The
HealthTech 2023
White Paper

Published by: Leanox

Did you know that…

1. *The use of TeleHealth has increased by over 50% since the start of 2020.[1]*

COVID-19 played a major role in the evolution of TeleHealth. The pandemic had a significant influence on routine doctor visits. Namely, the virus resulted in 63% fewer medical checkups in-person. Meanwhile, TeleHealth appointments increased by 154% which resulted in a peak in March 2020 and it appears that TeleHealth will continue to exist. The global TeleHealth market reached EUR 76 billion in 2022 and is projected to grow at a CAGR of 24% over the period 2023 to 2030.[2]

2. *Healthcare's big data market is expected to reach nearly EUR 64 billion (bn) by 2025.[3]*

By 2025, the big data industry for healthcare is projected to reach EUR 64 bn, according to Bain & Company. The potential for enhancing treatment options and patient outcomes is exponentially increasing as the collection of health data keeps speeding up.[4]

3. *Artificial intelligence (AI) can now be used to detect pandemics.[1]*

One of the top rising medical advancements is the use of AI in healthcare, whereby COVID-19 has recently forced a change in focus. AI is currently being developed to help fight infectious diseases on a worldwide scale and stop a virus like COVID-19 from striking us severely in the future. A potential use case is the utilisation of a machine learning algorithm that monitors data trends to find future disease outbreaks by assessing and forecasting disease transmission, infection rates, and infection trends.[2]

*"The HealthTech sector is facing
a perfect storm for things to happen
and all of them tend to be positive." [5]*

Eva Rosell, General Director at the Barcelona Health Hub

Promising numbers

EUR 403 bn

The global medical devices market in 2020 was valued at EUR 403 bn. This is the result of more healthcare facilities opening up around the world, more Personal Protective Equipment (PPE) and ventilators being produced to fight COVID-19, combined with a greater need for advancement of medical technological breakthroughs.[2]

Global investments in digital health reached an all-time high of EUR 52 bn in 2021, which is 79% higher compared to 2020. The US Bureau of Labor Statistics predicts that between 2021 and 2031, the healthcare technology sector will expand by 17%.[6]

EUR 52 bn

EUR 170 bn

The market size of AI in healthcare is projected to increase from EUR 14 bn in 2022 to EUR 170 bn in 2030.[7]

LEANOX
Impact Capital

HEALTHTECH

The definition of HealthTech

It can be argued that the HealthTech sector has great potential in terms of growth, based on the numbers mentioned previously. COVID-19 can partially explain this. As a result of the growing demand for healthcare caused by pandemics, healthcare technologies have advanced at an increasingly rapid rate. *But what is HealthTech exactly?*

> Health Technology or Health Tech is **every type of technology used to help healthcare companies**. This includes medical devices, IT systems, algorithms, AI, cloud computing, and blockchain. The intention is to increase hospital and administrative productivity and to enhance the overall standard of care while providing fresh perspectives on medications and treatments.[3]

Key problems

The following facts will give you an idea why HealthTech is important.

Total NCD mortality	Economic losses	Risk factors
41 m	**EUR 6 tn**	**80%**
deaths are caused by non communicable diseases (NCDs) which makes up 71% of all deaths worldwide, according to the WHO.[8]	the amount of economic losses by 2025 in low- and middle-low-income countries causes by the 4 most common NCDs.[8]	of premature heart disease, stroke, and diabetes can be prevented.[8]

Link with SDG

3 GOOD HEALTH AND WELL-BEING

Sustainable Development Goal 3 was designed to address the problems mentioned above. The aim of this SDG is "to ensure healthy lives and promote well-being for all at all ages." Fortunately, as a consequence of SDG 3, **positive changes have been made**. The probability of dying from any of the four main NCDs between 30 and 70 years of age declined from 20% in 2010 to 18% in 2019. On top of that, over the last 15 years, the number of children dying has decreased by half.[9]

How can HealthTech help?

Today's healthcare industry is **valued at EUR 2 trillion (tn)**. Tech-infused tools are being integrated into every step of the healthcare value chain to counteract two key trouble spots: **quality and efficiency**.[3]

➤ HealthTech goes hand in hand with the **knowledge of doctors and other health professionals** regarding their diagnoses and treatments. This promotes access to a greater quantity and quality of information. When technology and medicine are combined, HealthTech offers a significant advancement in the field of medicine that can both save lives and simplify a great deal of other tasks.[10] The options are diversified. It can create advancements in telemedicine but it can also contribute to design personalised medicine.

➤ HealthTech can contribute to making **care interdisciplinary, evidence-based, and patient-centered**. The prospective advancements are endless. First, organisations are able to integrate their data so that authorized persons may access the records they need. In this way, digital patient records can be standardized easily and stored securely. [24] Secondly, patient care will be improved as organizations can continuously review their results, spot potential issues and thereby uncover ways to enhance care and the patient experience.[10]
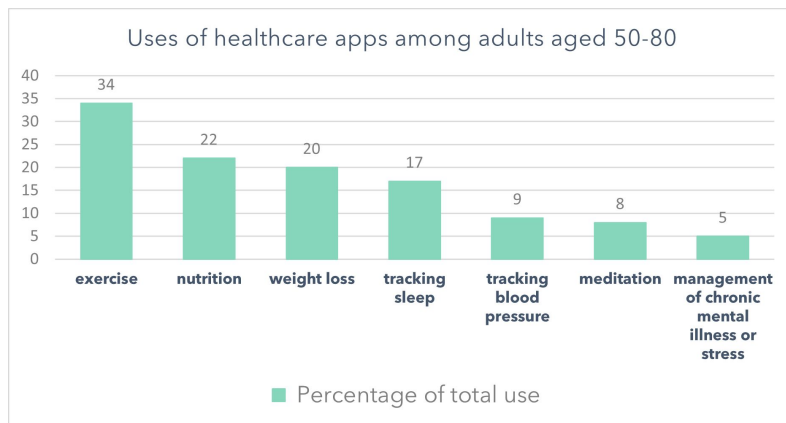
➤ HealthTech can improve efficiency by **tailoring experiences to the individual**. Customisation is crucial because businesses understand that adequate care cannot be provided in a one-size-fits-all manner.[3]
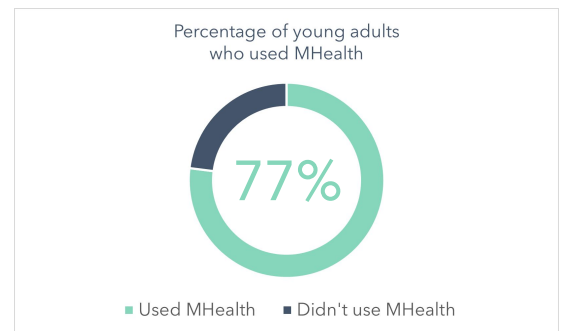
A deep dive into Mobile Health

> "Mobile Health or MHealth forms a general term for the use of mobile phones and other wireless technology in medical care. The most common application is to use these mobile devices to educate consumers about preventive healthcare services"(Holman, 2018).

Promising facts

- In 2021, the app market for healthcare was estimated at EUR 45 bn, with a projected growth to EUR 136 bn by 2028.[12]
- Current studies show that MHealth will experience a 14% growth, year after year, for the next five years.[12]
- As of February 2022, over 350,000 apps are available and they are frequently used by adults aged 50 - 80 years old.[12]
- 3 in 10 adults reported using at least one health app, of which 56% said they utilised health apps only recently.[12]

Uses of healthcare apps among adults aged 50-80

Percentage of total use: exercise 34, nutrition 22, weight loss 20, tracking sleep 17, tracking blood pressure 9, meditation 8, management of chronic mental illness or stress 5

(Petrovic, 2023)

Percentage of young adults who used MHealth

77%

■ Used MHealth ■ Didn't use MHealth

77% of young adults (18-25 years old) used MHealth at least once in their live to get information about their health condition.[12]

Introduction of TeleHealth

It is worth mentioning that TeleHealth and MHealth are not the same. The primary distinction is that MHealth is provided through mobile devices while TeleHealth refers to the provision of remote care through electronic information and telecommunications technology. Since COVID-19, Telehealth has experienced an immense growth which is beneficial for society in four ways.[13]

1. Telehealth lowers the possibility of a disease spreading by reducing contact between people.[14]
2. Telehealth lowers overhead expenses, particularly for emergency rooms. Recent research indicated that practitioners potentially save more than EUR 1,363 per visit by routing patients with urgent needs through a telemedicine service.[2]
3. Telehealth services can also increase consumer access and coverage by avoiding the time, money, and effort which are required to go to an in-person appointment.[15]
4. Telehealth ensures a decrease in waiting lines at outpatient clinics for follow-ups.[12]

Evolution of TeleHealth since COVID-19

MHealth became very accessible since COVID-19. It was one of the measurements taken to prevent the disease from spreading among the people. Since then, the growth evolution started and peaked during April 2020 and will continue to stabilise in the coming years.[11] The graph on the right shows the growth of TeleHealth being used during the COVID-19 pandemic. This is done by showing the growth in Telehealth usage in percentage of every month (February 2020 = 1).

The growth in TeleHealth usage compared to pre COVID-19 levels
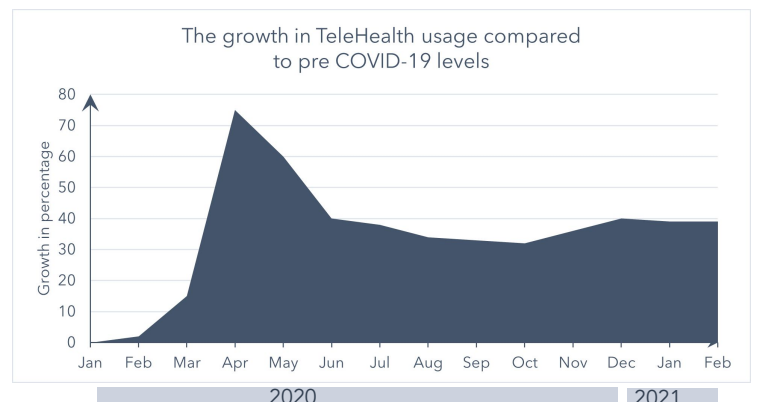
(Mc Kinsey, 2021)

How could MHealth contribute to a better world?

MHealth not only helps to prevent the spread of diseases, it also contributes to the effectiveness of reducing cases linked to heart failures. Remote telemonitoring of patients with a higher risk for heart failure enhances patients' physical and mental health, enhances the quality of life, and potentially lowers the need for additional hospitalisations because of the possibility to act quickly.[16]
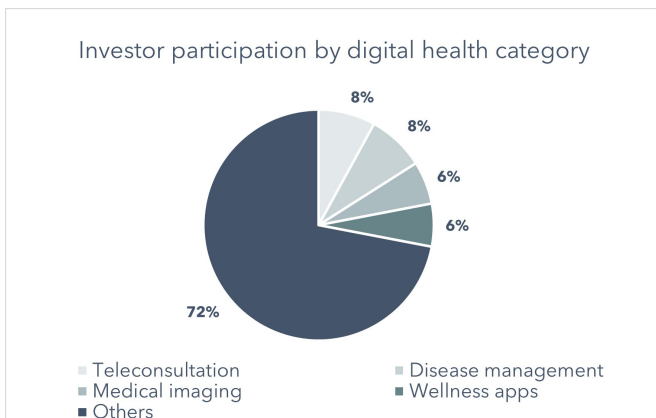
A deep dive into into drug development

Drug development is the process of bringing a new drug molecule into clinical practice. In its broadest sense, this includes all phases from the initial search for a viable molecular target to assisting with the drug's commercialisation. Drug development is lengthy and expensive and the risk of failure is high.[17] Nowadays HealthTech within drug development is becoming more popular in research and practice as AI is being used to increase efficiency or to develop new drugs for previously untreatable diseases.

Promising facts

The future for pharmaceutical applications of AI looks promising, which can be seen in the following two graphs.

Over the previous five years, close to 25,000 individual investment transactions have been performed in the digital health sector internationally.[6] The results of the investor participation classified by the different categories in digital health, are shown in the graph below. teleconsultation and disease management attracted the most investments, each accounting for 8% of the transaction share, followed by medical imaging and wellness apps, each accounting for 6% of the total transaction share respectively.[6]

Investor participation by digital health category

8%
8%
6%
6%
72%

- Teleconsultation
- Disease management
- Medical imaging
- Wellness apps
- Others

(*HealthTech 50 | Most Prominent Investors in Digital Health,* 2022)

7000
6000
5000
4000
3000
2000
1000
0

Value in EUR m

Market size value in 2021   Revenue forecast in 2029
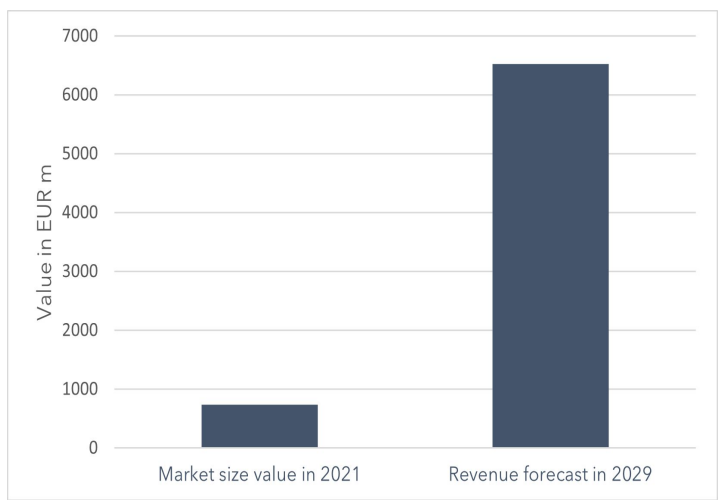
(*AI in Pharmaceutical Market Size Global Report, 2022*)

In 2021, the market size of AI in the pharmaceutical market was assessed at EUR 781m according to the Pharmaceutical Market Size Global Report of Polaris. Besides, it is anticipated to expand at a CAGR of 31% over the next five years. The reason for this increase is the rising AI use in the pharmaceutical market for R&D activities and drug development and the rising AI awareness among pharmaceutical manufacturers.[7]

Evolution of AI in drug development

AI is now being utilized to boost productivity or create new medications for conditions that couldn't previously be treated. Companies such as Microsoft, IBM Watson, Google, and Novartis are just a few of the main players participating in the pharma market connected to AI.[18]

Conventional formulation and process screening patterns do not understand drug distribution specifics, which rely on trial and error. Thankfully, recent advances in computational pharmaceutics have opened up new possibilities. Established AI and machine learning methods such as support vector machines (SVM) and artificial neural networks are increasingly used to discover and understand drugs and their properties.[19] Deep learning has been successfully applies in drug discovery and has advanced the drug development sector.[20]

How can drug development contribute to a better world?


Drug development

Drug development helps address unmet medical needs of patients. It combines developments in the understanding of the biology of diseases with methods for identifying and implementing remedies to these issues.[21] As a result, university academics now play a big part in the creation of new drugs.

The future of HealthTech: AI & Blockchain

The healthcare sector has been significantly impacted by the development of AI and HealthTech. Because of the combination of AI and HealthTech, the diagnosis, treatment, and management of numerous diseases and disorders by healthcare professionals have been transformed.[22] An important turning point occurred in the 1980s with the introduction of expert systems, which were computer programs created to mimic the decision-making capabilities of human experts.[19]

Since then, AI and HealthTech have advanced quickly, and a range of healthcare applications have been created.[14] One popular example is wearable technology. This technology can track and monitor a variety of health parameters, giving patients new tools for proactive health management. These tools may assess blood sugar levels, track sleep patterns, and even identify irregular heart rhythms, giving doctors important information about a patient's health.[19]

Due to COVID-19, AI's role in HealthTech became even more important. AI can minimise the process of COVID-19 from spreading altogether and can be used to optimise clinical trials for treatments and vaccines against COVID-19.[16] Furthermore, it can be utilised to create robots that can assist with sanitisation tasks and conduct online medical examinations of the population. The use of AI is advantageous for producing the equipment needed for the healthcare system.[16]
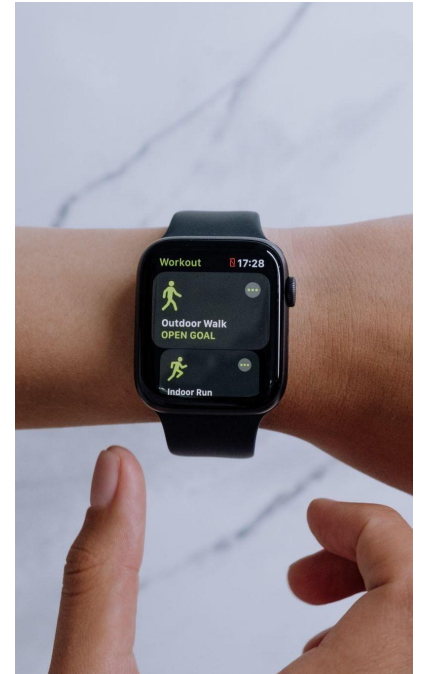
Wearable technology

MRI scan

Previously it is mentioned that AI can contribute to detect diseases. More specifically, AI has been used to develop algorithms that can analyse medical images such as X-rays and MRI scans, assisting radiologists in detecting and diagnosing diseases accurately.[23] AI-powered chatbots have been developed to provide patients with personalised and timely medical advice and support.[1]

The key players in the industry
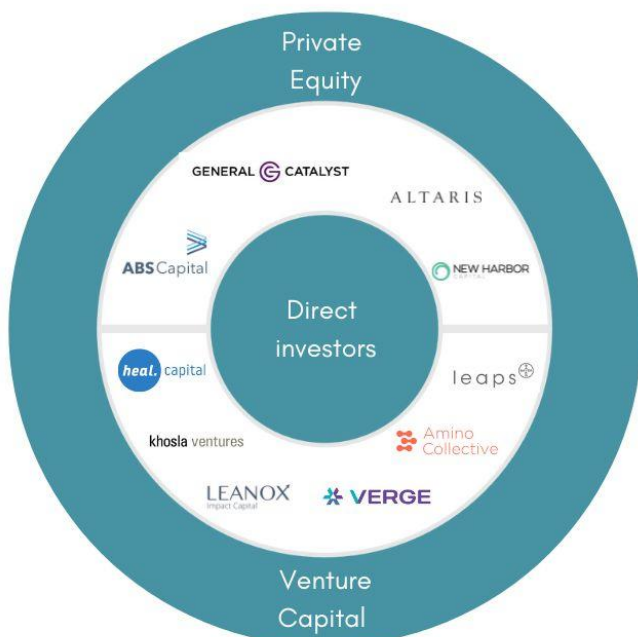
## Challenges for HealthTech

GDPR and consent in secondary data use

One of the most significant challenges is **data privacy and security**, as sensitive medical information is often stored and transmitted through technology. Organizations, especially startups in the area of HealthTech, process health-related personal data that is covered by Article 9 of the GDPR, "processing of special categories of personal data".[24] The prospect of paying fines must be avoided, hence GDPR compliance must be addressed diligently and frequently.[21] There is still some uncertainty left on how health research can be conducted by data protection rules. Upcoming guidelines from the European Data Protection Board aim to remove as much of this uncertainty as possible. This is necessary to make the future European Health Data Space (EHDS) practically functional and successful.[24] Other than that, it is important to keep in mind that data protection and any policies, practices and processes must be continually updated and evaluated.[21]

Drug development is linked with high costs

For each new drug to be licensed for clinical use, the discovery and development process takes about 10 to 15 years and costs on average more than EUR 1 bn.[2] Biologicals, research and development expenditures often account for the majority of the final commercial price of a new medicine. Manufacturing costs are a modest percentage of the commercial price. It is estimated that these costs fluctuate between EUR 1 bn and EUR 2 bn.[11] The twelve biggest pharmaceutical companies spent between EUR 3 bn and EUR 11 bn to manufacture each newly approved drug, according to an analysis of R&D spending compared with new drug approvals over 15 years.
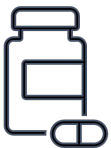
90% of clinical drug development fails

In the graph below you will find the evolution of the advancement of a drug candidate. As you can see, it is seen as a major accomplishment to advance a drug candidate to the phase II after they had undergone preclinical optimization. Nevertheless, phase I, phase II, and phase III of clinical trials as well as medication licensure fails nine out of ten treatment candidates when they entered clinical studies.[11]

There are five possible reasons which explain the 90% clinical failure rate of drug development, according to analyses of clinical trial data from 2010 to 2017. [11]

1. Lack of commercial demands and poor strategic planning (10%)
2. Insufficient drug-like qualities (10%-15%)
3. Unmanageable toxicity (30%)
4. Insufficient clinical efficacy (40%-50%)
5. Unfavorable drug-like properties (40%-50%)

4 Approval to launch
ca. 1.5 years
1 candidate

Dose, efficacy, toxicity 3
ca. 5 years
2-4 candidates

2 Lead optimization & preclinical test
ca. 2.5 years
10-20 candidates

Target validation & Screening 1
ca. 3 years
>10,000 candidates

(Sun et al., 2022)
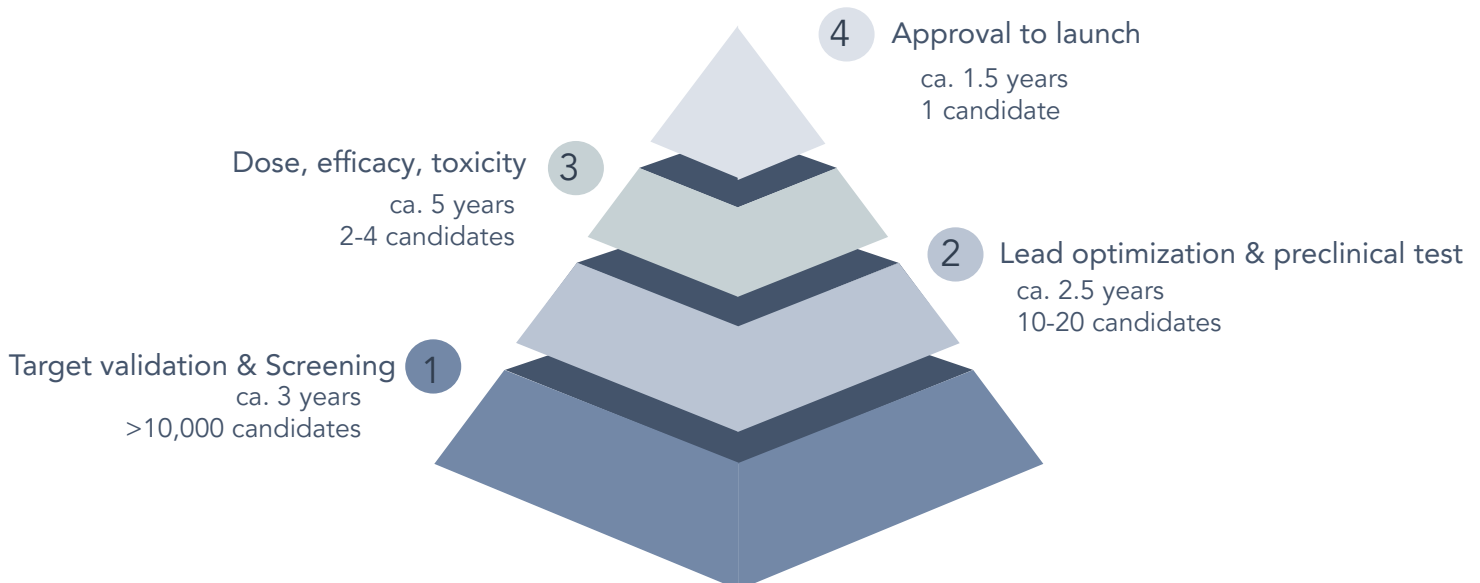
Sources

1   Secinaro, S. C. (2021, April 10). The role of artificial intelligence in healthcare: a structured literature review. BMC Medical Informatics and Decision Making, 23. doi:10.1186/12911-021-01488-9

2   Smith, A. (2022, October 19). 16 Jaw-Dropping Medical Technology Statistics of 2022. Retrieved April 2023, from RESOURCES10TO8: https://resources.10to8.com/blog/medical-technology-statistics/

3   Daley, S. (2022, September 19). Healthcare Technology 101. Retrieved April 2023, from BUILTIN: https://builtin.com/healthcare-technology

4   Bain & Company. (2019, August 6). Digital Trends in Medtech: Big Data is No.1. Retrieved from BAIN: https://www.bain.com/insights/digital-trends-in-medtech-big-data-is-no-1-snap-chart/

5   Open Innovation & BBVA. (2022, September 22). A snapshot of support for the healthtech sector. Retrieved april 2023, from BBVA: https://www.bbva.com/en/a-snapshot-of-support-for-the-healthtech-sector/

6   HealthTech 50. (2022, October 20). The most prominent investors in digital health. Retrieved April 2023, from HEALTHTECH50: https://healthtech50.com/

7   Polaris. (2022, jan). AI in Pharmaceutical Market. Retrieved april 2023, from POLARIS MARKET RESEARCH: https://www.polarismarketresearch.com/industry-analysis/artificial-intelligence-ai-in-pharmaceutical-market/analysis-type

8   The Global Goals. (n.d.). Good Health and Well Being. Retrieved April 2023, from GLOBALGOALS3: https://www.globalgoals.org/goals/3-good-health-and-well-being/

9   The United Nations. (sd). sdgs.un.org. Retrieved April 2023, van Ensure healthy lives and promote well-being for all at all ages: https://sdgs.un.org/goals/goal3

10   IBM. (sd). What is Healthcare technology? Retrieved April 2023, van IBM: https://www.ibm.com/topics/healthcare-technology

11   Sun, D. G. (2022, July). Why 90% of clinical drug development fails and how to improve it? Acta Pharmaceutica Sinica B, 11. Retrieved April 2023

12   Petrovic, V. (2023). Health App Usage Statistics. Retrieved April 2023, from VICERT: https://vicert.com/blog/health-apps-usage-statistics/

13   Nittari, G. S. (2022). Telemedicine in the COVID-19 Era: A Narrative Review. International Journal of Environmental Research and Public Health, 5101. doi:10.3390/19095101

14   Zbrog, M. (2022, May 16). The hottest medical technologies in 2022. Retrieved april 2023, from MTS: https://www.medicaltechnologyschools.com/medical-lab-technician/top-new-health-technologies

15   Hasselfeld, B. W. (2022, January 18). The Benefits of Telemedicine. Retrieved March 2023, from HOPKINS MEDICINE: https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/benefits-of-telemedicine#:~:text=You%20can%20see%20your%20doctor,or%20arrange%20for%20child%20care

16   Holman, T. (2018, November 29). MHealth (Mobile Health). Retrieved April 2023, from HEALTH IT: https://www.techtarget.com/searchhealthit/definition/mHealth#:~:text=mHealth%20(mobile%20health)%20is%20a,consumers%20about%20preventive%20healthcare%20services.

17   Hill, R. (2012). Drug Discovery and Development. In H. R.G., Technology in Transition. Elsevier Health Sciences. Retrieved April 2023

18   Mc Kinsey & Company. (2021, July 9). Telehealth: A quarter-trillion-dollar post-COVID-19 reality? Retrieved April 2023, from MC KINSEY&COMPANY:https://www.mckinsey.com/industries/healthcare/our-insights/telehealth-a-quarter-trillion-dollar-post-covid-19-reality

19   Kinch, M. S. (2020). Rising Academic Contributions to Drug Development: Evidence of Vigor or. In ACS pharmacology & translational science, 1427–1429. doi:10.1021/00167

20   Van Nooten, F. H. (2012). Health economics and outcomes research. Drug Discovery Today, 615-622. doi:10.1016/2012.01.021

21   Julin, S. (2020). GDPR compliance tips for HeathTech Industry. Retrieved April 2023, from LEXOLOGY: https://www.lexology.com/library/detail.aspx?g=650d9d3c-b6b4-4a1e-b924-037892eb4e11

22   Gitnux. (2023, March 23). Healtcare Technology Statistics. Retrieved April 2023, from BLOG GITNUX: https://blog.gitnux.com/healthcare-technology-statistics/

23   Javaid, M. H. (2020). Industry 4.0 technologies and their applications in fighting COVID-19 pandemic. Diabetes and Metabolic Syndrome: Clinical Research and Reviews, 419–422. doi:10.1016/2020.04.032

24   Becker, R. T. (2020, May 5). COVID-19 Research: Navigating the European General Data Protection Regulation. Social Science Research Network., 14. doi:10.2139/3593579

Disclaimer