

Healthcare Innovation Models Using Emerging Technologies

Marie-Eve Laporte

Professor, University Paris-Saclay, France

Abstract

Healthcare systems are increasingly influenced by emerging technologies that support innovative approaches to diagnosis, treatment, monitoring, administration, and patient engagement. Artificial intelligence, Internet of Things technologies, robotics, wearable devices, blockchain, cloud computing, advanced analytics, three-dimensional printing, virtual reality, and biomedical engineering are creating new possibilities for healthcare transformation. This study examines healthcare innovation models using emerging technologies, with particular emphasis on technological integration, patient-centered care, intelligent decision support, remote monitoring, personalized treatment, operational efficiency, and digital healthcare delivery. A qualitative descriptive and conceptual research design was adopted through a review of secondary academic literature.

The analysis identifies technology-enabled healthcare innovation as a multidimensional process involving digital infrastructure, clinical integration, data management, intelligent analytics, human-centered design, and organizational readiness. Emerging technologies can improve access to healthcare, strengthen continuous monitoring, support early diagnosis, optimize resource utilization, and facilitate personalized services. However, challenges related to cybersecurity, interoperability, regulatory compliance, implementation cost, digital inequality, data quality, workforce capabilities, and patient acceptance can restrict adoption.

The study concludes that successful healthcare innovation requires integrated models that combine technological capabilities with clinical evidence, organizational preparedness, ethical governance, patient participation, and sustainable implementation strategies. Future research should investigate scalable healthcare innovation frameworks, intelligent clinical ecosystems, privacy-preserving technologies, digital twins, advanced robotics, personalized medicine, and equitable technology adoption.

Keywords: Healthcare Innovation, Emerging Technologies, Artificial Intelligence, Internet of Things, Digital Healthcare, Robotics, Wearable Technologies, Telemedicine, Healthcare Analytics, Smart Healthcare.

1. Introduction

Healthcare innovation has become increasingly important as healthcare systems respond to growing patient expectations, complex diseases, aging populations, increasing healthcare costs, and demand for

accessible services. Traditional healthcare delivery models are progressively being complemented by technology-enabled approaches that use digital infrastructure, intelligent systems, connected devices, advanced analytics, and automated processes.

Emerging technologies provide opportunities to redesign healthcare services and create more responsive, efficient, personalized, and patient-centered models of care. Artificial intelligence represents one of the most influential emerging technologies in healthcare innovation. Machine-learning algorithms can analyze medical images, electronic health records, physiological signals, and other forms of healthcare data. AI-enabled systems can support clinical decision-making, disease prediction, risk assessment, and operational planning. However, effective implementation requires reliable data, clinical validation, transparency, appropriate human oversight, and responsible governance.

The Internet of Things has also created opportunities for connected healthcare ecosystems. IoT-enabled medical devices and sensors can continuously collect patient information and transmit it to healthcare platforms. Remote monitoring can support chronic disease management, home-based care, and early identification of abnormal physiological conditions. Connected technologies can therefore extend healthcare services beyond hospitals while enabling healthcare professionals to access more continuous patient information.

Wearable technologies provide another important foundation for healthcare innovation. Smartwatches, wearable patches, smart textiles, and biosensing devices can collect physiological and behavioral information. Continuous data collection can support health monitoring, preventive care, physical activity assessment, and remote patient management. The development of smaller, more comfortable, energy-efficient, and reliable wearable devices is expanding their potential healthcare applications.

Robotics is transforming several areas of healthcare delivery. Surgical robots can assist clinicians with precise movements and controlled procedures, while rehabilitation robots can support structured therapeutic activities. Service and assistive robots can also contribute to hospital logistics and patient support. Robotics can improve automation and precision, but successful deployment requires safety mechanisms, reliable control systems, clinical training, and appropriate human-machine interaction.

Telemedicine has become an important technology-enabled healthcare model. Digital communication platforms allow patients to interact with healthcare professionals without always requiring physical visits. Telemedicine can improve access to specialized healthcare and support remote consultations, particularly for patients located far from healthcare facilities. Its effectiveness depends on digital infrastructure, communication quality, patient accessibility, clinical suitability, and data security.

Cloud computing provides scalable infrastructure for storing and processing healthcare information. Cloud-based systems can support collaboration between healthcare institutions, facilitate data access, and provide computational resources for advanced analytics. However, healthcare organizations must address privacy, security, access control, data governance, and regulatory requirements when implementing cloud-based healthcare technologies.

Big data analytics supports healthcare innovation by enabling organizations to analyze large and diverse datasets. Healthcare information may include clinical records, laboratory results, medical images, sensor data, genomic information, and administrative records. Advanced analytics can identify

patterns, predict risks, and support resource planning. Data quality and appropriate analytical methods are essential to prevent inaccurate conclusions.

2. Objectives of the Study

The primary objective of this study is to examine healthcare innovation models using emerging technologies and evaluate how artificial intelligence, IoT, robotics, wearable devices, cloud computing, advanced analytics, mobile health, and other technologies can support diagnosis, treatment, monitoring, patient engagement, healthcare administration, and personalized care while addressing technological, organizational, ethical, security, and accessibility requirements.

2.1 Examination of Emerging Healthcare Technologies

The first objective is to examine major emerging technologies contributing to healthcare innovation, including artificial intelligence, IoT, robotics, wearable devices, cloud computing, blockchain, advanced analytics, virtual reality, three-dimensional printing, and digital twins.

The study considers their technological capabilities and potential applications across diagnosis, monitoring, treatment, rehabilitation, administration, and patient-centered healthcare delivery.

2.2 Assessment of Healthcare Innovation Applications

The second objective is to assess how emerging technologies contribute to healthcare innovation through intelligent decision support, remote monitoring, personalized medicine, automated workflows, digital consultation, predictive analytics, and connected healthcare services.

The study evaluates their potential to improve healthcare accessibility, operational efficiency, patient engagement, clinical decision-making, service quality, and continuity of care.

2.3 Identification of Implementation Requirements

The third objective is to identify major requirements for successful healthcare technology implementation, including cybersecurity, interoperability, data quality, clinical validation, regulatory compliance, workforce training, patient acceptance, affordability, digital inclusion, and organizational readiness.

The study emphasizes that technological innovation must be supported by appropriate governance, infrastructure, ethical safeguards, and sustainable implementation strategies.

3. Review of Literature

3.1 Artificial Intelligence and Digital Healthcare Innovation

Topol (2019) emphasized the growing convergence between artificial intelligence and healthcare, identifying opportunities for AI to support diagnosis, prediction, monitoring, and clinical decision-making. AI-based healthcare innovation can process complex datasets and identify patterns that may assist healthcare professionals.

However, clinical oversight, data quality, validation, transparency, and responsible implementation remain necessary for meaningful healthcare applications. Davenport and Kalakota (2019) examined the role of artificial intelligence in healthcare and identified applications across

diagnosis, clinical decision support, patient engagement, and administrative processes. Their work suggests that AI can improve healthcare processes when integrated appropriately into existing systems. Organizational readiness, workflow integration, and professional acceptance remain important factors affecting implementation.

3.2 Connected Technologies and Remote Healthcare

Islam et al. (2015) reviewed Internet of Things applications in healthcare and highlighted the potential of connected devices for monitoring, communication, and healthcare service delivery. IoT technologies can connect patients, medical devices, healthcare professionals, and information systems. However, security, interoperability, reliability, and data management represent continuing challenges for connected healthcare ecosystems.

Ting et al. (2020) discussed the growing role of digital technologies in healthcare transformation. Digital platforms, connected devices, and data-driven systems can support remote services and improve healthcare accessibility. The literature indicates that technological innovation must be accompanied by appropriate infrastructure, professional training, privacy protection, and effective integration with existing healthcare processes.

3.3 Wearable Technologies and Personalized Healthcare

Kim et al. (2019) examined wearable biosensors and their potential for healthcare monitoring. Wearable devices can continuously collect physiological information and provide data for health assessment. Their contribution depends on sensor accuracy, device comfort, energy efficiency, data interpretation, and integration with healthcare systems. These factors determine whether wearable technologies can generate clinically meaningful information.

Swan (2012) discussed the potential of wearable and quantified-self technologies to support personalized health management. Continuous data collection can increase awareness of individual health conditions and behaviors. The literature suggests that personalized healthcare technologies may strengthen patient engagement, although privacy, data interpretation, digital literacy, and long-term adherence remain important considerations.

4. Research Methodology

4.1 Research Design

This study adopted a qualitative descriptive and conceptual research design to examine healthcare innovation models using emerging technologies. The design was selected because the study focuses on identifying technological applications, healthcare contributions, implementation requirements, and challenges through existing academic knowledge rather than collecting primary clinical data.

The conceptual analysis examined relationships between emerging technologies, healthcare processes, patient outcomes, organizational capabilities, and implementation conditions. Major technology categories included artificial intelligence, IoT, robotics, wearable devices, cloud computing, analytics, blockchain, mobile health, virtual reality, and three-dimensional printing.

4.2 Data Collection

Secondary information was obtained from academic literature addressing emerging healthcare technologies and digital healthcare innovation. The reviewed literature included peer-reviewed journal publications, academic books, and established scholarly research covering AI, IoT, wearable technologies, robotics, healthcare analytics, telemedicine, digital health, and biomedical innovation.

The literature was organized according to technology type, healthcare application, expected contribution, and implementation requirement. Particular attention was given to technologies supporting diagnosis, monitoring, treatment, rehabilitation, patient engagement, clinical decision-making, healthcare administration, and remote service delivery.

4.3 Data Analysis

The collected literature was analyzed using thematic analysis. Major themes included intelligent healthcare, connected systems, personalized care, continuous monitoring, healthcare automation, clinical decision support, patient engagement, data management, cybersecurity, interoperability, organizational readiness, and equitable technology adoption.

A conceptual synthesis was developed to compare the contributions of emerging technologies across healthcare functions. The analysis considered technological capability together with clinical usefulness, safety, data requirements, organizational integration, patient acceptance, cost, scalability, and sustainability. This approach supported the identification of common patterns and implementation challenges.

5. Analysis

5.1 Emerging Technologies Supporting Healthcare Innovation

Emerging technologies are increasingly being incorporated into healthcare systems to improve clinical services, patient monitoring, operational processes, and decision-making. Artificial intelligence can analyze complex healthcare information, while IoT technologies facilitate communication among connected medical devices. Wearable technologies support continuous physiological monitoring, and robotics can assist surgical and rehabilitation activities.

Cloud computing provides scalable infrastructure for healthcare data, while advanced analytics supports prediction and planning. These technologies demonstrate that healthcare innovation increasingly depends on integrated digital and technological capabilities rather than isolated technological applications.

Table 1: Emerging Technologies and Their Healthcare Contributions

Emerging Technology	Major Healthcare Application	Primary Contribution
Artificial Intelligence	Diagnosis and prediction	Intelligent decision support
Internet of Things	Remote monitoring	Continuous data collection
Wearable	Physiological monitoring	Patient-centered monitoring

Emerging Technology	Major Healthcare Application	Primary Contribution
Technologies		
Robotics	Surgery and rehabilitation	Precision and automation
Cloud Computing	Data management	Scalable infrastructure
Big Data Analytics	Healthcare analytics	Pattern and risk identification
Blockchain	Data management	Data integrity and controlled access
3D Printing	Customized healthcare	Personalized manufacturing
Virtual Reality	Training and rehabilitation	Immersive healthcare experiences
Digital Twins	Simulation and planning	Predictive and personalized analysis

The table demonstrates that emerging technologies perform complementary healthcare functions. AI and analytics emphasize information processing, IoT and wearables focus on continuous data acquisition, while robotics provides physical assistance and automation. Cloud computing supports infrastructure and data management, whereas 3D printing and digital twins contribute to personalization. Their combined use can create integrated healthcare innovation models capable of supporting multiple stages of healthcare delivery.

5.2 Healthcare Applications of Emerging Technologies

Healthcare innovation models can apply emerging technologies across diagnosis, monitoring, treatment, administration, rehabilitation, and patient engagement. Diagnostic applications can use AI and advanced analytics, while IoT and wearable systems enable continuous monitoring. Robotics can support surgical and rehabilitation procedures, whereas telemedicine and mobile health platforms extend services beyond conventional healthcare facilities.

Cloud platforms enable information integration and collaborative access. These applications indicate that emerging technologies can influence both clinical and administrative processes when supported by suitable infrastructure and organizational capabilities.

Table 2: Healthcare Applications and Expected Innovation Outcomes

Healthcare Application	Technologies	Expected Outcome
Diagnosis	AI, Imaging Analytics	Improved diagnostic support
Patient Monitoring	IoT, Wearables	Continuous health observation
Treatment	Robotics, AI	Personalized and precise intervention
Rehabilitation	Robotics, VR	Improved therapeutic support
Remote Healthcare	Telemedicine, IoT	Expanded healthcare access
Administration	Automation, Analytics	Improved workflow efficiency
Patient Engagement	Mobile Health, Wearables	Greater participation
Personalized Care	AI, Genomics, Analytics	Individualized healthcare
Data Management	Cloud, Blockchain	Improved information handling
Healthcare Planning	Big Data, Digital Twins	Predictive resource management

The findings indicate that emerging technologies can support healthcare innovation at both patient and organizational levels. Their contribution extends from direct clinical support to administrative efficiency and patient engagement. However, technological deployment should be guided by clinical evidence, security requirements, interoperability, workforce readiness, and patient needs. Integrated implementation models are more likely to generate sustainable benefits than isolated adoption of individual technologies.

6. Discussion

Emerging technologies are reshaping healthcare by enabling more connected, intelligent, personalized, and responsive service models. Artificial intelligence, IoT, wearables, robotics, analytics, and cloud platforms can support different stages of healthcare delivery. Their greatest potential lies in integration, where multiple technologies operate together to generate continuous information, intelligent analysis, and coordinated services. Such integration can strengthen healthcare decision-making while improving operational efficiency and patient engagement.

intelligence can contribute to diagnosis, prediction, clinical decision support, and healthcare administration. Machine-learning systems can analyze complex datasets and identify patterns that may assist healthcare professionals. However, AI should complement rather than replace clinical expertise. Transparent models, reliable data, appropriate validation, human oversight, and responsible governance are necessary to ensure that AI-enabled healthcare innovations produce safe and clinically meaningful outcomes.

IoT and wearable technologies can strengthen continuous healthcare monitoring. Connected sensors can collect physiological information and transmit it to digital platforms for analysis. This approach may support remote patient management and early identification of health changes. Nevertheless, continuous monitoring creates substantial data-management and privacy requirements. Sensor reliability, interoperability, cybersecurity, patient adherence, and appropriate clinical response mechanisms must therefore be incorporated into healthcare innovation models.

Healthcare innovation also requires organizational and patient-centered transformation. New technologies can fail to deliver expected benefits when healthcare professionals are inadequately trained or when systems do not integrate with existing workflows. Patient acceptance, digital literacy, affordability, and accessibility also influence adoption. Sustainable innovation therefore requires collaboration among clinicians, engineers, administrators, policymakers, technology developers, and patients to ensure that emerging technologies address real healthcare requirements.

7. Challenges

7.1 Cybersecurity and Data Privacy

Emerging healthcare technologies generate and transmit substantial volumes of sensitive patient information. AI platforms, wearable devices, IoT systems, mobile applications, and cloud services can create additional points of vulnerability. Unauthorized access, data manipulation, and cyberattacks may compromise patient privacy and healthcare operations. Strong encryption, authentication, access controls, secure software development, regular updates, and continuous monitoring are required to protect healthcare information.

Data privacy is also affected by the increasing use of healthcare analytics and artificial intelligence. Large datasets may contain identifiable clinical, behavioral, and physiological information. Organizations must establish clear policies regarding data collection, storage, processing, sharing, and retention. Appropriate consent mechanisms, privacy-preserving techniques, governance frameworks, and accountability procedures are necessary to maintain patient trust while enabling responsible technology-based healthcare innovation.

7.2 Interoperability and Data Quality

Healthcare technologies often operate through different platforms, standards, and communication protocols. Lack of interoperability can prevent information from moving efficiently between medical devices, EHR systems, laboratories, hospitals, and digital health applications. Fragmented systems may reduce the value of collected information and create additional administrative workloads. Standardized interfaces, compatible data formats, and coordinated digital infrastructure are therefore important for effective healthcare technology integration.

Data quality presents another significant challenge because intelligent healthcare systems depend on accurate and representative information. Missing, inconsistent, biased, or incorrectly recorded data can reduce analytical reliability. AI systems may generate inappropriate results when trained on limited or unrepresentative datasets. Continuous data-quality assessment, standardized collection procedures, appropriate validation, and expert review are required to support reliable technology-enabled healthcare decisions.

7.3 Cost and Organizational Readiness

Implementing emerging healthcare technologies can require substantial financial investment in hardware, software, infrastructure, cybersecurity, maintenance, and workforce training. Smaller healthcare organizations may face particular difficulties because they have limited financial and technical resources. Sustainable implementation therefore requires careful economic evaluation, scalable technologies, phased deployment, and appropriate resource planning to ensure that technological investment produces measurable healthcare benefits.

Organizational readiness is equally important because technology implementation can change clinical workflows, professional responsibilities, and administrative procedures. Healthcare professionals require appropriate training and technical support to use new systems effectively. Leadership commitment, change-management strategies, interdisciplinary collaboration, and continuous evaluation can facilitate adoption. Without organizational preparedness, even technically advanced systems may remain underused or fail to achieve expected outcomes.

7.4 Digital Inequality and Patient Acceptance

Digital inequality can limit access to technology-enabled healthcare services. Patients may lack reliable internet connectivity, suitable devices, digital skills, or financial resources. Rural and underserved populations may face additional infrastructure limitations. Healthcare innovation models should therefore incorporate inclusive design, accessible technologies, alternative service channels, and appropriate support mechanisms to prevent emerging technologies from increasing existing disparities.

Patient acceptance also influences the long-term success of healthcare innovation. Concerns regarding privacy, usability, technological complexity, reliability, and personal control can affect adoption. Patients may discontinue using technologies that are inconvenient or difficult to understand. User-centered design, clear communication, informed participation, accessibility testing, and patient involvement in development can improve acceptance and encourage sustainable use.

8. Future Research

Future research should investigate integrated healthcare innovation models combining AI, IoT, wearable technologies, robotics, cloud computing, and advanced analytics. Greater attention should be given to real-time clinical decision support, personalized healthcare, digital twins, intelligent monitoring, and automated healthcare workflows. Research should also evaluate how these technologies can operate together within secure, interoperable, patient-centered healthcare ecosystems. Future studies should examine long-term clinical effectiveness, economic sustainability, cybersecurity, regulatory requirements, and equitable access.

Research should explore privacy-preserving AI, secure connected devices, explainable analytics, and scalable digital infrastructure. Additional investigation is needed into patient acceptance, workforce adaptation, digital literacy, environmental sustainability, and technology implementation across rural, urban, and resource-limited healthcare environments.

9. Conclusion

Emerging technologies are creating significant opportunities for healthcare innovation by transforming traditional approaches to diagnosis, monitoring, treatment, administration, and patient engagement. Artificial intelligence, IoT, wearable technologies, robotics, cloud computing, advanced analytics, and other technologies can provide new capabilities for healthcare organizations and professionals. Their integration can support more responsive and personalized healthcare delivery.

The analysis demonstrates that emerging technologies can contribute across multiple healthcare functions. AI and analytics can support intelligent decision-making, IoT and wearable devices can enable continuous monitoring, robotics can assist clinical and rehabilitation activities, and digital platforms can extend healthcare services remotely. These capabilities can strengthen operational efficiency, patient engagement, accessibility, and continuity of care.

However, technological innovation is accompanied by important implementation challenges. Cybersecurity, privacy, interoperability, data quality, cost, regulatory compliance, workforce preparedness, digital inequality, and patient acceptance must be addressed. Healthcare organizations should therefore evaluate technologies not only according to technical performance but also according to clinical effectiveness, usability, safety, affordability, and long-term sustainability.

Successful healthcare innovation requires collaboration among technology developers, healthcare professionals, researchers, policymakers, administrators, and patients. Emerging technologies should be implemented through evidence-based and patient-centered models that integrate technological capabilities with clinical workflows and ethical safeguards. Responsible governance and continuous evaluation are essential for maintaining trust and improving outcomes.

Overall, healthcare innovation models using emerging technologies can contribute to the development of more intelligent, connected, personalized, and efficient healthcare systems. Future progress will depend on effective technology integration, secure data management, clinical validation, organizational readiness, and equitable access. When these conditions are appropriately addressed, emerging technologies can provide sustainable opportunities for improving healthcare quality and patient-centered service delivery.

References

1. Syeeda, M. S., Poudel, N., Ngorsuraches, S., Veettil, S. K., & Chaiyakunapruk, N. (2022). Characterizing attributes of innovation of technologies for healthcare: A systematic review. *Journal of Medical Economics*, 25(1), 1158–1166.
2. Junaid, S. B., Imam, A. A., Balogun, A. O., De Silva, L. C., Surakat, Y. A., Kumar, G., Abdulkarim, M., Shuaibu, A. N., Garba, A., Sahalu, Y., Mohammed, A., Mohammed, T. Y., Abdulkadir, B. A., Abba, A. A., Kakumi, N. A. I., & Mahamad, S. (2022). Recent advancements in emerging technologies for healthcare management systems: A survey. *Healthcare*, 10(10), 1940.
3. Naik, N., Hameed, B. M. Z., Sooriyaperakasam, N., Vinayahalingam, S., Patil, V., Smriti, K., Saxena, J., Shah, M., Ibrahim, S., Singh, A., Karimi, H., Naganathan, K., Shetty, D. K., Rai, B. P., Chlosta, P., & Somani, B. K. (2022). Transforming healthcare through a digital revolution: A review of digital healthcare technologies and solutions. *Frontiers in Digital Health*, 4, 919985.

4. Sarker, I. H. (2021). Machine learning: Algorithms, real-world applications and research directions. *SN Computer Science*, 2, 160.
5. Gunasekeran, D. V., Tseng, R. M. W. W., Tham, Y. C., & Wong, T. Y. (2021). Applications of digital health for public health responses to COVID-19: A systematic scoping review of artificial intelligence, telehealth and related technologies. *npj Digital Medicine*, 4, 40.
6. Bhavnani, S. P., Narula, J., & Sengupta, P. P. (2016). Mobile technology and the digitization of healthcare. *European Heart Journal*, 37(18), 1428–1438.
7. Haleem, A., Javaid, M., Khan, I. H., & Vaishya, R. (2021). Significant applications of big data in COVID-19 pandemic. *Indian Journal of Orthopaedics*, 55, 237–245.
8. Radanliev, P., De Roure, D. C., Walton, R., Van Kleek, M., Santos, O., & Ani, U. D. (2020). COVID-19 pandemic makes real-world digital transformation in healthcare inevitable. *Digital Health*, 6, 1–4.
9. Keesara, S., Jonas, A., & Schulman, K. (2020). Covid-19 and health care's digital revolution. *New England Journal of Medicine*, 382, e82.
10. Tuli, S., Tuli, S., Wander, G., et al. (2020). Next generation technologies for smart healthcare: Challenges, vision, model, trends and future directions. *Internet Technology Letters*, 3(2), e145.
11. Meskó, B., Drobni, Z., Bényei, É. J., Gergely, B., & Györfy, Z. (2017). Digital health is a cultural transformation of traditional healthcare. *mHealth*, 3, 38.
12. Topol, E. J. (2019). High-performance medicine: The convergence of human and artificial intelligence. *Nature Medicine*, 25, 44–56.
13. Esteva, A., Robicquet, A., Ramsundar, B., Kuleshov, V., DePristo, M., Chou, K., Cui, C., Corrado, G., Thrun, S., & Dean, J. (2019). A guide to deep learning in healthcare. *Nature Medicine*, 25, 24–29.
14. Rajkomar, A., Dean, J., & Kohane, I. (2019). Machine learning in medicine. *New England Journal of Medicine*, 380(14), 1347–1358.
15. Jiang, F., Jiang, Y., Zhi, H., Dong, Y., Li, H., Ma, S., Wang, Y., Dong, Q., Shen, H., & Wang, Y. (2017). Artificial intelligence in healthcare: Past, present and future. *Stroke and Vascular Neurology*, 2(4), 230–243.
16. Islam, S. M. R., Kwak, D., Kabir, M. H., Hossain, M., & Kwak, K. S. (2015). The Internet of Things for health care: A comprehensive survey. *IEEE Access*, 3, 678–708.
17. Kruse, C. S., Krowski, N., Rodriguez, B., Tran, L., Vela, J., & Brooks, M. (2017). Telehealth and patient satisfaction: A systematic review and narrative analysis. *BMJ Open*, 7(8), e016242.
18. Aceto, G., Persico, V., & Pescapé, A. (2020). Industry 4.0 and health: Internet of Things, big data, and cloud computing for healthcare. *Journal of Network and Computer Applications*, 145, 102417.
19. Secinaro, S., Calandra, D., Lanzalonga, F., & Ferraris, A. (2021). KETs and digital technologies for healthcare innovation: A systematic literature review. *Technological Forecasting and Social Change*, 166, 120631.
20. Radanliev, P., De Roure, D., Walton, R., Van Kleek, M., Montalvo, R. M., Santos, O., & Ani, U. D. (2020). COVID-19 and the digital transformation of healthcare. *Digital Health*, 6, 1–12.