Top Strategic Technology Trends for 2022, Executive Leaders Perspective

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By Analyst(s): Arun Chandrasekaran, Frances Karamouzis, David Groombridge, Jitendra Subramanyam, Bart Willemsen, Daniel Stang

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As organizations face demands to grow and digitalize efficiently, executive leaders must embrace technology breakthroughs as force multipliers. Gartner's strategic technology trends highlight key emerging trends and technologies to adopt, scale and grow.

Additional Perspectives

- Summary Translation + Localization: Top Strategic Technology Trends for 2022, Executive Leaders Perspective
  (09 June 2022)

Overview

Opportunities

- Executive leaders should use the digital acceleration opportunity created by the pandemic to challenge long-held beliefs and sculpt rapid enterprise change.
- Boards of directors and CEOs are increasing budgets for digitalization in business units. Executive leaders must seize the opportunity to deliver new business models and products to accelerate growth.
- CEOs are seeking trustworthy and efficient IT operational environments. Executive leaders must exploit agile cost models to build lean operating environments in a secure, scalable and resilient manner.

Recommendations

Executive leaders contributing to innovation management must:

- Accelerate growth by deploying technology innovations that will rapidly scale digital products and increase market share.

- Sculpt change by harnessing new technology innovations that allow your fusion teams to automate IT and business workflows to leapfrog competitors.
- Engineer trust by creating resilient digital foundations that maximize the value of data and applications, enabling your organization to reap business value and scale cost-efficiently.

What You Need to Know

The years 2020 and 2021 have triggered faster technology change than ever before, and this pace will only increase. In this changing world, CEOs' priorities are clear: They aim for growth, digitalization and operational efficiency.

This means that it's vital for you, as an executive leader, to address the three themes in our top strategic technology trends for 2022 for action.

Trend Profiles: Click links to jump to profiles

Accelerating Growth	Sculpting Change	Engineering Trust
Generative Artificial Intelligence	AI Engineering	Cloud-Native Platforms
Autonomic Systems	Hyperautomation	Privacy-Enhancing Computation Techniques
Total Experience	Decision Intelligence	Cybersecurity Mesh
Distributed Enterprise	Composable Applications	Data Fabric

Accelerating Growth

You're no stranger to your organization's constant pursuit of growth. Our first four technology trends produce combinatorial innovation and maximize value creation, enabling exponential growth in the postpandemic world.

The four technology trends that will have the most significant impact in accelerating your future growth are:

Generative Artificial Intelligence

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Description:

This form of AI learns a digital representation of digital or physical artifacts from sample input and uses it to generate new, original artifacts that retain a likeness to the training data, but don't repeat it. Generative AI can produce novel media content, such as art, music, prose or synthetic data, and can propose innovative new examples of physical objects.

Why Trending:

Generative AI promises new levels of automation and creativity. We are at the cusp of an emerging wave of commercial solutions for use cases such as data generation, code generation, content creation and creative designs.

Implications:

- Generative AI will augment marketing, software development, data science and business analytics functions across industries.
- It can potentially reshape the R&D economics across customer experience, new product development, software engineering and data science, enabling lean and rapid product innovation.
- **Examples:**
  - American Express experiments with AI-generated fake fraud patterns to sharpen its models' ability to detect rare or uncommon swindles (see Fake It to Make It: Companies Beef Up AI Models With Synthetic Data).
  - Researchers from the University of South Carolina College of Engineering and Computing and from Guizhou University, China, have shown the potential for generative AI to speed up the identification of new inorganic materials by over a hundredfold (see Deep Learning Algorithm to Remove Materials Discovery Bottleneck in Emerging Tech Industries).

Actions:

- COOs, CTOs and CMOs should trial generative AI use cases for accelerating R&D and for content personalization.

- Data and analytics leaders should evaluate the use of generative AI to create synthetic data when handling large, sensitive data volumes in the cloud or with partners.

Autonomic Systems

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Description:

Autonomic systems feature automation, learning and awareness, which enables them to adapt their behavior to support new requirements and situations, optimize their performance, and react to ecosystem changes.

Why Trending:

By 2025, we expect that autonomic systems will have broad application in areas like robotics, smart vehicles, drones and smart spaces. In the long term, autonomic systems will mature from simple tasks and stand-alone devices to wider and more-complex domains, such as collaboration between swarms of smart objects.

Implications:

- Autonomic systems will enable organizations to respond and adapt quickly to market changes, excelling where conventional automation is inadequate.
- Autonomic systems' ability to learn and adapt their behavior may make them unpredictable. Other challenges relate to social concerns, digital ethics and safety, and legal liability.
- **Example:**
  - NASA Jet Propulsion Laboratory autonomously explores caves by integrating autonomy and AI on a robot (see Search for Life: Exploring Martian-Like Caves).

Actions:

- Create a multidisciplinary task force to prepare for the business, legal, social and ethical consequences of deploying systems that may act in unpredictable ways.

- COOs, CTOs and CIOs should pilot autonomic technologies where early adoption will deliver agility and performance benefits in software or physical systems.

Total Experience

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Description:

This is a business strategy for creating superior shared customer and employee experiences by interlinking the customer experience, employee experience, user experience and multiexperience disciplines. Total experience uses digital and nondigital techniques to enhance customer and employee confidence, satisfaction, loyalty and advocacy.

Why Trending:

Organizations are seeking better customer experience and employee experience strategies that lead to greater confidence, satisfaction, loyalty and advocacy. As digital channels are increasingly the main vehicles for engagement, executive leaders must identify and improve user experience touchpoints for customers and employees using multiexperience technologies.

Implications:

- Total experience will enable organizations to achieve more-resilient business outcomes and simultaneously increase revenue from customers and reduce internal costs.
- Organizations that use total experience to transform their business and operating models will achieve comparative and competitive advantage.
- **Example:**
  - Canadian Blood Services, for example, transformed its business and operating models through multiple total experience initiatives (see Top Strategic Technology Trends for 2022: Total Experience).

Actions:

- CMOs, chief customer success leaders and COOs should enhance experiences for customers and employees by driving an experience-driven agenda for technology investments.
- CTOs, CIOs and chief customer success leaders should increase both employee and customer retention by investing in multiexperience technologies to improve user experiences across channels, devices, touchpoints and interaction modalities.

Distributed Enterprise

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Description:

A distributed enterprise uses digital capabilities to support hybrid and remote workers, and to deliver services to consumers or citizens — both remotely and in person.

Why Trending:

The rapid increase in hybrid working makes the reality of distributed enterprises a “new normal” and creates significant impact on business models, hybrid workforce and digital enablement.

Implications:

- Distributed enterprises will lead to a change to business models. With the shift to the hybrid working model and the lack of consumers traveling into offices, businesses will need to expand digital service models to combine virtual and physical offerings.
- Organizations that move to a combination of office and remote working will gain substantial benefits, such as increased employee flexibility and cost savings (from reduced office space).
- **Example:**
  - Mastercard built a centralized virtual events playbook to help marketers effectively organize virtual events at scale (see Case Study: Virtual Events Playbook (Mastercard)).

Actions:

- CEOs and COOs should create fusion teams of IT and business technologists to accelerate creation of business models that integrate digital and physical services (see Note 1).
- CHROs and CIOs should reduce employee fatigue and burnout by deploying new collaboration tools, redesigning workspaces and processes to support hybrid ways of working.

Further Reading:

Top Strategic Technology Trends for 2022: Generative AI

Top Strategic Technology Trends for 2022: Autonomic Systems

Top Strategic Technology Trends for 2022: Total Experience

Top Strategic Technology Trends for 2022: Distributed Enterprise

Sculpting Change

With increasing use of fusion teams to enable business-led technology creation, executive leaders must deliver creative new uses of technology to enable their organizations to scale digitalization rapidly.

The four technology trends that will significantly enable your fusion teams to sculpt change in your organization are:

AI Engineering

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Description:

This is the discipline of industrializing to AI models. It enables organizations to industrialize AI to rapidly deliver new kinds of business value and compound this value over time.

Why Trending:

AI continues to be a top priority for executive leaders; however, reaping its business value has been elusive and difficult for many enterprises. Executive and technology leaders need to create a strong and cohesive AI engineering discipline within their organization to usher governance, agility and scalability of AI projects.

Implications:

- AI hype actually underestimates the potential value that AI can provide an enterprise, because most of the current value from AI is still derived from point-to-point solutions as part of narrow process automation initiatives. For AI to deliver transformative value, enterprises need to industrialize the creation, deployment and monitoring of AI models in the business ecosystem in which they operate.
- AI engineering will enable organizations to scale from only a few AI models in production to hundreds, realizing significant additional value with each model deployed.
- **Example:**
  - Case Study: Monitoring the Business Value of AI Models in Production (Georgia Pacific)

Actions:

- Data and analytics leaders should Include AI engineering practices as a core part of your AI strategy to reduce failures and to industrialize AI initiatives.
- CHROs should partner with CIOs and CTOs to nurture a high-performance team from the start. Fill critical roles for AI, develop a training and/or hiring program with HR, ensure responsibilities are well-defined among teams and define common key performance indicators that emphasize agility, accuracy, performance and responsible AI.

Hyper-Automation

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Description:

This is a disciplined approach to rapidly identify, vet and automate as many business and IT processes as possible. It involves the orchestrated use of multiple technologies, tools or platforms.

Why Trending:

The main reason that hyper-automation continues to trend is the unrelenting demand for accelerated growth through business model innovation or disruption, coupled with the underlying foundation of operational excellence across processes and functions.

Implications:

- Hyper-automation enables organizations to design and implement business model change that covers many functions. This should lead to long lasting competitive advantage.
- Hyper-automation can be applied to any business or IT process and is not partial to any technology or vendor, thereby reducing technical debt and enhancing business agility.
- **Example:**
  - Case Study: Kick-Starting a Low-Code/No-Code Community of Practice (Heathrow Airport)

Actions:

- Line of business leaders and CFOs should maximize the chance of successful hyperautomation initiatives by planning and architecting multiple concurrent initiatives. Demand holistic mapping of collective initiatives, rather than islands of task automation.
- Optimize the results of hyperautomation initiatives for business model change by using fusion teams throughout the iterative process of designing, building, scaling and governing your hyperautomation roadmap.

Decision Intelligence

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Description:

This is a practical discipline designed to improve organizational decision making. It involves understanding and engineering how organizations make decisions and how they evaluate, manage and improve outcomes through feedback.

Why Trending:

Organizations struggle to make decisions in an environment featuring unprecedented levels of business complexity and uncertainty. There is more unpredictability about the direction of the market, whether decisions will be questioned and about the durability of a decision. This implies that decision making must become more adaptive, allowing business stakeholders to quickly make changes to the decision flow or logic, should the need arise.

Implications:

- Decision intelligence helps organizations become disruption-ready and resilient by identifying, prioritizing, modeling and (re)engineering decisions for improvement.
- Decision intelligence enables organizations to analyze and improve their decision-making process. This enables them to augment and automate it with a combination of human workers and techniques such as AI.
- **Example:** How Proportunity uses decision intelligence to improve lending decisions (see Podcast Episode: Artificial Intelligence, Data-Driven Decisions and Proptech Shaking Up Mortgage Lending With …).

Actions:

- CEOs, COOs and line-of-business leaders should use decision intelligence to improve business-critical decision making with more data-driven support or AI-powered augmentation, or to scale and accelerate decisions with automation.
- Data and analytics leaders should model decisions and develop practices that incorporate both human and AI decision-making capabilities. Measure results by incorporating a feedback loop.

Composable Applications

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Description:

These are business-centric modular applications that organizations can assemble by adopting composable business principles.

Why Trending:

Driven by the broad shift to cloud services, APIs now dominate the mainstream design of applications and application integration. Event-driven interactions and adoption of low-code solutions are on the rise as well. These cumulative trends provide a foundation for building composable applications, which accelerate business agility.

Implications:

- Composable applications create agility and enable safer, more-efficient and faster change.
- Composability helps business leaders reengineer how they make the most complex and pressing business decisions.
- **Example:**
  - Case Study: Composable Platforms to Foster Reuse (Ally Financial)

Actions:

- CEOs and COOs should set up business-IT fusion teams and begin to equip them with dedicated design tools.
- CIOs and CDOs should champion composable architectural principles in all new technology initiatives and develop a roadmap for building them.

Further Reading:

Top Strategic Technology Trends for 2022: AI Engineering

Top Strategic Technology Trends for 2022: Hyperautomation

Top Strategic Technology Trends for 2022: Decision Intelligence

Engineering Trust

To deliver the cost-efficient growth your CEO demands, you need to securely integrate your digital assets and scale as your business does. The following trends engineer the trust necessary in a connected world by enabling scalable and secure integration and processing of data across cloud and noncloud environments.

The four technology trends that will help most in engineering trust in your organization are:

Cloud-Native Platforms

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Description:

These platforms provide capabilities that enable organizations to accelerate the pace of digitalization more quickly and more effectively.

Why Trending:

A combination of modern application architectures, cloud technologies, operational best practices and enterprise requirements is empowering organizations to build and run scalable applications in new ways. Cloud-native platforms enable enterprises to involve stakeholders aligned with, or embedded in, the business (also called fusion teams) as they collaborate to improve value through digitization initiatives.

Implications:

- Cloud-native platforms enable traditional organizations that lack digital talent and expertise to build agile applications and succeed more quickly with their digital initiatives.
- Cloud-native platforms maximize the potential of cloud computing, delivering faster time to value, increasing productivity and improving efficiency.
- **Example:**
  - Building a Platform for Product Team Productivity (adidas)

Actions:

- CDOs, CTOs and CIOs should make cloud-native platforms the first choice for new initiatives and progressively expand the scope of digital workloads that can benefit from cloud-native technologies.
- CIOs and CTOs should encourage organizational structures (such as platform teams) that have the primary goal of enhancing the usability of cloud-native platforms and ensure they are in tune with business outcomes and service delivery.

Privacy-Enhancing Computation Techniques

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Description:

Privacy-enhancing computation (PEC) techniques enable organizations to securely gain, share, pool, process and analyze personal data without compromising confidentiality and privacy while the data is in use. They also include robust approaches to protect personal data in transit and at rest.

Why Trending:

The demand for processing data in untrusted environments (such as in public cloud) and performing multiparty data sharing and analytics continues to grow and has become elemental to an organization's success. Rather than a bolt-on approach, the increasing complexity of analytics engines and architectures mandates a by-design privacy capability. The pervasiveness of AI models and the necessity to train them is only the latest addition to privacy concerns.

Implications:

- Through the use of various (combinations of) PEC techniques, confidentiality can be ensured, even after spillage. Analytics and business intelligence use cases can be completed without compliance or privacy risk concerns, allowing the gaining and use of information without exposing identifiable data.
- Other PEC techniques enable organizations to further their cloud adoption strategy under residency restrictions or enhance AI model training.

- **Examples:**
  - Synthetic Data Mimics Real Health-Care Data Without Patient-Privacy Concerns
  - ING Belgium is in the early stages of using analytics on sensitive databases across multiple jurisdictions, using an approach that analyzes data while it remains encrypted (see ING Belgium Sees Opportunities for 'Secret' Sharing of Encrypted Data).

Actions:

- CDOs and CISOs should identify where the organization wants to use personal data in untrusted environments or for analytics and business intelligence purposes, both internally and externally.
- CMOs and chief revenue officers should enable business value creation in otherwise locked opportunities by applying PEC techniques. Main use cases include sharing, cloud-based processing and analytics of people's information.

Cybersecurity Mesh

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Description:

This approach extends composable security controls beyond traditional enterprise perimeters, enabling trusted access by the workforce, clients, business partners and things.

Why Trending:

Existing approaches to identity and security architectures are not sufficient to meet today's rapidly changing demands. Cybersecurity mesh architecture (CSMA) helps provide a common, integrated security structure and posture to secure all assets, whether they're on-premises, in data centers or in the cloud. CSMA enables stand-alone solutions to work together in complementary ways to improve overall security posture by standardizing the way the tools interconnect.

Implications:

- CSMA helps provide a common, integrated security structure to secure all assets, whether they're on-premises, in data centers or in the cloud.
- CSMA fosters a more-consistent security posture to support increased agility for the composable enterprise.
- **Example:** Case Studies: CISOs Take on the 'Zero Trust' Challenge

Actions:

- CISOs should enable a robust defensive posture by eliminating silos and inefficiencies, both from an organizational perspective, as well as within technology.
- CIOs and CISOs should combat the increase in security complexity by evolving your security infrastructure to be more integrated, focusing on centralized administration and decentralized policy enforcement.

Data Fabric

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Description:

A data fabric informs smarter and more-effective support of data management tasks, regardless of deployment platform and architectural approach. It does so by using continuous analytics over existing, discoverable and inferenced metadata assets to see where and how data is being used.

Why Trending:

Cloud capacity has enabled the expansion of data assets in terms of volume and variety, while at the same time offering significantly more-complex resource allocation and utilization models in an on-demand, elastic environment. This has contributed to a significantly broader spectrum of data and process distribution.

Implications:

- Data fabric ensures that lessons learned from interactions with the data can be reused for other operational systems, and back-office and analytics solutions.

- Data fabric will automate predictable or inference-based tasks, and offload them to systems on an ever-increasing number of data assets. This will quadruple the output from human-driven efforts.
- **Example:** Equifax's journey to data fabric (see Data Fabric From Equifax: A Technology, Security and Privacy Overview).

Actions:

- CDOs and CIOs should confront roadblocks to data sharing by proactively and continually instilling enterprisewide data-sharing capabilities across people, processes and technologies.
- CDOs and CIOs should conduct a pilot focusing on one data product or domain-oriented prototype that integrates data from a minimum of three sources (from three different areas of business operations if possible) and vet its fit within your organization.

Further Reading:

Top Strategic Technology Trends for 2022: Cloud-Native Platforms

Top Strategic Technology Trends for 2022: Privacy-Enhancing Computation

Top Strategic Technology Trends for 2022: Cybersecurity Mesh

Top Strategic Technology Trends for 2022: Data Fabric

Evidence

Gartner Annual Tech CEO Survey, 2021: Transitioning From the Pandemic

Note 1: More About Fusion Teams

Definition: A fusion team is a multidisciplinary team that blends technology, or analytics and business domain expertise, and shares accountability for business and technology outcomes. Instead of organizing work by functions or technologies, fusion teams are typically organized by the cross-cutting business capabilities, business outcomes or customer outcomes they support.

Context: Fusion teams do not have a prescribed reporting structure. Team leaders or members may report to either dedicated IT departments or business areas outside IT. Fusion teams often start as agile project or scrum teams, and gradually adopt product management discipline to oversee a capability end to end, from strategy to delivery and continuous enhancements.

Recommended by the Authors

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Executive Leaders Handbook for Presenting to the Board of Directors

Executive Leaders Perspective: Financial Metrics That Encourage Innovation

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