Deloitte.

The rise of collaborative automation

How autonomous AI agents are redefining business processes

July 2025

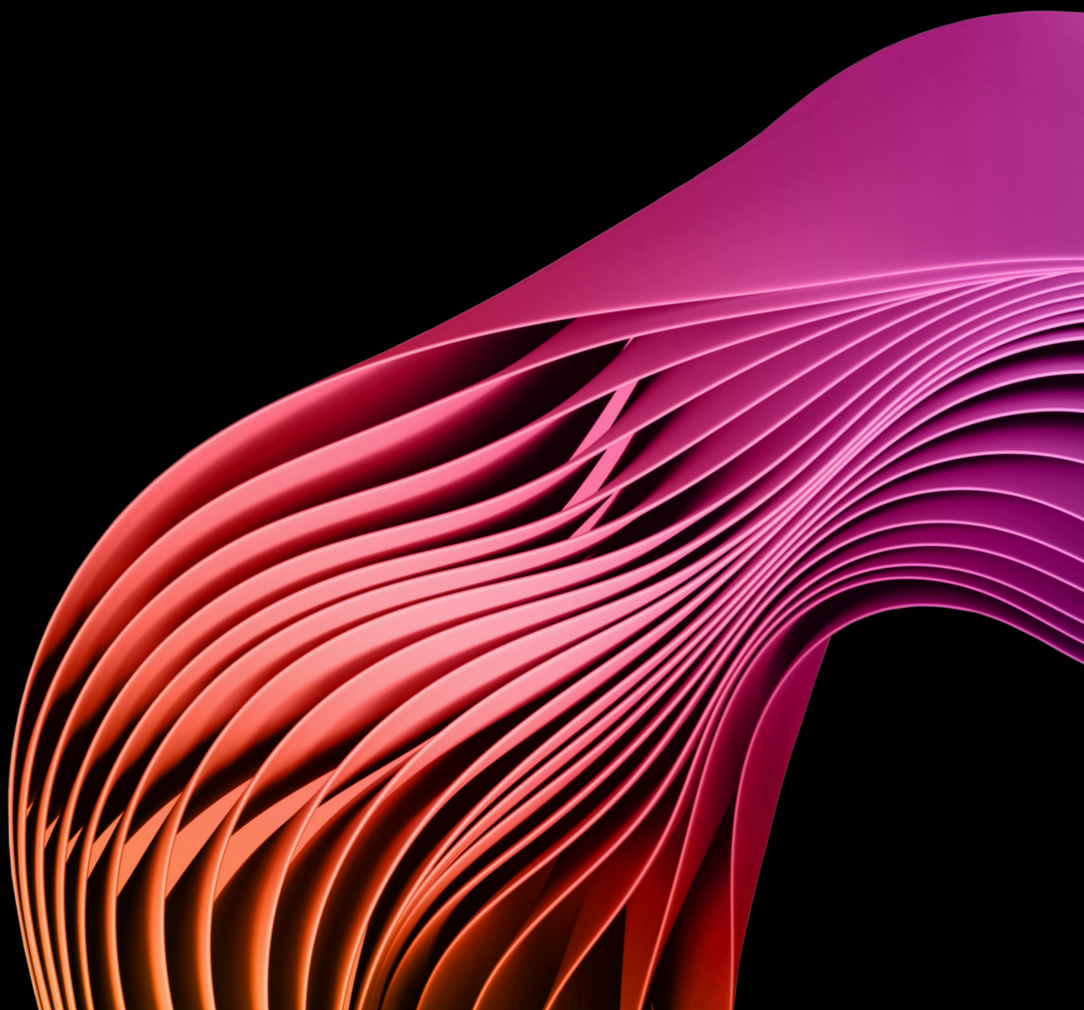
About the Deloitte AI Institute

The Deloitte AI Institute™ helps organizations connect the different dimensions of a robust, highly dynamic and rapidly evolving AI ecosystem. The Institute leads conversations on applied AI innovation across industries and offers cutting-edge insights, all to promote human-machine collaboration in the "Age of With."

The Deloitte AI Institute aims to promote a dialogue and development of artificial intelligence, stimulate innovation, and examine both challenges to AI implementation and ways to address them. The Institute collaborates with an ecosystem composed of academic research groups, startups, entrepreneurs, innovators, mature AI product leaders and AI visionaries to explore key areas of artificial intelligence including risks, policies, ethics, future of work and talent, and applied AI use cases. Combined with Deloitte's deep knowledge and experience in artificial intelligence applications, the Institute helps make sense of this complex ecosystem, and as a result delivers impactful perspectives to help organizations succeed by making informed AI decisions.

No matter what stage of the AI journey you're in, whether you're a board member or a C-suite leader driving strategy for your organization or a hands-on data scientist bringing an AI strategy to life, the Institute can help you learn more about how organizations across the world are leveraging AI for a competitive advantage. Visit us at the Deloitte AI Institute to access the full body of our work, subscribe to our podcasts and newsletter, and join us at our meetups and live events. Let's explore the future of AI together.

www.deloitte.com/us/AIInstitute



Content

Key takeaways

- AI agents have opened new horizons of automation through their ability to understand context, learn dynamically and make decisions autonomously.
- Organizations across industries are now leveraging AI agents to automate complex and dynamic processes that previous automation technologies could not address, with ongoing human oversight to maintain control and accountability.
- Combining robotic process automation (RPA) with AI agents can amplify productivity and scalability while balancing cost, effectiveness and adaptability.
- Businesses should maintain RPA for structured tasks while integrating AI agents to drive smarter, more adaptive automation.

Generating next-level efficiencies with next-generation AI

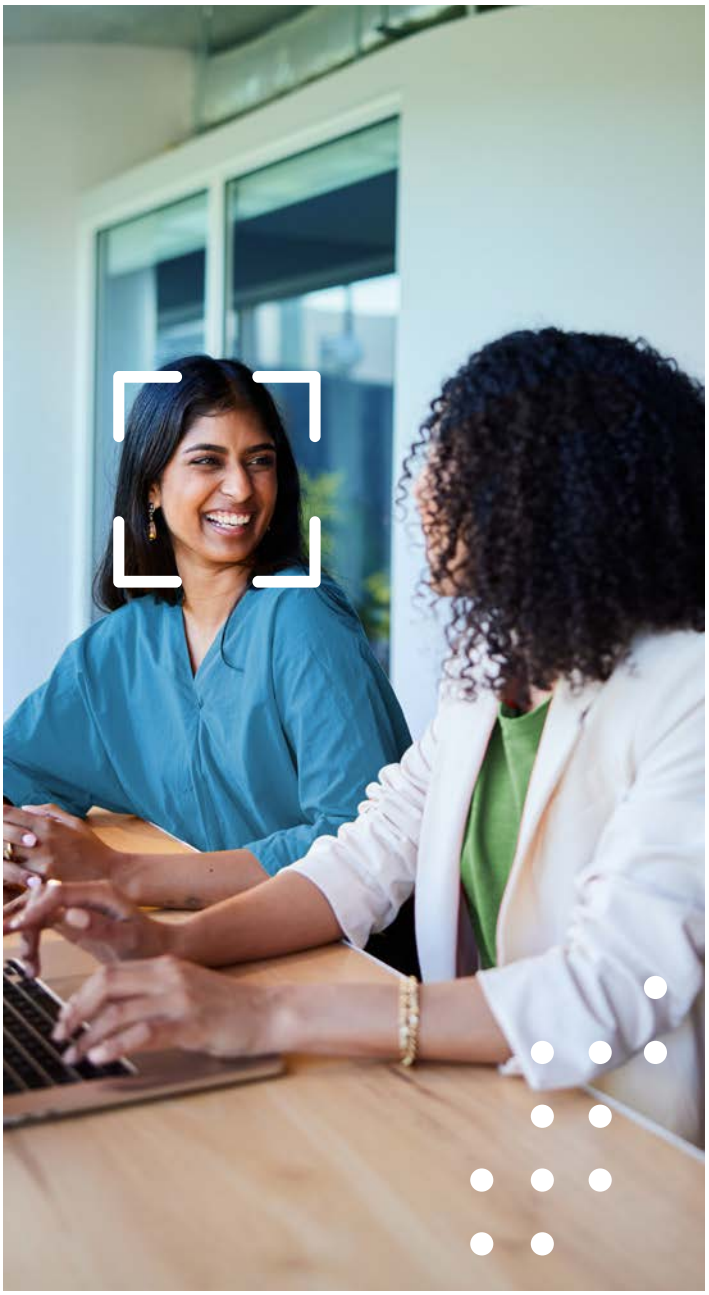
Since the dawn of the industrial revolution, future-focused enterprises have continuously found new ways to simplify processes, reduce manual labor, scale output and improve efficiency. As successive waves of mechanical, electrical and digital automations spread across industries, the companies that didn't adapt … didn't survive.

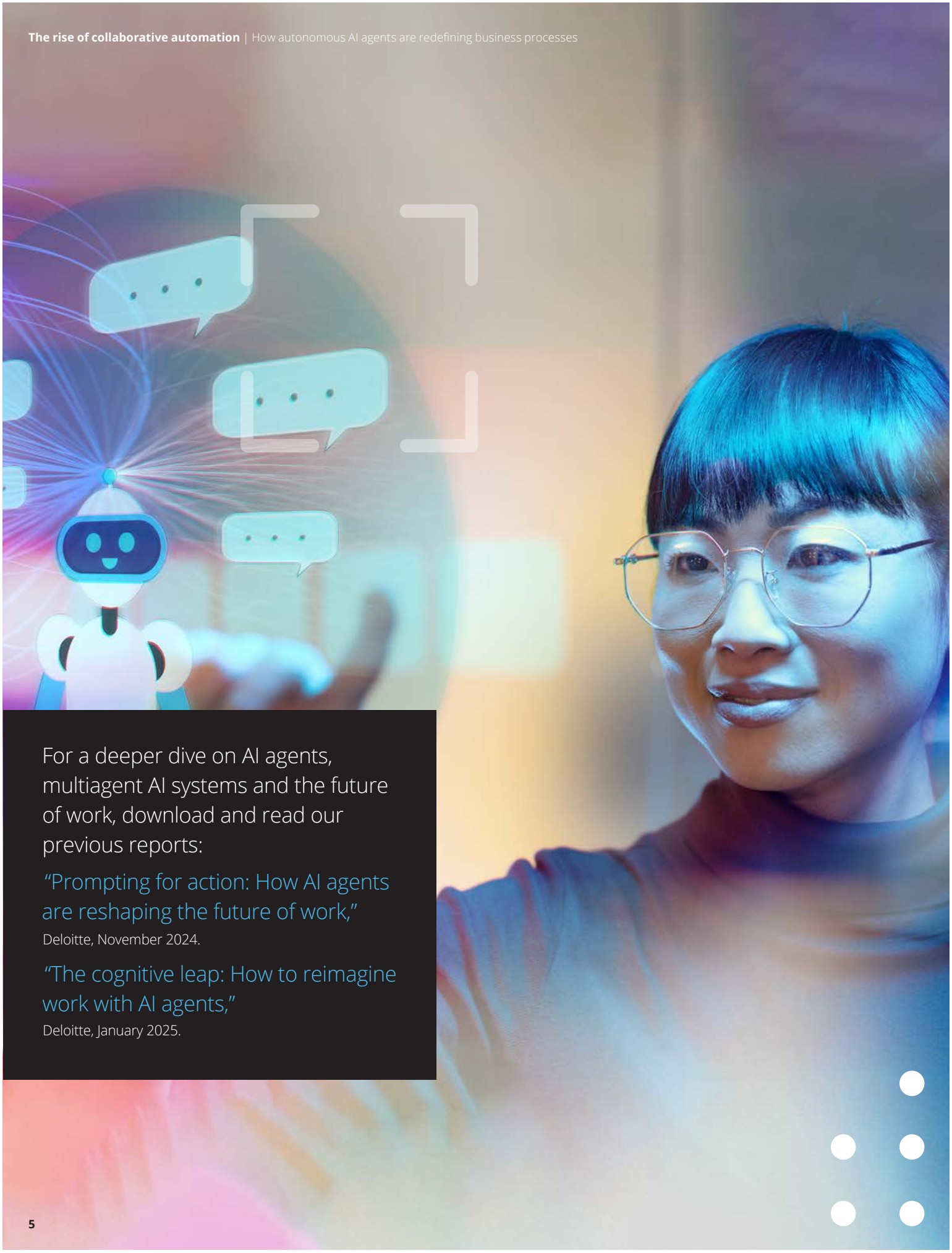
For the past 10 years, robotic process automation (RPA) has proven key to helping businesses boost productivity and free up human talent by handling repetitive, rule-based tasks with precision. However, as today's business and technology landscape grows more complex, organizations increasingly find themselves hitting the limits of traditional automation. Static, rule-based systems struggle to manage unstructured data, adapt to shifting conditions or make nuanced decisions—leaving businesses searching for the next automation game changer.

Enter AI agents—a breakthrough that redefines how work gets done. Unlike RPA, which depends on rigid workflows, AI agents can learn, adjust and optimize processes on the fly—reducing the need for human intervention while unlocking new opportunities for innovation and agility. And unlike many standalone language models, AI agents aren't limited to performing tasks. By interacting with data, systems, people and other AI agents in real time, an AI agent can execute entire workflows autonomously, with humans setting the goal and validating results to keep it on track.

In this report we explore how AI agents can help your enterprise rewrite the rules of automation—and generate game-changing efficiency and value as a result.

Automation is the **game changer** that **keeps on changing**.





For a deeper dive on AI agents, multiagent AI systems and the future of work, download and read our previous reports:

"Prompting for action: How AI agents are reshaping the future of work,"
Deloitte, November 2024.

"The cognitive leap: How to reimagine work with AI agents,"
Deloitte, January 2025.

From robotic to intelligent: Today's automation revolution

AI agents don't just react; **they reason and take action** on behalf of users.

RPA is now an established backbone of enterprise efficiency, leveraging technology to streamline workflows and eliminate manual effort. RPA employs software bots to handle repetitive, rule-based tasks with exceptional speed and accuracy. By automating well-defined processes, RPA has delivered tangible benefits across a range of use cases—driving cost savings, time efficiency and revenue growth while enhancing both employee and customer experiences.

RPA thrives in structured environments where processes have clear rules, predictable inputs and stable outputs. Its strength lies in automating well-defined tasks such as simple data integrations. These automations can provide immense value but remain limited to predefined logic. As a result, they struggle to handle ambiguity, dynamic conditions or high-level decision-making.

AI agents are ushering in a new paradigm of automation. Powered by Generative AI (GenAI), these reasoning engines can not only perform tasks but also understand context, plan complex workflows, connect to external tools and systems, and make decisions to achieve strategic goals.

Today, AI agents are already transforming businesses and industries through capabilities such as:

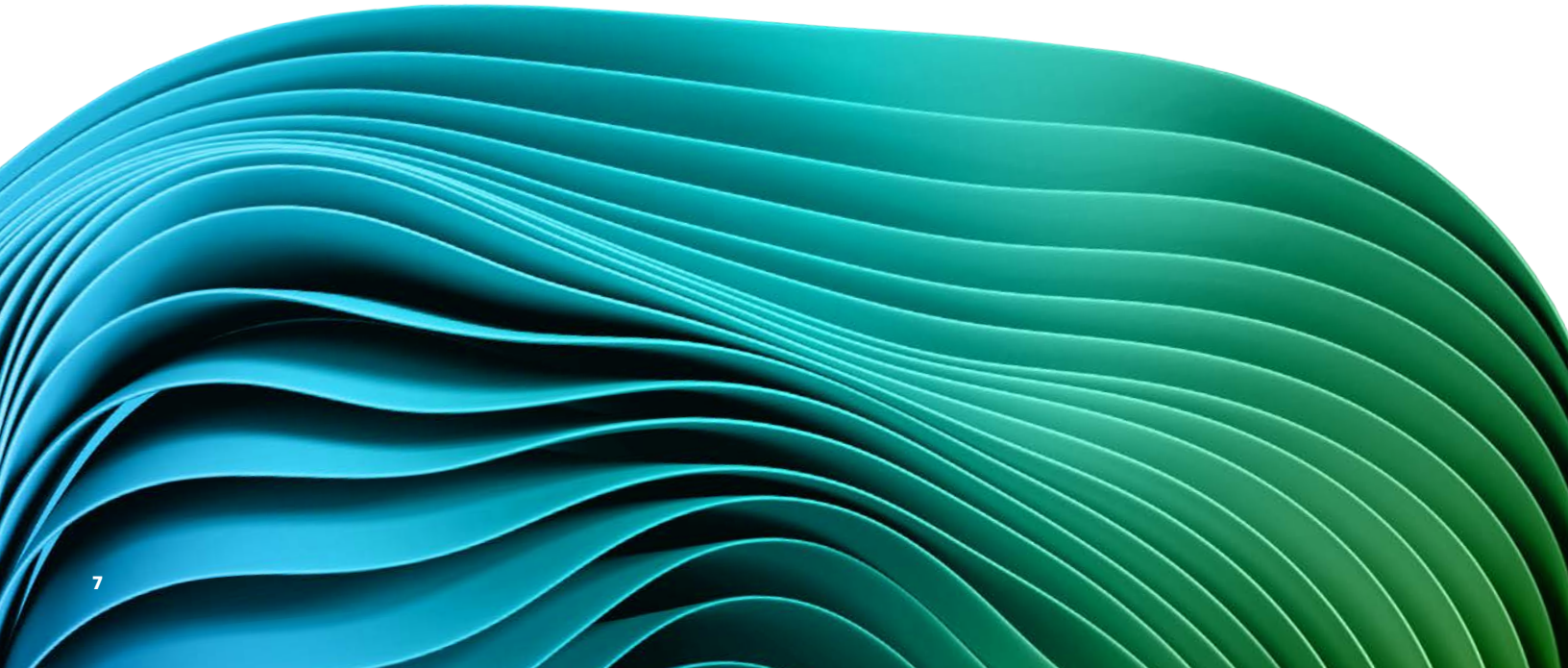
- **Scenario evaluation** and recommendations that improve strategic decision-making
- **Process optimization** to streamline complexity and accelerate outcomes
- **Experience personalization** that helps meet the needs of users in real time
- **Dynamic learning** that enables continuous performance improvements
- **Predictive insights** to help anticipate future trends and risks
- **Autonomous task execution** that frees human workers to focus on higher-value work
- **Decision transparency** to enhance accountability and reduce risks

In previous publications we've explored key use cases, design principles and new ways of thinking that can help organizations activate the potential of AI agents. *(See sidebar on previous page.)* We now take a closer look at where and how AI agents fit within the broader enterprise automation ecosystem.

A new paradigm for process automation

Through its ability to reason and plan, agentic process automation (APA) can address key limitations of RPA.

	RPA	APA POWERED BY AI AGENTS
Primary focus	Automation of well-defined systems and tasks	Automation of dynamic workflows and processes that require reasoning
Complexity to build/deploy	Medium—varies based on application	High—requires advanced models, knowledge modeling and data integration
Adaptability	Requires human intervention for all edits/modifications	Can autonomously adapt to changing needs/conditions
Speed to value	Can be built and implemented rapidly; however, each subsequent use case requires an entirely new build	Typically require upfront investment of time and resources—but speed can accelerate as agents are adapted for additional use cases
Data format	Typically requires highly structured, static knowledge	Can easily incorporate unstructured data and adjust dynamically to new information; however, it requires upfront planning and design effort to build a knowledge model that captures the domain relations and metadata specific to the use case
Contextual understanding	Focuses narrowly on specific tasks and workflows	Can understand context and adapt accordingly



Better together: Driving value with AI agents *and* RPA

AI agents and RPA share a common purpose—enhancing efficiency and optimizing operations. But, as discussed in the previous section, they deliver those benefits in fundamentally different ways. Rather than choosing between them, organizations should explore how RPA and AI agents can work together to amplify impact.

This is especially true for organizations that have already invested in RPA and continue to see value from those investments. The challenges that AI agents typically bring—including higher costs, implementation complexity and evolving regulatory considerations—mean organizations should be careful to avoid "fixing what isn't broken" and instead identify automation opportunities where agentic capabilities can streamline and improve processes.

This approach allows AI agents to leverage RPA as a foundation, using existing automations as building blocks to develop and execute more sophisticated, end-to-end processes. AI agents can process outputs from RPA, analyze data and provide decision support, making automation pipelines more resilient and flexible. This allows organizations to balance cost, efficiency and adaptability while reducing risks associated with early-stage adoption of AI agents.

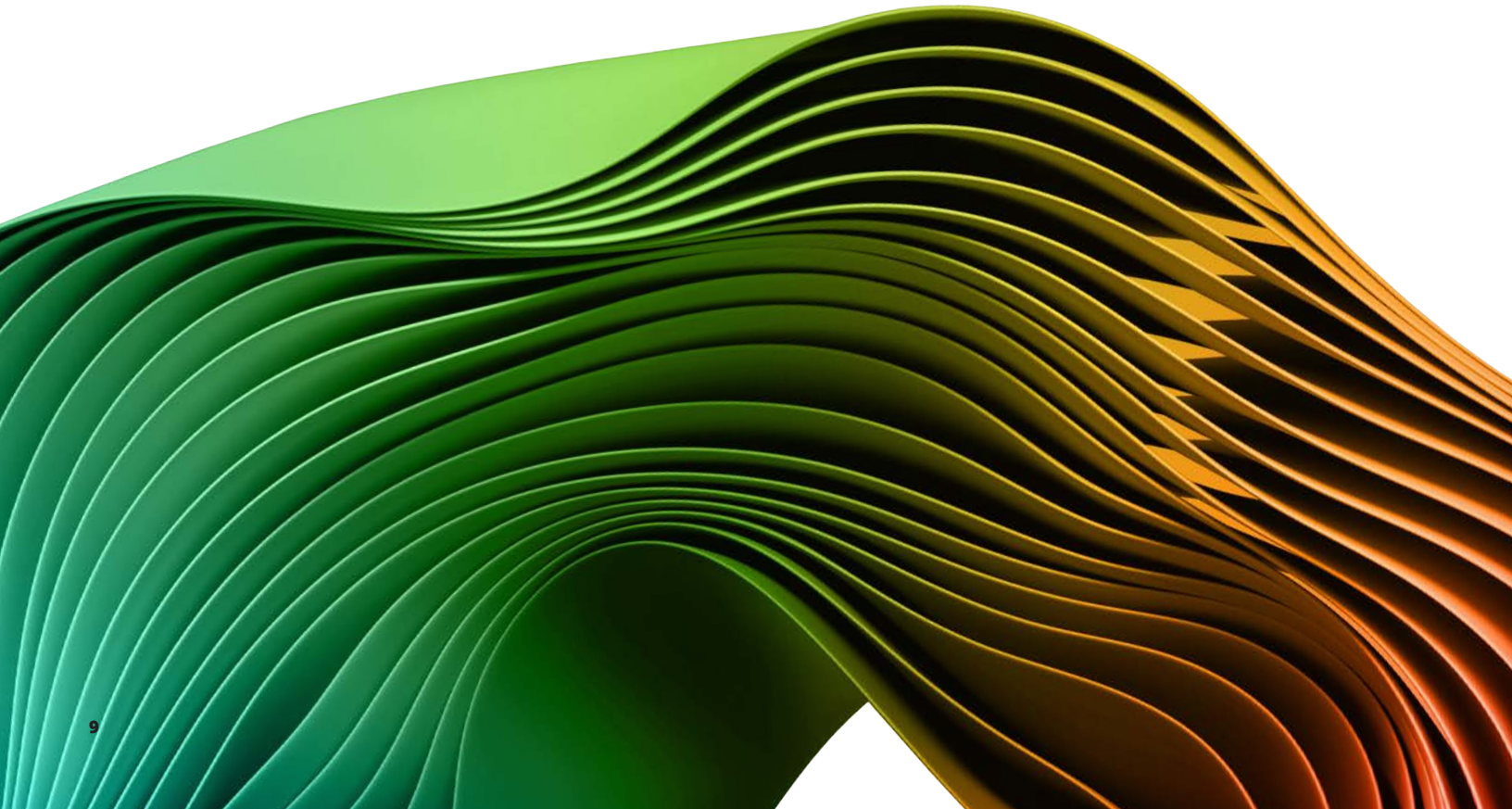
Benefits of combining RPA and AI agents can include:

- **Efficiency and intelligence:** RPA can take care of *repetitive, structured* tasks (e.g., logging in, button clicks, data entry), while AI agents address more *ambiguous, language-dependent* tasks (e.g., reading free-text fields, understanding synonyms and asking clarifying questions).
- **Reduced manual intervention:** By combining RPA's automation with AI agents' decision-making, many exceptions can be largely handled autonomously, with minimal human oversight.
- **Scalability and flexibility:** Traditional RPA can scale in *volume* of tasks handled, while AI agents can scale in *complexity* of the tasks handled—for example, by adapting to new data formats or business rules autonomously.

Extending the potential of RPA with AI agents

The table below shows several sample processes, how RPA would begin to automate parts of the process and how AI agents could extend that automation and, at times, leverage the existing RPA pipeline.

PROCESS	RPA FUNCTIONALITY	AI AGENTS EXTENSION
New-hire onboarding	Account creation and provisioning accesses	Security protocol analysis and access level confirmation; experience personalization based on the new hire's preferences and needs; insight-based process improvement based on feedback, system updates and emerging requirements
System integrations	Data integrations between systems	Intelligent data remapping to target systems based on schema changes; data transformation as needed to ensure compatibility; error correction in real time
Timesheet and compliance monitoring	Notification and escalation of missed timesheets	Personalized and adaptive reminder scheduling at times when employees are most likely and able to respond; exception and special case handling; autocorrection as data formats or systems change over time



Smarter automation in action: Enhancing RPA with AI agents

To illustrate the integration of AI agents with RPA, let's explore a two-part example centered on invoice processing: looking at the steps involved in automating the process with RPA alone, and then how those steps can be enhanced by incorporating AI agents.

How RPA handles invoicing today

An RPA-enabled process on its own can automate repetitive tasks like opening emails, copying data and filling fields. It follows prescribed roles with minimal variation and enables fast throughput on these rules.

Invoice collection
Bot monitors a dedicated email inbox or folder.

An RPA bot is programmed to detect new emails with "Invoice" in the subject line or attachments of specific file types (e.g., PDF).

Data extraction
Bot opens the attachment and uses OCR or templates.

The bot uses fixed rules or templated OCR to identify fields like invoice number, vendor ID, date, total amount.

Data entry
Bot logs into the ERP system.

The bot navigates predetermined screens, pastes data into the correct fields and submits.

Validation & logging
Bot checks for known errors; logs each transaction.

If the invoice number or vendor ID is missing or invalid, the bot flags it as an error, logs it and either sends a notification or places it into an "exceptions" queue.

Invoice processed

LIMITATIONS OF THIS RPA SOLUTION INCLUDE:

Rules-based
Must follow predefined steps. Templates can become ineffective if the invoice format changes drastically (e.g., new vendor layout, missing fields, new invoice design).

Limited contextual understanding
If an item is ambiguous (like "service charge" vs. "consulting fee"), a simple RPA bot can't interpret context or ask clarifying questions.

Limited exception handling
Complex exceptions will often require human intervention.

Invoicing workflow enhanced with AI agents

Now imagine we enhance this process by embedding an agent that can interpret unstructured data, adapt to new formats and dynamically interact with users or systems.

1

Smart intake
The same RPA bot hands off invoices to an agent model for parsing.

The agent can read each invoice in plain text (after OCR) or even parse well-formatted PDFs. It understands synonyms ("service fee" vs. "consulting fee"), identifies line items and can handle unusual invoice layouts without predefined templates.

2

Contextual extraction
The agent interprets invoice details with context-based reasoning.

Instead of rigidly matching text fields, the agent can infer fields ("due date" might be listed as "payment required by:") and interpret unstructured notes. It can handle disclaimers or footnotes by analyzing text in context, deciding which details are relevant to the ERP entry and which are not.

3

Adaptive validation
When an anomaly is detected (e.g., new vendor not yet in ERP), the agent can attempt to resolve it automatically.

The agent can decide to (a) look up the vendor in an external supplier list, (b) find the best match or (c) even generate an email (or chat) requesting more info, e.g., "We don't have this vendor on file. Could you confirm its official business name?" The RPA bot alone could not handle conversation loops.

4

Smart exception
If uncertain or contradictory data appears, the agent can escalate with a summarized explanation.

Instead of simply flagging an error code, the agent writes a human-readable explanation: "Invoice #123 has a mismatch in the amount stated in the line items vs. the total. Are you sure about the final cost?" This reduces time spent deciphering raw error logs.

5

Proactive learning
The system stores new vendor/invoice patterns to improve future processing.

Over time, the agent can learn from repeated patterns or frequent clarifications, gradually increasing accuracy and reducing the need for manual intervention, thus making the automation more resilient and flexible.

Invoice processed with AI agent enhancements

NEW CAPABILITIES INTRODUCED THROUGH AI AGENT INTEGRATION COULD INCLUDE:

Language understanding
The agent can handle variability in invoice language or structure ("invoice #" might appear as "ref #," "bill #," etc.).

Contextual decision-making
It can interpret disclaimers or special instructions, extracting only the relevant data.

Interactive exception resolution
The model can autonomously write clarifying emails, raise more nuanced tickets or even communicate with the vendor via chat.

Continuous adaptation
As new invoice formats appear, the agent can infer how to handle them without waiting for an RPA developer to reconfigure templates.

GenAI changed the game: Now, AI agents are *redefining* it

Few technological advancements in history have unleashed such **rapid, widespread and game-changing** impact on businesses and industries as GenAI.

In its first two years as an enterprise-ready technology, GenAI went from *new* to *necessary* for many businesses. By the end of 2024, 21% of global C-suite leaders said GenAI was already transforming their organizations.[1] Meantime, the pace of technological advancements—in language models, GenAI platform integrations, compute power and more—appears unlikely to slow anytime soon.

AI agents are now extending the impact of GenAI across industries—and they, too, are evolving rapidly. Already, AI agents are being deployed to *improve* operational efficiency and outcomes. In the coming years, agentic capabilities are likely to *redefine* what's possible through enterprise process automation.

Here's how we see AI agents changing the game today—and how they're poised to reset the playing field of tomorrow.

NOW
Context-aware and adaptive AI agents

While RPA remains a viable and cost-effective solution to complete tasks in defined workflows, AI agents can serve as *intelligent assistants* in processes that demand flexibility and contextual decision-making. And as today's first-wave agents become more capable of optimizing their own processes, enterprises may see a sharp reduction in maintenance costs—making traditional RPA systems less advantageous, particularly in fast-changing industries.

Today's agentic advancements include:

- **Context-aware automation** that understands business environments and user intent rather than following rigid scripts.
- **Personalized process automation** that adapts to user preferences and operational needs.
- **Decision-support AI** that assists in scenario planning, forecasting and risk assessment.

NEXT

Autonomous agents and multiagent AI collaboration

As AI agents begin taking on more complex and specialized tasks, the development of multiagent AI systems will enable them to work together autonomously as *collaborative teams*. Through their ability to handle complex, multistep business processes—with individual agents validating and improving each other's outputs—multiagent AI systems will require far less human oversight than current systems, thus freeing workers to focus on higher-value work. While RPA will remain a key part of automation architectures, it will increasingly be subsumed into agent-managed systems.

Next-wave agentic advancements include:

- **Multiagent collaboration,** where AI systems interact, assign tasks and optimize workflows dynamically.
- **Self-healing automation** that proactively identifies inefficiencies and corrects errors without human intervention.
- **Enterprisewide orchestration,** where AI agents manage supply chains, customer experiences and large-scale business processes.

FUTURE

Generalist AI agent systems and *automatic* automation

As agentic capabilities improve, expand and connect across every area of enterprise operations, generalist AI systems will increasingly serve as *strategic advisers* across multiple domains. Businesses will no longer rely on predefined automation rules; instead, AI agents will autonomously design, execute and optimize entire automation frameworks as new needs and conditions emerge. This will allow the focus of human work to shift further away from operational execution and toward roles such as high-level oversight, ethical decision-making and creative innovation that depend on our uniquely enduring human capabilities.

Future-wave agentic advancements include:

- **Cross-domain intelligence** that enables multiagent AI systems to address needs and optimize processes at the function and enterprise levels.
- **Autonomous negotiation and strategic planning** that allows AI to manage contracts, optimize business models and drive corporate strategy.
- **Autonomous decision-making** that spans investment planning, economic forecasting and competitive analysis.

Smart plays for better automation

The **future of automation** belongs to AI agents—but this shift will not happen overnight.

Organizations should approach the transition strategically, using RPA as a stepping stone while establishing the foundations needed for agentic automation. A phased approach—enhancing RPA with AI in the short term, selectively replacing it in the midterm and ultimately transitioning to AI agents and multiagent systems as they mature—will help businesses produce value at every step of the automation journey.

For organizations with existing RPA programs

It's important to play to your strengths—but not rest on your laurels. You can continue leveraging bots to handle clearly defined, rule-based tasks. Meantime, identify the task and process bottlenecks that can benefit from the reasoning, learning and flexibility of AI agents. In such instances, a hybrid approach—combining RPA with AI agents—can help improve automation while mitigating risks.

Also, keep in mind that multiagent solutions capable of handling large-scale decision-making and process execution will likely become feasible within the next six to 12 months. By starting to make moves with AI agents now, your organization will be well positioned for tomorrow.

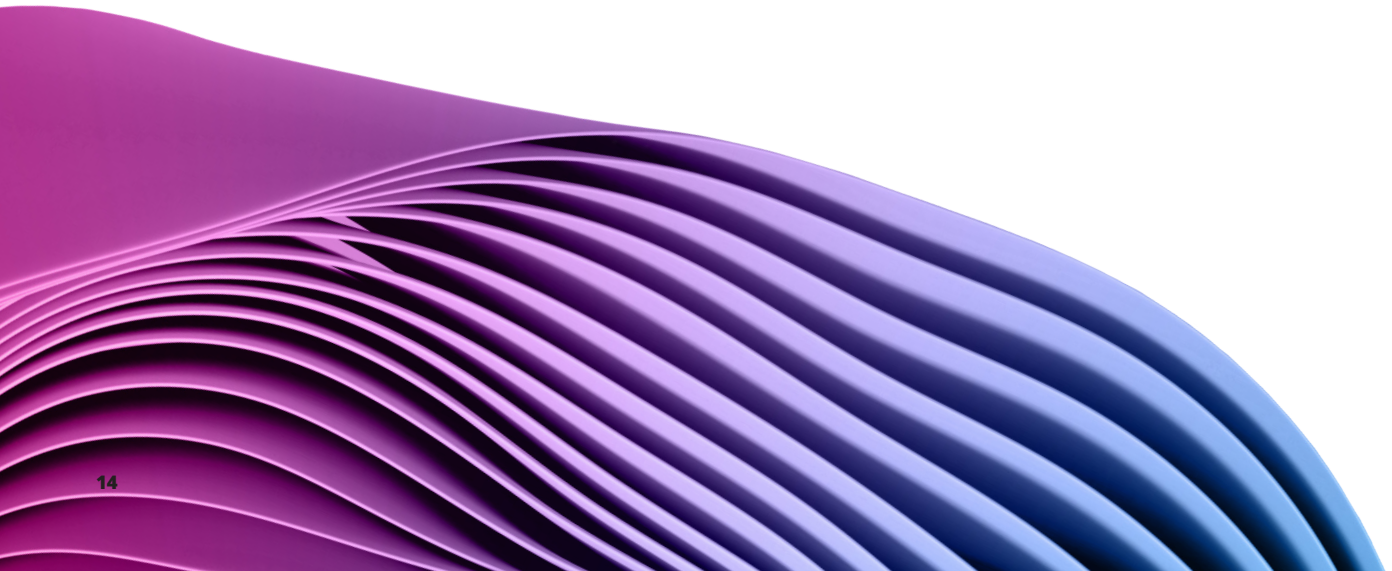
For organizations without RPA programs

Leap ahead or race to catch up? These might seem to be the only choices in today's fast-evolving landscape of automation technologies. But a blank slate can have its advantages. Previous investments in RPA won't be a consideration as you look for automation opportunities; every task and process can be analyzed and matched to best-fit solutions.

Starting with use cases that leverage RPA is still likely to provide the most rapid efficiency gains as well as significant value. RPA can also help lay the groundwork for agentic capabilities by aligning systems, cleaning up data and standardizing processes. Smart and steady can still win the race.

Companies with a higher risk appetite or those operating at the cutting edge of technology may choose to bypass traditional automation altogether and move straight to agent-enabled solutions. Making that leap can make it possible to build smarter, more adaptive automation ecosystems from the ground up, avoiding the need to retrofit AI onto an RPA-based infrastructure in the future. With AI agents at the core, workflows can be designed to be more scalable, future-proof and seamlessly integrated with ethical AI frameworks, data security and compliance from day one.

Wherever your organization starts the journey, augmenting RPA with AI agents is not about replacing one technology with another—it's about combining and evolving automation strategies to maximize efficiency, intelligence and adaptability. A thoughtful, phased approach can help your organization map a successful journey to agent-powered automation while maintaining operational and financial stability along the way.



Making moves now to prepare for what's next

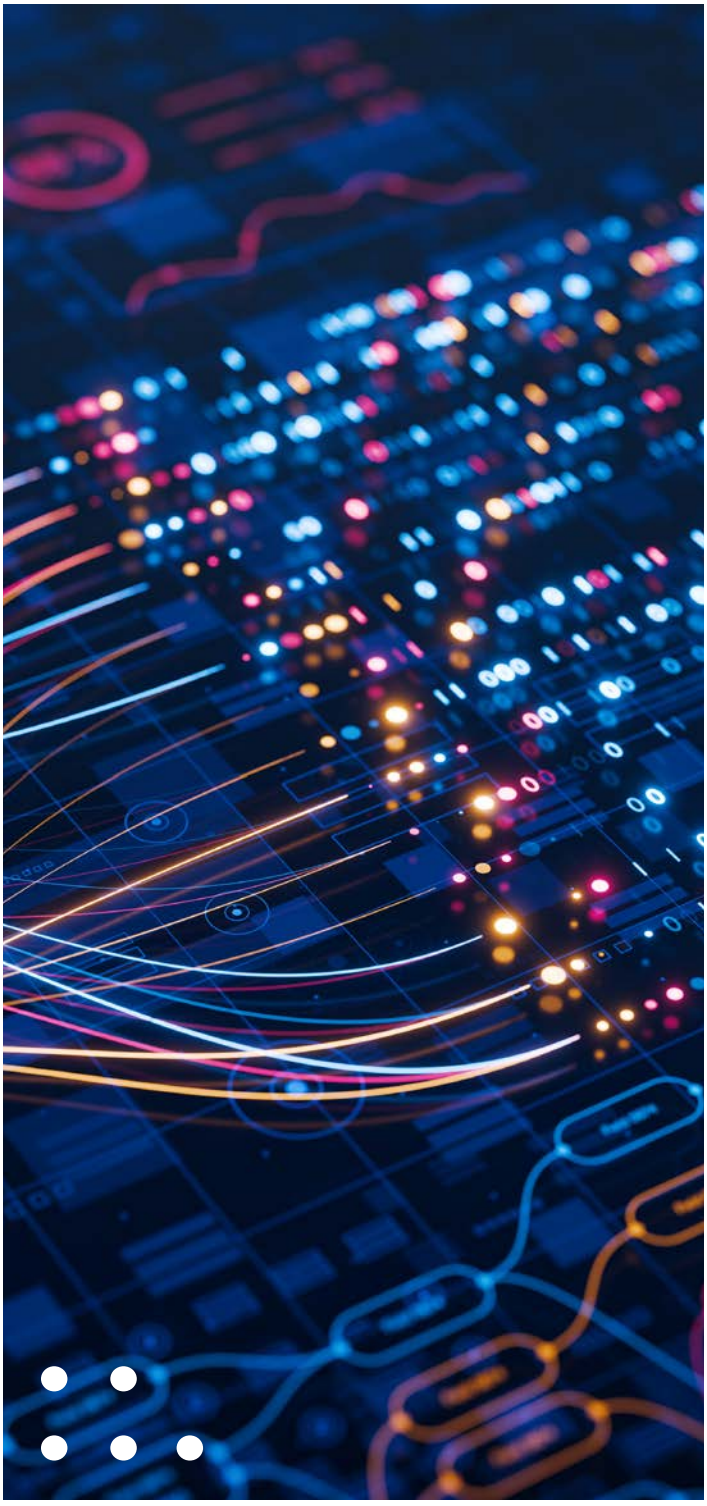
Game-changing technologies are often touted not only for the new efficiencies they can unlock, but for the old tools and ways of working they will replace. But in most cases, new technologies simply expand the range of available solutions. No matter how much horsepower is packed into cars, there will still be circumstances where riding a horse is the best option.

As previously noted, AI agents will not supplant *all* existing automations. Indeed, their greatest potential lies in expanding automation capabilities into realms of business activity that previous automation technologies could not address, and in enhancing existing automations with adaptability, reasoning and decision-making capabilities.

Those are the fertile territories where today's forward-thinking organizations are already unearthing new opportunities, cultivating transformative efficiencies and buttressing enterprise resiliency. In the process, they're becoming better prepared for whatever game-changing automation appears *next* on the horizon.

As you consider the path ahead, here are some questions to ask yourself:

1. **Where in our business have RPA efforts slowed** due to judgment- or knowledge-based processes?
2. **Are there specific pain points, inefficiencies, or decision-heavy tasks that would best be addressed by AI agents** instead of traditional RPA? Is there a clear ROI or strategic advantage to applying AI agents in these areas?
3. **In what ways can combining RPA with AI agents help** us balance cost, efficiency and adaptability in our operations?
4. **What steps should we take to ensure that AI agents can act autonomously** as business needs and conditions change, while also safeguarding against risks?
5. **How should we structure a phased approach** for integrating AI agents into our automation ecosystem?



Get in touch

Prakul Sharma
Principal, AI & Data
Deloitte Consulting LLP
praksharma@deloitte.com

AJ Maxwell
Principal, AI & Data
Deloitte Consulting LLP
amaxwell@deloitte.com

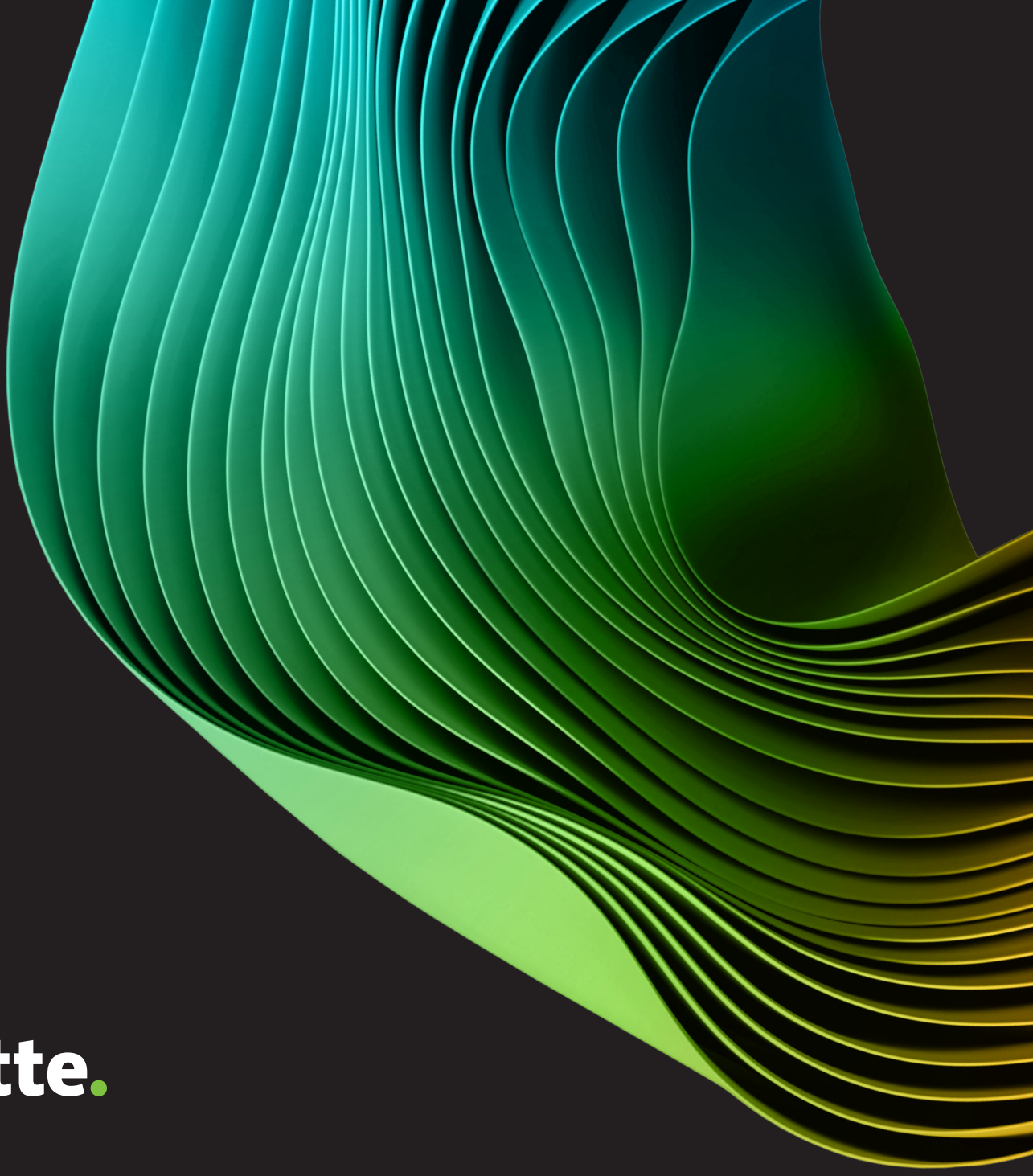
Patricia Henderson
Principal, AI & Data
Deloitte Consulting LLP
pahenderson@deloitte.com

Camille Chicklis
DC Specialist Leader
Deloitte Consulting LLP
cchicklis@deloitte.com

Contributors to this report:
Jim Rowan, Parth Patwari, Sanghamitra Pati, Ed Van Buren

Endnotes

1. Jim Rowan, Beena Ammanath, Costi Perricos, Brenna Sniderman and David Jarvis, *Now decides next: Generating a new future*, Deloitte AI Institute, January 2025, p. 28, https://www.deloitte.com/content/dam/assets-zone3/us/en/docs/campaigns/2025/us-state-of-gen-ai-2024-q4.pdf, accessed March 20, 2025.



Deloitte.

About Deloitte

As used in this document, "Deloitte" means Deloitte Consulting LLP, a subsidiary of Deloitte LLP. Please see www.deloitte.com/us/about for a detailed description of our legal structure. Certain services may not be available to attest clients under the rules and regulations of public accounting.

Deloitte provides industry-leading audit and assurance, tax and related services, consulting, financial advisory, and risk advisory services to nearly 90% of the Fortune Global 500® and thousands of private companies. Our people deliver measurable and lasting results that help reinforce public trust in capital markets, enable clients to transform and thrive, and lead the way toward a stronger economy, a more equitable society, and a sustainable world. Building on its 175-plus year history, Deloitte spans more than 150 countries and territories. Learn how Deloitte's approximately 457,000 people worldwide make an impact that matters at www.deloitte.com.