



Healthcare in the Digital Age

A #ThinkBeyond Best Practice Series





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Executive summary

Consumerization is transforming the healthcare space with digital technologies driving a fundamental shift in consumer demands, behavior, and preferences—where they proactively engage with healthcare providers rather than being passive recipients. Healthcare consumers' expectations for convenience, quality, and affordability are redefining how they engage at every stage of preventive care. Consumers are more willing to explore and try digital healthcare services. Providers that put digital at the core of their services to better meet these growing expectations of connected consumers succeed in earning consumer advocacy and loyalty, accelerating their digital transformation, and creating new competitive advantages.

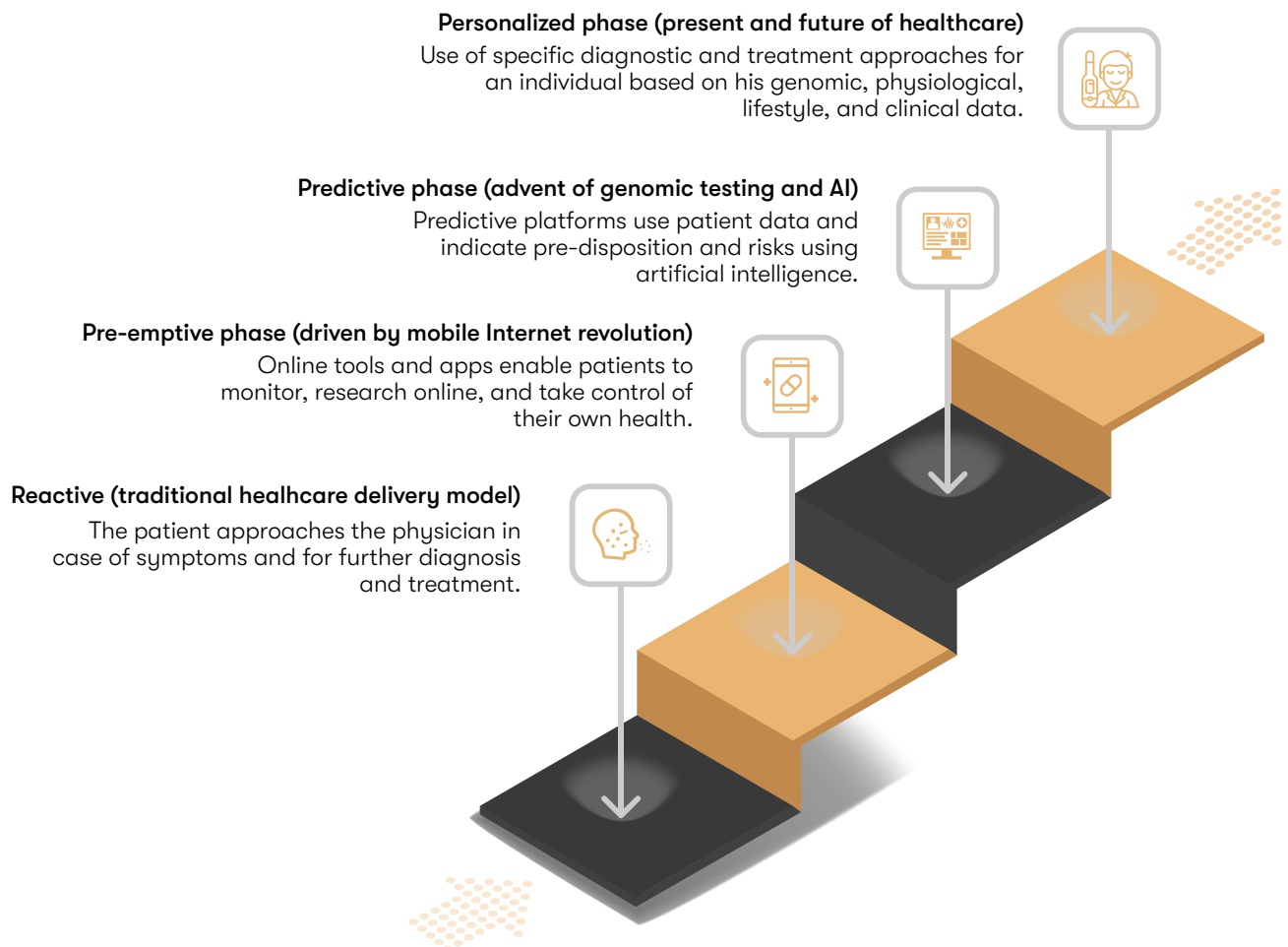
The dynamics of the healthcare industry are changing—with innovative digital solutions bringing about a shift from the curative care model to a more preventive care model. Precision medicine (also known as personalized medicine), genomics data analysis, adoption of IoT devices, integration of AI-powered intelligence, mHealth, wearables, and telehealth are some of the key digital technology trends that improve healthcare operations, solve existing problems, and create new opportunities for service providers.

Photon's guide discusses the significance of digital technologies in bringing a paradigm shift in the healthcare industry where digital is standardizing healthcare experiences and consumer engagement. It dives deep into disruptive digital technologies—such as artificial intelligence or machine learning, cloud, big data, Internet-of-Things (IoT), and mobile—and their implications on the industry. The guide further outlines how Photon helps global healthcare and pharma companies transform their operations and consumer experiences, digitally.

Overview

The digital transformation wave continues to disrupt the healthcare industry throughout the continuum of care. A new survey reveals that two-thirds of healthcare executives are leading their peer group in digital transformation¹. To compete with disruptors, traditional healthcare companies need to leverage digital technologies to think beyond the established service delivery models, maximize ROI from big data analytics, improve patient care and engagement, and maximize profitability—all while efficiently managing the growing risks around privacy and data security.

Evolution of the healthcare industry



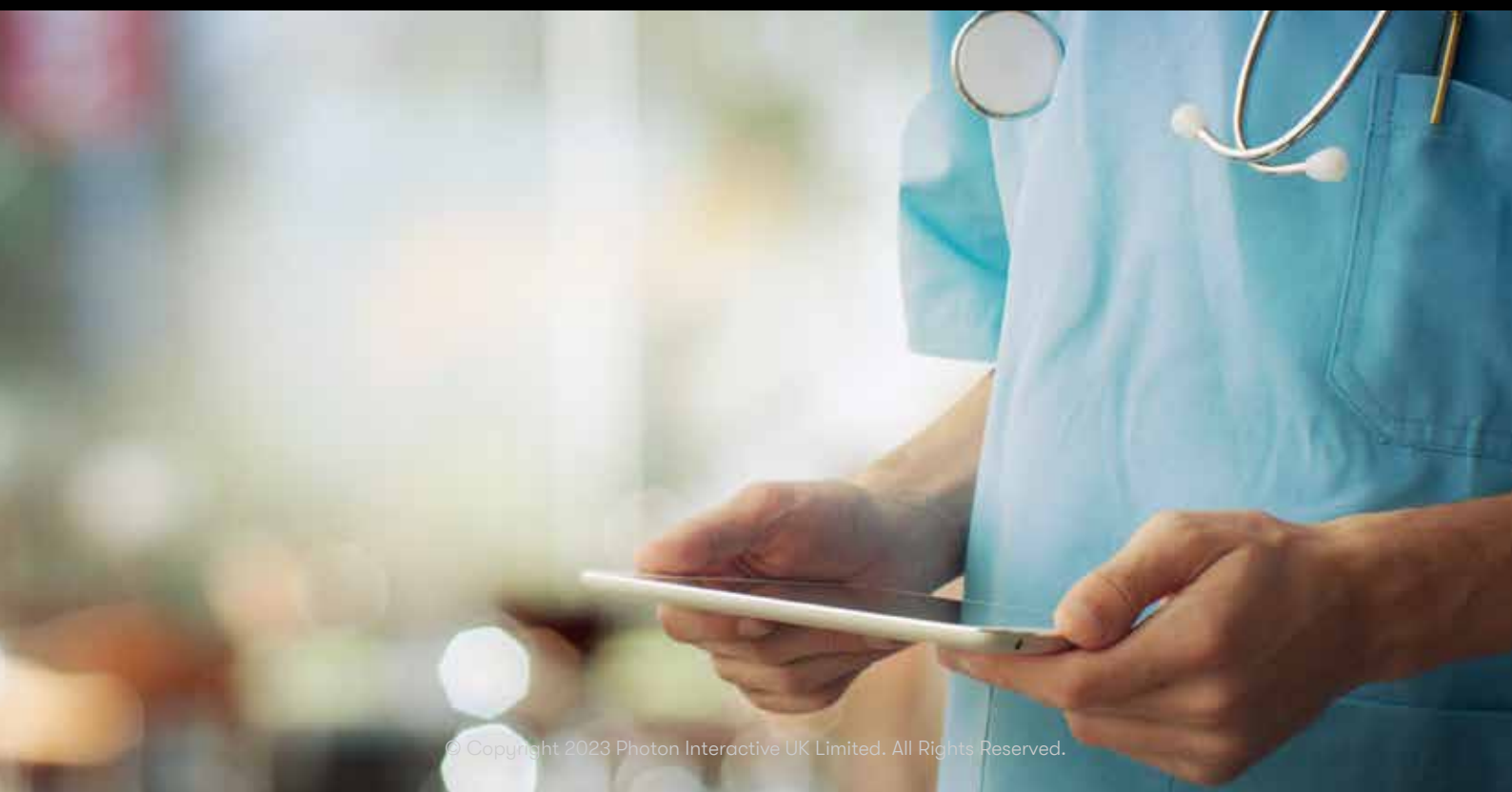
Consumerism is taking precedence in the healthcare space with a large number of digital-native companies delivering personalized services to consumers and setting the stage for new products, services, and business models. For example, digital-native service ZocDoc has digitized the process of finding a physician and making an appointment. Companies like Pager and Heal work to bring on-demand house calls to patients. As a result of this transition, consumers are seizing more control over the way healthcare services are accessed and delivered.

Tech giants like Google, Amazon, and Microsoft have forayed into the consumer healthcare market. In 2018, Amazon acquired PillPack, a direct-to-consumer pharmacy. With this acquisition, Amazon tapped into the \$500 billion US prescription drugs market with the goal of creating better experiences for consumers in terms of drug delivery. Microsoft's healthcare ambitions have led to a deal with Walgreens to build digital health tools for pharmacy customers. This seven-year partnership aims at creating integrated, next-generation, digitally enabled healthcare delivery solutions.

“With connected consumers increasingly owning healthcare decision-making and demanding convenient, timely, and hyper-personalized digital experiences, healthcare and pharma providers must build and drive customer-centric digital strategies to create competitive advantages.”

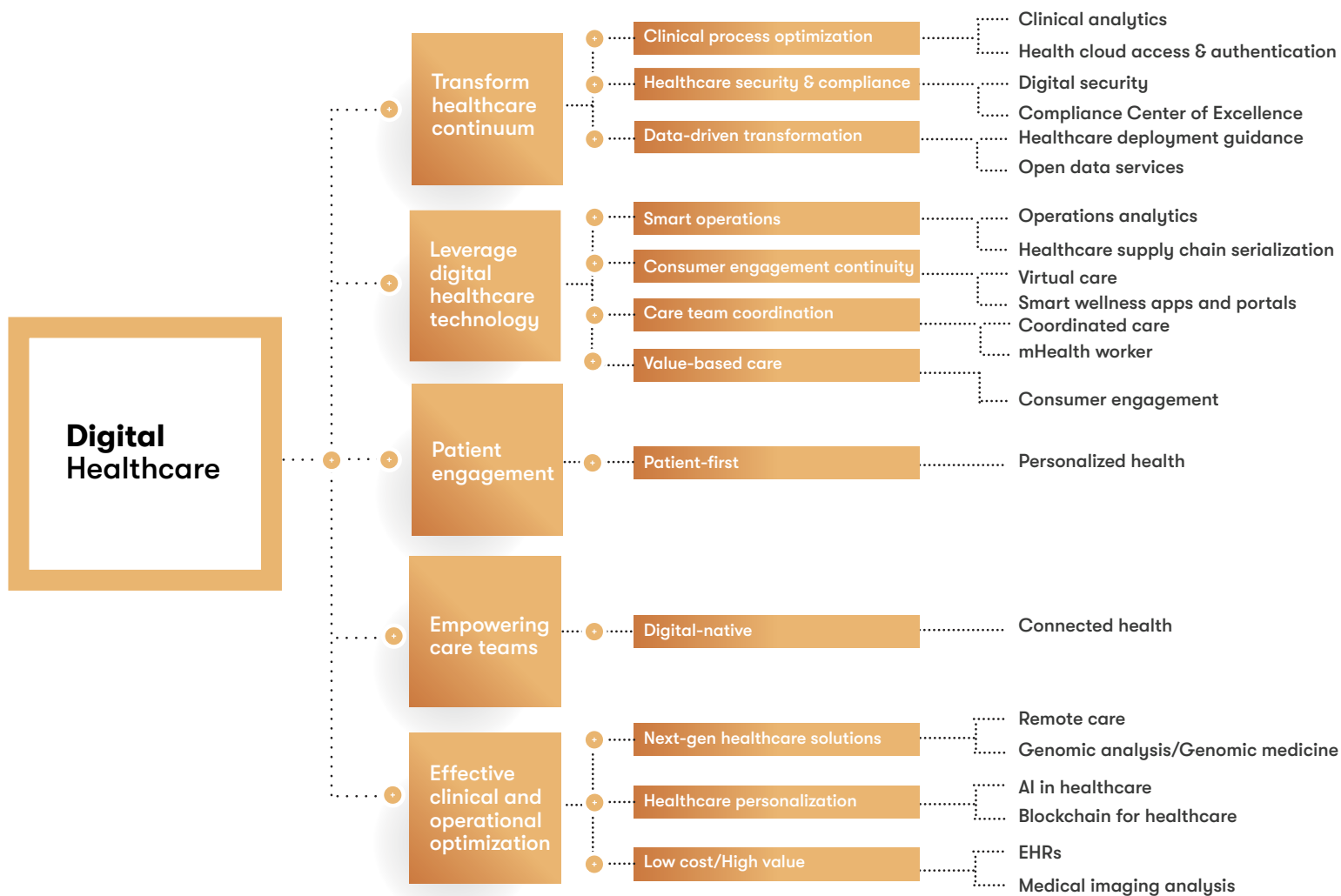


Mukund Balasubramanian,
CTO, Co-Founder,
Photon



What is digital healthcare?

Digital or non-traditional healthcare is essentially a consumer-centric approach that leverages next-gen digital technologies to revolutionize the methods of consumer engagement and service delivery. The increased emphasis on consumer digital experiences has led to the rapid adoption of technologies like software-based diagnostic devices, wearables, and analytical tools—leveraging artificial intelligence, big data analytics, and the cloud—by healthcare providers to deliver services on demand. By 2020, 60% of healthcare providers will make optimizing the digital patient experience a top strategic imperative.²



Digital healthcare aims at a cultural and behavioral shift in the ways consumers engage with healthcare service providers to fundamentally change the provider-payer relationship and enable the sharing of the decision-making process equally, allowing for the democratization of care. Digital healthcare can be further categorized into the following subsections to better understand the impact of technologies on healthcare practices:



Digital health

It includes technologies, platforms, and systems that engage customers for lifestyle, wellness, and health-related purposes and capture, store, or transmit health data and/or support life science and clinical operations.



Digital medicine

It empowers consumers and physicians with intelligent tools to address a wide range of health conditions through effective measurements and data-driven interventions. Digital medicine is driven by advanced, high-quality hardware and software programs.



Digital therapeutics

It delivers evidence-based therapeutic interventions driven by high-end software programs to manage, prevent, and treat a physical, mental, or behavioral condition. Individual-based, personalized digital therapeutics have the potential to transform existing medical therapies.



Traditional healthcare vs. digital healthcare

The convergence of healthcare and technology is creating a strong case for digital healthcare by not only improving medical diagnosis and the quality of treatment but also aiding in prevention. Intuitive and smart use of digital technologies by healthcare providers, pharmaceutical companies, medical device manufacturers, and even IT giants explain this adaptive shift from traditional to digital healthcare. In 2018, the digital health space garnered \$14 billion in funding, a 250% increase from 2017.³

Vs.

Traditional healthcare



Point-of-care is clinic/lab/hospital

Established service delivery—doctors, health professionals, nurses, etc.

Data owned by institutions

Community-based healthcare services

Access to information is limited—coming from doctors, professionals, experts, etc.



Digital healthcare

Point of care is the patient

Emerging service delivery; on-delivery care, connected health, digital therapeutics

Data owned and shared by patients

Personalized healthcare services

Access to medical information and advice available from numerous sources—the Internet, social media, crowdsourcing, etc.

Digital technologies disrupting healthcare service delivery

The approach of sustainable well-being as opposed to "response to illness" is becoming the center of healthcare owing to the digital transformation wave. Changing consumer demographics and evolving technology trends are compelling healthcare providers to embrace digital technologies to meet rising demands and efficiently deliver experiences that are convenient, timely, and relevant. Digital is enabling efficient ways for providers and consumers to better communicate and collaborate, and elevate the state of healthcare. In this section, we discuss the five biggest technology trends that are transforming the healthcare industry.

Digital healthcare trends and statistics

 <p>Mobile solutions</p>	<p>400 million global downloads for medical apps in 2018⁴</p>	<p>80% of Americans have searched for a health-related topic online⁵</p>	<p>\$31 billion in revenue to be generated by mHealth services and devices in 2019⁶</p>
 <p>Cloud-based healthcare</p>	<p>\$9.48 billion in healthcare spending on cloud services by 2020⁷</p>	<p>73.4% of healthcare providers leverage the cloud to support financial, operational, and HR applications⁸</p>	<p>83% of pharma companies are already using cloud services⁹</p>
 <p>Connected healthcare</p>	<p>30% of connected devices are used in the healthcare industry¹⁰</p>	<p>97.6 million units of healthcare wearables to be shipped globally by 2021¹¹</p>	<p>45% of connected health solution providers say they may eventually develop on-body devices¹²</p>
 <p>AI and machine learning</p>	<p>88% healthcare providers believe that AI will improve overall care¹³</p>	<p>77% of healthcare providers use AI and machine learning to support clinical decision-making¹⁴</p>	<p>50% of healthcare providers expect to see savings related to AI in less than three years¹⁵</p>
 <p>Healthcare analytics</p>	<p>60% of healthcare executives are using predictive analytics within their organizations¹⁶</p>	<p>80% of healthcare executives are investing more in big data analytics¹⁷</p>	<p>94% of hospitals in the US use electronic health records (EHRs) data to inform clinical practices¹⁸</p>

Mobile solutions for effective healthcare delivery

Mobile devices and applications working in tandem with an array of technologies like big data, cloud, and AI continue to lead the way in the digital transformation of the healthcare industry. It is estimated that the medical mobile apps market will grow to over \$11 billion by 2025.¹⁹ These applications are transforming current big data repositories into more proactive and smart repositories for enabling preventive care.



Healthcare information accessibility

Digital healthcare tools give consumers the option to access their medical information and have an active say in the diagnosis and treatment decision-making process. Data access improves consumer satisfaction significantly and adds value to the experience.



Mobile-first healthcare strategies

With connected consumers increasingly demanding personalized care, companies are driving mobile-first healthcare strategies to engage consumers with highly relevant and anytime, anywhere healthcare delivery.



Wellness apps

Wellness apps have become an integral part of the modern urban lifestyle and have begun to play a crucial role in the prevention of illness and diseases with innovative engagement models.



Telemedicine (or telehealth)

This enables remote care for patients who might have difficulty in making clinic visits. By 2022, the number of yearly telehealth visits in the US is expected to reach 63 million.²⁰



Cloud-based healthcare solutions

Cloud-based solutions provide an array of benefits when compared to on-premise systems—including operational, functional, and economical advantages. Healthcare organizations, pharma retailers, clinics, and hospitals are fast adopting cloud-based healthcare technologies. As per research, over 84% of healthcare organizations are already using cloud technology.²¹



Enable scalability

Scalability is the most valuable feature of the cloud, and with the growing landscape of the digital healthcare industry, a cloud-based architecture gives healthcare providers the capability to manage fluctuating demands in an efficient manner. With the proliferation of healthcare data from electronic health records (EHRs), medical devices or applications, online ordering, and billing—cloud-based services can help healthcare providers avoid the threshold of storage while empowering them to aggregate and analyze the data.



Deliver reliable digital services

Maintaining consumers' trust and satisfaction depends on the consistent delivery of reliable digital medical services. An efficient cloud architecture ensures that there are no latency issues in your network, and the delivery of advanced medical services like telehealth, connected healthcare, and virtual nursing can be fulfilled anytime, anywhere in an effective and cost-efficient manner.



Improve privacy and security

Cloud-based healthcare solutions have proven to be more secure than on-premise solutions. These solutions, when properly integrated, strengthen healthcare organizations' overall cybersecurity posture by adding additional layers of security and monitoring.



On-demand health with connected, intelligent ecosystem

Connected health is an approach that helps improve healthcare delivery and self-health via IoT, remote-patient monitoring devices, mobile, and wearable technologies. A report reveals that 60% of healthcare organizations worldwide have introduced IoT devices into their facilities.²²



Patient homes or care homes

A variety of devices and sensors provide home-based care while being connected to an integrated digital care record accessible to patients and physicians. This reduces the need for consumers to visit a clinic or a healthcare facility.



Wearables and IoT devices

The healthcare industry is quickly adopting wearables and healthcare devices to transform the patient experience. Providers can offer superior care by monitoring and sharing consumers' biometrics while increasing efficiency and reducing operational costs.



Continuous monitoring of health status

Digital healthcare provides consumers with continuous monitoring anywhere, anytime. Real-time data on consumer health helps caregivers gain actionable information on potential problems to deliver appropriate services on time.



Support patient independence and well-being

The potential of digital health in redefining the patient-provider dynamic is enormous. With increased health data transparency, consumers are gaining more control over the decision-making process and their overall well-being.



Artificial intelligence and machine learning-powered healthcare

The AI health market is experiencing rapid growth with AI systems expected to generate around \$6.7 billion in revenue by 2021.²³ From drug discovery to genomics, AI is improving various aspects of the patient experience and unlocking new business value—encouraging companies to make further investments in the technology and foster innovation. The major AI applications with considerable near-term impact in healthcare include:

“Artificial intelligence-powered healthcare solutions leverage actionable data-driven insights to create new efficiencies and enable better patient and economic outcomes, while delivering personalized experiences.”



Mukund Balasubramanian,
CTO, Co-Founder,
Photon



Robot-assisted surgery

Cognitive robots can integrate data from pre-operative medical records with real-time operating metrics to physically guide and enhance a surgeon's instrument precision, and recommend improved techniques and procedures. The global surgical robot market is expected to reach a valuation of \$19.4 billion by 2026.²⁴



Virtual nursing assistants

From guiding patients to suggesting the most effective care, virtual nursing assistants are another frontrunner of the AI value. AI solutions help remotely assess a patient's symptoms and deliver alerts to clinicians when patient care is needed.



Automate administrative tasks

30% of healthcare costs are linked to administrative tasks according to Business Insider Intelligence.²⁵ Artificial intelligence and machine learning can automate some of the administrative tasks, namely pre-authorizing insurance, following-up on unpaid bills, and maintaining records to ease the workload of healthcare professionals and ultimately reduce costs. Voice-to-text transcriptions help order tests, prescribe medications, and write chart notes.



Precision health

Providers are leveraging AI and machine learning to integrate precision medicine, genomics, and consumer treatment technologies and enable a personalized approach to care—from the proactive diagnosis of illnesses using a personal genome to tailored wellness and prevention interventions.

Big data analytics for predictive healthcare insights

The healthcare industry is increasingly implementing a data-driven approach owing to which the healthcare data market is growing rapidly. A research has revealed that the global healthcare big data analytics segment is expected to be worth more than \$47.7 billion by 2024.²⁶ From patient care to pharmaceutical testing, there are huge opportunities in this post-big data era to leverage new data sources for improved patient outcomes. The use of big data analytics in healthcare helps to:



Reduce hospital readmission

Big data, combined with predictive analytics, helps healthcare providers lower hospital readmissions by enabling preventive care, streamlining operations, and improving patient engagement.



Lower the rate of medication errors

There have been many incidents wherein the wrong drugs or medications were prescribed due to human errors. To prevent such errors and possible health complications, providers are harnessing big data to identify medication errors and flag adverse reactions.



Facilitate preventive care

Success in a value-based care environment requires the enabling of preventive care powered by big data analytics. By analyzing various types of data related to consumers, providers learn about their patient populations, lifestyles, and behaviors. These valuable insights are crucial for designing and implementing preventive care strategies, including predictive analytics around patient safety issues, targeted patient outreach, and risk stratification.



Deliver more targeted care to high-risk patients

Predictive big data analytics helps providers identify patients that are at a higher risk of hospitalization. For example, NorthShore University HealthSystem's emergency departments leverage predictive analytics to determine which chest pain patients should be admitted for further observation.



How healthcare providers are transforming service delivery and consumer experiences

Below are some instances wherein Photon helped global healthcare companies leverage customer-centric digital healthcare services to rethink and improve the consumer experience.



Client:

A leading network of independent pharmacists in Europe

Requirement:

The pharmacy chain wanted to integrate Pharmap services to its existing framework in Italy and enable the user to order medicines or drugs from the pharmacy stores.

Photon's involvement:

Photon built a feature in the Italy app that integrates with Pharmap services and enables the users to purchase or place orders via the mobile app. Photon was involved in the creation of minimum viable product feature for the Pharmap integration with the following features—product search, pharmacy search, manage cart, manage payment, and order notifications. Photon created a roadmap for other feature additions based on customer feedback and business requirements.





Client:

A leading US-based healthcare organization

Requirement:

The company wanted to revamp the digital experience of its Health Member Portal by providing solutions for faster and accurate claim processing, offering programs to support members with chronic illnesses, and selecting customized wellness programs by choosing the right health insurance plan for individuals and their families.

Photon's involvement:

The Health Member Portal was built for the web, Android, and iOS platforms. Photon transformed the digital experience by combining key aspects of market study, competitive intelligence, business solutioning and analysis, enhanced user experience, and cutting edge technology. Photon's architectural depth enabled integration with various external systems such as Wells Fargo, Optum RX, Siebel, Health Equity, Oracle CRM, and Web MD. The principal features implemented during this engagement include Member Virtual Visit, Role Based Tiling, Customizable Themes, and User behavior analytics. The applications were built as white-labeled solutions.



Client:

A hospital system with six primary-care hospitals, allied clinics, and outpatient facilities.

Requirement:

The company wanted to build an iOS native mobile app with specific, mutually agreed upon microservices along with a portal for administration. The application should push daily health forecast of users on common illnesses such as flu, fever, cough, and cold within the hospital service area and connect the users to activities such as yoga, running, walking, etc. that are happening in their vicinity.

Photon's involvement:

The project was initiated with a discovery process for user engagement where Photon presented ideas and solutions. Teams collaborated to brainstorm the platform and its features to help clients achieve a digital presence by creating awareness in their local community. The primary target group for the application comprised of millennials, and the MVP feature set to engage users included health forecasting in and around their neighborhood, illness and conditions from around the region, information for wellness activities around the user location, booking appointments through the app, and the mobile clinic teleconferencing feature among others. The applications were built using the native tech stack-Swift for iOS and Kotlin for Android as front-end technologies and back-end on Java services hosted on AWS servers.





Client:

A Fortune 100 pharmacy-led health and wellbeing enterprise

Requirement:

The company wanted to build an app for its customers which could provide them with a host of features. The drug retailing chain wanted to bring in the industry best practices in API development and also a developers web portal optimizing the usage of APIs available and enhance the collaborative approach towards better API developments.

Photon's involvement:

Photon developed a hybrid application leveraging best of smartphone native features and HTML5 technology. Some major features of the app include refill ordering by scanning a prescription bottle and the ability to quickly print photos from your phone. The app was integrated with Google Maps to provide driving directions to the specified provider. Photon created the API platforms for managing balance rewards, photo prints, pharmacy prescription refill and transfer, and appointment scheduler.

How can Photon help?

Photon helps healthcare companies—from healthcare providers to pharma brands—use the power of digital technologies to deliver hyper-personalized, efficient, and informed healthcare services with data-driven insights.

Our extensive digital healthcare experience helps providers create an impact in the following areas:

Experience



Seamless omnichannel healthcare experiences

From telehealth to precision medicine, deliver a simple, compelling, personalized, and consistent healthcare experience across all customer interactions. [Click here to learn more.](#)



Front-end mobile experiences

Leverage mobile app solutions and technologies and succeed in the era of individualized healthcare where patients are empowered to manage their care. [Click here to learn more.](#)



Connected and immersive healthcare

Use the power of AR or VR technologies to develop UIs which can interact with AI platforms, helping healthcare companies to leverage new types of patient data. [Click here to learn more.](#)

Execution



Cloud architecture for healthcare

Photon Cloud Architecture Program leverages the right combination of digital technologies, processes, and rich expertise in delivering transformation programs, ensuring reliable and lower migration costs. [Click here to learn more.](#)



APIs and microservices

Combine APIs and microservices architecture frameworks with a cloud infrastructure to accelerate digital healthcare innovation. [Click here to learn more.](#)



Global digital platforms

Harness the power of Photon's Website Factory Program to create a centralized system for enabling website localization and releasing consistent experiences for global consumers in accordance with their language preference or geographical location. [Click here to learn more.](#)



Customer Identity and Access Management

Leverage the CIAM framework to deliver value-added CX and better protect your healthcare organization from application-layer and network attacks. [Click here to learn more.](#)

Intelligence



AI-driven automated healthcare solutions

Photon delivers a full spectrum of AI capabilities—including advanced analytics, natural language processing, machine learning, and automation—to reinvent patient-provider relationships. **[Click here to learn more.](#)**



Big data personalization

Drive data-driven intelligence to pursue your innovation journey and deliver unified digital experiences to customers across touchpoints. **[Click here to learn more.](#)**

Helping you transform



Strategy consulting

Define digital solutions to build various digital foundational capabilities to power the implementation of quick wins as well as transformational wins. Develop the strategy and roadmap for building an optimal end-to-end CX. **[Click here to learn more.](#)**



Data protection and privacy

Audit your current policies, practices, and develop a roadmap to ensure your organization's GDPR, CCPA, and WCAG 2.1 readiness. **[Click here to learn more.](#)**



Transform healthcare with consumer-centric digital strategies

As the healthcare industry shifts to value-based care and as consumerism takes precedence, investments in digital health and technology continue to rise. Consumerism is rapidly redefining the way healthcare services and products are conceptualized, created, priced, and delivered. Providers must embrace next-gen digital technologies and place consumers at the center of a hyper-personalized and delocalized healthcare system.

Backed by a rich experience of serving 37 of the Fortune 100 companies, Photon's digital experiences help healthcare companies become connected, smarter, and agile. Our innovation teams have helped develop a range of digital solutions that are at the forefront of healthcare services. Awarded the **Walgreens Boots Alliance Technology Partner of the Year** at the Alphega Convention, we work with leading healthcare companies to ensure that they are at the cutting edge of digital technologies and mobile-powered solutions.

Connect with Photon today to build a customer-centric healthcare organization that delivers hyper-personalized, efficient, and informed healthcare services.

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embrace the power of digital technology.
We are the digital transformation partner
of choice for leading Fortune 500
companies. We offer an integrated
approach combining Strategy Consulting,
Creative Design, and Technology at scale.
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