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Gartner's Top Strategic Predictions for 2024 and Beyond — Living With the Year Everything Changed

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Gartner's Top Strategic Predictions for 2024 and Beyond — Living With the Year Everything Changed

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Initiatives: Executive Leadership: Innovation and Disruption Management; CIO Technology and Innovation Leadership

> 2023 was the year ChatGPT and generative AI unleashed massive creativity and productivity potential. But the breadth and depth of the innovation affects everything, and there is no simple path. This research offers insights for executive leaders into understanding how predictions shape our thinking.

Overview

Key Findings

- Generative AI (GenAI) makes people more powerful personally and professionally.
- Businesses will improve at overcoming their worst traits.
- New threats create new responsibilities and communities.

Recommendations

To build and expand a digital business, executive leaders in end-user organizations must:

- Use GenAI tools to improve the overall skill set of the workforce.
- Position GenAI as a force multiplier in solving both new and perennial problems.
- Meet unconventional threats by creating new roles to mitigate risk.

Strategic Planning Assumptions

- By 2026, 30% of workers will leverage digital charisma filters to achieve previously unattainable advances in their career.
- By 2027, the productivity value of AI will be recognized as a primary economic indicator of national power.
- By 2027, 25% of Fortune 500 companies will actively recruit neurodivergent talent across conditions such as autism, attention-deficit/hyperactivity disorder (ADHD) and dyslexia to improve business performance.
- By 2026, 50% of G20 members will experience monthly electricity rationing, turning energy-aware operations into either a competitive advantage or a major failure risk.
- By 2027, GenAI tools will be used to explain legacy business applications and create appropriate replacements, reducing modernization costs by 70%.
- By 2028, there will be more smart robots than frontline workers in manufacturing, retail and logistics due to labor shortages.
- Through 2026, 30% of large companies will have a dedicated business unit or sales channels to access fast-growing “machine customer” markets.
- By 2028, enterprise spend on battling malinformation will surpass $30 billion, cannibalizing 10% of marketing and cybersecurity budgets to combat a multifront threat.
- By 2027, 45% of chief information security officers (CISOs) will expand their remit beyond cybersecurity, due to increasing regulatory pressure and attack surface expansion.
- By 2028, the rate of unionization among knowledge workers will increase by 1,000%, motivated by the adoption of GenAI.

Analysis

What You Need to Know

Gartner's top predictions for 2024 capture how GenAI has changed our thinking on virtually every subject. 2023 was the year everything changed as ChatGPT, the "poster child" for GenAI, was released at the end of 2022. That introduction shifted many perspectives on what computing could be.

GenAI presents the opportunity to accomplish things never before possible. These predictions will help you consider what assumptions should be reimagined and when, allowing you to create a more flexible and adaptable organization that is better-prepared for whatever comes.

Savvy executive leaders must broaden the horizons of IT professionals and business teams alike. They will stress the need to experiment with GenAI to learn its possibilities. They will embrace the risks of using GenAI so they can reap its rewards.

When reading our outlook on 2024 and beyond:

- Use Gartner's predictions as planning assumptions on which to base your strategic plans.
- Evaluate near-term flags to determine whether a prediction is trending toward truth or away from it.
- Anticipate that predictions with longer time horizons are less likely to come true than those with shorter time horizons.

Last year, our focus was on the uncertainty that has become an everyday part of life. We promoted the notion of seizing uncertainty and turning it into opportunity. That proved prescient as 2023 unfolded. This year, we examine what it means for AI to move from a tool to a collaborator and creator. We will find we can go farther and do more than we ever imagined.

> **"All great changes are preceded by chaos."**
>
> — *Deepak Chopra*

From the practical to the philosophical, ruminations on GenAI will infect all strategic planning like a virus. The only inoculation against it will be to embrace it and to enjoy the squeeze — both good and bad.

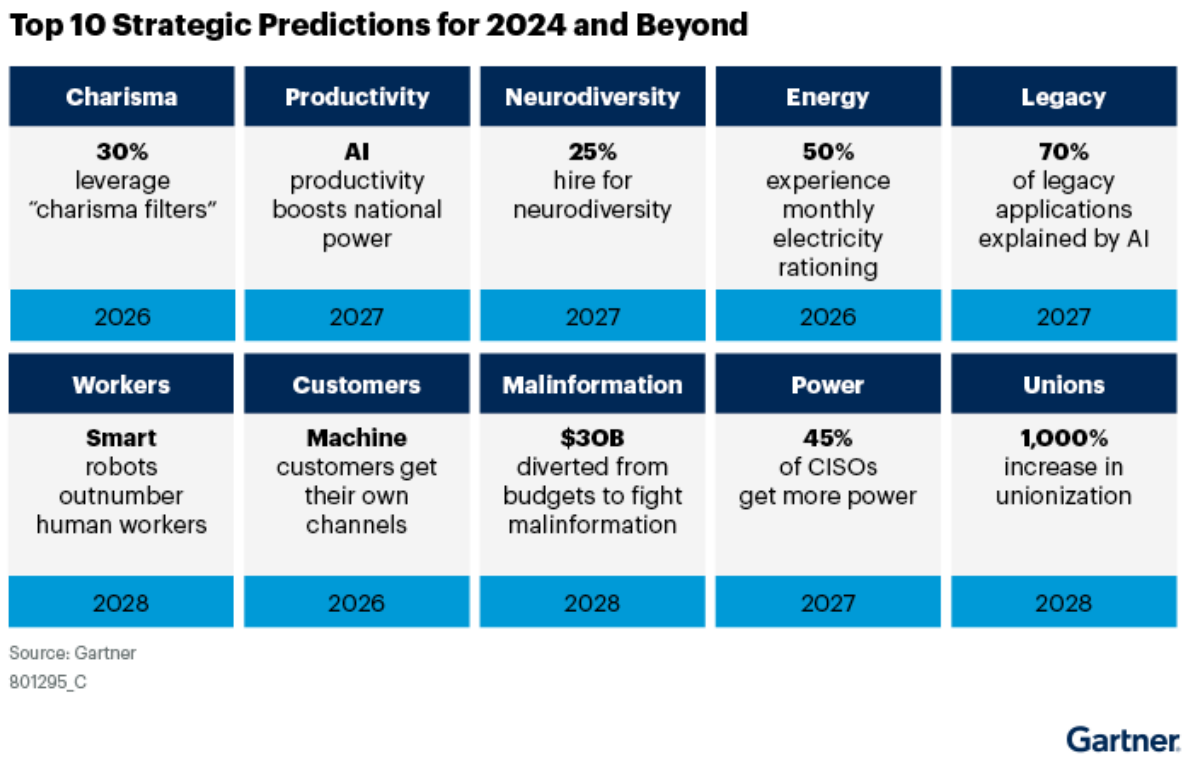
The Year Everything Changed

2023 is indeed the year everything changed. It is the first full year with GenAI seemingly at the heart of every strategic discussion. It is also the first year that seemingly every other technology-driven innovation has been pushed out of the spotlight. That has never happened before. Although the World Wide Web came close to this level of innovation, it didn't happen with PCs, or even with mobility. Those were powerful transitions, but they were in line with technology-driven changes of the past.

GenAI breaks that mold. The popularity of ChatGPT has spurred many to action well past technology innovation. The existence of large language models (LLMs) covers a broad range of creative capabilities that keep building more excitement. But opposite that excitement is healthy skepticism and concerns about risk. GenAI can produce hallucinations or create suboptimal responses, it is little understood, and it creates both legal and ethical dilemmas.

Our predictions this year demonstrate how GenAI can pervade any topic (see Figure 1). In fact, such conversations started *without* GenAI are shortsighted.

Figure 1: Top 10 Strategic Predictions for 2024 and Beyond



Here are some of the high-level trends that emerge from our predictions:

- **GenAI makes people better and more powerful personally and professionally.**
  - GenAI is a creative medium. People can use it to create better resumes, better reports, better work products and even better interactions with others. They can produce digital personas of themselves with which others can interact. As people take advantage of these "charisma filters," they can accelerate their growth in the work environment. But it doesn't end with individuals.
  - GenAI can help level the playing field between smaller and larger countries. It can provide a boost to productivity of the entire workforce. As a result, countries with large, inexpensive, workforces will not have as pronounced an advantage.
  - We foresee a more diverse workforce growing. Workers can use AI tools to make themselves stronger contributors. Neurodiverse workers, seniors or even less well-educated candidates can now work faster, better and with higher productivity.

- **Businesses will get better at overcoming their worst traits.**
  - Businesses and government organizations will find that the addition of GenAI to their strategies will mitigate some problems while amplifying and creating others. GenAI uses a lot of energy, opens the door to faster modernization of systems, helps supplement a deficient workforce and forces a rethink of business models — all at the same time.
  - Energy costs and availability of supply have been a rising concern as global climate changes threaten to leave the electricity-hungry populace short of an established and growing need. Some regions are experiencing an increasing instability of the electrical grid due to old infrastructure. A rapidly growing need for more electricity to power computers worsens this problem and will lead to a widespread need to ration electricity rather than assuming it is unlimited. GenAI plays a role here as it gobbles up energy and will proliferate to be a constant part of every individual, business and government initiative.
  - Legacy applications are a “sweet spot” for GenAI use. While many of the world’s most critical and important systems still run on legacy technology, modernization has been a longtime goal. Use of GenAI for code conversion is the least of the opportunities. Language-to-language conversions don’t solve most of the problem. Instead, GenAI can help to explain the intricacies of a legacy environment. It can provide modernization plans, refactoring plans, testing and validation, and a host of other capabilities to speed the modernization effort.
  - Robot workers seem to be the least of the worries of those fearing AI taking jobs. In fact, we are in a low cycle of worker availability. The need to supplement the workforce with robots can help businesses continue to grow — even in a worker-sparse environment. As the availability of these robots continues to grow and they get smarter and more creative, they expose a need to change business operations.

- Machine customers and machine workers are on the rise, prompting a rethink of key business operations. Just as workers will find new ways to evaluate performance and value, new machine customers will need their own new channels to acquire, access and use capabilities. Most people are familiar with printers that order their own ink refills, or cars that can alert dealers when they need to come in for service. But how does a business capture the attention of machines to use their services? With people, well-understood marketing and advertising mechanisms can guide them to the proper channels. But how does one market or advertise to machines? The problem is imminently solvable but will require new channels to support the change.

- **New threats create new responsibilities and communities.**
  - **Malinformation:** The debate around the truthfulness (or lack of it) in GenAI content will increase the pressure on companies to find ways to show customers they are honest brokers. Finding the balance between preventing malinformation, identifying and tagging it, and allowing free speech to surface from the ocean of AI-generated mediocrity will be difficult. Malinformation is not just about fake content; it is about intent to deceive or even to defraud. While GenAI brings a great deal of opportunity to use synthetic data and generated content to our advantage, the threat of malinformation is a new threat vector.
  - **CISO:** As a result of new threat vectors such as malinformation, CISOs will find their scope of action to be expanding. From protection of internal systems, the landscape will expand to include more than just technology and information protection. Because malinformation is part security and part marketing problem, and affects every part of the enterprise, the responsibilities for governing, devising, continually updating and executing on an enterprisewide anti-malinformation program must be clear. CEOs must empower a single responsible executive (such as the CISO) with sufficient resources to tackle this challenge across the organization.
  - **Unions:** We are already seeing the secondary effects of GenAI play out among labor unions in Hollywood. But it seems unlikely that those strikes will be an isolated incident. White-collar workers threatened with lost or changing jobs will seek protection from management decisions. The full scope of protections needed is currently unknown but threatens to expand rapidly. Everything from protecting intellectual property (IP) to protecting likeness to protecting speech are all under consideration for new legal remedies. Unions have often put pressure on organizations and government to center protections on *people* before *companies*. This will be no different in the age of GenAI.

Gartner's top strategic predictions continue to offer a provocative look at what might happen in some of the most critical areas of technology and business evolution. More importantly, they help people understand that opportunity lies in every action and every situation. Whether one is a customer, a business or an investor, these predictions will prove useful in capturing the interest of strategic thinkers and fueling the excitement of tactical decision makers.

Strategic Planning Assumptions

Strategic Planning Assumption: By 2026, 30% of workers will leverage digital charisma filters to achieve previously unattainable advances in their career.

Analysis by: Whit Andrews and Rita Sallam

Key Findings:

- Foundation-model-powered applications can improve many aspects of communication, not just factual or fluency issues. A properly trained model can prioritize social connection — when and how to communicate in a given context, not just what to communicate.
- Workers benefit from in-process nudges for how to layer behavioral positivity into routine interactions as well as postinteraction training and preinteraction preparation.
- The “muscle memory” of social interaction can be trained in more resource-effective ways through simulation using digital avatars.
- Research into foundation models allows for annotated analysis of interaction tone from many aspects of communication, from body language and tone of voice to word selection and timing and cadence.
- Etiquette and style training are constrained by the challenge of knowing what the best method of communication is in a given realm. Sensitivity training can improve a person’s ability to pick the best model for communicating, but the more complex the environment, the more anyone might benefit from structured counsel grounded in solid data.

- Complexity in interactions derives from many contextual aspects of all sides of a conversation, including:
  - The status of all participants
  - Multiple audiences for the conversation
  - When the conversation is happening
  - What came before the conversation
  - What might come after it
  - The time of day

Near-Term Flags:

- Cisco, Google, Microsoft and Zoom set their defaults to nudge positive interactions and contain riskier interactions.
- Executives fund updates to versions of digital workplace applications to get access to digital charisma filters that make interactions more successful.

Market Implications:

Digital charisma filters will improve organizations' abilities to expand hiring to include more diverse workers. They will do this by aiding conversations between workers who expect various social conventions as well as allowing for more effective conversations between native speakers and less idiomatically versed speakers in many languages. IT managers must collaborate with security leaders to evaluate the security of such systems and verify that their results will be stored in ways that allow for access only by properly approved parties.

Workers will expect to display their expertise in communication internally and as an aspect of their externally visible self-promotion. Workers will seek to find ways to work around controls and prompts in order to have more "frank" and "authentic" conversations. In-person communications will be discouraged by managers but preferred by workers who perceive charisma filters as counterproductive.

Recommendations:

- Expand your talent pool by incorporating the use of digital charisma filter assistants to improve the congruence of interactions at all phases of recruiting and employment.
- Avoid inequities that could develop from both sanctioned and shadow use of digital charisma filter assistants by proactively developing a policy for use and notification of use by the broader workforce.
- Accelerate access to digital charisma assistants by pressing your enterprise productivity and application vendors on how they are incorporating these capabilities into their roadmaps.
- Choose circumstances where feedback can exceed guidance for affirmation in order to preserve productive synthesis; consensus need not be ubiquitous (but respect must).

Related Research:

Address Talent Shortages and Improve Retention With Autistic Talent

Strategic Planning Assumption: By 2027, the productivity value of AI will be recognized as a primary economic indicator of national power.

Analysis by: Julian Sun and Svetlana Sicular

Key Findings:

- National governments have begun to demonstrate a strong commitment to AI. They are doing this by prioritizing strategies and plans that recognize AI as the key technology in both private and public sectors, supporting social benefits, driving its adoption across their economy and society, and incorporating AI into policies and regulations.
- National strategies include long-term budget allocations for AI advancements. Nations view AI as the key means of global leadership, international presence and managing geopolitical risk. Most national strategies look to compete globally, determining the potential advantages of their nations in terms of areas of AI leadership in specific solutions, products and services, as well as the ability to attract large companies and the best talent internationally.

Near-Term Flags:

- By 2026, at least one globally recognized AI index will emerge to quantify national AI strength, with comprehensive and quantifiable indicators.
- Nations start developing new country ecosystem standards, regulations and tools to increase data sharing and data security, which are needed to develop AI solutions.
- Multinational corporations tailor franchise models for their regional chief data offices.

Market Implications:

Implementation at a national level will solidify AI as a catalyst for enhancing productivity value to boost the digital economy. National AI startup ecosystems will form and drive innovation. Corporations will accelerate their AI adoption and develop their own AI strategies to pursue new opportunities supported by the national AI plans. Public sector and educational institutions will ramp up their AI capacity.

AI will become a "metaindustry" with various sectors, such as hardware, software, services, security, data management, robotics, products for industries and domains. New sectors and new jobs will emerge. For example, a "prompt engineer" is a new job that emerged in 2023.

Successful implementation of large-scale AI initiatives necessitates the support and collaboration of diverse stakeholders, showcasing the mobilization and convening power of national resources. Public-private partnership will be required to resolve ethical and responsible AI challenges to ensure that potential harms caused by using AI do not derail AI strategies.

Government support will lead to AI democratization, making AI available to billions of people for their business, personal and societal activities. This will take place through investments in AI resources for the public and regulations for risk mitigation.

The investment in AI will be subject to closer scrutiny with regard to its business outcomes and economic impact. For example, Japan is considering adopting more lenient regulations on AI compared with the European Union, aiming to enhance economic growth.

AI regulation in China is widely acknowledged as a catalyst for economic growth, thereby fostering greater receptiveness to AI innovation. Countries and organizations will emphasize the significance of AI-enabled productivity value, showcasing their ability to cultivate a digital economy through new economic indicators.

Recommendations:

- Review applicable national AI strategies and regulations to find and realize new business opportunities in an AI-enabled economy.
- Mandate adequate AI governance to deliver AI value in an ethical and responsible way.
- Prioritize AI innovation as a means of national leadership. Formulate the quantification of AI's contribution to organizational productivity consistently with national AI regulations and policies.
- Implement a continuous upskilling program for your workforce to stay abreast of advancements in business and technology. Capitalize on regions with favorable AI policies.
- Enhance citizens' AI literacy by integrating AI training into national and organizational education systems, thereby fostering a deeper understanding of how AI contributes to the economy.

Related Research:

Forecast Analysis: Artificial Intelligence Software, 2023-2027, Worldwide

Research Roundup: Realizing Value From Artificial Intelligence (AI)

Hype Cycle for Data, Analytics and AI in China, 2023

Geopolitics Is Shaping Generative AI (and Vice Versa)

Strategic Planning Assumption: By 2027, 25% of Fortune 500 companies will actively recruit neurodivergent talent across conditions such as autism, ADHD and dyslexia to improve business performance.

Analysis by: Colleen Giblin, Rob O'Donohue and Michael Katz

Key Findings:

- Up to 20% of the worldwide population is considered to be neurodivergent. [1,2]
- A cognitive diversity, neurodiversity is one of three primary types of diversity (cognitive, identity and preference/value), and the only one associated with higher performance and creative innovation on problem solving and predictive tasks. [3]
- Only about 7% of Fortune 500 companies are part of the Neurodiversity @Work Employer Roundtable, a leading collection of employers committed to neurodiversity-focused hiring. [4] Fortune 500 companies already investing in Neurodiversity hiring programs (e.g., EY, Ford Motor Co., Hewlett Packard Enterprise, Microsoft and SAP) are seeing impacts on engagement and productivity.
- Workplace accommodations for neurodivergence need not be costly to be effective. Small adjustments, such as shifting from verbal to written instructions or allowing the use of noise-canceling headphones, can help neurodivergent employees thrive in environments that might otherwise pose challenges. [5]

Near-Term Flags:

- The number of recruiting and job placement platforms designed to pair neurodivergent employees with employers seeking their unique strengths will continue to grow rapidly. Competitors to services, such as Mentra and Specialisterne will enter the market.
- Employers will increasingly offer expanded benefits specifically targeted to meet the needs of neurodivergent workers, such as specialized job coaching and confidential diagnostic services. They will also eliminate formal medical documentation requirements for workplace accommodations, such as low-cost aids (e.g., noise-canceling headphones) to reduce administrative burden and improve productivity and morale.

Market Implications:

Organizations that hire and retain neurodivergent talent will experience increased employee engagement, productivity and innovation across the workforce. Progressive organizations have already demonstrated the impact of neurodiverse employees. For example, EY and JPMorgan Chase & Co. have reported the impact of neurodiverse as compared with neurotypical employees on increased employee engagement scores, sense of belonging and productivity.

In addition, these companies will tap into a broader pool of available talent and achieve competitive advantage over those who do not take a neuroinclusive approach. Developments in AI will further fuel this trend by increasingly enabling employers to better support neurodivergent employees by, for example, accommodating their needs through software that automatically transcribes meetings and pulls out key summary points and action items.

Organizations with neuroinclusive hiring and inclusion practices that go beyond boilerplate diversity statements or policies will be more attractive, even to candidates who do not identify as neurodivergent. That's because those organizations are seen as inherently more human-centric and therefore viewed as better to work for. Currently, many organizations are falling short in this regard: Data shows neurodivergent employees feel they lack support in the workplace to perform at their best; 81% of neurodivergent employees feel they could be better supported by their employer (see Diverse Talent Helps CISOs Address a Skills Shortage).

Recommendations:

- Establish an outreach program and inclusive hiring practices to boost the discoverability of neurodiverse talent and help candidates navigate each stage of a more equitable hiring process. Organizations can fast-track their efforts by leveraging best practices from experts and lessons learned from leading organizations working on neurodiversity.
- Implement neurodiversity training and education for existing employees to better understand neurodivergent individuals, enabling them to better collaborate. Hiring neurodiverse candidates is not useful if your organizational culture isn't inclusive enough to retain them.
- Reevaluate the disability disclosure and accommodation request processes internally to foster a culture of accessibility. A more proactive and inclusive approach to accessibility improves engagement and performance, prevents biases, and fosters an environment of cognitive diversity.

- Include neurodivergent people in company leadership positions. Having openly neurodivergent leadership fosters a culture of inclusion. Recent Gartner research found that this can be the most valuable action to take from the perspective of neurodivergent employees. [6]

Related Research:

How to Attract Neurodiverse Individuals to Address Critical Skills Gaps

Talent Diversity: Key Actions CIOs Should Take to Increase Inclusion for Neurodiverse Employees

Unlocking the Potential of Neurodivergent Talent

How to Foster More Equitable Development for Neurodivergent Talent

Strategic Planning Assumption: By 2026, 50% of G20 members will experience monthly electricity rationing, turning energy-aware operations into either a competitive advantage or a major failure risk.

Analysis by: Lloyd Jones, Lauren Wheatley, Aapo Markkanen, Sarah Watt, Kristin Moyer and Bob Johnson

Key Findings:

- An aging grid infrastructure is limiting the ability to add electricity-generating capacity; however, demand for electricity continues to increase faster than capacity. [7] Examples include Japan, Israel, South Africa and the U.S. (Texas). [8]
- Electricity system operators will ration electricity initially through nudging principles, paying consumers to use less, and then shifting to more draconian measures of power cuts, with rotational load shedding.
- Enterprises are assessing energy price and availability as a competitiveness and business continuity risk. Business leaders are responding by creating energy-aware operations through optimization, consumption management and direct investment in energy generation. [9]

Near-Term Flags:

- Electricity allocation will focus on essential services. Availability of electricity for digital services is not guaranteed. Data center moratoria will expand. Examples include Ireland, Singapore and the Netherlands. [10]
- Capacity auctions and the expansion of renewable-energy generation are facing challenges as a result of government policies that drive low auction prices and do not align with the increasing costs borne by developers. These rising costs are primarily driven by high interest rates and weakening supply chains. [11,12]

Market Implications:

Energy customers value affordability, acceptability and availability. However, electricity prices have become volatile, triggered by supply constraints. Forty-five percent of surveyed business leaders across North America, Europe and Asia agreed that increases in energy costs in their operations is impacting business viability as opposed to being tolerated by the business. [9] In response, organizations will:

- Deploy digital technology to create energy-aware, intelligent operations to automatically adapt production to signals of electricity supply constraints, price spikes and greenhouse gas (GHG) emissions. This is enabled by investment in energy management and optimization solutions. [13]
- Make direct investment in energy-generating hardware. With investments in self-generation and energy communities, enterprises will become empowered and active participants in the energy system, changing their relationship with electric utilities.
- Stable access to electricity will become a competitive advantage. The business benefits of operating in geographical locations that offer secure access to low-carbon energy and sufficient supply will drive competitiveness, causing businesses to consider relocating operations.
- The CIO is a critical change agent — or a bottleneck — for enterprises' energy security.

Recommendations:

- Use digital technology to collect data (energy consumption, emissions and cost) throughout the enterprise. Use these insights to make informed energy decisions and create resilient mitigation plans.

- Conduct energy stress tests across your enterprise and supply chain. Model potential costs from electricity rationing and supply, operations, and customer failures, and use the findings to create risk mitigation plans.
- Leverage energy efficiency to establish long-term competitive advantage by structurally reducing energy consumption. Assess enterprise investments by including current and future anticipated costs of energy and carbon.
- Deploy intelligent operational tools, such as energy management and optimization systems, to secure production and reduce operational costs.
- Invest in operational autonomy by scaling intelligent industrial assets and self-generation to maximize the value of energy management and production.

Related Research:

3 Practical Actions to Address Uncertainties in Pathways for Reducing GHG Emissions

Hype Cycle for Low-Carbon Energy Technologies, 2023

How CIOs Can Mitigate Energy Costs and Risks

A Guide to Implementing a Low-Carbon Energy Strategy

Maverick Research: Net Zero Will Stall Tech Growth and Innovation

Strategic Planning Assumption: By 2027, GenAI tools will be used to explain legacy business applications and create appropriate replacements, reducing modernization costs by 70%.

Analysis by: Rajib Gupta, Anne Thomas, Howard Dodd, Svetlana Sicular and Van Baker

Key Findings:

- Legacy business applications are those applications that enterprises continue to use and maintain, although underlying technologies are no longer supported. Lack of documentation and scarcity of skills to understand those applications are holding back CIOs from modernizing their legacy business applications. They use a variety of workaround methods to keep legacy applications relevant to changing business needs.

- With continuous training, GenAI LLMs will gain maturity and trust. They will also gain the ability to interpret legacy codebase and document embedded business logic, data and process flows that can drive plans for modernizing the applications.
- GenAI code assistants will further accelerate modernization plans, allowing enterprises to deliver more value at a faster pace.
- Once modernized, the applications can be regularly tuned using feedback learning in these LLMs to mitigate or reduce future technology debt.

Near-Term Flags:

- By 2025, GenAI LLMs will be able to read and interpret legacy codebase and help document and annotate its business logic, data and process flows.
- GenAI-assisted programming techniques become mainstream, improving human coder productivity by 10 times.

Market Implications:

Maturity of LLMs offers an opportunity for CIOs to find a credible and long-awaited mechanism for modernizing legacy business applications in a cost-effective manner. In a recent Gartner survey, more than half of IT leaders surveyed (52%) said they believe that enterprises will use GenAI to build software applications. And more than 300 software engineering leaders listed GenAI among the top three factors that will improve developer productivity.

Syntax-to-syntax conversions have been tried before, but the resulting code is difficult to comprehend, maintain or revise, and does not address the critical business need of agility and flexibility. Maturity of LLMs opens a novel approach of a code-to-text-to-code method of modernization, which enables both code and architecture modernization. CIOs using LLMs in this two-step, code-to-text-to-code method for legacy application modernization will both reduce cost and accelerate positive results.

Recommendations:

- Deploy strong governance and oversight on usage of GenAI tooling in application development and modernization programs to avoid stealth proliferation of the technology.

- Use the two-step code-to-test-to-code method for legacy application modernization, and optimize business applications using cloud-native and API-first architectures.
- Establish change management and upskilling processes to enable the workforce to take full advantage of GenAI tools to maximize productivity throughout the modernization cycle.
- Create dedicated testing units for legacy modernization programs to test the outputs generated by GenAI LLMs, whether documents describing business logics and flows or the final modernized code.
- Engage sourcing counterparts at the early phases of legacy application modernization plans to conduct detailed market research of available GenAI tools.
- Involve privacy, IP and information security leaders of the enterprise at each step of the modernization program to comply with local laws and regulatory requirements of data protections and to protect company IP.

Related Research:

Quick Answer: How Can Generative AI Tools Speed Up Software Delivery?

Quick Answer: Should Software Engineering Teams Use ChatGPT to Generate Code?

Quick Answer: Can We Use ChatGPT for Code Transformation and Modernization?

Strategic Planning Assumption: By 2028, there will be more smart robots than frontline workers in manufacturing, retail and logistics due to labor shortages.

Analysis by: Dwight Klappich

Key Findings:

- Labor has become as big a constraint on operational performance as product availability.
- According to the U.S. Department of Labor, the U.S. workforce will grow at one-fifth the rate (0.5%) of U.S. GDP (2.5%) over the next decade. Furthermore, frontline workers in transportation will grow only 1.1%, while the manufacturing and retail workforces are expected to shrink by 0.1% and 0.4%, respectively.

- Workforces in established economies are aging. For example, by 2030, the U.S. Department of Labor expects that one-quarter of the U.S. workforce will be over 65 years of age, and the same is happening in Europe and parts of Asia.
- Labor participation rates are declining. For example, U.S. labor participation rates are projected to decline from 67% in 2000 to 60.4% in 2030, according to the U.S. Department of Labor.
- Ninety-six percent of survey respondents to the 2022 Gartner Supply Chain Technology User Wants and Needs Survey [14] that have already deployed or plan to deploy cyber-physical automation by 2024 said they were investing in or planned to invest in robotics. And 35% have already deployed robots, with 61% piloting or in the middle of their first implementation.

Near-Term Flags:

- Robotics vendor revenue growth and unit/vehicle compound annual growth rates (CAGRs) continue at more than 10%.
- The market hits the projected milestone of over 2 million mobile robots by 2025.

Market Implications:

Over the next decade, supply chain organizations will be challenged to find enough frontline workers for essential positions. While labor costs are rising, the problem isn't trying to find where to lower headcount. Rather than cutting headcount, most manufacturing, retail, and logistics companies cannot find or retain enough people to support their day-to-day operations. Robots will fill the gap.

Labor issues are a major concern among supply chain leaders, with 30% of recent survey respondents flagging hiring, retaining and managing supply chain labor a top three internal challenge. To address this, 96% of respondents said they were or were planning to invest in cyber-physical automation, with 59% of these saying that labor constraints were their primary motivation for doing so. [14]

Technology is advancing rapidly, making robots viable for a growing number of frontline jobs — from the factory floor and the warehouse to the retail store and beyond. The impacts of this accelerated adoption are many — some positive, and some problematic.

Robots often take over the dirty, dull or dangerous jobs that humans shy away from. Shifting these jobs to robots will free humans up to focus on more rewarding and often more lucrative positions that robots cannot yet address. Frontline management jobs, system integration, support and maintenance jobs will long require humans and typically pay more.

Adoption of robotics will also introduce challenges for companies and society. Companies must be prepared for a negative backlash if robots are introduced too quickly and workers are displaced unceremoniously.

While the industrial robotics market is mature, with over 2 million industrial robots already deployed, new use cases and improved technologies are expanding this market. The intralogistics smart robot (ISR) segment is growing at well over a 10% CAGR, with projections of over 2 million ISRs in operation in the next several years. With all this combined, it is likely there will be more robots deployed over the next decade than there are frontline workers today.

Recommendations:

- Identify appropriate robotics use cases by studying work patterns, looking for areas with high degrees of automatability where variability is low, predictability and repeatability are high, and robotic technology is viable.
- Lay the groundwork for rapidly growing and evolving portfolios of robots by developing new management techniques and an organization structure to support the evaluation, prototyping, deployment, management and support of robots across the organization.
- Accelerate time to value and reduce risk by pragmatically focusing on evaluating and deploying robots in an iterative and agile way.
- Experiment with various robotics scenarios that are adaptations of current processes as well as ones that are radical, new approaches.

Related Research:

Predicts 2023: Supply Chain Technology

Strategic Planning Assumption: Through 2026, 30% of large companies will have a dedicated business unit or sales channels to access fast-growing “machine customer” markets.

Analysis by: Don Scheibenreif, Mark Raskino, Pierfrancesco Manenti, Uma Challa, Irina Guseva and Keith Jones

Key Findings:

- CEOs estimate that 15% to 20% of their revenue will come from machine customers by 2030. [15]
- Gartner modeling predicts that machine customers will be directly involved in, or have influence over, trillions of dollars in purchases by 2030. By 2028, 15 billion connected products will exist with the potential to behave as customers, shopping for services and supplies for themselves and their owners (see Forecast: Internet of Things, Endpoints and Communications, Worldwide, 2021-2032, 3Q23 Update).
- Machine customers will make markets more efficient, as they’ll match demand more accurately in real time to supply, which will improve operations.
- Machine customers will force a reshaping of key functions, such as supply chain, sales, marketing, customer service, digital commerce and customer experience.

Near-Term Flags:

- By 2025, more than 25% of sales and service centers in large organizations will be fielding calls from machine customers.
- By 2025, 10% of large organizations will have announced a machine customer initiative.

Market Implications:

Machine customers will need their own sales and service channels because they make transactions at high speeds, and the volume of decision variables they use far exceeds human capabilities. This is much like in today's "robo-trading" or other forms of high-speed machine-to-machine communication. Machine customers will be programmed to consider dozens (if not hundreds) of decision factors. This means organizations will have to deploy their own "machine sellers," "machine marketers" and "machine customer service" bots to handle the incoming requests. Organizations need to prepare to monitor and measure the emergence of machine customer transactions, so they can build the necessary channels before the volume becomes overwhelming.

Dedicated business units in large established organizations are a proven method to incubate and grow a new idea that runs counter to the established business model. For example, HP Inc. created a subscription division over a decade ago to develop, test and launch its Instant Ink service. Instant Ink has over 11 million subscribers.

Machine customers will require different talent, skills and processes that may not exist in a human-customer focused division. This will cut across all parts of the business, including supply chain, marketing, digital commerce, sales and customer service.

Companies will need to create a dedicated machine customer business unit that will develop new revenue streams to increase the odds of success across its business ecosystem. It will require a reexamination of where the organization sits in their business ecosystem. It will not be enough to sell to a machine customer; you will need to think about the products and services adjacent to the machine customer and whether you will provide them or someone else will. For example, the makers of an autonomous lawnmower should think beyond the core work of mowing the lawn and providing replacement parts. They should also be thinking about how to sell fertilizer or sell landscape design services, or create a platform where several homeowners can share a single autonomous mower.

The rise of machine customers will be similar to the rise of digital commerce. New skills, mindsets and technologies will be needed to make it work. And like in digital commerce, we expect a machine customer business unit will face much of the same resistance. For a dedicated machine customer unit to work, business unit leaders must be comfortable crossing traditional boundaries to challenge the status quo, especially where there is investment in existing channels like digital commerce.

Recommendations:

- Identify use cases where your products and services can be extended to machine customers by collaborating with your chief digital officer, chief data officer, chief strategy officer, sales leaders and chief customer officer to explore machine customers' business potential.
- Expose your catalog, pricing and inventory through APIs and data interfaces, so that machine customers can search and understand them. Aim for real-time data to ensure the accuracy of order pricing and stock availability.
- Upgrade your commerce platform and operations to handle the larger volume of orders and requests from machine customers. Be able to detect fake machine customers.
- Pilot the ideas you compile during the identification of use cases to understand the technologies, processes and skills required to implement machine customers effectively.

Related Research:

Prepare for Machines as Customers or Risk Being Left Behind

How the Emergence of Machine Customers Will Impact Your Supply Chain

Podcast: When Machines Become Customers

Strategic Planning Assumption: By 2028, enterprise spend on battling malinformation will surpass $30 billion, cannibalizing 10% of marketing and cybersecurity budgets to combat a multifront threat.

Analysis by: Dave Aron and Leigh McMullen

Key Findings:

- The combination of AI, analytics, behavioral science, social media, Internet of Things (IoT) and other technologies make for an incredible opportunity for bad actors to create and spread highly effective, mass-customized disinformation, also known as malinformation.
- The most effective malinformation does not provide false facts; instead, it influences the mental models and decision-making mechanisms of humans and machines.

- Defense tactics against malinformation campaigns involve continual education of all stakeholders, use of technologies and tools to spot fake information, as well as lobbying/influencing regulators and the social media giants.

Near-Term Flags:

- By 2026, deepfake fraud will rise from a newsworthy novelty to a commonplace occurrence affecting individuals, enterprises and governments.
- By 2026, at least one commercially successful LLM will need to be retrained as a result of intentional pollution with malinformation.

Market Implications:

As a market issue, malinformation presents threats across three disparate functional areas:

- **Cybersecurity:** In cybersecurity, malinformation most often manifests as social engineering, spear phishing and deepfake fraud.
- **Marketing:** In marketing, malinformation appears most often as “astroturf” campaigns and reputation attacks that appear to be grassroots but are led by corporations or lobbyists.
- **AI:** We see this threat evolving to influence LLMs and AI, in particular, intentionally causing models to inject malinformation and cause hallucinations, either for fun or profit, and overwhelming filtering systems through the mass production of subversive content.

Gartner defines malinformation as algorithmically groomed and targeted facts, misinformation or disinformation, designed to undermine mental models and causing consumers to make decisions they otherwise wouldn’t. Malinformation affects both human beings and AI.

A continual stream of malinformation incidents will inflict damage to people, institutions and possibly even countries. Those who maintain a close watch on bad actors, regulators and providers of helpful tools and technology are likely to gain significant advantage over competitors.

Marketing departments will need to sense and respond to malinformation campaigns at digital speed.

Fraud-proofing employees will need to extend beyond simple “anti-phishing” techniques in play today, to deeper understanding of the tools and methods of fraud. In some industries, it may also be possible for companies to win by helping their customers, partners and other stakeholders with issues they experience through malinformation, such as fraud, identity theft and also simply bad decision making.

Recommendations:

- Ensure the company’s primary focus is on detection and response to malinformation by consistently raising the issue before the board and executive committee.
- Because malinformation is part security and part marketing problem and affects every part of the enterprise, the responsibilities for governing, devising, continually updating and executing on an enterprisewide anti-malinformation program must be clear. CEOs must empower responsible executives such as CISOs and provide them with proper resources.
- Devote resources to detect and address malinformation incidents by continually training all staff and stakeholders on the issue, and maintaining a watching brief on regulators, providers of tools and technologies, and incidents related to bad actors.
- Experiment with tools and techniques that help combat malinformation issues, and use the spirit of “chaos engineering” to continually generate and test the enterprise’s ability to handle malinformation attacks and campaigns.

Related Research:

Emerging Tech: Top 4 Security Risks of GenAI

How to Detect Fakes in a Zero-Trust World Using Artificial Intelligence and Blockchain

Maverick* Research: How Disinformation Is Destroying Business and How to Fight Back

Maverick* Research: Deepfakes Will Kill the Metaverse; Synthetic Media Could Save It

Maverick Stories: Brave New Worlds Episode 7 — Malcontents and Malinformation

Strategic Planning Assumption: By 2027, 45% of CISOs will expand their remit beyond cybersecurity, due to increasing regulatory pressure and attack surface expansion.

Analysis by: Andrew Walls

Key Findings:

- Modern enterprises that have accelerated digital transformation are now entirely dependent on predictable operation of their digital infrastructure.
- Digital assets, both local and cloud-based, are continuously attacked by myriad internal and external actors employing an ever-expanding range of tools and techniques.
- Government regulation is forcing greater levels of transparency on the approaches to and quality of security and privacy management throughout business operations.
- Although digital assets pervasively support business operations, the scope of responsibility and authority of CISOs is limited.
- Fragmentation of responsibility for securing the digital enterprise results in high costs, poor quality, and unacceptable exposure to threat actors and regulatory noncompliance.

Near-Term Flags:

- Regulatory fines are levied for security failure of digital assets outside the CISO's or CIO's oversight, and claims are filed asserting negligence on the part of CISOs and CIOs.
- An increasing number of CISOs move out from under the CIO to report elsewhere in the organizational structure.

Market Implications:

Organizations that implement a consistent, unified approach to security assurance across all digital assets will experience improved cost-efficiencies for security functions and more effective support of regulatory requirements.

Existing allocations of responsibility for security management of digital assets are fragmented across multiple individuals and teams, with the CISO (or their equivalent) overseeing a portion of the overall digital asset portfolio. This fragmentation results in inconsistencies in support for regulatory disclosures, assurance of digital security and effective management of security incidents.

> **Global enterprises must maintain global cybersecurity capabilities that effectively manage local and regional threat exposure**
>
> — *"CISO Edge: Secure Your Enterprise Amid Social Fracture," Gartner*

These inconsistencies reduce the overall performance of the organization and the market value of commercial organizations. Enterprises should unify security management — particularly the management of security incidents — to remove inconsistencies in security performance and to provide senior leaders with a comprehensive view of security threat exposure.

Expanding the portfolio of the CISO enables this unification of security management. But this expansion will require CISOs to develop new skills as their role encompasses technology historically managed by other teams outside IT. This expansion of the role is supported by tools and services provided by enterprise risk management (ERM), governance, risk and compliance (GRC), and security operations center (SOC) management vendors, all of which provide expansive platforms for collation of disparate security issues and digital assets.

Recommendations:

- CISOs must work with senior enterprise leaders to clarify responsibilities for security incident detection and response distributed across the enterprise and across different functions and infrastructure. Examples of functions include financial fraud and supply chain. Examples of infrastructure include SaaS and CPS (such as operational technology, IoT and industrial IoT).
- Identify and collate into a single, shared set of processes all security incident practices and resources throughout the organization.

- Expand the CISO role to provide oversight of the consolidated security incident management process throughout the organization.
- Align the security incident process with existing or planned crisis management processes.
- Enterprise CISOs with this expanded scope should use incident activity to drive investment priorities for digital defense across the enterprise, not just in IT.

Related Research:

How to Create an Incident Response Plan

Emerging Tech: Security — Cloud Investigation and Response Automation Offers Transformation Opportunities

Hype Cycle for Legal and Compliance Technologies, 2023

Market Guide for Operational Technology Security

2024 Planning Guide for Security

CISO Foundations: How U.S. CISOs Should Respond to Emerging Privacy Laws

CISO Edge: Secure Your Enterprise Amid Social Fracture

Strategic Planning Assumption: By 2028, the rate of unionization among knowledge workers will increase by 1,000%, motivated by the adoption of GenAI.

Analysis by: Nader Henein, Helen Poitevin and Rachel Steinhardt

Key Findings:

- Executives are more willing to explicitly call out AI as one of the reasons that positions are going away — whether AI is truly the culprit or not. [16,17]
- A recent Gartner survey found consumer support for knowledge worker union involvement in ensuring worker protections from GenAI at a staggering 77%. [18]

- The survey also found that consumers overwhelmingly (80%) wanted companies that use GenAI to prioritize preserving jobs, even if that means a lower profit potential. Only 37% believed that job loss from GenAI will be offset by the creation of new types of roles. [18]
- Increasing numbers of industrial action [19] and union negotiations [20] focus on protecting employees from having their work product used to train the models that are being built to replace them.
- Unionization among blue-collar workers has gradually dropped since the 1950s; the rate among knowledge workers is increasing. [21]

Near-Term Flags:

- Organizations that adopt GenAI and fail to clearly and convincingly address AI anxiety [22] among their knowledge workers will experience 20% higher rates of turnover.
- Organizations operating in countries with existing employee representation for knowledge workers (such as France and Germany) will start to see these representative bodies taking action to either shield or compensate their constituents from having their work-product supplement GenAI models that would ultimately replace them.

Market Implications:

Unlike the Luddite uprising of the early 19th century, when workers protested textile factories and their imminent mechanization, AI is currently incapable of replacing the majority of experienced knowledge workers. It is far more likely that this shift will happen slowly. This puts organizations in a very poor bargaining position should the situation deteriorate into negotiations with employee representatives.

Increased unionization and industrial action among knowledge workers will impact many organizations' capacity to function at multiple levels:

- IT security worker absence will result in a higher rate of unmanaged incidents and successful attacks.
- Developer absence will result in delays of feature development, harming competitiveness.

- Higher-level support (Level 2 and Level 3) staff absence will cause customer dissatisfaction and breaches in committed service-level agreements.
- Absences in industry-specific critical business roles will lead to missed business opportunities, product launch delays and service disruption.
- Impact on the business and brand can be significant. In B2C industries, consumer backlash could follow if employee action efforts are mismanaged.

Recommendations:

- Communicate clearly with your employees the organization's intent for internal AI deployments to avoid the unintended consequences of AI anxiety building in staff members through sensational news articles and internal rumors.
- Focus your AI efforts on worker augmentation to improve productivity and quality of work rather than role automation.
- Stay grounded in what the technology can and cannot deliver because a substantial amount of hype continues to influence board expectations.
- Maintain and communicate to leadership a realistic expectation of AI when it comes to internal deployment. This should be focused more on the near and medium term than the far future because the technology is rapidly changing and the risk of destabilizing your employee base is high.

Related Research:

How to Deploy Generative AI Capabilities Behind the Firewall to Augment Your Workforce

Plan for Generative AI's Impact on Jobs

Podcast: Planning for Generative AI's Impact on Jobs

Use Consumer Confidence in GenAI to Guide Brand Management

A Look Back

In response to your requests, we are taking a look back at some key predictions from previous years. We have intentionally selected predictions from opposite ends of the scale — one where we were wholly or largely on target, as well as one we missed.

This research is a collection of Gartner's highest-level predictions and so is not subject to on-target or missed predictions.

Evidence

[1] Autism and Neurodiversity, Specialisterne. Neurodivergent individuals are those whose brain functions differ from those who are neurologically typical (or neurotypical), affecting learning, mental functions, sociability, mood and attention. Neurodivergent diagnostic labels include bipolar disorder, dyspraxia, dyslexia, ADHD, dyscalculia, autism spectrum disorder (ASD) , Tourette syndrome and many more. Neurodivergent individuals often exhibit unique strengths specific to their diagnosis that can address critical talent skill gaps and confer a competitive advantage through increased cognitive diversity and innovation.

[2] Neurodiversity in the Workplace, MyDisablityJobs.

[3] Address Talent Shortages and Improve Retention With Autistic Talent

[4] Neurodiversity @ Work Employer Roundtable, Disability:IN.

[5] U.S. Department of Labor Announces Report Finding Nearly Half of Accommodations for Disabled Workers Have No Cost, U.S. Department of Labor. A recent study by the U.S. Department of Labor finds that nearly half of workplace accommodations can be implemented at no cost to employers, and of those that do incur a one-time cost, the median expenditure is only $300. The agency funds a Job Accommodation Network offering free advice to both employers and employees on appropriate accommodations for a wide variety of disabilities, both physical and neurological in origin.

[6] **2023 Gartner Autistic Talent Survey.** This survey was conducted to provide CIOs and executive leaders with insights on how to strengthen their strategies to attract and retain autistic talent. The survey also sought to provide an actionable toolkit on the most important things that CIOs and executive leaders can do to welcome and develop autistic talent. The research was conducted online from 23 March through 22 May 2023. Qualified respondents were autistic adults (aged 18 and older) or advocates of autistic adults (such as parents or spouses) . Respondents were recruited via social media networks and via associations that advocate for autistic people, including College Autism Network, Integrate Advisors, Mentra, Specialisterne, Disability:IN and others. In all, 797 respondents participated. Disclaimer: The 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. Sampling relied on LinkedIn posts, leading to a potential overrepresentation of employed respondents.

[7] World Investment 2023: Overview and Key Findings, IEA.

[8] See:

- Tokyo Faces Tight Power Supply Through2023, Nikkei Asia.
- Power Outages Spark Heated Accusations as Grid Fails to Meet Sweltering Demand, The Times of Israel.
- South Africa's Power Crisis Will Continue Until 2025 — And Blackouts Will Take 5 Years to Phase Out, The Conversation.
- Texas Utility Commission Chair Raises Threat of Summer Power Outages and Pushes for More Gas-Powered Electricity, The Texas Tribune.

[9] **2022 Gartner Sustainability Opportunities, Risks and Technologies Survey.** This survey was conducted to identify how sustainability can foster opportunities, mitigate risks, amplify responsible digital

technologies and control energy costs. The research was conducted online from 21 June through 21 July 2022. In total, 221 respondents were interviewed across North America (n = 75), Europe (n = 77) and Asia/Pacific (n = 69). Respondents represented qualifying organizations in information technology, manufacturing, financial services, retail and other industries with reported enterprisewide annual revenue for fiscal year 2021 of at least $250 million. Qualified organizations also were currently engaged in sustainability-related activities. Respondents were leaders or executives in director roles or above and were directly involved in making sustainability-related decisions. 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.

[10] Inside the Data Centre Moratorium Movement, Tech Monitor.

[11] Offshore Wind Drops Out of U.K. Auction on Costs, Risking Climate Goals, Reuters.

[12] Inflation, Interest Rates and Whales: Why Offshore Wind Projects Are on the Rocks, CNN.

[13] Unlocking Smart Grid Opportunities in Emerging Markets and Developing Economies, IEA.

[14] **2022 Gartner Supply Chain Technology User Wants and Needs Survey.** This survey was conducted to explore the roles digital and technology play in supply chain. It also supports supply chain technology leaders in their efforts to modernize legacy application landscape and generate a trustworthy business case for their digital journey. The research was conducted online during 26 October through 14 December 2022 among 499 respondents from North America, Latin America, Western Europe and the Asia/Pacific region. Respondents were from organizations with $250 million or more in 2021 enterprisewide annual revenue. Industries surveyed included manufacturing (consumer products, industrial, high tech, healthcare products and life sciences) , retail, wholesale trade, healthcare providers, natural resources, transportation and logistics. Respondents who had job roles tied to supply chain function and were involved in decision making regarding supply chain management processes/operations for more than two years qualified for the survey. Disclaimer: Results of this survey do not represent global findings or the market as a whole, but reflect the sentiment of the respondents and companies surveyed.

[15] **2022 Gartner CEO and Senior Business Executive Survey.** This survey was conducted to examine CEO and senior business executive views on current business issues, as well as some areas of technology agenda impact. The survey was conducted from July through December 2021, with questions about the period from 2021 through 2023. One-quarter of the survey sample was collected in July and August 2021, and three-quarters was collected in October through December 2021. In total, 410 actively employed CEOs and other senior executive business leaders qualified and participated. The research was collected via 382 online surveys and 28 telephone interviews. The sample mix by role was CEOs (n = 253) ; CFOs (n = 88) ; COOs or other C-level executives (n = 19) ; and chairs, presidents or board directors (n = 50) . The sample mix by location was North America (n = 176) , Europe (n = 97) , Asia/Pacific (n = 86) , Latin America (n = 40) , the Middle East (n = 4) and South Africa (n = 7) . The sample mix by size was $50 million to less than $250 million (n = 58) , $250 million to less than $1 billion (n = 81) , $1 billion to less than $10 billion (n = 212) and $10 billion or more (n = 59) . 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] IBM to Pause Hiring for Jobs That AI Could Do, Bloomberg.

[17] BT to Cut 55,000 Jobs With Up to a Fifth Replaced by AI, BBC News.

[18] **2023 Gartner Consumer Community** (n = 303, 28 June through 5 July 2023) . While the Gartner Consumer Community (n ≈ 500) resembles the U.S. general population, the data cited is based on the responses of community members who chose to take each activity. These samples may not be representative of the general population, and the data should be used only for directional insights.

[19] Generative AI Steps Into Starring Role in Actor, Writer Strikes, S&P Global Market Intelligence.

[20] Newsroom Unions Are Pushing Management to Negotiate AI Use, Digiday.

[21] Organizing White-Collar Workers, IndustriALL Global Union.

[22] AI Anxiety: How These 20 Jobs Will Be Transformed by Generative Artificial Intelligence, Forbes.

Document Revision History

Gartner's Top Strategic Predictions for 2023 and Beyond — Seizing Uncertainty - 11 November 2022

Gartner's Top Strategic Predictions for 2022 and Beyond — Leveraging What We Have Learned - 28 October 2021

Gartner's Top Strategic Predictions for 2021 and Beyond: Resetting Everything - 20 November 2020

Recommended by the Authors

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