Gartner

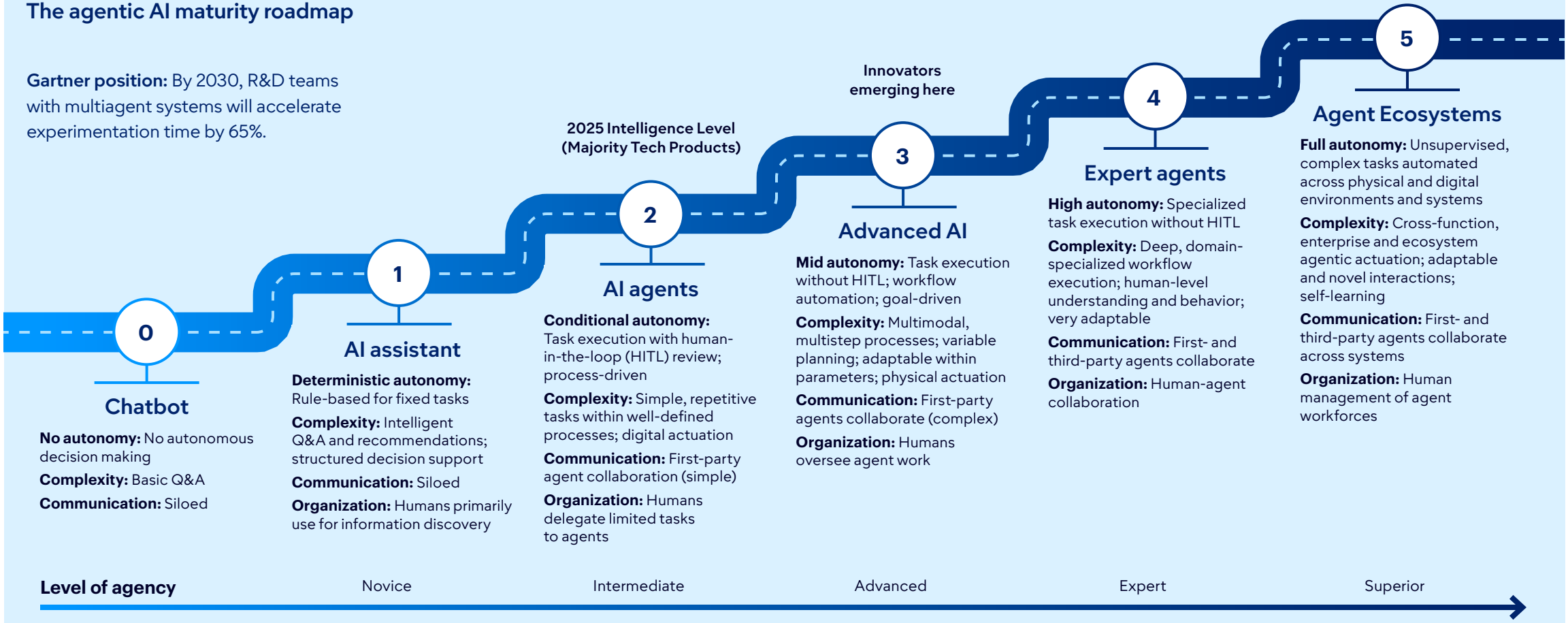
# Autonomous R&D

## Amplify Innovation Velocity With Agentic AI

By 2028, AI agents will move from experimental use to mainstream adoption, becoming the new normal in R&D workflows. Agentic systems are poised to transform R&D, offering immense potential to improve operational efficiency, enhance collaboration, strengthen decision support, autonomously innovate and support compliance and quality assurance. Getting agentic AI applications right is imperative, as it means future-proofing R&D in increasingly complex environments. **This report will delve into recommended actions R&D leaders should take to embrace this technology and position their teams for better, faster and more innovations.**

## The agentic AI maturity roadmap

**Gartner position:** By 2030, R&D teams with multiagent systems will accelerate experimentation time by 65%.




Note: Agency level — Rating considers automation level, complexity of task support, collaboration capacity and human-machine work relationship.
Source: Gartner

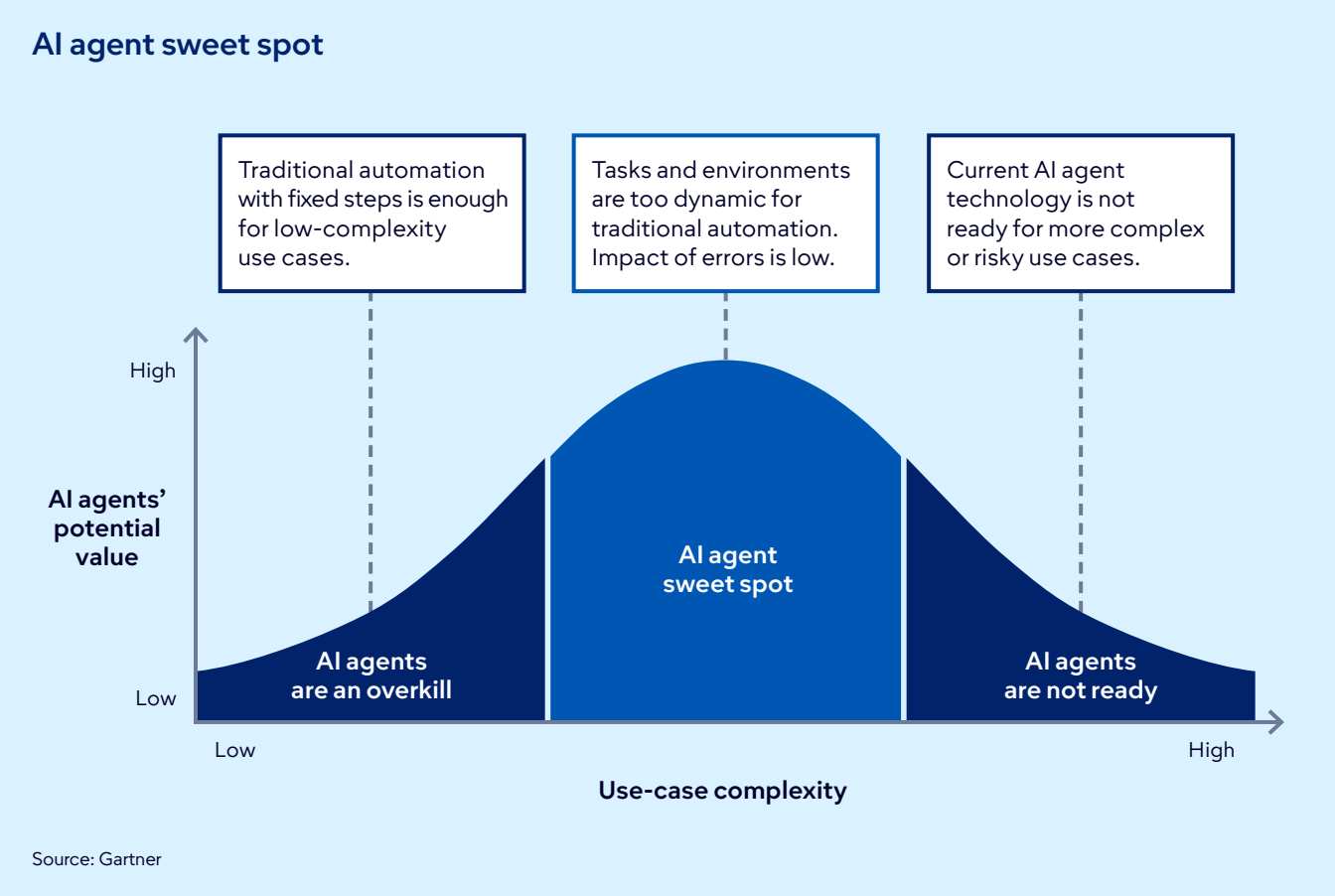
## Target high-value use cases and map capabilities

Focus on high-value use cases by first establishing metrics and benchmarks that capture R&D efficiency and productivity. Metrics such as idea-to-concept time, concept-to-market time, vitality index, project completion rate, commercialization success and active project counts per employee help diagnose operational bottlenecks and highlight potential agentic AI use cases. Combine these quantitative insights with interviews, surveys and historical data review to diagnose “slow steps” and highlight areas for improvement. Also, leverage process intelligence platforms to uncover inefficiencies that may escape traditional discovery methods.

Next, map workflow challenges and bottlenecks to agentic AI capabilities, assigning complexity ratings to each use case (low, medium and high). Complexity may stem from process gaps, regulatory hurdles or resource constraints. While some use cases could be addressed by AI assistants or GenAI solutions, agentic AI delivers greater impact through multistep reasoning, perception and planning, driving transformative gains across R&D workflows.

**Gartner defines a “slow step” as a specific part of the R&D process that is burdened by time, resources or both, where the strategic use of a digital technology would have a significant impact on time and costs.**

# Prioritize the AI agent sweet spot




Source: Gartner

Prioritize use cases that deliver high business value and fit within the "AI agent sweet spot" — moderate-complexity scenarios where traditional automation falls short, but current agentic AI can operate safely and effectively. These cases demonstrate the technology's practical impact and foster cross-functional stakeholder support and buy-in.

Close collaboration with IT is essential to assess technical risks — including safety, bias and privacy — and to ensure seamless integration with existing digital systems and the broader R&D ecosystem.

## Decide build vs. buy

Many organizations encounter significant cost and complexity when building agentic AI solutions internally, prompting consideration of established AI vendors. When evaluating vendor options, R&D leaders should rigorously assess claims related to agency, model explainability and prior deployments in comparable environments.

For those pursuing in-house development, success hinges on two foundational pillars: technology strategy and skills. The technology strategy must prioritize highly accurate, domain-specific agents, supported by robust data infrastructure that integrates seamlessly with existing digital systems such as LIMS, ELN and innovation management tools. AI agents require strict governance guardrails — including limits on autonomous actions, end-to-end encryption and multifactor authentication — to ensure security and accountability. Addressing skills gaps is equally critical; leaders should upskill current AI engineers in agent orchestration and governance or recruit specialized talent to build and sustain internal capabilities.

### Examples of agentic AI vendors

| Vendor | General; customized service | Multiagent |
|---|---|---|
| Microsoft | Yes, Yes (custom accelerators and frameworks) | Yes |
| Google | Yes, Yes (no-code custom agents, Vertex AI, open-source integrations) | Yes |
| OpenAI | Yes, Yes (Agent SDK, Frontier, Agent Builder) | Yes |
| Amazon | Yes, Yes (Bedrock Agents, AgentCore) | Yes |

Source: Microsoft, Google, OpenAI, Amazon

## Pilot, govern and scale responsibly

Regardless of build or buy, R&D leaders must derisk agentic AI adoption by launching fast-cycle pilots — typically three to six weeks — to rigorously validate agent behavior and output quality against established R&D benchmarks. Responsible autonomy stands at the core of this transition: Agents should operate as co-scientists, augmenting teams rather than displacing them.

To navigate this shift, organizations should invest in robust change management and expand AI literacy initiatives to include agentic-AI-specific training. This ensures that human teams evolve from executors to strategic validators, equipped to understand the benefits, risks and guardrails of autonomous workflows. As agentic AI moves beyond initial pilots, continuous governance and human-in-the-loop monitoring become essential to maintain accountability, manage risk and support responsible scaling across the enterprise.

**Gartner predicts that by 2030, R&D teams with multiagent systems will accelerate experimentation time by 65%.**

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