Opinion Piece

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What is coming next in health technology startups? Some insights and practice guidelines

Imon Chakraborty[1], Sisira Edirippulige[1] and P Vigneswara Ilavarasan[2]

Abstract

Health technology startups are experiencing a significant surge in growth, particularly since the COVID-19 pandemic, as they address gaps in the sector. However, despite their increasing prevalence, there is still relatively limited knowledge about this sector's evolution. This opinion article explores emerging trends in health startups, including their market size, growth, significant challenges, and guidelines for key stakeholders from a global healthcare service industry perspective. By gaining a better understanding of these trends, new research opportunities and evidence-based practices can be identified.

Keywords

Health-tech, Digital health, Med-tech, Biotech, Venture

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Big tech companies have been contributing to healthcare for more than six decades, where health-tech startups endowment were less noticed and did not get adequate attention in the industry. Suddenly, they started working in the fast lane, increasing the excitement among key stakeholders. The recent COVID-19 pandemic was a catalyst for this sectoral transformation.[1,2] Since then, they have been flooded with funding and raised $29.1 B in 2021, record-breaking in the healthcare industry.

This unprecedented time has brought many opportunities to them. They are rigorously involved in identifying the opportunity and growth potential by filling the healthcare gaps, improving the existing healthcare facility, and innovating ground-breaking solutions to meet the market demand.[3,4] Everyday trade media publishes about the new heights of health-tech startups, from innovation in the booming market to fuelling investors' excitement. At the same time, academic articles are evolving but remain scant to shed light on emerging trends in health-tech startups from global perspectives, which will open a new avenue for research and offer empirical evidence for practice guidelines. Given that, this opinion piece aims to present new trends in rapidly flourishing health-tech businesses.

The opinion article on emerging business trends is of significant importance as it can provide valuable insights and perspectives on the challenges and opportunities faced by this industry. It highlights the key issues and gaps in our understanding of this trend and can provide suggestions for future research directions. This article can also serve as a call to action for policymakers, investors, and healthcare professionals to address health technology startups' challenges and support their growth.

Before understanding the nuances of the emerging era of health technology startups, it is a prerequisite to interpret what we mean by health technology or, more specifically, what comes under the umbrella of health technology. Stakeholders and researchers use the term "health technology" extensively and define it to fit their working boundaries. The concept of health technology is predominantly focused on information and communication technology-driven healthcare. For example, IBM defined "Healthcare

[1]Centre for Online Health, Faculty of Medicine, The University of Queensland, Brisbane, Australia
[2]Department of Management Studies, Indian Institute of Technology Delhi, New Delhi, India

Corresponding author:
Imon Chakraborty, Centre for Online Health, Faculty of Medicine, The University of Queensland, Brisbane, Australia.
Emails: i.chakraborty@uq.edu, imon.icy@gmail.com

technology as any technology, including medical devices, information technology (IT) systems, algorithms, artificial intelligence (AI), cloud and blockchain, designed to support healthcare organizations."[5,6]

Nevertheless, the World Health Organization defined health technology as the "application of organized knowledge and skills in the form of devices, medicines, vaccines, procedures, and systems developed to solve a health problem and improve quality of lives."[7] This also considers pharmaceuticals, genetics, bioinformatics, and tissue-engineered products, including IT, AI, machine learning (ML), big data, the Internet of Things (IoT), and cloud technology solutions.[8] Therefore, the boundary can be considered in three broad dimensions such as digital health (telehealth to predictive analytics), Med-tech (robotics to hospital decision support system), and biotech (genomics to clinical trial). The startups usually fall in one dimension (see Figure 1) but also work in inter-dimensions. In a nutshell, these newly formed entrepreneurial ventures utilize the aforementioned technologies to address or improve healthcare by providing technology products and resources.[9]

This opinion paper aims to provide insights into the future direction of the health technology startup industry by analyzing current trends, challenges, and opportunities. To address this, the philosophical stance that we would take would be a critical realism approach. This approach is concerned with understanding the underlying structures and mechanisms that shape social phenomena, such as the health technology startup industry. By using a critical realist approach, this work attempts to identify the underlying trends of health technology startups. This could help stakeholders in this sector anticipate future trends and develop strategies better aligned with the underlying mechanisms shaping the industry. Here we discuss the emerging trends under three broad dimensions of startups.

Emerging trends in digital health startups

Digital health startups are the most rapidly growing ventures in the health technology space since the pandemic. AI, ML, IoT, virtual reality (VR), and blockchain tremendously shift the ventures' business model and value creation in the target healthcare market. The industry is estimated to reach $550 billion by 2027, with a compound annual growth rate (CAGR) of 16.5%.[10] Given that, the startups are not confined to technology-enabled healthcare services or merely providing online consultation platforms. These ventures are engaged in boosting accuracy and efficiency and connecting with technology-driven unique solutions

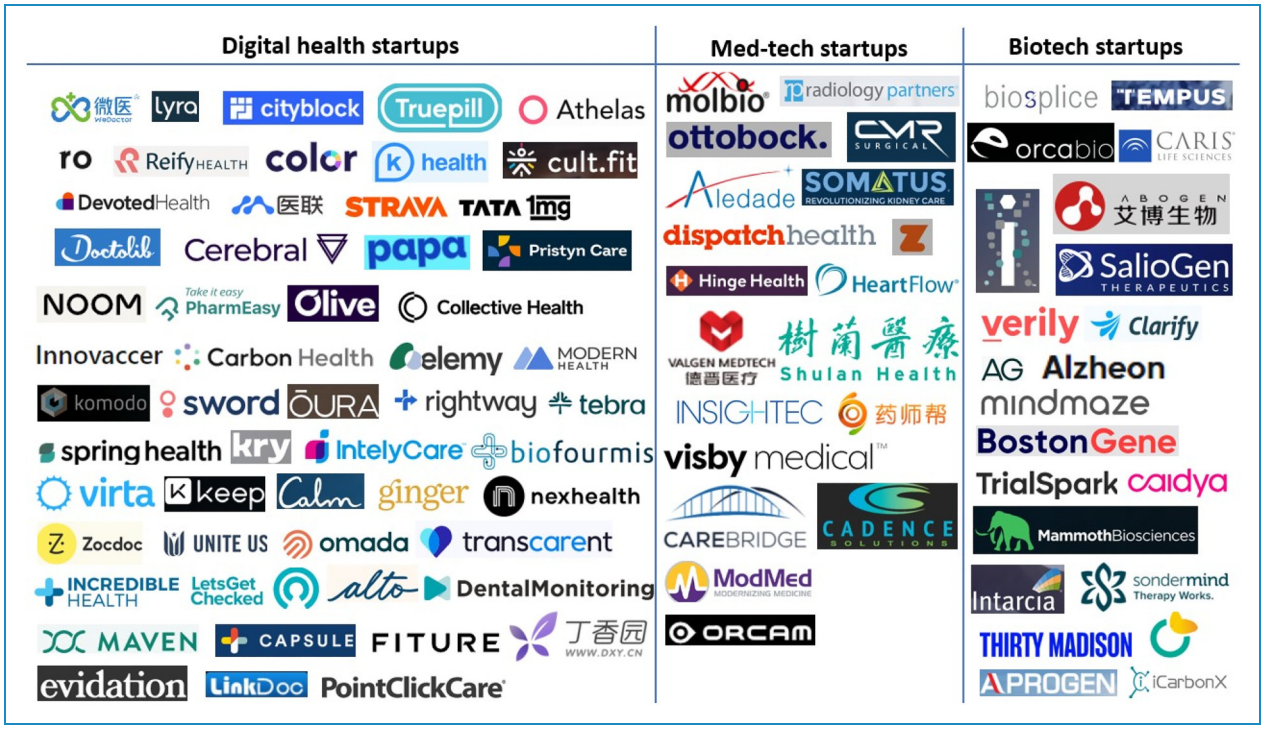

Figure 1. Health technology startups under broad technological dimensions.
Note. Some startups fall in two dimensions but are represented here under the dominant dimension. Out of 97 health technology unicorns (as of October 2022), 55 are in the digital health space. The numbers are high as the digital health market is booming, and startups take less time than med-tech and biotech startups for value creation. Unlike other health technology startups, they are primarily ICT-based and have limited association with clinical trials and validation. Data was extracted from https://www.holoniq.com/health-tech-unicorns.

to disrupt the healthcare market.[11] They predominantly use blockchain to increase data sharing security for healthcare data interoperability. With AI and ML, they are focusing on personalized care and service delivery. These startups are soliciting health equity through cost-effective approaches, reaching vulnerable communities to improve digital health literacy and individualized care.[12]

Emerging trends in med-tech startups

Med-tech startups are well-positioned to facilitate and innovate, especially in secondary and tertiary healthcare. These startups use AI, quantum computing, AR, and VR, including cloud technologies, to develop innovative devices and tools. They currently concentrate on wearable personalized devices to robotic-assisted surgical facilities. Their focus shifted from treatment facilitation to future devices that may predict and alert before any potential health issues. They also gathered data to enhance predictability, anticipating health issues and behavioral changes. Their business model extended from clinical efficiency and a hospital-focused market to individual consumer care space for enabling prevention and early intervention of healthcare services.[13,14]

Emerging trends in biotech startups

Since the COVID-19 pandemic, biotech startups are booming significantly and have bagged numerous venture capital fundings to disrupt the market from vaccine technology to next-generation gene therapy. These startups aim to build cutting-edge biological technology platforms for therapeutic products and research tools, including service businesses. They focus on precision medicine, cell therapy, ML-based drug discovery, nanomedicine, neurological, immuno-oncological, and aging-related therapeutics development. These platforms are shifting toward next-generation strategies to overcome existing challenges with gene therapies and connect with AI, ML, and big data technology.[15,16]

In the emerging market, these three kinds of health technology startups function parallelly and remain

Table 1. Overview of health technology startups' emerging market.

Startups' dimension	Market size	Compound annual growth rate (2022–2029)	Unicorns (Valued over USD 1 billion)	Examples (Valuation)	Major challenges
Digital health	USD 548.08 billion	29.5%	55	Lyra Health ($5.85B), PharmEasy ($3.4B), Zocdoc ($1.8B).	• Initial funding, including subsequent rounds • Duplication over innovation • Hiring top talent and expertise • Data interoperability • Rapid regulatory changes
Med-tech	USD 488.98 billion	6%	19	Hinge Health ($6.2B), Radiology partners ($4B), CMR Surgical ($3B).	• Implementing innovative products • Monetization of hardware products • Device sensitivity and accuracy
Biotech	USD 733 billion	15.83%	23	Biosplice Therapeutics ($12.4B), Caris Life sciences ($7.38B), Insitro (2.4B).	• Steady technological growth with business • Clinical testing and approval • Cost and funding • High risk of failure • Scaling up issues

Note. The data was adapted from multiple resources, and it's an approximation to understand the global outlook. Extracted from https://www.fortunebusinessinsights.com/industry-reports/digital-health-market; https://www.fortunebusinessinsights.com/industry-reports/med-tech-market; https://www.bloomberg.com/press-releases/biotechnology-market; https://www.holoniq.com/health-tech-unicorns.

Table 2. Recommended guidelines for key stakeholders.

Key stakeholders	Guidelines
Founders	• Focus on minimal resources to develop the product that fits the market. • Technology-driven innovation that the market needs, not only technology-enabled solutions. • Proper funding strategy before inception and only raise if required. • Developing a team for the long run who believes in the vision of the venture. • Plan for every diversity with emerging market dynamics. • Scale up possibility and strategy.
Investors	• Focus on the intended products along with the team's expertise. • Share experience with founders for shaping their ventures to be more financially stable. • Consider the usual long gestation time in health space for initial and subsequent funding.
Clinicians	• Engage with startups' product development. • Spread the potential of health technology ventures among their community. • Attract more healthcare professionals to support and work with ventures.
Consumers	• Provide feedback to startups' products for their improvement. • Observe the benefits of innovative products and understand how the product or solution will change their lives. • Share their experience with other consumers for organic customer traction.
Regulators	• Bring regulatory clarity and impede the clinical testing process. • Increase the awareness among common people about health technology startup innovation. • Providing financial benefits and incubation support for the startup ecosystem's growth.

interconnected for innovation through utilizing different technologies and serving the target market. An overview of their emerging market, well-known startups, and challenges from the global perspective is depicted in Table 1.

A total of 97 health technology unicorns have a value of over USD 229B globally (as of October 2022). More digital health unicorns will emerge worldwide soon, as currently, it is the highest growing health technology market. VC funding, adequate regulations, the government's active support, and significant consumer traction overall shaped the health technology market since the COVID-19 pandemic.[1,17] However, startups face similar challenges in funding rounds, technology protection, data interoperability, and long gestation time for approval, especially in med-tech and biotherapeutic solutions.[18] The sector reports revealed that 90% of startups fail in the long run and 60% within 5 years.[19] Nevertheless, founders, including stakeholders, expect to reduce these numbers in the coming years.

Based on the existing evidence[11,13,15] and emerging trends, a few guidelines for key stakeholders are recommended, irrespective of startup dimensions; it paves their path toward sustained growth in the new tech-driven market in Table 2.

Despite the high mortality rate, new health technology ventures are emerging and booming.[14] There is a need to be cognizant of the specific requirements of such businesses to create value and fit in the market. Every stakeholder should understand their indispensable role in paving the way to address the health affordability, accessibility, quality, and inequity challenges.

Health technology startups have emerged as a critical driver of innovation in healthcare delivery, filling sectoral gaps and providing solutions to longstanding problems in the industry.[20] The COVID-19 pandemic has accelerated this trend, with startups coming in the fast lane to address critical needs arising from the pandemic. One of the critical aspects discussed in this opinion article is the market size and growth of health startups. Understanding health startups' market size and growth trends can inform key stakeholders, including investors, policymakers, and healthcare providers, of the potential opportunities and challenges in this evolving sector.

Moreover, this opinion article also discussed the significant challenges faced by health startups, including regulatory barriers, difficulties in scaling up, and concerns regarding patient privacy and data security. These challenges are critical to address to ensure the success and sustainability of health startups. Key stakeholders, including healthcare providers, insurers, and policymakers, must work together to create a supportive ecosystem for health startups.[21,22] This can include regulatory reforms that promote innovation while ensuring patient safety and privacy,[23,24] as well as collaboration between startups and healthcare providers to ensure that solutions meet the needs of patients and healthcare providers.[25]

Understanding the emerging trends in health startups can also open new research avenues and evidence-based practice directions. For example, research can focus on evaluating the effectiveness of health technology solutions in improving healthcare outcomes and reducing costs.

Furthermore, research can explore the potential of health startups in addressing healthcare disparities and promoting equity in healthcare delivery. Considering that, future researchers should investigate how health-tech startups transform themselves in the new market and enquire about policy and regulatory changes needed for sectoral entrepreneurship development.

Overall, the article aimed to identify evidence-based practices and guidelines that could inform the actions of key stakeholders in the healthcare service industry. This assumption suggests that the value of knowledge is not just in understanding the phenomenon of health technology startups but also in using that knowledge to improve the practices and outcomes of healthcare organizations. The article implies that the best way to understand the emerging trends in health technology startups is through a practical and action-oriented lens, where research focuses on identifying strategies and practices to help stakeholders navigate this rapidly changing landscape.

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ORCID iD: Imon Chakraborty https://orcid.org/0000-0003-1992-7407

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