

The (R)evolution of Healthcare

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Introduction

Something both predictable and exhilarating is happening in healthcare. Predictable because it has already happened in virtually every other commercial industry. Exhilarating because, after centuries of seeming immunity, the healthcare sector is finally succumbing to progress and industrialization and beginning to transform. As it evolves, we will see healthcare become more standardized and more personalized, more advanced and more equitable, more human-centric and more technology-powered. We will see the emergence of new "mega-players" and ecosystems with both global reach and local insights, achieving sophistication in care and simplicity in administration. We will see better outcomes in terms of safety, quality, affordability and equity - and ultimately more people living longer healthier lives. We have frontrow seats to this transformation, and audience participation is encouraged.

Most other sectors saw rapid industrialization in the 19th and 20th centuries. Products and services that had been delivered locally by artisans and tradesmen became aggregated, standardized, professionalized and powered by technology. These transformations have been propelled by diverse and complex forces. As we fastforward to more recent times, examples include technological advancements such as the Haber-Bosch processes that transformed fertilizers and agricultural production, large-scale standardization such as the containerization that globally reshaped retail supply chain and logistics, and industry-wide platforms such as the international SWIFT monetary system in financial services. Industrialization has resulted in the generation of economic and societal surpluses - products and services can be more impressive and less expensive, and successful companies can reap the rewards of offering an improved customer experience.

Democratization has driven a second wave of transformation across industries. The convergence of technological advancement, an empowered consumer base and speedier innovation cycles has led to customization and tailoring at scale, as well as new expectations around standardized delivery of the basics.

Healthcare delivery — the provision of health services and management of health — has largely resisted the transformations of the last two centuries. Much has been written in recent decades on the lack of (and need for) modernization of healthcare — by Ken Arrow, Michael Porter, Atul Gawande and others. The reasons for lack of progress are well known and include the pay-foractivity revenue model, opaque market with barriers between buyers and sellers, high degree of regulation and subscale regional delivery structure.

In part because of the resulting backlog of progress historically, healthcare is now poised for an unprecedented transformation characterized by both industrialization and democratization. Our intent is not to rehash the challenges that the healthcare sector has faced but rather to highlight the opportunities for incumbent players to take action and drive evolution.

Health services is poised for an unprecedented transformation characterized by both industrialization and democratization.

As the transformation of healthcare unfolds, health systems are well-positioned relative to disruptors to lead this change, given the local advantage and capitalintensive nature of care delivery. But to do this they will need to dramatically evolve how they use technology, drive operations, deliver care and engage with their consumers. Sector-wide transformation will not be easy. These transformative changes within healthcare will draw more attention to healthcare policy, legal and organizational structures, which could prompt government action and further regulation. But experience from other sectors highlights the opportunity of first-movers in moments of industry change. Health systems will need to make swift, strategic decisions to capitalize on these industrializing forces. Those that are too slow to react will likely be left behind.

An industrialized sector will exhibit several key characteristics:

- Economies of scale (i.e., improving unit cost profiles)
- Predictable, standardized outputs
- Global reach/production footprint
- · Widely adopted common standards across quality, information sharing, and accessibility

Industrial revolutions: A history of innovation

Cross-industry analysis points to common phases of industrialization and democratization. Many industries went through these transformations in the 19th, 20th and early 21st centuries. Tremendous value was created, both financially and societally across industries. Organizations who led or quickly adopted these transformations were rewarded with significant early capture of that value. While each maturity path is unique in its specifics and cadence, we typically see industries move sequentially through these five phases of industrialization.

Industrialization lifecycle

Emerging trends across industries point to common characteristics of industrialization, including shifts in production and service delivery from artisanal, ground-up approaches to industry models that are increasingly aggregated, standardized, professionalized, and tech-powered. Most industries went through this lifecycle in the 20th century. In most respects, healthcare delivery remains early in its industrial journey – with traits most resembling foundational and catalyst phases that many other industries passed through a century ago.

Industrialization



1. Pre-industrialization

In their earliest stages, industries are local and characterized by fragmentation and limited scale. For some industries, economic factors may contribute to a prolonged pre-industrialization phase - for example, insufficient labor supply/skills gaps (construction, tech), capital intensity (trucking, real estate), artificial scarcity/barriers to entry imposed by incumbents (guilds) or broken marketplaces (education, healthcare). External factors such as political shifts, waves of migration or a lack of natural resources can also slow industrialization.

2. Foundational

Broad public investments in transportation and infrastructure — think interstate highways, the expansion of the electric grid and the development of the internet ---lay the groundwork for cross-industry growth and scale. Region-dominating players enter the scene and the foundations of industrialization emerge, including higher outputs, larger consumer markets and growing labor demand. As the industry grows, it impacts not just its customers but also suppliers, adjacent industries, communities and the environment - and it soon draws the attention of regulators, who begin to play a role here by reducing transaction costs and monitoring markets and competition.



3. Catalyst

Another wave of growth is fueled by the emerging leaders in the industry developing innovations and pursuing scale. Innovations can be both consumerfocused and supply-based, and they create new markets, aggregate demand, reduce production costs and standardize inputs and outputs. Consider early 20th century advancements in automotive mass production and the assembly line, or more recently, Walmart's operational improvements in warehousing and supply chain management and Netflix's omnichannel video streaming model. Regulators play a role here in either catalyzing or dampening innovation with levers like treatment of intellectual property and promoting, maintaining, or unseating competition.

📶 4. Scale

As industry leaders consolidate and settle, a strong ecosystem can develop around them. This stage is characterized by the emergence of mega-players, creation of ecosystems, globalization and an increase in labor demand. Industry players develop complementary products and improve service delivery. Think of Amazon (over one third of the e-commerce market)¹ and its ecosystem of sellers, public and private vendors, and ever-expanding consumer offerings such as Prime Video, grocery delivery, and Amazon Web Services. Consider as well the emergence of the modern agriculture industry with the formation of mega-players like Cargill (representing 25% of US grain exports),² consolidation across the industry (dairy, beef packing, seed manufacturing) and globalization of production and distribution (bringing mangoes to US consumers in January and largely helping to reduce famine not caused by war or politics). Regulators play a role here in overseeing growing incumbents and enforcing consumer protection and global competitiveness.

<u>\$</u> 5. Stabilization

Marketplaces, operating models and supply chains become far more global and complex at this stage. During this phase, growth may decelerate and level off. Incumbents are likely to innovate by buying smaller innovators while also investing in longerrange capital-intensive efforts that could lead to the next era of innovation such as robotics and AI. The growth that persists may look different, characterized by incremental innovations within the industry and higher switching costs for consumers. However, seemingly smaller innovations to improve operational efficiencies can still have a large impact at scale. For example, UPS continues to reduce costs and optimize operations by tracking and analyzing driver habits, traffic patterns, route characteristics and weather reports.

Healthcare delivery: A sector left behind

With many factors contributing to its slow pace, healthcare delivery is still early in its industrialization journey. We see pervasive signs of an undisciplined industry – variable quality outcomes, limited standardization, low transparency and unchecked pricing manipulations. In many ways the industry best resembles the foundational and catalyst phases most industries passed through during the 1900s.

Healthcare's slow pace of industrialization is not for lack of innovation. In fact, many clinical innovations are among the most awe-inspiring feats of the last century. Innovations in healthcare battled an HIV epidemic, rendering it an almost curable disease. Advances in genetics has allowed for individualized cancer treatments and fueled the unprecedented innovations in mRNA vaccines during the COVID pandemic. Still, technological and operational innovations can be resistant to scale, and the pace of adoption has been significantly slower than in other sectors.

Importantly, these innovations have not led to consistent quality or lower costs for patients and consumers. Healthcare spending has grown at almost twice the pace of the rest of the economy. Per capita costs have grown \sim 7x over the past 40 years. Medical outcomes are variable, and higher spend has not led to better outcomes.³

Case studies in industrialization

Retail: Retail has a long legacy of consumer innovation, but over the last 100 years it has industrialized through market expansion, consolidation, supply chain innovation (transportation and warehousing) and creation of new channels (mail-order catalogs, door-todoor sales, social selling and e-commerce). The expansion of the workforce to include women also empowered them as buyers and shoppers. Improved mass manufacturing techniques, fast fashion and the rise of online marketplaces have helped to democratize couture and keep prices low. Apparel prices have lagged inflation for decades. One analysis found that a pair of denim jeans cost \$91.41 in 1998 and \$46 in 2008 (adjusted to inflation).⁴ These transformations have resulted in the buying and selling of a greater variety of products across many channels (brick and mortar, catalogs, multi-level marketing, social apps), more easily and reliably across global markets.









Agriculture: Driven by innovations in farming methods and technologies, public infrastructure investments in transportation and the expansion of global markets, agriculture has evolved from subsistence farming and widespread food insecurity to mass production, surplus and affordable access to diverse food supplies. Contributing forces include innovations in production and irrigation methods, the rise of mega national producers, and containerization and refrigeration/freezing methods that enabled mass distribution. Sophisticated financial infrastructure such as futures markets for staple crops also stabilized demand and de-risked food-production. With global markets we can get mangoes and avocados year-round across the world. USDA regulations have helped to confirm higher food quality. The industry was able to increase output and reduce costs through mechanization and innovation in the global supply chain.

Consumer finance: Markets have used currency and financial tools to facilitate trade and commerce for millennia. Historically fragmented and hard for customers to navigate, banks have transformed to build trust and evolve end-user experience. Today's mature financial industry is more consolidated, more connected and more resilient to crises. The 20th and 21st centuries saw many supply-driven innovations, including the ATM, e-trading, mobile banking and the international SWIFT payments system. In parallel, government interventions from FDIC to Dodd-Frank have built confidence and increased access to capital and liquidity across markets.

Implications for healthcare: The rest of the article explores how this evolution might play out for healthcare, but the big lessons learned are clear. It is essential to determine how your organization will compete in the future, how it will create scale, and how it will navigate the labyrinth of changing regulations, standards and ecosystems.



Evolution of agriculture

Democratization: A second wave of transformation — and a catalyst for healthcare?

In recent decades, there has been a second wave of industry transformation — democratization. We are seeing increasingly empowered consumers, data and technology innovations that allow companies to better understand and serve them, and digitization and automation that have made reaching and equipping them more affordable and seamless. Democratization quietly took hold in some industries such as durable goods manufacturing in the 1950s. For other sectors, while democratizing forces didn't accelerate right away, enabling technologies began to set the stage for transformation - for example, the beginnings of big data, the internet and genetic science. These innovations primed industries for rapid transformation - transformation that was realized in subsequent decades in Larry Page's garage, Mark Zuckerberg's dorm room and Dr. Francis Collins' DNA sequencing lab. Democratization took the confluence of big data, big markets and the right spark to yield rapid innovation and scale.

In addition to the proliferation of enabling technologies, increasing consumer empowerment has contributed to this wave of democratization. The voice of the consumer has never been louder or harder to ignore than it is today. Feedback loops between innovators and consumers have been shortened. The convergence of technological advancement with an empowered consumer base has enabled rapid innovation cycles, along with reach and relevance on a new scale.

Could democratization become a catalyst for the lagging healthcare industry?

So, what would democratization look like for healthcare? We will see consumers having a bigger say in what care and coverage they get. We will see latest drugs, devices and treatments scale more quickly from the cutting edge to broad accessibility and affordability. Communities left behind by healthcare because of their location, income, race or other factors will be welcomed and embraced. Another driver of democratization for healthcare will be GenAI with the promise of becoming a co-pilot for everyone. How will this wave of change come about? It will be driven by four forces – all of which are already in effect and growing by the day.

- 1. Administrative and back-office transformation
- 2. Standardization of patient information flows
- 3. Clinical care innovation
- 4. Productization of healthcare





Area #1: Administrative and back-office transformation

Back-office transformation in healthcare through mass automation, standardization and digitization of processes will increase efficiencies and reduce costs on a large scale as it has for other industries. Many hospital systems have maintained homegrown operations, even in some multimarket systems. However, the need to reduce costs coupled with improvements in technology solutions like Oracle, Salesforce and Microsoft has helped sharpen the focus on administrative simplification.

Recent evidence of momentum includes workforce initiatives to optimize nurse staffing processes and transform recruiting and onboarding and business reorganization such as outsourcing administrative functions.⁵ Furthermore, the rise of novel platforms (e.g., Wheel) has the potential to lead to industrywide capacity shifts, which at scale could generate surplus that can be plowed back to clinical innovation delivery, transformation, and productization. The emergence of disruptors (e.g., CareAlign, ZocDoc, Innovaccer) suggests that back-office transformations may be at a tipping point in healthcare. It will be critical for the industry to continue to focus on managing resources such as human capital, physical space and supplies. While we are still in the early days with GenAI, it is already being used for some of the largest challenges in healthcare. Labor and supplies can be scarce and volatile, and space can be expensive and fixed. There are big benefits to be realized for companies that can leapfrog the structural barriers and predict and adapt to fluctuations.

The future of health delivery administration will be more centralized, transparent and automated. Imagine, for example, a competitive, modernized HR process that reduces the time to hire clinicians and staff and streamlines the licensing and credentialing processes. Finance and IT would be simplified and centralized, bringing together backend technology to help serve the health ecosystem, including reducing paperwork for providers. Supply chain management would be automated, transparent and integrated with ESG priorities. Revenue cycle management would be powered by AI, with reduced denials and simplified pre-authorization. All of this would translate to dramatically reduced administrative costs.



Area #2: Standardization of patient information flows

Though few would claim that patient data is easy to access and use across the health ecosystem, efforts to standardize the collection and transmission of clinical data have increased both inside and across health systems.

Pre-2000, medical records were still primarily paperbased. Today about 96%⁶ of US hospitals use an Electronic Health Records (EMRs), up from about 9%⁷ in 2008. Despite widespread adoption of EHRs, the industry is capturing a small fraction of the full value that could be realized through further standardization of patient information flows. In addition, only 15-30% of patients use EHRs.⁸

More user-friendly tools with intuitive workflows and higher usability/design standards could enable true democratization. For the healthcare ecosystem, limited exchange of health records and clinical data across health systems, payers and other players remains a key challenge. Interoperability will improve the overall quality of nationwide patient data and enable data-driven insights to help drive clinical research and catalyze innovation. Complementing the industry capability development in this area, updated standards for data interoperability (through e.g., HIPAA, HITRUST) will be a requirement for sector-wide standardization of patient information and true transformation. Still, there are signs of building momentum in this space. Some health systems already use EHR data to assess efficacy of care and forecast volumes/capacity. Startups that encourage interoperability through health information exchanges (e.g., Redox, Allscripts and Carecloud) are responding to growing demand resulting from new regulation pushes from CMS and Congress requiring increased accessibility of health information. Leading health systems are investing in these kinds of interoperability solutions, digitization, and clinical decision support tools. Recent innovations in third-party app integration into EMR workflows has accelerated adoption of innovative tools such as remote patient monitoring, automation and chronic disease management systems.

With continued progress, we envision a future in which standardized information flows encourage continuity of care. Patients would own their own data, and the data itself would be user-friendly, portable and consistent across systems. Communication among physicians, pharmacists, payers and patients through digital channels would be the rule rather than the exception. This will be heightened by more connected devices not just in hospitals but in our homes and as wearables — feeding data to algorithms in the cloud. With the progression of AI, big data quickly turns into qualitative insights as new models are trained and improve their forecasting accuracy.



Area #3: Clinical care industrialization

Recent innovations in care delivery are leveraging the latest technology, processes and cross-industry learnings to help improve health outcomes and lower cost. In the last 20 years, healthcare patents have skyrocketed. In 2021 alone, 44,700 patents were filed and 19,000 were granted.⁹ Although healthcare innovation has progressed at pace with technological innovation in other industries, healthcare has historically been slower to scale innovations and achieve widespread adoption.¹⁰ Now, new technologies and access to big data are helping lead to a wave of industrialization.

For consumers, the global pandemic has accelerated democratization in order to meet demand for homebased care including telehealth, home testing and acute care. As individuals are equipped with better and more sophisticated tools and resources for tracking and testing at home, they can be empowered to take a more active role in their care and in the care of their families. Scientific advances, improved data and analytics capabilities are helping to drive better documentation and analysis of the patient experience, equipping clinicians with more information to guide future care decisions. As we shift away from traditional healthcare settings, there's been a push to increase transparency around care protocols and performance and optimize labor and space efficiency. Efforts to standardize surgical procedures such as rebalancing surgical staffing ratios of nurses, physician assistants, surgeons - have already been proven to reduce costs.¹¹

Technological innovations in clinical care such as Al-driven radiology are helping to change how we diagnose by reducing biases and variation in care delivery. This has already been shown to improve outcomes and cost efficiency.¹² Scientific advances such as improvements in genetic testing have enabled lower-cost diagnostics to replace legacy invasive practices. For example, recent innovations in early pregnancy blood testing can identify fetal abnormalities through a simple maternal blood draw, decreasing reliance on amniocentesis, a more complex prenatal test that requires a sample of amniotic fluid. Many orthopedic procedures — such as hip, knee and shoulder replacements — have become more standardized and now require less time in the hospital.

We envision a future state in which clinical care innovations continue to become increasingly responsive and accessible to more people. For patients, we expect to see additional tools with new benefits and customizations based on market feedback and, over time, at lower prices that can enable more people to buy them. Patients will benefit from more affordable industry leading treatments, families will have access to better tools to take care of their aging relatives and rural communities will see improved health outcomes due to expanded access to virtual care.



Area #4: Productization of healthcare

Products in healthcare can offer a set of reliable benefits that a consumer can buy at a set price. While still the exception vs. the rule, we are seeing early signs of productization and marketplaces in healthcare. As consumers demand more agency in their health and information is democratized, care will likely be more commonly marketed and sold directly to consumers. Providers can increasingly bundle services to capture the value created by industrialized clinical care operations, emerging tech (AI and machine learning) and streamlined back-office functions.

Companies such as Carrum Health have used bundle products to create two-sided marketplaces connecting health systems and employers and offering greater standardization and transparency of offerings for select care episode bundles. In their portfolios, they've seen 45% procedure savings, 30% surgeries avoided, 80% readmission reduction and 11% medical cost reduction for employers.¹³ Companies such as One Medical and Forward Health offer concierge, subscription models of primary care. These companies orchestrate against a clinically integrated network, helping to keep the experience consistent for customers at a lower cost. A JAMA study showed that employees of one company who got most of their primary care at One Medical's on-site health clinic generated 2x more in spending on primary care but 45% less on healthcare overall than those who used One Medical infrequently or not at all.¹⁴



Peering into the crystal ball

Mature sectors in later scale and stabilization stages of industrialization exhibit several common characteristics: the emergence of mega-players (national players that transform how products and services are delivered), new ecosystems (partnerships across sectors and industries), globalization of markets (both consumer and labor supply), and broadreaching infrastructure (next-gen enabling technology). In line with this, we expect significant changes in the landscape and players of healthcare delivery in the coming years. These seismic shifts could yield big winners and big losers. Healthcare leaders should take quick and deliberate action to fortify their organizations' position in the new health order. Here are some of the shifts we're anticipating in healthcare:

A. Mega-players

In mature sectors, industry leaders emerge and set the new normal for industrialization. These leaders focus on both large-scale service innovations and smaller operational improvements that increase efficiencies at scale and lead to lower costs and higher quality. We anticipate the emergence of a set of mega-players who are able to create a truly national healthcare market, systems with annual revenue of more than \$50 billion reaching a large share of the population each year. Leaders who want their organizations to transform the way in which people receive care should consider opportunities to increase scale and scope of their operations. These players will create value at a much higher rate and attract talent away from incumbents who do not act.



Health systems — even mega-players — can't industrialize alone. Multiple skills and resources are required to truly deliver proactive healthcare built around the consumer, focused on the whole person, and competitive with other industries offering customer-centric experiences. This will require new and broad models of collaboration – extending beyond traditional organizational siloes and walls. We believe these ecosystems will offer compelling new capabilities, and we expect most healthcare organizations will elect to form or join one.

C. Globalization of inputs and markets

As with other mature sectors, we envision a future in which care delivery is globalized, as the healthcare workforce and consumer markets become increasingly international. Few of our household products are made in the US, and healthcare will be no different. We anticipate greater crossborder sharing of clinical pathways, algorithms and realworld evidence as healthcare becomes further democratized. In addition, we predict that over half of US healthcare will be delivered by workers outside of the US, with local specialists being used as the exception, not the rule. Executives who pursue lower-cost, high quality alternatives to traditional products will become the preferred partner for payers and other stakeholders. We've already seen radiology and psychiatry begin shifting to virtual-first models, and we expect even more complex care to be increasingly virtual and geography-agnostic, accompanied by complementary advances in augmented reality, sophisticated wearables and robotic surgery.

D. Development of broad reaching enabling infrastructure

Just as significant public investments in transportation and infrastructure helped to drive industrialization of multiple sectors in the 19th and 20th centuries in the US, so too will next generation technology platforms and data exchanges serve as the backbone of the future of healthcare. There's increasing demand for - and ability to use - massive, national datasets and supporting platforms that follow patients across a lifetime of health. Incumbents who meet that demand most effectively could ingratiate themselves into the future health infrastructure. Industry leaders can act now to contribute to a robust, nationwide database that tracks longitudinal health trends of individuals and entire populations leading to more sophisticated, data-driven research and development. The technology exists now for activities like predictive analytics to prevent and respond to future public health events like disease outbreaks, epidemics and pandemics. Fast movers will benefit from the seamless exchange of best practices in care delivery across geographic and socioeconomic lines.



E. Major policy change

The significant supply-side changes described here will attract new attention to many of the legacy policy, legal and organizational structures that have underpinned our modern healthcare system. Health system executives should seek out new infusions of capital and consider shifts in ownership structures, tax status and subsidies, and regulations that enforce transparency and interoperability to best enable success in an evolving marketplace. For example, the tax-exempt status of nonprofit healthcare organizations has come under scrutiny in the past. An explosion of economic growth in the industry could place greater pressure on nonprofit healthcare entities to adhere to more stringent, prescriptive definitions of community benefits, community health improvement and charity care.¹⁵ We also expect government actions to support the movement toward broad enabling infrastructure, deregulation to ease barriers to change, increasing mandates for transparency and interoperability across actors, and investing in population-wide accessibility (e.g., subsidized/free internet).



F. Innovation and technology

To date, the promise of technology has not been fully realized in healthcare. Unlike in most other industries, new technologies have increased costs, vulnerabilities and administrative burdens. Fortunately, healthcare institutions and investors have become much more value conscious when it comes to healthtech. New technologies are making scalability and affordability possible. For example, Gen AI is already saving time and money for health organizations when it comes to managing clinical capacity. And this is only the preview of the fourth industrial revolution in healthcare that will produce unprecedented productivity for caregivers, facilities, supply chains and data models.



The experience of the last several years has taught us to expect the unexpected, with risks of pandemics, climate disasters, wars, embargoes, labor strikes, market crashes and cyber attacks always on our minds. A vital part of industrializing healthcare will be to make it more resilient against these threats – by building scale, evolving dynamic market-sensing and planning tools, creating ecosystems to share risk, reinventing supply chains, and learning to switch seamlessly between physical and digital.



Conclusion

The forces of disruption and industrialization appear to be here to stay. The resulting scale and value creation will finally usher the health delivery industry from a fragmented, guild status into a new wave of transformation — AI-enabled, reliably safe and consumer driven. The inherent complexity of the industry implies a wrenching, non-linear path. Those who lead must persevere through undoubtedly challenging times on the road ahead.



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