

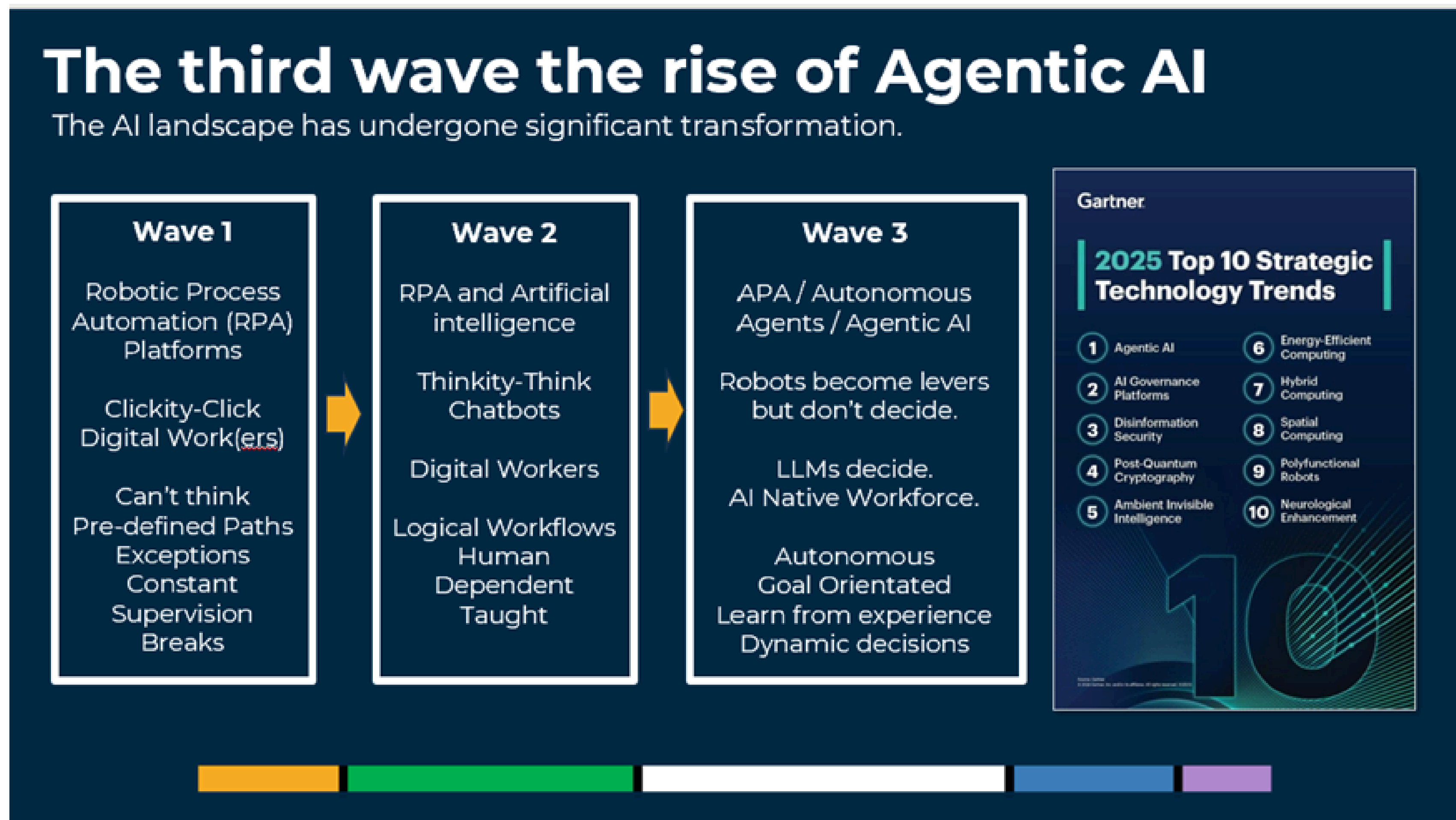
# Chapter 2

---

The Third Wave of AI:

Understanding the Rise of Agentic AI

# The Third Wave of AI: Understanding the Rise of Agentic AI



## The Evolution of AI: From Prediction to Agency

The landscape of artificial intelligence (AI) has undergone significant transformation, evolving through three distinct waves.

The first wave, predictive AI, focused on analyzing historical data to forecast future trends to support data-driven decision-making. It enabled organizations to predict outcomes but lacked the capability for creativity or autonomous action.

The second wave, generative AI, introduced the ability to create content, allowing systems to engage in human-like conversations, generate images, and produce written content. Generative AI captivated industries with its creativity and versatility but remained fundamentally reactive to human input.

Now, we stand on the cusp of the third wave: agentic AI. Unlike its predecessors, agentic AI represents a fundamental shift in capability. It enables AI systems to act autonomously, make decisions, and adapt dynamically to complex environments. This evolution is fuelled by the convergence of technologies such as advanced machine learning, cloud computing, and large language models (LLMs).

Together, these advancements empower AI systems to not only understand human intent but to independently execute tasks and collaborate with other agents to achieve goals. As such, the age of agentic AI is not just about automation; it is about endowing machines with agency.

## Decoding Agentic AI: A New Era of Autonomy

Agentic AI is characterized by its ability to operate independently, adapt to new situations, and continuously improve through self-learning. At its core, Agentic AI embodies three key traits:

- **Autonomous Decision-Making:** Unlike traditional systems, agentic AI can make decisions aligned with predefined objectives without requiring constant human oversight.
- **Adaptability and Self-Improvement:** Agentic systems learn from their interactions, refining their strategies and optimizing processes over time.
- **Goal-Oriented Behaviour:** Agentic AI focuses on achieving specific outcomes, breaking down complex tasks into manageable subtasks.

## From Predictive AI to Generative AI to Agentic AI

To fully appreciate Agentic AI, it is essential to understand its evolution. Predictive AI provided actionable insights but was inherently static and limited to predefined scenarios. Generative AI broke new ground by enabling content creation and conversational interactions. Agentic AI, however, transcends both, allowing systems to execute actions, interact with multiple agents, and autonomously complete end-to-end processes.

Attribute	Agentic AI	Generative AI
<b>Main Purpose</b>	Autonomous action and decision-making	Content creation based on training data in response to user prompts
<b>Autonomy</b>	High; acts independently to set and pursue goals	Low; reacts to user input and cannot set its own goals
<b>Adaptability</b>	Can adjust its behavior in response to changing conditions of real-world or virtual environments	Shows some adaptability but cannot independently adapt to fully new or unstructured environments
<b>Goal Setting</b>	Capable of setting its own goals	No independent goal setting; operates within predefined constraints
<b>Human Oversight</b>	Minimal; able to function with little to no human intervention	Necessary; operates based on user-provided prompts
<b>Learning Ability</b>	Can continuously learn from interactions and update its decision-making process	Limited to its training data; does not learn dynamically in real-time
<b>Interaction Style</b>	Operates proactively and can initiate actions	Responds reactively to user prompts
<b>Complex Task Execution</b>	Can plan and execute multi-step tasks autonomously	Generates outputs based on isolated prompts, without independent task management
<b>Use Cases</b>	Autonomous agents, robotics, AI-driven decision-making systems	Text/image/video generation, chatbots, creative assistance

## Agentic AI versus Generative AI

### The Role of LLMs in Agentic AI

Large language models, such as GPT-4, serve as the "brains" of Agentic AI. They enable systems to understand nuanced human instructions, reason through complex scenarios, and make decisions based on context. By integrating advanced natural language processing capabilities, LLMs ensure that Agentic AI can seamlessly interpret and act on user intent. This capability transforms AI from a passive assistant into an active collaborator.

### Enabling Infrastructure: Enterprise Integration

The rise of Agentic AI is also supported by robust enterprise infrastructure. Cloud computing provides the scalability needed to process vast amounts of data, while integration with existing business systems ensures seamless workflows. Data

accessibility and interoperability further enhance Agentic AI's ability to deliver actionable insights and optimize operations in real-time.

## **Key Technology Trends: The Path Forward**

Agentic AI is propelled by several technological trends that define its future trajectory.

### **Multi-Agent Systems**

The orchestration of multiple agents is a hallmark of Agentic AI. These systems rely on sophisticated communication protocols and coordination strategies to achieve scalability and efficiency. By leveraging multi-agent collaboration, organizations can tackle complex tasks that exceed the capabilities of individual agents.

### **Enterprise Integration**

The seamless integration of Agentic AI with existing systems is essential for success. APIs and secure data pipelines enable smooth interactions between AI agents and enterprise tools, ensuring efficient data flow and enhanced performance monitoring.

### **Future Developments**

Emerging capabilities, such as advanced reasoning, emotional intelligence, and proactive problem-solving, will further expand the horizons of Agentic AI. Ongoing research and innovation promise breakthroughs that will continue to redefine the boundaries of what AI can achieve.

## **Business Opportunities: Unlocking Potential**

Agentic AI presents transformative opportunities across industries, enabling organizations to redefine workflows and achieve unprecedented efficiencies. One of its most significant contributions is the automation of end-to-end workflows. By dynamically adapting to changing conditions, these systems streamline processes, reduce manual intervention, and minimize errors across a whole range of business areas. For example, in logistics, Agentic AI can optimize delivery routes in real-time, factoring in traffic, weather, and demand fluctuations.

Yet, the true power of Agentic AI lies in its ability to coordinate multiple agents. These agents specialize in different tasks, working together in a division of labour that

mirrors human collaboration. For instance, in customer service, one agent might resolve a billing issue while another addresses technical support. Such ecosystems of collaborating agents enhance efficiency and enable organizations to scale operations effortlessly.

## Industry Applications

With its ability to reason, coordinate, and act, Agentic AI is already making waves in a wide variety of sectors: For example,

- **Healthcare:** Automating patient care plans, optimizing resource allocation, and providing real-time diagnostics.
- **Finance:** Enhancing risk assessment, fraud detection, and portfolio management through continuous data analysis.
- **Customer Service:** Managing complex support queries autonomously, reducing response times, and improving customer satisfaction.
- **Supply Chain:** Offering dynamic optimization and planning, ensuring agility in fluctuating market conditions.

## Risks and Challenges: Navigating the Complexities

Whilst Agentic AI promises transformative benefits, it also introduces significant challenges that organizations must address if they are to responsibly leverage its full benefits.

### Trust and Transparency

A key concern is ensuring that autonomous systems make decisions transparently. Organizations must implement explainable AI frameworks to provide users with insights into how decisions are made. Building trust requires systems to demonstrate reliability and maintain accountability, especially in high-stakes scenarios such as healthcare or finance.

### Workforce Impact

The adoption of Agentic AI raises concerns about job displacement. However, it also creates opportunities for new roles, such as agentic AI trainers and workflow designers or orchestrators. The workforce of the future will require reskilling, with an

emphasis on collaboration between humans and AI. Employees must learn to delegate effectively and manage AI agents to maximize their potential.

## **Ethical and Regulatory Considerations**

The deployment of Agentic AI must adhere to strict ethical and regulatory standards. Issues such as data privacy, accountability for AI decisions, and compliance with governance frameworks will be critical to mitigating risks and ensuring responsible AI adoption.

## **Conclusion: Embracing the Agentic AI Era**

The third wave of AI, Agentic AI, ushers in a new era of possibilities, where machines can autonomously execute tasks, collaborate with other agents, and adapt to dynamic environments. While the opportunities are immense, so are the challenges. Organizations must navigate the complexities of trust, workforce transformation, and ethical deployment to fully realize the potential of Agentic AI.

The time to prepare for this transformation is now. By embracing responsible adoption and fostering collaboration between humans and AI, organizations can harness the power of Agentic AI to drive innovation, efficiency, and growth. The future of work is here, and it is powered by Agents.

## **References:**

<https://www.pwc.com/m1/en/publications/documents/2024/agentic-ai-the-new-frontier-in-genai-an-executive-playbook.pdf>

<https://www.uipath.com/ai/agentic-ai>

<https://blogs.nvidia.com/blog/what-is-agentic-ai/>

<https://www.endava.com/glossary/agentic-ai>

# Want to leverage AI in your business?

Contact us today to explore how we can help  
your organization harness the future of work.

 [kierangilmurray.com](http://kierangilmurray.com)

 [kieran@gilmurray.co.uk](mailto:kieran@gilmurray.co.uk)

   Kieran Gilmurray

*"Kieran is an exceptional technologist, automation expert, and skilled at AI, data analytics and decision insight. His business and technical knowledge are second to none. If you or your business want to achieve your goals and unlock your full potential, then connect with Kieran and his team."*

---

**Pascal Bernet –**

LinkedIn Top Voice in Tech | Keynote Speaker | Best-selling Author  
| AI & Automation expert | Forbes Tech Council



**TECHNOLOGY  
TRANSFORMATION  
GROUP**

*With Kieran Gilmurray*