Smarter AI for All

Comprehensive AI Solutions for Retail

intel®

Get started with Intel AI in Retail

Smarter technology for all

Lenovo

Contents

The future of AI in Retail

AI is reimagining Retail, fundamentally changing how e-commerce sites and brick-and-mortar stores operate, engage with customers, and plan for growth.

With AI, Retail businesses can leverage powerful tools to transition from traditional methods to a more data-driven, customer-centric approach, delivering insights and efficiencies that were previously out of reach. Today, the industry stands on the brink of an AI revolution.

Just as the introduction of the Internet and smartphones created new ecosystems and consumer behaviors, AI, and especially generative AI-based systems, are set to reshape the future of how we shop. Through predictive analytics and advanced automation, retailers can meet rising customer expectations, safeguard data and drive profitability—all while fostering sustainable practices. Businesses that are ready to move are set for transformational shifts in workforce productivity, inventory management, customer engagement, and optimized operations, ensuring a competitive edge.

At Lenovo, we believe in Smarter AI for All, bringing AI to your data using a secure, private, and hybrid approach. Our comprehensive AI products, solutions, as-a-Service models, and a growing partner ecosystem, provide our customers with the greatest set of open choices—where and when they need it most.

Delivering AI with Lenovo and Intel

Lenovo and Intel help you deliver secure AI solutions across the entire Retail ecosystem, touching every aspect of the business from supply chain management to customer service, providing actionable insights from anywhere, be it the warehouse, in transit, or on the shop floor.

Lenovo technology gives your organization full control, cybersecurity, and real-time access to information with local and hybrid edge computing solutions.
This includes data centers, where your AI apps and agents need high performance compute, availability, scale and seamless cloud integration.

Through a Hybrid AI approach, Lenovo and Intel help brings the right size and mix of AI models, devices, infrastructure, operations and expertise to your data across personal, enterprise and public environments.

What's already happening with AI?

It's no surprise that retailers are quickly realizing the benefits of investing in an AI strategy. AI offers transformative opportunities across almost every touchpoint, helping to streamline logistics, tailor customer journeys, predict emerging trends, and develop dynamic pricing strategies.

AI also plays a vital role in maintaining regulatory compliance with General Data Protection Regulation (GDPR) and the California Consumer Privacy Act (CCPA), safeguarding customer data and ensuring secure consumer transactions. Beyond compliance, AI systems analyze vast quantities of data to provide actionable insights, allowing retailers to make informed decisions about product placement, store layouts, and marketing strategies. These innovations help provide personalized product recommendations, reduce shrinkage, improve operational efficiency, and elevate overall customer satisfaction.

By 2035 AI is predicted to enhance Retail efficiencies by

59%[1]

69%

of retailers are planning to implement AI and ML technologies within the next 12 to 24 months. [2]

8% profit growth

Retail companies using AI or ML have seen their annual profit grow by 8%, outperforming retailers who have not utilized these technologies.[3]

4

How AI is having an industry-wide impact

Take a deeper look into how AI is already being used in Retail, and the many ways Lenovo can help drive industry innovation forward.

Customer experience:
Enhance customer interactions by providing personalized product recommendations and dynamic digital signage.

Loss prevention:
Detect and prevent theft by monitoring in-store activities and identifying suspicious behaviors.

Inbound logistics:
Streamline delivery schedules and supply chain routes, reducing costs and improving inventory accuracy.

Chatbots & virtual assistants:
Automate 24/7 customer service with AI-driven bots that can handle queries and product selection.

Inventory management:
Optimize stock levels and reduce waste through predictive analytics and real-time tracking.

Operational efficiency:
Streamline checkout processes with automated systems and reduces wait times through queue management.

Drive-thru:
Improve drive-thru operations by predicting peak times and enhance order accuracy with voice recognition technology.
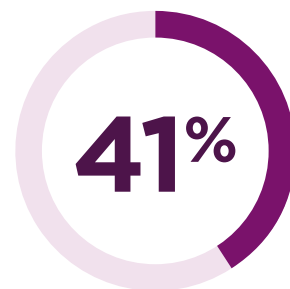
Predictive analytics:
Analyze data to forecast trends to anticipate and meet emerging consumer demands.

20% Less than 20% reported using advanced AI for receiving sales and operation planning. [4]

41% of decision-makers view the improvement of customer experience as a key driver. [2]

66% said they would use to AI to analyze customer data to create personalized recommendations.[5]

The challenges of implementing AI in Retail

Despite its vast potential, AI adoption in Retail has been uneven, hindered by investment priorities and limited understanding.

Cybersecurity is also a top concern, particularly as AI expands the attack surface, increasing the risk of data breaches, fraud, and model manipulation, potentially exposing sensitive customer information.

Integrating AI with existing systems, especially legacy infrastructures, also presents a significant challenge. Many retailers face a knowledge gap, lacking the internal expertise needed to move beyond initial AI pilots to full-scale implementations. While they see AI's potential to transform operations and customer experiences, they struggle with how to implement it effectively, securely, and within budget constraints.

43%
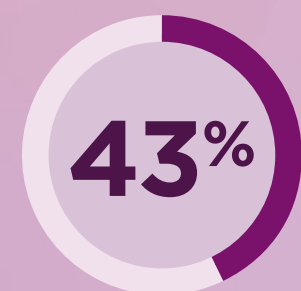
of retailers reported a lack of in-house AI expertise as a significant barrier to adoption. [2]

Other difficulties of implementing AI for Retail include:

- Knowing where to start

- A lack of strategic approach (AI for the sake of AI)

- The seven Vs of data: volume, veracity, validity, value, velocity, variability, volatility

- Skillset gaps and teaching shortages

- Managing evolving cybersecurity risks

- Compliance challenges and staying up to date with evolving regulations, including:
  - EU AI act
  - Digital Operational Resilience Act (DORA)
  - GDPR
  - California Consumer Privacy Act (CCPA)

- Difficulty integrating simple or complex data from diverse sources, particularly with legacy systems (data silos) and hallucinations

- Ensuring transparency, explainability, and fairness/lack of bias

- Consumer trust around data privacy

- Balancing investment in AI technologies with other critical business needs

- Keeping up with increasing consumer demands

- Underpowered hardware and devices.

77%
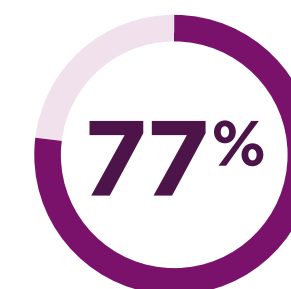
shared that their organization struggles to gain actionable insights from the data it collects. [4]

Only 33%

of organizations have implemented governance around responsible deployment of AI. [6]

65%
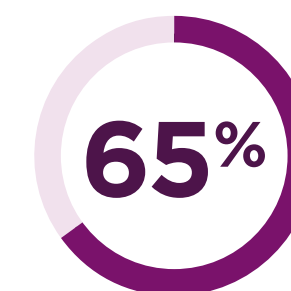
of retailers said they struggle to keep up with new technologies. [4]

IT should leverage AI using teamwork

The widespread adoption of AI requires IT teams to move beyond traditional roles and become proactive digital advisors, yet many retailers face a significant skills gap, lacking the necessary expertise in AI and data science.

Lenovo, as a trusted technology partner, can bridge the gap. Our AI solutions empower over 10,000 stores and 11 of the world's top 20 food chains with advanced AI capabilities. **With 4 AI Innovation Centers, 18 R&D locations, and extensive AI partner ecosystem**, Lenovo is uniquely positioned to support retailers at every stage of their AI journey. From identifying opportunities and use cases to managing data and deploying solutions, Lenovo becomes part of your AI strategy team, wherever you are on your journey.

AI technology: a team approach

Building a scalable, secure, and sustainable AI architecture requires a holistic, team-based approach that involves key stakeholders, including division leaders, infrastructure, operations, software development, and data science.

In an industry where meeting ever-changing customer demands is paramount, the human touch is still essential, even as we embrace automation.

Use real-time insights to make your store work more efficiently

When you use AI to process data at the edge, you can use real-time data analytics for immediate insights and actions. You can improve inventory management, enhance stock replenishment, minimize discrepancies, and deliver much more personalized shopping experiences. This working Retail solution is made possible using Sensormatic Solutions technology and Lenovo's ThinkEdge SE450 servers with Intel® AI capabilities.

Lenovo simplifies AI for Retail

Lenovo's vision for Smarter AI for All simplifies adoption and brings AI innovation to everyone in collaboration with Intel, through our Hybrid AI model, ensuring AI is delivered seamlessly, responsibly and securely to personal, enterprise and public environments across the Retail sector.

We bring AI to your data where and when you need it most, delivering AI solutions at your edges; on the shop floor, in distribution centers, or within your supply chain operations—wherever your organization needs full control, cybersecurity, and real-time access to data. We also deliver AI solutions at your data centers, providing high performance power, availability, scalability and seamless cloud integration.

Through a Hybrid AI approach, we bring the right size and mix of AI models, devices, infrastructure, operations, and expertise to your data across personal, enterprise and public environments.

In line with the unique demands of retail, Lenovo brings a hybrid approach, which can blend on-premises and cloud-based processing. Together, Lenovo and Intel jointly enable a broad portfolio for hybrid AI, data center, cloud, edge, and PC. With Lenovo supporting your AI adoption, retailers can advance sustainable, customer-centric strategies, and streamline operational efficiency and compliance across the supply chain.

Our Hybrid AI model brings innovation to everyone

Personal

Enterprise

Public

AI PCs predict consumer needs and support retail marketers to leverage automated, AI-generated content and editing. Teams are also empowered to perform strategic sales and marketing analysis locally—and all while keeping data private. We call this **AI for You**.

With Lenovo and Intel, AI is:

- **Personalized**: Utilize AI to enhance customer experiences by delivering personalized product recommendations, optimizing marketing campaigns, and tailoring promotions to individual shopper preferences.

- **Enhanced**: Streamline Retail operations with AI automation for mundane tasks such as stock checks, pricing updates, and even customer inquiries, freeing up staff to focus on more strategic, value-added activities.

- **Protected**: Fortify digital and physical infrastructure with advanced, predictive security measures, robust threat detection, cyber-resiliency, and loss prevention systems. Safeguarding customer data, ensuring transaction integrity, and preventing theft or unauthorized access.

Securely and privately develop, fine-tune, deploy and scale AI solutions (AI apps, agents, tools, models) on-premises, using enterprise data, policies, and governance compliance such as GDPR and CCPA across multiple devices.

- **Innovate**: Drive retail innovation with Lenovo's leading AI portfolio, providing rapid insights that inform decisions about product placement, store layouts, and marketing strategies.

- **Transform**: Transform life and work with enhanced innovation and productivity through scalable and smart AI solutions, infrastructure, services, and support.

- **Responsible**: Apply Responsible AI principles to your AI adoption ensuring the integration of secure, ethical and sustainable AI solutions.

Leverage cloud AI with virtual shopping assistants, chatbots, and open-source frameworks to enhance customer engagement and operational efficiency in Retail environments, optimizing costs while driving innovation and a seamless shopping experience.

- **Custom build, design and delivery**: Develop AI solutions tailored to your needs, boosting performance, maintaining compliance, and helping to reduce costs for long-term growth and competitive advantage.

- **Safeguard technology excellence**: Make sure your AI systems are robust, reliable, and perform consistently to minimize downtime, reduce errors, maintain business operations, and build customer trust.

- **Deliver exceptional customer and Retail experiences**: Better-designed, more intuitive AI solutions lead to enhanced user experiences, adoption rates and greater satisfaction.

The Lenovo AI portfolio

Building a scalable and sustainable AI architecture

Building an AI architecture begins with a technology partner like Lenovo that can bridge cross-industry best practices for compliance, security, and data management while providing devices and infrastructure to meet the unique needs of retailers and their customers.

Instant AI-driven productivity

Lenovo AI PCs, Workstations, and Edge devices include Intel processors and the new Intel AI-accelerating NPU (Neural Processing Unit) to enhance employee productivity and drive real-time decision-making across every touchpoint.

From stores to warehouses and distribution centers, Lenovo Edge AI servers, devices, and ISV-based solutions transform operations across your entire retail ecosystem.

Lenovo ThinkStation P Series
Powered by Intel® Xeon® Scalable processors

High-performance workstations which are powerful, ISV-certified, energy-efficient and highly versatile. Ideal for AI applications in analytics.

ThinkStation PX

ThinkPad X1 2-in-1

Lenovo ThinkPad X1 2-in-1
Powered by Intel® Core™ Ultra processors

The ThinkPad X1 2-in-1 Gen 10 Aura Edition combines the versatility of a laptop and a tablet, with AI-driven features that adapt to user preferences and improve efficiency.
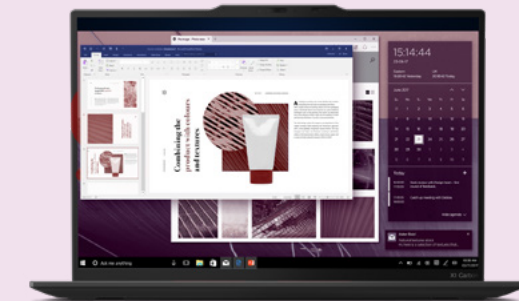
ThinkPad X1 Carbon

Lenovo ThinkPad X1 Carbon
Powered by Intel® Core™ Ultra processors

The ThinkPad X1 Carbon integrates AI-driven features like Microsoft Copilot, allowing users to automate tasks and enhance productivity effortlessly.

Smart shelving

Digital shelving: leverage AI-powered computer vision to improve shelf management by detecting out-of-stock items and ensuring accurate product placement. Retailers can monitor real-time shelf status and optimize inventory display with immediate adjustments.

Digital signage: create a personalized shopping experience with AI-powered digital signage, which captures and analyzes customers' behaviors and pushes relevant product promotion to create a more fun and engaging journey.

Smart checkout

Loss prevention: reduce shrinkage and ensure transaction integrity at self-checkout areas by employing Lenovo's powerful edge compute, integrated with a vision AI system, which can detect suspicious behavior and send alerts for further inspection.

Smart Point of Sale (POS): powered by an AI algorithm and Lenovo POS to provide a seamless checkout experience, assisted checkout captures the purchase of goods within seconds and presents information to customers immediately to ensure a smooth user experience.

Warehouse operations

Asset tracking: employ real-time location systems (RTLS) to accurately track goods to and from warehouses, optimizing logistics and improving operational efficiency.

Pick assist AMR: automate order fulfillment with Autonomous Mobile Robots (AMRs) that utilize AI decision-making to streamline operations, reduce manual labor, and enhance collaboration across warehouse tasks.

Warehouse Execution System (WES): gain comprehensive control over warehouse operations with real-time error reporting and AI-driven task management, ensuring efficient workflows and minimizing downtime.

Automated Storage & Retrieval Systems (AS/RS): deploy robot-based systems to optimize storage and retrieval processes, increase productivity, reduce labor costs, and improve inventory management.

Smart Store infrastructure

Lenovo ThinkEdge
Powered by Intel® Xeon® Platinum processors

Purpose-built platforms for compute-intensive applications deployed outside traditional data centers, with the flexibility needed for real-time data processing.

ThinkEdge SE450

Lenovo ThinkSystem
Powered by Intel® Xeon® Scalable processors

High-performance servers optimized for deploying and training AI models, handling large datasets, and complex algorithms.

ThinkSystem SR650

Lenovo ThinkAgile
Powered by Intel® Xeon® Scalable processors

Integrated systems offering pre-configured servers, storage, and networking to streamline AI adoption and deployment.

ThinkAgile HX650

Lenovo High-Performance Computing (HPC):

Supercomputers are increasingly vital in retail to process large datasets, optimize supply chain operations, and perform real-time consumer behavior analysis. Lenovo is the world's #1 supercomputing provider, according to TOP500.org [7]. Available as a Service, TruScale for HPC combines Lenovo's reliable technology with fully managed, predictable billing and flexible scaling to meet constantly changing business needs. With industry-leading technology and global HPC architects and experts, we take a customer-centric approach to deliver HPC solutions that best meet the evolving retail businesses.

Neptune™ Liquid Cooling

AI technology requires more system power than ever, putting an increased strain on energy demands. Lenovo's Neptune™ Liquid Cooling enables performance without compromise, reducing energy consumption by up to 40% while providing maximum performance and reliability of critical AI systems, ensuring that these systems can operate optimally without overheating or downtime.

The pace of change

Lenovo is passionate about responsible AI practices, offering end-to-end protection and support for your hybrid AI stack.

Our Responsible AI Committee, AI Innovators Program, and flexible Everything-as-a-Service solutions ensure secure, compliant, and sustainable AI expertise, wherever it's required:

AI Center of Excellence

The Lenovo AI Center of Excellence (AI CoE) is designed to help customers put AI to work for their organizations quickly, cost-effectively and at scale, with solutions that bring AI from ideation to reality. Lenovo makes AI adoption easier for you by providing workshops, proof of concepts, benchmarking, and performance optimization. Together, with our global partner ecosystem, we help reduce time to value and risk. Lenovo has strategically positioned AI data scientists, solution architects, engineers, and industry consortiums worldwide.

Lenovo AI Innovators program

Lenovo has a comprehensive partner strategy that brings together best-in-class Independent Software Vendors (ISVs) for AI software, hardware and solutions. We have over 50 AI Innovators in the program, providing more than 165 solutions. In the AI Innovator program, we provide access to our AI Discover Labs and a collaborative platform where partners can develop, deploy and validate their AI solutions with the support of cutting-edge tools, resources and expertise.

- Find specific enterprise AI solutions for retailers
- Execute proof of concept and comply with Lenovo's Responsible AI guidelines
- Train your own data without risking confidentiality

Services powered by AI

Lenovo AI Fast Start: Helps you quickly prove the business value of use cases on Personal AI, Enterprise AI and Public AI platforms within weeks, the Lenovo AI Fast Start service gives you access to AI assets, experts and partners that will help you rapidly build a generative AI use case solution with your own data and tailor it to the unique needs of your business, maximizing relevance in real-world environments and speeding progress to deployment at scale.

Lenovo TruScale Device as a Service (DaaS): Provides comprehensive, scalable Smarter AI devices and frees up valuable IT resources with a predictable subscription-based model—all from a single trusted partner. TruScale DaaS allows for quicker upgrades without upfront costs so Retail organizations can future-proof their technology investments and remain competitive.

Lenovo TruScale Infrastructure as a Service (IaaS): Unlock the advantages of on-premises infrastructure with the flexibility of a cloud-like experience. Lenovo offers tailored solutions for hybrid and multi-cloud environments, infinite storage, and high-performance computing (HPC).

Our new TruScale GPU as a Service offering enhances TruScale for HPC with advanced workload orchestration and usage metering, ensuring availability and maximizing productivity of AI-critical GPU resources. Combined with Asset Recovery Services, assets can be securely recycled, reused, or repurposed in an environmentally friendly way to maximize value. In an era of rapid advancements in AI and GenAI hardware and software stacks, this flexibility is crucial. Lenovo provides clients with the broadest range of deployment options.

AI grounded in security

In addition to accuracy, explainability, and transparency, security is a cornerstone of AI integration in organizational processes.

This includes adhering to guidelines such as the EU AI Act, as well as ensuring data privacy and information security. Unlike traditional IT systems, AI solutions must be built on a foundation of strong governance and robust security measures to be responsible, ethical, and trustworthy.

Lenovo's security-by-design approach establishes this foundation, ensuring AI solutions are secure from the component level, where the Intel vPro® platform enables advanced hardware protection, and through our Supply Chain Assurance capabilities. Our commitment to AI security is reinforced by our Global Security Organization, the appointment of our Chief Security & Artificial Intelligence Officer (CSAIO), and our participation in initiatives like the Joint Cyber Defense Collaborative.

CSAIO

Responsible

Ethical

Secure

Trusted

Governance

Put the right foundation in place

Lenovo's security by design approach provides the foundation for responsible AI solutions. Lenovo ThinkShield has you covered at every layer, starting with Supply Chain Assurance to protect your devices from the component level up. It also safeguards your devices from threats below the operating system, all the way to keeping data secure between the operating system and the cloud. And with our partnership with Intel, diverse AI workloads are further secured from data center to edge.

- Lenovo ThinkShield Zero-Trust practices to secure devices, infrastructure and networks

- Hybrid AI that balances on-premises and cloud processing to protect sensitive data

- Partnerships with leading security vendors to create a robust ecosystem

- Lenovo-owned and controlled manufacturing, so we can ensure security is built in every system and component

- Embedded governance, driving security across products and services to maintain a vigilant focus on customers' safety

- Lenovo experience and expertise prioritizing innovation, continuously earning our customers' trust

The foundation of responsible AI

To safeguard AI driven applications, AI adoption must be grounded in security. Lenovo's multi-layered approach provides the foundation for responsible, ethical, and secure AI solutions, built upon correct and up-to-date governance.

The Lenovo Responsible AI committee covers a wide array of challenges in the AI space. It makes sure AI is legal, ethical, fair, privacy-preserving, secure, and explainable.

The six pillars of Responsible AI at Lenovo are:

1. Diversity & Inclusion
2. Privacy & Security
3. Accountability & Reliability
4. Explainability
5. Transparency
6. Environmental & Social Impact

43%
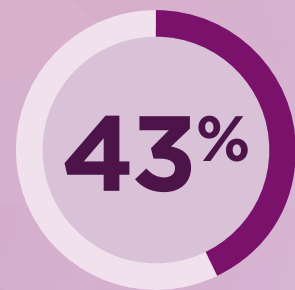
of retail leaders recognize that preparing retail data for AI models presents considerable complexity. [2]

Only **36%**

of retailers monitor stock allocations across sales channels. [2]

Delivering intelligent sustainability

We understand that what's better for people is also better for business, which is what drives every decision and investment we make.

Lenovo sustainability services include robust offerings to help retailers achieve their sustainability goals. Lenovo Asset Recovery Service (ARS) helps extend device ROI with premium warranty, support offerings, and hassle-free disposal.

Our innovative Neptune™ Liquid Cooling technology reduces energy consumption by up to 40%, supporting eco-friendly data centers, while addressing the growing concern of AI powered consumption [8]. Lenovo's CO_2 Offset Services allow our customers to offset their device's carbon footprint.

We also go further with the Lenovo Intelligent Supply Sustainability Analytics (LISSA) tool, which enables transparent monitoring of supply chain sustainability. We ensure all Generative AI solutions enabled by Lenovo undergo a responsible AI review including advising customers on how to setup their own responsible AI review and stay compliant.

Top 10

Lenovo's ranking in the 2024 Gartner Supply Chain Top 25. [9]

Since 2017, Lenovo has invested more than

$1.7 billion

into AI. [9]

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Get started with AI for All

Embarking on your AI journey begins with a thorough assessment of your current capabilities. You'll need to identify what your priorities are and focus on the quick wins that streamline operations and enhance the customer experience, then rapidly move beyond proof-of-concept.

Lenovo can support your AI initiatives at every stage of your AI journey. Once we understand your unique requirements, we define your desired outcomes, evaluate your data readiness, implement critical milestones, and pilot a use case to demonstrate proof of value and ensure your organization is set up for success, providing you with the tools, knowledge and expert guidance required for robust and reliable AI adoption.

Our AI Professional Services cover five critical phases: AI Discover, where we identify how AI can create value for your organization; AI Advisory, which assesses your AI readiness and defines strategic plans and roadmaps; AI Fast-Start, focused on designing and building AI elements; AI Deploy & Scale, implementing secure, scalable, and tailored Hybrid AI solutions; and AI Managed, which ensures continuous optimization.

Visit **www.lenovo.com/retail**

Why Lenovo?

You can trust Lenovo to empower your business with intelligent technology, driving innovation and growth in a secure and scalable way.

Embrace AI and redefine the future of your organization with intelligent solutions designed to enhance customer experiences, improve supply chain resilience, and accelerate time-to-market for new products. From devices and edge computing to infrastructure, servers, storage, and services, Lenovo delivers a complete, sustainable, and secure solution tailored to your needs.

Get a trusted partner. Discover Smarter AI for All and Smarter Retail for All.

Contact your Lenovo representative today.

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Get started with Intel AI in Retail

1. knightfrank.com/research/article/2023-11-10-retail-the-rise-of-ai

2. ecommercenews.uk/story/uk-retailers-confront-barriers-to-ai-adoption-study

3. https://www.statista.com/statistics/1453198/ai-and-ml-impact-on-retail-performance/

4. Forrester Consulting (Commissioned by Epicor) study, 2024.

5. KPMG, Generative AI in Retail, 2024.

6. PwC, 2023, Emerging Technology Survey.

7. top500.org/news/spoiler-alert-lenovo-still-1-global-provider-supercomputers

8. forbes.com/sites/bethkindig/2024/06/20/ai-power-consumption-rapidly-becoming-mission-critical

9. Supply Chain Top 25 for 2024, Gartner, 2024.

Smarter technology for all

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