Top Strategic Technology Trends for 2025: Agentic AI

21 October 2024 - ID G00818765 - 12 min read

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Agentic AI will introduce a goal-driven digital workforce that autonomously makes plans and takes actions — an extension of the workforce that doesn't need vacations or other benefits. This research describes the opportunities and dangers of agentic AI for IT leaders, and explains how to prepare.

Overview

Opportunities

- Agentic AI gives AI new levels of agency (the ability to select what actions to take for achieving particular outcomes). It'll provide a significant opportunity for performance gains that will increase over time as the systems evolve to more effectively achieve their goals.
- Agentic systems will change the future of decision making. They can quickly analyze complex datasets, identify patterns and act. This will avoid labor-intensive data modeling, lead to better problem solving, reduce time to action and enable new concepts of scale.
- Agentic AI will dramatically upskill workers and teams, enabling them to manage complicated processes, projects and initiatives through natural language. However, the orchestration and governance of autonomously acting software entities require advanced tools and strict guardrails.

Recommendations

- Integrate agentic AI into your strategic planning. Define the levels of agency you'll allow in each environment and workflow.
- Design agentic AI solutions to connect disparate applications and data, while prioritizing improved user experience and efficiency. Map decisions and actions that can be automated between previously siloed data and processes.
- Establish clear implementation and operational guardrails for agentic AI, including legal and ethical guidelines on autonomy, liability, security and data privacy. Ensure that agentic AI identity, security and monitoring capabilities are robust enough to protect your organization, employees and customers.

Strategic Planning Assumptions

By 2028, 33% of enterprise software applications will include agentic AI, up from less than 1% in 2024.

By 2028, AI agent machine customers will replace 20% of the interactions at human-readable digital storefronts.

By 2028, at least 15% of day-to-day work decisions will be made autonomously through agentic AI, up from zero percent in 2024.

What You Need to Know

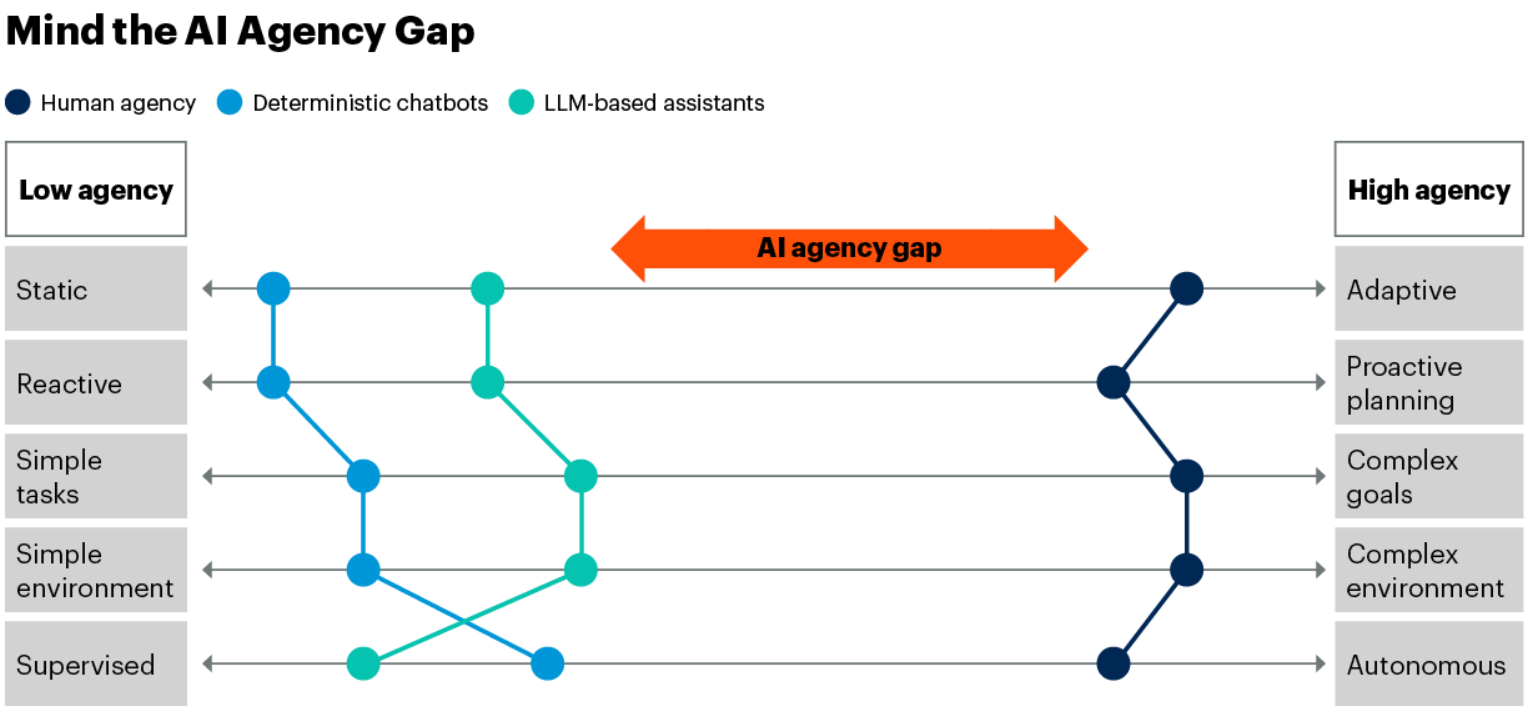
*This research is part of Gartner's **Top Strategic Technology Trends for 2025**.*

Until now, AI models such as large language models (LLMs) have performed tasks including generating text and summarizing documents, but they haven't been able to take action by themselves on their own "initiative." Instead, they've acted on your prompts. Agentic AI is changing that.

Tools are being built to give systems such as LLMs more agency, the ability to act autonomously with minimal human supervision, adapt to their context and execute goals in complex environments. This will dramatically increase AI's potential. For example, agentic AI can examine data, perform research, compile tasks to complete and then take those actions in the digital or physical world via APIs or robotic systems.

AI agency is a spectrum. At one end, traditional systems with limited agency perform specific tasks under narrowly defined conditions. At the other end, future agentic AI systems with full agency will learn from their environment, make decisions and perform tasks independently. A large gap exists between current LLM-based assistants and full-fledged AI agents (see Figure 1). This gap will close first for narrowly scoped activities. However, the scope and sophistication of agentic solutions will expand as we learn how to build, govern and trust agentic AI solutions.

Figure 1: Mind the AI Agency Gap



Source: Gartner
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Profile: Agentic AI

Description

Agentic AI refers to goal-driven software entities that have been granted rights by the organization to act on its behalf to autonomously make decisions and take action. These entities use AI techniques — combined with components such as memory, planning, sensing, tooling and

guardrails — to complete tasks and achieve objectives.

Unlike robotic process automation, agentic AI doesn't require explicit inputs and doesn't produce predetermined outputs. Agentic AI entities can receive goal instructions, iterate and delegate tasks, and output variables and dynamic information — often augmenting the user's work.

Examples of agentic AI include:

- AI agents
- Machine customers
- Multiagent systems

Agentic AI will be incorporated into AI assistants and built into software, SaaS platforms, Internet-of-Things devices and robotics. When AI assistants start planning, making decisions and taking action for you, agentic AI will be there. It'll be everywhere, with the potential to extend collaborative work management platforms beyond task tracking into planning and executing tasks.

Why Trending

Agentic AI (see Note 1 for a list of representative vendors) is important now because it enhances the abilities of AI technologies, such as LLMs. Many startups are already marketing themselves as AI-agent-building platforms, some including AI agents that help build users' AI agents from natural language workflows written by line-of-business owners. Hyperscalers are adding agentic AI to their AI assistants.

Agentic AI's ability to take action autonomously or semiautonomously has the potential to help CIOs realize their vision for generative AI (GenAI) to increase productivity across the organization (see Figure 2).

Figure 2: Top Types of Business Value From Applying Generative AI

Top Types of Business Value From Applying Generative AI
Multiple responses allowed

n = 78 CIOs, excluding "not sure"

Q: What are the top three types of business value your enterprise seeks from applying generative AI?
Source: 2024 Gartner CIO Generative AI Survey
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More organizations use advanced machine customers, a subset of agentic AI. Digital twin technology uses agentic AI to simulate scenarios from synthetic data and triggers actions or workflows based on the goal. Platforms are being developed that manage the intersection of AI techniques, data, memory, language, software tooling and automated self-critique (agentic AI's ability to critique its own work).

Organizations have long desired to promote high-performing teams, improve cross-functional collaboration and coordinate issues across team networks. Agentic AI has the potential to perform as a highly competent teammate by providing insights from derivative events that aren't often visible to human teammates.

Implications

Agentic AI will replace some AI disillusionment by giving it agency, enabling it to solve problems that require action rather than mere content generation.

This advancement will increase the number of tasks and workflows that can be automated, and will expand collaboration model usage, such as user-in-the-loop solutions. These will enable collaboration and communication from:

- Humans to agents

- Agents to agents
- Agents to humans

Agentic AI has the potential to significantly empower workers. It'll enable them to develop and manage complicated, technical projects — whether micro automations or larger projects — through natural language.

An agentic AI system can automate customer experiences by using data analysis to make highly calculated decisions at each step. For example, after a customer buys a product, AI examines the order history, reviews communications, sets a follow-up action based on customer-specific behavior analysis and identifies an upsell opportunity. It then composes and sends a personalized email thanking the customer, asking for feedback and suggesting the upsell at the optimal time of day to maximize engagement. Although this workflow is human-designed, it may or may not have a human in the loop.

The potential that agentic AI has to constantly analyze the performance of personalized interactions surpasses human capabilities, ensuring more precise and effective customer engagement. Software developers are likely to be some of the first affected, as existing AI coding assistants gain maturity and AI agents provide the next set of incremental benefits.

Agentic AI will change decision making and improve situational awareness in organizations through quicker data analysis and prediction intelligence. While you're sleeping, agentic AI could look at five of your company's systems, analyze far more data than you ever could and decide the necessary actions. When you log on in the morning, instead of receiving a message saying, "You should fix the following six issues," you'd receive a message saying, "While you were sleeping, I fixed the following four issues and you need to assess these two."

Agentic AI could, overnight, decide what adjustments a large company should make to an advertising campaign. It could make decisions about the company's advertising spending and also create and post content, greatly increasing speed and efficiency.

> Agentic AI will eliminate the need to interact with websites and applications. Why bother when your AI agent can do it for you?

Workflows will be designed for agentic AI, with humans added at high-value points.

Multiagent systems composed of multiple, independent, interacting agents — each capable of perceiving its environment and taking actions — will work toward a common goal that goes beyond the ability of individual agents. These systems will tackle complex tasks that individual agents can't while creating more adaptable, scalable and robust solutions. They'll create insights that weren't possible before, and can also work in environments requiring decentralized decision making.

However, it's not all about autonomy — some activities will still require human decision making, and agentic AI won't always work alone. It'll help in scenarios where there is difficulty in team collaboration, team decision making, team situational awareness and team synchronization. Agentic AI's impact on cross-organizational collaboration could be even more transformational than its impact on individual productivity. Agentic AI will be a co-worker, a valuable member of the team.

Agentic AI will also:

- Integrate and automate activities spanning enterprise applications and data sources, transforming application usage patterns and requirements
- Automate customer experiences, moving customers forward in their journey by completing significant actions
- Enable enhanced security systems that monitor, report and act

- Provide more proactive sales intelligence, next-best actions and outreach
- Automate supply chains and planning
- Create more opportunities to market for machine customers

Agentic AI Poses Challenges and Dangers, Too

Along with the opportunities agentic AI brings, it also poses challenges. The danger exists of repeating the robotic process automation problem: organizations created thousands of bots, but nobody now remembers what those bots do or why they were built. Employees may additionally deploy their own low-code agentic AI inside your IT stack, which may not meet your security or quality standards.

Agentic AI will make decisions based on its analysis of your organization's data, making plans based on that analysis. From there, it'll act on those plans. This will be dangerous unless you invest in the skills, practices and technologies to deliver trustworthy AI agents. Your organization's data may be of poor quality, further increasing the risk. As well as creating risk, poor data quality and architecture will also inhibit agentic AI's development.

Although it should help customers, agentic AI could also alienate them if the customer experience is poorly designed. This is where human intelligence is needed. Humans must create customer journey maps to design the ideal customer experience and define guardrails before handing over to AI agents for execution. It'll be a case of trial and error to adjust the agents' settings to achieve optimal results.

As always with automation, some employees will likely resent agentic AI, still feeling the need to be in control. Understandably, they may be worried about job security and the perceived value of their contributions.

Agentic AI will drive advanced cyberattacks that give rise to "smart malware." This will require innovations to address the unique risks and threats of systems that depend on LLMs and GenAI. Agentic AI will be at risk from prompt injections, jailbreaks, data security attacks and cyberattacks — including those that other AI agents create and execute.

The continued growth of agentic AI will also raise serious governance concerns for your organization as you try to control a technology that operates autonomously. Orchestration and governance will require advanced tools and strict guardrails.

Actions

- Plan to add agentic AI to workflows where there is significant demand for scale and efficiency. Rethink entire workflows across silos from an automation-only perspective, and then add humans back into new workflows at strategic points. Start small on use cases where high-quality data is accessible.
- Treat AI agents like Tier 1 digital coworkers or as digital employees that you delegate work to. Rethink collaboration models, workflows and team strategies to maximize the benefit of team members that can uncover and provide insights from derivative events that human teammates might not notice.
- Put in place guardrails to ensure that agentic AI is constrained to a defined role and set of capabilities. Do so to prevent it from taking incorrect actions that cause damage.

About Gartner's Top Strategic Technology Trends for 2025

This trend is one of our **Top Strategic Technology Trends for 2025**. Our 10 trends (see Figure 3) will help you shape the future with responsible innovation. They're the trends we consider most relevant and impactful, the ones you should start preparing for.

Our trends fall into three main themes:

AI imperatives and risk:

- The number and use of AI agents will increase to meet productivity demands, requiring advancements in AI governance technology.

- The effects of disinformation will put organizations and society at risk, creating the need for defensive technology.

New frontiers of computing:

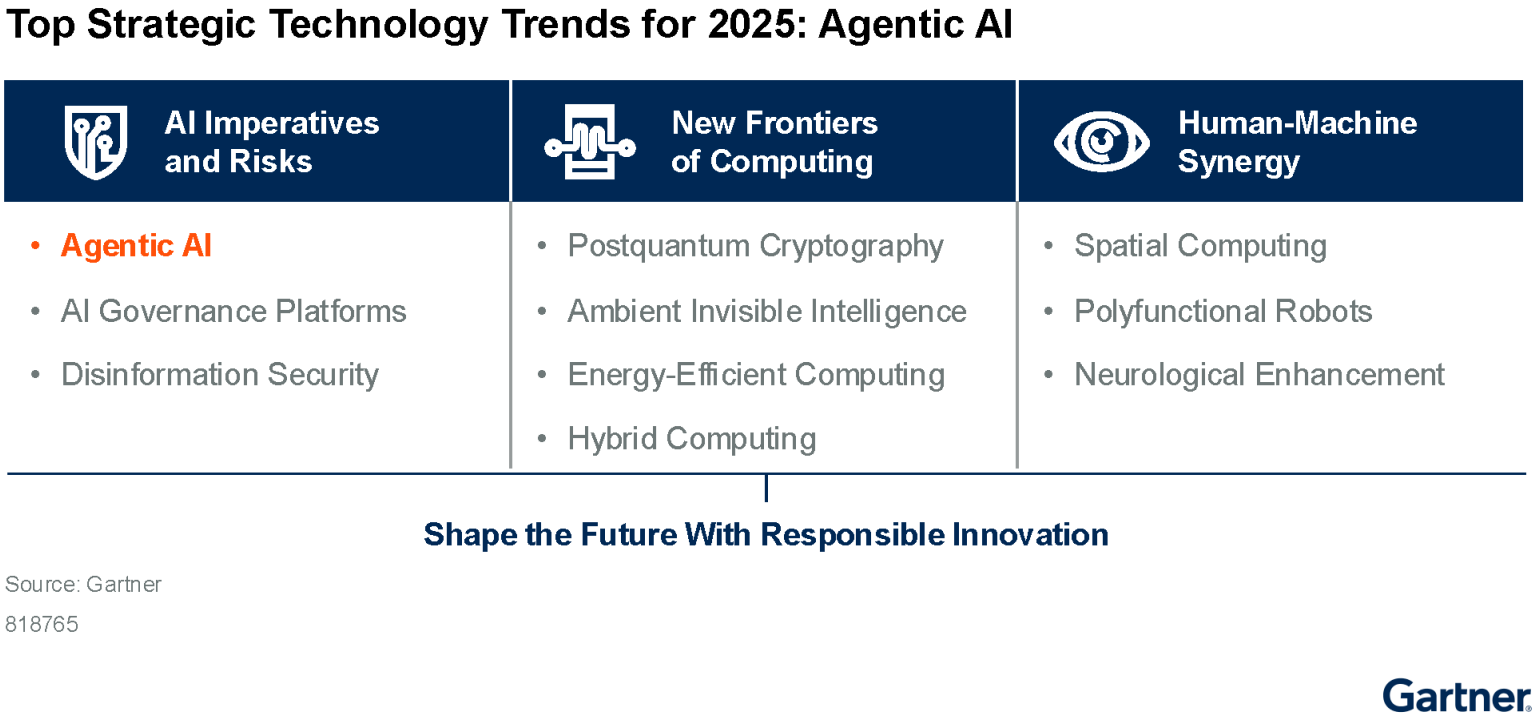
- Quantum computing threatens to break today's cryptology, so a new cryptology is needed.
- Ultra-low-cost wireless tags and sensors will make real-time, large-scale tagging, tracking and sensing affordable, enabling new business models and ecosystems.
- New energy-efficient compute models will be created to meet the increasing demand for computing and sustainability.
- Organizations will integrate and orchestrate the growing numbers of new computing models with the many existing ones to optimize their use.

Human-machine synergy:

- The creation of next-level interactions between physical and virtual experiences will continue.
- Robots performing more than one function will integrate into humans' daily work and home lives.
- The ability to directly access and improve thoughts and emotions can enhance human cognition and performance.

Work with other executives to evaluate our trends' impacts and benefits. This will enable you to determine which single trends — or strategic combination — will have the most significant impact on your organization, and the ecosystem in which it operates. Examine the trends' potential relative to your organization's specific situation, factor them into your strategic planning for the next few years, and adjust your business models and operations appropriately.

Figure 3: Top Strategic Technology Trends for 2025: Agentic AI



⊕ Evidence

Note 1: Representative Vendors

The following are some sample vendors of agentic AI:

AIXplain, AutoGen, AWS Bedrock, Cognigy, CrewAI, Databricks, Google Vertex, OneReachAI, Sema4 and Superface.