

The Playbook for Adopting **Agentic AI** in **RPA**



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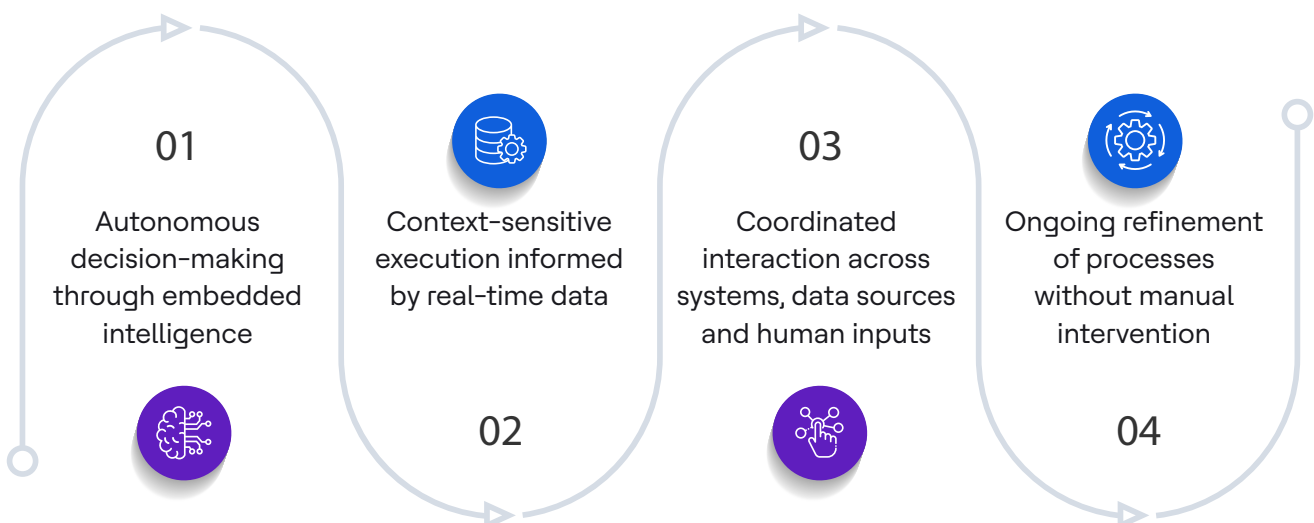
Executive summary



Enterprise automation has traditionally focused on task execution through predefined rules and structured workflows. While this approach has delivered measurable efficiency gains, it lacks the flexibility required to support strategic decision-making and dynamic business operations.

The automation space is undergoing a fundamental shift. As enterprises strive for greater agility, resilience and intelligence, conventional Robotic Process Automation (RPA) is no longer sufficient. Agentic RPA represents the next phase of automation maturity, where autonomous agents – capable of making decisions, adapting to operational changes and coordinating across systems to achieve defined business outcomes – are utilized.

This paper explores how Agentic AI transforms RPA from a static toolset into a dynamic, goal-oriented capability. It outlines the strategic imperative for enterprises to evolve beyond traditional automation and embrace agentic systems that deliver:



Recent industry data reinforces the urgency of this transition. The AI-in-RPA market is projected to grow at a massive pace, representing a compound annual growth rate of nearly 30%. As organizations face mounting pressure to innovate, reduce costs and respond to market volatility, Agentic AI provides a pathway to intelligent, resilient automation, laying the foundation for the autonomous enterprise.



Blending Robotic Process Automation and Agentic AI

The integration of RPA with Agentic AI transforms automation from executing fixed tasks to making context-aware decisions and adapting in real time. This enables handling complex workflows and exceptions, resulting in more agile, scalable and intelligent automation solutions.

What is Robotic Process Automation (RPA)?

Robotic Process Automation (RPA) utilizes software robots to automate rule-based, repetitive tasks across digital systems, such as data entry and invoice processing. RPA excels in high-volume transactional activities by automating well-defined workflows with speed and accuracy, while integrating seamlessly with legacy systems to minimize manual interventions and reduce operational errors.

The rise of Intelligent Automation (IA)

Intelligent Automation (IA), on the other hand, extends RPA by embedding AI technologies – like machine learning, natural language processing and cognitive computing – into automation workflows. This evolution enables bots to handle unstructured data, learn from patterns and adapt to new scenarios, thereby automating more complex processes and improving decision-making. IA empowers enterprises to deliver agile, intelligent business operations and enhanced customer experiences at scale.



Agentic AI is not merely the next step in automation, it represents a transformative shift that will redefine competitive advantage, moving from optional innovation to an essential capability for survival and leadership in the digital era.

The challenge: Why traditional RPA struggles at scale

Despite its initial success in automating repetitive tasks, traditional Robotic Process Automation faces significant challenges when applied at scale in complex enterprise environments. The core limitations stem primarily from its reliance on structured data, fragility in dynamic systems and organizational barriers that impede the realization of sustainable deployment and ROI.



1 Unstructured data and format diversity

RPA bots rely heavily on static UI elements and fixed workflows, making them brittle by design. Even minor changes in user interfaces, layouts or application updates can break automation scripts, requiring resource-intensive maintenance and reprogramming. This fragility increases operational costs and risks, as continuous human oversight is needed to detect and fix failures.



2 Exception handling and contextual blind spot

Traditional RPA lacks contextual understanding or learning capabilities. Bots execute discrete tasks but cannot handle exceptions intelligently or adapt to unforeseen scenarios. This leads to high volumes of false positives flooding compliance and operations teams, thereby reducing trust and increasing the need for manual intervention. The inability to manage end-to-end business goals restricts the effectiveness of RPA in complex workflows.



3 Script fragility and maintenance overhead

RPA bots rely heavily on static UI elements and fixed workflows, making them brittle by design. Even minor changes in user interfaces, layouts or application updates can break automation scripts, requiring resource-intensive maintenance and reprogramming. This fragility increases operational costs and risks, as continuous human oversight is needed to detect and fix failures.



4 ROI delays and process standardization gaps

Studies indicate that approximately 67% of automation initiatives fail or underperform due to unstandardized or poorly defined processes. The average time to achieve meaningful return on investment ranges between six and eight months, resulting in a slow business impact. Inconsistent processes across regions and departments create additional barriers, as automation requires standardization to scale effectively.



5 Technical barriers: Integration and bot fragility

Integrating RPA with legacy systems lacking modern APIs presents technical hurdles. Bots dependent on specific UI paths are vulnerable to application upgrades or system changes. These dependencies can disrupt workflows, demanding frequent adjustments and sophisticated governance to maintain stability.



6 Organizational barriers: Change resistance, skills gap, governance

Beyond technology, organizational culture and workforce readiness pose challenges. Resistance to process change, lack of skilled automation professionals and insufficient governance frameworks limit RPA adoption and scalability. Successful scaling requires comprehensive change management and investment in staff training.

Shift from RPA to Agentic RPA (ARPA)

The shift from traditional RPA to Agentic RPA (ARPA) embodies an evolution from brittle, scripted bots to intelligent digital coworkers capable of self-healing, adaptive decision-making and goal-driven automation. This transition addresses critical shortcomings inherent in legacy RPA deployments while accelerating ROI and scalability.



Phased transformation

Organizations typically undertake a phased transition, beginning with augmenting existing RPA bots with AI capabilities to handle unstructured data sources, including emails, invoices and handwritten forms, with over 89% accuracy than manual methods. Initial phases enhance bots' ability to process semi-structured data and detect anomalies via retrieval-augmented generation (RAG) combined with vision-language models (VLMs). Later phases focus on deploying autonomous agents that dynamically adjust to UI changes, handle exceptions and achieve goal completion.



Self-healing, adaptive and context-aware automation

A hallmark of ARPA is autonomous error detection and recovery guided by model context protocols (MCP) and feedback loops reminiscent of actor-critic algorithms. These systems continuously monitor execution, perform error analysis and replan workflows without manual intervention. By combining lightweight, focused agents with rich context and observability layers, ARPA achieves seamless adaptation and significantly reduces operational downtime. This contrasts with traditional RPA's brittle dependence on static UI elements and scripted sequences.



From task bots to digital co-workers

Unlike traditional RPA bots, which are constrained to discrete, rule-based steps, ARPA bots serve as collaborative agents embedded within workflows who understand the context and objectives of their tasks. By integrating semantic decision-making and human-in-the-loop (HITL) frameworks, ARPA systems drive proactive task orchestration and exception management. Bots transition from executing rigid procedures toward managing real-world goals dynamically — for example, “close daily risk reports for high-risk clients” rather than “click this button” repeatedly.



The shift to real-time, Autonomous Decision-making

ARPA systems leverage LLM-driven semantic reasoning to make real-time autonomous decisions aligned with business objectives. Using structured prompt generation, dynamic plan retrieval, validation and chained function execution, ARPA bots can navigate complex workflows end-to-end. Moreover, by tracking progress through asynchronous status updates and integrating human feedback intelligently, ARPA establishes a new automation paradigm focused on business value and scalability.



Agentic AI is redefining enterprise automation by breaking through the limits of traditional Robotic Process Automation (RPA). It actively leverages cognitive intelligence to unlock unstructured data, automate complex workflows and empower dynamic decision-making that drives high-value business outcomes.

Why now? Strategic imperatives driving AI-infused automation



Market growth and competitive pressures

The AI-powered automation market is experiencing unprecedented growth fueled by rapid technological advancements and growing enterprise demand for operational excellence. So, enterprises stand at a critical inflection point: embracing AI-infused automation is no longer optional but essential.

- The spending on hyperautomation toolchains will skyrocket, indicating the mandate to automate end-to-end processes and continuously optimize operations.
- Organizations leveraging AI-powered automation gain competitive advantages in speed, accuracy and business innovation, applying autonomous agents capable of dynamic task orchestration and seamless API integration.
- Platforms such as UiPath's AI Agents exemplify the shift beyond rigid, rule-based RPA to goal-oriented, context-aware digital coworkers driving complex workflows autonomously.

As competitive pressure intensifies, enterprises that do not adopt these intelligent automation capabilities risk falling behind nimble, AI-enabled rivals that can respond faster and execute with higher precision.



Experience economy and real-time responsiveness

Modern consumers expect seamless, hyper-personalized experiences tailored in real time across interaction channels. This paradigm shift, termed the Experience Economy, places experience transformation at the core of competitive differentiation. AI-powered agents meet these demands by predicting customer needs, enabling proactive engagement and dynamically adapting workflows. Enterprises that leverage AI to orchestrate real-time experiences achieve higher customer satisfaction, retention and brand loyalty – key elements in today's highly competitive markets.



Talent optimization and strategic workforce allocation

The infusion of AI automation liberates human talent from routine and repetitive tasks, allowing for redeployment into value-added roles that require creativity, judgment, and strategic thinking. Democratization of automation tools through low-code and no-code platforms further empowers non-technical "citizen developers" to contribute to automation efforts, increasing implementation velocity. Addressing the existing skills gap through upskilling and AI augmentation is vital for realizing this workforce transformation and maximizing productivity gains.



Process mining as a foundation for intelligent automation

Process mining has emerged as a crucial capability, with executives recognizing it as pivotal to the success of automation initiatives. By generating real-time digital twins of operational workflows, process mining identifies bottlenecks, anticipates SLA breaches and enables intelligent, automated response mechanisms. This insight-driven approach ensures automation efforts remain precisely targeted, responsive and continually optimized against evolving business dynamics.

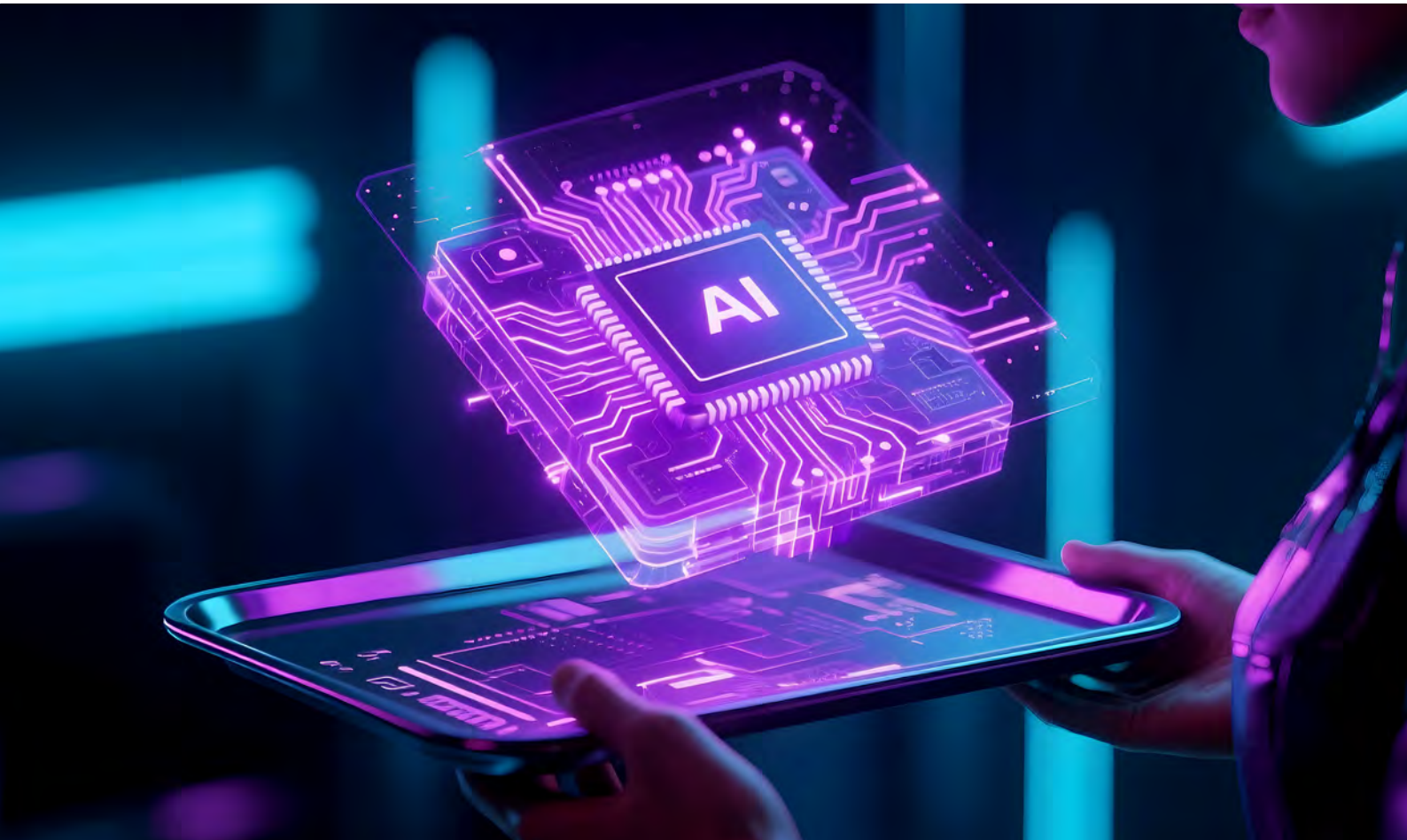


Cloud native and API-first delivery models

Cloud native automation platforms, now employed in over 53% of new RPA deployments, offer elastic scalability, rapid upgrades and extensive connectivity via API-first architectures. Such environments facilitate seamless integration across diverse systems, including ERP, CRM and legacy infrastructure. The agility provided by cloud and APIs accelerates innovation cycles and supports the complex orchestration demands of AI-driven automation ecosystems, ensuring technology can keep pace with business growth and transformation.

How to strengthen your automation?

Mature agentic AI-driven automation demands targeted improvements in data governance, robustness and organizational adoption readiness. The following best practices address real-world fragility points and offer actionable guidance for building resilient, high-impact automation programs.



Improving data quality through governance and profiling

Strengthening automation begins with an AI-powered data governance framework that rigorously enforces data accuracy, completeness and integrity, ensuring that agentic AI models are reliable at scale. Critical strategies include:

- Enforce role-based and context-sensitive permissions, bounding agent access according to data classification and use case.
- Institute privacy-by-design principles, leveraging differential privacy algorithms to enable agents to learn from sensitive data without violating individual confidentiality.
- Maintain immutable audit trails and transparent lifecycle controls, ensuring every agentic interaction is logged for compliance and traceability.
- Regularly profile and clean source datasets. Proven approaches involve automated cataloging, adaptive cleansing agents and ongoing relevance audits to eliminate inconsistent, obsolete or biased data points.



Enhancing bot robustness via vision anchors and self-healing models

To address the fragility of UI-bound bots and boost system resilience, state-of-the-art platforms are deploying vision anchor technology and self-healing models:

- Integrate deep learning algorithms to establish “anchor points” within visual interfaces, enabling bots to recognize shifts in layout or element changes and dynamically reorient their execution paths.
- Implement machine learning-based self-healing routines that detect anomalies, trigger automated error correction, and restore agent workflows in real time – proven to reduce downtime and ongoing maintenance burdens dramatically.
- Use semantic binding within application controls and predictive maintenance models to proactively identify at-risk scripts and implement corrective action before failures occur. These approaches minimize disruption and support robust operational continuity in Agentic RPA ecosystems.
- Explore reinforcement learning and predictive maintenance models: These approaches proactively identify at-risk scripts and implement corrective action before failures occur, addressing the corporate need for minimal disruption and operational continuity.



Driving adoption with change management and upskilling

Automation initiatives face adoption challenges due to user resistance and skill gaps; rigorous change management and upskilling strategies are essential.

- Establish a structured change management plan before agentic AI deployment, incorporating stakeholder engagement, transparent communication and continuous feedback loops to foster buy-in and reduce fears of displacement.
- Prioritize upskilling programs focused on real-world AI applications, such as generative AI, computer vision, NLP and prompt engineering.
- Leverage AI analytics to identify training needs, potential mentorship pairings and career progression pathways – helping employees contribute to automation initiatives while advancing their own roles.
- Design modular, repeatable onboarding frameworks to rapidly educate citizen developers in low-code/no-code platforms while maintaining governance guardrails to mitigate exposure to regulatory and operational risk.

Principles for successful agentic RPA design

Modern Agentic RPA requires rigorous design, combining natural language intelligence, intentional tool building, adaptive feedback systems and robust error analytics. These principles, validated by empirical research and state-of-the-art deployments in 2025, underpin high-value automation in enterprise settings.



Write smarter prompts, get smarter bots

Optimizing RPA agent performance starts with precise, context-rich prompt engineering. Studies show that ambiguous or sparse instructions result in suboptimal model outputs even when using advanced LLMs. All major LLM providers, including recent resources from Anthropic and Google, recommend using explicit, domain-tailored prompts – detailing context, intent, constraints and expected formats – to elicit accurate and reliable results. Bootstrapping system prompts with research-derived templates or LLM-generated drafts can accelerate agent onboarding and minimize common instruction ambiguities, thereby reducing development cycle time and error rates.



Build the tools carefully

Tool design for Agentic RPA agents is not a “quantity game” – excess tool options pollute execution memory and degrade model focus. Empirical analysis of agentic architecture reveals that best practice involves fewer than 10 highly focused tools, each designed for semantic clarity and with minimal parameters. State management must remain modular, with clear interfaces allowing AI agents to invoke tools as callable APIs and return actionable data to the core LLM. In advanced agentic systems, specialized tools may be created to generate domain-specific code or orchestrate external events, but only when direct, semantic tool interaction is feasible and securely managed.



Design a feedback loop

A two-phase feedback loop, inspired by actor-critic models, is essential for robust agentic automation. Agents execute plans (actor), while internal validators or external modules critique results – using compilers, linters, business rules or workflow tests. Validation identifies not just technical errors, but compliance and process fit. Agentic RPA is further strengthened by adaptive recovery: agents should log failed attempts, generate a contextual message for model replanning and choose from soft/hard recovery (reprocess, escalate or discard). The guardrails built into this loop are proven to reduce false positives, boost reliability and support transparent auditability.

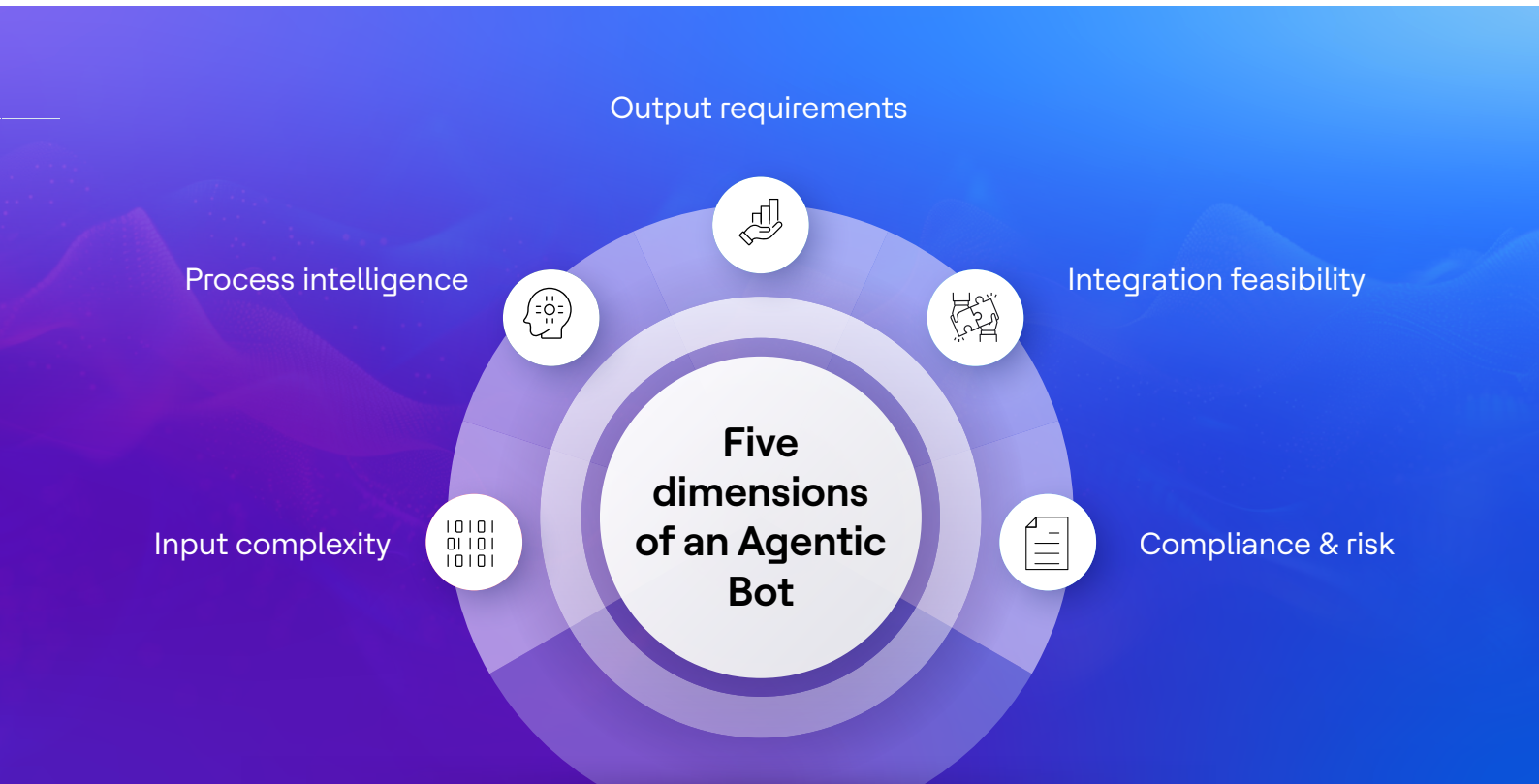


LLM driven error analysis at scale

Comprehensive error analysis in Agentic RPA involves automated baseline creation using system logs and execution trajectories, followed by LLM-powered review of failure paths and corrections. Recent deployments leverage extended LLM context windows (e.g., Gemini’s million-token capacity) to analyze execution histories and uncover blind spots in agent, tool or context management. Insight-driven error handling is shown to systematically improve baseline models, providing iterative, data-backed enhancements in automation across enterprise domains.

HCLTech's RPA Bot Scoring Framework

HCLTech's RPA Bot Scoring Framework emerges as a critical methodology for evaluating and guiding the transformation of traditional RPA bots into agentic, AI-empowered digital workers. By assessing each automation candidate across five meticulously selected dimensions, the framework delivers a quantifiable basis for strategic decision-making in AI conversion initiatives.



Input complexity

This dimension focuses on the nature and diversity of data inputs the bot must process. Structured inputs – such as database entries or fixed-format forms – usually require less adaptation, whereas semi-structured and unstructured data types (e.g., emails, scanned documents, natural language) demand sophisticated AI capabilities like NLP and computer vision. Bots dealing with heterogeneous, high-variance inputs score higher, indicating greater AI enablement potential as agentic systems excel in interpreting and adapting to complex content.



Process intelligence

Process intelligence assesses the cognitive load and decision-making complexity involved in the bot's assigned workflows. Routine, repetitive tasks with fixed logic rank lower, being aptly handled by classical RPA. In contrast, processes requiring heuristic reasoning, judgment or adaptive decision-making – such as exception handling or dynamic process adjustments – score higher due to AI's ability to learn, infer and optimize workflows autonomously. This dimension is pivotal in distinguishing simple task automation from true agentic autonomy.



Output requirements

The framework evaluates the output complexity, including format variability, accuracy tolerance and the need for explainability or auditability. Bots generating standardized, predictable outputs represent low AI integration urgency, whereas those producing natural language summaries, visualizations or multi-modal content require advanced generative AI capabilities. Additionally, industries with strict regulatory compliance demand transparent, explainable outputs, further elevating their classification for AI augmentation.



Integration feasibility

Bots operate within complex enterprise architectures, interacting with multiple layers like ERP, CRM, cloud services and legacy systems. Integration feasibility measures the technical ease or complexity of connecting these systems. Bots managing APIs and cloud-native endpoints score better, reflecting a smoother transition path toward Agentic RPA models. Conversely, bots that depend on brittle UI automation in siloed legacy systems pose higher risks and require careful assessment.



Compliance & risk

The compliance and risk dimension addresses governance, auditability and data sensitivity considerations. Bots processing personal or sensitive data, subject to data privacy regulations like GDPR or HIPAA, rank higher as candidates for AI-powered controls embedded with privacy-by-design principles and immutable audit trails. This evaluation prevents premature AI adoption in high-risk contexts while ensuring the safe and accountable scaling of automation.



Score interpretation and assigning scores across dimensions

Each dimension is scored on a scale of 1 to 5, reflecting increasing complexity or readiness for AI enhancement. These individual scores are aggregated to produce a composite suitability score. This quantification guides decisions, allowing for clear differentiation among bots that are well-suited for an agentic AI upgrade versus those that are better retained in classical RPA or enhanced incrementally with machine learning.



Interpreting total scores: Suitability for AI empowerment

1

Scores between 20 and 25: This identifies bots highly suitable for AI or generative AI conversion, typically supporting full agentic transformation with minimal hybridization.

2

Scores between 15 and 19: This suggests moderate suitability, where a hybrid approach combining AI and RPA components may optimize outcomes.

3

Scores below 15: This indicates bots with lower immediate AI readiness; such bots should either remain under traditional RPA with enhancements or undergo careful process reengineering before AI adoption.

This scoring framework equips enterprises with a crystal-clear, data-driven roadmap, emphasizing strategic AI investment where it delivers optimal operational value and risk-managed growth.

HCLTech's perspective: Orchestrating the future with Agentic RPA

HCLTech foresees a profound metamorphosis in automation, driven by the fusion of RPA and agentic AI, which will fundamentally redefine enterprise operations. This vision is rooted in the conviction that automation must transcend mechanistic task execution to become adaptable, goal-oriented collaborators within organizations. HCLTech believes this evolution is imperative for enterprises aspiring to achieve unprecedented agility, operational resilience and innovation velocity, especially in volatile market conditions.

From task automation to goal-oriented autonomy

HCLTech's philosophy moves automation beyond rule-based automation toward intelligent agents that own outcomes, not just tasks. Traditional RPA bots operate on linear, brittle scripts with limited context awareness, creating scalability and maintenance challenges. In contrast, Agentic RPA:

- **Interprets intent over instructions:** Agents can derive business objectives from context, enabling dynamic adaptation to evolving conditions rather than mechanical adherence to static scripts.
- **Self-learns from operational feedback:** Continuous learning loops allow agents to refine decisions, anticipate anomalies and improve performance autonomously.
- **Owns full process flow:** Rather than isolated task execution, agents take accountability for end-to-end delivery, proactively resolving exceptions and ensuring compliance without human intervention.

This approach minimizes operational friction and positions automation as a strategic partner in achieving business goals.



HCLTech's vision for intelligent, scalable automation

HCLTech envisions a future where agentic automation powers an open, smart ecosystem supported by cloud-native platforms and AI-driven orchestration layers. Core tenets of this vision include:

- **Modular design for rapid innovation:** AI agents are designed as composable building blocks, integrating with heterogeneous enterprise systems via APIs, enabling swift customization for industry-specific workflows.
- **Real-time observability and resilience:** Using AI-powered telemetry and diagnostics, agents self-detect drift, initiate self-healing processes and maintain continuous compliance with regulations and governance requirements.
- **Pioneering breakthrough AI models:** Partnering with cloud and AI leaders, HCLTech invests in vision-language models, reinforcement learning and generative AI advancements to deliver self-sustaining, adaptive automation frameworks.

This fusion delivers scalable automation ecosystems that reduce manual maintenance overhead, accelerate return on investment and facilitate ongoing digital transformation at enterprise scale.

Empower RPA teams with Agentic AI capabilities

Recognizing that human capital catalyzes successful automation, HCLTech's approach holistically integrates people and technology:

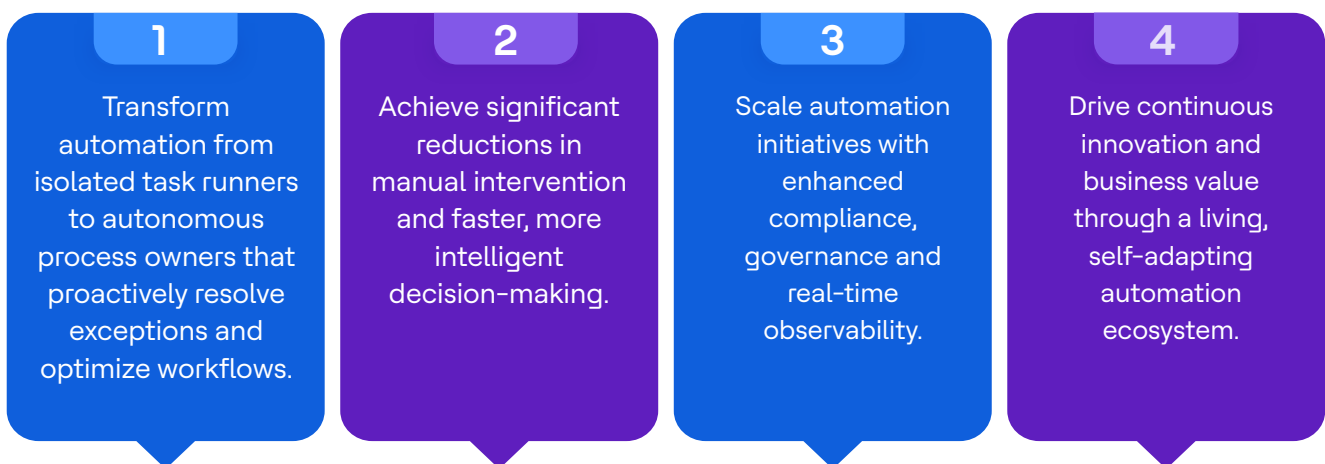
- **Targeted upskilling programs:** Comprehensive AI literacy in prompt engineering, data curation, and agent orchestration enables RPA practitioners to manage AI bots effectively, reducing skill gaps hindering adoption.
- **Democratized automation:** Low-code/no-code platforms empower "citizen developers" inside organizations to build and evolve agentic workflows with governance guardrails, accelerating deployment velocity.
- **Governance embedded into workflows:** Transparent audit, compliance and risk-management capabilities enable teams to scale automation with confidence, ensuring traceability and regulatory alignment.

By combining deep AI capabilities with scalable workforce development, HCLTech aims to help enterprises realize the full value of agentic automation while fostering a future-ready workforce poised for ongoing digital disruption.

Conclusion

Agentic AI integration within RPA signals a paradigm shift in enterprise automation. Moving beyond static, rule-based task execution, agentic RPA empowers digital workers to understand intent, adapt dynamically and continuously improve through learning. This advancement unlocks new levels of operational agility, resilience and efficiency, which are crucial for organizations facing complex and fast-evolving business environments.

By embracing agentic AI, enterprises can:



From HCLTech's perspective, agentic AI-powered RPA is not merely a technological evolution but a strategic imperative. HCLTech envisions a modular, cloud native ecosystem where AI agents integrate seamlessly with existing infrastructures, supported by embedded governance and ethical frameworks.

Mastering this intelligence imperative positions enterprises at the forefront of digital transformation, equipping them to innovate, compete and grow sustainably. HCLTech stands ready to lead this journey, advocating agentic RPA as the cornerstone for future-ready, agile and resilient organizations.

HCLTech | Supercharging Progress™

HCLTech is a global technology company, home to 211,000+ people across 52 countries, delivering industry-leading capabilities centered around digital, engineering and cloud, powered by a broad portfolio of technology services and products. We work with clients across all major verticals, providing industry solutions for Financial Services, Manufacturing, Life Sciences and Healthcare, Technology and Services, Telecom and Media, Retail and CPG, and Public Services. Consolidated revenues as of 12 months ending June 30, 2022 totaled \$11.8 billion. To learn how we can supercharge progress for you, visit hcltech.com.

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