COALITION FOR INNOVATION

HealthTech Blueprint for the Future

Coalition for Innovation, supported by LG NOVA

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The views and opinions expressed in the chapters and case studies that follow are those of the authors and do not necessarily reflect the views or positions of any entities they represent.

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October 2025

Preamble

The Coalition for Innovation is an initiative hosted by LG NOVA that creates the opportunity for innovators, entrepreneurs, and business leaders across sectors to come together to collaborate on important topics in technology to drive impact. The end goal: together we can leverage our collective knowledge to advance important work that drives positive impact in our communities and the world. The simple vision is that we can be stronger together and increase our individual and collective impact on the world through collaboration.

This "Blueprint for the Future" document (henceforth: "Blueprint") defines a vision for the future through which technology innovation can improve the lives of people, their communities, and the planet. The goal is to lay out a vision and potentially provide the framework to start taking action in the areas of interest for the members of the Coalition. The chapters in this Blueprint are intended to be a "Big Tent" in which many diverse perspectives and interests and different approaches to impact can come together. Hence, the structure of the Blueprint is intended to be as inclusive as possible in which different chapters of the Blueprint focus on different topic areas, written by different authors with individual perspectives that may be less widely supported by the group.

Participation in the Coalition at large and authorship of the overall Blueprint document does not imply endorsement of the ideas of any specific chapter but rather acknowledges a contribution to the discussion and general engagement in the Coalition process that led to the publication of this Blueprint.

All contributors will be listed as "Authors" of the Blueprint in alphabetical order. The Co-Chairs for each Coalition will be listed as "Editors" also in alphabetical order. Authorship will include each individual author's name along with optional title and optional organization at the author's discretion.

Each chapter will list only the subset of participants that meaningfully contributed to that chapter. Authorship for chapters will be in rank order based on contribution: the first author(s) will have contributed the most, second author(s) second most, and so on. Equal contributions at each level will be listed as "Co-Authors"; if two or more authors contributed the most and contributed equally, they will be noted with an asterisk as "Co-First Authors". If two authors contributed second-most and equally, they will be listed as "Co-Second Authors" and so on.

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The Coalition is intended to be a community-driven activity and where possible governance will be by majority vote of each domain group. Specifically, each Coalition will decide which topics are included as chapters by majority vote of the group. The approach is intended to be inclusive so we will ask that topics be included unless they are considered by the majority to be significantly out of scope.

We intend for the document to reach a broad, international audience, including:

- People involved in the three technology domains: CleanTech, AI, and HealthTech
- Researchers from academic and private institutions
- Investors
- Students
- Policy creators at the corporate level and all levels of government

Chapter 3:
The Impact of Artificial Intelligence on Healthcare

Author: Victor L. Brown

This section covers the impact of artificial intelligence (AI) on healthcare. The reader gains an understanding of what artificial intelligence is and how healthcare workers are using AI to enhance various applications. It will also discuss the outlook for how the evolution of AI and the adoption of healthcare will change the future by providing the author's opinion on what the trends and proverbial tea leaves are saying.

Overview of Artificial Intelligence

A foundational understanding AI will help you understand the key take-aways and themes of this chapter. For our purposes here, we define" artificial intelligence" as a computer algorithm that simulates the human ability to make decisions based on a collection of information.

For example, most people choose what to wear for the day based in part on a decision about how to dress for a warm day, moderate day, or cold day. A computer program could use artificial intelligence to make a decision on how to dress that day based on a number of factors with a goal of being comfortable. These systems take into consideration a large data set and draw their own conclusions. This contrasts with traditional computer programming that follows a defined decision tree based on if-then logic.

While choosing clothes represents a simple example, developers have created artificial intelligence capable of complex tasks using a variety of strategies and tools. Without diving deeply into the details of the different types of artificial intelligence, here is a brief summary of various types of AI characterized in different ways.

AI Categorized Based on Capabilities:

- **Narrow AI (Weak AI)**: Designed for specific tasks (e.g., virtual assistants such as Siri, chatbots, and recommendation algorithms)
- **General AI (Strong AI):** Hypothetical AI with human-like intelligence capable of reasoning and problem-solving across various domains
- **Super AI:** A theoretical AI that surpasses human intelligence in all aspects, including creativity, problem-solving, and decision-making

AI Categorized Based on Functionalities:

- **Reactive Machines:** Basic AI systems that respond to inputs but lack memory (e.g., IBM's Deep Blue chess-playing computer)
- **Limited Memory AI:** Can learn from past experiences to some extent (e.g., self-driving cars, fraud detection systems)
- **Theory of Mind AI:** Future AI with an understanding of emotions, beliefs, and human intentions
- **Self-Aware AI:** Hypothetical AI that possesses consciousness and self-awareness

AI Categorized Based on Learning Techniques:

- **Machine Learning (ML):** AI that learns from data to improve performance (e.g., predictive analytics, spam filtering)
    - **Supervised Learning:** Trained with labeled data (e.g., image recognition)
    - **Unsupervised Learning:** Finds patterns in unlabeled data (e.g., customer segmentation)
    - **Reinforcement Learning:** Learns by trial and error through rewards (e.g., game-playing AI)
- **Deep Learning:** A subset of ML using neural networks to process complex patterns (e.g., facial recognition, language translation)
- **Natural Language Processing (NLP):** AI focused on understanding and generating human language (e.g., ChatGPT, Google Translate)
- **Computer Vision:** AI that interprets visual data (e.g., medical imaging, facial recognition)
- **Expert Systems:** AI that mimics human expertise in a field (e.g., medical diagnosis, legal advisory AI)
- **Robotics AI:** AI combined with mechanical systems to perform physical tasks (e.g., autonomous drones, robotic arms in factories)

Characterization of Healthcare Industry

Research shows that the healthcare market is expected to grow to $25 trillion by 2040. This growth will be fueled by innovation just as the market has grown over the last 100 years due to innovation.

This amount of capital reflects transactions that impact most everyone on the planet. In the same sense, the oncoming adoption of AI within healthcare will have implications that will affect everyone. The million-dollar question is how exactly will AI have an impact. In an effort to answer this question, let's first look at how healthcare has historically handled adopting innovation and how that innovation has led to market growth to establish a baseline for predicting how AI will impact healthcare.

Historical Evolutions Within Healthcare

Over the course of the last hundred years, there have been many innovations in healthcare where those innovations have ultimately added value to the level of care individuals receive in healthcare and also added revenue to the overall healthcare market. Looking at these innovations, you could break down in ranges of years and for a good perspective of the changes within healthcare.

1920s–1940s: Foundational Advances - Market grew from approximately $20B to approximately $50B for 150% increase in size

Innovations in the 1920s through the 1940s included insulin, Penicillin, transfusions, vaccines, and the electrocardiogram. These innovations helped to fuel incredible growth over that time frame and further the advancement of overall health across the globe.

- **Insulin (1921):** First used to treat diabetes, saving countless lives
- **Penicillin (1928, mass use by 1940s):** The first true antibiotic, dramatically reducing deaths from bacterial infections
- **Blood transfusion & blood banks (1930s):** Enabled safe storage and widespread use during WWII
- **Vaccines:** Widespread immunization against diseases like diphtheria and tuberculosis
- **Electrocardiogram (ECG):** Became a standard diagnostic tool for heart conditions

1950s–1960s: Breakthroughs in Medicine and Technology - Market grew from approximately $150B to approximately $300B for 100% increase in size

The next phase of innovations included another critical vaccine – the Polio vaccine – along with the pacemaker, birth control, transplants, and medical imaging. Again, as one might expect, these innovations worked to help increase life expectancy and improve quality of life.

- **Polio vaccine (1955):** Mass immunization helped nearly eradicate the disease.
- **Cardiac pacemakers (1958):** Implanted to regulate abnormal heart rhythms
- **Birth control pill (1960):** Revolutionized reproductive health and women's autonomy
- **Organ transplantation:** First successful kidney (1954), liver (1963), and heart (1967) transplants
- **Medical imaging:** The development of ultrasound and improvements in X-rays transformed diagnostics.

1970s–1980s: Rise of High-Tech Healthcare - Market grew from $350B to $900B for a 157% increase in size

Over the next two decades, the rise of technology dominated healthcare evolution along with the HIV/AIDS growth which spurred a lot of research in an effort to combat the spread and treat the condition. Similar to past phases in the industry, humanity benefited worldwide.

- **Computed Tomography (CT scans, 1970s:** – Enabled cross-sectional imaging of the body
- **Magnetic Resonance Imaging (MRI, 1980s):** Non-invasive, detailed imaging of organs and tissues
- **Laparoscopic surgery:** Minimally invasive procedures reduced recovery time and risk
- **In vitro fertilization (IVF, 1978):** New paths to parenthood for infertile couples
- **HIV/AIDS identification and research (1980s):** Sparked global awareness and major research efforts

1990s–2000s: Digital and Genomic Era - Market grew from $1.8T to $4T for a 122% increase in size

In the 1990s through the 2000s, the promising innovation of mapping the human genome would lead to many health innovations. The innovation was accompanied by the evolution of technology and the start of digital health with early forms of telemedicine.

- **Human Genome Project (completed in 2003)** – Mapped human DNA, unlocking personalized medicine
- **Electronic Health Records (EHRs)** – Standardized digital documentation and data sharing
- **Telemedicine beginnings:** Early adoption in rural and military settings
- **Robotic surgery (e.g., da Vinci system):** Enhanced precision and patient outcomes
- **Targeted cancer therapies:** Designed to act on specific molecular targets in tumors

2010s–2020s: AI, Wearables, and Precision Health - Market grew from $7T to $10T for a 42% increase in size

Innovations across the next decades really started to lay the groundwork for incredible things yet to come due to the growth of data about health. Electronic records, connected devices, and wearables made it easier to collect and share with researchers and practitioners. New tools – including AI – improved the interpretation and understanding of this data. This period also saw growing acceptance that AI would be a dominating advancement in the future. All other innovations in some way could be improved using AI as a core part of the development and understanding of that new technology. Examples of some of these innovations include:

- **Wearable healthtech (Fitbit, Apple Watch):** Real-time monitoring of heart rate, sleep, ECG, etc.
- **Artificial Intelligence (AI):** Used in diagnostics (e.g., radiology, pathology), drug discovery, and patient triage
- **CRISPR gene editing (2012):** Pioneered gene therapy potential for diseases like sickle cell and cancer
- **mRNA vaccines (COVID-19, 2020):** A new vaccine platform rapidly deployed at scale
- **Telehealth boom (especially post-2020):** Video consultations and remote care became mainstream during the pandemic.

Research supports a continuing trend with great market growth; a big part of this growth will be driven by AI and AI-empowered solutions. There are a number of really cool innovations that are under the umbrellas of AI or AI-empowered. Digital twins, diagnostics, predictive analytics, personalized medicine, and regenerative medicine will all be a big part of what drives health innovation across the next couple of decades. However, AI will also be a very disruptive factor based on how it might be used and the impact that it will have in the industry. Here are just a few examples where AI will likely disrupt the industry as it operates today.

- **Digital twins:** Creating virtual models of patients for treatment simulations
- **AI-driven diagnostics:** Systems like IBM Watson and other AI tools for detecting diseases faster and more accurately than human doctors
- **Predictive health analytics:** Leveraging big data to forecast illness and optimize prevention
- **Personalized medicine:** Treatments tailored to individual genetics and lifestyle
- **Regenerative medicine:** Stem cells and 3D-printed organs hold promise for organ repair and replacement.

Historical Impact of Healthcare Innovation

When looking at the growth in market size and the innovation across the last 100 years, we can see that the life expectancy has risen, infant mortality rate has dropped, and overall management and control of illness have been enhanced. Those improvements have helped to advance our society and improve the quality of life for people in general. To a large extent, these innovations and the related growth has not been particularly disruptive for healthcare in general. At a high level, this improvement trend will continue powered by the advancement in AI and increased adoption of AI across a multitude of healthcare applications. This will likely lead to major disruptions in healthcare unlike what the industry has experienced over the last 100 years.

As a technology, AI is quite different from the other innovations that have been adopted within healthcare. Not since the dot com / Internet boom has industry been so impacted; AI is poised to be even more transformational and disruptive.

Outlook for AI's Impact on Healthcare

AI has combined with quantum computing to make the concept of a digital twin possible and signifies a leap forward in terms of the applications and impact within healthcare.

Imagine having a digital representation of yourself down to the exact genome, where you could then take a digital representation of a treatment and using AI and quantum computing simulate the outcome of that treatment. This could completely

revolutionize treatments in general and certainly be disruptive to the pharmaceutical industry. On one hand, effective treatments could be found faster, but on the other hand, perhaps natural cures might also be found faster which could make certain prescribed medications obsolete. Perhaps, it could even lead to a new revolution in performance enhancing designer drugs. The sky is the limit for this type of computing power leveraging AI.

CASE STUDY:

At Xcellent Life, we started working on Real-time Human Diagnostics (RtHD) which is the ability to describe human vitality in real time in a very accurate way. Because more data is becoming available, it is now much easier to evaluate vitality in a more holistic way. With AI, we can consistently examine a comprehensive data set using sophisticated predictive models. This will eventually give us the ability to identify the signatures of health risks long before those signatures result in symptoms or observable conditions.

At Xcellent Life we describe Real-time Human Diagnostics (RtHD) as being like an Onstar system for the human body. This innovation could take the industry from a reactive approach to a much more proactive approach which would also change revenue models.

It is not hard to imagine that with the pervasive access to data, sufficient computing power, and the ability to interpret that data, we will see personalized treatments start to play a more dominant role in treatment. In turn, people will start to expect this level of diagnosis and treatment. This should lead to much better outcomes, an increase in life expectancy, and lower healthcare costs overall. Of course, this sounds like an amazing advancement and it is, but now consider how AI is helping in the process of accelerating regenerating treatments.

Imagine having arthritis or bone-on-bone condition due to cartilage loss. Now imagine easily regrowing cartilage so that you no longer have a bone-on-bone condition. We are in the early phases of this now and the advancements in the field are going to accelerate due to AI.

Clearly, all these things sound very similar to things that have happened to healthcare over the last hundred years, which is to effectively improve care, lengthen life, and improve quality of life. How will AI be disruptive? What makes it different?

AI is different from any other technology that we have broadly adopted within healthcare. We have created tools, medicines, and treatments, as well as provided services that have been better over the years. However, “we” – as in human beings – have always been a required component of those solutions. Today, we have the capabilities using software and machines to diagnose, operate, and do many administrative tasks without any person really being needed. We are not totally operating like that today, which is a good thing, but the fact remains that we now have the technology that could in many cases perform better without human interaction to get a desired outcome.

What happens when it is broadly understood and trusted that we can get better outcomes, faster, more pervasively, and less costly using AI without so many humans in the equation?

It is an interesting question to ponder, and one likely outcome is the disruption of the healthcare industry. Revenue models will likely need to change; staffing will absolutely be different as well as the deployment of solutions. Given my time in the technology space – 30 years to be precise – I have not witnessed any technology that I believed to be more transformation than AI coupled with quantum computing.

Some incredible opportunities continue the trend of advancing health, lengthening life, and improving the quality of life for all, but there are also some incredible risks that AI practitioners and leaders will need to consider in the way this next wave of evolution impacts healthcare and the lives of everyone on the planet, if in fact we are to reap the benefits of this amazing technology vs realize the risks. As with any tool, AI can be used for good or bad. Hammers can build homes that provide shelter. They also can be used as a weapon that causes harm or even death. Metaphorically speaking, AI happens to be the biggest hammer we have seen in the last hundred years and thus we should choose to use it wisely.

Impact of AI in Healthcare Summary

We can expect to see incredible benefits from the growing adoption of AI within healthcare as it takes a foothold in helping with administrative tasks, operational tasks, and even in the act of providing analysis and treatments of illnesses. The industry will continue to grow, people will continue to get access to better care, which will lead to longer lives and higher quality of life. However, these things will likely happen in the context of disruption, which we will have to deal with as the industry works to get its arms around AI, which is a very big metaphorical hammer. We can be encouraged by the steps that industry leaders and AI practitioners are taking to ensure that AI is used to build society rather than tear it down.

Sources

1. **World Health Organization (WHO):** Historical vaccine development, infectious disease control https://www.who.int
2. **Centers for Disease Control and Prevention (CDC):** Public health milestones, vaccine impact, antibiotic era https://www.cdc.gov
3. **National Institutes of Health (NIH):** Organ transplant history, Human Genome Project, and biomedical research timeline https://www.nih.gov
4. **Centers for Disease Control and Prevention (CDC):** Public health milestones, vaccine impact, antibiotic era https://www.cdc.gov
5. **National Institutes of Health (NIH):** Organ transplant history, Human Genome Project, and biomedical research timeline https://www.nih.gov
6. **The Lancet / JAMA / BMJ (peer-reviewed medical journals):** For publications on IVF, mRNA, CRISPR, and precision medicine
7. **U.S. Food and Drug Administration (FDA):** Drug approvals, medical device innovation timelines https://www.fda.gov
8. **Science and Nature journals:** Foundational research for CRISPR (e.g., Doudna & Charpentier papers)
9. Medical history books and encyclopedias:
    - "The History of Medicine: A Very Short Introduction" by William Bynum
    - Oxford Illustrated History of Medicine
8. **Stat News, Health Affairs, MedTech Dive:** Analysis of wearables, telehealth, AI, and recent healthcare trends
9. **McKinsey, Deloitte, and PwC reports:** Health innovation trends, predictive analytics, digital twins, and AI in healthcare

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Victor L. Brown is a seasoned leader with extensive experience within both large global companies and start-ups where he has spent decades driving technology innovations across global markets.; Victor has driven business success as a leader and as a hands-on practitioner of best-practice approaches across engineering, marketing, business development & sales. Victor now cherishes the opportunity to explore ways to utilize AI to advance society.

For more information about the Coalition for Innovation,
including how you can get involved, please visit coalitionforinnovation.com.

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