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Digital transformation

COVID-19 has had a lasting impact on the life sciences sector, including the digital transformation that it ushered into the sector at scale and in some cases overnight. Before the pandemic, life sciences organizations, which include biopharma and medtech companies, lagged other industries in digital innovation. However, as COVID-19 spread, they quickly embraced a variety of technologies that allowed them to run their businesses remotely or virtually.[1] Innovation projects that had been on the books for years received funding and advanced rapidly. Now three years later, we can see the impact of this digital transformation: what works, what is still in progress, and what remains elusive.

> "
> *"Digital innovation has been accelerated by 10 years by what has happened over the course of the last 18 months," said Manoj Raghunandan, President, Global Self-care and Consumer Experience, Johnson & Johnson.[2]*
>
> *Alex Gorsky, the company's former CEO and Chairman, goes further: "I can't think of a more exciting time. I've never seen the kind of opportunities now where we're seeing science, technology and innovation accelerating at such a rapid rate."[3]*
> "

During the pandemic, cloud technologies and platforms gave organizations the scale and flexibility to enable employees to work remotely and collaborate, which includes storing and sharing data across third-party networks and enabled by artificial intelligence (AI) and machine learning (ML) algorithms. Cloud technology also helped reduce costs, improve time-to-discovery and insight, and collect data to improve manufacturing and supply chain operations. At the same time, pressure to develop vaccines and therapies required competitors to become collaborators and share digital information.

Technology that was still in the planning stages in 2020 is now an integral part of many life sciences companies heading into 2023.
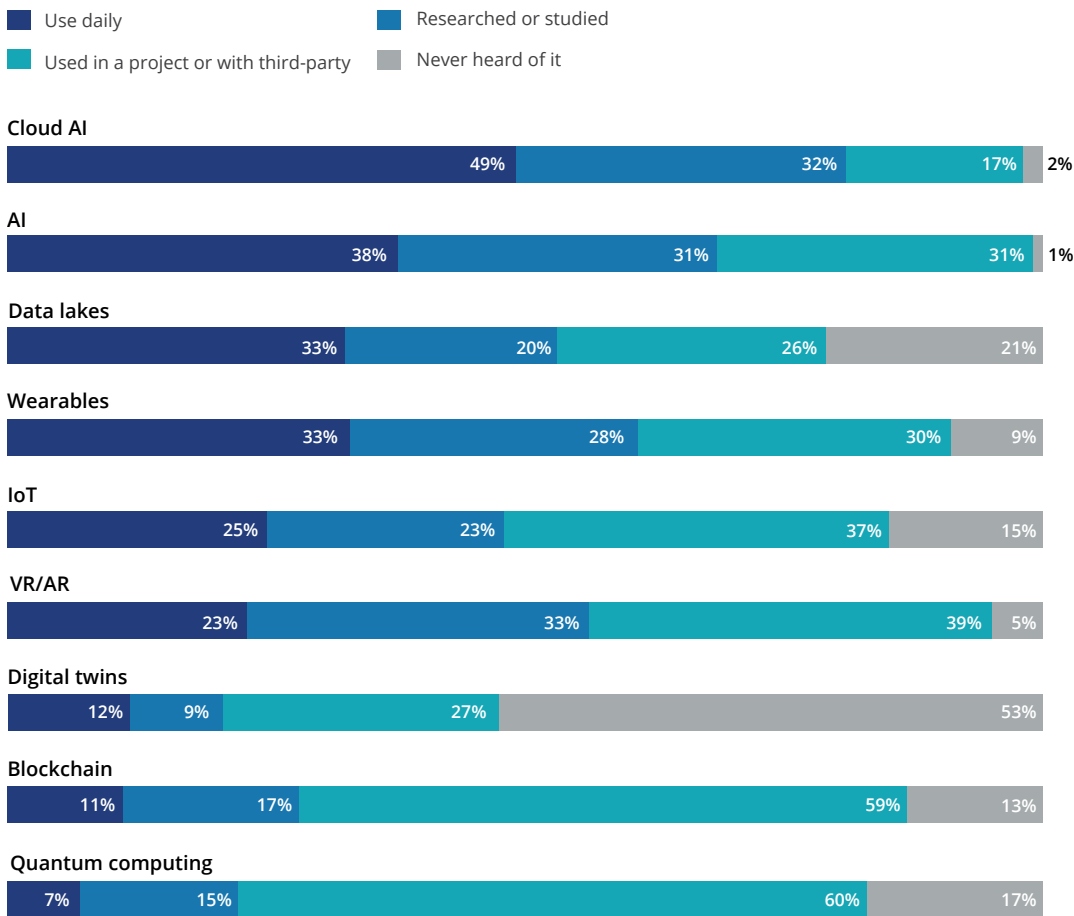
> "
> *"A few years ago, we were all talking about Data an Digital as a concept. Today, we're talking about how it drives value in the operations and innovation engines of our company," says Gregory Hersch, senior vice president for enterprise strategy and venture for Merck. "And now, we need to start scaling these innovations acrosspmroducts, countries and operations."[4]*
> "

However, not all technology has been adopted equally. Biopharma companies have embraced cloud platforms, AI, and wearables more than the Internet of Things (IoT) or blockchain (Figure 1). Nevertheless, the pandemic has fundamentally changed how these companies view digital solutions, and those companies that continue to embrace innovation will gain a competitive advantage in the years ahead over the competitors who do not.

Figure 1. Biopharma's experience with digital technologies is highest in cloud, AI, and wearables

Which of the following best describes your experience with each digital innovation technology within your organization?

■ Use daily   ■ Researched or studied
■ Used in a project or with third-party   ■ Never heard of it

Cloud AI

| 49% | 32% | 17% | 2% |

AI

| 38% | 31% | 31% | 1% |

Data lakes

| 33% | 20% | 26% | 21% |

Wearables

| 33% | 28% | 30% | 9% |

IoT

| 25% | 23% | 37% | 15% |

VR/AR

| 23% | 33% | 39% | 5% |

Digital twins

| 12% | 9% | 27% | 53% |

Blockchain

| 11% | 17% | 59% | 13% |

Quantum computing

| 7% | 15% | 60% | 17% |

Source: Deloitte's Biopharma Digital Innovation Survey 2021

Among leading biopharma and medical technology companies, digital solutions that were once seen as long-term projects for CIOs, are becoming vital to business operations. Life sciences organizations are now focused not on the technology itself, but how it's integrated into the business.

> " *Innovation tightly integrated into operations has worked that best," Hersch says. "The things that we're still waiting to see really gain traction are the ones that are farther away from operations.*[5]

For example, biopharma companies are using data to improve site selection for clinical trials and the oversight of supply chains, both of which have been effective. Technology further removed from operations, such as applications for patient safety, have been slower to advance.

The pandemic accelerated the application of digital solutions to optimize how work is done across the pharmaceutical and medical technology value chain. Initally, limitations on physical interactions drove demand, but patients preferred many of the digital solutions, and as payers reimbursed for them, it expanded capacity and reduced no-show rates. Technology in this environment has less do with transformation than with making processes faster and less expensive. Below is a sample of how new and emerging technologies are helping industry players optimize:

Software-as-a-Service (SaaS): In clinical development, companies are using SaaS platforms to simplify operations such as revenue and vendor management and to track data on clinical trial participants. The industry is adopting analytics-driven approach to support price management and tender processes, which helps in improve decision-making and optimize resource allocation.[6] Software is generating value in areas such as drug discovery as biopharma organizations look to cut research costs, shorten timelines, and improve transparency. The market for life sciences software is expected to reach $18 billion by 2025 from $11 billion in 2020.[7]

Artificial intelligence (AI): Biopharma companies are adopting AI for clinical and patient data analysis, supply chain and logistics management, physician understanding and predictive behavior analysis. In addition, they are using it internally to analyze and predict employee behavior, especially for ethics and compliance. AI can enhance drug design, improve quality checks, and provide predictive maintenance for manufacturing operations. It can also identify appropriate subjects for clinical trials by analyzing claims data. Even though the tech industry is currently experiencing disruption, we expect we will see more life sciences organizations collaborating with tech companies as they have in the past such as Google Health, Enlitic, and Owkin to use AI to improve clinical trial design and automate manufacturing processes.[8] AI can also be used to predict failure rates in medical devices.

We also are seeing broader adoption of AI in parts of clinical practice and workflow. As this accelerates, it will have additional implications for how life sciences manufacturers work with care providers. For example, if AI solutions become a broadly accepted tool in a clinician's approach to screening, it will have implications on study design, endpoints, and data strategy.

Internet of things (IoT): Smart sensors and smart meters will monitor real-time data to improve product efficiency, increase supply chain visibility, and enhance operational effectiveness. These devices and other linked IoT elements can bring greater efficiencies to manufacturing, packaging, warehousing, and other aspects of supply chain management. The prevalence of IoT services offers biopharma and medtech organizations the chance to optimize costs by streamlining supply chains, analyzing operations, and identifying new value-creation opportunities. Greater visibility of supply chains, for example, could help identify how drugs such as opioids fall into the wrong hands or quickly notify patients of a medical device recall.[9]

Automation: Companies such as Zenith Technology and Rockwell Automation are partnering with life sciences organizations to develop robotic process automation and business process modeling that can automate repetitive tasks, such as documentation at clinical sites, safety processing, and clinical research.[10,11] Automation can reduce costs for energy and raw materials, while improving product quality and consistency, and promoting safer work environments. It also speeds processing and packaging of pharmaceuticals while reducing human error.

Blockchain: Though not yet as widely embraced across the sector, some life sciences organizations are using distributed ledger technology to improve trust, provide greater transparency, and support patient safety and empowerment. Blockchain can help biopharma companies track counterfeit medicine and simplify supply transactions with hospitals, clinics, and other treatment facilities. Greater visibility of supply chains and traceability of pharmaceuticals and devices, for example, could help identify how drugs such as opioids fall into the wrong hands or quickly notify patients of a medical device recall.[12]

Data lakes: Cloud platforms such as ServiceNow are helping life sciences organizations build control towers or data hubs so that organizations can merge production, inventory, and other internal data with that of intermediaries and partners to provide real-time visibility into material and product flow.[13]

Wearables and AR/VR: The pandemic disrupted many clinical trials because participants could not readily access trial sites. Life sciences companies responded by adopting hybrid study approaches that included delivering medications and wearable technology directly to patients and monitoring and assessing them remotely, resulting in reduced trial cycle times and study. protocol deviations that would render results inconclusive. Similarly, travel restrictions forced manufacturing sites to operate with skeleton crews, and companies deployed wearable and AR/VR technologies so on-site staff could configure equipment, manage processes, and troubleshoot. Many companies plan to continue to use these technologies post-pandemic because they can increase data collection without imposing an undue burden on patients or study site staff.

Digital Therapeutics: Web-based applications that help patients with certain conditions, such as diabetes, improve their health and wellness or improve outcomes. Some applications are designed to help patients modify behavior, increase engagement with health care providers, or prevent more expensive treatments. For pharmaceutical and medtech companies, digital therapeutics can differentiate products with less capital investment than R&D. Total investment in digital therapeutics has already topped $600 million and the market is still in its infancy. The growth potential has attracted technology giants looking to change the health care landscape, payers applying it to reimbursement models and exploring how the patient data collected through such products can be leveraged to inform coverage, and start-ups that are introducing innovative ideas to attract investors.[14]

New threats

The advantages that made digital technology so attractive during the pandemic can also leave companies vulnerable. While a digital strategy can help a life sciences company improve, it also can expose companies to new risks as data starts to flow outside proprietary systems and into data lakes that sit on various cloud platforms.

Law enforcement agencies say pharmaceutical companies are increasingly being targeted for cyberattacks. In the past few years, cyberattacks[15] against biopharma and medical technology companies have disrupted supply chains, hobbled manufacturing processes, erased years of research, and resulted in hundreds of millions of dollars in damages. Cybercriminals likely assume that these companies, and other health organizations, are willing to pay ransoms because their services are critical. The attackers may also be drawn to the industry's trade secrets and intellectual property, its vast stores of personal health data, and its financial resources.[16] At the same time, the cyberattacks raise concens that hackers also could target implantable devices such as pacemakers, defibrillators, and neurostimulators that are monitored or programmed remotely.

Migrating systems to the cloud or adopting virtual clinical trials can expose companies to new types of attacks. These threats should be considered throughout the process—from requirements for architecture and design to development, testing, and deployment. Gaps can occur when cybersecurity is not integrated from the beginning. Such gaps could be exploited, potentially negating any progress or trust that would have been gained through the new approach.

The risks only increase as digital data becomes more consumable and accessible from multiple platforms and mobile devices, much like banking information. The easier data is to access, the more it needs protecting. This isn't always as easy as it sounds. For example, a company might not know exactly what its data contains if any portion of the data is tagged incorrectly. Companies must ensure that only designated users can access designated data through a designated channel. At the same time, the data must be retrievable for audits or other internal reviewsCompanies must ensure that only designated users can access designated data through a designated channel. At the same time, the data must be retrievable for audits or other internal reviews.

About half of US consumers do not trust biopharma companies.[17] As life sciences operate more closely with consumers, patients, and customers, garnering end-user trust can become even more important. Allowing end-users to securely access their data when they want to often is the first interaction a consumer has with the company. Finding the perfect balance of accessibility, while protecting critical information, brings cybersecurity and data protection to the forefront of building and growing trust.

In addition, as technology such as AI advances and becomes used more widely, it invites new risks, such as understanding how AI is deriving its answers and where the data it's using is coming from.

> *We really need to understand what biases are already there and how embedded they are in something that is going to propagate those biases for as long as that model is used," Hersch says "Another point is the data sets we're using. AI requires massive amounts of data. "We're often relying on patient source data that has come through third parties. Those third parties have assured us that patient's privacy rights have been respected in the collection of that data. But how do we really know that is true? And to what standard?[18]*

Transforming the organization

As the world emerges from the pandemic, the life sciences industry is at a crossroads. COVID-19 has shown companies that they need to embrace digital transformation, and most of them are taking more risks and investing in new technology. Those that don't may be left behind or at least find themselves at a competitive disadvantage. Alex Gorsky's perspective is that "there's not a place in health care from development to even patient delivery....all these areas which we would usually only equate with Silicon Valley. I think they are going to be ubiquitous in health care in a way we haven't seen."[19]

A Deloitte survey of 150 biopharma leaders found that almost 80% said their organizations needed to be more aggressive in adopting digital technologies.[20] But simply adopting technology to address specific issues isn't enough. Data, for example, should be considered an asset — one that can be used to improve the business, enhance efficiencies, and develop new strategies and competitive advantages.

As life sciences organizations continue their digital transformation in 2023, they need to move from doing digital to being digital by embracing enterprise-wide digital integration.

This broad, holistic embrace of digital technology cuts across value chains, business units, therapeutic areas, and strategic focus. This means moving from transactional engagements to an insight-driven, value-based enterprise. The transformation should connect and elevate all technology as part of a companywide digital strategy.

Achieving digital maturity

As the challenges of the pandemic ease, life sciences organizations are reassessing their digital strategies and determining what to retain and what to advance to make 2023 the year of digital optimization.

There's much work to do. Deloitte's research has found that only about 20% of biopharma companies are digitally maturing (Figure 2).[21] And while the adoption of digital solutions has accelerated since the pandemic, life sciences still lags other industries such as banking in its embrace of cutting-edge technology.

> **"**
> *If we go back to 2017, we were all getting used to the idea of a cloud being a secure place to put things," Merck's Hersch says. "The one thing that is different now is...how embedded tech is in all of our basic processes. But frankly, I'd hoped we'd be much further along than we are today.[22]*
> **"**

Figure 2. Digitally mature biopharma companies are most likely to explore new ways of doing business (vs. those in the developing or early stages of digital adoption)

■ New business methods
■ New business methods and competencies
■ Existing competencies
■ Don't know

Digital objectives breakdown by maturity

Maturing
- 31%
- 54%
- 15%

Developing
- 26%
- 40%
- 31%
- 3%

Early
- 38%
- 56%
- 6%
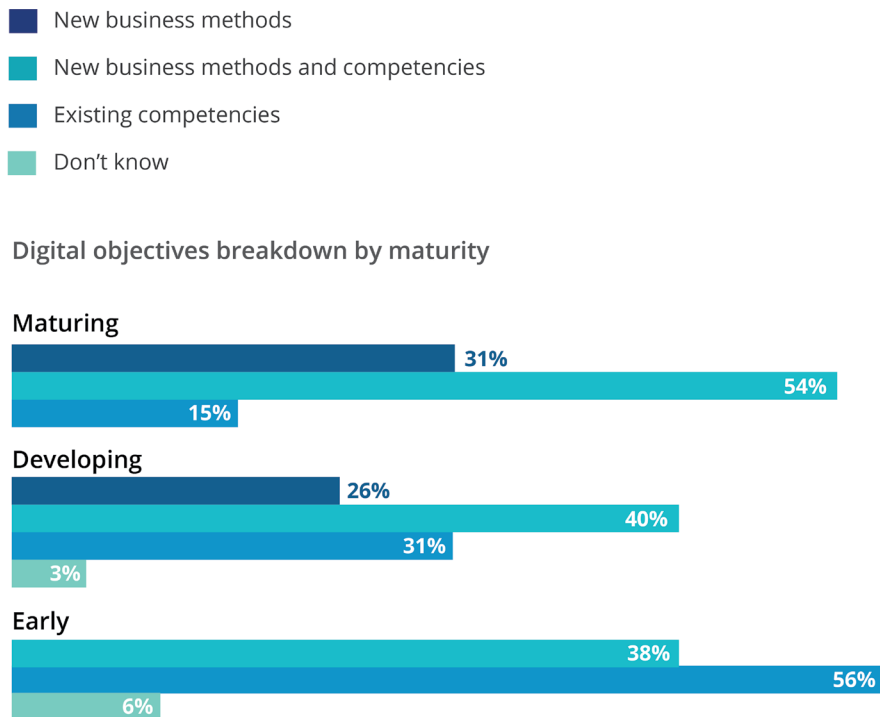
Source: Deloitte Center for Health Solutions analysis of MIT SMR and Deloitte's 2018 Digital Business Global Executive Survey data

> *Too many companies are still distracted by the "hype cycle" of the latest technology, Hersch says, rather than looking at ways to scale and improve the technology they already have.*
>
> *The hype cycle drags people down because the stuff that's tangible, proven, and works doesn't sound as cool, he says. Focusing on things that are actually delivering value is what needs to happen.[23]*

As companies rethink their future, they will move from adopting digital technology in pockets and instead initiate broader digital transformations that to position themselves for a more competitive marketplace where patient engagement and traditional selling models are being transformed out of necessity.

Companies that fail to successfully navigate these digital transformations risk becoming minimized or boxed in (or boxed out) by the digital health care ecosystem. Enterprise digital transformations deliver more significant business advantages by applying innovation and digital technology to existing and new business models in strategic, creative, and agile ways for patient, partner, and employee impact, which allows companies to accelerate their core mission to deliver improved health, wellness, and experiences for their patients; drive business impact; and inspire company employees and stakeholders.

Encouraging digital maturity

No strategic business transformation is easy. Many companies in many industries talk about it. As life sciences leaders drive digital transformation and maturity in their organizations they will need to address six key questions:[24]

1. **What is my holistic digital ambition?** The strategic business question is what digital transformation strategy fits a company's strategic objectives, financial, and competitive needs.

2. **How do I value and position a broader digital transformation?** Successful companies use a structured digital value model that consists of value, operational performance, and capability measures.

3. **How do I activate my ecosystem to accelerate digital value and realization?** Life sciences companies should engage their wider ecosystem to leverage non-traditional approaches.

4. **How do I structure, mobilize, and align my organization for success?** Digital transformations should be structured to drive alignment, reinforce what works, scale quickly and mobilize for success to meet critical strategic objectives.

5. **How do we future proof our capabilities and become an adaptable organization?** Leaders should view digital transformation as an ongoing process that requires flexibility. It's important to avoid hardwiring processes.

6. **How do I monetize it to add value to my organization and the existing payer system since it will take large investments to create and maintain?** Digital technology can bring greater efficacy to drug and device development, improving the margins for each and encouraging a broader range of products.

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Interested in learning more about digital transformation and its impact on global life sciences? Check out these Deloitte publications:

Digital Transformation in Life Sciences

2022 Life Sciences Technology Trends

Digital transformation value

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