



The Integrative Role of Innovative Technology and Management Strategy in Enhancing the Quality of Community Health Center Services

Mutiara Desty ^{a*}, Muhardi ^a, Tasya Aspiranti ^a

^a Doctor of Management Program, Faculty of Economics and Business, Universitas Islam Bandung, Indonesia

ABSTRACT

This study aims to examine the integrative role of innovative technology and management strategies in improving the quality of services at Community Health Centers (Puskesmas). Employing a systematic literature review guided by the SPIDER framework, this research analyzes scientific articles published between 2013 and 2023 that are relevant to primary healthcare innovation. The findings reveal that the adoption of health information technologies such as electronic medical records, digital queuing systems, and performance dashboards significantly enhances operational efficiency and service transparency. However, the success of these innovations is highly dependent on the managerial readiness of Puskesmas in leading change, fostering team collaboration, and utilizing data for evidence-based decision making. The integration of technological approaches with data driven, cross unit organizational strategies is essential for creating adaptive, sustainable, and quality oriented services. This study recommends a systemic approach that aligns technological innovation, managerial capacity, and organizational culture to strengthen the transformation of primary healthcare services in the digital era.

Keywords: Technological innovation, management strategy, Puskesmas, service quality, digitalization.

1. Introduction

Community Health Centers, or Pusat Kesehatan Masyarakat (Puskesmas), represent the cornerstone of Indonesia's primary healthcare system. These first-line health facilities are mandated to deliver a comprehensive range of services with its functions; promotive, preventive, curative, rehabilitative, and palliative, within their assigned territorial jurisdictions (Wendimagedn & Bezuidenhout, 2019). In accordance with the most recent regulatory framework issued by the Ministry of Health in 2024, the role of Puskesmas has undergone a significant paradigm shift. No longer confined to merely curative functions, these centers are now legally and functionally obligated to prioritize promotive and preventive health services, with an emphasis on family-centered and community-oriented approaches (Hasanah et al., 2021).

Despite these progressive mandates, Puskesmas continue to encounter substantial structural and managerial challenges that impede the realization of high-quality, equitable, and responsive healthcare services. The increasing complexity of service demands, that driven by demographic transitions, epidemiological shifts, and rising community expectations, exacerbates the limitations imposed by long-standing resource constraints. These constraints not only compromise service efficiency but also hinder the institutional capacity of Puskesmas to meet national healthcare quality standards. Structurally, the healthcare delivery system at the primary level remains plagued by a range of systemic deficiencies (Mechie et al., 2024; Segal & Sacopulos, 2009). Empirical studies have consistently reported uneven distribution of healthcare professionals, particularly between urban and rural or remote areas, resulting in significant service disparities (Chiem et al., 2024). Infrastructure gaps, which are manifested in outdated medical equipment, inadequate facilities, and suboptimal patient flow arrangements, continue to hinder effective service delivery. Compounding these challenges is the inadequacy of health information systems, which often fail to provide timely, accurate, and actionable data necessary for clinical and managerial decision-making (Doherty et al., 2003).

From a managerial standpoint, leadership weaknesses at the Puskesmas level have been frequently documented. Heads of Puskesmas are often inadequately equipped with the strategic competencies necessary for quality planning, resource management, and innovation leadership (Afiah & Ayuningtyas, 2023). A pervasive culture of low data utilization further impedes evidence-based decision-making processes. Monitoring and evaluation systems, which should ideally function as performance accountability mechanisms, are often reduced to mere administrative formalities devoid of strategic insight (Ismoyo, 2023). Moreover, administrative overload, limited opportunities for continuous professional development, and widespread resistance to change, particularly regarding digital transformation, pose formidable obstacles to sustained quality improvement (Safrin & Nurhasanah, 2025).

These multifaceted challenges highlight the urgent necessity for an integrative reform agenda that leverages both innovative technologies and adaptive managerial strategies. Research has indicated that many Puskesmas remain deficient in service quality due to inadequate human resources, poor

organizational governance, and limited institutional capacity for systemic change (Arsyad et al., 2022). In particular, the leadership capabilities of Puskesmas heads in managing change, fostering interprofessional collaboration, and promoting a culture of performance-based accountability remain underdeveloped.

The integration and utilization of digital health technologies within Puskesmas operations has been increasingly recognized as a critical enabler of service quality enhancement. Applications such as electronic medical records (EMRs), digital queuing systems, real-time surveillance tools, and integrated performance dashboards offer significant potential for improving operational efficiency, service transparency, and clinical decision-making. However, empirical findings suggest that adoption levels remain low due to several converging barriers, including limited digital literacy among staff, poor infrastructure for interoperability, and inadequate technical support systems (Afiyah & Ayuningtyas, 2023).

Further, the implementation of such technologies frequently encounters behavioral resistance from healthcare personnel, especially those with limited prior exposure to digital systems. Inadequate training mechanisms, absence of supportive supervision, and lack of participatory policy development exacerbate this resistance, leading to underutilization or abandonment of implemented systems. These challenges underscore the importance of institutionalizing change management strategies that are participatory, inclusive, and oriented toward capacity-building.

Transformational leadership, as a managerial paradigm, offers a viable framework for overcoming these impediments. Heads of Puskesmas must be envisioned not solely as administrative figures but as proactive change agents capable of articulating a compelling vision for innovation, mobilizing internal and external resources, and cultivating a workplace culture receptive to continuous learning and digital integration. Leadership practices rooted in transformational principles, such as individualized support, intellectual stimulation, and inspirational motivation, have been empirically associated with greater organizational adaptability and improved service outcomes in healthcare settings (Gopur et al., 2025; Yuliani, 2022).

Moreover, the success of digital innovations in primary care is intrinsically linked to the institutional readiness of Puskesmas, encompassing structural preparedness, workforce competencies, and alignment of policies with local health priorities. The internalization of technological innovations should not be regarded as an end in itself but as an instrumental component of a broader quality improvement agenda that aims to standardize clinical practice, optimize patient care pathways, and expand access to essential health services, particularly among underserved populations. Consequently, the pursuit of service quality improvement in Puskesmas necessitates a dual strategy: first, the strategic deployment of appropriate digital health technologies tailored to local contexts; and second, the enhancement of managerial capacities through structured leadership development programs, knowledge-sharing platforms, and institutional performance benchmarking. When implemented in tandem, these strategies have the potential to transform Puskesmas into dynamic, responsive, and high-performing health organizations.

This article aims to provide a conceptual analysis of how the integration of innovative technologies and adaptive management strategies can be optimized to enhance service quality in Indonesia's Puskesmas system. By drawing on current empirical evidence and theoretical frameworks, this study is expected to offer valuable insights for policymakers, healthcare administrators, and frontline practitioners in developing a transformational model for strengthening primary healthcare comprehensively.

2. Research Methodology

This study employed a Systematic Literature Review (SLR) approach to comprehensively explore the intersection between innovative technologies and management strategies in enhancing service quality within Community Health Centers (Pusat Kesehatan Masyarakat or Puskesmas). The SLR method was chosen to provide a rigorous, transparent, and replicable synthesis of existing knowledge, drawing upon both empirical evidence and theoretical perspectives. To ensure methodological robustness and thematic relevance, the SPIDER framework comprising Sample, Phenomenon of Interest, Design, Evaluation, and Research type, was adopted in this study. The SPIDER tool is particularly well-suited for qualitative and exploratory research domains, especially in healthcare policy and service delivery, where conceptual depth and contextual specificity are critical (Gopur et al., 2025; Yuliani, 2022)

- Sample (S): The studies reviewed predominantly focused on primary healthcare service delivery organizations, with a particular emphasis on Puskesmas in Indonesia and functionally equivalent facilities in other developing countries. This scope allowed for cross-contextual insights into how similar institutions address shared challenges related to service quality enhancement.
- Phenomenon of Interest (PI): The central phenomenon investigated was the integration of innovative technologies—such as Health Information Systems (HIS), Electronic Medical Records (EMR), digital queuing systems, and telehealth platforms—with management strategies that include quality management frameworks, transformational leadership practices, and organizational innovation mechanisms. The review aimed to capture how the convergence of these domains contributes to improved service quality in primary healthcare settings.
- Design (D): The review encompassed studies employing a wide range of methodological designs, including qualitative, quantitative, and mixed-methods approaches. Selected research included case studies, organizational surveys, program evaluations, conceptual and policy analyses, and implementation science reports. This methodological diversity allowed for a more nuanced understanding of both the technological and managerial dimensions of service improvement efforts.
- Evaluation (E): Evaluative focus was directed toward key service quality indicators, such as operational efficiency, clinical and administrative effectiveness, patient satisfaction, health workforce performance, and the responsiveness of organizational systems

through the use of health data and digital infrastructure. These indicators align with widely recognized standards in primary care performance measurement.

- Research Type (R): The review included both empirical and theoretical studies published in reputable, peer-reviewed journals—both national (Indonesian) and international—between the years 2013 and 2023. The inclusion of literature in both English and Indonesian ensured contextual relevance while maintaining global comparability. Studies were limited to those with direct relevance to healthcare service delivery in the public sector, particularly within resource-constrained environments.

To identify relevant literature, a structured search strategy was employed using a combination of electronic academic databases, including Google Scholar, PubMed, and ScienceDirect. The search utilized keyword combinations such as: “Puskesmas,” “primary care quality improvement,” “innovative health technologies,” “electronic medical records in Indonesia,” “healthcare facility management,” and “transformational leadership in healthcare.” Boolean operators (AND/OR) and controlled vocabulary were used to refine search outputs.

Articles retrieved during the initial search phase underwent a two-tiered screening process. In the first tier, titles and abstracts were assessed for thematic relevance and alignment with the SPIDER framework. In the second tier, full-text versions of selected articles were reviewed in detail to confirm inclusion criteria such as focus on primary care service improvement, methodological rigor, and explicit discussion of technological and/or managerial components. Studies that lacked methodological clarity, had limited applicability to the Puskesmas context, or did not provide measurable outcomes were excluded from the final analysis.

Through this systematic review process, the study aimed to consolidate insights into how technological innovation and strategic management coalesce to influence service delivery outcomes in Indonesia’s primary healthcare system. The findings are expected to inform policy formulation, institutional capacity-building, and the strategic orientation of Puskesmas as essential drivers of national health system performance.

3. Results and Discussion

The review of selected scholarly articles reveals that the integration of innovative technologies and adaptive management strategies plays a pivotal role in enhancing service quality at Community Health Centers (Puskesmas). Three interrelated thematic findings emerge from the literature: (1) the contribution of digital technology to service efficiency and transparency, (2) the critical role of managerial readiness in facilitating innovation-based transformation, and (3) the imperative for synergy between technological adoption and data-driven, collaborative organizational strategies.

3.1 The Contribution of Technology to Service Efficiency and Transparency

The integration of Health Information Technology (HIT) into service delivery systems at Puskesmas (Community Health Centers) has emerged as a critical enabler of both operational efficiency and institutional transparency. Various digital platforms, including Electronic Medical Records (EMRs), online queuing systems, and performance monitoring dashboards, have proven instrumental in transforming administrative and clinical workflows within primary care settings. These technologies streamline processes by digitizing patient records, automating registration procedures, and enabling real-time monitoring of key performance indicators, thus reducing the clerical burden on health workers and enhancing accountability toward service users (Ahlan & Ahmad, 2014; Mengestie et al., 2023; Sheikh et al., 2021; Yen et al., 2017).

Empirical studies underscore the multifaceted benefits of HIT adoption. Saragih et al. (2022) found that digitization of documentation systems not only improves the timeliness and completeness of patient data but also mitigates the risk of information loss, facilitates internal and external referrals, and boosts data accessibility for clinical decision-making. These efficiencies contribute directly to improved patient care quality and staff productivity. A compelling case study by Efliani & Amin (2022), conducted at Umban Sari Puskesmas in Pekanbaru, demonstrated that the introduction of a digital queuing system effectively reduced patient wait times from an average of more than 60 minutes to just 10–15 minutes. This intervention not only improved throughput and service flow but also enhanced public perception of responsiveness and professionalism in public healthcare.

The successful implementation of HIT systems, however, is not solely dependent on the technology itself but also on the organizational environment in which it is embedded. Oh et al. (2022) identified four critical success dimensions for digital health adoption: system quality (ease of use, interface design), information quality (accuracy, timeliness, and relevance of data), service quality (user satisfaction and convenience), and organizational support, particularly the role of top-level management in providing leadership, resources, and policy backing. Without strategic alignment and executive sponsorship, even well-designed systems are likely to face adoption barriers and underutilization.

Beyond efficiency, HIT integration also serves as a mechanism for enhancing transparency in health service governance. Tools such as real-time dashboards, automated performance analytics, and web-based reporting platforms empower Puskesmas managers to engage in routine performance monitoring, detect service delivery gaps early, and make timely, data-driven decisions. This transparency extends externally through integration with district-level information systems such as SIKDA Generik (*Sistem Informasi Kesehatan Daerah*), which allows for automated data synchronization with health departments, improving reporting accuracy, submission timeliness, and auditability (Fernanda & Suryani, 2023). Such integrations are vital for accountability and support broader health system goals including UHC (Universal Health Coverage) and post-pandemic healthcare revitalization.

Nevertheless, the effectiveness and sustainability of these digital initiatives are heavily conditioned by internal preparedness, including the robustness of ICT infrastructure, the level of staff digital literacy, and the commitment of leadership to foster a culture of evidence-based decision-making. Lawanson et al. (2025) caution that without ongoing technical assistance, structured training, and participatory management frameworks, HIT can inadvertently

become a source of technological fatigue or operational overload for frontline staff. In environments where system rollouts are top-down and disconnected from staff needs, digital tools may be viewed as burdensome rather than beneficial, reducing engagement and system utility.

In addition to institutional factors, sociocultural dimensions must be recognized in the design and deployment of HIT solutions. Research by Lazuardi et al. (2021) and Sutanto et al. (2022) highlights the evolving information ecosystem in Indonesian communities, where patients increasingly rely on social media, peer networks, and traditional medicine as alternative or complementary health resources. This trend reflects a duality in health-seeking behavior, where biomedical and cultural paradigms coexist. Ignoring these patterns in digital design risks alienating users and undermining trust in formal healthcare systems. Therefore, effective HIT interventions must be culturally contextualized, not only delivering biomedical information but also acknowledging local values, health beliefs, and behavioral norms. Culturally sensitive communication strategies, including the use of vernacular language, interactive platforms, and community influencers, are key to increasing the acceptability, legitimacy, and reach of digital innovations at the Puskesmas level.

In sum, while the integration of health information technology has demonstrably improved the performance of Puskesmas, its true potential lies in its alignment with institutional capabilities, managerial readiness, and community contexts. Sustainable digital transformation requires not only infrastructure and applications but also visionary leadership, robust human resource strategies, and inclusive engagement models that bridge technology with local realities.

3.2 The Role of Managerial Readiness in Leading Innovation-Based Change

While technology constitutes a crucial component of health service innovation, its successful implementation and long-term sustainability are profoundly dependent on the managerial capacity of health institutions. The literature consistently emphasizes that technological innovation alone does not automatically translate into improved service outcomes unless it is accompanied by a high level of organizational readiness, active leadership engagement, and structured change management frameworks. This underscores the critical role of Puskesmas heads, not merely as administrators but as transformational change agents who are responsible for operationalizing strategic visions into actionable interventions and cultivating a culture that supports innovation and continuous quality improvement (Amir et al., 2024; Yuliani, 2022).

Managerial readiness is a multidimensional competency set, encompassing visionary leadership, collaborative team development, and the capacity to institutionalize data-driven decision-making. Leaders who possess a clear and strategic understanding of digital transformation are more likely to champion the necessary organizational shifts and foster a climate of innovation. This includes the ability to articulate the purpose of digital integration, align technology with local needs, and advocate for institutional investment. Burke-Garcia & Soskin Hicks (2024) and Greenhill et al. (2021) emphasized that the success of health information system implementation is strongly correlated with active involvement of leadership across the entire system lifecycle, from the initial planning and infrastructure development phases, through pilot testing and rollouts, to ongoing monitoring, evaluation, and system refinement.

However, leadership engagement must be complemented by inclusive and participatory management strategies to ensure institutional buy-in and minimize resistance. One of the most commonly cited barriers to digital transformation in the public health sector, particularly at Puskesmas, is frontline staff resistance, which is often rooted in limited familiarity with digital tools, anxiety over increased administrative workloads, and a lack of perceived relevance or benefit. This underscores the importance of effective change management, which involves not only top-down direction but also bottom-up engagement. Open and transparent communication, ongoing capacity-building, and co-design of new workflows are key strategies to support this process. Structured interventions such as staff coaching, interactive team-building sessions, and collaborative training programs can significantly improve the perceived usability of digital systems, reduce skepticism, and foster a stronger sense of system ownership among users (McLaney et al., 2022).

In addition to building internal engagement, adaptive leadership is essential for tailoring implementation strategies to the diverse operational realities of different regions. Puskesmas in urban areas typically have better infrastructure, human resources, and ICT capacity compared to their rural or remote counterparts. Consequently, a "one-size-fits-all" digitalization strategy is often ineffective. Leaders must demonstrate contextual intelligence and strategic agility to calibrate interventions in accordance with local conditions, including workforce skills, community expectations, and infrastructure constraints. Braathu et al. (2022) and Nazir (2021) argue that collaborative, proactive leadership is crucial for narrowing the gap between technological sophistication and practical user integration. This means that digital health initiatives must be embedded not only in formal managerial procedures but also in community-centered governance models, where local needs and constraints shape system design and implementation.

Without strong and adaptive managerial support, digital transformation efforts risk being reduced to bureaucratic formalities, fulfilling compliance metrics without contributing meaningfully to service delivery outcomes. In such contexts, technology can paradoxically exacerbate inefficiencies, create frustration among health workers, and erode public trust. Therefore, institutional leadership capacity, grounded in participatory governance, operational flexibility, and a commitment to organizational learning, is indispensable for leveraging technology as a true catalyst of transformation in primary healthcare services.

3.3 The Need for Synergy Between Technology and Collaborative, Data-Driven Strategies

Although the deployment of digital technologies has demonstrably improved service workflows and transparency within Puskesmas, sustainable transformation of these health institutions requires more than just the installation of ICT infrastructure. Lasting operational improvement cannot be realized without deliberate and strategic organizational change, particularly strategies that prioritize data utilization, inter-unit collaboration, and the

development of an institutional culture rooted in learning and accountability. While technology provides the tools and architecture for improvement, the true drivers of meaningful change lie in the capacity of organizations to integrate these tools into coordinated, evidence-based decision-making processes.

Numerous studies have highlighted that Puskesmas with well-functioning health information systems tend to share common structural characteristics. These include the presence of internal mechanisms that support cross-program data flow, the routine use of performance dashboards or SIMPUS data in management meetings, and the institutionalization of data literacy across staff levels (Ahmad F et al., 2023; Rambe et al., 2024). In these organizations, data is not merely collected and archived, it is actively analyzed, interpreted, and translated into actionable insights. For instance, routine performance review sessions allow for early detection of service delivery gaps, alignment of program priorities, and dynamic resource allocation. The transformative potential of tools like SIMPUS or performance dashboards is fully realized only when these data systems are embedded in organizational routines, discussed during multidisciplinary forums, and used to guide follow-up actions across units including outpatient, maternal health, nutrition, and disease surveillance.

Moreover, successful integration of digital technology into health service delivery is inextricably linked to organizational approaches to human resource and capacity management. Dabić et al. (2023) and Sharma & Meet (2024), in their study on long-term care institutions, emphasized that digital tools alone do not reduce staff burden unless accompanied by workload redistribution, clear role delineation, and supportive team dynamics. In the context of Puskesmas, similar principles apply, wherein the adoption of digital innovations must be paired with reforms that safeguard staff well-being, prevent burnout, and ensure manageable workloads. A data-driven system can easily become counterproductive if it imposes excessive clerical demands on health workers without parallel investments in support systems, such as task delegation frameworks or automated reporting.

To that end, interdepartmental collaboration and horizontal integration across clinical, administrative, and support units are critical enablers of digital transformation. Many well-intentioned digital interventions ultimately fail, not due to flaws in software or infrastructure, but because of organizational silos, lack of communication, and weak collective ownership. These challenges underscore the need to shift from top-down implementation models to participatory, inclusive management practices. Digital transformation efforts should involve frontline staff from the early stages of planning, pilot testing, and feedback loops, thereby cultivating a sense of agency and system ownership. This inclusive approach improves adoption rates, enhances trust in the system, and ensures that workflows are adapted to local operational realities.

In tandem, the availability of real-time, granular data should serve as a catalyst for managerial transformation, from intuition-driven to data-informed governance models. This transition necessitates the development of internal analytic capabilities, including continuous training in data interpretation, the use of evidence for performance evaluation, and the creation of SMART (Specific, Measurable, Achievable, Relevant, Time-bound) performance indicators aligned with institutional goals. Building this capacity also involves integrating feedback mechanisms into routine monitoring, enabling rapid cycle improvements and fostering a culture of learning.

Furthermore, the successful alignment of technology and management within Puskesmas must be supported by external stakeholder coordination, including regional health offices (Dinkes), national ministries, civil society partners, and professional associations. The vertical synchronization between national health information systems (e.g., SIKDA Generik, P-Care BPJS) and local implementation frameworks ensures consistency in data reporting, accountability, and strategic alignment. At the same time, horizontal partnerships across service programs, inter-professional networks, and community organizations can strengthen contextual relevance, improve system uptake, and expand service reach, especially in underserved or remote areas. This aligns closely with Indonesia's post-pandemic primary health care revitalization agenda, which highlights three strategic pillars: people-centered care, digital transformation, and cross-sectoral integration (Berlo et al., 2024; Godinho et al., 2023).

In conclusion, the effective and sustainable adoption of digital technologies in Puskesmas is not simply a matter of acquiring hardware or installing software. It represents a complex and systemic transformation that must be supported by institutional realignment across people, processes, and technology. Without robust internal frameworks to support data use, inter-unit collaboration, adaptive leadership, and capacity development, investments in health information technology risk remaining underutilized—or worse, contributing to inefficiencies. Therefore, the future of digital innovation in Indonesia's primary healthcare sector depends on building institutions that are not only technologically capable, but also organizationally agile, culturally sensitive, and strategically coordinated.

4. Conclusion

This study has demonstrated that the sustainable improvement of service quality in Community Health Centers (Puskesmas) is inseparable from the dual reinforcement of technological innovation and adaptive managerial strategies. The reviewed literature provides compelling evidence that digital health technologies—such as electronic medical records (EMRs), digital queueing systems, integrated performance dashboards, and health information systems—have significantly contributed to increasing operational efficiency, enhancing transparency, and strengthening accountability in primary healthcare services. These tools streamline service processes, reduce administrative burdens, facilitate real-time monitoring, and improve public trust in primary care institutions.

However, the implementation of such technologies is not a panacea. The impact and sustainability of digital innovation are profoundly shaped by internal organizational readiness, particularly the managerial capacity of Puskesmas leaders. Visionary leadership, competency in change management, the establishment of a data-informed culture, and cross-unit collaboration are repeatedly identified as critical enablers of successful digital transformation. Without these elements, technology risks becoming an additional bureaucratic layer rather than a driver of quality improvement.

Furthermore, the findings highlight that technological adoption must be accompanied by human resource development, including ongoing technical training, simulation-based learning, and mentoring, particularly in under-resourced and peripheral healthcare settings. Resistance to change, limited digital literacy, and weak infrastructure remain persistent barriers that can only be addressed through proactive, participatory change management and policy alignment across institutional levels.

In addition, the success of innovation depends not only on vertical support from district and national health authorities but also on horizontal synergy across programs, professional disciplines, and community stakeholders. Emphasizing people-centered care, innovations must reflect local health-seeking behaviors, cultural values, and contextual realities to ensure inclusivity and effectiveness. The integration of digital health solutions into organizational strategies must therefore be context-sensitive, participatory, and embedded in comprehensive quality frameworks.

In conclusion, the transformation of Puskesmas into high-quality, responsive, and sustainable primary care institutions demands a systemic approach that harmonizes technology, human resources, and organizational processes. Innovations should not be viewed as isolated interventions, but as integral components of broader institutional reform aimed at achieving equitable, accountable, and community-based healthcare. Policymakers, healthcare leaders, and stakeholders must recognize that technology alone is insufficient—its value is realized only when supported by visionary leadership, data-driven decision-making, and collaborative governance structures. Only through this integrated lens can the promise of innovation be fully harnessed to strengthen the foundation of primary healthcare in Indonesia.

References

- Afiyah, N., & Ayuningtyas, D. (2023). Factors Influencing The Implementation Of Health Service Quality Governance In Puskesmas: Systematic Review. *Asian Journal of Healthy and Science*, 2(3), 130–147. <https://doi.org/10.58631/ajhs.v2i3.36>
- Ahlan, A. R., & Ahmad, B. I. (2014). User Acceptance of Health Information Technology (HIT) in Developing Countries: A Conceptual Model. *Procedia Technology*, 16, 1287–1296. <https://doi.org/10.1016/j.protcy.2014.10.145>
- Ahmad F, H., Mazidatus S, L., Nabiihah, A., & Fitriana, N. (2023). Analisis Faktor Keberhasilan Sistem Informasi Manajemen Puskesmas (SIMPUS) di Indonesia: Systematics Literature Review. *Jurnal Ilmiah Sistem Informasi Dan Ilmu Komputer*, 3(2), 153–166. <https://doi.org/10.55606/juisik.v3i2.497>
- Amir, A., Sari, P., & Herwansyah. (2024). Defining the Integration of Primary Health Services : Perspectives from Leaders of Puskesmas. *Jurnal Kesehatan*, 15(3), 370–374.
- Arsyad, D. S., Hamsyah, E. F., Qalby, N., Qanitha, A., Westerink, J., Cramer, M. J., Visseren, F. L. J., Doevendans, P. A., & Ansariadi, A. (2022). The readiness of public primary health care (PUSKESMAS) for cardiovascular services in Makasar city, Indonesia. *BMC Health Services Research*, 22(1), 1–12. <https://doi.org/10.1186/s12913-022-08499-w>
- Berlo, A. Van, Ouderaa, M. K. der, & Kayser, L. (2024). An Innovative Person-Centered Model for Provision of Mental, Social and Medical Care for People Living with Dementia. *Health*, 16(10), 970–983. <https://doi.org/10.4236/health.2024.1610066>
- Braathu, N., Laukvik, E. H., Egeland, K. M., & Skar, A. M. S. (2022). Validation of the Norwegian versions of the Implementation Leadership Scale (ILS) and Multifactor Leadership Questionnaire (MLQ) in a mental health care setting. *BMC Psychology*, 10(1), 1–11. <https://doi.org/10.1186/s40359-022-00725-8>
- Burke-Garcia, A., & Soskin Hicks, R. (2024). Scaling the Idea of Opinion Leadership to Address Health Misinformation: The Case for “Health Communication AI.” *Journal of Health Communication*, 29(6), 396–399. <https://doi.org/10.1080/10810730.2024.2357575>
- Chiem, J. L., Hansen, E. E., Fernandez, N., Merguerian, P. A., Parikh, S. R., Reece, K., Low, D. K., & Martin, L. D. (2024). Transforming into a Learning Health System: A Quality Improvement Initiative. *Pediatric Quality and Safety*, 9(3), E724. <https://doi.org/10.1097/pq9.0000000000000724>
- Dabić, M., Maley, J. F., Švarc, J., & Poček, J. (2023). Future of digital work: Challenges for sustainable human resources management. *Journal of Innovation and Knowledge*, 8(2). <https://doi.org/10.1016/j.jik.2023.100353>
- Doherty, N. F., King, M., & Al-Mushayt, O. (2003). The impact of inadequacies in the treatment of organizational issues on information systems development projects. *Information and Management*, 41(1), 49–62. [https://doi.org/10.1016/S0378-7206\(03\)00026-0](https://doi.org/10.1016/S0378-7206(03)00026-0)
- Efliani, D., & Amin, S. (2022). Kepuasan Pasien Terhadap Layanan Keperawatan Masa Pandemi di Puskesmas Umban Sari Pekanbaru. *Jurnal Mutiara Ners*, 5(1), 25–29.
- Fernanda, M. N., & Suryani, A. I. (2023). Analisis Penerapan Sistem Informasi Kesehatan Daerah (SIKDA) Generik Dalam Meningkatkan Pelayanan Rawat Jalan Di Puskesmas Rawat Inap Ciranjang. *Jurnal Ilmiah Perekam Dan Informasi Kesehatan Imelda (JIPIKI)*, 8(2), 183–194. <https://doi.org/10.52943/jipiki.v8i2.1322>
- Godinho, M. A., Ashraf, M. M., Narasimhan, P., & Liaw, S. T. (2023). Understanding the convergence of social enterprise, digital health, and citizen engagement for co-producing integrated Person-Centred health services: A critical review and theoretical framework. *International Journal of Medical Informatics*, 178(April), 105174. <https://doi.org/10.1016/j.ijmedinf.2023.105174>
- Gopur, A., Wijaya, E. J., Dhartono, J. D., & Veranita, M. (2025). Studi Literatur: Pengaruh Kepemimpinan terhadap Kualitas Kinerja Karyawan di Puskesmas. *Musytari: Neraca Akuntansi Manajemen, Ekonomi*, 19(6), 1–12. <https://doi.org/10.8734/mnmae.v1i2.359>

- Greenhill, R. G., Pearson, J. S., Ryan, N., Stuart, D., & Rossette, S. (2021). Exploring Healthcare Leadership Competencies for the Fourth Industrial Revolution : A Scoping Review of the Literature. *The Journal of Health Administration Education*, Fall 2021(806), 695–708.
- Hasanah, Y., Dai, R. M., & Sari, D. S. (2021). Implementasi Kebijakan Fungsi Puskesmas Selama Pandemi Covid 19 Di Puskesmas Margahayu Selatan Kabupaten Bandung. *Responsive*, 3(4), 223–239. <https://doi.org/10.24198/responsive.v3i4.33339>
- Ismoyo, M. B. (2023). The Analysis of Regional Expenditure on the Provision of Health Workers in the Community Health Center (Puskesmas). *Bestuurskunde: Journal of Governmental Studies*, 3(1), 71–80. <https://doi.org/10.53013/bestuurskunde.3.1.71-80>
- Lawanson, O. M., Abu-Halimeh, A., & Ajiferuke, O. (2025). Leveraging advanced technologies to improve telemedicine delivery in Nigeria. *World Journal of Advanced Research and Reviews*, 25(3), 1698–1707. <https://doi.org/10.30574/wjarr.2025.25.3.0902>
- Lazuardi, L., Sanjaya, G. Y., Ali, P. B., Siahaan, R. G. M., Achmad, L., & Wulandari, H. (2021). Interoperability of Health Digitalization: Case Study on Use of Information Technology for Maternal and Child Health Services in Indonesia. *Business Information Systems*, 1(July), 317–327. <https://doi.org/10.52825/bis.v1i.53>
- McLaney, E., Morassaei, S., Hughes, L., Davies, R., Campbell, M., & Di Prospero, L. (2022). A framework for interprofessional team collaboration in a hospital setting: Advancing team competencies and behaviours. *Healthcare Management Forum*, 35(2), 112–117. <https://doi.org/10.1177/08404704211063584>
- Mechie, S., Ujhelyi Gomez, K., Harrison, J., & Hill, J. E. (2024). The link between social care deficiencies and healthcare pressures. *British Journal of Healthcare Management*, 30(5), 1–5. <https://doi.org/10.12968/bjhc.2023.0080>
- Mengestie, N. D., Yeneneh, A., Baymot, A. B., Kalayou, M. H., Melaku, M. S., Guadie, H. A., Paulos, G., Mewosha, W. Z., Shimie, A. W., Fentahun, A., Wubante, S. M., Tegegne, M. D., & Awol, S. M. (2023). Health Information Technologies in a Resource - Limited Setting: Knowledge, Attitude, and Practice of Health Professionals. *BioMed Research International*, 2023(1), 1–7. <https://doi.org/10.1155/2023/4980391>
- Nazir, A. (2021). Healthcare leadership lessons from COVID-19. *Journal of the American Geriatrics Society*, 69(10), 2793–2794. <https://doi.org/10.1111/jgs.17386>
- Oh, K., Kho, H., Choi, Y., & Lee, S. (2022). Determinants for Successful Digital Transformation. *Sustainability (Switzerland)*, 14(3), 1–14. <https://doi.org/10.3390/su14031215>
- Rambe, Y. H., Muthi, S., Andini, Z., & Purba, S. H. (2024). Analisis Faktor Penghambat Penerapan Sistem Informasi Manajemen Puskesmas di Indonesia : Literature Review. *Journal Sains Farmasi Dan Kesehatan*, 2(2), 126–136.
- Safrin, & Nurhasanah. (2025). Optimalisasi Administrasi Pelayanan Pasien Melalui Edukasi dan Pedampingan Sistem Pencatatan di Puskesmas Sempaja Kota Samarinda. *Jurnal Pengabdian Kepada Masyarakat Nusantara (JPKMN)*, 6(2), 1964–1969. <https://doi.org/http://doi.org/10.55338/jpkmn.v6i2.5821>
- Segal, J. J., & Sacopolos, M. (2009). A modified no-fault malpractice system can resolve multiple healthcare system deficiencies. *Clinical Orthopaedics and Related Research*, 467(2), 420–426. <https://doi.org/10.1007/s11999-008-0577-9>
- Sharma, A., & Meet, M. K. (2024). Human Resource Digital Transformation (HRDT): A Study of Innovation and Capability Through Digitalization and Individual Factors. *Educational Administration: Theory and Practice*, 29(3), 394–412. <https://doi.org/10.53555/kuey.v29i3.5002>
- Sheikh, A., Anderson, M., Albala, S., Casadei, B., Franklin, B. D., Richards, M., Taylor, D., Tibble, H., & Mossialos, E. (2021). Health information technology and digital innovation for national learning health and care systems. *The Lancet Digital Health*, 3(6), e383–e396. [https://doi.org/10.1016/S2589-7500\(21\)00005-4](https://doi.org/10.1016/S2589-7500(21)00005-4)
- Sutanto, E., Mulyana, R., Arisgraha, F. C. S., & Escrivá-Escrivá, G. (2022). Integrating Blockchain for Health Insurance in Indonesia with Hash Authentication. *Journal of Theoretical and Applied Electronic Commerce Research*, 17(4), 1602–1615. <https://doi.org/10.3390/jtaer17040081>
- Wendimiegn, N. F., & Bezuidenhout, M. C. (2019). Integrating promotive, preventive, and curative health care services at hospitals and health centers in Addis Ababa, Ethiopia. *Journal of Multidisciplinary Healthcare*, 12, 243–255. <https://doi.org/10.2147/JMDH.S193370>
- Yen, P. Y., McAlearney, A. S., Sieck, C. J., Hefner, J. L., & Huerta, T. R. (2017). Health information technology (hit) adaptation: Refocusing on the journey to successful hit implementation. *JMIR Medical Informatics*, 5(3), 1–9. <https://doi.org/10.2196/medinform.7476>
- Yuliani, L. (2022). Holistic Leadership Model Heads of Puskesmas (Community Health Center) in Garut Regency, West Java Province. *Proceedings of the 4th Social and Humanities Research Symposium (SoRes 2021)*, 658(SoRes 2021), 501–503. <https://doi.org/10.2991/assehr.k.220407.102>