Review Article

Fintech and healthtech synergism: Pioneering a digital healthcare revolution for accessible, affordable, and effective patient-centered care

Rushikesh Shukla[1], Harshit Bagotia[1], Poorvikha Satish[2], H Shruthi Kamath[3], Swastika Chatterjee[4], Donald Savariah[5], Ved Kaulgud[6], Harsha Gobburi[7], Sourya Acharya[8]

[1]Department of Medicine, Jawaharlal Nehru Medical College, DMIHER (DU), Maharashtra, India, [2]Department of Internal Medicine, St John's Medical College Hospital, Bangalore, India, [3]Department of Medicine, Kasturba Medical College, Manipal, Karnataka, India, [4]Department of Medicine, Tbilisi State Medical University, Tibsili, Georgia, [5]Department of Medicine, Belarusian State Medical University, Minsk, Belarus, [6]Department of Medicine, HBT Medical College, Maharashtra, India, [7]Department of Medicine, Osmania Medical College, Hyderabad, India, [8]Head of Medicine, Jawaharlal Nehru Medical College, DMIHER (DU), Maharashtra, India

Abstract

The blending of financial technology (fintech) and health technology (healthtech) has the potential to bring about major changes in the healthcare industry. In this review, we have delved into this convergence and explored how it can improve healthcare access, affordability, and patient outcomes. Beginning with a delineation of fintech and healthtech, we analyzed the impact of financial innovations such as mobile payment systems, crowdfunding platforms, and blockchain technology on healthcare. Additionally, we examined the rising trends in healthtech integration, such as telemedicine, wearable devices, and health data analytics, and how these technologies intersect with financial systems to enhance healthcare delivery. By showcasing real-life examples and case studies, the study demonstrated how fintech and healthtech solutions have been successfully implemented in healthcare settings. But why doesn't everyone take them up? Regulatory complexities along with ethical considerations are two of the main barriers toward large-scale adoption of these solutions, besides technological limitations. It is crucial to meet these challenges if financial and healthcare solutions are going to be successfully combined through continued innovation.

Keywords: Blockchain, fintech, healthtech

Introduction

Healthcare innovation is a fast-growing industry. The COVID-19 pandemic has caused an increase in the demand for accessible and more affordable healthcare, leading to innovation. Financial technology (fintech) and health technology (healthtech) have revolutionized respective industries through their creative application in service delivery, access, and experience delivery. Fintech refers to the application of technology in offering a wide range of financial services and products. Fintech has overturned the conventional financial services industry by creating more personalized, prompt, safe, and comfortable financial services that have improved customer experiences and decision-making processes through increased accessibility,

Address for correspondence: Dr. Rushikesh Shukla, Department of Medicine, Jawaharlal Nehru Medical College, Sawangi, Wardha, Maharashtra, India.
E-mail: Rushikeshshukla786@gmail.com

Received: 09-06-2024 **Revised:** 16-08-2024
Accepted: 18-09-2024 **Published:** 25-03-2025

Access this article online

Quick Response Code:

Website: http://journals.lww.com/JFMPC

DOI: 10.4103/jfmpc.jfmpc_999_24

How to cite this article: Shukla R, Bagotia H, Satish P, Kamath HS, Chatterjee S, Savariah D, *et al*. Fintech and healthtech synergism: Pioneering a digital healthcare revolution for accessible, affordable and effective patient-centered care. J Family Med Prim Care 2025;14:820-4.

higher productivity, and innovative payment methods. The term "healthtech" describes the application of technology to enhance the effectiveness, efficiency, and outcomes of healthcare services. Telemedicine,[1] robotic services,[2] rapid adoption of them, and the reconfiguration of established supply systems[3] are examples of this transformation that has opened new opportunities within the industry.

Healthcare and financial services share many characteristics, including complex systems, dissatisfied clients, and legacy organizations. Both industries are controlled by powerful individuals, highly regulated, and opaque. However, healthcare is beginning to shift as fintech enters the healthtech space. This convergence is fueled by society's demand for high-quality services that prioritize patient needs and reduce the increasing and unpredictable workload on medical personnel due to a surge in patient numbers.[4] The inclusion of fintech has already sped up the transmission of payments, increased clarity, and improved money management within healthcare. Administrative costs are now substantially lower, thanks to this trend which has also led to better efficiency while offering personalized financial experiences for patients. This fintech and healthtech team-up can help with rising chronic illness costs. Businesses have begun adopting gamification and behavioral economics to influence healthy behaviors among patients. For instance, they have gamified wellness by rewarding physical fitness, reducing medical non-adherence, and incentivizing compliance with medication timetables or regular doctor's visits. It also provides options for both patients and doctors, such as tracking the disease spread, carrying out automated screening; and getting suggestions in case of a disease.[5]

The healthcare sector can be revolutionized by technology if it is properly used to address current and emerging issues according to various scholars and industry experts.[6-8] Thus, this paper aims at exploring the intersection between fintech and healthtech as it is facilitating medical innovations. The challenges and future directions of the integration have been discussed, including the key obstacles facing its adoption and some of the possible ethical, technological, and regulatory concerns that can ensure that there will be more innovation in the future.

Discussion

Fintech, short for financial technology, is an amalgamation of financial services and technology, that employs modern, innovative technologies to automate financial services and processes in any industry.[9] In recent years, fintech and healthtech have become intricately intertwined, ushering in the advent of emerging financial technologies such as artificial intelligence (AI), embedded systems, wireless communication, information security, and medical technology.[10] Although fintech is a relatively modern concept, the burgeoning industry has been growing at a frenetic pace since the mid-twentieth century. The genesis of technological innovation in the finance sector can be traced back to the introduction of cheques as a mode of payment in 1945, followed by credit cards in 1958, and subsequently ATMs in 1967. In the 1990s and early 2000s, bolstered by the advent of the Internet, mobile payments and crowdfunding burgeoned, representing a disruption to the financial sector.[11] Today, fintech provides a veritable smorgasbord of products and applications to the user, including financing services such as crowdfunding; innovative credit solutions such as peer-to-peer lending, invoice factoring, asset allocation, and personal finance management services to track investment and retirement savings; alternative payment solutions such as blockchain and cryptocurrencies; and insurance, search engines, IT infrastructure among many others. Fintech tools such as risk stratification algorithms and predictive analytics also enable healthcare organizations to identify high-risk patients, optimize healthcare care delivery, improve cost-effectiveness, and ultimately improve the overall quality of care.[12]

This intersection of fintech and healthtech has revolutionized the healthcare industry, particularly in the realm of digitization of payment processing. Traditionally, healthcare payments have been fraught with challenges such as high transaction costs, tedious reimbursement processes, and concerns about data security.[13] Now, with the integration of fintech solutions into healthcare systems, significant advancements have been made to payment processing, accessibility, and management, improving operational efficiency for healthcare providers while simultaneously enhancing the overall patient experience. By leveraging technologies such as electronic billing systems, digital wallets, and a wide array of money transfer applications, seamless and secure payments from their smartphones or computers may become the norm for most patients. Apart from improving convenience for patients, it also accelerates payment cycles for healthcare establishments by increasing revenue streams and reducing administrative overhead, thereby saving a lot of time for both parties involved. Nowadays, smart contracts and blockchain technologies are also being deployed to immutably record transactions to ensure a traceable and transparent trail of payment activity. This helps mitigate billing inaccuracies, attenuate the risk of financial fraud, and ensure that payments are processed securely and recorded accurately, preventing the risk of forged transactions, through integrated multifield decentralized network frameworks such as blockchain [Figure 1].[14] Therefore, fintech solutions are enabling greater transparency and efficiency in healthcare payments.

Blockchain, also known as distributed ledger technology, is one of the most important innovations in the IT sector that has captured the imagination of financial institutions across the globe. Blockchain is a decentralized, continuously expanding ledger where each "block" contains a cryptographic hash derived from the previous block. Each digital record is stored immutably, which means that the information is encrypted in such a way that it makes it impossible to decipher on computers in the network. Although blockchain has been largely used for cryptocurrency, financial transactions, and other industries such as manufacturing and entertainment, stakeholders are aggressively pursuing the blockchain-enabled healthcare system to optimize business

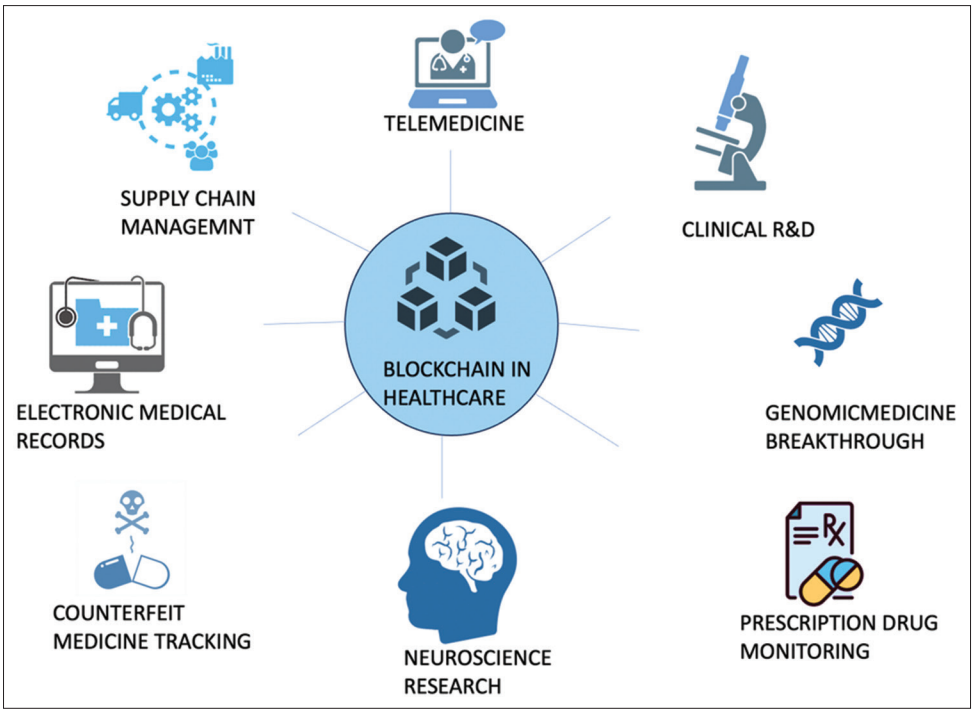

Figure 1: Advantages of blockchain in healthcare

processes, lower overhead costs, enhance compliance, overcome inefficient bureaucratic processes, improve patient outcomes, and enable better use of healthcare data.[15] An IBM research of Life Sciences leaders from 18 countries found that more than 70% of respondents believe blockchain would eventually supersede legacy systems due to its speed and efficiency.[14] In 2019, Anthem, the second-largest health insurance carrier, said that it would employ blockchain technology to store patient health data for 40 million of its customers.[16] The benefits of incorporating blockchain for payments in the healthcare sector are manifold. First, given the improved transparency and security of data without any third-party interference, mistrust between patients and physicians can be eliminated. Second, smart contracts could mitigate fraud and reduce administrative costs by expediting the claims processing workflow and speeding up the payout process for policyholders. Blockchains can help streamline and automate the process of linking financial penalties and reimbursements to specific health outcomes in the blockchain medical records, reducing human intervention, and thereby reducing the possibility of errors.[15] Therefore, from using diverse digital distribution channels to bypass traditional intermediaries such as brokers or agents selling policies to consumers to underwriting and risk management, Insurtech is harnessing the power of technology to drive greater efficiency and customer-centricity in this field.

Another fintech innovation that has enraptured public attention, especially during the COVID-19 pandemic is crowdfunding platforms, such as GoFundMe, Indiegogo, and Kickstarter, which raise funds for a variety of causes by collecting small contributions from a large number of people, the most prominent among which is individuals lacking financial resources to access the health services that they require. Crowdfunding can help significantly with the attainment of universal health coverage, which is encapsulated within the 2030 Agenda of the Sustainable Development Goals by harnessing the collective power of global communities, mobilizing resources, and reducing financial exclusion of people, particularly in low- and middle-income countries, to access quality health services.[17] Furthermore, fintech solutions allow patients to pay for their medical expenses through low-interest loan methods, which will have significant implications for the underprivileged sections of society and address a key challenge of poverty alleviation.

The COVID-19 pandemic: A case study of fintech and healthtech

Most notably, in the recent past, the COVID-19 pandemic was not only unprecedented in terms of a mutating, transmissible virus that had transcended geographical boundaries but also brought to the fore the stark lack of patient-driven interoperability plaguing the current healthcare system. Safe retrieval, dissemination, and effective management of patient data across disparate systems became another crucial challenge besetting the already floundering healthcare system. Given the fact that medical records are voluminous, inaccessible, and non-standardized, the portability of data to coordinate care, appraise quality, reduce medical errors, and perform real-time data analysis to inform public policy becomes extremely essential. Deploying the blockchain system could have easily circumvented this recordkeeping problem by reconciling records and activities of patients across multiple healthcare providers.[18]

Healthcare IT, at the confluence of massive data, AI, blockchain systems, cloud technology, Internet of Things, and smart

wearables, had a substantial synergic effect on counteracting a grave public health crisis such as COVID-19. Introduced by tech companies Apple, Google, and Amazon, wearables continuously monitor individual health parameters, including movement, body temperature, respiratory sounds, heart rate, and heart rate variability, throughout the day with the help of sensors.[19] The vast amounts of health data generated from these wearables can foster digital health research by informing preventive guidelines and encouraging holistic lifestyles among individuals. Additionally, it bolsters telemedicine and remote consultation as physicians are able to monitor the patient's condition in real time without physical contact. Up-to-date, precise, and comprehensive medical records will not only empower patients to monitor their health data but also enable physicians to keep track of their previous medical history such as allergies, comorbidities, and vaccination status in perpetuity. This may increase the probability of an accurate diagnosis and the likelihood of successful treatments, furthering the vision of delivering cost-effective care.[20]

Challenges and future directions

Although versatile and nimble, fintech applications are still in their early stages and have not been widely adopted across industries. There are no successful fintech models on the market that healthcare organizations may mimic. Fintech research is still in its early phases, making it difficult to evaluate its usefulness in the actual world. Cost, complexity, unpredictability, and a lack of awareness of this technology, as well as social, legal, and governance constraints, are among the barriers to its rapid deployment.

Technologies such as blockchain have proven extremely beneficial in bulwarking healthcare records from ransomware and cyberattacks, which could not be achieved by the aging, centralized legacy IT infrastructure widely used in hospitals today. This means that healthcare firms will no longer need to invest in advanced security technology such as encryption, AI, large backups, and real-time security platforms to secure patient data from hackers and breaches. It is expected that by 2027, the healthcare industry will consume approximately 20% of the US GDP.[21] According to studies, integrating blockchain technology into healthcare could save up to $100 billion per year by 2025, resulting in lower operational expenses, data breach costs, IT costs, counterfeit-related frauds, and insurance frauds. However, corporations are unsure about the scalability of these technologies.[14] Only authorized users can access and manipulate data once public and private keys have been established. This strategy effectively safeguards patients' privacy and rights while limiting data leakage and misuse.[22] In addition, it boosts confidence in healthcare institutions, assuring the industry's continuous expansion and the protection of patients' data. Blockchain technology ensures transaction security while also allowing patients to control who has access to their data.[23]

The digital health environment today is no longer a static, tangible platform, but encompasses an overarching ecosystem that fosters a collaborative, consummate digital health environment. Whether considered "revolutionary" or "disruptive," fintech innovations must keep abreast with the unique healthcare requirements of a diverse set of consumers, patients, healthcare professionals, pharmacies, insurers, and regulators alike. With tech giants foraying into the healthcare industry, there have been concerted efforts to implement strategies to secure sufficient funding for the long-term sustainability and scalability of the digital health environment to ensure it attains its maximum potential.

By and large, technological integration with healthcare management has been glacially slow due to regulatory constraints, inconsistent backend systems, and fragmented medical information. In conclusion, the intersection of fintech and healthtech is reshaping the landscape of healthcare payments, driving innovation, efficiency, and improving patient experiences. As these technologies continue to evolve and integrate further into healthcare systems, we can expect to see a paradigm shift in healthcare payments and delivery in the years to come.

Conclusion

We believe that we are witnessing just the beginning of a digital revolution in healthcare, and the convergence of health and fintech will be the game-changer, tackling some of healthcare's most urgent challenges such as limited access, soaring costs, and gaping disparities in outcomes. The rise in the costs of healthcare is due to emerging medical technology, which can be mitigated by the implementation of robust health technology assessment processes to evaluate the clinical effectiveness, cost-effectiveness, and safety of new medical technologies before they are widely adopted. By analyzing improved health outcomes relative to their cost, financial innovations can provide valuable insights into the adoption of such technologies on a larger scale. Prioritization and appropriate healthcare budgeting are essential to ensure that resources are allocated to the most cost-effective, evidence-based, and promising medical technologies. However, societal acceptance of these advancements is of paramount importance to facilitate the effective integration of fintech and healthtech. There is still much room for research and development in this field, as well as opportunities for collaboration among regulatory agencies, fintech firms, and healthcare providers. By working together to overcome barriers and foster innovation, stakeholders can improve access, affordability, and healthcare outcomes.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Nyame-Asiamah F. Improving the 'manager-clinician' collaboration for effective healthcare ICT and telemedicine adoption processes – A cohered emergent perspective. Inf Technol Dev 2020;26:525-50.

2. Kaiser MS, Al Mamun S, Mahmud M, Tania MH. Healthcare robots to combat COVID-19. In: COVID-19: Prediction, Decision-Making, and Its Impacts. Springer Singapore; 2021. p. 83-97.
3. Mollenkopf DA, Ozanne LK, Stolze HJ. A transformative supply chain response to COVID-19. J Serv Manag 2021;32:190-202.
4. Kulkov I, Ivanova-Gongne M, Bertello A, Makkonen H, Kulkova J, Rohrbeck R, *et al*. Technology entrepreneurship in healthcare: Challenges and opportunities for value creation. J Innov Knowl 2023;8:100365.
5. Khan ZH, Siddique A, Lee CW. Robotics utilization for healthcare digitization in global COVID-19 management. Int J Environ Res Public Health 2020;17:3819.
6. Lee D, Yoon SN. Application of artificial intelligence-based technologies in the healthcare industry: Opportunities and challenges. Int J Environ Res Public Health 2021;18:271.
7. Kulkova J, Kulkov I, Rohrbeck R, Lu S, Khwaja A, Karjaluoto H, *et al*. Medicine of the future: How and who is going to treat us? Futures 2023;146:103097.
8. Tortorella GL, Saurin TA, Fogliatto FS, Rosa VM, Tonetto LM, Magrabi F. Impacts of Healthcare 4.0 digital technologies on the resilience of hospitals. Technol Forecast Soc Change 2021;166:120666.
9. Lucero-Prisno III DE, Olayemi AH, Ekpenyong I, Okereke P, Aldirdiri O, Buban JM, *et al*. Prospects for financial technology for health in Africa. Digit Health 2022;8:20552076221119548.
10. Jing R, Ma Y, Zhang L, Hafeez M. Does financial technology improve health in Asian economies?. Front Public Health 2022;10:843379.
11. Ashta A, Biot-Paquerot G. FinTech evolution: Strategic value management issues in a fast changing industry. Strategic Change 2018;27:301-11.
12. Lee I, Shin YJ. Fintech: Ecosystem, business models, investment decisions, and challenges. Bus Horiz 2018;61:35-46.
13. Jin Z, Wang Z. Operational and financial impacts of digital health technology: A study on canadian healthcare system during the COVID-19 pandemic. Int J Environ Res Public Health 2022;19:15025.
14. Attaran M. Blockchain technology in healthcare: Challenges and opportunities. Int J Healthc Manag 2022;15:70-83.
15. Lakhani KR, Iansiti M. The truth about blockchain. Harv Bus Rev 2017;95:119-27.
16. Rosenbaum L. Anthem will use blockchain to secure medical data for its 40 million members in three years. Forbes 2019. Available from: https://www.forbes.com/sites/leahrosenbaum/2019/12/12/anthem-says-its-40-million-members-will-be-using-blockchain-to-secure-patient-data-in-three-years/.
17. Snyder J. Crowdfunding for medical care: Ethical issues in an emerging health care funding practice. Hastings Cent Rep 2016;46:36–42.
18. Sharma A, Bahl S, Bagha AK, Javaid M, Shukla DK, Haleem A. Blockchain technology and its applications to combat COVID-19 pandemic. Res Biomed Eng 2022;38:173-80.
19. Maier E, Reimer U, Wickramasinghe N. Digital healthcare services. Electron Mark 2021;31:743-6.
20. Ahmad RW, Salah K, Jayaraman R, Yaqoob I, Ellahham S, Omar M. The role of blockchain technology in telehealth and telemedicine. Int J Med Inform 2021;148:104399.
21. Kamal R, McKermott D, Ramirez G. How has US spending on healthcare changed over time? Peterson-KFF Health System Tracker. Available from: https://www.healthsystemtracker.org/chart-collection/how-has-the-quality-of-the-u-s-healthcare-system-changed-over-time/.
22. Ma S, Zhang X. Integrating blockchain and ZK-ROLLUP for efficient healthcare data privacy protection system via IPFS. Sci Rep 2024;14:11746.
23. Rovere G, Bosco F, Miceli A, Ratano S, Freddo G, D'Itri L, *et al*. Adoption of blockchain as a step forward in orthopedic practice. Eur J Transl Myol 2024;34:12197.