Proceeding of The International Conference of Inovation, Science, Technology, Education, Children, and Health

e-ISSN : 2776-9062

Research Article

Digital Transformation of Health Services in Indonesia Through the Utilization of Artificial Intelligence, Big Data, and Telemedicine: Systematic Literature Review-VOSviewer

Salihati Hanifa[1]*, Kurniawan Erman Wicaksono[2]

1 Politeknik Negeri Jember,Indonesia
e-mail : salihati_hanifa@polije.ac.id
2 Politeknik Negeri Jember;Indonesia
e-mail : kurniawan_erman@polije.ac.id

* Corresponding Author : Salihati Hanifa

Abstract: Indonesia's healthcare system continues to face significant challenges in delivering equitable services across diverse and remote regions. The digital transformation of healthcare—through the integration of Artificial Intelligence (AI), big data, and telemedicine—offers promising solutions to overcome disparities in access, infrastructure, and service delivery. This study aims to comprehensively analyze global and national research trends related to the digital transformation of healthcare using a Systematic Literature Review (SLR) approach, supported by bibliometric analysis through the VOSviewer software. Following the PRISMA protocol, a total of 30 relevant articles published between 2020 and 2025 were identified and analyzed. The network and overlay visualizations generated reveal four major thematic clusters: digital transformation and service quality, big data and pandemic response, AI and data privacy, and community engagement in digital health services. Overlay visualization also shows a clear shift in research focus—from early pandemic responses toward system optimization, ethical governance, and technological inclusivity in recent years. The study concludes that the integration of AI, big data, and telemedicine not only enhances healthcare efficiency but also requires strong regulatory frameworks, infrastructure readiness, and public engagement. Future research should incorporate co-citation and cross-country comparative analyses to enrich the understanding of digital health transformation in a global context.

Keywords: Artificial Intelligence; Big Data; Digital Transformation; Telemedicine

Received: 17,May,2025;
Revised: 31,May,2025;
Accepted: 16,June, 2025;
Published: 30,June,302025;
Curr. Ver.: 30,June,2025;

1. Introduction

Digital transformation in the healthcare sector has become a central pillar of global service reform, especially as the COVID-19 pandemic accelerated the demand for remote care, data-driven decision-making, and efficient information systems. In this shifting landscape, the emergence of big data analytics, artificial intelligence (AI), and telemedicine has formed the foundation for building adaptive, real-time, and personalized healthcare ecosystems. These technologies not only streamline service delivery but also revolutionize how healthcare professionals understand, predict, and respond to medical challenges [1], [2].

Big data enables the rapid collection and analysis of millions of medical data points from both structured and unstructured sources. When integrated with AI, these data can be processed to detect clinical patterns, predict disease risks, and recommend preventive or curative interventions. At the same time, telemedicine bridges geographical barriers by providing inclusive access to healthcare services for populations in remote or densely populated areas, enhancing equity in health service delivery. Despite their transformative potential, the implementation of these technologies—particularly in developing countries—

faces multiple challenges. Limited digital infrastructure, low technological literacy, data security concerns, and fragmented information systems remain critical obstacles. Therefore, a comprehensive understanding of the current research landscape and implementation practices of big data, AI, and telemedicine integration is essential to inform policy-making and the development of sustainable digital health systems [3], [4], [5].

Previous studies have examined the application of each of these technologies separately. For instance, Abdillah highlighted the adoption of AI in digital healthcare platforms such as Halodoc and Alodokter; Adha et al. discussed trends and challenges in health information systems (HIS) as a foundation for leveraging big data; while Lukito & Gan [6] investigated service efficiency through telemedicine**.** This article presents a Systematic Literature Review (SLR) supported by bibliometric analysis using VOSviewer, aiming to map research trends, conceptual linkages, and the direction of global studies concerning digital transformation in healthcare. The study will map scientific publications from the past five years (2020–2025) and identify patterns of conceptual relationships among key terms such as "artificial intelligence," "telemedicine," and "healthcare transformation".

2. Literature Review

Healthcare System

The healthcare system refers to an organized structure and process designed to meet the health needs of the population through the provision of preventive, curative, and rehabilitative services. In Indonesia, the system is built on the principles of decentralization and universal access; however, in practice, it still faces significant disparities in access between urban and rural areas as well as across regions [11]. These disparities are further exacerbated by the unequal distribution of healthcare professionals and the uneven availability of medical infrastructure. The COVID-19 pandemic accelerated the digitalization of health services, particularly through the adoption of electronic medical records and online consultations, which have demonstrably improved access to care in marginalized and remote areas [2]. Nevertheless, challenges such as limited digital literacy among healthcare workers and inadequate infrastructure remain major obstacles. The concept of Health 5.0 emphasizes that transforming healthcare services cannot rely solely on technology—it must also be grounded in inclusive governance and social equity as foundational principles [12], [13].

Artificial Intelligence

Artificial Intelligence (AI) refers to the application of machine-based intelligence that mimics human cognitive functions to support diagnosis, treatment, and patient data management. Its implementation has demonstrated significant improvements in clinical accuracy and service efficiency, as evidenced by platforms such as Halodoc, which help reduce the burden on physicians and expedite early-stage patient care [3]. However, alongside these benefits arise critical ethical and regulatory challenges, including concerns over algorithmic transparency and legal accountability for diagnostic errors [14], [15]. The adoption of AI also requires a well-prepared legal framework and robust governance of health technologies. Furthermore, effective collaboration among technologists, healthcare practitioners, and regulatory bodies is essential to ensure that AI deployment is not only technically efficient but also socially equitable [16], [17].

Big Data

Big data refers to large-scale data analytics derived from diverse sources such as electronic medical records, health applications, and epidemiological surveillance data, used to support rapid and evidence-based decision-making. In Indonesia, its application has proven effective in strengthening the health system's response to the pandemic and facilitating real-time resource allocation [18]. However, limitations in electronic record systems, low data literacy among healthcare workers, and insufficient integration across healthcare facilities continue to hinder the optimal utilization of big data [12], [19]. Data security concerns also remain a critical issue that may affect public trust in digital health systems. Addressing these challenges requires a robust national interoperability framework and strong data protection policies, accompanied by capacity-building initiatives for health professionals [2], [20].

Telemedicine

Telemedicine is defined as the practice of delivering healthcare services remotely through information and communication technologies, offering solutions to geographic and affordability barriers in medical access. In Indonesia, telemedicine has experienced rapid growth since the onset of the COVID-19 pandemic, due to its ability to accelerate service delivery and reduce patient costs [6], [21]. Nevertheless, several challenges persist, including unclear regulatory frameworks and uneven digital infrastructure across regions. Additionally, resistance from healthcare providers and public concerns regarding the accuracy of digital diagnoses remain significant obstacles [14], [22]. To ensure sustainability, telemedicine must be structurally integrated into the national healthcare system through strengthened regulation, digital training for healthcare workers, and public education initiatives [15], [23].

3. Proposed Method

This study employs a systematic literature review (SLR) approach combined with bibliometric analysis as its primary methodology. The process follows the PRISMA protocol, which includes four main stages: identification, screening, eligibility assessment, and inclusion. The initial step in the bibliometric analysis involves formulating the research objectives and questions, as well as developing a relevant search strategy to obtain the dataset. Due to the procedural similarities between the two methods, this study integrates SLR and bibliometric analysis in a unified framework—from defining the research focus to the final stage of data interpretation. Each step was conducted in a structured and planned manner, including the data collection process.

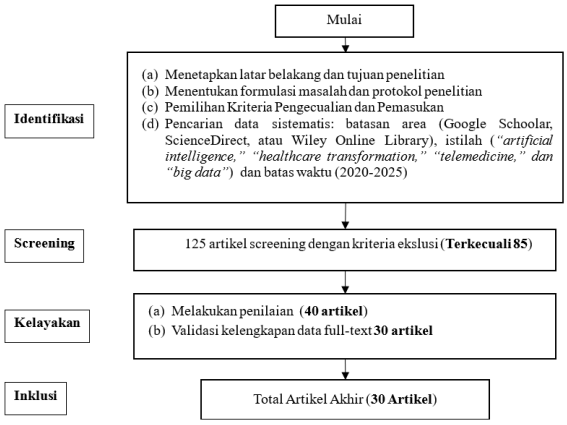
Data collection followed a predefined workflow established during the planning phase. A ten-year publication window was considered sufficient to capture the evolution of the topic under investigation. The collection process began by accessing major academic databases, including Google Scholar, ScienceDirect, and Wiley Online Library. Specific and relevant keywords such as "artificial intelligence," "healthcare transformation," "telemedicine," and "big data" were used to search within titles, abstracts, and keywords. The search was limited to document types (articles and reviews) and the publication period (2020–2025). The retrieved data were saved in CSV format and organized using Mendeley. For bibliometric visualization, the CSV data were further analyzed using the VOSviewer software.

In the screening phase, inclusion and exclusion criteria—previously defined during the identification stage—were applied. At this stage, all articles and reviews were filtered to determine their eligibility for SLR analysis.

Data extraction using the defined exclusion criteria resulted in a total of 85 articles. These articles were then assessed for eligibility. The collected data were evaluated based on the following quality assessment questions:

1. Was the article published in a journal indexed by Google Scholar, ScienceDirect, or Wiley Online Library between the years 2020 and 2025?
2. Does the article address the concept of Digital Health Services?

If the answers to the above questions were affirmative, the article was deemed to have passed the quality assessment for eligibility.



Picture 1. Flow Diagram of PRISMA

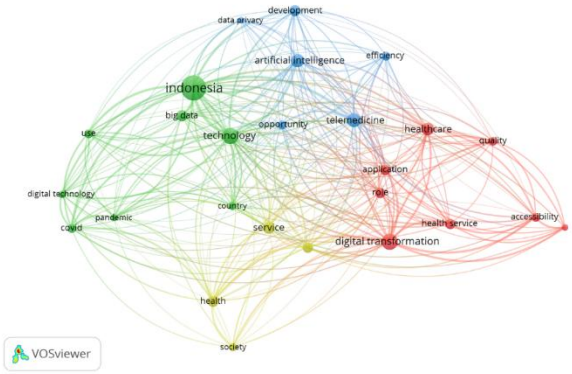
The flowchart in Figure 1 systematically summarizes the stages involved in the Systematic Literature Review (SLR) and bibliometric analysis conducted in this study. The first stage is identification, which begins with defining the research objectives, developing a review protocol, and establishing the conceptual boundaries of the study. Subsequently, data were systematically retrieved from databases such as Google Scholar, focusing on journal articles published between 2020 and 2025. During the screening stage, a total of 125 articles were initially extracted, then filtered based on exclusion criteria. Of these, 85 articles were deemed ineligible and excluded, leaving 40 articles for further evaluation.

In the eligibility stage, the remaining articles were assessed in greater depth to ensure their quality and relevance. Finally, in the inclusion stage, 30 full-text articles were selected as suitable for bibliometric analysis and manual content review. For the purpose of analysis, the online version of VOSviewer software (version 1.6.17), developed by the Centre for Science and Technology Studies (CWTS) at Leiden University, was used. This application is highly effective in mapping and visualizing bibliometric networks, such as relationships among titles, authors, journals, abstracts, and keywords. The online version of VOSviewer also includes interactive features that allow readers to explore the visualization results.

4. Results and Discussion

Results

The transformation of the healthcare service system in Indonesia has become a critical topic that has seen rapid development in recent years. Based on literature mapping using VOSviewer, one of the key outputs is the network visualization. This network visualization illustrates the interconnection between core concepts in the literature concerning the transformation of Indonesia's healthcare system through the integration of artificial intelligence (AI), big data, and telemedicine. Each node represents a significant keyword from scientific publications, connected by edges that indicate the strength of co-occurrence within the same documents. The different colors represent thematic clusters, with each cluster reflecting a major focus area in the scientific discourse related to digital healthcare transformation.



Picture 2. Network Visualization Vosviewer based on Keyword

The clusters presented in Figure 2 can be described as follows:

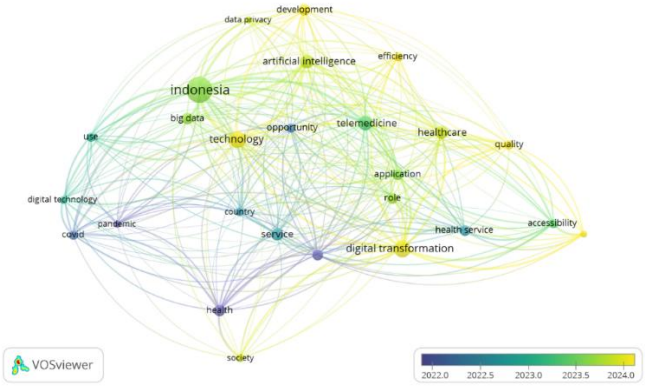
- **Cluster 1 (Red):** This cluster highlights the integration of digital transformation, e-health, application, and healthcare as foundational components in shaping modern health services. The term *"digital transformation"* serves as the central node, linked to *"role," "quality,"* and *"accessibility,"* indicating that digitalization is not merely a technical innovation but also transforms roles and access in healthcare delivery [4], [22], [27]. Ahmadi & Wening [3] emphasize that telemedicine applications serve as key instruments to improve service quality and expand accessibility, particularly in rural areas of Indonesia. Meanwhile, Kusumaa & Hermawan [28] underscore the importance of responsive e-health integration that aligns with patient needs, and highlight the crucial role of user-centric design in promoting community engagement.
- **Cluster 2 (Green):** This cluster is dominated by the keywords *"Indonesia," "big data,"* and *"pandemic,"* which are strongly connected to *"digital technology"* and *"use."* The main theme centers around digital literacy and technology adoption in the post-

COVID era. Studies by Aisyah et al. [2] and Adha et al. [5] indicate that the pandemic accelerated digital transformation in Indonesia's healthcare sector. Big data played a vital role in pandemic monitoring, case tracking, and data-driven decision-making [16]. Intani & Annisa [15] highlight the role of national policy strategies in supporting digital health services while ensuring equitable access across regions.

- **Cluster 3 (Blue):** Keywords such as *"artificial intelligence," "efficiency,"* and *"data privacy"* reflect a focus on optimizing healthcare processes through AI and the importance of data protection. Research by Widjaja et al. [17] reveals that the application of AI in diagnostic procedures and hospital management significantly enhances efficiency in terms of time and resources. However, a major challenge lies in safeguarding patient data, as emphasized by Laksono et al. [1] in their analysis of data protection regulations in AI systems. On the other hand, Yusriadi et al. [23] report that AI-based telemedicine has the potential to extend healthcare services to remote areas while maintaining diagnostic efficiency and accuracy.
- **Cluster 4 (Yellow):** This cluster focuses on social aspects and direct service delivery. Keywords such as *"health," "service,"* and *"society"* suggest that digital transformation in healthcare must go beyond technological solutions to also address social dimensions and community participation. Sulastri et al. [3] and Tutuko et al. [29] the importance of involving communities in building adaptive health systems.

This visual map illustrates that healthcare transformation in Indonesia is multidimensional—encompassing technological innovation (AI, big data), structural reform (digital transformation), and the strengthening of social capacity (society, service). Kusumo et al. [12] argue that the efficiency of digital services can only be optimized when supported by system readiness, robust regulation, and active public participation. Therefore, transformation strategies must be contextualized within Indonesia's vast geographic, social, and economic diversity [30].

The *Overlay Visualization* view in VOSviewer provides a temporal overview of research topic evolution related to the transformation of Indonesia's healthcare system through the integration of artificial intelligence (AI), big data, and telemedicine. The node colors represent the average publication year of each keyword, where purple indicates topics dominant in the early analysis period (2022), while yellow signifies emerging topics in the most recent publications (2024–2025). This visualization is useful for tracing the development trajectory of academic discourse and identifying keywords that are currently at the forefront of research.



Picture 3. Overlay Visualization Vosviewer based on Keyword

Topics such as *COVID*, *pandemic*, and *health*, marked by purple to blue hues, occupy the early positions in the chronology of discourse. This indicates that the initial phase of research from 2020 to 2022 was largely driven by the global health emergency, which accelerated the adoption of digital technologies in healthcare systems. During this period, the primary focus was on digitalization as a response to mobility restrictions and the urgent need for remote healthcare services. Entering the year 2023 and beyond, the focus began to shift toward *artificial intelligence*, *data privacy*, *efficiency*, and *development*, represented by light green gradients. These themes suggest that following the initial adoption of digital health technologies, research attention turned to system optimization and the use of intelligent technologies to improve efficiency while ensuring ethical standards and patient data privacy.

The emergence of keywords such as *telemedicine* and *opportunity* during this phase indicates a transition from basic technological usage toward the development of long-term

innovation-based health system strategies. The most recent keywords (highlighted in bright yellow), such as *digital transformation*, *accessibility*, *quality*, and *technology*, reflect the latest research focus projected for 2024–2025. The keyword *Indonesia*, shown in green-yellow, illustrates that the local context is increasingly recognized as a key variable in building an inclusive digital health system.

Table 2. Number of Research Article by Year of Publication

Year of Article	Total of Article	Percentage (%)	Title of Article
2020	2	6.67	"Examining on Indonesian Legal Challenges for Future Transnational Healthcare Service" [28], "A Deep Learning Approach to Integrate Medical Big Data for Improving Health Services in Indonesia" [29]
2021	2	6.67	"The New Leadership Paradigm in Digital Health and Its Relations to Hospital Services" [1], "Digital Transformation in Indonesia Health Care Services: Social, Ethical and Legal Issues" [31]
2022	1	3.33	"Pemanfaatan Kecerdasan Buatan (AI) dalam Telemedicine: Dari Perspektif Profesional Kesehatan" [16]
2023	7	23.33	"Analisis Literatur Sistem Informasi Kesehatan (SIK): Tren, Tantangan, dan Manfaat dalam Peningkatan Pelayanan Kesehatan di Indonesia" [5], "The Use of Digital Technology for COVID-19 Detection and Response Management in Indonesia: Mixed Methods Study" [2], "Transformasi Digital pada Layanan Kesehatan Berkelanjutan di Indonesia" [30], "Economic and Management Strategies for Optimizing Healthcare Services: A Case Study on Telemedicine in Indonesia" [21], "Era Disrupsi Digital pada Perkembangan Teknologi di Indonesia" [32],"Erosi Ketimpangan Kesehatan Digital" [33], "Implementation of Artificial Intelligence in Indonesia" [23]
2024	10	33.33	"Revolusi Digital Kesehatan: Meningkatkan Layanan dengan Kecerdasan Buatan" [4], "Teknologi dan Inovasi dalam Manajemen SDM Kesehatan: Meningkatkan Efisiensi melalui Digital" [34], "Tantangan dan Solusi Administrasi Kesehatan di Era Digital (Tinjauan Literature Review atas Implementasi Teknologi)" [22], "Legal Analysis of Artificial Intelligence Technology Development in Healthcare Industry in Indonesia" [15], "Peran Digitalisasi dalam Penanggulangan Stunting: Solusi Inovatif untuk Generasi Sehat" [35], "Pelayanan Kesehatan yang Efisien dan Terjangkau melalui Transformasi Kesehatan Digital via Telemedicine di Indonesia" [6], "Perlindungan terhadap Perkembangan Layanan Kesehatan Berbasis Kecerdasan Buatan di Indonesia" [19], "Pengembangan Aplikasi Berbasis Mobile untuk Peningkatan Layanan Kesehatan"[11], "e-Health and Digital Transformation in Increasing Accessibility of Health Services" [36], "The Role of Artificial Intelligence in Indonesia's Digital Transformation: Challenges and Opportunities" [20], "The Role of Artificial Intelligence in Telemedicine:Legal Considerations under Indonesian Health Laws" [14], "Technology-Based Health Communication: Legal Regulation, Telemedicine Implementation, and Patient Data Protection in the Era of Digital Transformation" [17]
2025	8	26.67	"The Role of Artificial Intelligence for Medical Professionals in Indonesia: A Systematic Literature Review" [3], "Konteks Transformasi Digital di Sektor Usaha Kesehatan" [27], "Sustainable Digital Transformation in Healthcare: Challenges and Directions in the Society 5.0 Era" [12], "Strategi IDI dalam Menghadapi Tantangan di Era 5.0" [13], "Big Data Analytics for Predictive Insights in Healthcare" [37], "Transformasi Digital dalam Sektor Kesehatan: Kajian Literatur untuk Mendukung Inovasi dan Efisiensi Layanan Kesehatan" [38]
Total	**30**	**100.00**	

Based on Table 1, publications on the transformation of healthcare service systems have increased significantly since 2023, with the highest surge occurring in 2024 (33.33%) and 2025

(26.67%). This rise aligns with the dominance of green and yellow colors in the visualization map, indicating that topics such as *digital transformation*, *accessibility*, and *AI* have become central themes in the past two years. In contrast, only five articles were published prior to 2022 (16.67%), which corresponds to the dominance of purple nodes associated with keywords such as *COVID* and *digital technology*. The correlation between color trends and publication volume reflects a discursive shift from the emergency response phase of the pandemic to a phase of system development that is both sustainable and adaptive to emerging technologies. In the context of Indonesia, the surge in publications during 2023–2025 also indicates growing scholarly attention to national strategies for digitalizing health services, as well as the challenges and opportunities arising from this transformation.

5. Discussion

The digital transformation of healthcare services in Indonesia has become increasingly critical due to persistent systemic challenges such as limited access to healthcare, a shortage of doctors and nurses in remote areas, and insufficient medical equipment and facilities. These issues are rooted in unequal development across regions and, if not promptly addressed, will continue to hinder rural populations from receiving adequate healthcare services [33], in this context, the integration of technologies such as Artificial Intelligence (AI), Big Data, and telemedicine has emerged as a pivotal strategy to improve healthcare delivery. A notable example can be observed during the COVID-19 pandemic, which accelerated the adoption of these technologies—evident through the use of applications such as *Halodoc* and *PeduliLindungi*, which enabled citizens to access healthcare services without in-person visits [2], [6], [36]. Despite this progress, several barriers persist, including low digital literacy, data security vulnerabilities, and limited internet connectivity in underserved regions [5], [22]. Although the implementation of Health Information Systems (HIS) has enhanced service efficiency and distribution, regional disparities and uneven IT infrastructure continue to hinder the full potential of digital technology [5], [30][23].

AI has demonstrated significant contributions in supporting diagnostic processes, clinical decision-making, and remote patient monitoring through algorithms capable of learning from data patterns [3], [4], [29]. Platforms like *Alodokter*, *Halodoc* now integrate AI to analyze symptoms and offer personalized initial recommendations. However, these advancements bring ethical and legal challenges, such as algorithmic bias, medical accountability, and the absence of robust regulations within Indonesia [15], [17], [19]. To address these concerns, collaboration among government bodies, healthcare institutions, academic researchers, and the technology industry is essential in formulating inclusive and adaptive regulatory frameworks [5], [11], [30]. Meanwhile, the application of Big Data through electronic medical records and cloud-based surveillance systems enables real-time analysis of disease trends and healthcare workforce needs [18], [20], [38]. Nevertheless, the limited data analytics capacity among healthcare professionals hampers optimal data utilization [12], [31] and patient data protection remains a pressing issue requiring comprehensive solutions [19], [32].

Telemedicine further enhances digital transformation by providing accessible, flexible, and rapid online consultations, especially for populations in remote areas [11], [21]. Studies have shown that telemedicine reduces waiting times, expedites treatment for critical or emergency cases, and alleviates the burden on healthcare facilities [1], [21]. When telemedicine is integrated with AI and Big Data technologies, healthcare delivery evolves from a reactive model to a predictive and personalized approach. In such a system, doctors can identify potential health risks early and offer timely interventions—even before symptoms appear [23], [28].

Conclusions

The results of the bibliometric analysis and systematic literature review (SLR) indicate that the transformation of Indonesia's healthcare system through the integration of AI, big data, and telemedicine has emerged as a dominant theme in academic publications since 2020. Technological advancements—particularly the application of artificial intelligence (AI), big data, and telemedicine—are now recognized as key innovations in improving healthcare services in Indonesia. AI supports healthcare professionals in making more accurate and timely decisions by intelligently analyzing medical data. Meanwhile, big data provides a robust

foundation for early risk detection, efficient resource allocation, and evidence-based policy evaluation. Telemedicine has also become a vital bridge, connecting healthcare services with communities in remote areas. VOSviewer visualizations suggest that issues related to service quality, accessibility, and data protection will remain key focal points in future research. Further studies are recommended to expand the scope of bibliometric visualization by incorporating co-citation analysis and bibliographic coupling to identify author influence and trace the evolution of the literature in greater depth. Additionally, cross-country comparisons could be integrated to provide a more contextualized contrast between Indonesia's local dynamics and global developments.

Funding: This research received no external funding

Conflicts of Interest: The authors declare no conflict of interest.

References

[1.] Abdillah, M. F. (2024). Revolusi Digital Kesehatan: Meningkatkan Layanan Dengan Kecerdasan Buatan. Journal of Syntax Literate, 9(10).

[2.] Abdillah, R. P. A., Nabilah, H., & Wasir, R. (2024). Teknologi dan inovasi dalam manajemen SDM kesehatan: Meningkatkan efisiensi melalui digital. Indonesian Journal of Health Science, 4(6s), 840–847.

[3.] Adha, F. R., Sahria, Y., Febriarini, N. I., Fauziah, R. N., Sa'adah, W., & Hidayati, A. (2023). Analisis Literatur Sistem Informasi Kesehatan (SIK): Tren, Tantangan, dan Manfaat dalam Peningkatan Pelayanan Kesehatan di Indonesia. In Prosiding Seminar Nasional UNIMUS.

[4.] Ahmadi, S., & Wening, N. (2025). The Role of Artificial Intelligence for Medical Professionals in Indonesia: A Systematic Literature Review. Journal of Social Science (JoSS), 4(4), 204–213.

[5.] Aisyah, D. N., Hatta, M., Indriani, F., Susanto, H., Siregar, N., Setiawan, E., Suparman, R., Wahyudi, I., & Handiyani, H. (2023). The use of digital technology for COVID-19 detection and response management in Indonesia: mixed methods study. Interact J Med Res, 12(1), e41308.

[6.] Andae, B. D., Argie, D., Viryadi, M. Y., Pramesuari, F. D., & Tuda, J. S. B. (2024). Telemedisin di Indonesia: Antara Regulasi dan Pelaksanaan. Proceeding Masyarakat Hukum Kesehatan Indonesia, 1(01), 82–89.

[7.] Bartolini, M., Bottani, E., & Grosse, E. H. (2019). Green warehousing: Systematic literature review and bibliometric analysis. J Clean Prod, 226, 242–258.

[8.] BPPT. (2020). Strategi Nasional Kecerdasan Artifisial Indonesia Tahun 2020-2045. Jakarta.

[9.] Dameria, K., & Jane, O. (2025). Konteks Transformasi Digital di Sektor Usaha Kesehatan. AKADEMIK: Jurnal Mahasiswa Ekonomi & Bisnis, 5(1), 75–87.

[10.] Gates, J. D., Yulianti, Y., & Pangilinan, G. A. (2024). Big Data Analytics for Predictive Insights in Healthcare. International Transactions on Artificial Intelligence (ITALIC), 3(1), 54–63. https://doi.org/10.33050/italic.v3i1.622

[11.] Hensmit, V. R., Simanjuntak, W. E., Purwadhi, P., & Widjaja, Y. R. (2024). Tinjauan Literatur: Telemedika Sebagai Strategi Pelayanan Kesehatan di Masa Pandemi dan Pasca Pandemi. Journal of Innovation Research and Knowledge, 4(4), 2297–2304.

[12.] Huang, C., Yang, C., Wang, S., Wu, W., Su, J., & Liang, C. (2020). Evolution of topics in education research: A systematic review using bibliometric analysis. Educ Rev (Birm), 72(3), 281–297.

[13.] Intani, A. A., & Annisa, F. (2024). Legal Analysis of Artificial Intelligence Technology Development in Healthcare Industry in Indonesia. South-East Asian Journal of Advanced Law and Governance (SEAJ ALGOV), 1(1), 1–19.

[14.] Komalasari, R. (2022). Pemanfaatan Kecerdasan Buatan (Ai) Dalam Telemedicine: Dari Perspektif Profesional Kesehatan. Jurnal Kedokteran Mulawarman, 9(2), 72–81.

[15.] Kusuma, F. I. S., & Hermawan, S. (2020). Examining on Indonesian Legal Challenges for Future Transnational Healthcare Service. Sci Med (Phila), 66, 2145–2156.

[16.] Kusumo, H., Marlina, D., & Solechan, A. (2025). Sustainable Digital Transformation in Healthcare: Challenges and Directions in the Society 5.0 Era. Advance Sustainable Science Engineering and Technology, 7(1), 250113.

[17.] Laksono, S., & Darmawan, E. S. (2021). The new leadership paradigm in digital health and its relations to hospital services. Jurnal Ilmu Kesehatan Masyarakat, 12(2), 89–103.

[18.] Lobho, K. E. T., Tanu, L. S. N., Ika, H., Luni, D., & Sula, Y. I. (2024). Peran Digitalisasi dalam Penanggulangan Stunting: Solusi Inovatif untuk Generasi Sehat. Indonesian Research Journal on Education, 4(2), 1152–1161.

[19.] Lukito, M., & Gani, A. (2024). Pelayanan Kesehatan Yang Efisien Dan Terjangkau Melalui Transformasi Kesehatan Digital Via Telemedicine Di Indonesia. Jurnal Kesehatan: Jurnal Ilmiah Multi Sciences, 14(2), 107–117.

[20.] Mamesah, N. F. H., Andiansyah, L., & Yusuf, H. (2025). Strategi Idi Dalam Menghadapi Tantangan Di Era 5.0. Jurnal Intelek Insan Cendikia, 2(1), 684–694.

[21.] Maspul, K. A., & Putri, N. K. (2025). Big Data and Predictive Analytics for Indonesia's Economic Transformation and Digital Resilience. Journal of Technology and System Information, 2(2), 22.

[22.] Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, L. J., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, J., … Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ, 372, n71. https://doi.org/10.1136/bmj.n71

[23.] Pitaloka, A. A., & Nugroho, A. P. (2021). Digital transformation in Indonesia health care services: social, ethical and legal issues. J. STI Policy Manag, 6(1), 51–66.

[24.] Pongtambing, Y. S., & Sampetoding, E. A. M. (2023). Transformasi digital pada layanan kesehatan berkelanjutan di Indonesia. SainsTech Innovation Journal, 6(2), 412–420.

[25.] Primasatya, S. (2024). Perlindungan Terhadap Perkembangan Layanan Kesehatan Berbasis Kecerdasan Buatan (Artificial Intelligence) Di Indonesia: Protection Regarding The Development Of Artificial Intelligence-Based Health Service Technology In Indonesia. Jurnal Globalisasi Hukum, 1(1), 78–93.

[26.] Putra, D. K. (2024). Pengembangan Aplikasi Berbasis Mobile untuk Peningkatan Layanan Kesehatan. Circle Archive, 1(6).

[27.] Rerey, H. V., Syauki, A. Y., Waqqosh, A., Limijadi, E. K. S., & Ruhana, F. (2023). Economic and management strategies for optimizing healthcare services: A case study on telemedicine in Indonesia. Jurnal Aisyah: Jurnal Ilmu Kesehatan, 8(3).

[28.] Roswita, R., & Nurhayati, N. (2024). Efektifitas Telenursing Dalam Pemantauan Tekanan Darah Pada Pasien Dengan Hipertensi: Literature Review. Jurnal Skala Kesehatan, 15(1), 26–32.

[29.] Santoso, F. S., Ramadhani, P. A., Amnamuchlisah, D., & Purba, S. H. (2025). Transformasi Digital Dalam Sektor Kesehatan Kajian Literatur Untuk Mendukung Inovasi dan Efisiensi Layanan Kesehatan. Cindoku: Jurnal Keperawatan dan Ilmu Kesehatan, 2(1), 1–12.

[30.] Santoso, I., Supriyadi, R., & Utami, W. (2025). The Role of Artificial Intelligence in Indonesia's Digital Transformation: Challenges and Opportunities in 2024. AlgoVista: Journal of AI and Computer Science, 2(2), 1–6.

[31.] Saragih, E., Paramarta, V., Thungari, G. I., Kalangi, B., & Putri, K. M. (2023). Era Disrupsi Digital pada Perkembangan Teknologi di Indonesia. Transformasi: Journal of Economics and Business Management, 2(4), 141–149.

[32.] Sebastian, R. (2024). The Role of Artificial Intelligence in Telemedicine: Legal Considerations under Indonesian Health Laws. Devotion: Journal of Research and Community Service, 5(12), 1558–1568.

[33.] Sutanto, E. B., Christyana, T. L. P. I., Mandagie, A. K., Tjitradinata, C., & Simanjuntak, H. E. (2023). Erosi Ketimpangan Kesehatan Digital. Praxis: Jurnal Sains, Teknologi, Masyarakat dan Jejaring, 5(2), 175–187.

[34.] Tutuko, B., Nurmaini, S., Rachmatullah, M. N., Darmawahyuni, A., & Firdaus, F. (2020). A Deep Learning Approach to Integrate Medical Big Data for Improving Health Services in Indonesia. Computer Engineering & Applications Journal, 9(1).

[35.] Widjaja, G., Sijabat, H. H., & Dhanudibroto, H. (2025). Technology-Based Health Communication: Legal Regulation, Telemedicine Implementation, And Patient Data Protection In The Era Of Digital Transformation. Jurnal Komunikasi, 3(5), 194–203.

[36.] Yusriadi, Y., Rusnaedi, R., Siregar, N. A., Megawati, S., & Sakkir, G. (2023). Implementation of artificial intelligence in Indonesia. International Journal of Data and Network Science, 7.