



A healthy outlook

Digital Reinvention in healthcare

Executive Report

Digital Strategy
Healthcare

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Reimagining healthcare

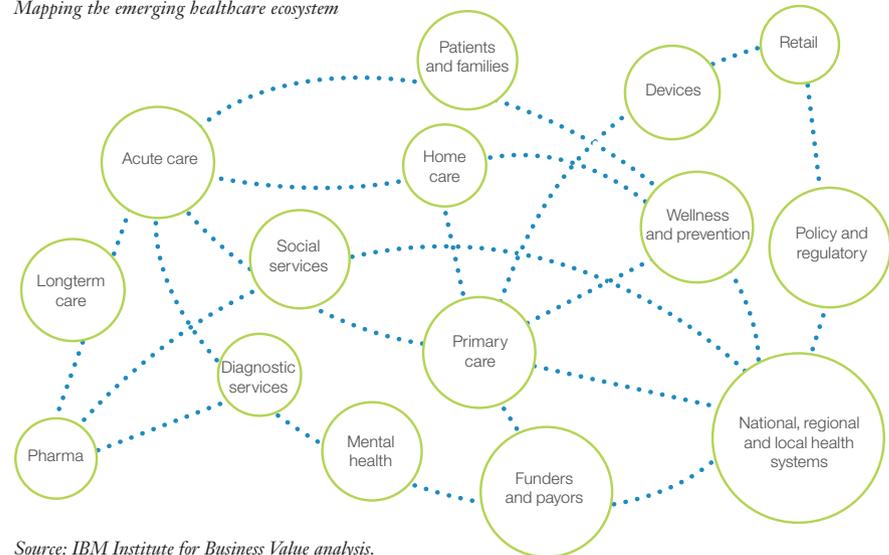
Until recently, healthcare systems and providers focused exclusively on the remediation of specific ailments or systemic challenges. Recent innovations in global healthcare, however, have begun to move the industry away from solely addressing medical issues once they have occurred and toward medical prevention, management and cure. But such initiatives reflect merely a beginning. Current advances in technology will support the ubiquitous orchestration of health and wellness. And these advances will do so affordably, individually and at scale. Digital Reinvention™ provides the mechanism and overarching vehicle to align healthcare investments and initiatives to realize this vision sooner than many might think.

Forces beyond nature

Global healthcare is experiencing dramatic and remarkable change. New and emerging technologies – such as artificial intelligence (AI), cognitive computing, the Internet of Things (IoT), cloud and 3D printing, among many others – are converging to change not only how, where and with what precision healthcare is delivered, but also the very definition of healthcare. Once a series of fragmented activities, healthcare is evolving into integrated ecosystems of researchers, providers, payers and regulators that can interact with patients, caregivers and others on an individualized basis. And, with the help of new technologies, such engagement is increasingly able to be delivered affordably and at scale (see Figure 1).

Figure 1

Mapping the emerging healthcare ecosystem



Source: IBM Institute for Business Value analysis.



43% of surveyed healthcare executives say boundaries between their industry and others are blurring



54% of surveyed healthcare executives report that traditional industry value chains are being replaced with new value models



51% of surveyed healthcare executives say competition is coming from new and unexpected places

What was once a staid and conservative industry has, over recent years, become an epicenter of disruption and change. Shifting demographics, particularly in relation to rapidly aging populations around the world, have contributed to dramatic growth in the incidence of chronic and lifestyle diseases, placing significantly increased pressure on healthcare systems around the world.

Motivated by challenging economic times and tight public sector budgets, many healthcare organizations are changing their business and operating models from fee-for-service to value-based reimbursement in an effort to provide affordable, quality care at lower costs. And such pressure is extending across the medical landscape, from wellness initiatives to preemptive treatment for acute conditions and chronic diseases.

Technological advancements are helping healthcare to become more personalized, more cost-effective and scalable, and more capable of achieving success outcomes than ever before. And yet, the availability of skilled and semi-skilled healthcare workers is projected to decline significantly due to changing social demographics and rapidly evolving technologies.¹ This shift challenges healthcare organizations to be even more efficient, create better workplace environments, pay and train more, and engage with employees – and in more creative ways – to retain staff and maintain and grow necessary skills.

Many healthcare organizations are already employing new digital technologies to create new value in the industry. California-based healthcare payer and provider Kaiser Permanente, for example, has implemented an electronic health record system called HealthConnect that transforms both health research and clinical practices.² In a separate initiative, Kaiser Permanente is employing big data in neonatal intensive care units to help physicians gauge preterm and newborn babies' risk of developing sepsis.³

In the area of predictive analytics, the Wellcome Trust Sanger Institute is investing heavily in analytics and high-performance computing capacity to help research teams generate analytical results faster, better and more economically. The goal is to help researchers meet publication deadlines and improve the likelihood of securing funding.⁴

Based in Beijing, Baheal Pharmaceutical Group is accelerating cancer patients' access to cognitive technology and allowing doctors more time to focus on the best decisions they can make for those patients.⁵ China is the home to a quarter of all global cancer cases.⁶

Other organizations are also employing digital technologies to significantly improve the healthcare experience. US-based global medical device company Medtronic has developed a prototype of a diabetes app that predicts, with an accuracy of 75-86 percent, the onset of dangerously low blood sugar in diabetics, often up to three hours in advance of serious medical implications.⁷ UK-based Alder Hey Children's Hospital has decreased anxiety levels of its young patients by developing apps in which a child can create and interact with an animated avatar. The avatar acts as a third party that can ask questions and express concerns that children might have difficulty expressing themselves.⁸

The Toronto-based Hospital for Sick Children (SickKids) has developed a series of digital apps for areas such as pain management, arthritis and bowel disease, and the company has also implemented a sophisticated telemedicine program. Each year, SickKids helps more than 5,000 children engage with medical professionals remotely through its device-agnostic video conferencing platform.⁹ And India's Manipal Hospital Group has adopted a cognitive platform for oncology treatment that helps physicians identify options for individualized, evidence-based cancer care.¹⁰

Healthcare professionals and executives around the world are recognizing that the way healthcare is conducted and managed is changing in radical and fundamental ways. Of the 83 global healthcare leaders who participated in the 2016 IBM Institute for Business Value global ecosystem survey, conducted in collaboration with the Economist Intelligence Unit, 43 percent told us that boundaries between the healthcare industry and others are blurring. Fifty-four percent said that traditional healthcare value chains are fragmenting and being replaced as a result of disruptive technologies. And 51 percent said that competition is coming from new and unexpected places.¹¹

Knowing you, knowing everyone

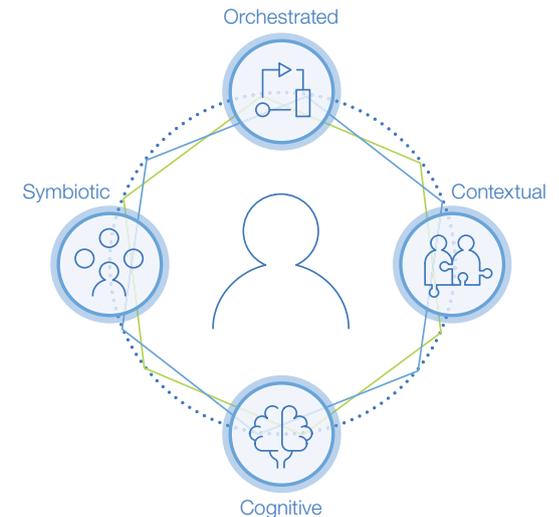
The disruptive and rapidly changing environment in which global healthcare executives – and their patients – find themselves can best be understood within what we call the everyone-to-everyone (E2E) economy. The E2E economy has four distinct elements: It is orchestrated, based on business ecosystems that are both collaborative and seamless. It is contextual, in that consumer and partner experiences are calibrated and relevant to their specific actions and needs. It is symbiotic, in that everyone and everything, including patients and providers, are mutually interdependent. And it is cognitive, characterized by data-enabled self-supported learning and predictive capabilities (see Figure 2).

The E2E business environment is profoundly digital. Medical innovations such as computed tomography (CT) scanners, magnetic resonance imaging (MRI) scanners, X-ray machines and pacemakers have become commonplace, but in reality, most healthcare industry processes and operations came late to the digital game. Until very recently in most countries, medical records and other information remained paper-bound and siloed, and the industry remained extremely fragmented.

But in many areas, even in highly fragmented and politically charged locations such as the US, the healthcare industry has come under increasing pressure to embrace digital and drive efficiency and other performance improvements.

Figure 2

The everyone-to-everyone economy consists of four elements



Source: IBM Institute for Business Value analysis.

For healthcare, we can think of digital as going through an evolving process – from digitization to digital transformation to Digital Reinvention. Within the context of healthcare, digitization involves setting up digital capabilities that support processes or functions. Digital tests such as CT scans and MRIs are good examples of digitization within healthcare, along with other more administrative capabilities such as automated billing.

Digital transformation in healthcare goes further, involving the integration of digital functions or processes across the enterprise – be it a payer, a provider or another organization. By combining a set of digital systems and processes, digitally transformed healthcare can offer its patients both individualized and omni-channel experiences. Advancements in electronic medical records or other initiatives striving for medical interoperability reflect the recent shift toward the digital transformation of healthcare.

Digital Reinvention in healthcare goes even further. Digitally reinvented healthcare involves a fundamental reimagining of the way payers, providers and others operate and engage with patients or consumers and other stakeholders – with the aid and support of digital technologies. Digital Reinvention at its most fundamental level reconceives the healthcare experience from a patient-first, or consumer-centric, perspective. Forming or redesigning healthcare processes and building seamless healthcare ecosystems around health, wellness, and treatment reflects a Digital Reinvention philosophy.

And when organizations are conceiving the healthcare ecosystems of the near future in a digitally reinvented world, they will find the possibilities limited only by their imaginations. For example, biological sensors that operate through the IoT to deliver real-time analytics and insight, and that are connected to AI-enabled systems, may help medical professionals provide vastly more precise advice and manage their activities and time optimally in real time. Personalized well-being management linked to personalized preventative and remedial treatment will not only extend lives, but dramatically reduce inefficiency and waste (see Figure 3).

Figure 3

Digital Reinvention follows a path that starts with digitization and progresses through digital transformation



Source: IBM Institute for Business Value analysis.

So it begins

Digitally-born healthcare businesses, unencumbered by any legacy organization, already possess Digital Reinvention attributes and are leading the innovation charge. San Francisco-based AliveCor, for example, developed the world's first smartphone-connected electrocardiogram (ECG) called Kardia. Kardia detects abnormal heart rhythms using a smartphone and lets patients check their heart health quickly and decide whether medical attention is required. In 2016, AliveCor announced a collaboration with New York's Mayo Clinic to use machine learning to better understand hidden health indicators within the EKG data.¹²

Austrian startup mySugr, founded in 2012 and recently acquired by global pharmaceutical giant Roche, is using gamification techniques, including a diabetes monster, to keep users motivated and engaged in monitoring and managing their blood sugar levels. The company's apps and services combine diabetes coaching, therapy management, testing and automated data tracking with seamless medical device operability.¹³

Australian firm Global Kinetics Corporation, makes the Personal KinetiGraph, a wearable device that tracks the movement of patients with Parkinson's disease and reminds them when to take medications. KinetiGraph's algorithm-based system records patients' movements through time, creating personalized reports that can be used to improve treatment.¹⁴ And San Francisco-based startup Enlitic is using AI to help doctors diagnose and predict various diseases. Enlitic's deep learning technology, which sources a wide range of unstructured medical data, can deliver high rates of accuracy and context, and it can do so many thousands of times faster than doctors can achieve alone.¹⁵

Readying for reinvention

For successful Digital Reinvention, healthcare organizations need to pursue a new strategic focus, build new expertise and establish new ways of working (see Figure 4).

Pursue a new focus

Healthcare organizations can explicitly define and formulate new experiences, building ecosystems, capturing efficiencies and monetizing value. Initiatives might include spawning new business models, tapping new forms of financing and developing better, more holistic ways of conducting risk assessments. Leaders will create deep, contextual capabilities.

Build new expertise

Healthcare organizations will need to continue to digitize products, services and processes that help merge the physical with the digital. They will need ever-better predictive analytics, AI and cognitive computing, along with new applications for the IoT and new forms of automation, to create fully integrated, flexible and agile operating environments that support the individualized health, wellness and, if necessary, care.

Establish new ways of working

Healthcare organizations will also need to identify, retain and build the talent necessary to create and sustain a highly digital organization. The most successful are expected to create and perpetuate innovation-infused cultures that incorporate design thinking, agile working and fearless experimentation.

Adopt a self-funding approach

Healthcare organizations will need to deploy the technologies mentioned earlier in this paper quickly, as well as others that may not even be commercially available, to support scalable capabilities and interoperability. They will need to use digital tools to optimize existing operations and improve efficiencies, using any savings to fund further innovation.

Figure 4

The Digital Reinvention operating environment revolves around new experiences



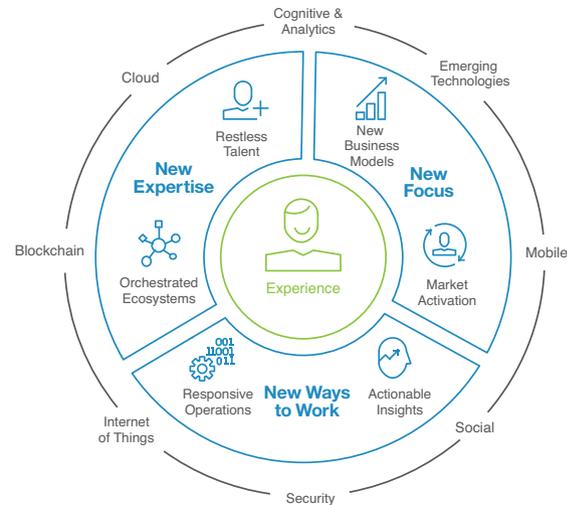
Source: IBM Institute for Business Value analysis.

Embrace digital drivers

Healthcare organizations will also need to become ever-more proficient in digital technologies. They will, in fact, need to become digital leaders. Technologies will underpin any reinvention of healthcare, with the deeply intimate, individual experiences required. Rather than incrementalism, Digital Reinvention provides a path for the most visionary to adopt an experience-first planning approach, employing the strengths of both ecosystem partners and themselves (see Figure 5).

Figure 5

The Digital Reinvention framework combines the strengths of ecosystem partners



Source: IBM Institute for Business Value analysis.

In the healthcare provider segment, digitally reinvented organizations can dramatically improve visibility for patients or consumers and drive toward more successful outcomes. They can work toward creating integrated systems that streamline processes, interoperability and transparency. They can engage digitally connected employees to generate new ideas and focus on robust training and generational succession planning.

Specifically, digitally reinvented organizations can build new platforms by connecting devices using digital tools to manage health data. They can deploy innovations such as apps and wearable devices to monitor health and integrate data with electronic health records. They can embrace the IoT by using sensors and cloud services, nanotechnology and big data to digitize traditional healthcare operations. These organizations can deploy advanced analytics based on AI and cognitive computing to better understand consumer or patient needs to generate superior outcomes. They can use ecosystems to help them address likely skills shortages and find more productive ways to engage with employees.

Digitally reinvented healthcare payers can dramatically improve the individualization of services. They can streamline processes and better equip employees with intelligent tools to make better, faster decisions and improve patient outcomes and efficiency. Specifically, payers can engage with emergent healthcare ecosystems and embrace technologies such as AI and cognitive computing to aim for improved operational performance and decision-making around event preparation, loss prevention, response and recovery. They can deploy new tools to better assess and manage risk, and they can prioritize collaboration.

Johnson & Johnson uses AI to redefine healthcare delivery

Global healthcare giant Johnson & Johnson has created consumer-focused apps that combine AI with health data to provide virtual coaches for patients. With the vision of combining deep expertise in behavior modification rooted in connecting behavior with individual purpose and motivation, rich data and predictive analytics, the apps will directly address significant health and wellness challenges, including the management of chronic conditions and pre- and post-operative care. Johnson & Johnson is applying lessons from consumer electronics and other consumer-facing industries to the healthcare sphere to improve the quality and speed of recovery.¹⁶

Memorial Sloan Kettering builds cognitive ecosystems to enhance patient care

New York-based Memorial Sloan Kettering Cancer Center is combining its extensive cancer expertise with deep analytical capabilities to provide individualized cancer treatment. The Center has deployed cognitive solutions that can understand medical conditions and recommend courses of action. Memorial Sloan Kettering is partnering with Hackensack Meridian, a leading not-for-profit health care organization to improve care, share best practices and collaborate on clinical trials. As a result, the Center has not only improved the accuracy of its treatments, but scalability of its expertise.¹⁷

Surfing the digital wave

To set out on the path toward Digital Reinvention, healthcare industry leaders can take four initial steps: Envision possibilities, create pilots, deepen capabilities and orchestrate environments.

Step 1: Envision possibilities

Conduct visioning sessions based on design thinking to produce a definitive reinvention blueprint. For example, through deep conversations and in-depth marketing analysis, develop a better understanding of stakeholder's needs, aspirations and desires; brainstorm new ideas to enhance engagement; and visualize unexpected consumer scenarios. Incorporate external stakeholders in these sessions, including consumers, to encourage thinking that goes beyond business-as-usual.

Step 2: Create pilots

Develop prototypes using agile development, test them with consumers and get them to market quickly to promote feedback and iteration. Establish communities of interest to create "safe" environments to beta test innovations and incorporate them as a central part of design and development of processes, frameworks and creation of rules.

Step 3: Deepen capabilities

Augment digital capabilities with strategic initiatives and continue to build and deploy necessary applications aligned to the target Digital Reinvention operating model and ecosystem strategy. As pilots evolve, impediments around development will emerge, highlighting limitations in existing capabilities. Enact a continuous, iterative strategy to address these limitations by building new or extending existing capabilities.

Step 4: Orchestrate ecosystems

Execute through holistic reinvention rather than a series of point solutions, maintaining a clear focus on deep needs, aspirations or desires of patients, caregivers, clinicians and others. Focus on interoperability and ecosystems to expand and align a broader set of capabilities and to help create and deliver on consumer promises.

Under Armour reinvents its business and engagement model

Under Armour Inc. is reinventing its business, expanding from traditional sportswear manufacturing to digitally enabled fitness products and services. Under Armour is building new capabilities that support Connected Fitness, which helps consumers track, analyze and share their fitness activities using connected devices and various apps. The company has plans to further expand its capabilities through a cognitive coaching system that could serve as an interactive personal consultant, trainer and coach, providing timely, evidence-based research, interaction and advice.¹⁸

Key questions

- How can you make your digital strategy more ambitious to face disruption head-on?
- In what ways can your organization become more agile, so it is better equipped to respond to unexpected challenges and opportunities?
- What steps can you take to make your workforce more open and flexible and relevant for the future?
- How can help your leadership become more visionary, conceiving what consumers – including patients and caregivers – want before they know it themselves?

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For more information

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