques, including analysis of variance (ANOVA), multiple regression, and factor analysis (Norabuena et al., 2020). One of the main advantages of these models is that they facilitate the formulation of the type and direction of (Teresa et al., 2016) anticipated relationships between the different variables included, subsequently allowing for the estimation of parameters established by proposed theoretical relationships (García-Ramos, 2017). This is why they are called confirmatory models, since their main objective is to "confirm" the relationships proposed by the reference theory through sample analysis (Escobedo Portillo et al., 2016).

2.2 Digital Transformation

The concept of digital transformation should not be restricted solely to the integration of digital technology into all of an organization's activities; rather, it represents a continuous, complex, and social and cultural process that demands a rapid capacity for adaptation. Warner and Wäger (2019) maintain that the transformation digitalHE characterizes by be a process uninterrupted in which HE employs the latest digital technologies in the company's daily operations (Pacheco & Rodríguez, 2019). Digital transformation involves integrating digital technology into all areas of a business, fundamentally altering its operations and how it delivers value to its customers (Delgado, 2020). Furthermore, it entails a cultural shift that requires organizations to question the status quo, innovate, and accept failure as part of the process. The history of digital transformation can be traced back to the first computers, which transformed handwritten notes into digital data that could be processed, examined, and disseminated (Sun & Wang, 2023). With the advent of networks and the internet, these capabilities were consolidated, and data volumes also grew. Big data led to the need for more complex processes for the analysis and management of digital data, supported by data centers, data warehouses, and now, data lakes (Escorcia et al., 2022).

Digital transformation involves analyzing and reinventing most, if not all, areas of an organization, from its supply chain, workflows, and employee skills, to how the board of directors makes decisions and delivers value to users, and even the interactions it has with its customers and what it offers to its stakeholders (Kumar et al., 2024).

As we enter the 2020s, it is becoming clear that for companies to grow and compete, they will need to become more resilient, competitive, and agile (Rasheed et al., 2024). They must create and transform their digital environment, from raw materials and the early stages of the supply chain to responding to evolving customer demands for more personalized services and modernizing and innovating their traditional business models (Nguyen et al., 2024). Digital transformation involves several emerging technologies, such as applications and software, networking capabilities, artificial intelligence, machine learning, augmented and virtual reality, the Internet of Things (IoT), sensor technologies, video analytics and cloud solutions, among others (Inga-Ávila et al., 2023). The ability to combine business process transformation with advanced automation can generate greater value and meet evolving expectations (Inga-Ávila et al., 2023). Successful companies have shifted their focus to selling relationships rather than simply generating leads; they have streamlined the buying process instead of engaging in lengthy negotiations over terms and conditions; and they have opted for collaborative success, implementing technology on behalf of clients rather than providing licensed technology that they must manage internally for implementation and integration, thereby fostering their own success.

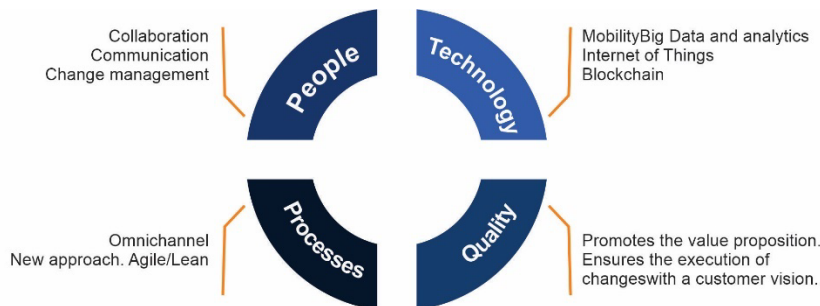


Fig. 1. Dimensions of Digital Transformation (Palos-Sánchez et al., 2023).

- People:** The people within the organization are the cornerstone of any digital transformation strategy. It is people who make the transformation possible, or not (Behera et al., 2024). No technology can digitize a company if the people behind it do not allow it, are unwilling, or do not understand it. Therefore, it is crucial that people have active and participatory access to the entire strategy, that they are involved in all its aspects, and that they are made aware of the importance this transformation will bring to the company or organization.
- Technology:** It is of utmost importance to prioritize, understand, and select the right tools when guiding a company through digital transformation. Today, we find a wide variety of tools, strategies, and methodologies, many with the same objectives, which must be analyzed in detail to select the most suitable one according to strategic, tactical, and operational plans (Fraser, 1994).
- Processes:** It is necessary to select the processes that will begin the path toward digitization or systematization. It must be understood that, initially, not all processes can be systematized or digitized, and even the strategies to implement may differ for each one (Serrat, 2021).
- Quality:** Ultimately, quality must be the guiding principle in digital transformation. Each strategy to be implemented must be carefully planned, analyzed, tested, and deployed to ensure that the tools are appropriate and that the integration or development undertaken meets the needs of the business.

2.2 Job performance

Williams et al. (2010) state that job performance is based on the results or behaviors that are indirectly or directly linked to the achievement of the organization's strategies, which is why it relates to behavior or development and especially to the achievements reached. Likewise, this must be evaluated systematically because the performance of each person in relation to the activities they carry out, the goals and the results they achieve develops their potential for professional development (Chiavenato, 2009). Employee productivity ratings are very important because they are a tool that allows for the identification of different skills and elements that demonstrate an employee's strengths, as well as their effort and how they contribute to achieving the company's goals and objectives. It should be noted that this evaluation is used to establish merit-based systems, awards, and to understand the individual and group development of the staff. It is important to identify the negative and positive elements, the strengths and weaknesses, within organizations related to employee performance. This allows for the planning and development of activities that increase worker productivity and, consequently, the achievement of the organization's goals and objectives (Palacios-Serna et al., 2024). Understanding and evaluating the job performance of all employees is crucial because, based on these results, it is easier to inform the entire organization (management and employees) about the execution of assigned tasks. Another element of employee development is the ability to cultivate a culture of continuous improvement by proposing activities that enhance productivity according to their roles or positions, as well as developing activities that enable a necessary change in employee behavior. Meyer and Allen (2001) argue that organizational commitment is the feeling and understanding of the organization's past and present, as well as the

understanding and sharing of the organization's objectives by all its members. Here, there is no room for employee alienation, but rather for employee commitment. According to Chiavenato (1009), companies require their personnel to have minimum knowledge, possess the necessary skills, and manage procedures appropriately. A procedure is defined as a set of actions and activities to be carried out by each employee, as established by the organization. Organizational productivity is the primary objective of managers and their responsibility (Robbins & Judge, 2009). Resources are managed by people, who put forth their best efforts to produce goods and services efficiently, continuously improving production. Therefore, any intervention to improve productivity within the organization originates with people.

3. Methodology

3.1 Research Methodology

The research addressed the analysis and implications of the problem (Nieto, 2018), employing a descriptive, non-experimental design, as characteristics were identified within their natural context (Hernández-Sampieri & Mendoza, 2019). No specific situation was created (Ocampo, 2017), as pre-existing conditions within the population were observed, and the relationship between variables was established through inferences. The sample consisted of 227 administrative workers, either permanent staff or those belonging to Administrative Regime 276 and Regime 1057, from a specialized, high-complexity hospital serving the clinical and surgical needs of the city of Huancayo in the Junín region of Peru. These workers perform administrative activities within the hospital (Table 1). Furthermore, a non-probability random sampling method was used due to considerations of time, cost, and accessibility to the population members.

Table 1
Personnel under employment regime

Cluster	Population	Sample
Professionals	54	23.79%
Technicians	69	30.40%
Assistants	51	22.47%
Regime 1057	53	23.35%
Total	227	100%

3.2 Research Model

The model for the present research is presented in Fig. 2, which shows the relationship between the dimensions of digital transformation such as personal, technological, processes, and quality (Hair et al., 2021).

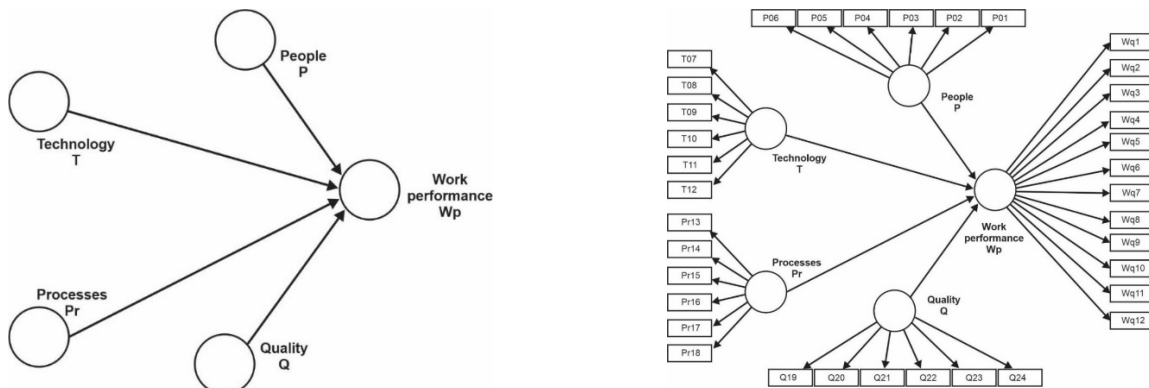


Fig. 2. Proposed research model

Based on the model described, the following specific hypotheses were proposed:

Specific Hypothesis 1 (H₁): There is a significant relationship between the people dimension and job performance in health sector workers.

Specific Hypothesis 2 (H₂): There is a significant relationship between the technology dimension and job performance in health sector workers.

Specific Hypothesis 3 (H₃): There is a significant relationship between the process dimension and job performance in health sector workers.

Specific Hypothesis 4 (H₄): There is a significant relationship between the quality dimension and job performance in health sector workers.

3.3 Data collection and processing process

Data collection was carried out using the survey technique, which allowed us to develop and use two specific instruments called: a) Digital transformation questionnaire of 24 questions and b) Job performance questionnaire consisting of 12 questions. The content validity of the instruments was determined through expert judgment, in which experts evaluated the relevance, clarity, and coherence of the items in relation to the study's theoretical dimensions. The experts agreed that the items adequately represent the constructs of digital transformation and job performance. Based on their observations, adjustments were made that strengthened the consistency and relevance of the instruments used. Both instruments were administered using the Google Forms and Microsoft Forms platforms; these questionnaires were shared with the sample members, who were able to answer the questions. Informed consent, data confidentiality, and anonymity of the respondents were ensured. Once the information was collected, the data matrix was created and processed using Microsoft Excel 2024 and SPSS version 28.0 for descriptive analysis, and SmartPLS 4.0 software for general analysis.

4. Results

4.1 Presentation of collected and processed results

The results of Table 2 show a clear division between human potential and operational performance: while the People dimension is the strongest, with 41% at the "Good" level, Quality is the Achilles' heel of the transformation, with a worrying 49% deficiency. This indicates that, although there are trained personnel and adequate technology (mostly "Fair" at 43%), there are structural flaws in the Processes that prevent talent from translating into the highest quality standards, making quality management the immediate priority for intervention.

Table 2
Dimensions of Digital Transformation

		Person		Technology		Process		Quality	
		F	%	F	%	F	%	F	%
Digital transformation	Deficient	45	20%	47	21%	60	26%	111	49%
	Regular	90	40%	98	43%	95	42%	77	34%
	Well	92	41%	82	36%	72	32%	39	17%
Total		227	100%	227	100%	227	100%	227	100%

Source: Questionnaire on digital transformation in administrative workers in the health sector.

Table 3
Dimensions of job performance

		Commitment		Procedure		Productivity	
		F	%	F	%	F	%
Job performance	Deficient	78	34%	54	24%	52	23%
	Regular	115	51%	111	49%	92	41%
	Well	34	15%	62	27%	83	37%
Total		227	100%	227	100%	227	100%

Source: Job performance questionnaire for health sector workers.

The sample's work is highly contrasted in terms of performance and praised attitude. Productivity was identified as the best-performing dimension, achieving 37% at the "Good" level. However, this performance is threatened by low Adherence, which only reaches 15% at the "Good" level and is the highest deficiency in the study at 34%. Overall, the results indicate that, although workers appear to be adhering to their procedures and objectives (predominantly "Adequate" and "Good" levels), there is a sufficient institutional disconnect to cast doubt on a long-term commitment to results.

4.2 Model confirmation

Table 4 shows the confirmation of the model, where Cronbach's alpha and composite reliability determined the model's reliability. Based on the data obtained and in accordance with Nunnally (1978), the internal consistency is adequate, as the Cronbach's alpha value is greater than 0.9 in all cases. Likewise, the composite reliability coefficients are above 0.9, demonstrating highly satisfactory composite reliability. Furthermore, the construct validity was analyzed using discriminant and convergent validity (Cepeda & Roldan, 2004). The AVE coefficient generates a value for the variance between a construct and its indicators; this value should be above 0.50 (Hair et al., 2021).

Table 4
Confirmatory model

	Reliability		variance extracted Average variance extracted (AVE)	Discriminatory validity				
	Cronbach Alpha	Composite reliability		Wp	T	I/C	AND	TO
Digital transformation	0.856	0.852	0.847	0.869				
People	0.903	0.821	0.865	0.902	0.901			
Technology	0.921	0.899	0.825	0.899	0.912	0.852		
Processes	0.856	0.823	0.888	0.878	0.905	0.952	0.875	
Quality	0.811	0.799	0.693	0.752	0.723	0.861	0.800	0.863
Reference values	>0.7	>0.7	>0.5					

The present study shows values above 0.57, indicating adequate convergent validity. Furthermore, discriminant validity was obtained through the square roots of the AVE and compared with the correlations between latent variables (Fornell & Larcker, 1981). Therefore, we can conclude that the model used in this study is presented in Table 4, which includes the following items.

4.3 Structural Equation Model Analysis

For the job performance variable, the structural equation model generated an R² value of 0.68, meaning that 68% of the variability of this variable is attainably explained by the dimensions of people, processes, technology, and quality. This value confirms a high explanatory power, considering that in social science research, R² values greater than 0.50 are considered substantial.

Regarding the effect size (f²), the dimensions of people (f² = 0.21), technology (f² = 0.19), and processes (f² = 0.24) showed a medium effect, while the quality dimension showed a small to medium effect (f² = 0.11). These results indicate that each dimension contributes significantly to job performance, with processes and people having the greatest influence within the structural model.

Finally, the predictive relevance of the model, assessed using the Q² statistic = 0.42, demonstrates that the model possesses adequate predictive capacity, since Q² values greater than zero confirm that the model has predictive power over the dependent variable. Taken together, the R², f² and Q² indicators confirm the explanatory and predictive strength of the SEM model proposed in the study.

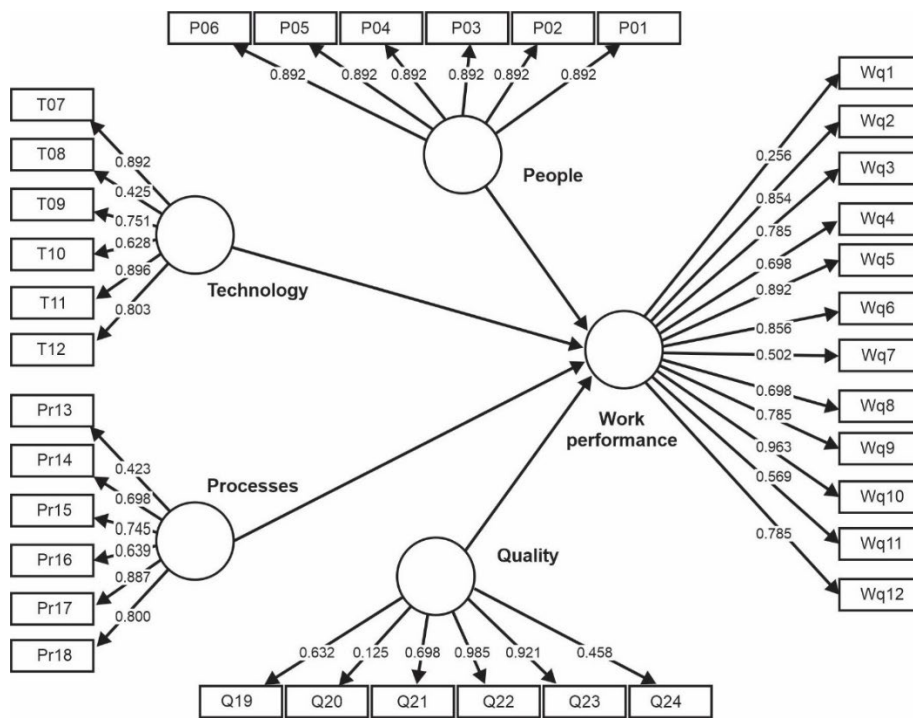


Fig. 3. Confirmatory structural model

According to the results obtained in Fig. 3, the rejection or acceptance of the specific hypotheses formulated was established.

Table 5 Hypothesis testing

Hypotheses	Mean sample	Standard deviation	Path beta value	Student's t statistic	p value	Decision
H ₁ : P → Wp	0.321	0.225	0.285	2,852	0.000	Accepted
H ₂ : T → Wp	0.305	0.285	0.261	2,656	0.000	Accepted
H ₃ : Pr → Wp	0.354	0.345	0.323	3,566	0.006	Accepted
H ₄ : Q → Wp	0.399	0.378	0.379	3,825	0.001	Accepted

t > 1.96; p < 0.05

Based on the results obtained, it can be stated that the specific hypotheses H₁, H₂, H₃, and H₄ were accepted, demonstrating a positive and statistically significant relationship between the dimensions of digital transformation and the job performance of administrative workers in the healthcare sector. In particular, the people dimension showed a significant effect on job performance (β = 0.285; p < 0.001), as did the technology dimension (β = 0.261; p < 0.001). Likewise, the process dimension showed a relevant positive impact (β = 0.323; p = 0.006), while the quality dimension showed the highest structural coefficient

within the model ($\beta = 0.379$; $p = 0.001$). These results confirm that the people, technology, processes, and quality dimensions contribute significantly to job performance, validating the proposed structural model. Similarly, the overall fit of the model was evaluated using the SRMR index Standardized Root Mean Square Residual (SRMR) is considered an absolute measure of fit between observed and predicted correlations. According to Hu and Bentler (1999), SRMR values below 0.08 indicate a good model fit. In this sense, the value obtained in the present study (SRMR = 0.069) shows that the structural equation model has an adequate fit.

5. Discussion and Conclusion

The results indicate that digitalization has a positive and significant impact on the job productivity of administrative employees in the healthcare sector. The structural model explained 68% of the variance in job performance ($R^2 = 0.68$), representing a high degree of predictive power in the social sciences. The overall fit was also satisfactory (SRMR = 0.069), indicating consistency between the proposed relationships and the data, considering the four dimensions of personal, technological, process, and quality aspects, and job performance.

5.1 Relationship between people and job performance

Regarding the people dimension, the results indicated a positive and significant impact on job performance ($\beta = 0.285$; $p < 0.001$; $f^2 = 0.21$), representing a medium-sized effect. This result aligns with the findings of Zheng and Zhang (2023) and Feliciano-Cestero et al. (2023), who indicate that human capital, leadership, and the development of digital skills are the pillars for consolidating digital transformation. In healthcare, the predisposition to change, ongoing training, and dedication of administrative staff are key factors for improving management efficiency and the quality of institutional care. This also highlights the importance of the people dimension in digital transformation, given that people are the ones who promote and manage change within organizations, and leaders are fundamental for defining the vision and fostering a culture open to innovation. On the other hand, training and skills development are necessary to overcome the challenges associated with the introduction of new paradigms (Zheng & Zhang, 2023). By understanding customer needs, individuals can design more effective and personalized experiences and become responsible for managing resistance to change and facilitating the migration to new ways of working. Cooperation and communication, which are crucial to the entire process, depend on interpersonal relationships (Feliciano-Cestero et al., 2023).

5.2. Relationship between the technology dimension and job performance

Regarding the technology dimension, a positive correlation was shown with job performance ($\beta = 0.261$; $p < 0.001$; $f^2 = 0.19$), with a moderate effect size. This result aligns with previous studies highlighting that the use of digital tools, information systems, and technological platforms facilitates the automation of procedures, reduces processing times, and supports decision-making (Coronel & Aquino, 2022; Inga-Ávila et al., 2023). In terms of administration, the correct application of digital technology in the hospital contributes to increased productivity and a reduction in administrative and operational errors. Evidence suggests that the technology dimension is critical in digital transformation because it provides the capabilities to redefine and optimize processes and to increase operational effectiveness and efficiency. Technology enables process automation, leading to cost savings and freeing up time for more strategic activities. It also provides the opportunity to analyze large volumes of data, leading to informed, evidence-based decisions. Communication technologies facilitate collaboration between teams in different parts of the world or by physical proximity, while opening doors to new ways of relating to customers (who get more personalized experiences in their relationship with companies and become loyalty incentives), their convergence with artificial intelligence and the Internet of Things stimulate innovation and competitiveness.

5.3 Relationship between the process dimension and job performance

For the processes dimension, the greatest structural weight in the model was reported ($\beta = 0.323$; $p < 0.01$; $f^2 = 0.24$), indicating a moderately high positive impact on work performance. This finding is consistent with Miranda-Torrez (2023) and Rasheed et al. (2024), who mentioned that the digitization and standardization of processes contribute to resource savings, increases internal coordination, and strengthens organizational efficiency. In the case of healthcare institutions, having digitized and well-defined administrative processes is essential to ensure operational continuity and the achievement of institutional goals. By defining and improving processes, organizations can identify inefficiencies and opportunities for improvement, which translate into increased productivity. Process digitization facilitates the automation of certain processes, allowing resources to be used for innovation and strategic development. Similarly, having well-defined procedures can also help maintain the consistency and quality of the product and service offered. Clear processes allow for better adoption of new technologies and digital solutions, and provide improved performance monitoring and analysis, which aids in decision-making. In a changing environment, flexible and agile processes are necessary to quickly meet market demand (Miranda-Torrez, 2023).

5.4 Relationship between the quality dimension and job performance

Finally, the quality dimension was also positively and significantly related to job performance ($\beta = 0.379$; $p < 0.01$; $f^2 = 0.11$), although with a smaller effect size than the other dimensions. This result is consistent with Ellström et al. (2022), who argue that quality is a cross-cutting factor that guarantees reliability in digital processes and satisfaction among internal users. In this sense, quality benefits job performance by promoting continuous improvement, information security, and trust in the applied digital systems, and also by fostering customer trust, which is essential in an increasingly competitive environment

like the digital one. Quality assurance in digital activities contributes to data protection and privacy, and these are increasingly important issues (Ellström et al., 2022). Quality fosters innovation because it gives companies the freedom to test new technologies without jeopardizing their operations. By incorporating quality metrics into digital transformation, continuous improvements can be implemented to evolve the user experience.

In summary, the results indicate that digital transformation, understood from its dimensions of people, technology, process, and quality, has a positive impact on the job performance of administrative workers in the health sector. These results support existing empirical evidence and provide a holistic model that explains how digital transformation can be strategically managed to improve job performance and organizational efficiency in public health institutions.

6. Conclusion

The study has confirmed that digitalization positively influences work performance, as employees have access to tools and technologies that facilitate their tasks and promote collaboration. With task automation and improved communication, employees have more time to dedicate to activities requiring greater attention, resulting in increased productivity and work efficiency. Training in new technological tools not only allows for individual improvement but also strengthens teamwork and innovation at the organizational level. Ultimately, a successful digital transformation not only transforms how a company operates but also enhances work performance through a more dynamic work environment that meets market demands.

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