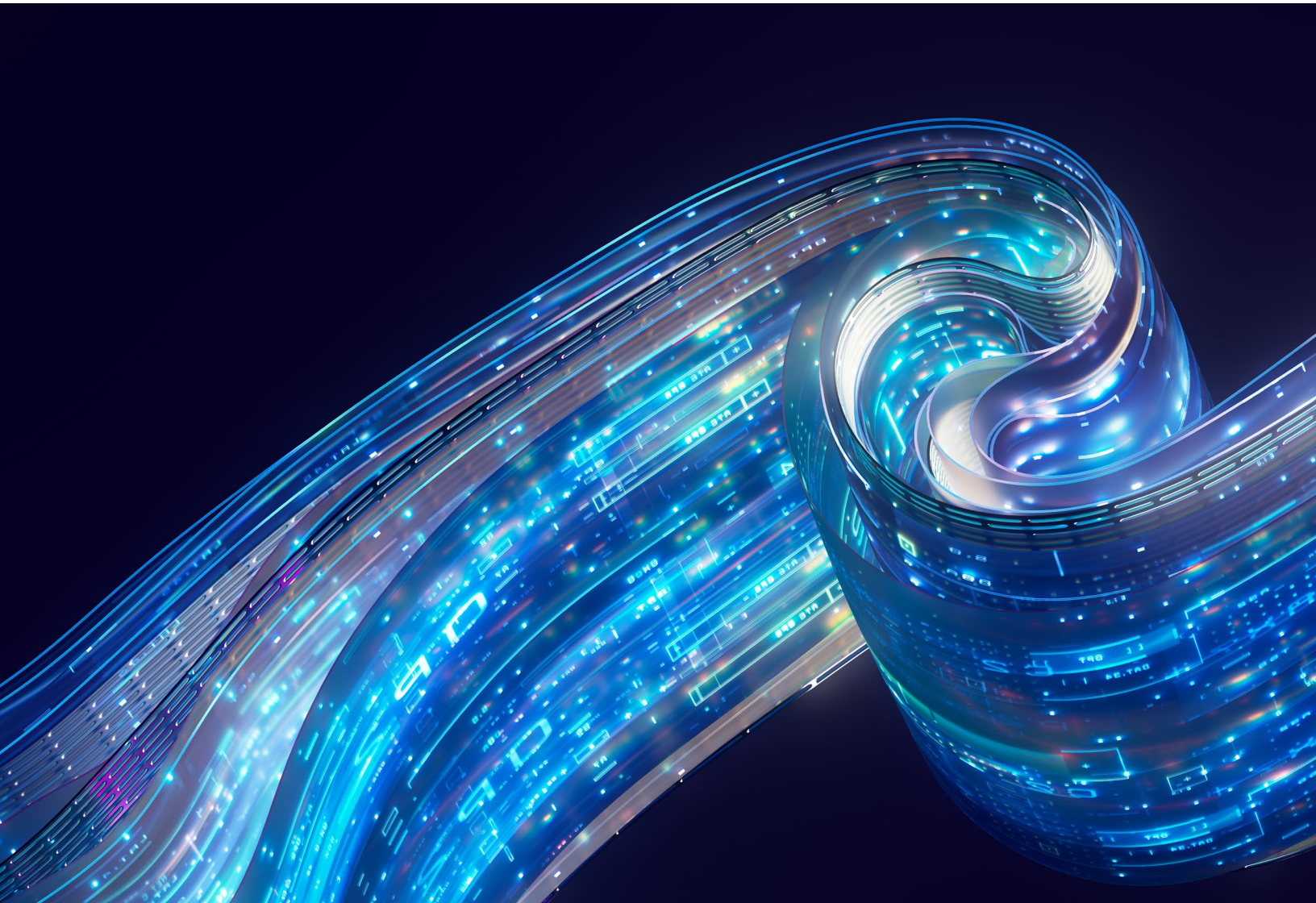




State of Modernization Report 2026

From consolidation to
orchestration in the age of AI



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Executive summary

Cost reduction, consolidation and escaping legacy systems used to be the case for modernization, the process of upgrading or replacing legacy technology systems, applications and infrastructure. Today, AI, geopolitics and the race for innovation are fueling a new wave of modernization focused on business transformation. It's also resulting in a divide between organizations that can transform continuously and create a flywheel effect, and those that are left behind.

That's what 2,000 business and technology leaders across five continents told us for our first State of Modernization Report, which shows a shift in modernization priorities as companies orchestrate their technology to be ready for AI – with cascading rewards for those who can pull ahead.

Cost reduction and legacy escape are no longer the leading motivations to modernize. As AI increases demand on nearly every element of IT, and as sovereignty considerations become more acute, leaders want their complex technology estates – a mix of old and new decisions – to work better. Over two-thirds (68%) are increasing usage of at least four IT elements, while half (50%) are increasing usage of at least five (across SaaS; public, private, and sovereign cloud; mainframe, edge computing, and on-prem infrastructure). This means organizations are managing technology estates that are more distributed and larger than ever before.

At its core, complexity is not simply the result of having more technology. It is the accumulation of dependencies, technical debt, governance requirements and operational obligations that make future change slower and more expensive. Here, agentic AI is emerging as one way to cut through that complexity as it can speed up portions of modernization initiatives that used to take months or longer of intensive manual work.

The ambition has shifted from escaping the past to actively enabling the future – agility, innovation, scalability, and AI readiness now define success. Organizations say they're re-investing efficiencies in further modernization projects.

Yet only about half of those modernizing report achieving better IT operations, and less than half are seeing innovation gains. Nearly 1 in 5 (18%) say their firms saw limited or unclear value from modernization efforts.

The challenge facing today's leaders is ensuring that modernization translates into better business outcomes. And unlocking that business value requires organizations to think beyond technologists alone to coordinate across architecture, operations, finance, security and the workforce.

Taken together, the new phase of modernization is centered on building the organizational capacity to continuously translate technology investments into business outcomes. Organizations that can orchestrate architecture, operations, AI, sovereignty and workforce transformation as a connected system will be positioned to move faster, while those that cannot risk falling further behind.

Five takeaways from our research

- 1. Organizations are thinking about modernization not as a one-time upgrade but as the flywheel that determines how fast and how well they can put AI to work. Yet nearly one in five haven't seen value from past modernization efforts.** AI has put modernization at the center of enterprise strategy rather than at the edge of IT budgets. Organizations agree with this premise in principle: top reasons to modernize are greater agility, performance, security and AI readiness across their increasingly complex estates — priorities that now all rank ahead of legacy-systems escape or cost reduction. Still, a split remains in how firms can act on this imperative. A full 18% are unclear on what value past modernization has delivered to their firms, and fewer than half are seeing better innovation outcomes.
- 2. AI is not just a workload running on top of enterprise infrastructure. It is actively reshaping how that infrastructure gets built and how organizations will use and finance it.** AI is now the top driver of modernization of network, edge, mainframes, and applications, and the number-two driver for private cloud and software-as-a-service. Every organization with a mainframe plans to deploy AI on the platform, and 23% have put AI into production. Yet many doubt their firms can operate AI cost effectively once they add new capabilities: 3 in 10 are concerned modernization will result in unpredictable AI costs, and nearly half say managing AI costs in the cloud is very or extremely challenging.
- 3. Geopolitics is forcing technology and operational decisions beyond cost and performance.** As the footprint of enterprise technology estates expands, organizations also need to consider how much freedom they will retain if regulations or geopolitical conditions change. Nearly two-thirds expect sovereign cloud usage to grow in the next year, but the data shows most taking a workload-by-workload approach, not comprehensive planning. Increasingly, modernization is not only about building for speed and scale, but also preserving freedom of action in an uncertain environment.
- 4. Most organizations begin modernization at a significant disadvantage, both technically and organizationally. Nearly half are behind schedule, with measurable costs.** Creating modern applications with both new features and better security is a major motivator for modernization, but fewer than 1 in 10 organizations are fully confident they know those dependencies today, a significant technical blind spot. And since real agility depends on people, process, and technology moving together, decision-making on modernization is now split across multiple stakeholders, making this as much an organizational imperative as a technical one. Those who have delayed modernization report measurable negative impacts as a result, from security vulnerabilities to the loss of top talent.
- 5. Agentic AI is showing early promise to address longstanding challenges in modernization and speed progress.** Agentic AI is being used to map hidden dependencies, generate code, and create documentation — all traditionally time-consuming, error-prone processes. Organizations not using agentic AI for modernization are much more likely to be behind schedule than early adopters.



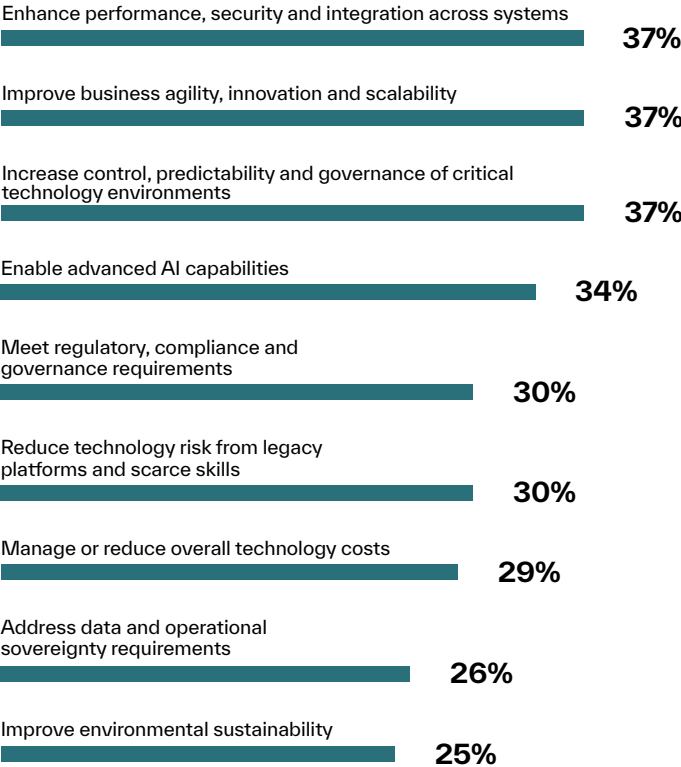
Today's organizations are expanding the use of multiple platforms all at once. Managing this complexity is at the top of the modernization agenda.

Why modernize at all? Organizations say they are modernizing to create IT estates that are more capable, adaptable, and controllable — goals they now rank ahead of cutting costs, reducing legacy dependence, addressing skills gaps, or meeting compliance requirements.

The state of play shows why. Mission-critical applications continue to be distributed across platforms — mainframe, public and private cloud, and on-premises infrastructure — not neatly consolidated, and not trending that way. This persistence reflects fit-for-purpose design more than inertia, as technology leaders have over the past several decades, chosen best-fit platforms for their challenges. Many of those platforms, even those considered newer technologies, are aging: respondents say nearly half of their mainframe environments are more than ten years old, as are 36% of their application portfolios, 33% of their networks.

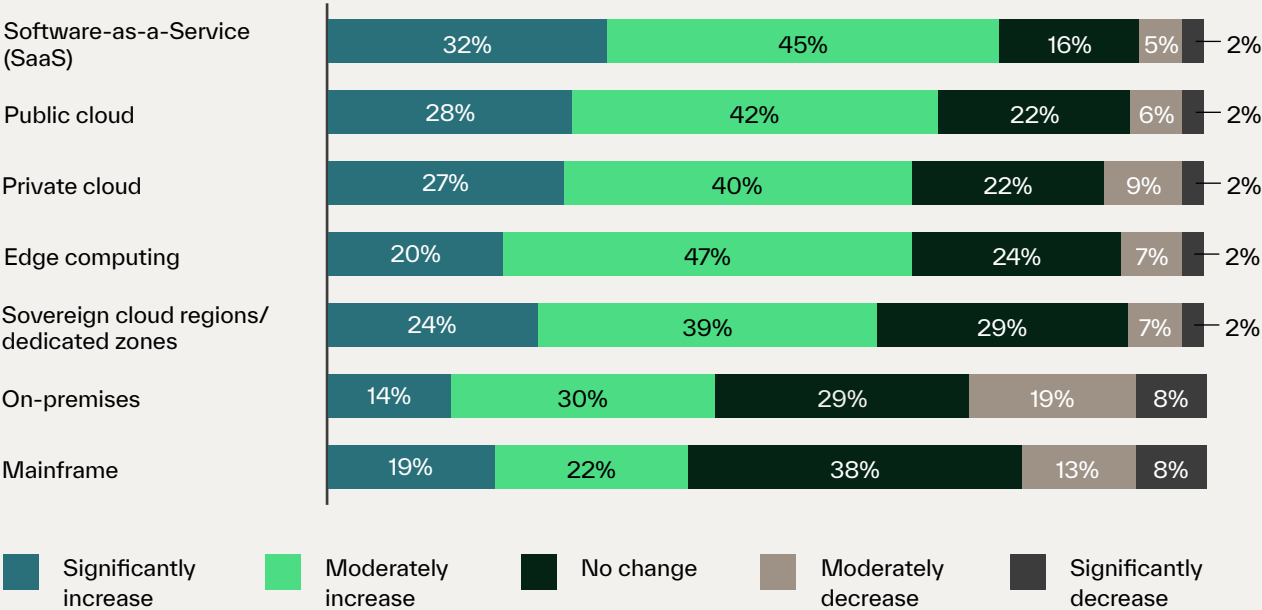
In the next year, more organizations are planning to increase usage of all IT elements we asked about, than those who seek to decrease them. Over two-thirds (68%) of respondents are increasing usage of at least four IT elements, while half (50%) are increasing usage of at least five (across SaaS, public cloud,

Why modernize? The need for agility, performance and control now ranks ahead of cost and legacy escape.



Q5: What are the main reasons your organization is modernizing its technology infrastructure? Base: Total (n=2,000). Rank up to 3 answers.

Even though there are stronger moves away from the mainframe and on-premises infrastructure, every technology element measured shows more organizations planning to increase usage than decrease it over the next 12 months. Half anticipate an increase in usage across at least five of the seven elements.



Q2: Moving beyond mission-critical applications specifically, how do you expect your organization's overall use of the following environments to change over the next 12 months? Base: Total (n=2,000). Single code per option. Sums may vary due to rounding.

private cloud, mainframe, on-premises infrastructure, edge computing, and sovereign cloud).

Artificial intelligence is one reason for the increase; more on this in the next chapter. Organizations are also finding that their security needs, and a broader regulatory context, are demanding distributed solutions. This means the operational challenge is less picking a single technology destination, vendor, or capability as it is integrating, securing and governing across a permanently distributed estate.

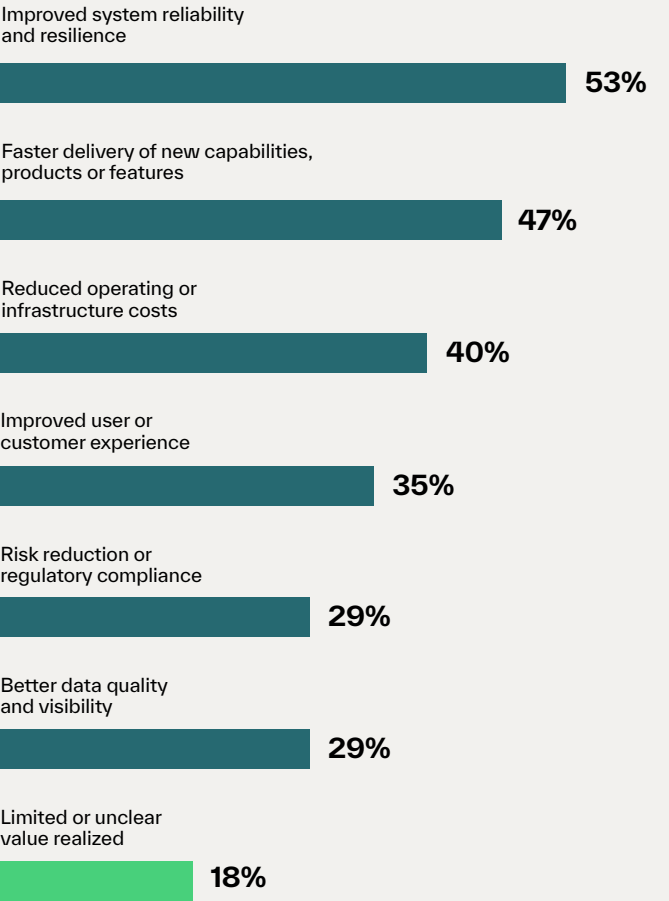
The risk here isn't complexity for its own sake. It's the risk that older platforms come with their own specific governance requirements, organizational habits, and institutional inertia that slow the business from making changes to compete.



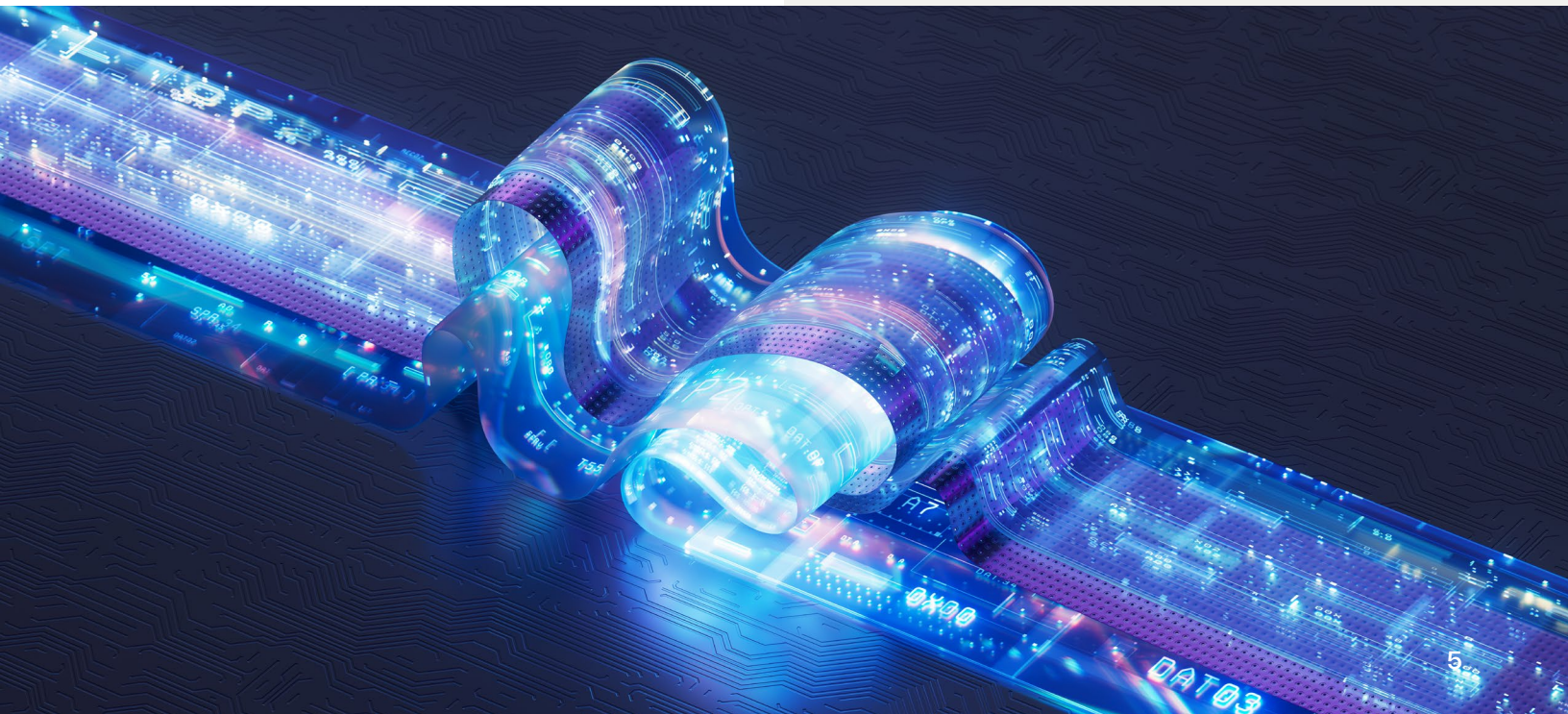
Initially, our cloud strategy was focused on scalability, resilience and cost efficiency. Now AI introduces another dimension, because different workloads have different requirements: some AI use cases can run in the cloud, while others involving sensitive engineering information, customer data or operational processes require stricter controls over where data is processed. So modernization is no longer just about moving workloads to the cloud; it's about designing an architecture that can support cloud services, hybrid environments, and AI services while maintaining security."

— CIO at a manufacturing organization, Germany

Modernization's value still skews operational, not transformative. Here's where organizations say the majority of their value from modernization comes from.



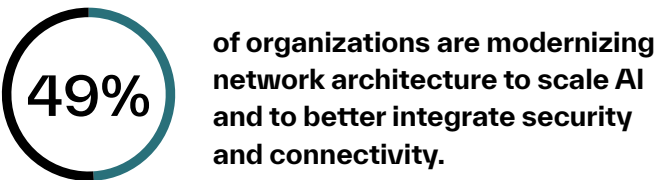
Q7: Where does the majority of realized value from modernization initiatives within your organization come from today?
Base: Total (n=2,000).



AI is rewriting the modernization agenda.

AI is reshaping today’s modernization projects, forcing organizations to coordinate infrastructure, financial, geopolitical and operational decisions in ways that modernization programs a generation ago did not require.

AI is the number-one driver for increased usage of edge and mainframe, and the number-two driver for increased usage for SaaS (behind scalability) and private cloud (behind security).



Networks

The massive, continuous, and distributed demands of AI workloads are the leading reason for network modernization: 8 out of 10 (82%) say AI is increasing network architecture requirements. It’s the top reason why organizations are modernizing their networks (49%), tied with better integration of security and connectivity.

The connection between networking and security means most companies realize that AI isn’t just adding volume to their existing networks but also requires a new approach to govern and secure networks across the distributed estate. That imperative is translating into concrete actions. Among those who say AI is a driver of network modernization, nearly half (49%) are moving to software-defined network fabrics such as SASE and SD-LAN, and 41% are enabling Zero Trust micro-segmentation and next-generation firewalls.

AI workloads are also the main reason businesses give for the expansion of edge computing (50%). The low latency of AI applications results in a need to process data close to where it’s created, rather than at a remote location. The volume of data created by AI also makes local processing economically attractive.

Cost to operate AI

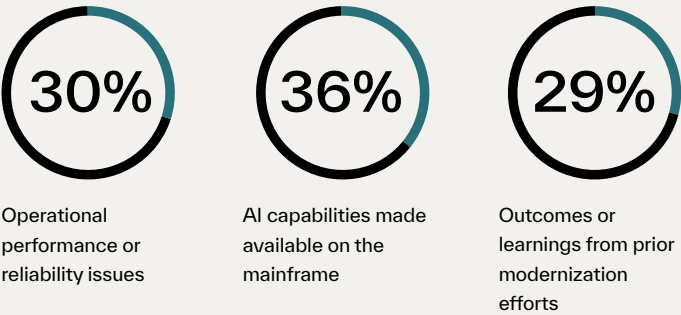
At the same time, organizations express concern about the costs of AI once modernization projects progress. Nearly half (46%) rate predicting and controlling the cost of AI workloads in cloud environments as “very challenging” at present. Open-weight options may be the right fit for some; this shifts costs and risk.

And as organizations prepare for frontier AI, they are also turning to AI-enabled threat detection, though maturity varies across estates.

Mainframe

As AI capabilities grow on the mainframe, the technology has become the number-one reason for increased usage of the platform, and new capabilities on the mainframe are the top driver of strategy shifts in the past year. All organizations we polled are planning to deploy AI to the mainframe: about half (49%) are in early planning or proofs of concept, and 23% have already scaled production. Organizations anticipate a high ROI from mainframe-based AI initiatives over the next three years, expecting to spend \$8.61 million, on average, to achieve projected savings of \$12 million to \$15 million in revenue.

36% say that the main change in their modernization strategy over the past year is a new focus on AI availability on the mainframe.



QM6: Please select the main reasons why you are...? Base: Mainframe and Cloud modernization respondents (n=1,000).

Security, AI and Q-Day

The specter of Q-Day reinforces why security is an urgent modernization issue. Q-Day represents the point when quantum machines will be able to crack today’s cryptography.

Before that happens, organizations must uncover hidden cryptographic dependencies and progressively make applications, infrastructure, networks and data systems capable of adopting post-quantum security. However, progress with continuous modernization is slow, and our research shows that only 4% of companies have fully implemented quantum-resistant network security mechanisms today.

Sovereignty is an increasing influence on workload placement and future spend, but firm-wide planning is still in early stages.

Where will data physically reside? Which country's laws apply? Can we move the workload between providers if regulations change? Can we continue operations amid geopolitical and other disruptions?

Increasingly, data and operational sovereignty is steering enterprise infrastructure decisions that might previously have been made on the basis of cost or technical performance. They're investing accordingly. Nearly two-thirds (63%) of organizations expect sovereign cloud usage to increase, while over a third (37%) of those who have repatriated workloads onto the mainframe in the past 12 months cite sovereignty or governance requirements as the reason why.

Yet despite its ubiquitous influence, companies often don't recognize that sovereignty has become a leading strategic consideration, and one that can be hard to undo. Two-thirds (65%) admit that sovereignty-related decision-making is primarily reactive, explaining that they address sovereignty only selectively, or mainly through a compliance lens. Only 6% say that they anchor their broader transformation strategy in sovereignty principles from the outset.

Still the planning and implementation of these considerations at the firm level is still in early stages. At a workload level, organizations also say geopolitics and regulation are increasingly dictating physical placement decisions related to IT estates. Four out of 10 enterprises (40%) are routing regulated data workloads to private cloud over the next 24 months, while over half (55%) state that they expect regulatory or sovereignty pressure to actively increase their network architecture requirements.

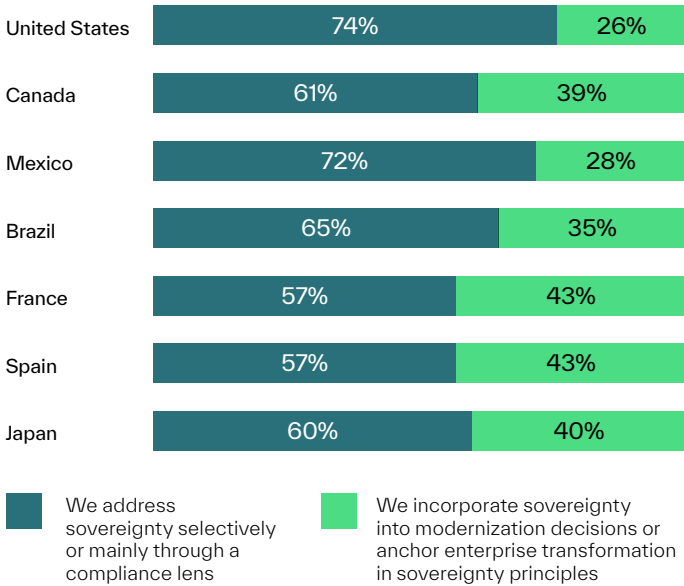
Leaders should consider the hidden influence of choices related to sovereignty; the goal isn't just to comply with existing demands but to be flexible when circumstances change.



Success will not be measured by how many systems you have replaced or how many re-architecture programs you have run.... It will be measured by how quickly a bank can respond when a new payment method appears or a regulation changes suddenly."

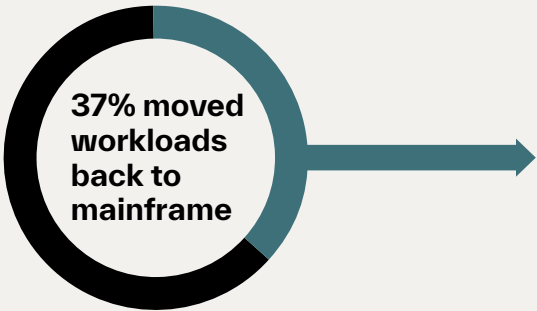
— Operations leader, financial services, Japan

Regional differences in approaches to sovereignty.

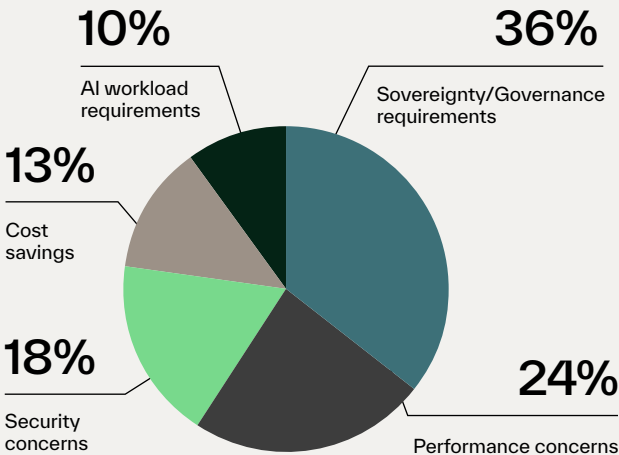


Q.9b. Which most accurately describes your organization's approach to data and operational sovereignty requirements? Base: Total (n=2,000).

Sovereignty or governance requirements are the leading reason why companies have repatriated workloads onto the mainframe over the past 12 months.



QM7: In the past 12 months, have you moved any workloads from other platforms back to the mainframe? Base: Mainframe and Cloud modernization respondents (n=971).

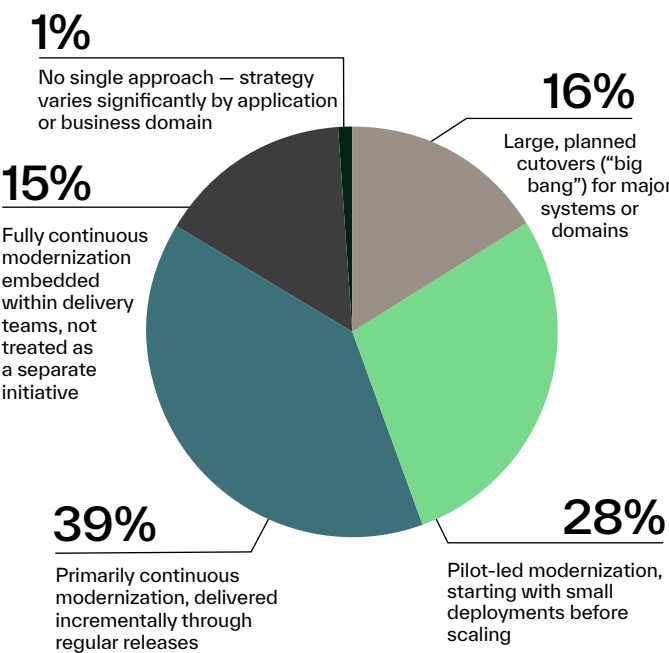


QM7a: What is the main reason for moving workloads from other platforms back to the mainframe? Base: Those who have repatriated workloads (n=391). Sums may vary due to rounding. Single-coded question.

Postponing modernization has measurable costs. Nearly half are behind schedule.

Big-bang modernizers and continuous modernizers report similar technology challenges. But big-bang cutover teams are far more likely to be blocked by strategic gaps: 47% say executive alignment is a major challenge, versus 32% of continuous modernizers. Big-bang teams also report greater challenges meeting regulatory and compliance requirements (50% vs. 43%) and with FinOps discipline (44% vs. 39%). This suggests the big-bang model could carry governance and operational gaps.

A minority of businesses have fully embedded continuous modernization into delivery teams.



Q4: How would you describe your organization's approach to IT modernization? Base: Total (n=2,000). Sums may vary due to rounding.

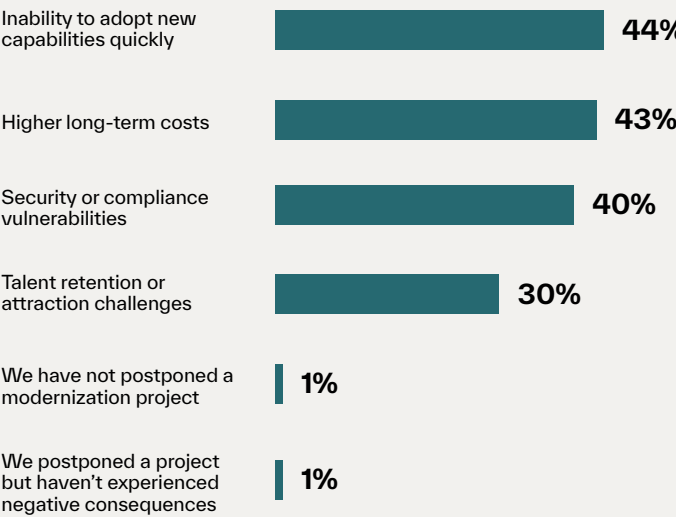
Delaying major modernization projects is usually treated as the cautious choice, and is often considered the cheaper one; however, the data shows the opposite. Ninety-nine percent of organizations have delayed a modernization project, and virtually all of those have observed a negative impact from doing so. The consequences include an inability to adopt new capabilities quickly (44%), higher long-term costs (43%), and new security or compliance vulnerabilities (40%) as direct consequences of postponement.

Decision-making for modernization requires a high degree of cross-functional alignment. Modernization budgets and decisions are split across multiple functions different divisions

with decision-making or budgetary authority; the average respondent chose three different groups with decision-making authority. When participants were asked which internal groups influence modernization decisions, nine different groups of stakeholders received more than 25% of ranking votes.

There are upsides to those who get it right. Those whose modernization efforts lead to financial savings could be reinvesting those savings into further updates. For example, those who reduce cloud costs typically reinvest in increased modernization efforts (49%) and innovations such as AI (58%). This creates a self-reinforcing cycle of positive momentum for this group of modernizers.

When modernization efforts are postponed, companies notice a measurable negative impact.



Q9a: Has your organization experienced any of these negative consequences from postponing a modernization project? Base: Total (n=2,000). Multi-coded question.



AI is evolving incredibly quickly, but large enterprises do not make important decisions that quickly, especially when those decisions could affect critical customer services or long-term modernization programs.... By the time all of those discussions are complete, several months may have passed. That is why I see organizational alignment as one of the biggest blockers to AI implementation today, because in many cases the technology is ready long before the organization is, and closing that gap is often much harder than deploying the AI itself."

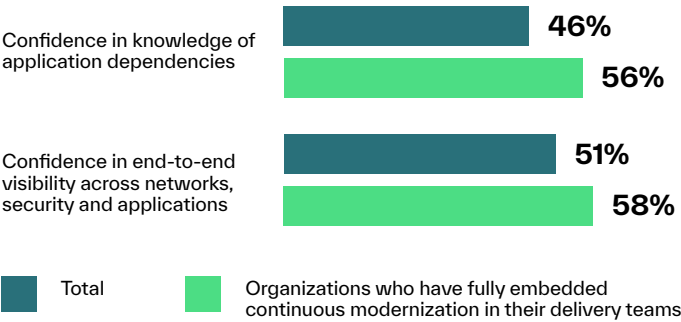
- Director of IT at a telco and media company in Canada

Managing the cost of cloud

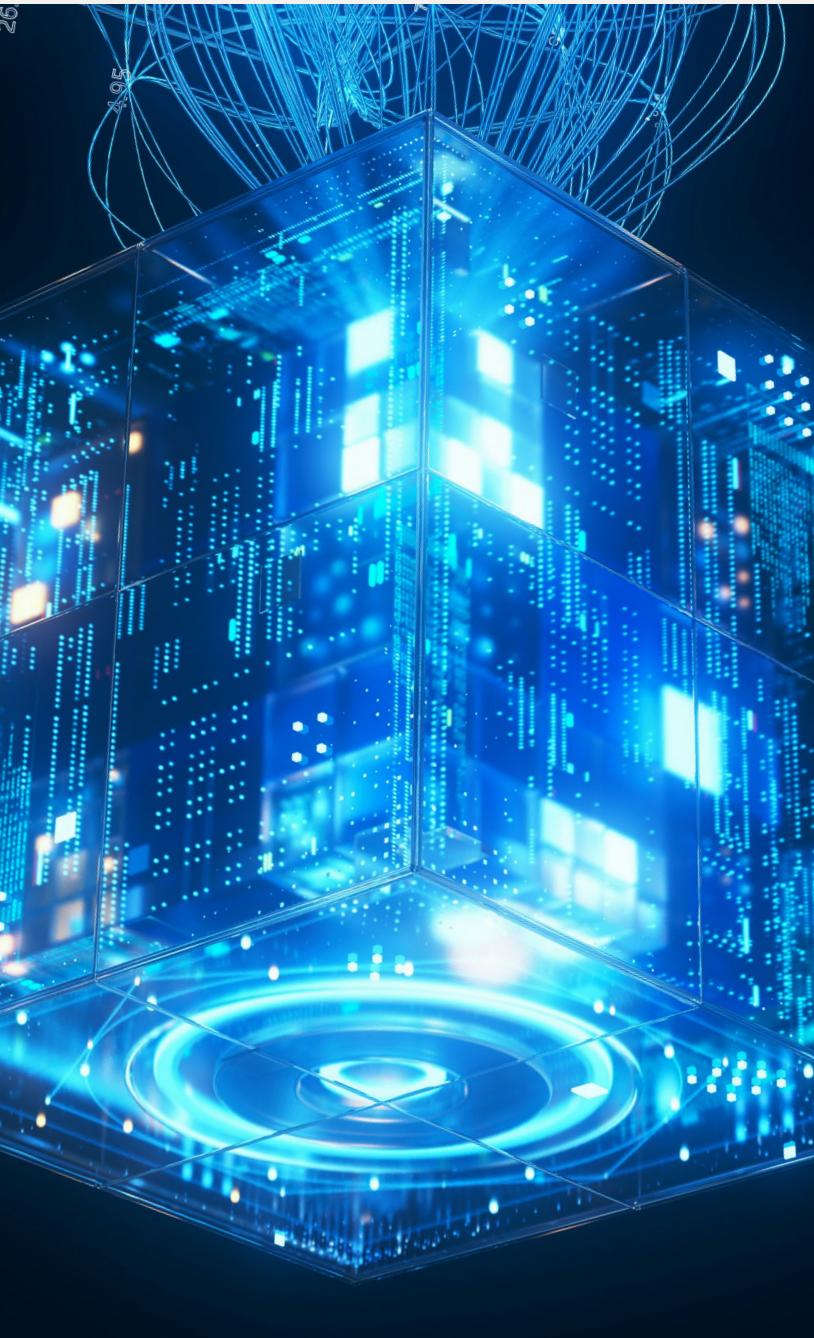
The link between cost efficiencies and a well-run IT estate is clear when we look at cloud-related spending. Organizations that have optimized their estates and reduced cloud spending report fewer issues with their architecture, operations and governance. For those companies that are seeing increased cloud costs, the culprit may not be the technology itself but how they manage their IT estate.

For them, the good news is those challenges can be addressed. Companies for whom cloud costs have increased are more likely to complain of difficulties related to regulatory, compliance, or security requirements, (54% compared to 41% of those spending less on cloud), lack of a clear target architecture or hybrid operating model (52% versus 42%), FinOps practices (48% versus 37%), and data quality, availability, or readiness: (45% versus 35%).

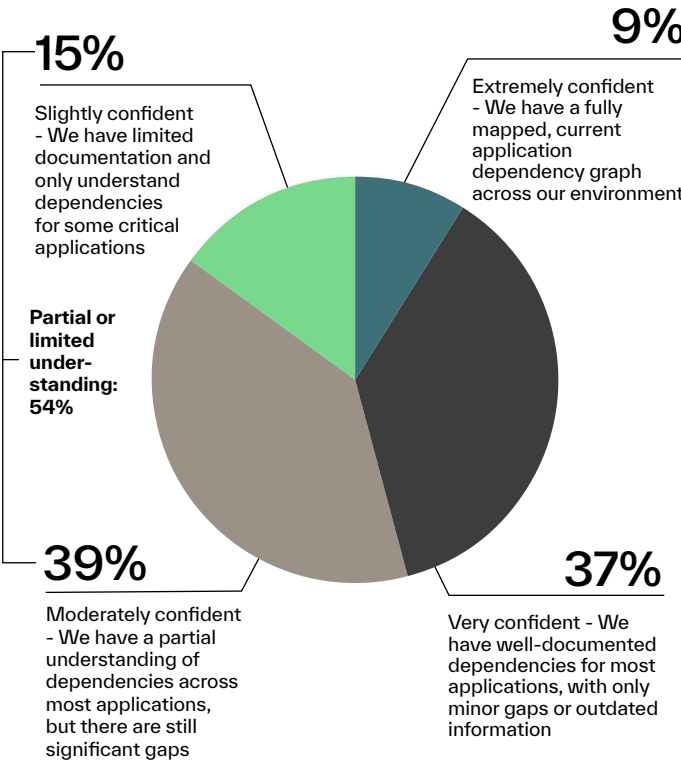
Continuous modernizers are more confident about their knowledge of application dependencies and report improved end-to-end visibility.



QN3: How confident are you in your organization's ability to document and understand your current application dependencies before starting modernization? Base: Application and Network modernization respondents (n=1,000). QN15: How confident are you in your end-to-end visibility across network, security, and applications? Base: Application and Network modernization respondents (n=1,000).



Over half of businesses admit that pre-modernization, they have a partial or limited understanding of application dependencies.



QN3: How confident are you in your organization's ability to document and understand your current application dependencies before starting modernization? Base: Application and Network modernization respondents (n=1,000). Sums may vary due to rounding.

The small number using agentic AI for modernization are starting to see better results.

IT environments contain layers of hidden engineering decisions made over time — in some cases many decades. Our research shows the average enterprise runs 383 business-critical applications, but just 9% have fully mapped how those applications and their dependencies connect. This means that most modernization decisions happen in an environment that contains significant blind spots.

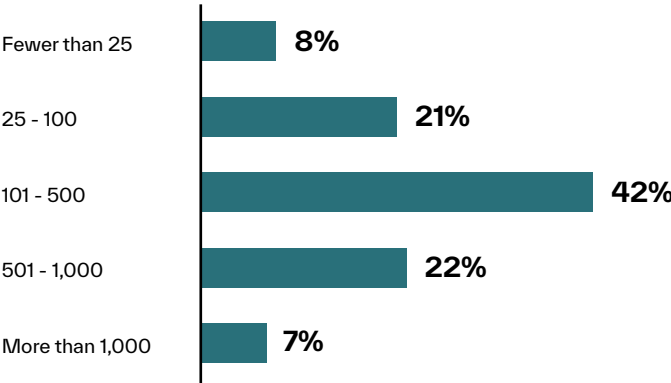
When modernizing applications, more than half (54%) have only partial or worse understanding of these dependencies before starting, and one in four organizations report many undocumented or “dark” applications. Nearly a third (29%) say that the main obstacle preventing faster application modernization is the complexity of legacy integrations and dependencies.

Again the research shows that operational approach matters. A closer look at the 15% of organizations that have embedded continuous modernization in their delivery teams shows the connection between ongoing modernization and the visibility of IT estates. The group who continuously modernize is more confident in their knowledge of application dependencies (56% versus 46% of all others). They also report more end-to-end visibility across their networks, security and applications (58% versus 51%).

New tools are shown to matter as well.

A small number — 10% — have put agentic AI into production across multiple modernization use cases. Agentic AI can operate autonomously to carry out a series of goal-oriented tasks, using software tools and systems to take actions along the way. Most organizations are in the early stages of adopting

The average enterprise runs 383 business-critical applications.



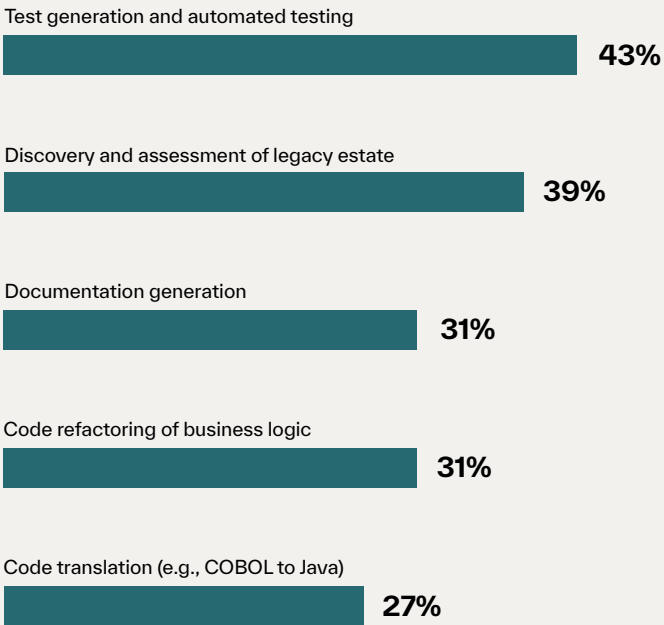
QN2: Approximately how many business-critical applications does your organization run? Base: Application and Network modernization respondents (n=1,000).



The biggest modernization challenge has been underestimating some of the hidden technical debt. Something is planned as a six-month or seven-month modernization effort, but once the team starts looking at it, they discover undocumented database dependencies, multiple duplicate customer records, and a lot of inconsistent supplier codes. There have been some cases where we also found some business rules embedded directly inside older application logic. Sometimes around 25% of the original effort can shift away from new development and into data cleansing, dependency mapping, and automated regression testing.”

– CTO of a travel company in India

When agentic AI is used in modernization projects, its most common tasks are automated testing and legacy-estate discovery and assessment.



Q10a: In which of the following areas of your modernization initiatives are you using, piloting or actively evaluating agentic AI? Base: Those using, piloting or actively evaluating agentic AI (n=1,344). Multi-coded question.



One activity that in my opinion will become largely automated in coming years is change impact analysis... Engineers spend a lot of time understanding everything that is connected to the application, because a single change can affect too many parts of the technology environment... AI can handle a big part of that process.

[AI] can analyze the Configuration Management Database (CMDB) and look at secure code and operational data all at the same time. Then it can build a complete picture in a matter of minutes. For example, it will show that the proposed change is touching 18 connected systems, affects three business services and requires additional testing on four interfaces, and carries a higher operational risk because similar changes have caused incidents before. So instead of engineers searching across 10 or 15 different tools and piecing everything together themselves, AI can present that information almost immediately.”

– Head of IT at an energy company in Spain

agentic for modernization initiatives: a third (33%) are evaluating its suitability, while a quarter (25%) are running pilots.

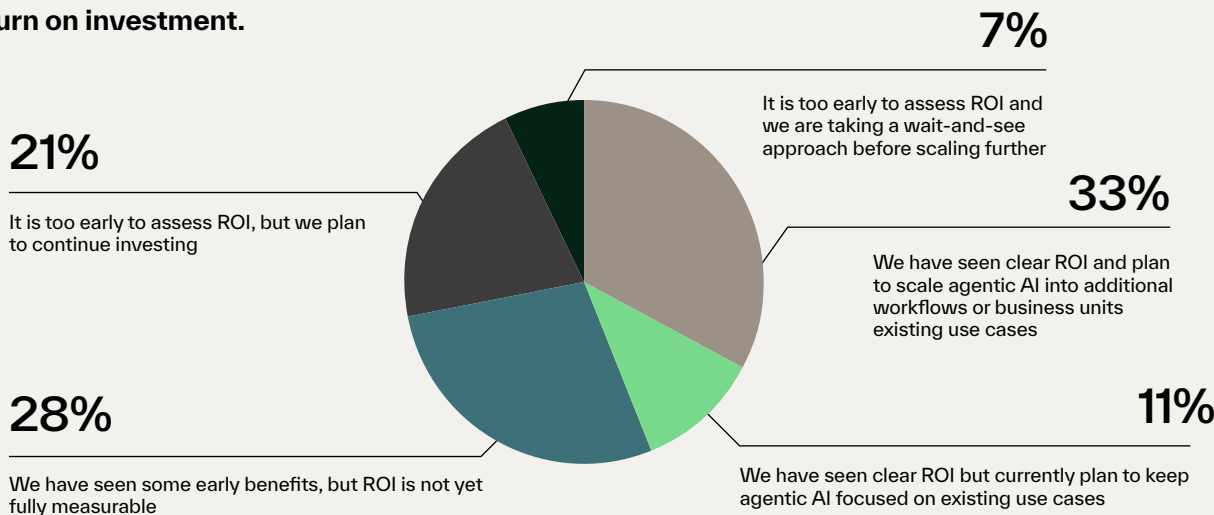
When agentic is deployed to help enterprises understand and de-risk their complexity, its most common tasks are automated testing (43%) and legacy-estate discovery and assessment (39%). It is also being used in documentation (31%), code refactoring of business logic (31%), and code translation (27%) – for example, converting older languages like COBOL, embedded in the logic of critical systems, into modern languages such as Java.

The results of agentic AI use are promising, albeit still unproven at scale. However, a third of enterprises (33%) using it in production have seen a clear return on investment and plan to deploy agentic in further workflows and business units. Another 39% are seeing positive early results but haven’t yet fully measured ROI. Agentic-AI users are one-third less likely to report being behind on their modernization goals: 33% versus 49% among non-users.

Our research also identifies the barriers slowing agentic deployment: security posture (33%), integration with existing toolchains (32%), lack of trust in AI decision-making (30%), and governance/audit requirements (30%). Companies are also concerned about cost predictability (29%), lack of internal agentic expertise (28%), and poor data quality (27%).

It’s notable that some factors are similarly identified by organizations as key obstacles to modernization more broadly: for example, security requirements are named as a challenge by 43% of modernizers, while integration issues are an obstacle for 51%. Those who address these challenges as part of their modernization efforts will be better placed to exploit the potential benefits of agentic AI.

A third of early adopters of agentic AI have seen a clear return on investment.



Q10c: Which best describes the results your organization has seen from using agentic AI in modernization initiatives, and how you expect to proceed? Base: Those actively using agentic AI across multiple modernization use cases (n=192). Sums may vary due to rounding.

Takeways for tech and business leaders

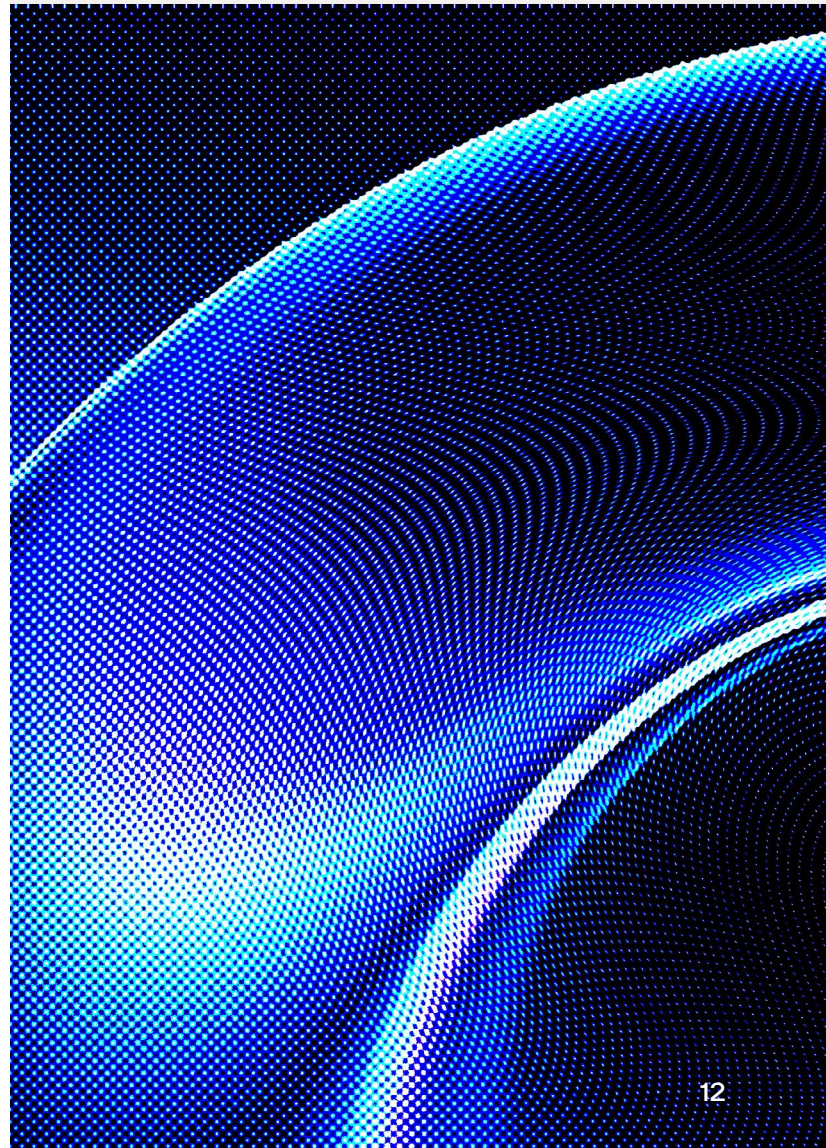
This year, a more strategic approach to modernization is helping organizations unlock greater value from their technology estates. IT leaders recognize that modernization projects lead to improved reliability, resilience and innovation.

- 1. A continuous modernization model can better align tech and business teams.** Our research identifies the considerable advantages associated with a continuous approach to modernization, including increased visibility of IT estates and the mapping of legacy dependencies, and less friction when aligning tech and business teams. Those whose efforts lead to financial savings tend to reinvest in modernization projects, resulting in self-reinforcing progress.
- 2. Treat AI as a set of new infrastructure and business requirements,** not just a new workload on your existing systems and a new tool on top of your workforce. Invest ahead in network, edge, and mainframe capacity built for AI. To help with adoption, a Human-Systems Architect can design the people-agent collaboration layer alongside the technical build so to transform business processes alongside the technology.
- 3. Budget for AI's full economics:** model choice, workload placement, token/inference consumption, and data architecture, not just implementation cost. Evaluate open-source and open-weight options on total observable cost, security tolerance and outcome fit.
- 4. Pilot agentic AI now for discovery, testing and documentation.** Even in the early stages of use, agentic AI is proving to be a promisingly effective tool for enterprises who seek to understand and de-risk their own complexity. As increasing numbers of companies explore its potential, it looks set to become a powerful engine of modernization across the business landscape. Define a modernization champion before decisions. In a world where nine different stakeholder groups already have influence on modernization, make ownership of outcomes explicit rather than ambiguous.
- 5. Treat sovereignty as a modernization architecture principle** from day one, not a compliance afterthought. Most are already thinking about workload placement, but just 6% of firms consider sovereignty demands from the outset. Those decisions can be challenging to undo later when conditions change.
- 6. Delay is measurably more expensive than action.** Embed modernization in the operating model, not as a one-time project. Build integration, security, and governance across platforms rather than chasing consolidation.

Methodology and background

Since 2022, Kyndryl has embarked on a series of research projects to explore successful IT modernization strategies across platforms. This year, Kyndryl again commissioned Coleman Parkes to undertake a fourth annual global survey, and we expanded the study to encompass 2,000 leaders across North America, Latin America, the Asia-Pacific region and Europe.

The 2,000 leaders surveyed include senior IT decision-makers and line-of-business leaders working in enterprise and mid-market organizations with an average global revenue of USD \$3.8 billion. They work for organizations based in North America (25%), Latin America (10%), the Asia-Pacific region (30%) and Europe (35%). The leaders work in 12 sectors: high-tech, banking and financial services, manufacturing, healthcare, retail, telecommunications and media, oil and gas, insurance, energy and utilities, automotive, travel and transportation and government organizations. They hold roles such as VP/Director/Head of IT, Chief Information Officer, Chief Technology Officer, and line-of-business positions within areas like operations and management.





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