

Top Strategic Technology Trends for 2023

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Initiatives: [Technology Innovation](#)

Thriving in times of intense economic and social volatility requires organizations to find new forms of efficiency in their operations, scale their productivity and pioneer new business models. IT leaders and other executives must use our trends to enable their organizations to succeed.

Additional Perspectives

- [Summary Translation + Localization: Top Strategic Technology Trends for 2023](#)
(12 December 2022)

Overview

Opportunities

- To enhance their organization's financial position during times of economic turbulence, IT leaders and other executives must look beyond saving costs to new forms of operational efficiency — preserving operating margin and reinvesting in sustainable technologies.
- Ongoing supply chain issues and skills shortages pose challenges. However, they also present opportunities to scale organizational productivity by empowering agile teams with self-service capabilities to enable the organization to compete and collaborate in digital ecosystems.
- Large-scale advancements in technology and a shift toward a hybrid work culture provide IT leaders and other executives with an opportunity to reinvent business models and accelerate digital transformation. This includes the need for assessing the carbon footprint impact of each investment to address the increased customer attention to the environmental and social behavior of enterprises.

Recommendations

IT leaders and other executives who are planning their mid- and long-term strategy for technology innovation, must:

- Optimize costs by ensuring service resiliency through a digital immune system, improving operations through applied observability, and by enhancing AI delivery through consistent use of AI trust, risk and security management.
- Speed growth by using industry cloud platforms by accelerating software delivery through the adoption of platform engineering, and by planning for new digital innovation through wireless value realization.
- Transform the existing business model by pioneering new forms of engagements through superapps, by facilitating rapid responses using adaptive AI and by uncovering new forms of virtual opportunities in the metaverse.
- Build an enduring business that maximizes shareholder value — while improving environmental and social ecosystems — by investing relentlessly in sustainable technology.




What You Need to Know

The impact of the pandemic and global countermeasures have led to a persistent change in the way of working. Geopolitical turmoil is adding extra pressure and requires us to prepare for economic turbulence. This turbulence will impact all businesses, from small companies to large enterprises.

Lack of resources throughout supply chains and polarizing economic regions are already triggering more regulations and high inflation. Inflation is the main reason why organizations are revisiting investments to protect operating margins. At the same time, organizations must attract and retain talent in differentiating digital capabilities, while optimizing business operations in light of a potential recession. They must also satisfy the demand for hybrid working settings. However, as an IT leader, you can help your organization to thrive despite economic turbulence by using the right opportunities, which include some of our top strategic technology trends for 2023 (see Figure 1).

Figure 1: Top Strategic Technology Trends for 2023

Top Strategic Technology Trends for 2023

 Optimize	 Scale	 Pioneer
<ul style="list-style-type: none">• Digital Immune System• Applied Observability• AI Trust, Risk and Security Management	<ul style="list-style-type: none">• Industry Cloud Platforms• Platform Engineering• Wireless Value Realization	<ul style="list-style-type: none">• Superapps• Adaptive AI• Metaverse
Sustainable Technology		

Source: Gartner
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Two of our themes for 2023 show where technologies can help your organization withstand pressure and thrive. They address the obvious: operational excellence and customer experience. The third theme identifies the main technologies that can help you be laser accurate in addressing individual to community demands (see Figure 1). Within each theme, the main objectives/drivers are:

Optimize operational sustainability: Use AI-infused technology capabilities to observe and predict system and user behavior, and apply them to prevent failures and adapt product and process capabilities more autonomously:

- Optimize resilience through digital immune system
- Optimize operations through applied observability
- Optimize trust through AI trust, risk and security management

Scale productivity and customer value: Combine industry-specific with optimized developer platforms and sensing technology to deliver and scale sector-specific enterprise value:

- Scale vertically through industry cloud platforms
- Scale software delivery through platform engineering
- Scale everywhere through wireless value realization

Pioneer productizing individualism: Exploit new technologies to support unique consumer expectations within social, economic or technology communities:

- Pioneer engagement through superapps
- Pioneer acceleration through adaptive AI
- Pioneer virtual opportunities through metaverse

All themes are impacted by environmental, social and governance (ESG) expectations and regulations, which translate into the shared responsibility to apply sustainable technologies. Every technology investment will need to be set off against its impact on the environment, keeping future generations in mind. A growing number of organizations expect their product and service providers to demonstrate how they reduce their carbon footprint and how they support society in a wider context. “Sustainable by default” as an objective requires sustainable technology.

Trends and technologies, however, don’t exist in isolation — they build on and reinforce one another. We selected our trends for 2023 in part based on their combined effects. Taken together, our top strategic technology trends for 2023 will help you meet your CEO’s priorities to optimize, scale and pioneer.

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Table 1: Gartner’s Top Strategic Technology Trends for 2023

Optimize	Scale	Pioneer
Digital Immune System	Industry Cloud Platforms	Superapps
Applied Observability	Platform Engineering	Adaptive AI
AI Trust, Risk and Security Management	Wireless Value Realization	Metaverse
Sustainable Technology		

Source: Gartner (October 2022)

Optimize

Digital Immune System

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by Joachim Herschmann

Strategic Planning Assumption: By 2025, organizations that invest in building digital immunity will increase customer satisfaction by decreasing downtime by 80%.

Many IT organizations can’t fulfill the expectations of the business because teams lack the skills to:

- Build robust and resilient applications
- Deal with unexpected failures or events
- Deliver value faster than they create technical debt

This exposes organizations to operational and business risks when applications and products or services that depend on them are severely compromised, or stop working altogether. CIOs are looking for new practices and approaches that their teams can adopt to mitigate these risks, deliver high business value and increase customer satisfaction. A digital immune system provides such a roadmap.

The digital immune system approach includes practices and technologies for software design, development, automation, operation and analytics. It uses these to create a superior customer and user experience that won't be compromised by defects or system failures that impact business performance. Digital immune systems interlink practices from the areas of observability (see [Innovation Insight for Observability](#)), software testing, chaos engineering (see [Innovation Insight for Chaos Engineering](#)), site reliability engineering (see [Quick Answer: What Is Site Reliability Engineering?](#)) and supply chain security of applications (see [Innovation Insight for SBOMs](#)).

As an example of a digital immune system, American Airlines uses site reliability engineering, a “test first” approach and chaos engineering practices ¹ to better deal with increased system complexity and address unknown vulnerabilities and weaknesses. This has resulted in the growth of system understanding and knowledge, and one large resilience vulnerability finding.

Banco Itau added predictive and remediation capabilities to its monitoring systems to continuously assess health and improve system performance, and deliver insight into what drives the best employee and customer experience. These capabilities increased automatic remediation of incidents by 37% and improved employee experience. ²

Actions:

- Form executive-sponsored teams to create and execute a digital immune system strategy. Start by assessing which business capabilities have the highest priority or will benefit the most from digital immune system investments.
- Create dedicated communities of practice (CoPs) to share lessons learned, guiding principles, reusable assets, standards, tools and any AI-based insights realized. Ensure that the digital immune system CoPs are led by enterprise architects to ensure all relevant domains are represented.
- Encourage and reward resilience improvements across the organization – and especially collaboration on digital immune system opportunities. Make all leaders of resilience-related initiatives equally responsible for improving customer experiences.
- Foster a collaborative culture between development, security and operations teams to ensure ongoing support for these initiatives.

For more information, see [Top Strategic Technology Trends for 2023: Digital Immune System](#).

Applied Observability

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Analysis by Frances Karamouzis and Manjunath Bhat

Strategic Planning Assumption: By 2026, 70% of organizations that successfully applied observability will achieve shorter latency for decision making, enabling competitive advantage for target business or IT processes.

Observable data reflects the digitized artifacts (sometimes called the footprints, traces or “exhaust” that appear when any stakeholder takes any kind of action). Examples of observable “raw data” (or digital artifacts) include logs, traces, API calls, dwell time, downloads and file transfers. Applied observability uses these observable artifacts in a highly orchestrated and integrated approach to enable decision making in a new way across many levels of the organization — mainly on functional, application and infrastructure levels.

The value of applied observability comes from the fact that the data is all sourced from confirmed stakeholder actions, rather than intentions, obligations or promises. It’s not a forecast or prediction. The observable data is cataloged, engineered and layered with semantic understanding, which results in both active and passive metadata. The architected use of this metadata drives better, faster and more effective business and IT decisions.

Applied observability enables organizations to exploit their data artifacts for competitive advantage. It’s powerful because it elevates the strategic importance of the right data at the right time for rapid action based on confirmed stakeholder actions, rather than intentions. When planned strategically and executed successfully, applied observability is the most powerful source of data-driven decision making.

Customers consistently cite response time latency as one of the top four identifiable differentiators of customer loyalty. Applied observability helps organizations on the journey to nearly real-time response as a source of competitive advantage. Its main goal is to enable shorter feedback loops (latency) between (stakeholder) action to (organization) reaction, *and* proactive planning of business decisions.

The feedback loops can be related to stakeholder actions that are positive, negative or areas of indecision or lack of information. A positive feedback loop between customer behavior and reward mechanisms can be a key differentiator to improve customer loyalty. A negative one can be related to potential bad actors, or simply addressing an area of stakeholder limits or boundaries for regulatory requirements. Additionally, areas of indecision can be an abandoned shopping cart with four products where the client was indecisive or interrupted.

Tesla is an example of an organization using targeted elements of applied observability. It offers vehicle insurance in several U.S. states to Tesla owners based solely on their “observable” real-time driving behavior. Tesla vehicles “observe” and measure driving behavior using sensors and Autopilot software to produce a monthly Safety Score. Tesla says that those deemed “average” drivers based on its Safety Score could save 20% to 40% on their premium, and those with the safest scores could save 30% to 60%.³

Actions:

- Treat your observable data as your most precious monetizable asset. Focus on identifying business capabilities and use cases from active and passive metadata for competitive advantage. This will form the early foundation for strategically orchestrating multiple concurrent observability initiatives.
- Drive proactive decision making with the shortest possible latency by reframing the focus of the organization from “monitoring” and reacting to applying observability.
- Pave the way for organizational adoption of applied observability. Do so by focusing on the spectrum of business, application and infrastructure layers.

For more information, see [Top Strategic Technology Trends for 2023: Applied Observability](#).

AI Trust, Risk and Security Management

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Analysis by Avivah Litan, Farhan Choudhary, Bart Willemsen and Jeremy D'Hoinne

Strategic Planning Assumption: By 2026, organizations that operationalize AI transparency, trust and security will see their AI models achieve a 50% result improvement in terms of adoption, business goals and user acceptance.

Many organizations aren't well-prepared to manage AI risks. A Gartner survey found that 41% of surveyed organizations had experienced an AI privacy breach or security incident. ⁴ Legacy security controls aren't enough to stop such events, which can have serious consequences — organizations' increasing dependence on AI magnifies the impact when AI models misperform. Yet organizations that govern their models properly and continuously have far better AI model outcomes.

A Gartner survey found that organizations that actively managed AI risk, privacy and security achieved improved AI project results. More of their AI projects moved from proof of concept status into production and achieved more business value than did AI projects in organizations that didn't actively manage these functions. ⁵

Conventional data and application security best practices are foundational and mandatory, but don't address the new trust, risk, privacy and security management issues that AI raises. AI regulations are proliferating worldwide, mandating auditable practices that ensure trust, transparency and customer protection. Organizations must implement new capabilities to ensure model reliability, trustworthiness, security and data protection. AI trust, risk and security management (TRiSM) requires participants from different units, (e.g., AI, security, compliance and operations) to work together to implement new measures.

Organizations using AI TRiSM include:

- The Danish startup Abzu created an AI product that generates mathematically explainable models to identify gene combinations in women with breast cancer that lead to higher incidence of death. These discoveries enable it to develop more precise and effective breast cancer drugs. ⁶
- Unity Health improved AI results, using a four-step process to make its models trustworthy. It drastically reduced mortality in its high-risk patients — during the COVID-19 pandemic — by following a human-centric, credibility-focused approach. ⁷
- The Danish Business Authority (DBA) developed a way to apply ethical guidelines to AI model development and assessment, once deployed. The DBA has rapidly deployed 16 ethical AI models that process financial transactions worth billions of euros. ⁸

Actions:

- Manage AI trust, risk and security across organizational units that have a vested interest in AI business success.
- Set your organization's priorities for AI TRiSM by using [Top 5 Priorities for Managing AI Risk Within Gartner's MOST Framework](#).
- Implement collective AI privacy, security and risk management for improved AI business outcomes, rather than just for the sake of compliance.

For more information, see [Top Strategic Technology Trends for 2023: AI Trust, Risk and Security Management](#).

Scale

Industry Cloud Platforms

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Analysis by Gregor Petri, Tiny Haynes, Yefim Natis and Wataru Katsurashima

Strategic Planning Assumption: By 2027, more than 50% of enterprises will use industry cloud platforms to accelerate their business initiatives.

Industry cloud platforms offer a combination of SaaS, platform as a service (PaaS) and infrastructure as a service (IaaS) — along with tailored, industry-specific functionality to address specific vertical requirements. Industry cloud platforms use modularity and composability to offer the agility that industries need to respond to continuous disruptions.

Industry cloud platforms elevate the conversation between cloud consumers and cloud providers from cloud technology to specific industry business use cases. They do so not as predefined, one-off, vertical SaaS solutions, but rather as agile platforms supported by a portfolio of industry-specific packaged business capabilities. In effect, they turn a cloud platform into a business platform and expand a technology innovation tool into one that also serves as a business innovation tool.

Industry clouds use composable modularity to assemble vertical propositions that offer:

- More adaptability than most of today's SaaS applications
- More industry-specific business functionality in the form of reusable business capabilities, empowering faster innovation and accelerating time to value

- More potential to use innovation in one industry for building cross-industry solutions

The use of industry cloud platforms involves a broader set of stakeholders — both in IT and the line-of-business organization. It requires traditionally separate areas to collaborate to realize more holistic business and cloud strategies.

Organizations can use the packaged business capabilities of industry cloud platforms, both to actively recompose them for differentiating transformation and innovation initiatives, or to use them preconfigured to support more mundane business optimization and modernization.

The former will become more frequent as organizations master composability. Leading organizations will also use composability and modularity to enable multicloud scenarios, where they compose their own enterprise-specific industry cloud platform by combining capabilities from multiple industry cloud providers. This will prevent excessive provider lock-in and reduce concentration risk.

Driven by unprecedented disruptions, the healthcare segment has been a front-runner in turning to industry cloud platforms. The [Competitive Landscape for Digital Health Platforms](#) describes how these platforms integrate application data from operational systems with a library of healthcare-specific packaged business capabilities to build tailored digital experiences across a broad range of stakeholders.

The following examples show how four organizations have used industry cloud platforms — each partnered with one or more large cloud providers to accelerate or support its industry cloud journey.

Intermountain Healthcare selected a healthcare industry cloud from a hyperscale provider to help it support positive end-user experiences, while innovating to keep up with changing business needs. The organization's initial strategy is to use much of the stack from that provider, but the organization's enterprise architecture team expects to remain flexible, to continually evaluate alternatives and to transform from an order taker into a proactive source of ideas and innovations. ⁸

Hangzhou city built a platform to manage congestion and streamline daily city operations. The large Chinese city partnered with Alibaba, which has its headquarters in Hangzhou, to build the smart city management platform. The platform combined digitized infrastructure, a central data platform, industry-specific AI engines and massive applications to manage daily scenarios with agreed protocols and formal evaluation mechanisms. Hangzhou once ranked as China's fifth most congested city, but dropped to No. 57 after implementing the platform. Other urban locations, such as Kuala Lumpur, have also adopted the platform. ⁹

Land O'Lakes partnered with Microsoft to create a platform that connects an agricultural ecosystem of 3,000 farmers with over 90 agricultural retailers via an industry-specific agricultural technology platform. This enables developers from various participating partners to co-create composable solutions on top of its industry cloud platform. ¹⁰

Goldman Sachs is partnering with Amazon Web Services (AWS) to offer its institutional and large hedge fund clients an industry cloud platform — Financial Cloud for Data. This makes available to financial services firms the same artificial intelligence tools and applications that Goldman Sachs uses on its own trading floor. ¹¹

Actions:

- Use industry cloud platforms to complement the existing portfolio (like an exoskeleton) with new capabilities that add significant value — rather than as full-scale replacements of largely already existing functionality with more up-to-date technology.
- Create enterprisewide understanding and support for the industry cloud journey by engaging business technologists and fusion teams. Set up such teams if they don't already exist.
- Formulate rules for when to deploy for convenience (as is), and when to deploy for differentiation (recomposed). Build composability skills and pursue radical modularity to address lock-in and other concentration risks.

For more information, see [Top Strategic Technology Trends for 2023: Industry Cloud Platform](#).

Platform Engineering

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Analysis by Paul Delory and Oleksandr Matvitskyy

Strategic Planning Assumption: By 2026, 80% of software engineering organizations will establish platform teams as internal providers of reusable services, components and tools for application delivery.

Product teams spend an inordinate amount of time and effort designing, building and maintaining operational development environments. This affects productivity and often leads to redundancy when different product teams – working in isolation independently – build similar capabilities. Moreover, software developers aren't often experts in the services that underlie the applications, so they can't manage those services effectively.

Platform engineering empowers product teams by providing a self-service, curated set of tools, capabilities and processes that together offer a frictionless experience for developers. The platform should include everything that the developer needs, and present it in whatever manner fits best with the developer's workflow established for the software engineering organization.

Platform engineering is the discipline of building and operating self-service internal developer platforms for software delivery and life cycle management. The goal of platform engineering is to optimize the developer experience and accelerate product teams' delivery of customer value.

Many software engineering organizations have already established platforms – and teams to build and run them. Gartner predicts that 80% of software engineering organizations will establish platform teams by 2026, and that 75% of those will include developer self-service portals.

The following three examples show platform engineering in use:

- The platform engineering and architecture team at adidas offers standardized common activities as attractive, value-added services to which product teams can opt-in.¹²
- Politiet, Norway's police, replaced legacy middleware with a self-service developer platform.¹³ This increased developer autonomy and enabled rapid product innovation – while maintaining stability. Politiet also created a team with the required skills to build and maintain the platform.

- The composable platform strategy that Nike established is another example of platform engineering principles enabling reduction of operational costs and risks while improving business agility and innovation. Technology and business leaders at Nike first identified their platforms, then defined a logical grouping and composability strategy with the platform catalog. Finally, they established the people and technology strategy for alignment with platforms, clear ownership and accountability.¹⁴

Actions:

- Treat the platform as a product. Build a platform/product that is valuable to your customers (even if those customers are internal users). Understand your target users and build them what they need.
- Establish one or multiple platform teams. Each platform, regardless of the sourcing approach, needs an owner and technical experts responsible for the planning, building and maintenance of the platform components.
- Start with cloud-native workloads. Assess whether containers and container management systems, like Kubernetes, can also be the foundation for your platforms.
- Don't expect to buy a platform. Accept that any commercially available tool is unlikely to provide everything you need in a platform, even though some vendors may claim otherwise.

For more information, see [Top Strategic Technology Trends for 2023: Platform Engineering](#).

Wireless Value Realization

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Analysis by Tim Zimmerman and Nick Jones

Strategic Planning Assumptions: By 2025, 50% of enterprise wireless endpoints will use networking services that deliver additional capabilities beyond communication, up from less than 15%.

By 2025, 60% of enterprises will have five or more wireless technologies bridged across an intelligent connectivity overlay, up from less than 3%.

Realizing value from wireless technologies extends beyond traditional communications. While no single wireless technology will dominate, wireless technologies will be used in new ways. Wireless endpoints will be able to sense, e-charge, locate and track people and things beyond the traditional endpoint communication capabilities. The roadmaps for the five key wireless technologies include new capabilities in areas, such as location tracking, energy harvesting and sensing.

This innovation is being driven not only by new applications, but also organizational changes, as responsibility for enterprise networks continues to converge. In the 2021 Gartner IT/OT Alignment and Integration survey, over 75% of surveyed business and technology leaders (including managers) said that CIOs were responsible for IT and operational technology decisions.^{1 5} Facility management assets, such as cyber-physical systems, are continuing to converge with IT and are being added to the IT infrastructure.

Line of business assets, such as warehouse fork trucks, not only communicate with warehouse management system applications but are also physically tracked for asset management applications. They're also integrated with applications that measure speed with the ability to slow or stop fork trucks automatically for employee safety. New innovations in tags can use wireless frequencies to charge their communication circuitry.

Explore the wide range of capabilities that wireless technologies will provide beyond simple connectivity. These capabilities will serve as a foundation for digital innovation. To gain the optimum value, create a holistic business and technology strategy that includes the validation, implementation and benefits realization of at least the five dominant wireless technologies. Make sure that your strategy ensures the capabilities to secure and manage these technologies in operation.

The following examples show some of the ways in which different sectors can realize value from wireless technologies:

- **Shufersal:** Shufersal uses Wiliot Bluetooth low energy (BLE) sensors that require no external power source, as they use power harvesting from the network. This enables the sensors to attach directly to goods. Use cases include tracking vegetables from the farm to store shelves for supermarkets, providing supply chain visibility and inventory management for enterprises, and providing provenance information for consumers.¹⁶

- **BSH (Bosch-Siemens Hausgerate):** BSH uses Trio Mobil UWB tags and location application to provide the location and velocity of forklifts and employees. BSH uses location data to optimize productivity and additional sensor fusion data to reduce forklift collisions and near misses, increasing employee safety.
- **Albemarle:** Albemarle partners with NTT to deploy a private LTE/5G network to communicate with every significant piece of equipment. This can enable innovations, such as remote crane operations, or robot vehicles moving containers, as well as employee safety and equipment maintenance. RFID sensor fusion devices detect falls or worker distress, and provide location data. ¹⁷

Actions:

- Explore the new capabilities of wireless technologies, such as energy harvesting, location tracking and sensing. To maximize business value and provide business outcomes that were previously unattainable, identify which technology fits different use cases best.
- Engage peers and educate them on the new potential of wireless technologies. Use the different use cases to collaborate with them and identify innovation opportunities that optimize existing digital products and services, or realize new ones.
- Process the collaboration efforts into holistic business and technology strategies and roadmaps that can accommodate, secure and manage at least five — but preferably more — diverse wireless systems of the future, and align them with business capability roadmaps.

For more information, see [Top Strategic Technology Trends for 2023: Wireless Value Realization](#).

Pioneer

Superapps

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Analysis by Jason Wong, Adrian Leow, Sandy Shen, Koji Motoyoshi, Mike Gotta and Dennis Gaughan

Strategic Planning Assumption: By 2027, more than 50% of the global population will be daily active users of multiple superapps.

A superapp is an app that provides customers, partners or employees with a set of core features and access to independently created miniapps. A superapp is more than just a composite mobile app or a web portal and marketplace. It's a platform for delivering a composable miniapps ecosystem. Superapps enable the user to activate the micro/miniapp within it, not from a separate app catalog, such as AppExchange. This enables users to activate personalized app experiences.

WeChat by Tencent and Alipay by Ant Group are the archetypal superapps, but the model evolves based on industry and region. Superapps emerged in China and have come to market in Asia, India, South America, the Middle East and Africa. Industries such as financial services, retail, healthcare and telecommunications are adopting superapps to gain competitive advantage.

Organizations can create superapps to consolidate multiple mobile apps or related services to reduce friction in the user experience, such as context switching, and development effort. Superapps can help achieve economies of scale and exploit the network effect of a larger user base and multiple providers. They can provide a more engaging experience for customers, partners and employees.

Business and technology leaders must evaluate the potential for creating superapps for customers, employees and partners — as well as for participating in related superapp ecosystems with miniapps.

Examples of superapps in different areas include:

- **Commerce:** Tata Neu has been designed to offer customers of the Tata group an extensive, yet highly personalized shopping experience. It integrates the group's top brands into a single platform, covering categories including electronics, groceries and travel. ¹⁹
- **Finance:** The Revolut superapp disrupts traditional financial services. It offers digital banking services for consumers and has expanded its ecosystem into businesses, where small and midsize businesses and freelancers can offer services in the superapp. ²⁰

- **Workforce:** Walmart's Me@Walmart meets some of the work and personal needs of Walmart associates in one superapp. It enables users to perform tasks, including managing their work schedules, requesting time off, swapping shifts and taking COVID-19 health assessments. ²¹

Actions:

- Increase superapp delivery model effectiveness by prioritizing people-centric products, processes and services. Start by addressing sales and commerce, resource and workflow planning and collaboration opportunities.
- Identify core features in your superapps (e.g., payments, communications, collaboration, services and entertainment), that will drive a critical mass of adopters so developers will want to serve those users.
- Support developers and attract partners by implementing, if lacking, a sound business model and organizational structure to support the distributed development ecosystem for miniapps. This requires executive sponsorship, so prepare the financial case for funding as a digital business initiative.
- Offer an easy developer experience and convenient developer tools (e.g., APIs, design guidelines, software development kits and frameworks) for partners to build, test, register and submit miniapps.
- Define security and data protection requirements by establishing governance, reinforced with common platform implementation, to satisfy security and data protection constraints.

For more information, see [Top Strategic Technology Trends for 2023: Superapps](#).

Adaptive AI

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Analysis by Erick Brethenoux

Strategic Planning Assumption: By 2026, enterprises that have adopted AI engineering practices to build and manage adaptive AI systems will outperform their peers in the number and time it takes to operationalize AI models by at least 25%.

Flexibility and adaptability are vital. Reengineering systems has significant impacts on employees, businesses and technology partners. Improving engineering capabilities to increase resilience to change is a continuous process for any organization. Using adaptive AI can be a critical success factor in realizing organizational agility. For many organizations, these changes demand resilience-by-design and adaptive-by-definition.

Adaptive AI systems continuously retrain models and learn within runtime and development environments, based on applying graph analytics. This enables AI models, and the applications relying on them, to adapt more quickly to changes in new, real-world circumstances that weren't foreseen during development.

The AI engineering framework facilitates the management of adaptive AI systems.²² It does so by using AI capabilities to orchestrate and optimize AI models to adapt to, resist or absorb disruptions. AI engineering provides the foundational components of implementation, operationalization and change management at the process level that enable adaptive AI systems.

Adaptive AI systems require processes to be reengineered for automated decision making. This can have major implications for existing process architectures. In addition, increased automated decision making requires business stakeholders to ensure the ethical use of AI for compliance and regulations.

Bring together representatives from business, IT and support functions to implement adaptive AI systems. Identify the use cases, provide insight into technologies and identify sourcing and resourcing impact. At a minimum, business stakeholders must collaborate with data and analytics, AI and software engineering practices to build adaptive AI systems. AI engineering will play a critical role in building and operationalizing the adaptive AI architectures.

The following are examples of organizations using adaptive AI:

- The U.S. Army and U.S. Air Force have built a learning system that adapts its lessons to the learner's individual strengths and weaknesses. The system knows what to teach, when to test and how to measure progress. It acts like a personal tutor, tailoring the learning to the student.²³

- Jaguar Land Rover uses graph analytics to give the business a connected view of supply and demand, enabling it to form efficient answers to complex business questions. ²⁴ Graphs provide the means for understanding semantic relations and continue to learn during deployment, which is the core of adaptive systems (see [How Graph Techniques Deliver Business Value](#)).
- Dow's user-value-based strategy deploys adaptive AI systems to realize a virtuous cycle in which usage patterns, adoption obstacles and business value optimization work together to realize the promise of enterprise analytics. Dow overcomes users' obstacles by proactively understanding user consumption patterns in a business context. The result is a 25% increase in platform consumption, and a 4.2-fold increase in business revenue. ²⁵

Actions:

- Prepare for deploying adaptive AI systems by assessing the readiness of decision flows for automated decision making. Identify the associated decision owners in business and IT, and enable them to champion and support an adaptive AI system PoC. Ensure sponsorship from the chief data and analytics officer, CIO and/or CTO.
- Create the foundations of adaptive AI systems by complementing current AI implementations with continuous intelligence design patterns and event-stream capabilities. Move eventually toward agent-based methods, giving more autonomy to systems components.
- Reengineer decision flows to make flexible and time-bound initial decisions that can be amended as more information is gathered about the environment.
- Maximize business value from ongoing AI initiatives by establishing AI engineering practices that streamline the data, models and implementation pipelines to standardize AI delivery processes (see [Top Strategic Technology Trends for 2022: AI Engineering](#)).
- Make it easier for business users to adopt AI and help manage adaptive AI systems. Do so by incorporating explicit and measurable business indicators through operationalized systems and incorporating trust in the decisioning framework.

For more information, see [Top Strategic Technology Trends for 2023: Adaptive AI](#).

Metaverse

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Analysis by Marty Resnick, Alfonso Velosa, Michelle Duerst and Adrian Leow

Strategic Planning Assumption: By 2027, over 40% of large organizations worldwide will be using a combination of Web3, spatial computing and digital twins in metaverse-based projects aimed at increasing revenue.

Gartner defines a metaverse as “a collective virtual 3D shared space, created by the convergence of virtually enhanced physical and digital reality. A metaverse is persistent, providing enhanced immersive experiences.” Gartner expects that a complete metaverse will be device-independent and won’t be owned by a single vendor: It will have a virtual economy of itself, enabled by digital currencies and non-fungible tokens (NFTs).

Three characteristics make up a complete metaverse:

- **Transport:** The ability to become immersed in a virtual world. That world may be a 3D simulation and/or in virtual reality.
- **Transform:** The act of bringing digital to the physical world. This enables the user to access real-time information, collaboration and experiences in the physical world through augmented reality (AR) capabilities.
- **Transact:** The economic foundation of the metaverse through the use of cryptocurrency, NFTs and blockchain.

Emerging metaverses are fragmented. Be careful when investing in metaverse-specific technologies (e.g., spatial computing, digital humans and virtual spaces) because it’s too early to determine which investments have long-term viability. Furthermore, the next one to three years will be a time of learning, exploring and preparing for a metaverse with limited implementation. The financial and reputational risks of early investments aren’t fully known, and we advise caution.

While technology plays a key role in achieving a mature metaverse, another challenge involves establishing user-centric guidelines for ethics and governance covering different aspects of the metaverse. These must include topics such as privacy, data sovereignty, acceptable terms of use, accountability, identity and legal protections.

Examples of early metaverse implementations include:

- Developer Everyrealm bought a piece of Decentraland, a 3D virtual reality platform. It combined Web 3 technologies and the metaverse to turn this into the Metajuku shopping district. ²⁶ J.P. Morgan opened its Onyx lounge there (the name refers to the bank's suite of permissioned Ethereum-based services), becoming the first U.S. bank with a metaverse office. ²⁷
- Tennis Australia made the 2022 Australian Open an immersive experience in Decentraland, enabling viewers to experience the matches from anywhere in the world as the event took place. The event included the minting of thousands of Art Ball NFTs, linked to live match data. ²⁸

Actions:

- Start building examples of how to align metaverse use cases to your core business operations. Create separate consumer, employee, partner and co-innovation ecosystem use cases.
- Develop business and technology strategies that use the built-in infrastructure and participants of the metaverse you chose to participate in or deploy, to host or provide the platform for new digital products or services.
- Deploy caution when investing in a specific metaverse, as it is still too early to determine which investments will be viable in the long term. Assess the underlying technologies, intended user personas and use cases, the associated marketing efforts, scaling out and integration capabilities and investments, and the user-centric guidelines for ethics and governance.

For more information, see [Top Strategic Technology Trends for 2023: Metaverse](#).

Trend That Underpins All Three Themes

Sustainable Technology

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Analysis by Autumn Stanish, Arun Batchu and Kristin Moyer

Strategic Planning Assumption: By 2025, 50% of CIOs will have performance metrics tied to the sustainability of the IT organization.

Stakeholders are increasing pressure on businesses to produce improved, verifiable and competitive sustainability outcomes. In response, IT leaders are tasked with delivering technology with positive environmental, social and governance (ESG) impact within and beyond the business. However, current information technologies have limited telemetry to capture the necessary data and assess their respective impacts on the environment. Existing infrastructure and tools weren't instrumented for this use case. It's challenging to retrofit sustainability capabilities and implement the required transparent governance to maintain continuous progress on sustainability goals.

This is compounded by the fact that the technologies that have the greatest potential for improving sustainability performance also have the greatest environmental footprint. For example, blockchain and AI can enable sustainable solutions, but also contribute significantly to greenhouse gas emissions. Thus, sustainable IT is a balancing act between the need to drive higher business performance while ensuring that it does not adversely hinder sustainability goals.

Executives must invest more in innovative solutions that were designed to address environmental, social and governance (ESG) demand to meet sustainability goals. If they fail to do so, they risk losing customers, employees and investors who are increasingly pressuring businesses to contribute. In some regions, they may also face industry, regional and local regulator fines, and exclusion from markets or tender processes. Sustainability is increasingly part of buying decisions processes.

To enhance sustainability, organizations need a new sustainable technology framework. Sustainable technology includes a range of IT, OT and ET. IT leaders and other executives must:

- Make IT more sustainable
- Use IT to help the enterprise become more sustainable
- Use IT to help customers become more sustainable

Sustainable technology is a framework of solutions that enable ESG outcomes:

- **Environmental technologies:** These mitigate and adapt to risks in the natural world.
- **Social technologies:** These increase human well-being and prosperity.
- **Governance technologies:** These strengthen the rule of law, business conduct and capacity building.

Sustainable data centers have become essential to avoid harming the environment and maintain a resilient infrastructure. Airtel is an example of a company that uses sustainable technology, sourcing from a mix of solar, hydro and wind energy to power its data center facilities. ²⁹

The supply chains for all agricultural commodities traded globally have many layers. To improve transparency, Unilever uses geospatial analytics to detect farm fields linked to deforestation and take action. ³⁰

IT leaders must compensate for their carbon footprint in the short term while working to neutralize the carbon impact of their IT for the long run. Technology organizations such as Shopify, Zendesk and Stripe use carbon removal services to offset the CO2 emissions from their heavy computing footprint. ³¹

Actions:

- Use sustainable technology to identify and remediate inefficient infrastructure and operations.
- Maximize the impact of sustainable technology by prioritizing investments based on issues that have been identified as important to stakeholders and have a significant level of business impact.
- Improve the quality and scale of reporting by using sustainable technology to provide real-time analytics and historical context on ESG performance.

For more information, see [Top Strategic Technology Trends for 2023: Sustainable Technology](#)

Changes Since Last Year

For 2022, Gartner identified 12 strategic technology trends (see [Top Strategic Technology Trends for 2022](#)):

- AI engineering
- Autonomic systems
- Cloud-native platforms
- Composable applications

- Cybersecurity mesh
- Data fabric
- Decision intelligence
- Distributed enterprise
- Generative artificial intelligence
- Hyperautomation
- Privacy-enhancing computation techniques
- Total experience

Although these trends remain important, most have evolved and combined into, or became part of, a wider strategic trend. For example, AI engineering and generative AI have become integral parts of adaptive AI. In the same sense, some trends have evolved into demonstrable use cases. For example, composable applications are reflected in superapps, but build on trends such as platform engineering and digital immune system. Equally, decision intelligence and hyperautomation support applied observability, and total experience becomes instantiated in a variety of metaverse technologies. All trends will build on data fabric and cybersecurity mesh architecture, with the latter focus shifting from access to AI in AI TRiSM. Privacy-enhancing computation technologies will be embedded in industry cloud, AI TRiSM and digital immune system. The evolution toward autonomic systems will use a variety of the 2023 trends, including wireless value realization, reflecting the connecting technologies to realize autonomy.

The combining trend for 2023 is sustainable technology, which underwrites the global impact of the distributed enterprise trend.

Evidence

¹ [Innovation Insight for Chaos Engineering](#)

² [Case Study: Evolving Infrastructure Monitoring to Observability \(Banco Itau\)](#)

³ [Tesla Insurance Using Real-Time Driving Behavior](#), Tesla.

⁴ Gartner 2021 AI in Organizations Survey. This survey was conducted to understand the keys to successful AI implementations and the barriers to the operationalization of AI. The research was conducted online from October through December 2021 among 699 respondents from organizations in the U.S., Germany and the U.K. Quotas were established for company size and for industries to ensure a good representation across the sample. Organizations were required to have developed AI or intended to deploy AI within the next three years. Respondents were required to be part of the organization's corporate leadership or report into corporate leadership roles, and have a high level of involvement with at least one AI initiative. Respondents were also required to have one of the following roles when related to AI in their organizations: determine AI business objectives, measure the value derived from AI initiatives or manage AI initiatives development and implementation. The survey was developed collaboratively by a team of Gartner analysts and Gartner's Research Data, Analytics and Tools team.

Disclaimer: Results of this survey do not represent global findings or the market as a whole, but reflect the sentiments of the respondents and companies surveyed.

⁵ [Cool Vendors in AI Governance and Responsible AI – From Principles to Practice](#)

⁶ [Case Study: Make AI Models Credible, Not Explainable \(Unity Health Toronto\)](#)

⁷ [Case Study: How to Apply Ethical Principles to AI Models \(Danish Business Authority\)](#)

⁸ [Case Study: Intermountain Healthcare Creates a Digital Health Platform for Growth and Agility](#)

⁹ [Alibaba's 'City Brain' Is Slashing Congestion in Its Hometown, CNN and](#)

[Market Insights: Unique Regional Dynamics Require Tailored Strategies for Smart Cities in Asia.](#)

¹⁰ [Case Study: Innovation Ecosystems for Digital Business Transformation \(Land O'Lakes\)](#)

¹¹ [New Goldman Sachs-AWS Data Service Points to a Larger Banking Trend, Computerworld.](#)

¹² [Building a Platform for Product Team Productivity \(adidas\)](#)

¹³ [Case Study: Infrastructure Platform Teams for Self-Service Delivery](#)

¹⁴ [Case Study: Composable Platform Strategy to Drive Business Agility \(Nike\)](#)

¹⁵ Gartner's IT/OT Alignment and Integration 2021. The 2021 Gartner IT OT Alignment and Integration Survey was conducted to understand the degree to which CIOs and IT leaders are involved in operational technology (OT) management (varying by industry and country). The survey explored the IT OT alignment and integration plans and the resulting benefits across different industries. It also covered a few areas of OT security (such as tools used, past security incidents, investment and accountability for risks). The research was conducted online from April through May 2021 among 401 respondents from North America, Western Europe and Asia/Pacific, and across different industries, such as resources, utilities, transportation, process manufacturing and discrete manufacturing. Respondents were screened for their involvement in OT-related activities (should be at least knowledgeable about the decisions of organization's OT-related activities). The survey was developed collaboratively by a team of Gartner analysts and Gartner's Research Data, Analytics and Tools team.

Disclaimer: Results of this survey do not represent global findings or the market as a whole, but reflect the sentiments of the respondents and companies surveyed.

¹⁶ [Israeli Tech Firm Rolls Out Tracking Devices the Size of Postage Stamps](#), The Wall Street Journal.

¹⁷ [Forklift Safety, Accident and Collision Prevention System](#), TrioMobil.

¹⁸ [NTT Adds Private LTE/5G Support to Albemarle's Lithium Mine](#), IT Pro.

¹⁹ [Tata to Open Up Super App Neu to Outside Brands](#), TechCrunch.

²⁰ [Revolut CEO Eyes Expansion Into Mortgages, Crypto Wallets](#), Reuters.

²¹ [Walmart's New Workforce App Provides a Look Into the Future](#), HRExecutive.

²² [Top Strategic Technology Trends for 2022: AI Engineering](#)

²³ [How the Army and Air Force Integrate AI Learning Into Combat Training](#), Military.

²⁴ [Case Study: Answering Critical Business Questions With Graph Analytics \(Jaguar Land Rover\)](#)

²⁵ [Case Study: Realizing the Promise of Analytics and BI Platforms \(Dow\)](#)

²⁶ Everyrealm creates [Metajuku](#) shopping district in Metaverse, Everyrealm.

²⁷ [J.P. Morgan \(JPM\) Enters Metaverse, Unveils Virtual Onyx Lounge](#), Nasdaq.

²⁸ [The Australian Open Swings Into the Metaverse, Will It Be an Ace?](#), Forbes.

²⁹ [Airtel's Green Data Centers](#), GSMA.

³⁰ Unilever uses [Technology to Help End Deforestation](#).

³¹ Charm Industrial helps [Put Oil Back Underground](#).

Document Revision History

[Top Strategic Technology Trends for 2022 - 18 October 2021](#)

[Top Strategic Technology Trends for 2021 - 19 October 2020](#)

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[2022 CEO Survey Research Collection](#)

[2022 CEO Survey: Sustainability and ESG Become Enduring Change](#)

[The CIO's Response to Inflation](#)

[CIOs Must Shift From Defense to Offense to Seize New Leadership Opportunities](#)

[CFOs' Digital Investment Plans Remain Ambitious for 2022 and 2023](#)

[Survey Analysis: The Most Successful AI Implementations Require Discipline, not Ph.D.s](#)

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Table 1: Gartner's Top Strategic Technology Trends for 2023

Optimize	Scale	Pioneer
Digital Immune System	Industry Cloud Platforms	Superapps
Applied Observability	Platform Engineering	Adaptive AI
AI Trust, Risk and Security Management	Wireless Value Realization	Metaverse
Sustainable Technology		

Source: Gartner (October 2022)