

Hospital performance and its determinants in health systems: evidence from an international systematic review (2014–2025)

Desempeño hospitalario y sus determinantes en los sistemas de salud: evidencia de una revisión sistemática internacional (2014–2025)

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ABSTRACT

Hospital performance is a key component of health systems and is influenced by institutional, organizational, and human factors. This study aimed to analyze research trends on hospital performance through a systematic review of the literature published between 2014 and 2025. A systematic review was conducted following the PRISMA 2020 guidelines. Fifty potentially relevant studies were initially identified, of which 35 met the established inclusion criteria. Data were extracted into a structured matrix and analyzed using descriptive statistics in RStudio. Institutional factors accounted for 45.7% of the studies, followed by organizational (34.3%) and human factors (17.1%). Governance and health policies, as well as organizational performance, were the most frequently addressed dimensions. Quantitative studies predominated (82.9%), and publication activity increased notably after 2020. Hospital performance is a multidimensional phenomenon primarily influenced by institutional and organizational factors, with growing attention to human resources, institutional resilience, and digital innovation.

Keywords: hospital performance, health systems, health governance, hospital management, human resources for health.

RESUMEN

El desempeño hospitalario es un componente clave de los sistemas de salud y está influenciado por factores institucionales, organizacionales y humanos. Este estudio tuvo como objetivo analizar las tendencias de investigación sobre el desempeño hospitalario a través de una revisión sistemática de la literatura publicada entre 2014 y 2025. Se realizó una revisión sistemática siguiendo las directrices PRISMA 2020. Inicialmente se identificaron cincuenta estudios potencialmente relevantes, de los cuales treinta y cinco cumplieron con los criterios de inclusión establecidos. Los datos se extrajeron en una matriz estructurada y se analizaron mediante estadística descriptiva en RStudio. Los factores institucionales representaron el 45,7% de los estudios, seguidos por los organizacionales (34,3%) y los humanos (17,1%). La gobernanza y las políticas de salud, así como el desempeño organizacional, fueron las dimensiones abordadas con mayor frecuencia. Predominaron los estudios cuantitativos (82,9%), y la actividad de publicación aumentó notablemente después de 2020. El desempeño hospitalario es un fenómeno multidimensional influenciado principalmente por factores institucionales y organizacionales, con una creciente atención a los recursos humanos, la resiliencia institucional y la innovación digital.

Palabras clave: desempeño hospitalario, sistemas de salud, gobernanza sanitaria, gestión hospitalaria, recursos humanos en salud.

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INTRODUCTION

Hospitals represent one of the most complex components of healthcare systems due to the magnitude of the resources they require and the role they play in addressing highly complex health problems. Their operation directly influences the responsiveness of healthcare systems, the quality of care, and the financial sustainability of services. For this reason, the study of hospital performance has become increasingly relevant for both policymakers and healthcare managers (Ayiko et al., 2020; Piubello Orsini et al., 2021).

For many years, hospital efficiency was analyzed primarily from a productivity perspective, focusing on the relationship between resources used and outcomes achieved. However, accumulating evidence shows that hospital performance depends on a much broader set of factors. Aspects related to organizational management, governance, health policies, the availability of professionals, leadership, and institutional adaptability significantly influence the results achieved by these organizations (van Ineveld et al., 2016; Kim et al., 2021; Lindaas et al., 2024).

The growth of research in this field has been accompanied by the development of increasingly sophisticated tools for evaluating hospital performance. Among the most widely used methodologies are Data Envelopment Analysis (DEA), Stochastic Frontier Analysis (SFA), and productivity indices—techniques that have allowed for the comparison of hospitals, the identification of efficiency gaps, and the recognition of factors associated with improved institutional performance (Mujasi et al., 2016; Blatnik et al., 2017; Sultan & Crispim, 2023). Thanks to these approaches, evidence has been generated regarding the influence of hospital size, bed occupancy, management models, healthcare reforms, ownership structure, and the availability of specialized human resources.

The results obtained in different countries show that there is no single factor capable of explaining hospital performance. Some studies indicate that resource management, productivity, and the utilization of installed capacity play a determining role in the efficiency of services (Campanella et al., 2017; Vaňková & Vrabková, 2023; Beiter et al., 2024). Others highlight the influence of healthcare reforms, financing mechanisms, and governance structures on institutional outcomes (Franco-Miguel & Fullana-Belda, 2020; Chen et al., 2024; Lindaas et al., 2024). One line of research that has gained traction in recent years relates to human resources in health, especially the availability of specialists, professional leadership, and the working conditions of

healthcare personnel (Barahona-Urbina et al., 2021; Wong-Ayoub et al., 2022; Vaca-Auz et al., 2024).

The COVID-19 pandemic spurred new discussions about hospital performance and tested the responsiveness of health systems. The pressure exerted on hospitals and professionals highlighted the importance of having institutions capable of adapting rapidly to crises, managing scarce resources, and maintaining the continuity of essential services. At the same time, interest increased in topics related to organizational resilience, digital health, and care coordination (Mitakos & Mpogiatzidis, 2024; Carlo et al., 2025).

In Ecuador, the analysis of hospital performance has acquired particular importance due to the challenges facing the national health system. Recent research has addressed topics such as institutional governance, inequalities in the distribution of specialists, funding limitations, and coordination difficulties between levels of care (Molina, 2019; Armijos-Briones et al., 2020; Moreno-Zambrano et al., 2023). Although a growing body of scientific research exists, the findings remain scattered across various approaches and analytical contexts.

Given this situation, it is pertinent to integrate the available evidence to understand how hospital performance has been studied in recent years and which factors appear most frequently in the scientific literature. Therefore, this study aims to analyze research trends on hospital performance through a systematic review of the literature published between 2014 and 2025, identifying the main dimensions analyzed, the methodological approaches used, and the organizational, human, and institutional factors associated with the performance of health systems.

METHODOLOGY

This systematic literature review followed the guidelines of the 2020 PRISMA statement (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), considered one of the leading international standards for the planning, execution, and reporting of systematic reviews, as it provides criteria that promote transparency and reproducibility in the process of searching, selecting, and synthesizing scientific evidence (Page et al., 2021).

The literature search was conducted exclusively in the Scopus database, selected for its broad coverage of indexed scientific literature in areas related to health sciences, healthcare management, hospital administration, and health policy. The search strategy was designed to

identify research related to hospital performance and the factors associated with the management, organization, and operation of hospitals.

Terms in English and Spanish were used, including: hospital performance, hospital efficiency, hospital productivity, technical efficiency, health system performance, hospital management, and health services management. These descriptors were combined using Boolean operators (AND and OR) to broaden the retrieval of potentially relevant studies.

To ensure the relevance and quality of the evidence analyzed, inclusion and exclusion criteria were established to refine the sample of documents. Regarding the inclusion criteria, only scientific articles published between 2014 and 2025, written in Spanish or English, and that had undergone a peer-review process were considered. Likewise, the research had to address topics directly related to hospital performance, hospital efficiency, healthcare services productivity, health governance, hospital management, or human resources in health; finally, full-text availability was required for a comprehensive review.

On the other hand, exclusion criteria were applied to discard materials that did not provide original or substantive evidence on the subject of study. In this regard, editorials, letters to the editor, and conference abstracts were excluded, as they do not constitute primary research or systematic reviews with the required rigor. Similarly, all articles published in languages other than Spanish or English were discarded to ensure full comprehension of the contents and the feasibility of the analysis.

The study selection process followed the stages established in the PRISMA 2020 statement. The initial search identified 50 potentially relevant publications, which were sequentially reviewed by titles, abstracts, and full texts to verify compliance with the predefined inclusion criteria. In this phase, 15 studies were excluded for not meeting these requirements —mainly due to limitations in the availability of sufficient information for analysis or the language of publication—, resulting in a final sample of 35 scientific articles that were included in the systematic review. Figure 1 presents the detailed breakdown of the identification, screening, eligibility assessment, and inclusion process, using the PRISMA 2020 flow diagram.

To systematize the collected evidence, a data extraction matrix specifically adapted to the research objectives was designed. Each article was individually reviewed, recording the following information: author and year of publication, country of origin, study title, objective, methodology used, main findings, primary factor identified, thematic category, and the dimension of hospital

performance to which it referred. Based on their content, the studies were subsequently classified into four analytical categories: institutional, organizational, human, and methodological, which allowed the identification of the predominant approaches and the main lines of research present in the scientific literature on hospital performance.

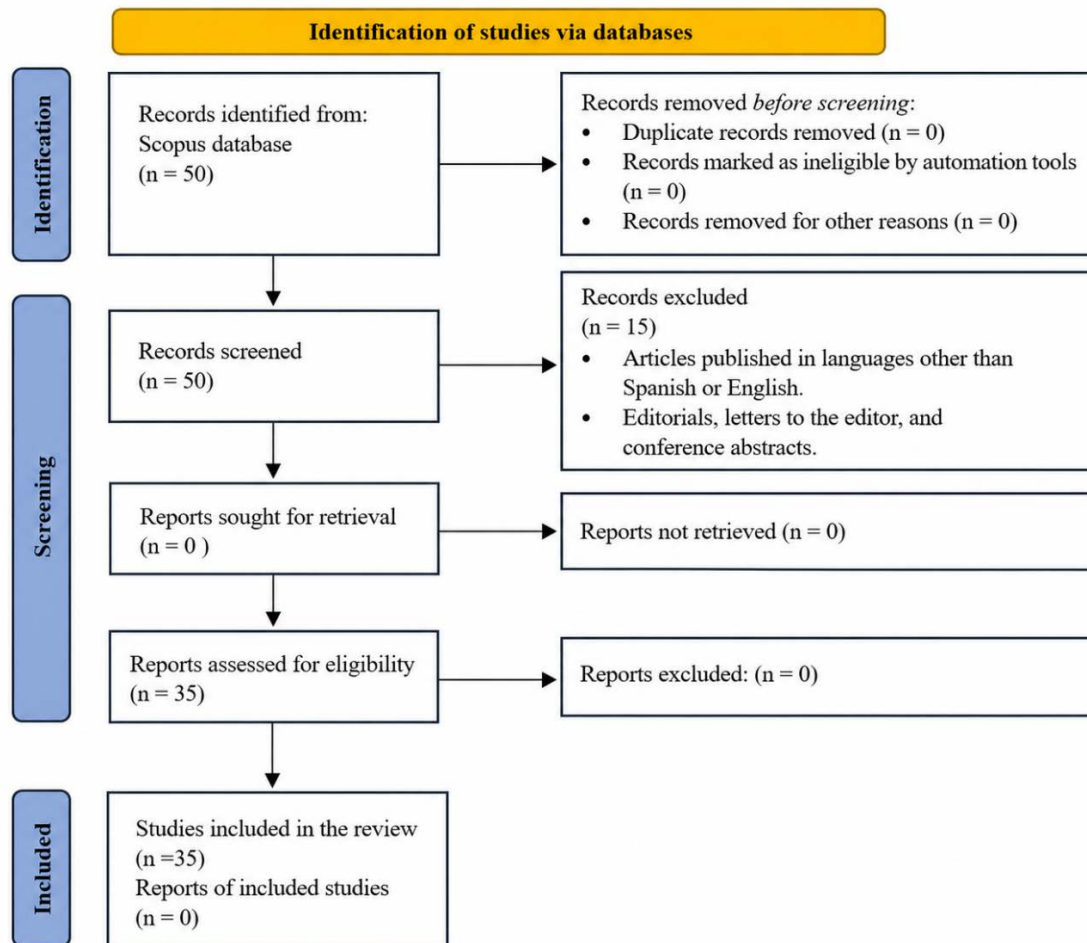


Figure 1. PRISMA 2020 flow diagram of the study selection process.

The extracted information was organized into a structured database and processed using RStudio software (version 4.5.1). Descriptive analyses were performed, using absolute and relative frequencies, to characterize the included studies according to year of publication, country of origin, thematic category, dimension of hospital performance, and research type. The results are presented through frequency distribution tables, descriptive graphs, and a narrative analysis to identify research trends, thematic patterns, and emerging areas related to hospital performance in health systems.

RESULTS AND DISCUSSION

The systematic review included 35 scientific articles published between 2014 and 2025, selected using the PRISMA protocol. The analyzed studies allowed for the identification of the main factors associated with hospital performance, grouped into institutional, organizational, human, and methodological categories. The distribution of articles according to the final category showed a predominance of institutional factors, present in 16 studies (45.7%), followed by organizational factors with 12 studies (34.3%). Human factors were represented in 6 publications (17.1%), while methodological factors corresponded to one study (2.9%).

Table 1. General characteristics of the included studies (n = 35)

Variable	Category	n	Percentage
Final category	Institutional	16	45.7
	Organizational	12	34.3
	Human	6	17.1
	Methodological	1	2.9
Research type	Quantitative	29	82.9
	Qualitative	3	8.6
	Quantitative longitudinal	1	2.9
	Methodological	1	2.9
	Document review	1	2.9

Institutional and organizational studies together constitute 76 % of the reviewed literature (43.2 % and 32.4 %, respectively), highlighting a predominant focus on governance, health policies, sector reforms, and operational management as key determinants of hospital performance. Conversely, human factors received substantially less empirical attention, representing only 18.9 % of the studies, despite their recognized relevance to specialist availability, clinical leadership, and staff well-being. Methodological contributions were marginal (5.4 %), suggesting a relative measurement consensus but also pointing to the need for further development of innovative evaluation tools. Overall, this distribution reveals a markedly top-down analytical orientation, in which institutional and organizational determinants clearly overshadow the human and technical micro-dimensions, even though the latter remain essential components of hospital performance.

Scientific output showed an increasing trend during the analyzed period. Between 2014 and 2019, the number of publications was relatively limited, with a maximum of three studies in 2017. From 2020 onward, a significant increase was observed, reaching seven publications, the highest figure in the entire time series (Figure 2).

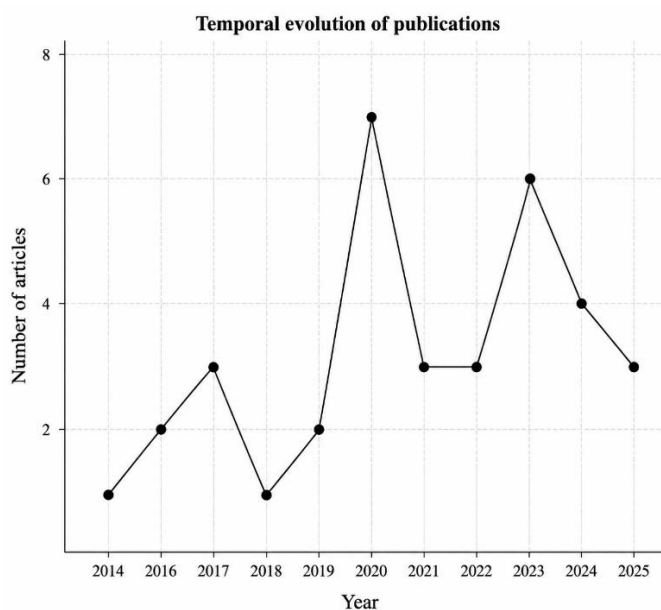


Figure 2. Temporal evolution of publications (2014–2025).

The increase observed since 2020 coincides with the COVID-19 pandemic and a greater international interest in evaluating hospital efficiency, institutional responsiveness, health service productivity, and the impact of human resources in high-demand healthcare scenarios. Although output subsequently decreased slightly, it remained at levels higher than those observed before 2020.

Dimensions of hospital performance identified

The thematic analysis of the included studies identified seven main dimensions associated with hospital performance. As shown in Table 2, the most represented categories were governance and health policies, and organizational management and performance, each present in 11 studies. These findings demonstrate that the scientific literature has focused a significant portion of its attention on the institutional and organizational factors that influence hospital responsiveness, functioning, and outcomes.

For its part, the human resources in the health dimension represented 17.1% of the analyzed studies. The studies included in this category primarily addressed aspects related to the availability and distribution of specialists, professional leadership, working conditions, and the psycho-emotional well-being of healthcare personnel. These results reflect the multidimensional nature of hospital performance and highlight the need to consider structural, organizational, and human

factors to understand the differences observed between healthcare institutions and systems.

Table 2. Distribution of studies according to the dimension of hospital performance

Dimension	n	Percentage
Organizational management and performance	11	31.4
Health governance and policy	11	31.4
Human resources in health	6	17.1
Innovation and institutional resilience	4	11.4
Access, care coordination, and digital transformation in health	1	2.9
Evaluation and measurement of hospital performance	1	2.9
Financial sustainability and hospital efficiency	1	2.9
Total	35	100.0

Factors identified in the literature review

The review identified several factors associated with hospital performance, which were grouped into four analytical categories: institutional, organizational, human, and methodological. Each category encompasses a set of elements that were recurrently addressed by the included studies and that contribute to explaining the observed differences in the performance of health systems and organizations (Table 3).

Table 3. Main factors identified in the literature according to the analytical category

Category	Factors identified
Institutional	Health governance, health system reforms, financing mechanisms, management models, hospital ownership structure, institutional resilience, digital transformation, and care coordination.
Organizational	Technical efficiency, hospital productivity, bed utilization, operational capacity, regional performance, resource allocation, cost management, and quality of services.
Human	Availability of specialists, professional leadership, distribution of healthcare staff, occupational mental health, burnout, and psychological well-being.
Methodological	Hospital performance evaluation models, data envelopment analysis (DEA), and efficiency measurement methodologies.

Studies classified under the institutional category primarily addressed aspects related to health governance, health system reforms, and financing mechanisms. Meanwhile, the work grouped under the organizational category focused on evaluating technical efficiency, productivity, and the utilization of hospital resources.

The human category included research aimed at analyzing the availability of specialized human resources, professional leadership, and the working conditions of healthcare personnel. Finally, the methodological category was represented by research centered on the development and application of tools for evaluating hospital performance.

Predominance of institutional factors in hospital performance

One of the main findings of this review was the predominance of institutional factors within the analyzed literature. Nearly half of the included studies focused on aspects related to health governance, health system reforms, financing mechanisms, management models, and hospital ownership structures. This result suggests that hospital performance is increasingly interpreted as a phenomenon influenced by structural factors that transcend the internal management of health facilities.

The reviewed studies show that public policies and governance mechanisms condition how hospitals organize their resources and respond to the needs of the population. Research conducted in Ecuador, Spain, Norway, and China has shown that changes in management models, health reforms, and financing systems can generate significant variations in levels of productivity, efficiency, and institutional responsiveness (Piedra-Peña & Prior, 2020; Franco-Miguel & Fullana-Belda, 2020; Lindaas et al., 2024; Chen et al., 2024; Cheng et al., 2024).

The importance of health governance has also been identified in studies conducted in the Ecuadorian context. Molina (2019) points out that the functioning of the National Health System depends largely on the coordination among institutional actors, the coordination of services, and the regulatory capacity of the State. These elements are especially relevant in systems characterized by the coexistence of multiple providers and financing schemes.

Another recurring aspect within this category was the financing of health services. The included studies agree that resource allocation and payment mechanisms are factors that influence the sustainability and performance of healthcare organizations. In this regard, research conducted in Ecuador and Colombia highlights the need to strengthen financing models to reduce inequities and improve the efficiency of service delivery (Armijos-Briones et al., 2020; Morales-Sánchez & García-Ubaque, 2022).

The findings suggest that improvements in hospital performance require interventions that extend beyond the operational sphere of hospitals. Public policies, regulatory frameworks, financing systems, and governance mechanisms are fundamental components for creating

conditions that foster efficient and sustainable hospital management.

Organizational management and hospital efficiency

The second most prevalent category in the analyzed literature was organizational factors, representing 34.3% of the included studies. These investigations focused primarily on evaluating technical efficiency, hospital productivity, resource utilization, installed capacity, and the operational performance of health services.

One of the most consistent findings was the influence of resource management on hospital performance. Several studies identified that variables such as bed availability, hospital occupancy, bed turnover, the number of outpatient visits, and staff allocation significantly influence the levels of efficiency observed in hospitals (Mujasi et al., 2016; Alhidary et al., 2023; Beiter et al., 2024). These results suggest that the ability to adequately manage available resources is a determining factor in improving institutional performance.

Hospital productivity also featured prominently within this category. Research conducted in China, the Czech Republic, Slovakia, and the Netherlands has shown that changes in productivity are often associated with organizational transformations, technological improvements, and adjustments in service delivery models (van Ineveld et al., 2016; Vaňková & Vrabková, 2023; Chen et al., 2024; Cheng et al., 2024). Although national contexts differ considerably, the studies agree that productivity is a fundamental dimension for evaluating hospital performance.

Another aspect widely addressed was the technical efficiency of healthcare facilities. Studies conducted in Italy, Palestine, Slovenia, Uganda, and Cambodia employed methodologies such as Data Envelopment Analysis (DEA) to identify differences in the performance of hospitals and health centers (Campanella et al., 2017; Blatnik et al., 2017; Piubello Orsini et al., 2021; Sultan & Crispim, 2023; Beiter et al., 2024). The evidence obtained shows that a significant portion of healthcare organizations operate below their potential efficiency frontier, highlighting opportunities to optimize resource use without necessarily increasing spending.

The results also show that the operational characteristics of hospitals influence their performance. Variables such as institutional size, service complexity, cost structure, and capacity utilization were identified as factors associated with significant differences in efficiency levels observed among hospitals (Mujasi et al., 2016; Campanella et al., 2017; García-Cornejo & Pérez-Méndez, 2020).

In summary, the reviewed evidence suggests that organizational management remains a key determinant of hospital performance. The appropriate use of resources, the strengthening of internal processes, the monitoring of operational indicators, and the continuous improvement of productivity consistently appear as elements associated with better institutional outcomes. These findings align with international literature that considers technical efficiency and management capacity as essential components for the sustainability of healthcare systems.

Human resources and hospital performance

Although human factors represented a smaller proportion of the studies analyzed compared to the institutional and organizational categories, the reviewed evidence demonstrates that they constitute a fundamental component for understanding hospital performance. The six studies included in this category addressed aspects related to the availability of healthcare professionals, the distribution of human talent, professional leadership, and the psychological well-being of healthcare staff.

One of the most recurring themes was the availability and distribution of specialists. Research conducted in Ecuador revealed significant limitations in the availability of neurologists and psychiatrists within the public health system, as well as a geographic concentration of these professionals in certain areas of the country (Moreno-Zambrano et al., 2023; Wong-Ayoub et al., 2022). These findings suggest that the shortage and unequal distribution of specialists can affect the problem-solving capacity of health services and generate disparities in access to specialized care.

Staff allocation was also identified as a factor associated with the performance of healthcare services. A study conducted in Finland showed that the distribution of human resources influences the technical performance of mental health services, highlighting the importance of proper human talent planning to optimize institutional outcomes (Diaz-Milanes et al., 2023).

Another line of research addressed the relationship between characteristics of medical personnel and hospital efficiency. A study carried out in Chile identified associations between medical staffing and hospital performance, emphasizing the importance of considering human resources as a strategic component within healthcare management processes (Barahona-Urbina et al., 2021).

In recent years, the analysis of the psychological well-being of healthcare personnel has gained particular relevance. The COVID-19 pandemic generated a growing interest in

understanding the impact of working conditions on the mental health of professionals. In Ecuador, high levels of burnout, anxiety, depression, and post-traumatic stress were identified among nursing professionals exposed to situations of high healthcare demand (Vaca-Auz et al., 2024). These results highlight that the performance of health services depends not only on structural or management factors, but also on the working and emotional conditions of the staff providing care.

Professional leadership also emerged as a relevant element within this category. Available evidence emphasizes that nursing leadership played an important role during the health response to the pandemic, facilitating team coordination, decision-making, and continuity of care in highly complex settings (Saltos et al., 2022).

The findings identify that human resources constitute one of the fundamental pillars of hospital performance. The availability of professionals, their geographical distribution, working conditions, psychological well-being, and professional leadership appear to be elements closely related to the responsiveness and functioning of healthcare organizations.

Emerging trends: institutional resilience, innovation, and digital transformation

The review also identified emerging lines of research that have gained greater relevance in recent years. Although these topics are less frequent compared to institutional, organizational, and human factors, their presence reflects a progressive broadening of the approaches used to analyze hospital performance.

One of the most visible aspects was the growing interest in institutional resilience. The COVID-19 pandemic tested the response capacity of hospitals and health systems in different national contexts, generating new research aimed at understanding how healthcare organizations cope with crises. Studies conducted in Greece, Turkey, and Ecuador showed that adaptability, resource management, and institutional coordination significantly influence the functioning of health services during periods of high healthcare demand (Sülkü et al., 2023; Moreno-Zambrano et al., 2023; Mitakos & Mpogiatzidis, 2024).

Another identified trend is the incorporation of digital tools and technological transformation strategies in healthcare systems. The study by Carlo et al. (2025) highlighted the potential of digital health to improve care coordination, facilitate information exchange, and strengthen continuity of care. These findings suggest that digital technologies can become a strategic element for optimizing processes and improving coordination between different levels of care.

Consequently, current challenges for healthcare systems are not limited to improving resource utilization or increasing hospital productivity. The evidence analyzed suggests that strengthening institutional adaptability, promoting organizational innovation, and leveraging the opportunities offered by digital transformation are increasingly relevant elements for ensuring the sustainable performance of healthcare services.

CONCLUSIONS

This systematic review concludes that hospital performance is a multidimensional phenomenon shaped by institutional, organizational, and human factors, with the first two alone accounting for nearly 80% of the literature. Governance, policies, and organizational management were the most studied dimensions, highlighting institutional structures, productivity, and resource efficiency as key performance drivers. Human factors—specialist availability, leadership, and staff well-being—also significantly influence responsiveness and care quality. Research has progressively shifted from traditional technical efficiency toward emerging areas such as institutional resilience, innovation, and digital transformation, especially post-COVID-19. Thus, optimizing performance demands a comprehensive approach integrating institutional strengthening, resource management, talent development, and organizational innovation, as their interaction is essential for building efficient, resilient, and adaptive health systems.

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CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

AUTHOR CONTRIBUTIONS

Conceptualization: Jorge X. Álvarez. **Data curation:** Jorge X. Álvarez. **Formal analysis:** Jorge X. Álvarez. **Investigation:** Jorge X. Álvarez and Nuria G. Barrezueta. **Methodology:** Jorge X. Álvarez. **Software:** Jorge X. Álvarez. **Supervision:** Jorge X. Álvarez. **Validation:** Nuria G. Barrezueta. **Visualization:** Jorge X. Álvarez and Nuria G. Barrezueta.

Writing – original draft: Jorge X. Álvarez. **Writing – review & editing:** Jorge X. Álvarez and Nuria G. Barrezueta.

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