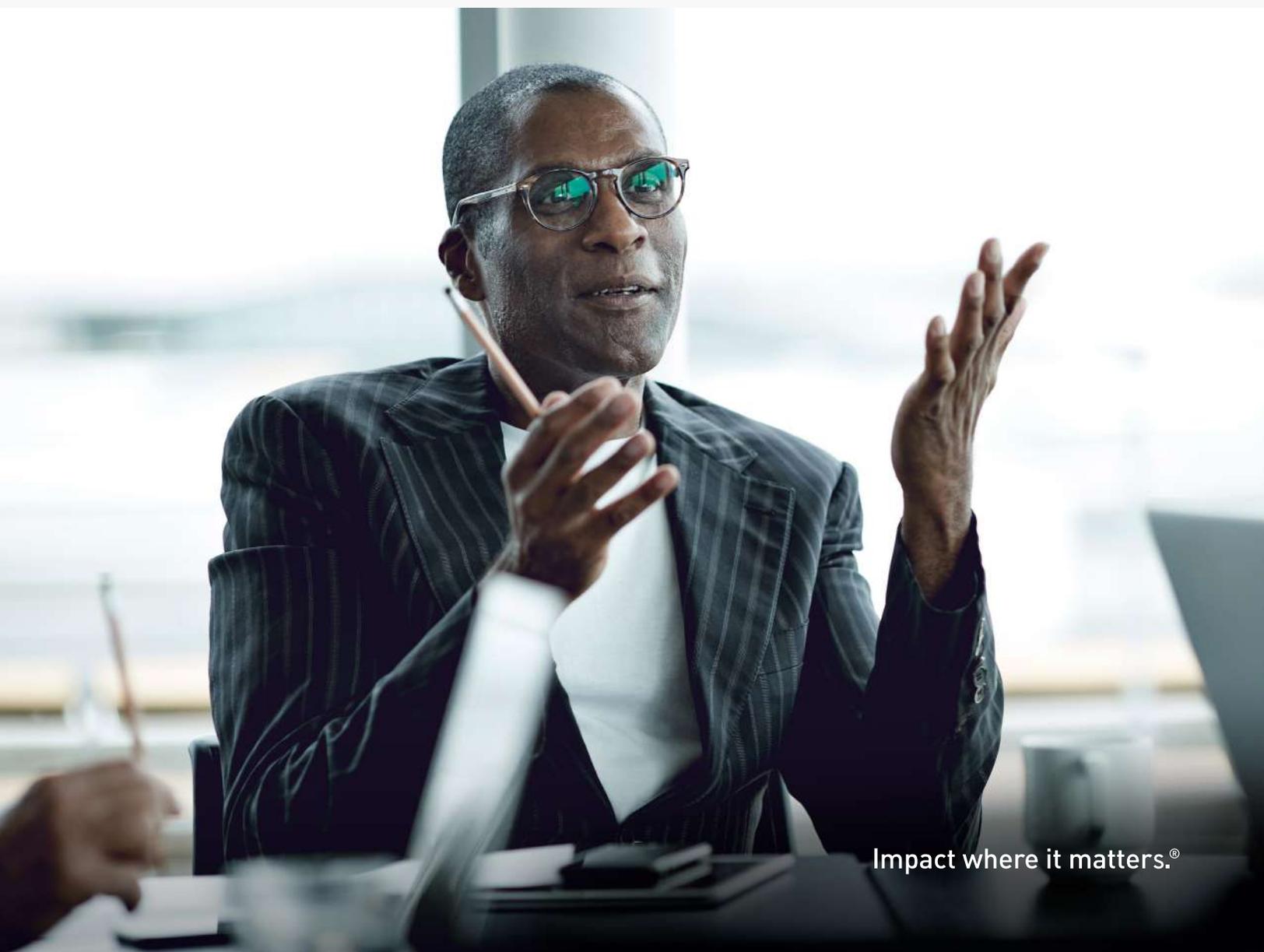ZS

Scaling up: An executive guide for the life sciences digital agenda

Actions for the Chief Digital Information Officer

By Asheesh Shukla, Mahmood Majeed and Ashish Goel

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Why we're here

Ask chief digital and information officers (CDIOs) how they spend most of their time and they'll tell you it's spent looking for ways to scale digital successes. They want people, data, analytics and technology to work together to create self-sustaining, repeatable cycles of value creation.
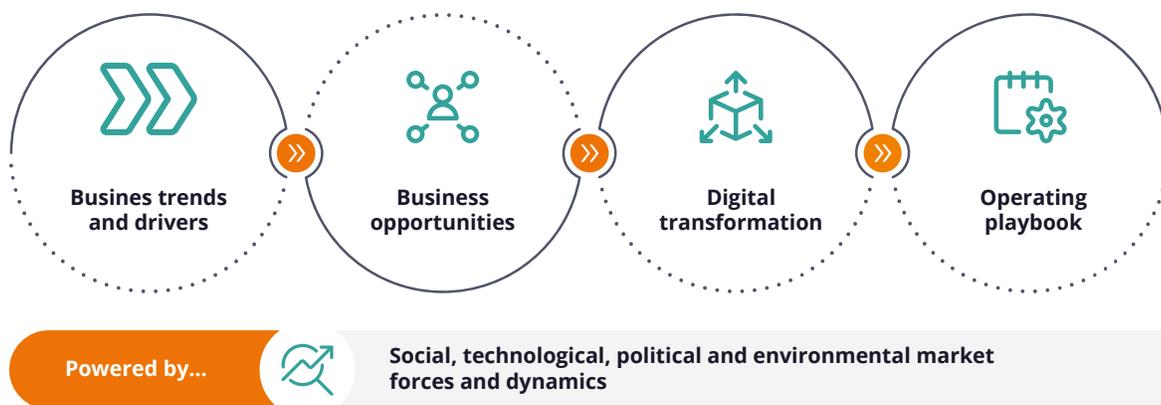
Yet, too often, that vision stays out of reach. What's missing are ways to translate strategies into workable steps for digital transformation and change that lasts.

Leaders driving digital transformations are in the best position to drive value-creation cycles by infusing common, enterprise-grade digital capabilities at scale across several opportunities. Here we'll offer a guide to achieving this goal.

It starts with finding opportunities specific to the business, then planning for digital capabilities that help teams scale up for those opportunities. It continues with leaders who can own the operating playbook to implement and sustain organizational change.

FIGURE 1:

An outside-in approach

Busines trends and drivers	**Business opportunities**	**Digital transformation**	**Operating playbook**

Powered by... — Social, technological, political and environmental market forces and dynamics

Understand industry trends to refine possible paths

In recent years, various social, technological, political, economic and environmental factors (including the impact of COVID-19) have been driving macro changes in the life sciences industry. These forces collectively present exciting possibilities, including advancements in gene therapies, messenger RNA (mRNA), digital therapeutics and virtual engagements driving healthcare.

But industry leaders are also concerned about several underlying challenges, including the growing cost of developing new products, narrowing market access and rising political pushback against healthcare costs.

Understanding these macro trends helps identify business opportunities and refine possible paths for your digital agenda.

Trend 1: The expansion of consumerism

People are increasingly taking advantage of the opportunities to choose their health and wellness experiences and, as a result, are collectively influencing life sciences organizations' priorities and actions. With newfound access to their health data, consumers can research and compare providers offering similar products or services, choose between alternative treatment options as well as financial models, connect with other consumers who have similar needs and rate or share their experiences online. Two shifts are particularly noteworthy:

Life sciences organizations must develop processes and systems to improve the consumer experience and to strengthen their current engagement methods.

- Digitization of services (including electronic health records) increased electronic access to medical knowledge and the growing ecosystem of smartphones and personal technologies are democratizing access to health data, which is increasingly available to applications for analytics and digital engagement. See sidebar "Health records at your fingertips" for examples of how big tech providers are leveraging APIs based on Fast Healthcare Interoperability Resources (FHIR) to enable health data democratization.[1]

- Progressive regulatory reforms aim to bring more customer centricity into the life sciences and healthcare. In the U.S., for instance, the Consumer Assessment of Healthcare Providers and Systems score enables a performance-based payment adjustment— the better the patient perception of their care, the more their healthcare provider is paid.[2] Health exchanges enabled by the Affordable Care Act have likewise empowered consumers to choose and purchase insurance amongst the various providers.

Why it matters: The customer experience has now been established as a true differentiator between healthcare services and providers. Life sciences organizations must develop processes and systems to improve the consumer experience and to strengthen their current engagement methods.

One such promising practice is the rise of customer 360 initiatives, where data and analytics power AI-driven applications to offer personalized experiences. Another untapped opportunity is managing the customer journey and orchestrating customer touchpoints

across different business units. Companies can govern a growing number of engagement activities along clinical pathways, digital touchpoints, outreach systems and more to avoid customer confusion and frustration.

HEALTH RECORDS AT YOUR FINGERTIPS

Life would be much easier if you could view your full medical history with a few taps on your smartphone. The introduction of the FHIR standard is going to enable exactly that.

Growing consumerism and demand for a freer exchange of healthcare information is pushing many tech giants to offer FHIR-based apps and services to consumers and health industry professionals. Apple's FHIR-based health API enables iOS to function like a personal health record and has already been adopted by 500-plus care provider organizations, representing millions of patients. Similarly, Google also offers an Android FHIR library for building mobile-first health apps facilitating the interoperability of data across systems.

This provides patient and healthcare consumers with free, automated, electronic access to their health data, leading to newer consumer engagement opportunities for life sciences companies.

Trend 2: Increasing value delivery expectations

Patients and increasingly payers on behalf of patients, expect that patient care is priced according to expected health outcomes, resulting in a slow but steady shift from the traditional fee-for-service payment models to value-based models such as bundled payments and capitation. This notion of value delivery, which the digitalization of healthcare is further propelling, is likely to bring structural changes in how care is provided, measured and reimbursed.

According to Humana, primary care providers that employed value-based arrangements cared for 67% of individual Medicare Advantage members in 2020, resulting in better health outcomes; and approximately 85% of Cigna's Medicare Advantage network physicians were utilizing value-based payment arrangements in October 2020. The global value-based care market was valued at $2.03 billion in 2020 and is expected to expand at a compound annual growth rate (CAGR) of 20.3% through 2027.[3]

Success will depend on how providers measure care outcomes and attribute value to them. Traditionally, value measurement has focused on an intervention's immediate outcomes without necessarily considering the patient's perception of value determinants such as access, quality of care, preventive interventions and other social forces. The COVID-19 pandemic has further polarized discussions of whether and how virtual health services should influence value determinations.

Why it matters: Life sciences companies need to deepen their focus on beyond-the-pill initiatives to enhance their product's value. Real-world evidence generation and outcomes demonstration become critical as payers continue to push for value-based contracting.

More importantly, as models increasingly attempt to measure value at every intersection of care, the interoperability of data and systems among the healthcare ecosystems will be key to creating comprehensive longitudinal views of patients. And with privacy concerns sure to multiply as data flows between organizations, firms should focus on proactive security measures so as not to let such concerns become a barrier to value orchestration.

Trend 3: Rapid advancements in medical innovations

Innovations in medical science, diagnosis and care delivery have accelerated in recent years, driving industry change and resulting in significant ramifications for cost, delivery and the impact of medical drugs and services. Noteworthy innovations include:

- Advances such as cell and gene therapy and mRNA have enabled accelerated therapy development and approval. COVID-19 mRNA-based technologies from both Pfizer-BioNTech and Moderna completed three phases of clinical studies within a year, resulting in emergency use authorizations in the U.S. The global mRNA vaccine market is expected to reach approximately $127 billion by 2027, growing at a CAGR of 11.9%.[4]

- Increasing use of advanced analytics, in addition to AI and machine learning (ML), is reinvigorating the drug discovery process and enabling the development of precision medicines (see the sidebar "Advanced analytics for drug discovery").

- Digital therapeutics launches and activities are increasingly complementing traditional medication, with the global digital therapeutics market size expected to reach $14.5 billion by 2027, rising at a 21.8% CAGR.[5] For instance, Bristol Myers Squibb is creating an oncology-specific digital therapeutic app for patients to self-manage symptoms and to enable remote monitoring by healthcare providers.[6] Otsuka, meanwhile, is collaborating with Click Therapeutics to develop and commercialize a prescription digital therapeutic for the treatment of major depressive disorder.[7]

Why it matters: Not only are medical products' delivery mechanisms rapidly changing, but the data generated from these new technologies is proving as valuable as the drugs and devices themselves. As a result, life sciences firms can rethink their business processes and models, leveraging their digital capabilities to mine and monetize the explosion of data from diverse sources.

Digital and technology giants outside the healthcare sphere are also seeking a slice of the pie. And as advancements renew the focus on life extension research efforts, firms will also need to pay increased attention to nonmedical determinants of health (such as social and environmental factors) and omics sciences.

ADVANCED ANALYTICS FOR DRUG DISCOVERY

Alphabet's AI offshoot DeepMind has developed AI models that can accurately predict protein structures from their amino acid sequences, enabling faster and more advanced drug discovery.

In some cases, DeepMind's structure predictions have been indistinguishable from those determined using "gold standard" experimental methods, such as X-ray crystallography. It might not obviate the need for these laborious and expensive methods yet, but the AI will make it possible to study living things in new ways.

In an academic partnership, Roche is collaborating with Cambridge Quantum Computing to design and implement quantum algorithms for early-stage drug discovery and development to help with new treatments for diseases, such as Alzheimer's. This collaboration could potentially lead to next-generation, quantum-inspired therapeutics.[8]

Trend 4: Structural shifts and transformations

While the life sciences industry has previously experienced gradual, structural shifts in customer preferences, value expectations and medical advancements, the COVID-19 pandemic triggered sudden, sharp and lasting changes that will continue to shape the industry for years to come.

Much like how remote work evolved from a perk to a necessity, many of the existing business processes in life sciences will need to be reimagined multiple times in the wake of the pandemic before becoming aligned with new normal priorities. For example:

- Healthcare provider preferences for sales representative engagements have been changing, leading to a "hybrid rep" concept that integrates virtual and face-to-face engagements and acts as an orchestrator with other teams such as medical and inside sales. Approximately 45% of sales rep visits post-COVID-19 are expected to be remote, according to ZS research.[9]

- Patient attitudes toward in-person medical visits are also evolving, with the increased reliance on telemedicine forcing life sciences firms to reassess their preparedness to reach physicians and patients in the telemedicine channel and to bridge coverage gaps. According to the same research, approximately 20% of patient visits are likely to shift to telemedicine in the long term.[10]

- Lockdowns drove significant cross-functional collaboration and ecosystem-spanning initiatives by necessity (enabled by fusion teams, data interoperability and modular thinking) to serve several use cases for both customers and employees. There's no turning back from this shift toward digital, modular workplaces.

Why it matters: During the pandemic, firms demonstrated their ability to move toward a more resilient, new normal. They must continue to build on that momentum, which will reflect in the ongoing reimagining of commercial, clinical and other business processes in ways that both adjust to and take advantage of new ways of working.

By exploiting data, analytics and technology advancements, firms can turn the new reliance on hybrid reps, telemedicine and virtual trials, among other changes, to their benefit. Leaders will meanwhile need to focus on enhancing their firms' digital literacy and adapting their operating models to strike a balance between organizational efficiency and resilience.

The confluence of these trends is what creates the opportunity for business leaders to drive outcomes that improve patients' lives and create long-term value for life sciences firms.

How will you maximize value?

Digital transformation helps teams scale up to meet rising business opportunities. And CDIOs shape how an enterprise builds digital capabilities at scale. They set digital agendas to improve existing business processes and models and they drive new digital products and services—all to pursue improved productivity, increased revenues and better customer experiences.
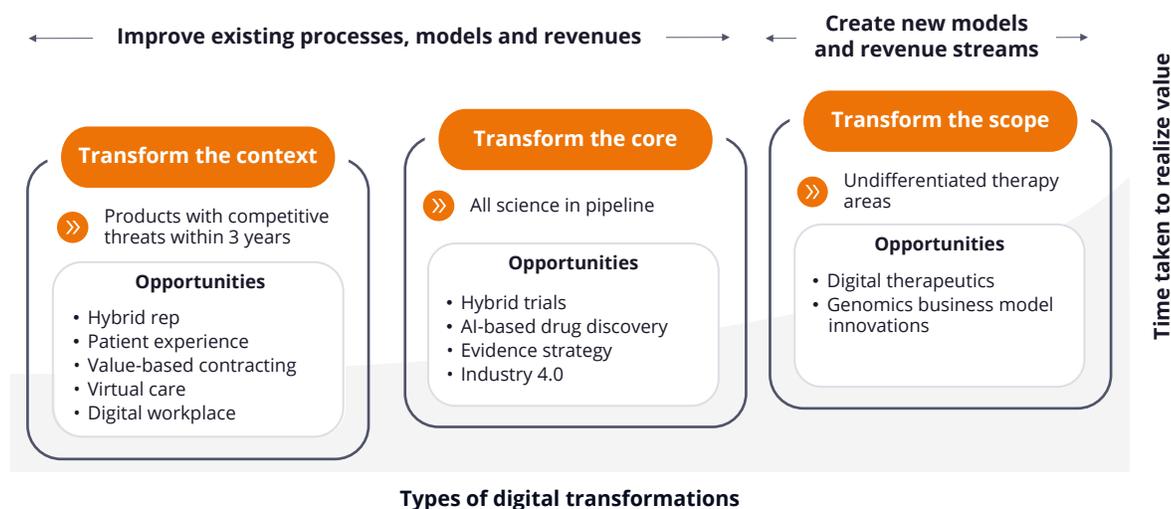
When setting the digital transformation agenda, think in terms of three buckets: **core, context and scope.**

- **Transforming the core** focuses on transforming the firm's core drug discovery, clinical trials and operations-related processes.

- **Transforming the context** focuses on transforming the firm's commercial model by differentiating its approach to care through digital services.

- **Transforming the scope** focuses on transforming the firm's entire business model through novel techniques, such as digital-first therapeutics.

Transforming either the core or the context improves the firm's business processes and strengthens existing revenues while transforming the scope creates new opportunities and revenue streams.

FIGURE 2:

Focus on integrated parts of the business system, rather than discrete opportunities

← Improve existing processes, models and revenues →   ← Create new models and revenue streams →

Transform the context

» Products with competitive threats within 3 years

Opportunities
- Hybrid rep
- Patient experience
- Value-based contracting
- Virtual care
- Digital workplace

Transform the core

» All science in pipeline

Opportunities
- Hybrid trials
- AI-based drug discovery
- Evidence strategy
- Industry 4.0

Transform the scope

» Undifferentiated therapy areas

Opportunities
- Digital therapeutics
- Genomics business model innovations

Time taken to realize value
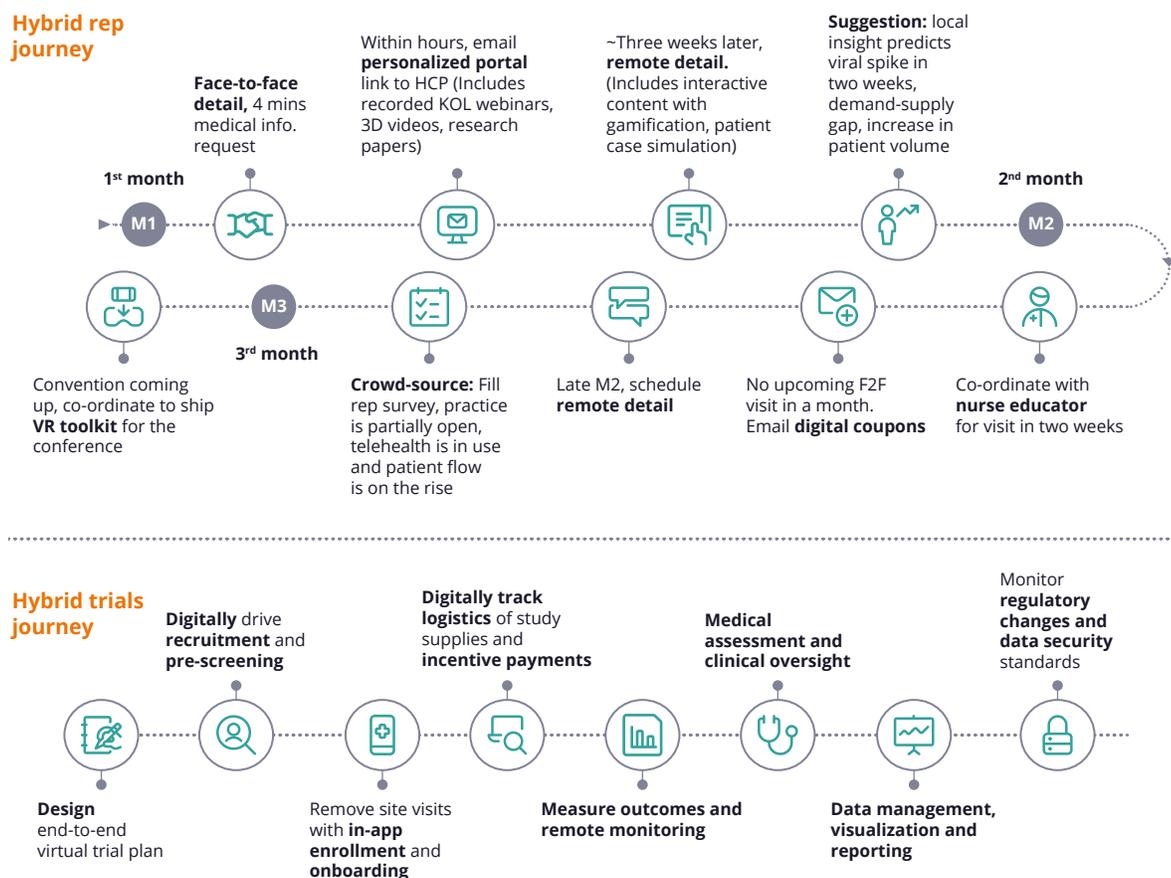
Types of digital transformations

We believe that rather than working on discrete projects, you can focus on the integrated parts of the business system where the power of data, analytics and digital will scale and supercharge business value.

And that's where CDIOs will play a pivotal role in infusing common, enterprise-grade digital capabilities at scale across several business opportunities—both within the same transformation bucket as well as across buckets. In the process, CDIOs will create structural and sustainable advantages for their firms.

In Figure 3, the CDIO has worked with the executive team to prioritize two opportunities: one for hybrid healthcare professional sales rep engagement and one for a hybrid digital model for clinical trials. A successful journey toward either model requires some common digital capabilities.

FIGURE 3:

Embrace journey mapping to understand common needs

Hybrid rep journey

Face-to-face detail, 4 mins medical info. request

Within hours, email **personalized portal** link to HCP (Includes recorded KOL webinars, 3D videos, research papers)

~Three weeks later, **remote detail.** (Includes interactive content with gamification, patient case simulation)

Suggestion: local insight predicts viral spike in two weeks, demand-supply gap, increase in patient volume

1st month

M1   M2   2nd month

M3   3rd month

Convention coming up, co-ordinate to ship **VR toolkit** for the conference

Crowd-source: Fill rep survey, practice is partially open, telehealth is in use and patient flow is on the rise

Late M2, schedule **remote detail**

No upcoming F2F visit in a month. Email **digital coupons**

Co-ordinate with **nurse educator** for visit in two weeks

Hybrid trials journey

Digitally drive **recruitment** and **pre-screening**

Digitally track logistics of study supplies and **incentive payments**

Medical assessment and clinical oversight

Monitor **regulatory changes and data security** standards

Design end-to-end virtual trial plan

Remove site visits with **in-app enrollment** and **onboarding**

Measure outcomes and remote monitoring

Data management, visualization and reporting

To enable these opportunities, the firm would deploy AI techniques that serve both journeys. They'd focus on capabilities that could transmit the right message through the right channel to the right healthcare professional (HCP) at the right time (the hybrid rep journey) as well as accurately score and make inferences about trials outcomes without the need for patient reporting (the hybrid trials journey).

Newer data sources, such as Definitive Healthcare, American Hospital Association (AHA), U.S. Census, Johns Hopkins and virtual data-capture options (e.g., wearables), would need to be integrated and analyzed respectively.

User-friendly apps and virtual assistants would activate digital touchpoints to engage HCPs, patients and reps throughout each journey.

FIGURE 4:

Common digital capabilities needed for hybrid rep and hybrid trials (illustrative)

Data and analytics	AI and ML	User experience	Business process and technology	Delivery skills
• New data sources: Definitive Healthcare, AHA, U.S. Census, unstructured, wearables data • Remote analysis and microsampling • Customer affinity	• Suggestions, dynamic targeting • Event-based notifications • Real-time monitoring • Auto-tagging	• Design-led applications • Augmented reality, virtual assistant • Hyper-personalization	• Agile medical, legal, regulatory processes • Interoperability platforms • Cloud enablement • Information security	• Data science and engineering • UI/UX • Solution architects • Product managers • Information security

The CDIO is in the best position to drive this value-creation cycle by infusing **common, enterprise-grade capabilities** across opportunities. In the next section, we provide an operating playbook for how CDIOs can implement and scale these changes across their organizations.

Own the operating playbook

Our operating playbook for CDIOs is built on six critical components for digital business success.

- **Three orchestration components**—adaptable vision, organization and operating model—help organizations create a self-sustaining cycle of value creation.

- **Three foundational components**—data and analytics capabilities, technology foundation and talent and skills—help to drive discrete business opportunities in a consistent, unifying manner.

The below figure depicts the six components, followed by brief summaries of each.

FIGURE 5:

6 components of the operating playbook

- Delivery model
- Innovation at scale
- Customer experience

- Digital strategy and ambition
- Organizational buy-in

- Business model agility
- Organizational modularity
- Organizing structure

Adaptable vision — Operating model — Organization

CDIO framework

- Data supply chain
- Advanced analytics
- AI capabilities

Capabilities — Technology foundation

- Cloud enablement
- Modular architecture
- Security and privacy

Talent and skills

- Roles and skills
- Digital literacy
- Partnerships and talent development

Orchestration components   Foundational components

Adaptable vision

The path toward becoming a successful digital organization begins with a clear focus on the vision and scope of the digital journey. Firms' digital strategies or ambitions can vary from improving existing business models and revenues (transforming the core and the context) to adding new products or services and revenues (transforming the scope). And while transformations to scope tend to receive the most fanfare, transforming the core and the context bring significant nearer-term benefits and can be equally rewarding in the long term. In tandem with other firm leadership, CDIOs should aim to select the optimum mix of the three types of transformations in specific areas.

Where you choose to locate transformative energies determines the work and the investments required to become an increasingly digital business. The decision also sets the tone for the expertise and skillsets required of stakeholders and the organization more broadly. As the digital market evolves and circumstances change, CDIOs would do well to revisit their strategy decisions frequently.

Equally important as choosing the optimally efficient transformation strategy is to **drive agreement among the firm's executive leadership.** Those in C-suite roles typically align with enterprise-level transformations, while functional and business unit leads are often inclined toward improving current approaches and models. The right strategy would ideally provide each leader with a pivot for his or her goals, thereby aligning the executive team and balancing the organization's digital journey.

Organization

Once the CDIO formulates the firm's digital strategy and aligns the executive team, their next step is to orient the firm's **business model** to the strategy while maintaining the agility to evolve in response to shifting needs.

The ability to evolve the business model is often a key differentiator and is at times necessary for business survival. Depending on the strategic orientation, business models can vary from creating digital channels that improve the customer experience while selling existing services to actively pursuing information- and platform-driven initiatives that produce new digital revenues. For example, a firm aiming to transform the context might leverage AI and analytics to optimize prices and promotion, or it might add digital channels to improve the customer journey.

Next, CDIOs can focus their attention on **organizational modularity** to structure units so that teams can assemble, separate or recombine for more nimble ways of working. This modularity typically results from the combination of an organization's mindset, its practices and the tools it uses to help simplify problem areas into more easily managed units. The results are flexible solutions, such as bite-sized training modules that can be assembled and re-assembled into multiple personalized learning journeys.[11]

Lastly, the digital **organization structure** determines where in the organization the digital resources will reside and how digital services and capabilities will be delivered. While there's no perfect organization structure—centralization of accountability prioritizes efficiency and scale, while decentralization is often positioned as expertise-driven and innovative—the key for CDIOs is to find the right balance between these possible extremes. Business value premised on digital can help drive the optimal structure: The greater the homogeneity in the business value, the more centralized the organization's structure can be.

Operating model

Once the optimal organization structure has been agreed upon and designed, a key element of the operating model is to organize the **delivery of digital solutions and services.** While in the past these services have often been delivered as linear projects or programs, there's merit in exploring newer **product- or platform- based delivery models** to allow for faster, more flexible and scalable delivery.

In a product-based delivery model, each product is comprised of a set of activities and associated technologies that deliver on a specific business goal. These products are managed individually, can be swapped in and out depending on the organization's needs at the time and, together, form the backbone of a firm's digital and technological capabilities.

This model allows firms to accelerate and scale quickly without being restricted by the demands of traditional project delivery models. While traditional models are still useful for goals with definite start and endpoints, platform- or product-based delivery models are better suited for goals that require the continuous flow of data and insights.

A culture that imbues the firm with the ability to **innovate at scale** is another key requirement for establishing a successful digital operating model. CDIOs should invest in maturing their organization's innovation capabilities, replacing accidental innovation with intentional and continuous innovation. This culture shift will involve operationalizing a framework to generate and nurture new ideas and systematically moving those ideas through prototyping to the industrialization cycle.

Customer experience management (CX) should be ingrained as part of firms' operating models. In response to the increasing importance of customer centricity in the life sciences industry, CDIOs must develop processes and systems to improve the customer experience and elevate current engagement methods.

Proven paths forward include digitalization efforts to understand the customer voice or an experience strategy that features journey maps, personas and an integrated user experience. But no matter the path, be certain that efforts are consistent and intertwined across the enterprise.

Key to truly enhancing the customer experience is to ensure that all CX-focused processes and systems are designed with an outside-in understanding of customers' needs, perceptions and aims. Too often, efforts are designed inside-out based on firms' executive understanding of customer needs and at best only succeed at reducing customer dissatisfaction.

Capabilities

The ability to deliver digital solutions and services is highly dependent on the maturity of data and analytics capabilities, so there are great incentives for life sciences CDIOs to invest in an **enterprise data strategy** and enable connected decisions.

With the proper investment, CDIOs can provide a business interface for all cross-functional stakeholders to share and democratize data at the enterprise level. It's equally important to define **architectural guidelines** for data integration, management, access and analytics, ensuring that data applications and products are created consistently.

We expect data analytics to continue driving decisions at scale and on a real-time basis. CDIOs should accelerate the use of partial or incomplete data—as well as a wider variety of data, such as text, audio, video and customer sentiment analysis—rather than deep or voluminous (and more historical) data. Likewise, they can harness relationships within datasets by leveraging graph technology and train AI models with newer techniques, varying from reinforcement learning to continuous, embedded learning.

CDIOs should also put automation and intelligence at the heart of digital delivery strategies. Investments in **automation and intelligence** will create a lasting advantage for firms, not only in delivering savings but also by creating room for ongoing innovation. We're already seeing increased demand in the life sciences industry for intelligent data management, augmented analytics and intelligent robotic process automation. Interest in automation that leverages DevOps teams with the goal of eventually reaching NoOps (no operations) is taking off too.

Technology foundation

CDIOs need to lead the modernization of their firm's technology by implementing **cloud-first,** flexible architectures supported by **modular constructs** and must meanwhile protect data and systems through **advanced privacy and security.** A strong technology foundation is critical to building state-of-the-art data and analytics capabilities, enabling firms to deliver on the digital promise.

While cloud-first deployments are becoming standard practice in life sciences, firms are yet to take full advantage of cloud adoption. The technology's speed, scale, innovation and productivity benefits are essential to the pursuit of broader digital business opportunities, both in the present and, we expect, well into the future. While the industry has largely utilized cloud adoption to optimize the application development costs and to improve business resilience, CDIOs can also realize substantial value by leveraging cloud technology to accelerate innovative use cases and the adoption of emerging technologies by performing experiments at low cost.

Modular architectures consist of compact, self-contained, service-based components that are linked with easily configurable APIs. These architectures accelerate time to market and facilitate quick responses to evolving business requirements, especially in times of crisis. Best-in-class life sciences organizations are now embracing concepts such as containerization and microservices to take advantage of their benefits.

Cloud-first approaches change security and privacy considerations as well as potential regulatory and compliance considerations, so these should be integrated as part of the solution development cycle, rather than after development.

Talent and skills

The importance of an organization's collective digital talent and skills cannot be overemphasized in the era of digital transformation. CDIOs need to build teams with accomplished practitioners in digital-era skills such as big data, cloud, analytics, AI and ML, human-centered design, privacy and security, among other areas.

This approach to team building requires constant focus and investments in both various **talent development initiatives for digital resources** (such as upskilling, flexible work environments and career paths) and **alternate staffing models** (including partnerships and crowdsourcing) that cater to both short- and long-term demands. Organizations also need to enhance the **digital literacy of those in all areas of the business** to help a broad range of ecosystem participants collaborate effectively with one another to scale digital solutions.

Moving forward

CDIOs are uniquely positioned to drive digital transformations at scale and to position their firms for future success, but they need more practical ways to translate strategies into workable steps and change that lasts. Three ideas underpin our approach:

- Keep your business and technology executive teams informed about key market trends and the business opportunities they create.

- Use a "Transform the core, context and scope" way of thinking to brainstorm, categorize and prioritize the business opportunities most relevant to your organization's objectives.

- Activate an operating playbook for both business foundations and orchestration to drive opportunities at scale and create sustainable differentiation.

With this clarity, CDIOs can make more of the opportunities to use digital technologies to address unmet business needs. Leading firms will drive value even further to transform the market. They will create sustainable competitive advantage through common, enterprise-grade digital capabilities at scale to serve several opportunities in their business ecosystem at once.

Endnotes

[1] See Janet Rae-Dupree, "Tech giants like Apple and Google are competing to make it easier for you to get your health records, and it could be a $38 billion market," www.businessinsider.com and "Institutions that support health records on iPhone and iPod touch," https://support.apple.com.

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[9] ZS's "U.S. voice of the patient and provider: Beyond the pandemic," August 2021.

[10] ZS's "U.S. voice of the patient and provider."

[11] Composable Business Index, Gartner.

About the authors

Asheesh Shukla is a managing principal at ZS. His current focus is on expanding ZS's role in clients' strategic programs from strategy through execution. He manages ZS's real-world data and patient insight practices with a focus on patient-centric services and evangelizing the use of patient analytics across the healthcare value chain.

Mahmood Majeed is a managing principal at ZS and leads the company's global digital and technology practice areas. In the past 22 years, he has partnered with more than 100 global life sciences companies, advising clients on delivering measurable business outcomes by realizing and optimizing the value of investments in technology, digital and AI that directly contribute to growth initiatives.

Ashish Goel is a knowledge management and research manager at ZS. He's based out of ZS's New Delhi office and has more than 10 years of experience conducting research in technology and analytics, with a focus on digital and AI.

About ZS

ZS is a professional services firm that works side by side with companies to help develop and deliver products that drive customer value and company results. We leverage our deep industry expertise, leading-edge analytics, technology and strategy to create solutions that work in the real world. With more than 35 years of experience and 10,000-plus ZSers in more than 25 offices worldwide, we are passionately committed to helping companies and their customers thrive.

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