BCG

Supercharging your Biopharma Teams with Agentic AI Teammates

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Imagine a coworker who can screen millions of molecular compounds overnight, pinpointing the most promising drug candidates in response to a breakthrough study on a novel disease target, significantly accelerating lead generation cycle time. Or think of a colleague who can synthesize complex trial data into a 300-page Clinical Study Report (CSR) in minutes, boosting CSR drafting efficiency. These are only two real-world examples of agentic AI teammates already driving tangible impact in Biopharma. They highlight the transformative paradigm shift that agentic AI brings—redefining business operations in ways unmatched by earlier AI implementations.

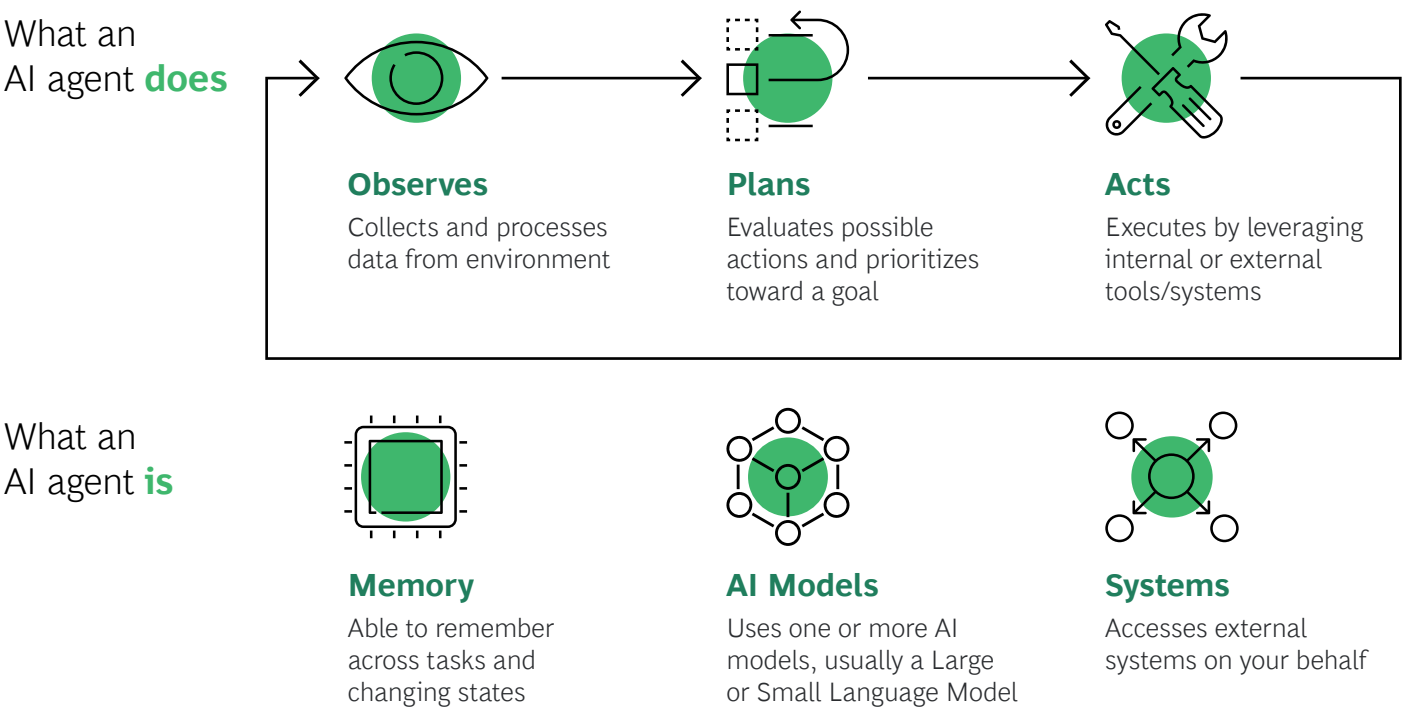
The ability of AI agents to observe, plan, and act autonomously calls for a fundamentally different way to think about their deployment, versus traditional automation or GenAI assistants. Unlike traditional automation, which replaces humans in repetitive, structured tasks, or GenAI-based assistants, which support humans by extracting knowledge or generating content, AI agents can autonomously execute complex tasks with clear objectives (see Figure 1). They go beyond mere assistance and are able to work independently, operating like self-directed employees. Consequently, instead of helping humans achieve incremental productivity gains in their roles, AI agents work next to employees, directly contributing output and potentially accelerating team productivity several times over. AI agents also enable employees along the entire Biopharma value chain to focus more on high-value, creative, and strategic work. Such hybrid teams are set to deliver a competitive advantage to companies that deploy them. (Read more about BCG's view on the value of AI coworkers **here.**)

While agentic AI is still early in its evolution when it comes to market maturity—for example, Salesforce and Microsoft are just launching their AI agent builders, and LLM providers such as OpenAI and Anthropic are entering the space—the market for AI agents is expected to grow exponentially over the next few years. We expect this technology to move fast, pushing the boundaries of what is possible with GenAI today. With increasing autonomy, tasks that today are—at best—GenAI enabled for a human could be taken care of by an AI agent in the future.

It is therefore critical for business leaders to understand the art of the possible through agentic AI, its implications on future GenAI use, as well as broader workforce implications—mitigating the real risk of falling behind in the GenAI revolution.

FIGURE 1

Definition of AI agents



1. Potential Archetypes of AI Agents for Biopharma

Across industries, 67% of executives are starting to explore AI agents as part of their AI transformation (BCG AI Radar, Jan 2025). At the same time, two-thirds of companies struggle to drive both the right incentives and change management needed to drive value from AI initiatives; they also struggle to keep up with hiring the right AI talent (Ibid). Agentic AI can help overcome the adoption challenge by having autonomous agents operate alongside staff, without the friction of retraining to incorporate them into workflows.

We present the following four types of AI agents emerging across Biopharma—as a thought experiment on where AI agent personas can augment workflows and capitalize on the vast amounts of data generated across the value chain:

Analyst: Imagine your virtual team member, Anqi.AI, seamlessly integrated into your commercial operations or brand marketing teams. Anqi.AI analyzes monthly sales volume and prescription demand data to generate detailed portfolio insights for quarterly business reports—a task that traditionally requires large teams of human analysts to compile. Anqi.AI dynamically pulls data on performance, market dynamics, and sales metrics, selecting the appropriate visuals to deliver dashboards that enable brand leads to focus on strategic priorities, such as identifying growth opportunities and addressing underperforming assets. By utilizing agentic AI capabilities, Anqi.AI reduces manual effort, accelerates decision-making, and enables human analysts to concentrate on driving business impact.

Planner: Paul.AI is a study feasibility AI agent embedded into the R&D clinical operations team, coordinating intricate workflows such as planning multi-site clinical trials or early-stage study designs. By analyzing resource availability, regulatory constraints, and project timelines, Paul.AI generates optimized study plans that reduce bottlenecks and ensure efficient use of resources. He dynamically adjusts plans as new variables (such as budget changes or recruitment rates) arise, enabling project managers to focus on higher-value decisions such as strategic site selection and stakeholder engagement. By automating these complex processes, Paul.AI enables acceleration of development timelines to bring medicines to patients more rapidly.

Operator: Meet Owen.AI, your manufacturing operations team's expert. Owen.AI streamlines critical tasks such as managing production schedules, monitoring inventory levels, and ensuring regulatory compliance. By analyzing real-time production data and identifying potential inefficiencies, Owen.AI flags issues such as resource shortages and machine downtimes before they impact production—and takes action within defined guardrails. Owen.AI also generates reports for audits and compliance checks, freeing up human operators to focus

on second-order mitigating actions such as scheduling an overtime shift or an extended validation cycle. By automating these structured and time-sensitive tasks, Owen.AI ensures smooth, compliant, and cost-effective manufacturing processes.

Servicer: Imagine Susan.AI, your dedicated patient services assistant, seamlessly integrated into your patient support programs. Susan.AI helps patients navigate complex processes such as enrolling in patient assistance programs, accessing affordability resources, and understanding treatment options. She proactively engages with patients to provide insurance support, resolve coverage issues, and answer questions about reimbursement, ensuring that patients can start and stay on therapy without delays. For specialty medications, Susan.AI coordinates with specialty pharmacies and healthcare providers to streamline prescription fulfillment and adherence support. When a handoff is needed for more complex issues, Susan.AI briefs her (human) colleague on the full context so that the patient has a seamless experience. By automating critical interactions, Susan.AI enhances the patient experience, reduces access barriers, and ensures that Biopharma teams deliver timely and compassionate care.

These archetypes showcase the diverse ways AI agents can transform the Biopharma value chain from enhancing decision-making to improving operational efficiency and patient support.

FIGURE 2

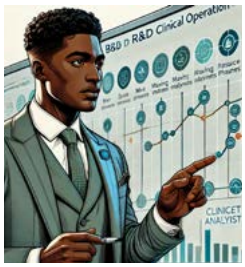
Exemplary AI agent archetypes in Biopharma

Analyst Anqi.AI: ComOps/Brand marketing teammate

Analyzes sales volume and prescription demand data to generate detailed portfolio insights for quarterly business reports and dashboards

Enables brand leads to focus on strategic priorities, such as finding growth opportunities or addressing underperforming assets

Planner Paul.AI: R&D clinical operations teammate



Plans multi-site clinical trials or early-stage study designs by analyzing resource availability, regulatory constraints, and project timelines

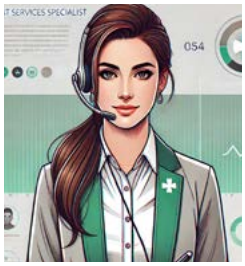
Enables project managers to focus on higher-value decisions such as strategic site selection or stakeholder management

Operator Owen.AI: Manufacturing operations expert

Analyzes real-time production data and flags issues such as resource shortages or machine downtimes before they impact production

Enables human operators to focus on second-order mitigating actions such as scheduling an overtime shift or extended validation cycle

Servicer Susan.AI: Patient services assistant



Engages with patients to help them enroll in assistance programs, access affordability resources, and understand treatment options

Enables Biopharma teams to deliver timely and compassionate care, while enhancing the patient experience

Image source: DALL-E

2. The So What: What Agentic AI Means for Biopharma Organizations

The integration of AI agents into the workplace introduces profound changes to Biopharma companies' operating models, challenging traditional notions of work distribution, team composition, and managerial oversight.

Here are the steps that leadership teams need to take to realize value from AI agents:

Rethink your job architecture. AI agents will thrive by targeting specific tasks within roles rather than replacing entire jobs, enabling Biopharma organizations to redefine jobs and workflows to drive efficiency and effectiveness. Traditional roles—spanning R&D, operations, commercialization, and enterprise functions—should be disaggregated to identify tasks that AI agents can execute autonomously, such as trial design optimization, supply chain forecasting, and real-world evidence (RWE) analysis. This approach moves beyond automation, where predictable processes dominate, to an era where AI agents collaborate dynamically with, for example, scientists,

supply chain managers, and field sales reps. These AI agents not only accelerate decision-making, but also standardize methodologies across functions, improving consistency and comparability. Meanwhile, humans focus on strategic oversight, creative problem-solving, and stakeholder interaction, fostering a hybrid intelligence model. To fully realize this hybrid model, organizations will need to reskill employees to strengthen these capabilities that will enhance their collaboration with AI agents, while also aligning human employees with updated job profiles that reflect their redefined roles (**Reskilling in the Age of AI**, Oct 2023).

Redefine organizational structures. Biopharma organizations must adapt to hybrid team models composed of both human employees and AI agents. Managers will increasingly oversee mixed teams of human employees and AI agents. This shift requires a rethinking of managerial roles, skill sets, and evaluation metrics. Illustrative of this transition, Moderna recently expanded the role of its Chief Human Resources Officer to Chief People and Digital Technology Officer, "emphasizing the profound ways in which AI and digital platforms will reshape [...] ways of working and deliver on [Moderna's] mission" (Moderna 2024 Shareholder Letter, Jan 2025). Agentic AI directly drives productivity improvements by enabling organizations to scale team sizes without proportionally increasing headcount. Skills such as problem-solving, ethical decision-making, and AI fluency will become essential, with employees focused on supervising, optimizing, and innovating alongside AI. In an industry that has seen demand for data scientists quadruple over the last five years (and their attrition double versus other roles over that same time period), there is a critical need to rethink Biopharma teams of the future.

Anticipate major shifts in resource allocation and investment. As organizations evolve to hybrid human-agent workforces, Biopharma organizations must redirect spending from traditional HR budgets to IT infrastructure, data management, and computing costs. These can be especially high due to the complex nature of datasets and high level of security and transparency required in the industry. Investments in robust training programs for employees to collaborate with AI agents and the development of centralized governance structures to manage AI agent deployments will also be critical.

Harmonize your data infrastructure to enable seamless collaboration. For agentic AI to fulfill its potential, Biopharma organizations must harmonize data infrastructures and processes across R&D, operations, commercial, and enterprise functions to AI facilitate agent operations. Most organizations have embarked on this journey; the advent of AI agents makes it critical to accelerate these efforts, as AI agents operate most effectively when integrated into clearly defined workflows with accessible datasets. The 10/20/70 rule for AI implementation still holds true (allocate 10% of the effort to data science capabilities, 20% to a modernized and scalable tech stack, and 70% to effective processes supported by talent and robust change management), as AI agents are only as good as the data and processes they operate on. Additionally, a robust orchestration framework will be necessary to ensure seamless collaboration between AI agents, minimizing redundancy and conflict.

Bolster your Responsible AI framework and governance capabilities to effectively navigate new risks. The increased autonomy of AI agents brings operational risks, including cybersecurity vulnerabilities and potential of misalignment with organizational goals. Assigning more autonomy to AI also comes with risks, particularly in Biopharma, where adherence to rigorous safety and ethical standards is critical. Upholding these standards requires thoughtful implementation, ongoing monitoring, and governance as part of your Responsible AI efforts. Continue reading on BCG's approach to Responsible AI **here**.

3. The Now What: How to Get Into Action

AI agents present an opportunity to massively accelerate the Biopharma industry's ambition of discovering and bringing to market lifesaving medicines for patients. But in order to do this, Biopharma companies must act fast: Use trigger points, such as scaling a business unit, as opportunities for implementing agentic AI. Start by choosing a team or set of teams to redefine, breaking down the jobs into skills to determine the right future split of tasks between humans and AI agents. Only then start to develop the AI agents that can be part of the enhanced team—and given the pace of change in the industry, ensure that all developments are based on scalable, flexible AI agent frameworks (for example, **BCG's AgentKit**) that can evolve as technology advances. Companies must act decisively and approach this as a fundamental shift in how work will be done in the future—not just as a series of new technology products to be deployed.

About the Authors

Jazz Tobaccowalla is a Managing Director and Partner at BCG's New York office. He is an expert in the Life Science industry across functions with a focus on technology and digital transformations. Jazz has a track record of over 25 years leading technology functions, including various senior leadership roles with P&L and country responsibility at Celgene, Regeneron, and Pfizer. He can be reached at **Tobaccowalla.Jazz@bcg.com**

Shaheer Rizvi is a Managing Director and Partner at BCG's New York office. He is an expert in AI/digital transformation and digital health across the biopharma industry. With 15+ years of experience in consulting, he helps leadership teams develop digital strategies, navigate complex transformations, understand the implications of emerging technologies and translate digital investments into meaningful business outcomes. He can be reached at **Rizvi.Shaheer@bcg.com**

Wangjing ("Jing") Ke is a Principal at BCG X's Silicon Valley office. He is an expert in biopharma R&D and clinical operations. He has 10+ years' experience in leading teams to strategize, ideate, build and deploy AI solutions in healthcare and drive digital transformation for measurable value creation. He can be reached at **Ke.Wangjing@bcg.com**

Antonia Wild is a Project Leader at BCG's Boston office. She specializes in digital strategy, transformation, and AI deployment across biopharma R&D, Commercial, and Operations. With experience leading diverse teams of industry experts and data scientists, she helps clients shape and deliver on their digital agendas. She can be reached at **Wild.Antonia@bcg.com**

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