

Original Article

Technology, Governance, and Workforce Management in Hospitals: A Scoping Review of Human Resource Management Evidence



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ABSTRACT

Background: Evidence on hospital human resource management (HRM) remains fragmented, particularly regarding technology integration, public-private differences, and the management of non-clinical staff. This scoping review mapped the available evidence to identify key themes and research gaps in these areas.

Methods: This scoping review was guided by the Arksey and O'Malley framework and reported in line with PRISMA-ScR. The review used the PCC framework (Population: hospital HRM stakeholders; Concept: technology integration, public-private HRM differences, and non-clinical workforce management; Context: hospitals and healthcare facilities). Searches were conducted in PubMed, Scopus, and Web of Science for English-language empirical studies published from 2020 to 2025. Eligible studies were qualitative, quantitative, or mixed-methods; non-empirical articles, non-English publications, studies before 2020, and studies outside healthcare-facility settings were excluded. After screening 487 records, removing 75 duplicates, assessing 57 full texts, and excluding 42 reports, 15 studies were included. Data were charted by author, year, country, design, focus, and key findings, then synthesized thematically.

Results: Five themes emerged from thematic synthesis: HRM as a strategic capability; technology-enabled HRM; motivation and retention of non-clinical staff; public-private differences in HRM practices; and the relationship between HRM, service quality, and patient satisfaction. The evidence suggested that digital tools can improve monitoring, coordination, and decision-making, but implementation depends on organizational readiness and available resources. Public hospitals were generally constrained by bureaucracy and limited flexibility, whereas private hospitals were more adaptable. Research on non-clinical staff remained limited, especially regarding career pathways, retention strategies, and unit-level HR practices.

Conclusion: Hospital HRM is shifting from an administrative function to a strategic, technology-supported system that influences service quality and organizational performance. This review contributes a consolidated map of evidence on digital HRM integration, public-private differences, and non-clinical workforce management, while showing that these areas remain underexplored. Future studies should prioritize comparative designs, stronger theoretical.

Keywords: Hospital Administration; Personnel Management; Health Workforce; Digital Health; Organizational Performance; Hospitals.

Implications for Practice:

- Digital human resource management systems can facilitate evidence-based workforce planning, improve staffing allocation, and enhance decision-making related to recruitment, scheduling, and performance monitoring.
- Hospital administrators and policymakers can use the findings of this review to update HRM policies that promote workforce flexibility, digital readiness, and equitable management of both clinical and non-clinical staff.
- Resource-constrained hospitals may benefit from adopting scalable HR technologies that align with their organizational capacity, allowing gradual digital transformation without compromising service quality or workforce sustainability

Introduction

Human resource management (HRM) in hospitals is one of the primary determinants of service quality, operational efficiency, patient safety and the sustainability of organizational performance. In an increasingly complex healthcare environment, human resources are no longer regarded merely as an administrative function, but rather as a strategic asset that shapes service quality, patient satisfaction and the organization's capacity to respond to change ([Hariyadi & Aini, 2024](#)). A number of studies have demonstrated that effective human resource management practices, leadership quality and appropriate job design are significantly associated with improved service outcomes and the performance of healthcare organizations ([Gile et al., n.d.](#)), ([Liu et al., 2020](#)), ([Zhang et al., 2025](#)).

Human resource management in hospitals has also become a critical global health issue due to the persistent shortage of health workers worldwide. According to the World Health Organization (WHO), the global health workforce is projected to face a shortage of approximately 11 million health workers by 2030, with the greatest burden occurring in low- and middle-

income countries (LMICs). Similarly, reports from the International Labour Organization (ILO) and the Organisation for Economic Co-operation and Development (OECD) emphasize that workforce shortages, uneven distribution of personnel, staff burnout, and retention difficulties continue to challenge health systems globally. These challenges highlight the need for more effective human resource management strategies that not only focus on workforce recruitment but also strengthen retention, professional development, workforce planning, and organizational resilience.

From a theoretical perspective, Strategic Human Resource Management Theory, the Resource-Based View (RBV), and Organizational Capability Theory suggest that human resources represent a valuable organizational asset capable of generating sustainable competitive advantage when effectively managed. Furthermore, Socio-Technical Systems Theory and the Digital Transformation Framework emphasize that organizational performance is shaped by the interaction between human resources, organizational structures, and technological systems. Within hospitals, digital technologies may enhance workforce planning, performance monitoring, communication, and decision-making processes, thereby influencing workforce outcomes such as employee satisfaction, retention, productivity, and ultimately service quality and organizational performance.

Nevertheless, human resources management in hospitals is not without its structural and contextual constraints. Public hospitals in particular frequently face budget limitations, rigid regulations and complex bureaucratic structures that ultimately restrict workforce management flexibility ([Hidayah et al., 2021](#)). A Study conducted in Ethiopia found that public hospitals have limited autonomy in

decision-making, whilst research in China confirms that the bureaucratic nature of the organization call for the strengthening of strategic human resources management capacity at the service unit level ([Gile et al., 2022](#)),([Feng et al., 2023](#)).

As global health system continue evolves, the adoption of technology in hospital human resources management has grown substantially. Digital and artificial intelligence (AI) based technologies have been employed to enhance operational efficiency, optimize workforce scheduling, and support more systematic, data-driven performance evaluations. Despite this progress, technology implementation in hospitals continues to face significant challenges, particularly in public hospitals, where infrastructure, financial resources and staff readiness to adopt new technologies remain limited ([Hampel & Hajduova, 2023](#)).

Beyond structural and technological concerns, the existing literature also indicates an imbalance in the focus of hospital human resources studies. The majority of research has concentrated on clinical staff, such as physician and nurses, while non-clinical personnel, including administrative and managerial staff, have received comparatively little attention. A study conducted in Vietnam found that the administrative staff motivation is influenced by factors such as incentives, working environment and career development opportunities ([Nguyen et al., 2021](#)). Meanwhile, research in Indonesia demonstrated that management support, leadership policies and continuous professional development affect job satisfaction and staff retention of health workers ([Firman et al., 2024](#)).

Despite the growing body of literature, several important evidence gaps remain. Existing studies have often examined technology adoption, public-private differences in HRM, and workforce

outcomes separately, resulting in fragmented evidence. Moreover, research conducted in LMIC settings remains limited despite these countries experiencing greater workforce shortages, resource constraints, and challenges in digital transformation. Previous reviews have primarily focused on healthcare workforce issues in general or on specific professional groups such as nurses and physicians, with limited attention given to the integration of digital technologies into HRM, comparisons between public and private hospitals, and the management of non-clinical personnel. Consequently, a comprehensive synthesis that integrates these dimensions is still lacking.

Using the Population–Concept–Context (PCC) framework recommended for scoping reviews, this study focused on hospitals as the population, human resource management practices including technology integration, public-private differences, and non-clinical workforce management as the concept, and hospital healthcare settings as the context. Therefore, this scoping review was conducted to map the existing evidence, identify research trends, and explore knowledge gaps regarding hospital HRM in the digital era. The review also aims to contribute to the development of evidence-based HRM policies and health system strengthening strategies. Accordingly, the research questions addressed are: (1) How do public and private hospitals manage human resources in terms of recruitment, training, and employee development? (2) How does the adoption of digital technologies and artificial intelligence influence hospital human resource management? and (3) How do differences in HRM practices between public and private hospitals affect workforce outcomes, organizational performance, and service quality?

Methods

Design

This study employed a scoping review methodology to systematically map, summarize, and synthesize the available evidence regarding hospital human resource management (HRM) in the digital era. A scoping review was considered the most appropriate approach because the literature addressing technology integration, public-private differences in HRM practices, and non-clinical workforce management is heterogeneous in terms of study designs, contexts, and outcomes. Unlike systematic reviews that primarily focus on evaluating intervention effectiveness, scoping reviews aim to examine the breadth, characteristics, and gaps within a body of literature.

The review was conducted following the methodological framework developed by Arksey and O'Malley, which was further refined by Levac et al. The review process consisted of six stages: (1) identifying the research question, (2) identifying relevant studies, (3) selecting studies, (4) charting the data, (5) collating, summarizing, and reporting the results, and (6) expert consultation. Reporting of the review adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) guidelines.

The review was guided by the Population–Concept–Context (PCC) framework recommended by the Joanna Briggs Institute (JBI). The Population comprised public and private hospitals. The Concept included human resource management practices, technology integration, workforce management, employee motivation, retention strategies, and management of non-clinical staff. The Context encompassed hospital healthcare settings across different countries and health systems. The PCC framework was used to formulate the review questions,

develop eligibility criteria, and guide data extraction and synthesis.

Eligibility Criteria

Eligibility criteria were established according to the PCC framework. Studies were included if they: (1) focused on human resource management in public or private hospitals; (2) addressed one or more concepts related to HRM, including workforce planning, recruitment, training, retention, motivation, leadership, organizational performance, technology integration, or non-clinical workforce management; (3) employed qualitative, quantitative, mixed-methods, or Delphi study designs; (4) were published in peer-reviewed journals; and (5) were published in English between January 2020 and March 2025.

Studies were excluded if they: (1) did not focus on hospital-based HRM; (2) were editorials, commentaries, conference abstracts, opinion papers, or letters to the editor; (3) were published in languages other than English; or (4) were conducted in non-healthcare settings.

The publication period was limited to 2020–2025 because this period reflects rapid developments in digital transformation, artificial intelligence implementation, and workforce challenges that emerged following the COVID-19 pandemic. English-language studies were selected because English remains the dominant language in international scientific publishing and resource limitations prevented translation of non-English articles. Grey literature was excluded to maintain methodological consistency and ensure that only peer-reviewed evidence was synthesized.

Information Sources

A comprehensive literature search was conducted across six electronic databases: PubMed/MEDLINE, Scopus, Web of Science,

CINAHL, Embase, and ProQuest. Additional studies were identified through manual searching of reference lists from eligible articles. The final database search was conducted on March 31, 2025.

Search Strategy

The search strategy combined Medical Subject Headings (MeSH) and free-text keywords related to hospital human resource management. Boolean operators (AND, OR) were used to combine search terms and improve retrieval sensitivity and specificity. An example of the search strategy used in PubMed was: ("Human Resource Management"[Mesh] OR "human resource management" OR "workforce management" OR "personnel management") AND (hospital* OR healthcare facility OR healthcare organization) AND ("digital transformation" OR technology OR artificial intelligence OR digital health OR information systems) AND ("public hospital" OR "private hospital" OR "non-clinical staff" OR administrative staff).

A pilot search was conducted before the final search process to refine keywords, eligibility criteria, and database selection. Search terms and retrieval strategies were reviewed and validated by an academic supervisor experienced in evidence synthesis and healthcare management research.

Selection Process

All records identified through database searches were imported into a reference management system, and duplicate records were removed. Study selection was performed in two stages: title and abstract screening followed by full-text review.

Two reviewers independently screened all records against the eligibility criteria. Any disagreements regarding study inclusion were resolved through discussion and consensus. When consensus could not

be reached, a third reviewer was consulted. The study selection process followed the PRISMA-ScR flow diagram, documenting the number of records identified, screened, assessed for eligibility, excluded, and ultimately included in the review.

Data Collection Process

Data extraction was conducted independently by two reviewers using a standardized data extraction form developed specifically for this review. Prior to the full extraction process, the form was pilot-tested using five studies to ensure clarity, consistency, and completeness.

Extracted information included author details, publication year, country, study design, hospital characteristics, HRM focus, technology components, workforce outcomes, and key findings. Any discrepancies in extracted data were resolved through discussion between reviewers. Microsoft Excel was used to manage and organize extracted data.

Data Charting Process

The data charting process followed JBI recommendations for scoping reviews. A structured charting form was developed and refined iteratively throughout the review process. The charting form was calibrated using a subset of studies before full data extraction commenced.

Data charting included information related to the PCC framework. Population variables included hospital ownership (public or private), healthcare setting, and country. Concept variables included HRM practices, technology integration, workforce planning, recruitment, retention, motivation, leadership, and management of non-clinical staff. Context variables included healthcare system characteristics, geographical regions, and organizational settings. Charted data were reviewed and validated by both reviewers to ensure consistency.

Data Items

Data items extracted from each study included publication characteristics (author, year, country), methodological characteristics (study design and sample), hospital characteristics (ownership type and setting), HRM-related variables (recruitment, training, retention, motivation, performance management, leadership, and workforce development), technology-related variables (digital HR systems, artificial intelligence applications, digital transformation initiatives), workforce outcomes (job satisfaction, retention, performance, engagement), and organizational outcomes (service quality, patient satisfaction, operational efficiency, and organizational performance).

Critical Appraisal of Individual Sources of Evidence

Consistent with JBI recommendations for scoping reviews, a formal critical appraisal or risk-of-bias assessment was not conducted. The primary purpose of this review was to map the breadth and characteristics of existing evidence rather than evaluate the effectiveness or methodological quality of individual studies. Therefore, studies were included regardless of methodological quality provided they met the eligibility criteria.

Consultation to Expert

In accordance with the extended framework proposed by Levac et al., preliminary findings and thematic interpretations were discussed with experts in healthcare management and nursing administration. The consultation process was conducted to enhance interpretive validity, identify potential gaps in the analysis, and improve the relevance of the findings for healthcare policy and practice. Feedback obtained during the consultation stage was incorporated into

the final synthesis and interpretation of results.

Synthesis of Results

A thematic synthesis approach was used to analyze and summarize the findings. The synthesis process involved several stages. First, reviewers familiarized themselves with the extracted data through repeated reading of study findings. Second, open coding was conducted to identify meaningful concepts related to HRM practices, technology integration, workforce outcomes, and organizational performance. Third, codes with conceptual similarities were grouped into descriptive categories. Fourth, analytical themes were developed through an iterative process involving comparison, discussion, and refinement among reviewers.

Coding was conducted using an inductive approach, allowing concepts and categories to emerge directly from the included studies rather than being predefined. Two reviewers independently coded the extracted findings before comparing coding results. Any discrepancies were resolved through discussion until consensus was achieved. Related codes were then merged into descriptive categories and iteratively refined into higher-order analytical themes through constant comparison across studies. Theme refinement continued until all included studies could be adequately represented within the final thematic framework.

Thematic synthesis resulted in five overarching themes: (1) HRM as a strategic organizational capability, (2) technology integration in hospital HRM, (3) motivation and retention of non-clinical staff, (4) public-private differences in HRM practices, and (5) the relationship between HRM, service quality, and organizational performance. A thematic map was developed to illustrate the relationships

among themes and to support interpretation of the findings.

Results

Selection of Sources of Evidence

The literature search identified 487 records from the three databases. After 75 duplicate records were removed, 412 records remained for title and abstract screening. Following this initial screening, 57 full-text articles were assessed for eligibility, and 42 were excluded because they did not meet one or more of the prespecified inclusion criteria. Ultimately, 15 studies were included in the final scoping review. The study selection process is presented in the PRISMA flow diagram in **Figure 1**.

Full-text exclusions occurred primarily because the studies did not sufficiently address hospital-based human resource management, did not examine the review concepts of technology integration, public-private differences, or non-clinical workforce issues, or were not eligible by publication type, setting, language, or publication year. These exclusion categories were aligned with the review's eligibility criteria and should be reported briefly in the manuscript or in a supplementary table to improve transparency.

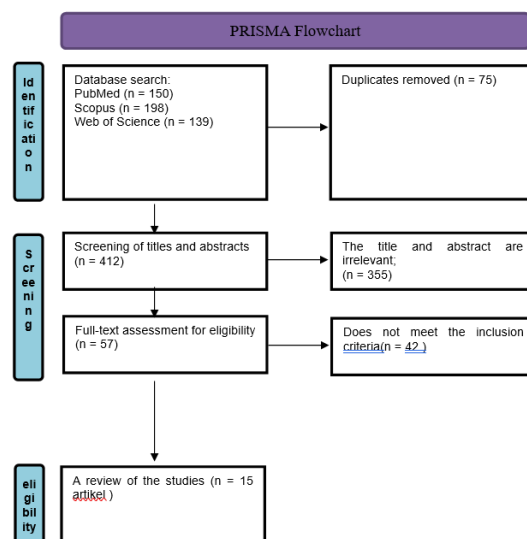


Figure 1. PRISMA Flowchart - Article Selection Prism

Characteristics of Sources of Evidence

Table 1 illustrates the distribution of included studies by country, research method, and publication year. The included studies were published between 2020 and 2025 and were dominated by quantitative designs, followed by qualitative, mixed-methods, and Delphi studies. Geographically, most studies came from China, followed by Europe, Indonesia, Ethiopia, Vietnam, and India.

Table 2 summarizes the characteristics and key findings of the included studies. Across the 15 studies, the review captured evidence on strategic HRM capabilities, technology-enabled HRM, public-private differences in workforce management, non-clinical staff motivation, and HRM-related outcomes such as service quality, patient satisfaction, and organizational performance.

Table 1. Distribution of Studies by Country, Method and Year of Publication (n=15)

Country / Region	Number of studies	Research Method	Year of Publication
China	5	Quantitative (3), Mixed Methods (1), Delphi (1)	2020, 2021, 2023, 2025, 2025
Ethiopia	2	Quantitative (1), Qualitative (1)	2022, 2022

Country / Region	Number of studies	Research Method	Year of Publication
Europe (multi-country)	4	Quantitative (1), Qualitative (3)	2020, 2023, 2024, 2025
Indonesia	2	Quantitative (1), Qualitative (1)	2024,2025
Vietnam	1	Quantitative (1)	2021
India	1	Quantitative (1)	2024
Total	15	Quantitative (9), Qualitative (4), Mixed Methods (1), Delphi (1)	2020-2025

Table 2. Summary of Studies Analysed in the Scoping Review (n=15)

Author (Year)	Study Location	Research Focus	Method	Key Findings
Feng et al. (2023)	China	Strategic human resources management capabilities	Delphi	Strategic human resources management encompasses workforce planning, development and retention
Ashwini & Padhy (2024)	India	Nurse retention in private hospitals	Quantitative	Retention is influenced by compensation, training and management support
Gile et al. (2022)	Ethiopia	Strategic human resources management in public hospitals	Quantitative	Human resource management practices significantly affect organizational performance and service quality
Hampel & Hajduova (2023)	Europa	HRM transformation in healthcare	Qualitative	HRM transformation is shaped by technology and organizational dynamics
Tiriteu et al. (2024)	Europa	Digitization of hospital management	Qualitative	System integration improves efficiency and inter unit coordination
Firman et al. (2024)	Indonesia	Nursing career pathways	Qualitative	Career systems are suboptimal due to weak policies and professional development
Gile et al. (2022)	Ethiopia	Human Resource Management in Public Hospitals	Qualitative	Limited autonomy and bureaucracy impede human resources management flexibility
Liu et al. (2020)	China	Link between human resources management and patient outcomes	Quantitative	HRM practices such as leadership and teamwork are associated with quality
Milicevic et al. (2025)	Europa	Environment and patient satisfaction	Quantitative	Social environment and green practices improve patient satisfaction
Nguyen et al. (2021)	Vietnam	Administrative staff motivation in hospitals	Quantitative	Motivation is influenced by incentives, work environment and development opportunities
Jankelov & Joniakov (2020)	Europa	Workforce diversity Management	Qualitative	Workforce diversity contributes to patient satisfaction and organizational culture
Sumarjiansyah et al. (2025)	Indonesia	Health workers Performance	Quantitative	Intrinsic motivation and work discipline affect performance
Wang et al. (2021)	China	Digital based quality	Quantitative	Digitization improves performance monitoring and service quality

Author (Year)	Study Location	Research Focus	Method	Key Findings
		management system		
Yu et al. (2025)	China	Hospital service efficiency	Mixed methods	Efficiency is influenced by governance, collaboration and technology
Zhang et al. (2025)	China	Nurse-patient relationships and performance	Quantitative	Interpersonal relationships contribute to health workers performance

Critical Appraisal Within Sources of Evidence

No formal risk-of-bias or quality appraisal was conducted, consistent with the scoping review design used in this study. As a result, study quality was not used as an exclusion criterion and did not determine the direction or weight of the synthesis. Therefore, the findings should be interpreted as a map of the available evidence rather than as an estimate of effect strength.

Results of Individual Sources of Evidence

The thematic synthesis showed that hospital HRM was increasingly framed as a strategic capability rather than a purely administrative function. Several studies linked HRM practices to workforce planning, staff development, retention, leadership, teamwork, and organizational performance. Technology-related studies suggested that digital systems can improve efficiency, monitoring, communication, and decision-making, although implementation remained uneven across settings.

Evidence on non-clinical staff was limited but important. The included studies indicated that motivation and retention among administrative and managerial staff were influenced by incentives, work environment, development opportunities, and career pathways. In addition, the review identified a consistent public-private pattern: private hospitals were generally more flexible in recruitment, training, incentives, and digital adoption, whereas public hospitals were more

constrained by bureaucracy, regulation, and limited autonomy.

Synthesis of Results

Five themes were generated from the thematic synthesis: (1) HRM as a strategic organizational capability; (2) technology integration in hospital HRM; (3) motivation and retention of non-clinical staff; (4) public-private differences in HRM practices; and (5) the relationship between HRM, service quality, and organizational performance. These themes were developed iteratively from the coded data and were then organized into a thematic framework that captured how workforce management, technology, and organizational context interact in hospital settings.

The synthesis also revealed several evidence gaps. First, studies on technology in HRM were concentrated on digitalization and quality management, whereas AI-specific HR applications remained limited. Second, non-clinical staff were underrepresented across the included literature. Third, evidence from LMICs was still sparse relative to the burden of workforce constraints in these settings. Fourth, very few studies explicitly compared public and private hospitals using the same conceptual lens, limiting direct comparison across ownership models.

Because the included studies used heterogeneous designs, settings, and outcomes, no meta-analysis or pooled effect estimate was conducted. The review

therefore presents a qualitative evidence map rather than statistical synthesis.

Discussion

The findings of this scoping review indicate that human resource management (HRM) in hospitals is not merely an administrative mechanism, but a strategic determinant that influences service quality, patient safety, workforce sustainability, and organizational performance. The synthesis of the included studies shows that hospital HRM is shaped by organizational characteristics, governance arrangements, technological readiness, and workforce motivation. This finding is consistent with Strategic Human Resource Management Theory, the Resource-Based View, and Organizational Capability Theory, which explain that human resources can become a valuable organizational capability when recruitment, development, retention, and performance management are integrated into the long-term strategy of the institution.

HRM as a Strategic Organizational Capability

Hospital HRM should therefore be recognized as a strategic organizational capability rather than a routine administrative function. Recent evidence suggests that effective HRM practices contribute to operational efficiency, reduced medical errors, improved employee competence, and higher patient satisfaction ([Purwadi et al., 2024](#)). A systematic review of global evidence also showed that hospital management practices have positive associations with structural quality, clinical quality, and health outcomes, although the association with patient satisfaction is less consistent across settings ([Ward et al., 2025](#)). Comparative evidence from leading global hospitals further demonstrates that organizational excellence is achieved when recruitment,

placement, training, performance evaluation, staff welfare, and organizational culture are aligned with institutional values and long-term development strategies ([Wang et al., 2024](#)). In this regard, comprehensive manpower planning is essential for responding to rising operational costs, workforce shortages, and employee burnout in healthcare organizations ([Zhu et al., 2024](#)).

These findings strengthen the argument that HRM reform in hospitals cannot be reduced to staff administration alone. Consistent with the included studies, strategic HRM capability at the departmental and organizational levels is closely related to workforce planning, staff development, leadership, teamwork, and service quality ([Feng et al., 2023](#); [Gile et al., 2022a](#); [Liu et al., 2020](#)). HRM should therefore be positioned as a core management capability that connects workforce needs with organizational goals, clinical performance, and patient-centered outcomes.

Technology Integration in Hospital HRM

Technology integration has become an increasingly important dimension of hospital HRM. Digital technologies and emerging artificial intelligence applications offer more scalable approaches to data-based decision-making, workforce planning, telehealth-related staffing, scheduling, and predictive performance evaluation ([Zhu et al., 2024](#)). Strong information systems can reduce administrative workload and make scheduling, performance monitoring, and staff training more efficient, thereby allowing managers to focus on service quality and workforce development ([Purwadi et al., 2024](#)). These findings support the Digital Transformation Framework and Socio-Technical Systems Theory, which emphasize that technology produces value only when it is integrated

with organizational structures, staff competencies, leadership, and governance.

However, the implementation of digital HRM is not automatically successful. Evidence from low- and middle-income countries shows that digitalized human resources for health information systems often face barriers related to governance, information technology literacy, data interoperability, infrastructure, and limited organizational capacity ([Nagai et al., 2026](#)). Political commitment, strong leadership at national and subnational levels, coordination among stakeholders, and interoperability among HRH information systems are important facilitators across implementation stages ([Nagai et al., 2026](#)). This finding is consistent with the present review, which found that technology can improve monitoring and decision-making but remains highly dependent on organizational readiness, available resources, and staff acceptance ([Hampel & Hajduova, 2023](#); [Tiriteu et al., 2024](#); [Wang et al., 2021](#)).

Motivation and Retention of Staff (Clinical and Non-Clinical)

Staff retention requires a holistic HRM approach that addresses both internal service quality and workplace protection. Evidence from nursing research shows that employee well-being mediates the relationship between internal service quality, job satisfaction, and performance, suggesting that supportive internal systems influence not only attitudes but also work outcomes ([Abdullah et al., 2021](#)). Motivation among health workers is shaped by both extrinsic and intrinsic factors, including incentives, job satisfaction, recognition, career development, collegial relationships, and a supportive work environment ([Ayichew et al., 2025](#)). Therefore, retention strategies should combine financial rewards with

psychological, relational, and professional development interventions.

Quality of work life is also closely related to workplace safety and the availability of organizational resources. Studies show that health professionals' quality of work life is associated with institutional type, family size, availability of personal protective equipment, eye protection, engineering controls, and access to safety materials ([Ayalew et al., 2024](#)). Weaknesses in these organizational supports may also contribute to poorer patient safety culture, particularly when staff lack equipment, safety programs, job satisfaction, or supportive work arrangements ([Ayanaw et al., 2023](#)). For non-clinical and administrative personnel, the present review confirms that motivation is influenced by incentives, work environment, career pathways, development opportunities, and managerial support ([Nguyen et al., 2021](#); [Sumarjiansyah et al., 2025](#)). These findings demonstrate that hospital HRM must address the needs of both clinical and non-clinical staff because both groups contribute to service continuity and organizational performance.

Public-Private Differences in HRM Practices

The evidence also shows a complex public-private divide in hospital HRM outcomes. Some studies indicate that health workers in private hospitals may report higher motivation than those in public hospitals, partly because of more flexible management practices, stronger collegial relationships, more responsive work environments, and lower bureaucratic constraints ([Ayichew et al., 2025](#)). This aligns with the present review, which found that private hospitals are often more adaptable in recruitment, training, incentives, and digital adoption. Nevertheless, this does not mean that

private hospitals are inherently superior in all HRM outcomes.

Other empirical findings suggest that quality of work life and patient safety culture can be stronger in government health institutions under certain conditions, particularly when public institutions provide better workplace protection, equipment distribution, and more stable employment arrangements (Ayalew et al., 2024; Ayanaw et al., 2023). This divergence indicates that HRM performance depends less on ownership status alone and more on how each institution manages daily resource allocation, compensation fairness, safety infrastructure, staff participation, and managerial autonomy. Thus, public-private differences should be interpreted as contextual and governance-dependent rather than as a simple contrast between efficient private hospitals and inefficient public hospitals.

Integrative Synthesis

Taken together, the findings suggest that hospital HRM can no longer rely on a one-size-fits-all model. Digital HRM can improve coordination, monitoring, and decision-making, but its effectiveness depends on whether technology is aligned with staff motivation, workplace safety, leadership commitment, and governance reform. In private hospitals, HRM strategies may need to focus on sustaining motivation, preventing burnout, and protecting quality of work life despite competitive performance pressures. In public hospitals, reform should prioritize managerial flexibility, reduced bureaucratic rigidity, stronger unit-level HRM capability, and more adaptive use of digital systems. This integrated interpretation reinforces the view that hospital HRM is a socio-technical capability system in which human factors, technology, and governance interact to shape service quality and organizational performance.

From a policy perspective, improvements in hospital service quality cannot be separated from HRM reform. Hospitals should strengthen workforce planning, career pathways, employee well-being programs, safety infrastructure, digital readiness, and data-based decision-making. Greater attention should also be directed toward non-clinical staff because administrative and managerial personnel support the continuity of clinical services, coordination, data management, and patient experience. These findings are particularly relevant for low- and middle-income countries, where workforce shortages, limited resources, digital inequality, and centralized governance continue to challenge health system performance.

Rather than representing independent dimensions of hospital management, the five themes identified in this review appear to operate as an interconnected system. Governance structures shape the extent to which hospitals can adopt digital HRM technologies by influencing managerial autonomy, resource allocation, and organizational flexibility. In turn, successful digital HRM implementation supports evidence-based workforce planning, communication, scheduling, and performance monitoring. These improvements contribute to employee motivation and retention by creating more supportive work environments and clearer career development pathways.

The interaction among governance, technology, and workforce management ultimately influences organizational performance and service quality. Hospitals with flexible governance structures are better positioned to implement digital innovations and adapt HRM strategies to workforce needs, whereas rigid bureaucratic systems may limit technological adoption and reduce organizational responsiveness.

Consequently, hospital HRM should be understood as a dynamic socio-technical capability system in which governance, digital transformation, leadership, and workforce management interact continuously rather than functioning as isolated organizational components.

Implications and limitations

This scoping review contributes conceptually to the growing body of knowledge on hospital human resource management (HRM) by demonstrating that workforce management, digital transformation, and organizational governance should be understood as interdependent components of a socio-technical system rather than as isolated organizational functions. The findings extend Strategic Human Resource Management Theory, Organizational Capability Theory, the Resource-Based View, and Socio-Technical Systems Theory by illustrating how governance structures influence the adoption of digital HRM technologies, how digital innovations affect workforce management and employee retention, and how these interacting factors ultimately contribute to organizational performance and service quality. These findings provide a foundation for future theory development and implementation research, particularly in low- and middle-income countries where workforce shortages, governance constraints, and varying levels of digital readiness continue to challenge healthcare organizations. Future research should prioritize longitudinal and comparative studies evaluating the implementation and effectiveness of digital HRM interventions, governance models across public and private hospitals, and workforce management strategies that include both clinical and non-clinical personnel.

Several limitations should be acknowledged when interpreting these

findings. The review included only English-language, peer-reviewed publications, which may have introduced language bias and publication bias by excluding relevant studies published in other languages or grey literature. In addition, the search was limited to selected electronic databases, potentially resulting in database bias and the omission of relevant evidence. The relatively small number of included studies and the concentration of evidence within specific geographical regions may further limit the transferability of the findings to different healthcare systems and organizational contexts. Furthermore, consistent with current methodological guidance for scoping reviews, no formal methodological quality appraisal or risk-of-bias assessment was conducted. Consequently, the synthesized findings represent the breadth and characteristics of the available evidence rather than the certainty or strength of that evidence. Because the included studies varied substantially in research design, methodological rigor, and contextual settings, the implications for policy and practice should be interpreted with appropriate caution. Therefore, the findings should be regarded as a comprehensive mapping of existing evidence that identifies research trends and knowledge gaps rather than as definitive evidence of intervention effectiveness or causal relationships.

Relevance to Practice

Hospital managers can use the findings of this review to strengthen workforce planning, recruitment, retention, and performance management through the integration of digital HR systems. Policymakers may utilize the evidence to revise HR regulations and increase managerial flexibility in public hospitals, enabling more adaptive responses to workforce shortages and changing service demands. Health workforce planners

should develop retention programs that combine financial and non-financial approaches, including career pathways, professional development, supportive work environments, and leadership development. Furthermore, hospitals operating in resource-constrained settings can implement low-cost and scalable digital HR solutions that match local infrastructure and workforce readiness, thereby supporting gradual digital transformation without compromising service quality or organizational performance.

Future research should prioritize longitudinal studies evaluating the long-term effectiveness of digital HRM interventions, comparative studies examining governance models across public and private hospitals, implementation research in low- and middle-income countries, and theory-driven investigations integrating Strategic HRM, Organizational Capability Theory, and Socio-Technical Systems Theory. Greater attention should also be directed toward non-clinical workforce management, AI-supported HRM applications, and cross-country comparative analyses to strengthen the evidence base for policy and organizational decision-making.

Conclusion

This scoping review mapped the current evidence on hospital human resource management in the digital era and identified four key areas of evidence: strategic HRM capabilities, technology integration in HRM, public-private differences in workforce management, and the motivation and retention of non-clinical staff. The findings indicate that HRM functions as a strategic determinant of service quality and organizational performance rather than merely an administrative function. The review further demonstrates that workforce outcomes are shaped by the interaction among

technology adoption, organizational governance, leadership, and workforce management practices. From a theoretical perspective, the findings support the integration of Strategic Human Resource Management Theory, Organizational Capability Theory, and Socio-Technical Systems Theory in explaining how HRM contributes to organizational performance within healthcare settings. The review also highlights important evidence gaps, particularly regarding non-clinical personnel, HRM implementation in low- and middle-income countries, and the long-term impact of digital HRM systems. Future research should focus on evaluating the effectiveness of digital HR interventions, examining governance factors that influence HRM implementation across public and private hospitals, and expanding the evidence base on workforce management beyond clinical staff. Collectively, these efforts may contribute to the development of more adaptive, evidence-informed, and sustainable HRM strategies for healthcare systems.

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CrediT Authorship Contributions Statement

Herlina Oktaviyanti: Conceptualization, Methodology, Supervision, Investigation, Formal Analysis, Writing – Original Draft, Project Administration.
Qurratul Aini: Data Curation, Validation, Resources, Visualization, Writing – Review & Editing.

Conflicts of Interest

There is no conflict of interest.

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