

451 Research Special Report

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Delivering AI at scale

AI leaders emphasize the need for planning, scalability and broad infrastructure upgrades

S&P Global
Market Intelligence

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Introduction

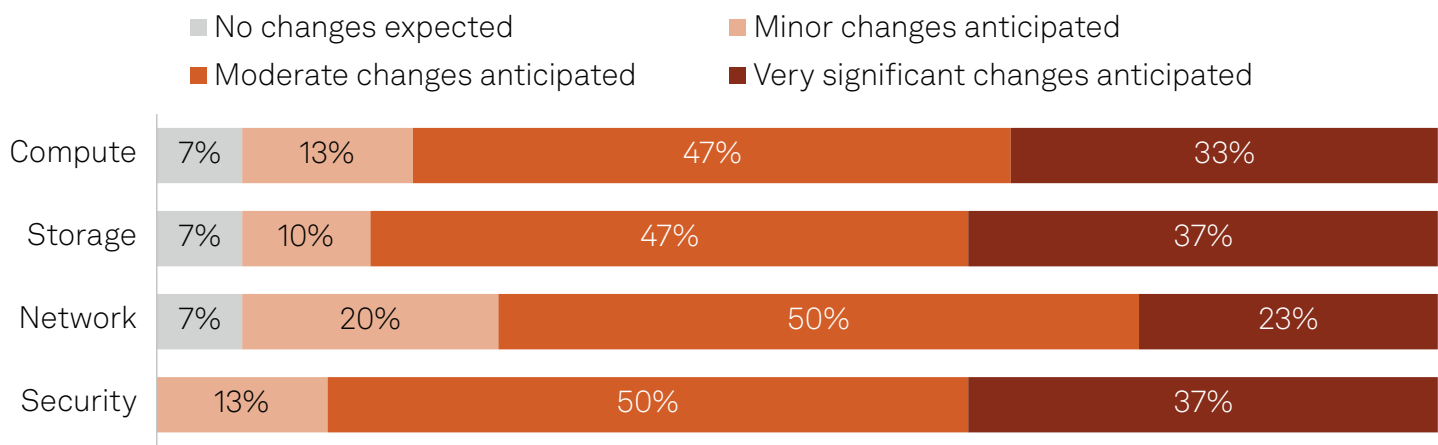
Few organizations question AI’s potential to drive greater efficiency and enhance products and services. The challenge lies in translating that potential into impactful, scalable applications. Many companies remain stuck in pilot phases or have experienced disappointing results from their first wave of investments. A [recent study](#) by S&P Global Market Intelligence and Verizon Business offers a roadmap, drawn from insights gathered during interviews and peer discussions with AI leaders who have successfully scaled their initiatives.

Key takeaways

As organizations progress on their AI journeys, they increasingly realize that IT infrastructure can become a bottleneck. Without proactive planning and modernization, AI projects often encounter delays, unexpected costs and disappointing outcomes. A reactive approach — one that fails to anticipate the needs of projects scaling from pilot to production, or that contemplates only minimum requirements rather than optimal performance — has derailed projects, even among experienced organizations.

The chart below illustrates that while compute power is a well-acknowledged requirement, it represents only one aspect of the pressure created by AI workloads. Organizations must also address networking and security considerations from the outset to ensure projects stay on track and can deliver at scale. This proactive planning must account for the fact that AI strategies commonly evolve to extend across diverse environments. Failing to recognize and prepare for this complexity can result in expensive data transfers and heightened security risks.

AI leaders identify a broad set of infrastructure upgrades needed to support AI workloads



Q. Looking ahead over the next 12-24 months, what changes do you anticipate in your infrastructure that are being driven by existing or new AI/ML use cases?
Base: Executive discussion board participants (n=30).
Source: S&P Global Market Intelligence 451 Research AI at Scale study commissioned by Verizon.

A common trait among experienced AI adopters is a deep appreciation for the role of data, even in the era of large, pretrained generative models. A clear refrain from study participants was that the highest-impact AI applications are often data-intensive. Without careful attention to data availability, preparation, security and network performance, these projects are likely to fail. Accordingly, network architecture must be designed with AI in mind, emphasizing bandwidth, latency and availability. Techniques such as network segmentation can further enhance control and efficiency.

Participants emphasized the importance of scalability throughout the study, as well as the benefit of starting small and scaling up. It was clear from these participants, however, that this topic is often misunderstood. It is not simply a case of moving to the cloud. While cloud infrastructure is important for adding flexibility, it is not suitable for every use case and comes with privacy, cost and lock-in challenges. A robust strategy for scalability should also include modular architectural designs, cross-functional collaboration and stronger infrastructure monitoring.

The primary takeaway is that building resilient and scalable AI applications requires a thoughtful data strategy, integrated security planning and a clear understanding of workload demands, beyond simply increasing infrastructure investments. Organizations may be dedicating significant resources toward AI projects without adequate forethought, driven by both the scale of opportunity and a fear of competitive pressure. Organizations that can overcome these scaling hurdles may find themselves in a strong position to stand out, even in an environment where many are investing heavily in AI.

Business implications

Meaningful AI adoption requires strategic planning: Participants highly recommended starting small and scaling, but this only works when paired with clear direction and foresight. Many experienced organizations regret focusing solely on the immediate needs of pilots or small-scale projects without engaging in longer-term planning. This planning goes beyond infrastructure — although designing for architectural scalability and modularity is important — and extends to data management and integration requirements, process and governance changes, and cross-functional collaboration.

Network infrastructure must be AI-ready: For data-intensive AI projects, networks need to be designed for low latency, high bandwidth and high availability. Failure to anticipate these needs can lead to an abrupt — and expensive — realization when scaling AI initiatives. Techniques such as distributed storage, caching and dedicated subnets for AI hardware can optimize performance and prevent congestion. Proactive network planning ensures AI capabilities can scale without bottlenecks. For more information on this topic, please see [Architecting AI at scale](#).

Security is important at every stage of the AI life cycle: Security cannot be relegated to an afterthought in AI strategies; it must be a foundational element alongside broader AI governance. Security strategies need to be comprehensive and adaptive, with a clear intent to protect data and intellectual property across all the environments where AI workloads execute. As AI expands the attack surface, organizations should explore zero-trust frameworks and the integration of advanced tools for API security, enhanced authentication and real-time threat detection. For more information on this topic, please see [Securing AI at scale](#).

AI delivery requires more than technical readiness: A resilient AI strategy that delivers scalable capabilities must also consider people and processes. Project teams must navigate diverse expectations and varied levels of AI understanding across the organization, which can be challenging with the widespread recognition of AI's potential. Without proactive education and outreach, this enthusiasm could drive a range of ineffective initiatives, leading to poor project prioritization and greater infrastructure strain. In addition, particularly in areas such as data management, stakeholders outside of the core project team often play a crucial role in the success of AI projects, and changes to processes and governance practices can be required to ensure projects deliver value.

Looking ahead

As organizations transition from experimenting with generative AI to full-scale deployment, their needs are evolving rapidly. Initial investments often focused on broad, general-purpose use cases such as summarization. However, as AI project teams explore tailored applications — whether by incorporating deeper domain expertise or integrating third-party data — the need for a well-informed AI strategy grows.

With ambitions expanding to support larger user bases, integrate diverse data sources, or tackle use cases involving latency or edge computing, AI strategies are becoming more complex. Advanced applications are frequently perceived as having a much greater impact potential. There is a clear distinction between a model that provides generic responses through a cloud service and an on-device model a field technician can use to address specific maintenance tasks. Aligning AI more closely with an organization's operating environment can help automate complex, multistep workflows and deliver a competitive edge.

Organizations with experience in AI are already recognizing this shift. As executives and technical teams plan investments, they recognize the value of a comprehensive AI strategy. They view a proactive approach that considers data, networking, security, processes, people, compute resources and tools as essential to overcoming the challenges that have hindered earlier initiatives.



About Verizon Business

Verizon Business is all about helping organizations like yours succeed in today's dynamic digital environment. We provide essential network solutions that support and enhance business operations and empower how millions of people live, work, and play every day. This research was commissioned to provide insights into the challenges of AI deployment, share peer experiences, and clarify the strategic choices facing IT leaders. Our aim is to offer a deeper understanding of these intricate dynamics, especially the critical importance of network and security infrastructure. We believe these insights can help your organization to scale AI confidently, maximize its potential, and consistently stay ahead in this rapidly evolving landscape.

About the author



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Alex Johnston is a senior research analyst on the 451 Research Data, AI & Analytics team at S&P Global Market Intelligence. He focuses on emerging technologies and how they can be applied in business contexts. Alex's primary coverage areas are artificial intelligence, distributed ledger technology, event stream processing and data marketplaces. Alex's recent areas of concentration include monitoring the emerging generative AI market, tracking the evolution in blockchain use cases and investigating real-time architectures.

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