WHITE PAPER

Digital Therapeutics: Enterprise Opportunities in Virtual Healthcare

Abstract

Technological advancements in healthcare, specifically in the areas of Artificial Intelligence, Deep Learning and health monitoring using wearables, are helping doctors collect vast amounts of data and generate valuable insights. This has led to a tangible shift in the priorities for healthcare stakeholders.

More and more, patients are looking for digitally enabled solutions that can provide personalized and on-demand care. Similarly, providers are looking for digital tools that enable real-time patient monitoring, and improved patient engagement. Payers on the other hand, need solutions that identify risks and reduce the overall costs involved, while pharmaceutical companies seek to improve the quality care. For many the answers lie in digital therapeutics.

This paper examines the ability of digital therapeutics to address a diverse spectrum of clinical problems in the context of the growing focus on low-cost and preventive care solutions.

What exactly is digital therapeutics?

"Digital therapeutics deliver evidence-based therapeutic interventions to patients that are driven by high quality software programs to prevent, manage, or treat a broad spectrum of physical, mental, and behavioral conditions. It forms an independent category of evidence-based products within the broader digital health landscape, and are distinct from pure-play adherence, diagnostic, and telehealth products."- Digital Therapeutics Alliance

Digital therapeutics provides physicians and care providers evidence-based actionable insights that can drive informed decisions, and better patient outcomes. The concept is also designed to be device-agnostic and provides patients with on-demand and remote access to personalized therapies for a variety of medical conditions.

Key drivers of adoption

Changing medical protocols, alongside the need to bring down the cost of care is driving an upsurge in investments in digital therapeutics, which is projected to grow at the rate of 26.7% to reach USD 6.9 billion for the period 2020-2025[1].

In today's market, startups are leading the way by leveraging innovative digital therapeutic solutions such as AR & VR-enabled, interactive video games to address mental health conditions. Similarly, tech giants such as Amazon, Google and Apple are also leveraging data and analytic capabilities to build a connected healthcare infrastructure.

Additionally, the COVID-19 pandemic has accelerated the adoption of virtual and home care technologies, transforming patient engagement by integrating data across the healthcare landscape via wearables and smart devices. It is estimated that up to USD 250 billion of the US healthcare spend could be virtualized, because of the accelerated adoption of telehealth solutions[3] driven by the current pandemic. Digital health solutions also enable caregivers to continuously monitor and engage patients, enabling remote changes to treatment plans in

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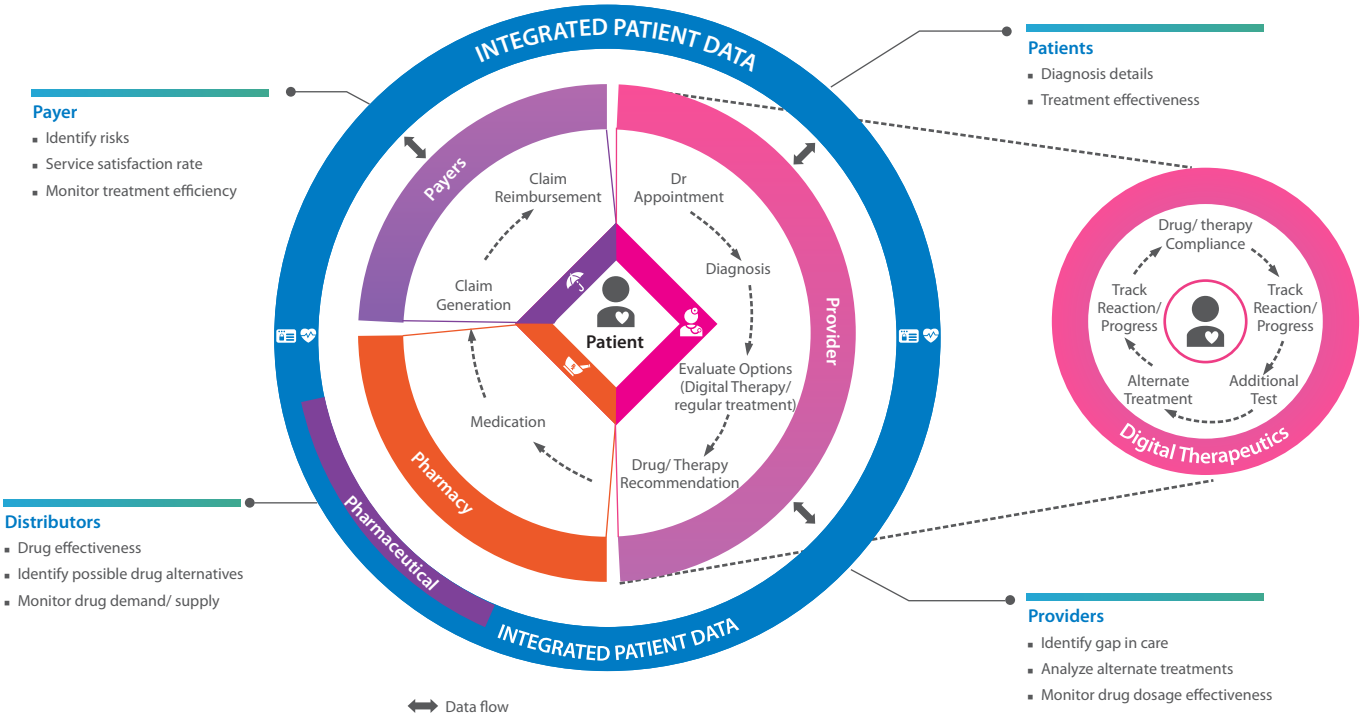
[1] Digital Therapeutic (DTx) Market by Application (Prediabetes, Nutrition, Care, Diabetes, CVD, CNS, CRD, MSD, GI, Substance Abuse, Rehabilitation), Sales Channel (B2C, Patient, Caregiver, B2B, Providers, Payer, Employer, Pharma) - Global forecasts to 2025 - https://www.marketsandmarkets.com/Market-Reports/digital-therapeutics-market-51646724.html#:~:text=%5B166%20Pages%20Report%5D%20The%20global,period%20(2020%E2%80%932025).

[3] Telehealth: A quarter trillion-dollar post COVID-19 reality? - https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/telehealth-a-quarter-trillion-dollar-post-covid-19-reality

real time. In the future, digital therapeutics is projected to play an important role in enabling physicians to work closely with the patients and provide personalized care.

In addition to helping improve patient outcomes digital therapeutics also help doctors manage patient adherence to medical regimens. These capabilities help digital therapeutics play a major role in building an integrated health ecosystem that can enable seamless transfer of data between different stakeholders such as payers, providers, and pharmacies, in turn improving the quality of services provided to the patients.



Due to its ability to be used independently, or in combination with other conventional therapies or medications, digital therapeutics can even offer patients treatment options for medical problems, which remained untreated by conventional therapies in the past. As the application of digital therapeutics increases and more digital therapeutics-based solutions are developed, we can expect a more diverse set of therapy options addressing a broader set of physical, mental, and behavioral problems in the future.

Potential applications & areas of use

- **Behavioral Change & Guidance:** Medication adherence, where patients either forget, neglect to take medicines, or take a lower-than-recommended dose, is a major problem faced by all stakeholders within the healthcare ecosystem. For example, in the US, three out of four patients have been

found to be non-adherent. The Pharmaceutical Research and Manufacturers of America (PhRMA) estimates that the annual cost of hospitalizations due to non-adherence is around USD 100 to USD 300 billion, with non-adherent patients spending an extra USD 3,575 on an average hospital visit compared with an adherent patient[4].

Digital therapeutic solutions help improve medication adherence with personalized nudges that encourage long-term behavioral change in patients. And for people with chronic conditions like diabetes and COPD, digital therapeutics can play a vital role to help ensure the patients are adhering to the dose guidelines.

- **Medical Training & Patient Engagement:** Developments in virtual reality technology have opened compelling opportunities within the healthcare sector that can benefit both the patients and physicians. While VR-enabled solutions can help aspiring surgeons hone their surgical skills, growing investments and improvements in VR-based therapeutic solutions can help patients effectively manage their chronic conditions and receive personalized therapy programs.

  In the context of managing preoperative anxiety or postoperative pain, VR-based digital therapeutic solutions are being used to create a virtual environment to help the patients remain calm and relaxed. Based on a recent study it was found that 80% patients felt less pain and 73% reported feeling less anxious when wearing VR headsets during surgery[5].

  Given the opioid crisis in many developed countries, VR-based therapeutics, with its potential to effectively distract the patients from painful stimuli, can turn out to be a viable alternative to painkillers.

- **Mental Health:** Close to 260 million people are afflicted with depression, while globally nearly 800,000 people die of suicide every year[6]. In the US alone, one in five young people have mental health problems, but two thirds of them do not have access to necessary treatment. Investments in digital therapeutics technology can make mental healthcare more accessible, despite the growing shortage of specialists in the field.

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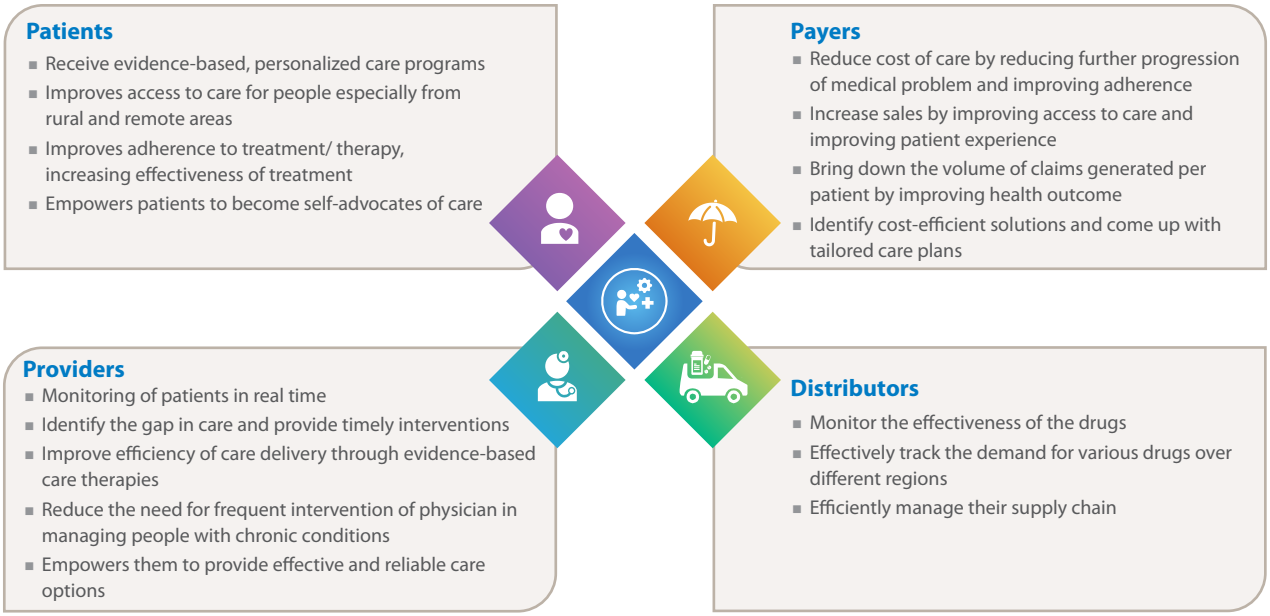
[4] The cost of medication non-adherence- https://www.lark.com/blog/2018-4-12-the-cost-of-medication-non-adherence/#:~:text=An%20estimate%20from%20the%20Pharmaceutical,patient%20who%20had%20been%20compliant.

[5] VR headsets relaxing patients during surgery at St George's - https://www.stgeorges.nhs.uk/newsitem/vr-headsets-relaxing-patients-during-surgery-at-st-georges/

[6] Suicide- https://www.who.int/news-room/fact-sheets/detail/suicide

Advancements in AI, deep learning and advanced analytics, allows healthcare specialists to closely monitor the symptoms and behavior of such patients. Additionally, the vast amount of behavioral and health data collected, enables them to effectively analyze and diagnose the patient's condition.

Benefits of digital therapeutics for every stakeholder



The Way Forward

By 2030, the cost of chronic disease management is expected to reach USD 42 trillion. In fact, the CDC reports that 90% of the US healthcare spend worth USD 3.3 trillion annual goes towards treating people with chronic and mental health conditions[7]. Compounding the problem, the global shortage of healthcare workers is also projected to reach 15 million by 2030. To many in the healthcare sector, the need for technological intervention that drives efficiency gains is quite clear.

With COVID-19 already fueling the need for remote patient engagement and mental wellbeing, digital therapeutic solutions, with its ability to provide evidence based personalized interventions and care, can play a major role in addressing the growing shortage of medical personnel and in managing chronic conditions efficiently.

[7] Cost of chronic disease to reach $42 Trillion by 2030- https://www.innovu.com/post/cost-of-chronic-disease-to-reach-42-trillion-by-2030#:~:text=Chronic%20Disease%20in%20America%2C%20CDC,%243.3%20trillion%20annual%20healthcare%20spend

Organizations looking to invest in digital healthcare have multiple routes of approach available to them:

- **Partner:** Today, multiple organizations have already made headway in developing digital solutions that address specific needs within the healthcare market. For example, Happify provides digital interventions that help improve mental health, Cognoa specializes in digital therapeutic solutions for treatment and diagnosis of autism, while Omada Health focuses on chronic disease management among others[2]. One of the fastest ways to build a powerful digital healthcare ecosystem is for enterprises to partner with such startups, and leverage their existing client base and service experience, playing the role of an aggregator in providing services to a wider range of end customers.
- **Invest & Acquire:** Investments in well-being and care delivery innovators saw a rapid increase between 2018 and 2019, with health tech companies and innovators leveraging technologies such as AI, Deep Learning and Internet of Things (IoT) to garner greater interest from investors. Reports state that investments made into health tech innovation exceeded USD 7.4 billion in 2019[8], and the number is only expected to grow in the coming years. Leading tech giants and service providers could look at investing in suitable health tech innovators or even outright lock-stock-and-barrel acquisition, in order to quickly expand into the digital healthcare market.
- **Start Afresh:** Although multiple organizations are working on identifying digital health solutions for different medical areas, this emerging technology-driven sector still has significant gaps within the market. As different medical areas such as psychology, neurology, physiology, etc., need varying personalized therapy programs and clinical content capable of addressing specific pain points, there exists tremendous opportunity for enterprises looking to move into this market. However, while building a new digital therapeutic solution, organizations need to ensure that they are aligning with multiple industry requirements such as solution design and quality, usability, clinical evaluation, regulatory compliance, data privacy, and security.

[2] Digital therapeutics Alliance- https://dtxalliance.org/dtx-solutions/

[8] Health tech investment trends: How are investors positioning for the future of health? - https://www2.deloitte.com/us/en/insights/industry/health-care/health-tech-investment-trends.html

Conclusion

Digital therapeutics in combination with other digital health platforms is set to transform the healthcare system by empowering physicians to provide evidence based clinical interventions that will help improve the overall health outcome among the patients. By integrating data from multiple sources and applying advanced analytics, digital therapeutics help improve the efficiency, personalization, and accuracy of care. Organizations that build the required technology base, establish the necessary infrastructure, and identify the right partnerships, will have an early mover advantage in the market and will be positioned to reap significant future benefits in investments made today.

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Balakumar is the Head of Innovation for TCS Healthcare Business Unit and is responsible for creating new and innovative solutions around the Healthcare Payer and Provider IT systems.

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