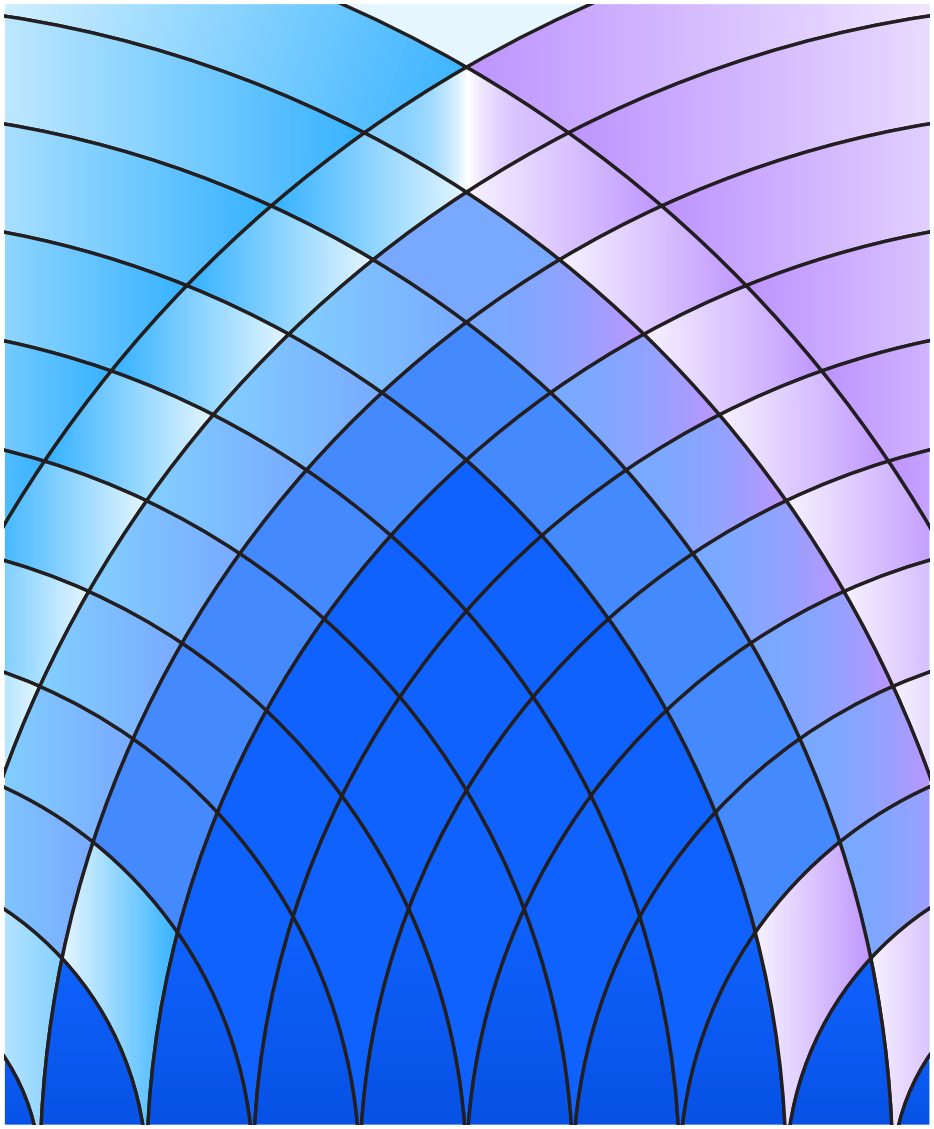
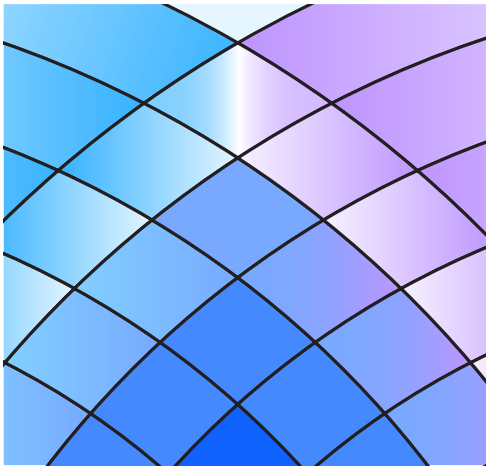


One language, one truth

Why agentic AI demands unified ERP

Contents



Key takeaways

ERP has become strategic again—not just as a system of record, but as the system that defines reality.

Semantics unlock scale.

Despite a full 99% of organizations expecting cloud-modernized ERP by 2028, only 38% have embedded semantic definitions into AI models today. As a result, organizations estimate their AI initiatives are moving 30% slower than they could.

Governance multiplies ROI.

Those with strong governance and moderate AI maturity show 7% higher ROI and 163% greater confidence in AI reliability compared to high-tech, low-governance peers. Yet less than half of organizations have governance in place to oversee autonomous agents.

Cross-silo agents deliver structural advantage.

Only 46% of organizations say their ERP enables effective cross-functional coordination—but those that do report higher AI ROI and broader workflow transformation. Cross-silo agents orchestrate entire workflows, eliminating handoffs and surfacing exceptions before they cascade.

Introduction

Most enterprises don’t have an AI problem. They have a meaning problem.

As organizations experiment with agentic AI, they’re realizing a hard truth: autonomy collapses when the enterprise can’t agree on what things mean. When “customer” and “product” have various definitions across systems, agents don’t accelerate work. They pause, escalate, or make decisions that can’t be trusted. This is why so much AI ambition is stalling not in the lab, but in operations.

It’s also why ERP has become strategic again—not just as a system of record, but as the system that defines reality. ERP is where the enterprise decides what is true, how work connects across functions, and which decisions machines are allowed to execute. AI doesn’t smooth over ERP fragmentation. It exposes it. Every customization, inconsistency, and workaround becomes a risk multiplier as autonomy increases.

New research from the IBM Institute for Business Value (IBM IBV) shows a clear inflection point. According to our survey of 1,000 senior executives spanning 20 industries and 12 countries, the organizations that treat ERP as semantic infrastructure—not just transactional plumbing—are the ones able to move from AI pilots to trusted, scaled autonomy. They aren’t modernizing ERP to keep systems current. They’re doing it to make the enterprise legible to machines.

More than two-thirds (68%) of enterprises say accelerating ERP modernization is critical to achieving competitive advantage and operational efficiency. The question now facing leaders isn’t whether agentic AI is coming. It’s whether their ERP can be trusted with it.

Part 1

The backbone of enterprise truth

When ERP becomes the authoritative source for core definitions, metrics, and workflows, organizational behavior changes. Cross-functional coordination improves. Translation friction dissolves among teams. Decisions accelerate, and handoffs shrink. Agents can operate across domains without constantly reconciling divergent interpretations.

This is because shared truth synchronizes organizational attention. When finance, HR, and operations speak the same language, those pillars focus on what matters to the enterprise, not just to individual managers.

Our analysis finds organizations that establish ERP as "the backbone of enterprise truth" report 18% stronger cross-functional coordination effectiveness. This translates into tangible business outcomes: shorter order-to-cash cycles, faster inventory turns, and reduced exceptions that would otherwise escalate to manual intervention. When the enterprise operates from shared definitions, coordination becomes a structural advantage—not a daily negotiation.

Today, just under half (48%) of organizations say they have established ERP as the backbone of enterprise truth—and they're seeing measurably stronger coordination, faster decision cycles, and higher AI confidence as a result. The remaining half faces an urgent imperative: without this foundation, agentic AI stalls before it scales.

Cloud modernization unlocks financial momentum

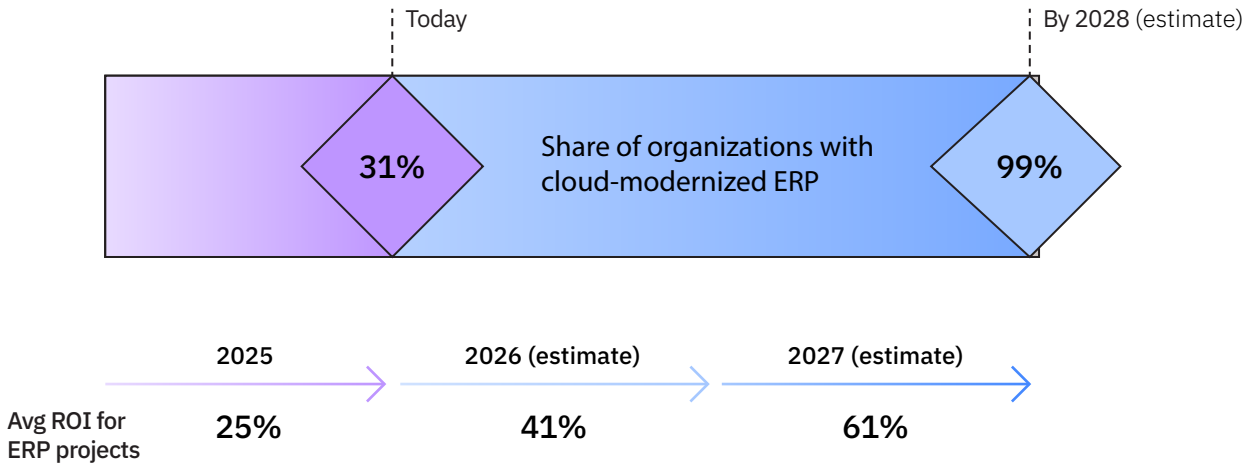
Cloud ERP doesn't just reduce cost. It reshapes the economics of modernization. Organizations migrating to cloud report sharper ROI trajectories for both core ERP projects and agentic AI initiatives. Beyond incremental improvement, this reflects a structural shift that frees capital and leadership attention to address the deeper work of modernization.

Migration is accelerating. More than 60% of ERP infrastructure has already moved to cloud. And despite just 31% of organizations at fully cloud-modernized states today, a whopping 99% expects to be there by 2028. Much of this urgency is driven by vendor deadlines and end-of-support timelines—forcing organizations to modernize whether they're ready or not.

Figure 1

Cloud ERP is surging—and returns are rising with it

Percentages reflect the share of organizations with cloud-modernized ERP today and by 2028, alongside projected ROI over the same period.



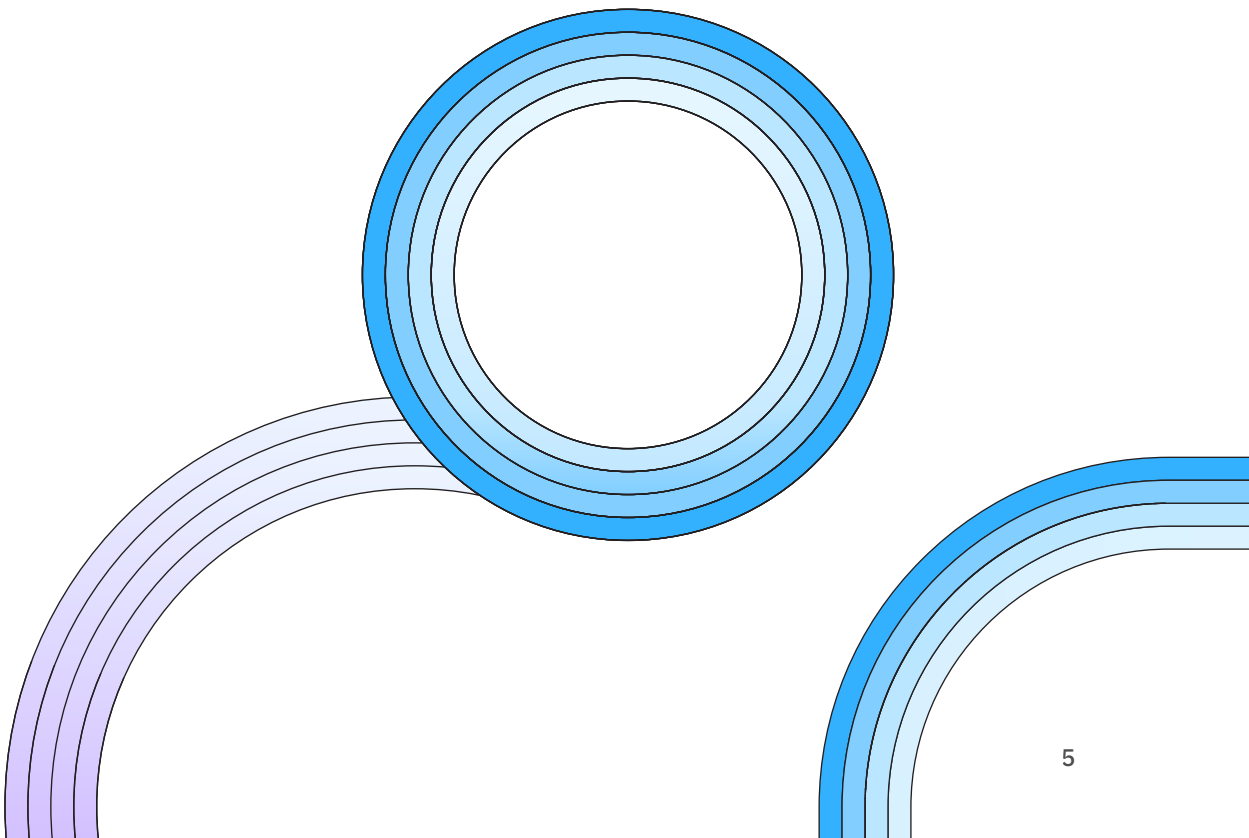
But this pressure also creates opportunity. Organizations viewing migration as more than a compliance exercise can unlock the financial momentum and architectural flexibility that makes deeper transformation possible (see Figure 1). According to our research, average ROI for ERP projects is expected to surge from 25% in 2025 to 61% by 2027. ROI for ERP-enabled agentic AI solutions, too, is expected to climb—from 15% in 2025 to 34% by 2027.

But modernization is resource intensive. Fixing semantics, reducing customization, and harmonizing data models require sustained investment. Cloud ERP generates the investment capacity to make these changes possible—not through cost-cutting alone, but through cost takeout and rapid redeployment of savings. Financial headroom becomes capacity for change.

What cloud alone can't fix

Compared to their on-premises peers, cloud-mature organizations show higher confidence in AI reliability, 42% greater willingness to embed AI into operational decision-making, and 23% greater willingness to embed semantic definitions into AI models.

But even cloud-mature organizations face a readiness gap. Only 38% of organizations have fully embedded semantic definitions into their AI models, and just 17% express full confidence that small language models will improve automation reliability and enterprise-wide decision-making. What's more, organizations estimate their AI initiatives would be progressing 30% faster if they had consistent semantic definitions for core data elements.

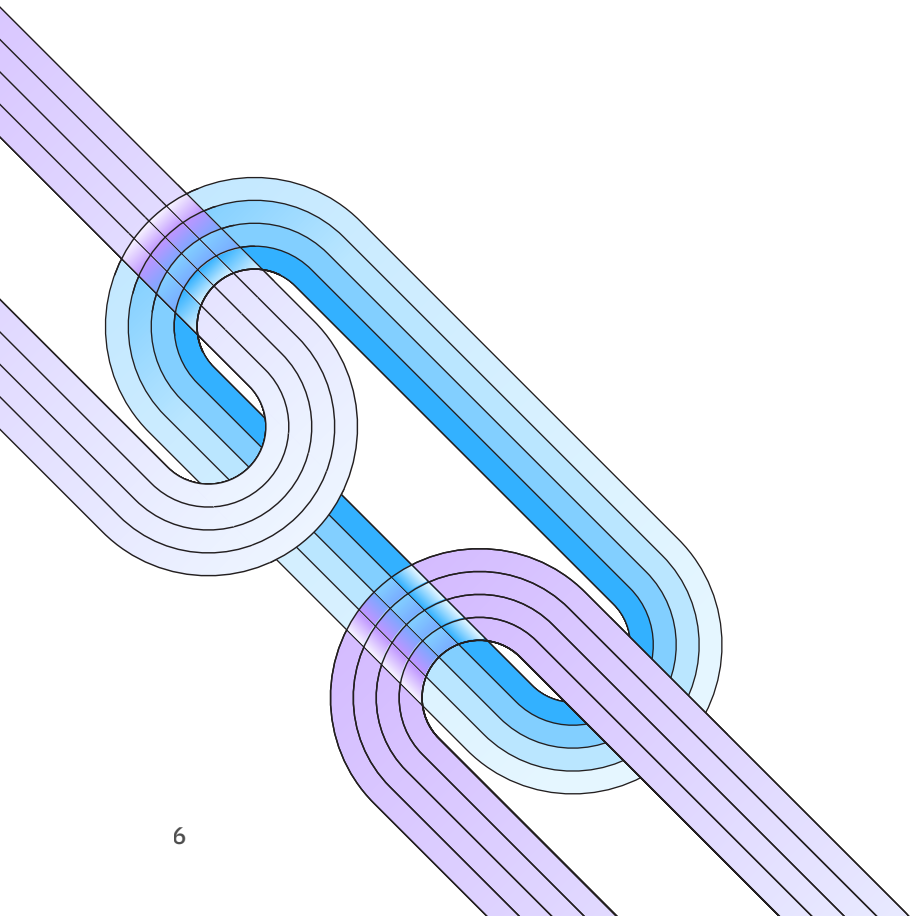


Cloud removes infrastructure constraints—but three legacy problems prevent agents from scaling:

- **Semantic inconsistency.** 85% of executives say it limits AI accuracy and automation performance. On average, organizations report having 19 different definitions of "customer" and 29 for "product." When core entities lack stable meaning, agents can't reason reliably across systems.
- **Custom code drag.** 36% of organizations' ERP code is custom, and 24% of customizations have caused upgrade delays in the past year. Custom logic blocks modernization and forces constant rework when deploying AI.
- **Fragmented coordination.** Only 46% of executives say their ERP effectively enables cross-functional coordination. Where coordination is weak, agents can't operate across silos—and they remain trapped in isolated workflows.

These aren't technology problems. They're architectural debt. Overcoming it requires a coordinated approach: anchor AI in business outcomes, operationalize governance as semantic discipline, and treat standardization as strategic advantage.

Cloud migration is necessary. Semantic alignment is what makes it sufficient.



Case study

HEINEKEN's metamorphosis into a future-ready, digitized enterprise[1]

HEINEKEN, a globally celebrated brewer with over 500 distinct brands across more than 190 countries, has consistently prioritized future-proofing through its Evergreen 2030 strategy, focused on balanced, sustainable growth and its ambition to become the world's best-connected brewer.

At the core of Evergreen 2030 are three interconnected priorities: accelerating growth, stepping up productivity, and strengthening a future-fit foundation. Together, these guide HEINEKEN's transformation—digitizing the route to consumers, simplifying and automating end-to-end business processes, modernizing the technology landscape, and unlocking the value of data at scale.

To enable this transformation, HEINEKEN is developing a Digital Backbone to harmonize key processes and data across finance, supply chain, and commerce. The company adopted an Agile DevOps way of working and implemented a modular, hybrid cloud-based IT landscape supported by standardized systems and centralized data capabilities.

These initiatives delivered measurable results. Deployment time dropped by 95%, from one to two days to approximately 45 minutes. Hardware and virtual machine provisioning fell from 10–15 days to under five minutes. More than 54 automation use cases reduced the data footprint by over 500 GB, boosting system performance and freeing teams to focus on higher-value initiatives.

95%	98%	>500 GB
reduction in deployment time, from 1–2 days to approximately 45 minutes	reduction in hardware/ VM provisioning time, from 10–15 days to under 5 minutes	reduction in data footprint through optimized storage and system performance

Part 2

The operating system of agentic AI

Those achieving major AI impact aren't just optimizing tasks. They're restructuring work around outcomes.

When ERP-enabled AI is anchored in business results—revenue growth, margin improvement, enterprise value—three things happen: ROI climbs, confidence rises, and modernization spreads across functions. Organizations that strongly agree ERP drives business outcomes report 9% higher ROI from agentic AI compared to peers focused on task efficiency. They're more likely to expect agentic AI to transform workflows by 2028, and they express higher confidence that their enterprise AI is reliable.

But that outcome-driven approach collapses when the enterprise can't agree on what core entities mean. When semantics diverge, agents can't reason reliably—and outcomes become impossible to track consistently. Without shared definitions, even the best AI can't deliver coordinated results.

By anchoring AI in measurable business outcomes, organizations give leadership a reason to fund governance, standardization, and the hard work of semantic alignment. Outcome focus doesn't just improve results. It unlocks organizational permission to modernize.

When AI is framed as a margin or growth driver rather than a cost-reduction initiative, it gets resourced differently, governed differently, and scaled differently. Organizations anchoring AI in outcomes rate ERP modernization as 11% more strategically important than those focused purely on process efficiency.

What's misunderstood about governance

Outcome framing alone doesn't deliver change at scale. That requires governance—and governance is a performance multiplier, not compliance overhead.

Governance is often narrowly understood as compliance, ethics, and cybersecurity. But in the context of agentic AI, governance is something richer: it's the playbook for how the enterprise defines meaning and coordinates decisions. In practice, governance is semantic alignment operationalized.

Organizations with strong governance frameworks and moderate AI/ERP technology consistently outperform their high-tech, low-governance peers. Our research reveals a critical lack of symmetry. Those scoring high on both governance structures for autonomous agents and semantic definitions embedded in AI models show higher agentic maturity levels, 7% higher ROI, and 163% greater confidence in AI reliability, compared to organizations with advanced AI capabilities but weak governance foundations.

A modest AI deployment with defined escalation paths, semantic ownership, and audit trails delivers reliable value. A sophisticated AI deployment without clear governance creates expensive chaos. Agents make inconsistent decisions, teams second-guess outputs, and executives lose trust.

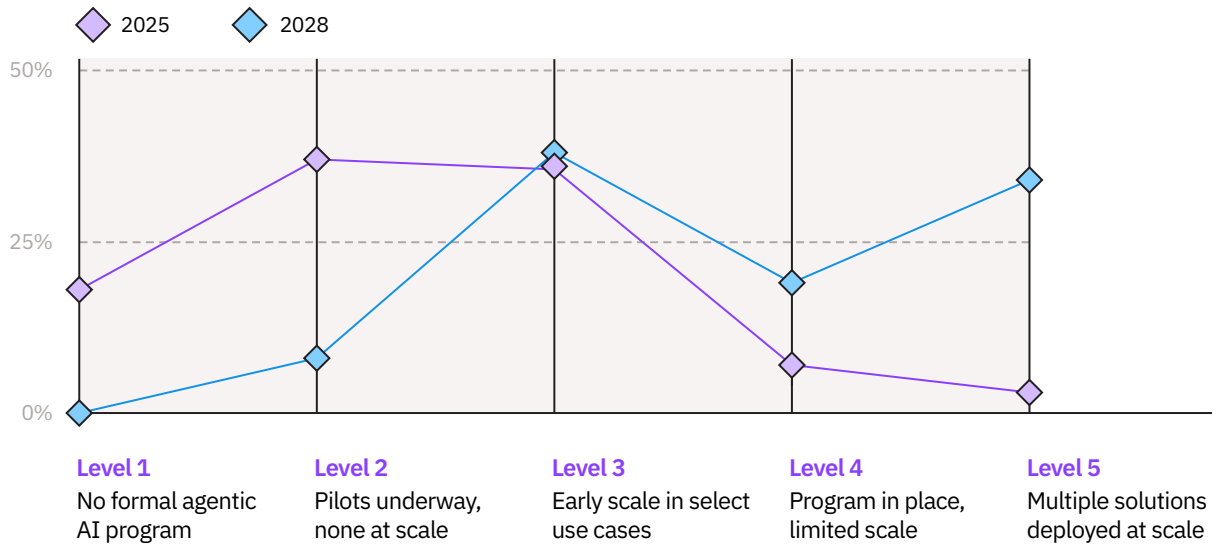
Clear governance requires defining key terminology as well as operational standards—chart of accounts structures, units of measure, currency handling—and who owns those definitions. It means establishing escalation paths when agents encounter ambiguity. And it means creating audit trails so decisions can be traced back to their semantic inputs.

Yet less than half have governance structures in place to oversee the deployment of autonomous agents. Another 13% have limited governance or none at all. This gap is the primary constraint preventing organizations from progressing beyond pilot-stage agentic maturity.

Figure 2

Most organizations stall before agentic AI reaches scale

Percentages reflect the share of organizations at each stage of agentic AI maturity in 2025 and expected by 2028.

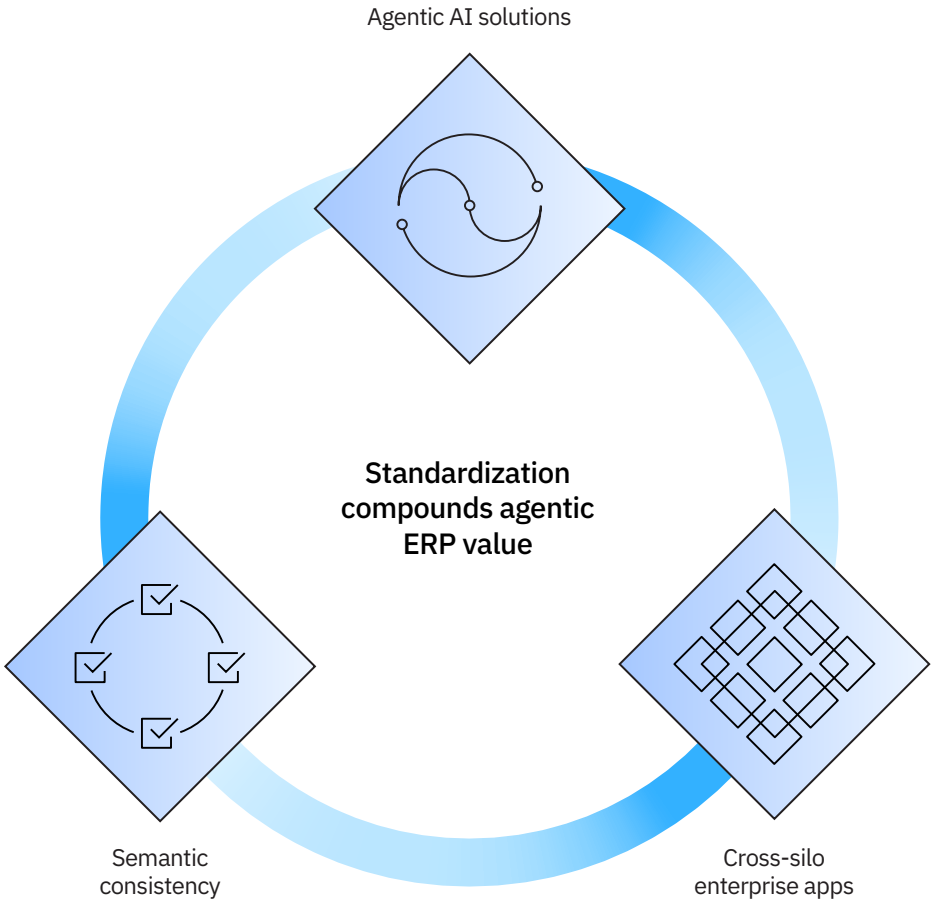


This progression assumes foundational work gets done, and that work is semantic. Done right, it creates a reinforcing cycle (see Figure 3). Semantic consistency enables faster adoption of AI, automation, and analytics across silos, which drives business value, which then justifies further standardization and continuous capability upgrades. Each turn compounds the next—and organizations that enter this cycle early compound advantage faster than peers still wrestling with fragmentation.

Figure 3

Standardization separates pilots from programs

Semantic consistency and cross-silo ERP applications reinforce the deployment of agentic AI solutions.



Those stuck at early maturity levels, meanwhile, show 22% lower rates of semantic definitions embedded in AI models, weaker governance structures, and numerous conflicting definitions for core business entities. Semantic alignment is the difference between pilots and programs. Without it, organizations plateau—trapped between experimentation and enterprise scale.

Custom code creates fragmentation, not differentiation

What looks like differentiation at the functional level—tailored workflows, custom fields, local optimizations—becomes fragmentation at the enterprise level. This is the customization trap. Once semantics stabilize, agentic AI stops being an R&D expense and becomes an operational asset. The ROI curve bends upward, not because the models improve but because the enterprise becomes coherent.

Organizations with stronger semantic foundations show steeper ROI growth curves compared to peers still wrestling with fragmentation. The pattern is clear: costs rise initially as organizations invest in semantic cleanup, governance structures, and foundational modernization. But once those foundations stabilize, support costs drop sharply (see Figure 4).

When semantics are fragmented, AI projects require constant human intervention—rework, reconciliation, exception handling. When semantics align, automation becomes reliable, exceptions shrink, and exceptions shrink, and operational efficiency improves.

Here is where standardization becomes critical. Organizations often defend customization as a source of differentiation. Our research shows the opposite.

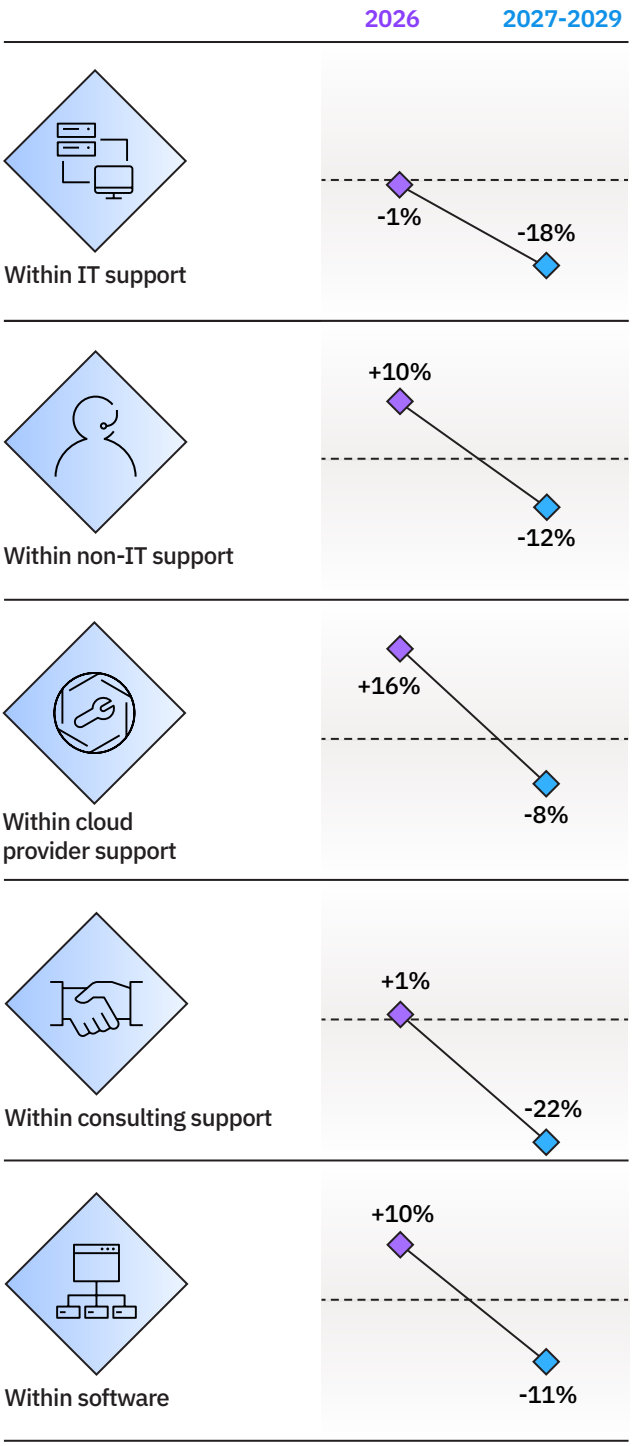
Organizations maintaining heavy customization show lower ROI on both ERP projects and agentic AI initiatives compared to peers with standardized architectures—and incur dramatically higher operational friction.

- 24% of customizations caused upgrade delays in the past year.
- 58% of executives say custom fields and non-standard processes frequently or almost always require rework when deploying AI or automation.
- Eliminating customization would shrink upgrade cycle times by 32%.

Figure 4

Short-term costs lead to long-term savings as agentic automation scales

Figure shows cost changes in 2026 compared with expected savings over the next 3 years, across ERP support functions.



Custom code accumulates over time as a series of “local optimizations.” These are fixes that made sense within one function or moment but created global complexity. Each customization doesn’t just add maintenance burden—it creates semantic drift. Custom fields become custom definitions. Custom workflows become isolated logic that agents cannot navigate. What looks like differentiation at the departmental level becomes fragmentation at the enterprise level, and agentic AI can’t scale across that fragmentation.

Organizations that make ERP standardization a strategic discipline—freezing new custom code, externalizing existing customizations into modular services, and enforcing API-first extension models—are reaching agentic maturity fastest. By keeping the core system clean, organizations can maintain upgrade speed and reduce technical debt. This approach is what enables the continuous modernization required for agentic scale.

AI doesn’t smooth over ERP fragmentation. It exposes it.

Part 3

The roadmap to coordinated scale

ERP modernization doesn't require stopping the business.
It takes pit-stop discipline.

High-performing organizations modernize the way elite racing teams upgrade cars mid-race—by isolating components, instrumenting performance, changing one thing at a time, and validating results before returning to full speed. Each intervention removes friction, frees capacity, and de-risks the next move. The winners aren't the boldest. They're the most precise.

Agentic maturity requires synchronized progress across three critical dimensions (see Figure 5). Organizations that modernize ERP, establish governance, and anchor AI in business outcomes simultaneously reach agentic maturity faster than their peers advancing just one or two in isolation. The difference is coordination. Fragmented progress compounds friction. Coordinated change removes it.

Where you're weakest determines how far you'll go:

- **If you're weak on standardization:** Freeze custom code and consolidate to single-solution, single-instance architectures where possible. Externalize existing customizations into modular services and enforce API-first extensions. Organizations that reduce customization show higher ROI, faster upgrades, and less rework.
- **If you're weak on governance:** Embed semantic ownership before scaling pilots. Establish who owns each core definition, how agents escalate ambiguity, and how decisions are audited. Organizations with strong governance and moderate AI maturity outperform high-AI, low-governance peers on both ROI and confidence.
- **If you're weak on outcome focus:** Reframe AI business cases around growth and margin, not task automation. Organizations that anchor ERP-enabled AI in business outcomes achieve better financial results, broader workflow evolution, and greater confidence in AI.

When all three align—standardized ERP architecture, governance operationalized as semantic discipline, and AI anchored in business outcomes—organizations progress from pilot stages to comprehensive agentic programs faster.

Forget perfection. It's all about identifying your binding constraint and addressing it before you scale.

Cross-silo agents deliver structural advantage

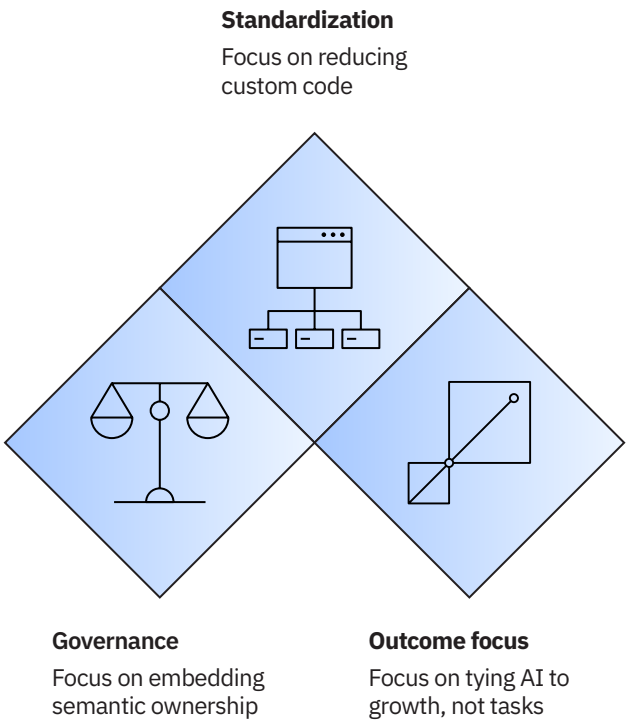
Coordination doesn't stop at organizational alignment. It extends to how agents work across silos and process areas. Silo-optimized AI delivers incremental efficiency. Cross-functional agents deliver structural advantage.

Consider order-to-cash: a silo-optimized agent might accelerate invoicing, but a cross-silo agent orchestrates credit approval, inventory allocation, shipping logistics, and payment reconciliation as a single workflow. This eliminates handoffs, reduces cycle time, and surfaces exceptions before they cascade.

Organizations where ERP effectively enables cross-functional coordination report higher AI ROI and broader workflow transformation. Yet only 46% of organizations say their ERP effectively enables this cross-functional coordination today. The gap represents untapped value.

Figure 5

Three dimensions determine whether agentic AI scales



Semantic consistency is the technical enabler. When “customer” and “order” mean the same thing in every system, agents can traverse functional boundaries without translation. When definitions diverge, cross-silo workflows fracture—and agents revert to silo-optimized tasks.

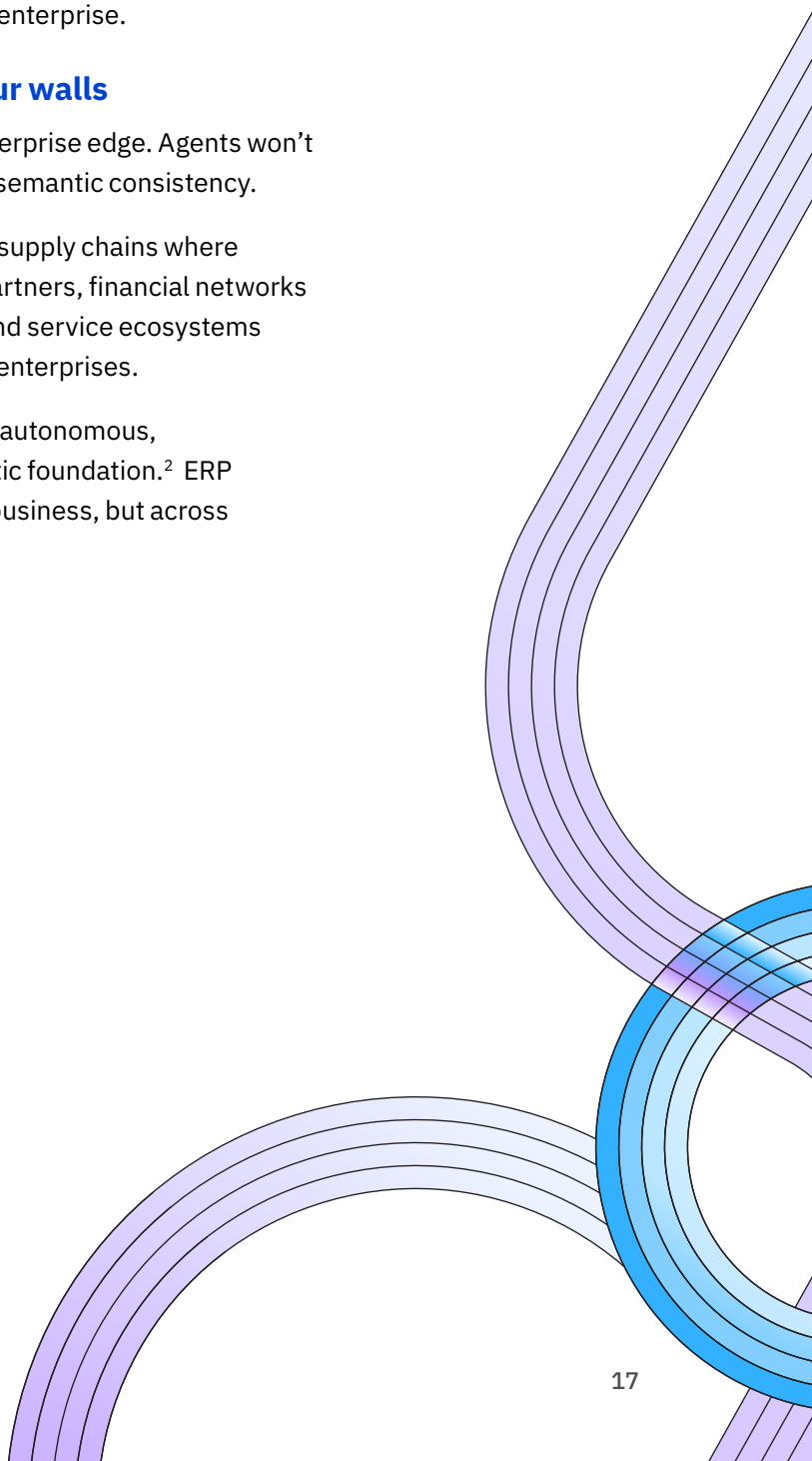
Cross-silo efficiency isn’t just about connecting systems. It’s about agents operating on shared ground truth across the entire enterprise.

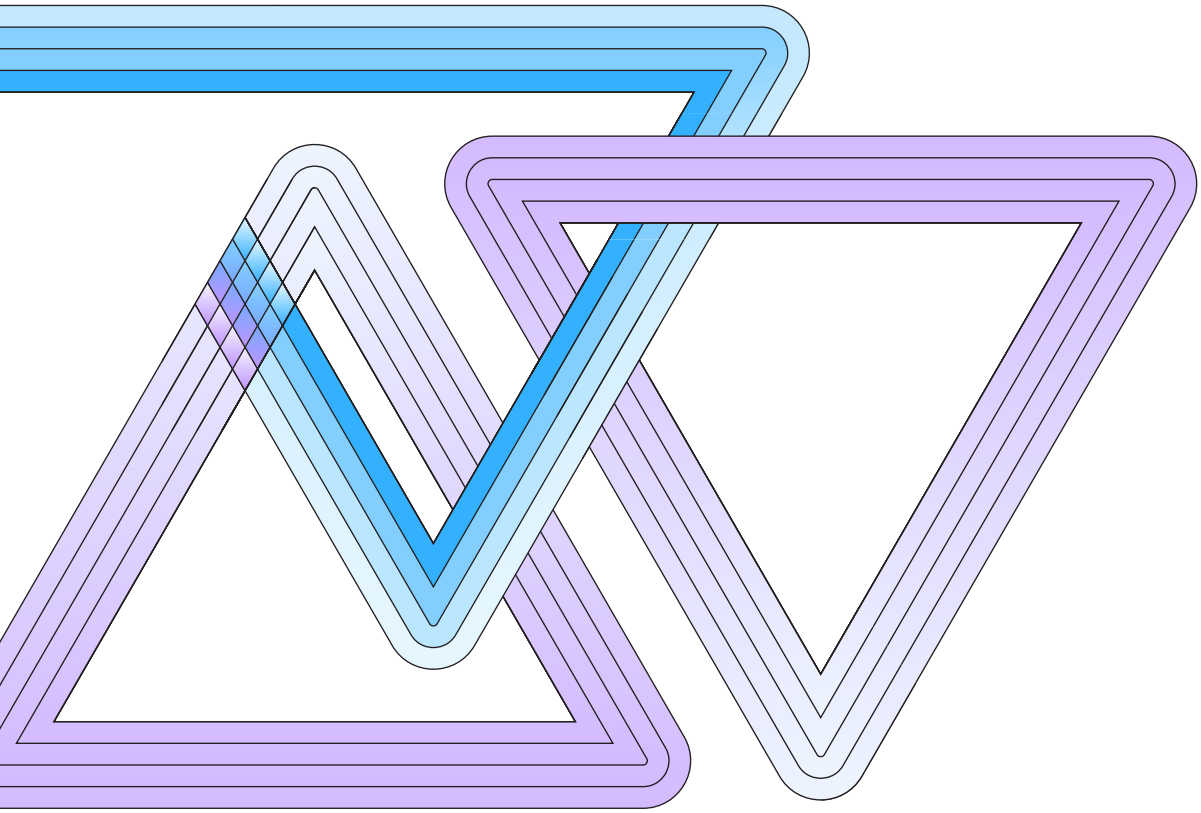
Semantic consistency doesn’t stop at your walls

The agentic operating model doesn’t end at the enterprise edge. Agents won’t stop at enterprise boundaries—and neither should semantic consistency.

The next frontier is ecosystem-scale coordination: supply chains where agents negotiate inventory commitments across partners, financial networks where agents reconcile transactions in real time, and service ecosystems where agents orchestrate delivery across multiple enterprises.

In separate IBM IBV research, we found that these autonomous, interconnected workflows require a shared semantic foundation.[2] ERP becomes the translation layer—not just within the business, but across the entire value network.





Yet today, only 17% of organizations take a continuous modernization approach to ERP. Most rely on periodic, multi-year lifts or fragmented, module-specific efforts. These episodic approaches cannot keep pace with the semantic alignment required for ecosystem-scale agentic operations.

Continuous modernization—with iterative upgrades, composable extensions, and ongoing semantic refinement—is what lets organizations extend consistent definitions beyond their walls. Cloud-based ERP environments make this far easier to implement. Shared data contracts, composable extensions, and event-driven workflows allow agents to operate across enterprise boundaries without manual intervention.

Those pursuing semantic consistency as an ecosystem capability are beginning to establish shared definitions with strategic partners, align data structures with suppliers, and design interfaces where agents can interpret and respond to events from other organizations in real time. In this model, ERP becomes the operational basis of the agentic ecosystem—the shared semantic layer that lets agents negotiate, coordinate, and execute across suppliers, partners, customers, and service networks.

The shift from functional silos to autonomous, interconnected workflows—where cross-domain teams and agent networks deliver outcome-based operations—depends entirely on this foundation. The agentic operating model extends as far as semantic consistency can reach.

Conclusion

From constraint to catalyst

ERP modernization is more than a simple IT initiative.
It’s the foundation of the agentic operating model.

For CIOs, the priority is semantic ownership, model readiness, and upgrade cadence, ensuring ERP becomes machine-legible infrastructure that agents can trust. For COOs, the focus is cross-silo workflows and cycle time reduction, eliminating handoffs and exceptions that prevent agents from orchestrating end-to-end processes. Both roles must coordinate, or the modernization falters.

Organizations that position ERP as semantic infrastructure operate in a fundamentally different way, with agents that reason across domains, workflows that span ecosystems, and competitive advantage that builds with every semantic standard they embed. Those that defer the work risk watching their AI investments stall at the pilot stage, unable to scale beyond the fragmentation they've inherited.

The next operating model runs on ERP. The question isn't whether to modernize. It's whether you'll modernize fast enough to lead, or slow enough to follow.

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2 Goyal, Yogi, Sachin Varma, and Karen Butner. *The blueprint for agentic operations: How to build an interconnected enterprise,* IBM Institute for Business Value. May 12, 2026. ibm.biz/agentic-ai-enterprise

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