Healthcare and Life Science Business Driver: Strategic Technology Change

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Initiatives: Healthcare and Life Science Digital Transformation and Innovation

Technologies such as AI engineering, composable applications, data fabric, hyperautomation and total experience promise high-value capabilities to address urgent industry challenges. Healthcare and life science CIOs can use this research to calibrate their technology plans and strategic investments.

Overview

Key Findings

- CEOs and boards demand growth and operational efficiency achievements that create a new imperative for CIOs to realize the power of strategic and transformative technologies. CIOs and business executives face increased urgency to apply technology advances that have moved into the mainstream over the last decade, to put innovation to use and make it stick.

- COVID-19-pandemic-spurred business and operating model disruption continues as digital demand persists out of public health necessity, an evolving competitive landscape and new consumer preferences.

- Emergent healthcare applications and data architectures are starting to proliferate, enabling innovation at scale across the enterprise and accelerating technology adoption.

Recommendations

CIOs advancing healthcare and life science digital transformation and innovation should:

- Scale the foundation that supports high-priority strategic technology opportunities by implementing key foundational capabilities, such as APIs and a digital analytics architecture.
Why This Matters

This research is one in a five-part series covering business drivers in healthcare and life sciences.

Healthcare and Life Science Business Drivers

Strategic technology change is one of five healthcare and life science business drivers that collectively influence CIO and executive leader decisions and actions in shaping their business models, operating models and technology investments (see Figure 1).

Figure 1: Healthcare and Life Science Business Driver: Total Experience

Analysis

Description of Strategic Technology Change as a Business Driver of Technology Decisions
Strategic technology change demands a paradigm shift in the way the healthcare and life science industry is using technology. Among leaders, it’s not just an incremental movement, but an observable transformation that is creating force-multiplier value opportunities. Gartner has identified three overarching and convergent categories for the 12 top strategic technology trends for 2022: those that accelerate growth, sculpt change and engineer trust (see Figure 2).

**Figure 2: 2022 Top Strategic Technology Trends**

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Together, these technology trends are upending an industry still enmeshed in, and defined by, legacy IT systems and code. Although each of the 12 trends is discrete technology, the value proposition for organizations that deploy them is multiplicative. For example, an organization can enhance the transformation of total experience across consumers and employees in a distributed enterprise by applying hyperautomation to administrative processes.

While these technologies are not at the same stage of adoption — or even aspirational consideration — for all sectors or organizations, CIOs must anticipate that consumers, employees and partners will increasingly expect value and experiences that depend on these capabilities. Table 1 provides a quick reference guide with bookmarks to navigate the technologies and use cases described in this research.
### Strategic Technology Trends That Accelerate Growth

#### Generative AI

Traditional AI outputs produce data about artifacts. Examples include a machine-learning-derived numeric impactability score to prioritize outreach, a natural-language-processing-enabled label or classification for an interaction like an authorization request, or a computer vision classification, such as a cancerous mole. Also included are generative AI outputs artifacts, such as video, narrative, training data and solution design (see Top Strategic Technology Trends for 2022: Generative AI).
Generative adversarial networks (GANs), or neural networks that compete against each other to identify which artifact is real versus which is fake, were introduced to healthcare use cases in 2014. While GANs require vast training datasets, newer applications of generative AI allow artifact generation with minimal sample size. This technology is starting to mature in other industries and is perhaps most widely recognized as the ability to create "deep fake" video content (see Figure 3).

**Figure 3: Expanding the Output of AI Systems**

Generative AI approaches generally fall into two categories:

- **Augmented** — Artifacts that support higher-order creative tasks by humans. For example, it autogenerates 3D printing designs for medical devices for R&D resources. The human operators shape the AI's generation behavior through reinforcement, such as by saying “more like this” generated element or “less like this.”

- **Automated** — Artifacts produced in bulk with little human involvement beyond shaping the parameters for production. For example, humans set the medical context for automated organ design as the input to 3D printing.

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**Autonomic Systems**
Often called “self-healing,” autonomic systems are differentiated from traditional automated systems because they are self-aware and act with agency (see Top Strategic Technology Trends for 2022: Autonomic Systems). They execute domain-bound tasks by learning from experience and can adapt their behaviors — or even change their goals — in real time (see Figure 4).

**Figure 4: The Three Elements of Autonomic Systems**

The Three Elements of Autonomic Systems

- **Automated systems** are a mature concept across industries. These systems perform well-defined tasks and have fixed, deterministic behavior, such as printing a pharmacy label or dispositioning a call center record.

- **Autonomous systems** add independent behavior to automated systems, with the degree of autonomy controlled by an algorithm or human operator. For example, drug delivery robots in hospitals have set waypoint parameters that are programmed by a human but have autonomy in navigating obstacles between the points.

- **Autonomic systems** exhibit adaptive behavior for both task execution and adjusting the goals for the task. This “self-healing” ability is valuable for volatile operating environments, such as unpredictable staffing levels during a pandemic, and allows the system to learn a task by example rather than requiring a well-understood algorithm to program its execution.
Healthcare researchers proposed the concept of autonomic care systems in 2009 that automatically triages patients and orchestrates the appropriate care teams. Autonomic systems will progressively generate significant value for healthcare and life science organizations as well as help reduce the burden of care on caregivers. They will enable exponential scale for complex, high-value processes that are currently resource-intensive and help realize the real-time health system (see Real-Time Health System Vision).

These systems will, over time, reduce the human interventions and oversight involved in care delivery and care management by optimizing care and medications algorithmically, adjusting to even the slightest sensor-detectable change in the patient’s condition.

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**Total Experience**

Consumer and employee experience initiatives are historically developed, implemented and monitored independently. By contrast, total experience focuses on optimizing shared experiences through unique respective journeys and points of intersection across touchpoints, devices and interaction modalities (see Top Strategic Technology Trends for 2022: Total Experience).

TX strategy interlinks customer experience, employee experience, user experience and multiexperience disciplines to drive greater customer and employee confidence, satisfaction, loyalty and advocacy using digital and nondigital techniques (see Figure 5).
TX improvement is crucial to healthcare and life sciences for a number of reasons, such as achieving many organizations’ “Quadruple Aim” goals of improving patient and physician experiences as well as lowering costs and improving outcomes. Pandemic conditions have dramatically accelerated healthcare workers’ voluntary attrition rates, exacerbating an already-critical shortage of nurses, home health workers and physicians. Life science commercial operations and revenue suffered from an inability to interact with prescribing physicians effectively. Similarly, many payer and provider organizations tie reimbursement rates to experience measures.

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**Distributed Enterprise**
The future of work is a hybrid work environment for many industries, with employers competing on workplace flexibility for scarce talent in a highly competitive labor market. Respondents to Gartner's 2021 Evolving Work Experience Survey indicate that over two-thirds of all employees will be primarily or partly working remotely after the pandemic. Business and IT leaders are focusing performance measures on work outcomes and on-time deliverables rather than traditional measures, such as task execution.

Organizations are responding to this trend by integrating remote and physical environments and services for employees and customers into a distributed enterprise model (see Top Strategic Technology Trends for 2022: Distributed Enterprise and Figure 6).

**Figure 6: A Distributed Enterprise Impacts Hybrid Work and Service Delivery**
Healthcare providers, payers and life science manufacturers alike face challenges with adopting and persisting a distributed enterprise operating model outside of administrative and technology-focused employees. This is because many care delivery and life-science-related products and services require in-person interactions. Although low-acuity care lends itself to a hybrid work and service delivery model, acute and emergent care delivery generally require in-person assessments and treatment. While life science R&D practices continue to expand their use of in silico simulations, digital clinical trials and real-world data, many activities still demand physical presence. Payers, on the other hand, do not typically have the same operating environment constraints and instead must overcome lingering cultural barriers to retaining the distributed enterprise model most were forced to adopt during the pandemic.

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**Strategic Technology Trends That Sculpt Change**

**AI Engineering**

AI engineering operationalizes AI across the enterprise, encompassing the security, ethics, autonomy, decisioning and change management necessary to achieve scale on the journey from developing individual models to deploying autonomic systems powered by generative AI (see Top Strategic Technology Trends for 2022: AI Engineering). Bringing together DataOps, ModelOps and DevOps capabilities, the effective use of AI engineering will provide the governance necessary to trust the activities and outputs of technologies, such as autonomic systems and generative AI (see Figure 7).
While not yet pervasive, AI adoption is accelerating across the healthcare and life science industry as vended solutions increasingly incorporate capabilities, such as computer vision or machine learning algorithms. Across Gartner surveys, healthcare and life science organizations have reported that the most critical barriers to AI adoption are concerns about bias, ethics, privacy and a lack of trust. AI engineering promises to overcome these barriers by enabling both “explainable AI” and “credible AI.” Explainable AI ensures all stakeholders have an understanding of the AI model and is often key to internal review board or regulatory agency approval for use. Credible AI focuses on building trust in the AI model by demonstrating model and expert alignments, and framing discrepancies as puzzles to solve collaboratively.

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Hyperautomation
Instead of human decision making interrupting automation tasks, hyperautomation applies AI to reach decisions that orchestrate automated tasks (see Top Strategic Technology Trends for 2022: Hyperautomation). This approach exploits capabilities along a spectrum from single-tool task automation that delivers immediate savings to ecosystem-integrated data and workflow automation that contributes to business reinvention (see Figure 8).

**Figure 8: Spectrum of Hyperautomation**

In 2021, Gartner surveys found that more than 50% of CEOs and 69% of boards of directors across industries demand accelerated growth and operational excellence. Hyperautomation provides a critical path to achieving both (see 2021 Gartner CEO Survey: The Year of Rebuilding and Roadmap to Renewal: The 2022 Board of Directors Survey). Healthcare and life science executives will have to advance hyperautomation capabilities to achieve their growth objectives with limited IT budget increases.
For example, in the Gartner 2022 CIO and Technology Leaders Survey, provider respondents report their organizations expect a 3.4% revenue bump this year with only a 3% IT budget increase. Payers expect 2.1% more revenue with a 1.5% IT budget increase — the smallest IT budget increase across all industries we surveyed. Life science organizations are investing comparatively more in IT to achieve growth goals, with a 5.2% IT budget increase in support of a 6.5% revenue increase target. Life science organizations’ IT budget jump is second only to that seen in the transportation industry and is higher than the cohort of highly composable businesses.

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**Decision Intelligence**

Decision intelligence is a practical discipline used to improve decision making by explicitly understanding and engineering how decisions are made and how outcomes are evaluated, managed and improved by feedback (see Top Strategic Technology Trends for 2022: Decision Intelligence). Decision intelligence frames a wide range of decision-making techniques. Depending on the decision context, these can range from conventional analytics to AI and complex adaptive system applications.

Decision intelligence provides a framework that brings multiple traditional and advanced techniques together to design, model, align, execute, monitor and tune decisions. Decision intelligence applies not just to individual decisions, but also sequences of decisions — grouping them into business processes and even networks of emergent decision making (see Figure 9).
While healthcare and life sciences generally have maturing decision support systems, decision intelligence is a much more advanced capability that is dependent on transparency in decisioning and composability of decision flows and models. However, there is a clear path to acceptance within existing paradigms. For example, care pathway decisions align with evidence-based medicine that requires traceability to explicit clinical guidelines. The peer review process for repeating studies and accepting research findings into clinical practice requires transparent decisions with adjustable component variables. Algorithms augmenting clinical decision support are increasingly applied.

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Composable Applications
Application architects have espoused modularity for over 25 years since services-oriented architecture, but composable applications serve a new audience — the multidisciplinary, democratized “composers” who work in fusion teams (see Top Strategic Technology Trends for 2022: Composable Applications). Composable application architecture is business-centric, with engineering open to technology and business professionals. The core design principles of composability are modularity, autonomy, orchestration and discovery (see Figure 10).

**Figure 10: Core Design Principles of Composability**

Healthcare and life science organizations are in the process of breaking monolithic megasuites into composable applications with modular, accessible data and workflows that can be packaged into business capabilities and integrated into other systems (see Creating the Composable Healthcare Organization for Healthcare and Life Science CIOs). Embracing a composable architecture approach advances opportunities for real-time, interoperable and automated data and workflow orchestration across the ecosystem that supports increasingly complex roles, such as care managers and clinical trial administrators.
Strategic Technology Trends That Engineer Trust

Cloud-Native Platforms

Although healthcare and life science organizations were late cloud adopters, their interest in, and use of, public cloud is now accelerating, with many organizations pursuing a "cloud-first" policy for onboarding new workloads. Past efforts at building private clouds in enterprises have met with limited success due to lack of tooling maturity, automation gaps, lack of scale and inability to innovate at the speed and scale of hyperscale providers. Cloud-native platforms enhance the ability to deliver standardized, automated solutions in which infrastructure resources are complemented by integrated platform services (see Top Strategic Technology Trends for 2022: Cloud-Native Platforms and Figure 11).

Figure 11: Cloud-Native Ecosystem

Characteristics of cloud-native platforms include:

- **Declarative APIs**: The user defines a desired end state and the cloud-native platform automates the provision of resources to maintain that state.
Numerous Gartner surveys over recent years have demonstrated that healthcare and life science organizations, concerned about data integrity and governance in particular, lag behind other industries in cloud adoption, but their investments are now accelerating. Cloud service providers increasingly offer vertical-specific solutions with advanced capabilities while addressing privacy and security risk concerns with better oversight than many organizations can achieve in their own data centers.

Privacy-Enhancing Computation
Executive leaders are focusing on obtaining information from data for analytics and business intelligence purposes — including data monetization and infonomics. These use cases are trending in Gartner interactions with healthcare and life science organizations, and they often serve secondary purposes beyond the primary purpose for which the (personal) data was obtained. Such processing activities instead require anonymous data handling, managing compliance and brand risks as well as earning customers’ trust. Aside from data monetization, enterprises increasingly require an exchange of information, rather than of data, for the purposes of age or identity verification, 360-degree customer views or fraud analytics. Meanwhile, legislators and regulators across jurisdictions continue to add new compliance requirements, such as General Data Protection Regulation (GDPR).

Privacy-enhancing computing (PEC) is a collection of techniques through which the individual use cases and challenges will determine which PEC techniques are applicable—either stand-alone or in combination with others (see Top Strategic Technology Trends for 2022: Privacy-Enhancing Computation and Figure 12).
PEC techniques aid in the protection of privacy and confidentiality while using data and information and, as such, ensure expanded business activities and facilitate both cross-border transfers and detailed analytics of data. PEC can also help reduce compliance and other privacy risks that currently hinder public cloud adoption. For healthcare and life science organizations, PEC will increasingly enable ecosystem opportunities, such as real-world, evidence-sourced algorithm marketplaces.

Cybersecurity Mesh
One of the most vulnerable industries to cyberattack, healthcare and life science organizations consider cybersecurity a top priority. Cybersecurity mesh architecture (CSMA) is a composable and scalable approach to extending security controls, even to widely distributed assets (see Top Strategic Technology Trends for 2022: Cybersecurity Mesh). CSMA enables a more composable, flexible and resilient security ecosystem. Rather than every security tool running in a silo, a cybersecurity mesh enables tools to interoperate through several supportive layers, such as consolidated policy management, security intelligence and identity fabric (see Figure 13).
CSMA provides the foundation for people and machines to connect securely from multiple locations across hybrid and multicloud environments, channels, and diverse generations of applications, protecting all the organization's digital assets. By doing so, it fosters a more consistent security posture to support increased agility for the composable enterprise. CSMA allows security tools to integrate by providing a set of enabling services, such as a distributed identity fabric, security analytics, intelligence, automation and triggers, as well as centralized policy management and orchestration. As healthcare and life sciences expand the use of capabilities, such as app marketplaces, sensor-generated data, global research data collaboratives and consumer-mediated data exchange, CSMA will become key to maintaining trust and regulatory compliance.

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Data Fabric
Swiftly becoming an integral part of data management, a data fabric uses continuous analytics over a combination of existing, discoverable and inferenced metadata assets to inform smarter and more effective support of data management tasks, regardless of deployment platform and architectural approach (see Top Strategic Technology Trends for 2022: Data Fabric and Figure 14).
A data fabric is a series of data processes that read, capture, integrate and deliver data based on:

- Understanding who is currently using data
- Classifying the types of use
- Monitoring changes in use patterns

**Figure 14: Data Fabric Pillars**

The healthcare and life science industry is plagued by data silos that inhibit clinical research, timely responses to needs, such as COVID-19 reporting and efficient administration. The data fabric breaks down the concept of data silos by recognizing how existing use cases create patterns that echo behavior, even for newly added datasets. As the data fabric progresses from a system based on metadata recognition and analysis, and introduces recommendations and alerts, it gradually introduces augmented data management principles. At its mature implementation, the data fabric will reduce the effort of having to physically do the work by consuming metadata your business generates every day and treats as waste.
Evidence of Strategic Technology Change in Healthcare and Life Sciences

Gartner 2022 CIO and Technology Leaders Survey Industry Insights

Healthcare and life science industries vary in their adoption of the composable thinking, business architecture and technologies necessary to maximize the value of strategic technologies. Zero percent of U.S. payers and only 2% of providers demonstrate high composability, and they are the lowest-ranking industries. By contrast, 8% of life science organizations are included in the highly composable cohort. Legacy modernization is still a high-priority investment area for many organizations, with 28% of life science organizations, 33% of payers and 33% of providers increasing their spend to modernize applications and thereby paving the foundation of innovation.

Across industry sectors, CIOs are increasing investment in transformative capabilities in parallel with their legacy modernization, including the majority of the top strategic technologies and related foundational initiatives (see Figure 15).
There are several key insights we can glean from these targeted investment priorities:

- **Providers are most likely to target cybersecurity** — It’s no surprise that cybersecurity is a top priority for all sectors. However, more healthcare providers worldwide are targeting cybersecurity for increased investment than their payer and life science peers. There are emerging contributors to this investment trend beyond the clear evidence of the health system’s vulnerability. These include the increasing adoption — even mandated use — of APIs to exchange information with third parties and apps outside of the healthcare system. Across all sectors, it is likely that privacy compliance is included in their blanket response to cybersecurity investments.
U.S. payers are most likely to target total experience — Health plan members, provider partners and employees routinely report high-friction interactions across common activities, such as service authorization. Legacy processes, application silos and persistent paper-based information exchange lead to delays, frustrating call center engagement and poor satisfaction scores that affect revenue. With experience-based measures now comprising the largest segment of Medicare Advantage star ratings scores and providers’ negotiating power strengthening, payers have significant incentives to urgently address total experience.

Life science organizations are most likely to be expanding digital workplace investments — Out of necessity during the pandemic, payers and providers implemented and scaled remote operating models, including making the seismic shift to virtual care. Life science organizations were slower to adapt to remote or hybrid conditions and are increasing their investments to attain the workplace and product or service delivery that the market now expects.

All sectors are targeting cloud platforms, but not yet replatforming for cloud-native architecture — Healthcare and life science organizations were reluctant converts to the cloud, only reaching cloud spending parity with cross-industry peers over the past few years. The increasing verticalization of cloud service provider offerings, the perceived lower total cost of ownership and the cloud-first or cloud-only deployments of high-value niche software have broken down barriers to public cloud adoption. While all sectors recognize the value of cloud platforms, very few are prioritizing cloud-native architecture for their existing workloads.

Real-time ecosystem enablement is a top priority among providers and payers — Integration technologies, such as APIs, are foundational for realizing the value of all of the strategic technologies. Total experience transformation depends on sharing real-time data, insights and workflows across constituencies participating in common experiences. Composable application architecture uses APIs to support packaged business capabilities. Hyperautomation relies on real-time orchestration across complex process touchpoints. Although life sciences prioritize APIs lower than their cross-sector peers, it is still in their top five.
There are a number of examples of many of these strategic technologies operating in the real world. While some like CSMA and PEC remain nascent, others are currently deployed and delivering value. It's important to keep in mind that these technologies are interrelated and many are interdependent.

The data fabric is the heart of composable architecture, and industry organizations worldwide are embracing and investing in these solutions and supporting processes. Montefiore, a U.S. healthcare provider, implemented an entity-event knowledge graph to provide an integrated view of its data and provide a continuously updated source to power its AI applications (see Case Study: Entity-Event Knowledge Graph for Powering AI Solutions (Montefiore)). The vendor market is thriving and includes cloud service providers Amazon Web Services (AWS), Google and Microsoft as well as specialized solution providers, such as Ataccama, Cambridge Semantics, Cinchy, CluedIn, Collibra, Denodo, IBM, K2View, Informatica, Stardog and Talend. There are also niche industry players, such as Metaform and Vyasa Analytics.

Hyperautomation is proliferating rapidly and is particularly gaining traction in administrative use cases. Integrated healthcare delivery organization CVS Health developed a new system for its Pharmacy Benefits Manager (PBM) called AVAIL, which stands for “Adding Value thru AI and Learning” (see Case Study: Hyperautomation for Healthcare Payer Administration (CVS Health)). AVAIL streamlines administrative tasks associated with pharmacy benefits configuration, from benefits application receipt to payments and issues resolution. It uses artificial intelligence to interpret vast amounts of CVS account data in a broad range of structured and unstructured formats, align the explicated data with complex coding rules and seamlessly execute benefits configuration within the core administrative system. This capability enables CVS PBM to offer world-leading members benefit experience scenarios, designed from the member’s perspective, with real-world copays and annual deductibles, explained in clear, accessible terms.

Generative AI already has commercial and research applications. In conjunction with researchers at Cornell University, IBM is exploring how deep generative models could create novel molecules using small samples and simulating clinical conditions in silico, eliminating training dataset barriers to drug discovery. Another popular use case is the development of synthetic datasets that support PEC techniques. By creating manufactured new data and patient information that cannot be reengineered back to the original production data, solution providers enable researchers and data monetization alike while remaining compliant with privacy laws. There is a thriving solution marketplace for synthetic data engines populated by vendors such as Aetion, Diveplane, KerusCloud and Syntegra, as well as open-source capabilities, such as MITRE’s Synthea that supports patient-centered outcomes research.
In a demonstration of AI engineering, Kaiser Permanente, a U.S. healthcare provider, integrated DataOps and ModelOps after finding a discrepancy between pristine training data and real-world, patient-submitted data for skin lesions that significantly diminished model performance. By shifting their model’s input from research-sourced static photos to consumer-submitted short videos, Kaiser Permanente increased the image volume by 15,000% and achieved multifold additional angles of the lesion captured. This led to improved model performance in 14 days without model alteration (see Top Strategic Technology Trends for 2022: AI Engineering).

Also representing AI engineering, Unity Health Toronto focused on the human side of the AI governance process to build trust in its Intensive Care Predictive Model (see Case Study: Make AI Models Credible, Not Explainable (Unity Health Toronto)). Through trial and error, Unity Health discovered that the typical approach to “explainable AI” led to more questions than answers for its stakeholders and was not successful in engendering trust in its AI model. Unity Health’s approach to achieving “credible AI” involves demonstrating model output cases of no surprises, minor surprises and major surprises when compared with expert findings, and giving experts the opportunity to understand and clear deviations.

The Gartner Eye on Innovation Awards in Healthcare and Life Science finalists and winners demonstrate the multiplicative value of applying strategic technologies. The 2021 life science sector winner, Novartis, transformed its operations through composable applications, distributed enterprise, AI engineering and total experience emphasis (see Video: 2021 Eye on Innovation Awards in Healthcare and Life Sciences — The Platform (Novartis)). Novartis packaged data and algorithms as business capabilities into an easy-to-use composable platform to support an open market of data exchange, self-service exploration and use-case application. The company has enabled use cases, such as presenting and analyzing live clinical trials data for over 800 studies and 300,000 patients, with a “control tower” approach that allows it to address problems before they materialize. Operating in a distributed enterprise, Novartis has already scaled “The Platform” to more than 40,000 employees across 265 programs and intends to continually expand access.
In another demonstration of multiplicative value, Showa University Hospital in Japan transformed its intensive care unit (ICU) operating model (see Case Study: Critical Care Beyond Hospital Walls (Showa University Hospital)). Showa University Hospital partnered with Philips to implement and scale a virtual ICU (eICU) continuous-demand model for clinical surveillance with decision intelligence to predict and intervene in clinical deterioration across multiple sites of care. This helped the hospital address the burnout associated with an escalating critical care clinician shortage by improving total experience. This operating model reduced mortality in the face of a 30% increase in ICU cases and supported 20 to 30 patients per nurse.

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Next Steps

Implications of Strategic Technology Change to the CIO

While there is tremendous opportunity for these strategic technologies to exponentially increase value for consumers and organizations, there is also enormous risk associated with many of them. For example, research studies and algorithms are already under scrutiny for sample bias and skewed outputs, broadening health inequities that already exist. Without rigorous oversight, technologies such as generative AI, decision intelligence and autonomic systems could amplify these biases and proliferate unethical findings across the ecosystem with disastrous effects.

A growing number of regional privacy laws also present barriers to adoption and scale, with the United Nations reporting that 128 out of 194 countries have privacy legislation in place. These include the Health Insurance Portability and Accountability Act (HIPAA) in the U.S., the European Union’s GDPR, Canada’s Consumer Privacy Protection Act (CPPA), Brazil’s General Data Protection Law (LGDP) and Singapore’s Personal Data Protection Act (PDPA).

To capitalize on strategic technologies while addressing consumer, industry and regulatory concerns about their use, CIOs should:

- Continue with legacy modernization initiatives that will enable composability — but do not wait until they are “finished.” The modernization will never be finished in time to deliver competitive capabilities and experience. Prioritize investments that scale the foundational architectures and capabilities that support high-value strategic technology opportunities for the organization.
Collaborate with business and IT leaders to identify business technologists who can operate in fusion teams to innovate across the business and IT. Establish fusion teams to align with roles, products and services based on the expertise of those business technologists and charge them with matching capabilities to use cases. Encourage them to ideate outside existing application and data constraints and design an optimal application experience.

Convene a data and ethics committee of executives and leaders across business and technology functions. Lead the committee in establishing or refining policies that govern the organization's acceptable use of strategic technology assets and capabilities, whether existing or planned for the future.

Collaborate with peers to institute an advisory council composed of employee stakeholders across roles and consumers across the continuum to get the inside-out and outside-in perspectives of their experience across shared journeys. Do not have employees substitute for external consumers. Budget to compensate consumer participants as experts for their time.

Task process engineering resources with evaluating the extent of the trust barriers that may be preventing adoption and scale of AI-enabled technologies. Have them prepare a survey instrument that can be used to measure changes in trust over time and administer the survey across representative resource samples from all business units.

Explore vendor partners to pilot foundational and overarching strategic technologies, such as data fabric and total experience. Use the pilot findings to inform RFPs for these technologies and adjacent solutions.

Manage expectations continuously and rigorously. Given the nascent and emergent nature of strategic technologies, ROI realization is likely to be further away than CEOs and boards want. Focus messaging on the long-term value opportunity to affect growth and achieve superior operational excellence.

Evidence

Gartner’s 2021 Evolving Work Experience Survey was conducted online from 14 April 2021 through 17 April 2021, with 70 participants from Gartner’s CIO Research Circle, a Gartner-managed panel.

Gartner’s 2021 Gartner CEO Survey: The year of rebuilding and 2021 evidence from the board of directors study
Gartner's 2022 CIO and Technology Executives Survey. This survey was conducted to help CIOs and technology executives adopt business composability as a means to thrive during periods of volatility and uncertainty. It was conducted online from 3 May 2021 through 19 July 2021, among Gartner Executive Programs members and other technology executives. Qualified respondents are each the most senior IT leader (CIO) for their overall organization or a part of their organization (for example, a business unit or region). The total sample is 2,387, with representation from all geographies and industry sectors (public and private), including 122 healthcare providers, 61 life science and 31 U.S. health payers. The survey was developed collaboratively by a team of Gartner analysts, and was reviewed, tested and administered by Gartner's Research Data and Analytics team. Disclaimer: Results do not represent global findings or the market as a whole but reflect sentiment of the respondents and companies surveyed.

1 The GANfather: The Man Who's Given Machines the Gift of Imagination, MIT Technology Review.

2 Perspective: Autonomic Care Systems for Hospitalized Patients, Academic Medicine.

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4 Accelerating Antimicrobial Discovery With Controllable Deep Generative Models and Molecular Dynamics, Cornell University.

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6 Directing Research Toward Health Equity: A Health Equity Research Impact Assessment, National Center for Biotechnology Information.

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2022 CIO and Technology Executive Agenda: A Healthcare Provider Perspective
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<td>Self-aware systems that act with agency</td>
<td>Enable real-time health system and exponentially scale hospital without walls</td>
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<td>Alleviate clinical staff conditions that lead to burnout</td>
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<tr>
<td>Composable Applications</td>
<td>Business-centric architecture, with engineering</td>
<td>Package clinical and operational data and</td>
</tr>
<tr>
<td>Technology Area</td>
<td>Description</td>
<td>Supporting Technology/Services</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Cloud-Native Platforms</td>
<td>Enhances the ability to deliver standardized, automated solutions in which infrastructure resources are complemented by integrated platform services</td>
<td>Containerization of core administrative processing solution workloads</td>
</tr>
<tr>
<td>Privacy-Enhancing Computation</td>
<td>Aids in the protection of privacy and confidentiality while using and sharing data and information across entities and borders</td>
<td>Compliant, federated access and use of synthetic dataset for global research collaboration</td>
</tr>
<tr>
<td>Cybersecurity Mesh</td>
<td>Enables security tools to interoperate through several supportive layers, such as consolidated policy management, security intelligence and identity fabric</td>
<td>Secure participation in — even ownership of — app and data marketplaces</td>
</tr>
<tr>
<td>Data Fabric</td>
<td>Uses continuous analytics over a combination of existing, discoverable and inferenced metadata assets to inform smarter and more effective support of data management tasks, regardless of deployment platform and architectural approach</td>
<td>Entity event knowledge graph to provide integrated view and continuously updated source of data to support AI models</td>
</tr>
</tbody>
</table>

Source: Gartner (February 2022)
Actionable, objective insight

Explore these additional complimentary resources and tools for CIOs and other senior technology executives:

**eBook**
2022 CIO Agenda
Create an action plan to master business composability.

**Roadmap**
The IT Roadmap for Digital Business Transformation
Avoid pitfalls and lead smart, effective digital transformations.

**Template**
IT Strategic Planning Guide
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