# Applying AI — Industries

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Initiatives: Artificial Intelligence

AI is applied in vertical areas to address industry-specific problems. In some cases, these are for competitive differentiation; in others, the methods are common to a sector. This report provides an overview of Gartner's AI research and coverage as related to industry sectors and industry themes.

**Additional Perspectives**

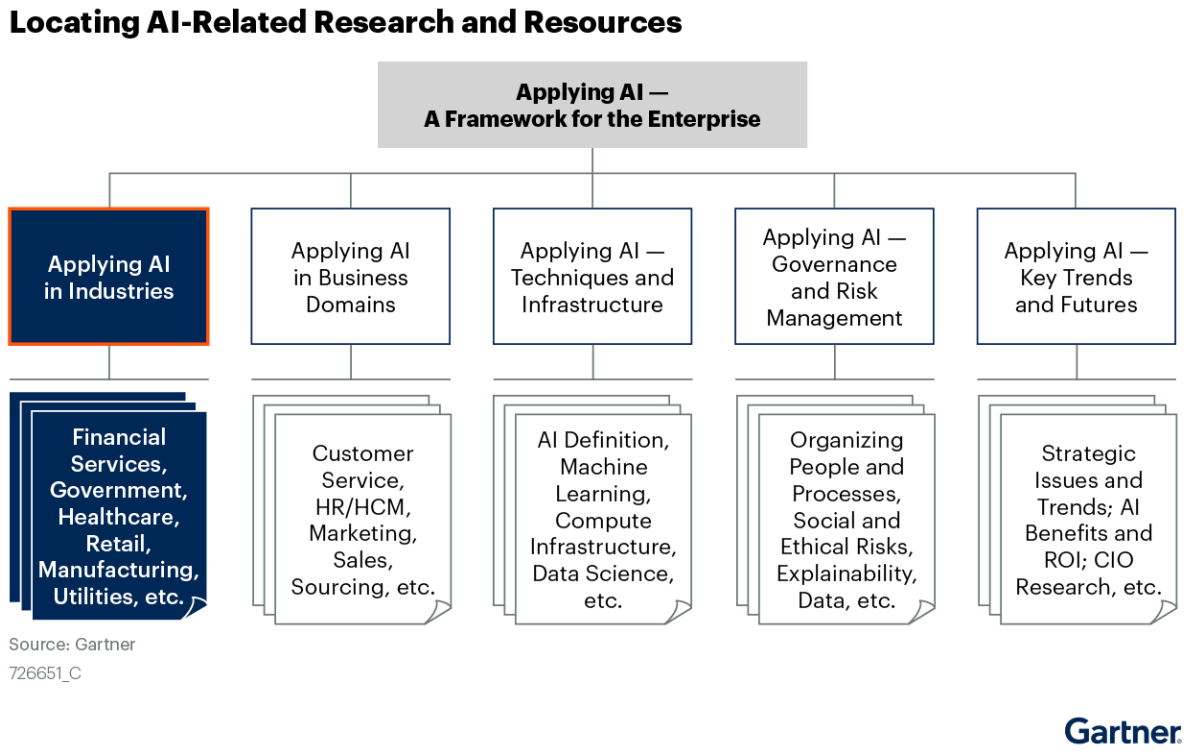
- Summary Translation: Applying AI — Industries
  (27 June 2023)

## Analysis

AI is a part of over 50 separate research areas within Gartner. To make research and resources easier to locate, Gartner divides this broad topic into the research areas below. The top-level research note is called Applying AI — A Framework for the Enterprise.

This report focuses on AI in industry verticals.

Figure 1: Locating AI-Related Research and Resources




The links below take you directly to the research outlined in Figure 1.

- **Applying AI — Industries** (this research note) describes where and how AI is applied in industries such as financial services, healthcare, retail, manufacturing and government.
- Applying AI — Business Domains describes where and how AI is applied within business domains and enterprise departments such as customer service, HR, marketing and sales.
- Applying AI — Techniques and Infrastructure includes the fundamental techniques and practices that comprise AI and AI engineering.
- Applying AI — Governance and Risk Management includes strategies and methods related to transparency, interpretability, ethics, privacy and security issues. It also addresses personnel and skills development, staffing, developing AI centers of excellence, and defining the ROI for AI projects.
- Applying AI — Key Trends and Futures focuses on the key trends and the future of AI, both in terms of strategic emerging technologies and key skills and governance options. It includes a focus on CIO and CTO executive priorities.

In the following sections, we provide an overview of Gartner's written and analyst resources as related to the application of AI in industries:

| Industry Sectors | Industry Themes |
| --- | --- |
| ■ Automotive and Transportation<br>■ Banking and Investment Services<br>■ Consultancies and System Integration<br>■ Defense and Law Enforcement<br>■ Education<br>■ Healthcare and Life Science<br>■ Insurance<br>■ Manufacturing<br>■ Media<br>■ Public Sector<br>■ Retail<br>■ Semiconductors<br>■ Technology Providers<br>■ Telecom<br>■ Utilities | ■ Consumer Products With AI<br>■ Regional AI Perspectives<br>■ Smart Cities and Smart Spaces<br>■ Sustainability and ESG |

## Research Highlights

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### Industry Sectors

**Automotive and Transportation**

Back to top

The car and commercial vehicle of the future will be nothing but a huge, moving, cloud-connected computer. Vehicles will become more and more automated and the features and capabilities controlled by software. Trucks will integrate with optimized logistics chains, dispatch and operations. AI is now being used across the whole value chain of mobility, from vehicle development to fleet servicing, enabling improvements in safety, cost and quality.

Analyst resources: Mike Ramsey, Jonathan Davenport, Pedro Pacheco, Masatsune Yamaji, Gaurav Gupta, Carly West, Oscar Sanchez Duran, Marc Halpern, Ivar Berntz

*Research resources:*

- Infographic: Artificial Intelligence Use-Case Prism for Automotive Enterprises
- Use-Case Prism: Artificial Intelligence for Transportation
- Predicts 2023: Automotive and Smart Mobility
- Emerging Tech: Assess Autonomous Vehicle AI Chips to Ensure Competitive Advantage
- Emerging Tech: The Future of Autonomous Vehicles
- Hype Cycle for Connected, Electric and Autonomous Vehicles, 2022

**Banking and Investment Services**

Back to top

In this industry, AI applications are moving from product creation to process automation, which is transforming financial services. AI-based tools are predominant across all lines of business, applied to business cases directly engaging with customers and employees. Leaders now have dedicated teams dealing with data sciences, machine learning (ML), natural language processing (NLP) and explainable reporting.

Analyst resources: Moutusi Sau, Jason Malo, Jeff Casey (general), Ali Merji (asset management), Agustin Rubini, Alistair Newton, Jasleen Kaur Sindhu

*Research resources:*

- Infographic: Artificial Intelligence Use-Case Prism for the Banking Industry

- Quick Answer: Could Adopting Explainable AI in Lending Lead to Increased Financial Inclusion?
- Tool: AI Use Cases for Banking and Investment Services
- Top Technology Trends Driving Change for Retail Banking CIOs in 2023
- Top Technology Trends Driving Change for Commercial Banking CIOs for 2023
- Top 10 Technology Trends for Investment Management CIOs in 2023
- Emerging Tech Impact Radar: Artificial Intelligence in Banking
- Quick Answer: What Are Banks' Current Plans for AI Using ChatGPT?

### Consultancies and System Integration

Back to top

Consulting and system integration (C&SI): These services include discrete project-based services that have finite start and end dates with specific deliverables. C&SI may include one or more of the following: strategy, business and IT consulting, as well as many variations of design, configuration, integration and deployment.

The global business and IT services market is among the most fragmented across any buying category (hardware, hosting, middleware, software or telecom). There are thousands of service providers. The estimated overall sizing of the global IT services market is approaching $1.41 trillion. A subset of that market is data and analytics (D&A) services (inclusive of AI). The worldwide D&A services market is forecast to exceed $177 billion in 2023.

Many of the service provider markets are quite fragmented. And the market for AI service providers is no exception. Gartner estimates that more than 80% of all the service provider options are composed of smaller, midsize, niche and specialty providers (which translates to service providers that have less than $100 million in annual revenue). This market dynamic gives rise to one of the biggest challenges for organizations looking for providers — identifying the potential service providers that would be most closely aligned to their situational demand. For organizations that rely on service providers of all types (including consultants, systems integrators, outsourcers and cloud providers), it is vital that D&A teams find the right partners.

Moreover, all of this must be done at a faster pace in today's dynamic environment, meaning that it is essential to start at the right place to reduce costly mistakes as part of the overall evaluation and selection process.

The three high-level categories where enterprises utilize consultants and systems integrators for AI initiatives are (a) buy, (b) build, or (c) embedded AI functionality. A summary of these three areas is as follows:

- **Buy** — Enterprises that may purchase AI-specific software such as recommendation engines, fraud detection systems, conversational platforms or other types of solutions.
- **Build** — Enterprises that want to build a targeted solution may utilize consultants and systems integrators to help in whole or in part with strategy, data engineering, model development, operations or governance. Examples of this work include building and training algorithms and models, curating data, operationalizing AI initiatives, assessing and mitigating risks, and identifying ethical issues.
- **Embedded** — Many of the largest applications vendors that have enterprise suites or platforms have embedded AI in either the user interface or the specific functionality of their offerings. Examples include SAP, Oracle, Salesforce, Workday and many others. Consultants and systems integrators are often involved in these deployments and more specifically leveraging AI for target enterprise demands.

One of the most frequently asked questions of a Gartner services analyst is, "Who are the top service providers?" Gartner's long-standing position is that there is no such thing as a "top" or "best" provider. The "best provider" is in the eye of the beholder. Only the organization making the buying decision can determine the provider best for that enterprise's needs. Unless there is a measurement of something objective like revenue, headcount or market share to create a fact-based stack ranking, it becomes very difficult in the service industry to reach a conclusion of the "top" vendors. Gartner's position is that the "right" service provider is the one that meets the client's evaluation criteria, aligns with the scope of the deal and has the most suitable cultural alignment.

Analyst resources: Frances Karamouzis, Shubhangi Vashisth, Afraz Jaffri

*Research resources:*

- TechWave Podcast: Insights on the Business and IT Services Market

- TechWave Podcasts for Technology-Driven Business Results
- 9 Key Factors to Consider When Negotiating Labor Rates for IT Services Deals
- Toolkit: Vendor Identification and Selection Guide for AI and Data and Analytics (D&A) Service Providers

### Defense and Law Enforcement

Back to top

Many defense and law enforcement organizations have identified artificial intelligence as a top priority. Drones, autonomous vehicles and surveillance systems are already having a direct impact on defense and law enforcement as well as on public and personnel safety. Organizations increasingly also use technology to collect data from people and things to improve situational awareness for commanders, supervisors and deployed personnel as they face increasingly dynamic events. Analysis of that data, using AI and related techniques such as graph, geospatial analytics and computer vision, creates accurate and actionable information for the right people at the right time.

*Analyst resources:* Bill Finnerty (public safety, justice), Michael Brown (public safety, justice), Michael McFerron (defense)

*Research resources:*

- Infographic: Artificial Intelligence Use-Case Prism for Smart Cities
- Predicts 2022: Decision Points Loom for Digital Innovation in Public Safety and Justice
- Hype Cycle for Public Safety and Law Enforcement, 2022
- Quick Answer: What Are the Implications of LLM Applications Such as ChatGPT for Government CIOs?
- Presentation: Top Technology Trends in Government for 2023

### Education

Back to top

AI is making significant inroads into education, with institutions experiencing measurable results in areas such as student retention, recruiting and faculty productivity. Increasing access to generative AI is also challenging education providers to review longer-term AI impacts on the sector. Institutions are exploring implications of AI in content development, enhanced student support, new teaching methods, research and assessment. However, there is a need to both develop more deliberate AI strategies and to distinguish between true artificial intelligence and projects that are more about robotic process automation (RPA) or just hype.

Analyst resources: Tony Sheehan, Kelly Calhoun Williams

*Research resources:*

- Quick Answer: How Should Education Institutions Respond to Use of Generative AI such as ChatGPT?
- Top Business Trends in Higher Education for 2023
- Top Technology Trends in Higher Education for 2023
- Top Trends in K-12 Education for 2023
- Hype Cycle for Higher Education, 2022
- Hype Cycle for K-12 Education, 2022
- Innovation Insight: Formative Digital Assessments in K-12 Education
- Predicts 2023: Education Will See Consolidation, Competition and Creativity

### Healthcare and Life Science

Back to top

Today, many healthcare organizations are making practical decisions about what AI use cases to prioritize and how to acquire or build AI solutions. Do they make the investments in data science tools and talent to build their own models? Do they focus on platforms or healthcare industry clouds with embedded AI/ML services? Or do they wait for “off the shelf” software products for specific healthcare use cases?

A myriad of AI applications can be found in epidemiology, diagnostic imaging, pharmaceutical R&D, process optimization, consumer engagement, clinical automation, medical service authorization, and many other areas of healthcare. Healthcare delivery organizations (HDOs) commonly use cloud platforms along with an interesting mix of edge, hybrid and on-premises hosting. Governance of AI is still inadequate to the particular demands of healthcare (consistent efficacy, avoidance of harm, health equity and source data variance), making it the root cause of many obstacles.

Analyst resources: Jeff Cribbs, Animesh Gandhi, Laura Craft, Amanda Dall'Occhio, Sharon Hakkennes, Nick Ingelbrecht, Jeff Smith, Michael Shanler

*Research resources:*

- Hype Cycle for Healthcare Data, Analytics and AI, 2022
- Infographic: Artificial Intelligence Use-Case Prism for the U.S. Healthcare Payer Industry
- Infographic: Artificial Intelligence Use-Case Prism for Life Science Manufacturers
- AI-Enabled IoT — Implications for Healthcare Providers
- Voice-Enable Your EHR to Improve Clinician Experience and Reduce Burnout
- Innovation Insight for AI-Enabled Diagnostic Imaging Interpretation

### Insurance

Back to top

Innovative property and casualty and life insurers have adopted AI and ML for a variety of use cases, from customer-facing activities to back-office transaction processing. To date, the top use cases are customer service and claims, but many are emerging, such as underwriting and distribution. Insurers are seeking to use a range of AI technologies, including chatbots for customer engagement, ML for fraud detection, NLP for next best action, and image analysis for claims estimation of loss.

Analyst resources: Kimberly Harris-Ferrante, Laurie Shotton

*Research resources:*

- How Insurers Are Using AI to Generate Business Impact

- Digital Insurance Success Requires Leveraging Data, Analytics and Artificial Intelligence
- Predicts 2023: What's Next for Insurance CIOs Operating in an Era of Turbulence?
- Hype Cycle for Digital Life and P&C Insurance, 2022
- Tool: Artificial Intelligence Use Cases for Insurance

### Manufacturing

Back to top

AI offers substantial potential for manufacturing companies, both in operations and business process optimization. Industry 4.0, factory of the future and smart manufacturing strategies point toward a self-adaptive and automatically reconfigurable production capability. In operations, a confluence of physical and virtual automation raises quality, reduces waste, accelerates continuous improvement and improves factory service levels. AI plays a vital role in all of these areas and others through smart robotics, computer vision for quality, ML for predictive maintenance, social listening for ideation, optimization algorithms for supply chain management, and production execution.

Analyst resources: Ellen Eichhorn (consumer goods), Simon Jacobson (supply chain), Scot Kim (asset-driven), Sohard Aggarwal, Alexander Hoeppe

*Research resources:*

- Top Strategic Technology Trends in Manufacturing and Transportation for 2023
- Hype Cycle for Manufacturing Operations Strategy, 2022
- Top Strategic Technology Trends in Consumer Goods Manufacturing for 2023
- Top Automotive Trends for 2023
- Quick Answer: What Are the 5 Essential Attributes of an Emerging Metaverse in Manufacturing?
- Metaverse's Implications for Manufacturing Technology and Solution Providers
- Innovation Insight for Smart Factory
- Infographic: Artificial Intelligence Use-Case Prism for Automotive Enterprises

- Infographic: Artificial Intelligence Use-Case Prism for Supply Chain

### Media

Back to top

AI traverses a myriad of areas of the media and publishing industry. Clients demand that publishers deliver in multiple media channels. AI is having an effect in three areas:

- **Written or image content augmentation and creation** — AI can automate, augment or allow for fully autonomous tasks or targeted processes. These include drafting content, content simplification, classification, summarizing large blocks of content and researching sources. In other subsegments of media, AI can augment tasks like segmenting scripts, creating shortlists, storyboarding and building schedules.
- **Personalization of content recommendations** — The focus of this area is to understand audiences and generate more relevant and engaging content, which, in turn, will lead to improved discoverability. This includes automatic content moderation and production. Successful digital publishers don't just publish content; they also curate content to engage and inform their readers.
- **Delivery of content in multiple channels or platforms** — The ability to leverage or repurpose content across different channels or platforms is a critical success factor in media. This entails the ability to deliver content (written word, audio, video, images, interactive graphics) in different levels of detail, and user interaction. AI can help make visual and interactive content more engaging, allowing for interactive feedback or channel optimization.

A current challenge in the use of AI in media focuses on fake content, plagiarism and copyright enforcement, as well as sourcing evidence and references. A number of AI tools are being designed to help deal with these issues, including automated fact checking, electronic watermark or fingerprinting content.

Analyst resources: Andrew Frank, Colin Reid, Anthony Mullen, Frances Karamouzis

*Research resources:*

- Quick Answer: How Should CMOs Respond to ChatGPT Today?
- Use Generative AI to Enhance Content and Customer Experience

- Elevate Your Influence Goals With Emotion AI
- Predicts 2023: AI, Social Toxicity and Disappearing Customers Forge the Future of Marketing
- Magic Quadrant for Content Marketing Platforms

**Public Sector**

Back to top

Public-sector organizations around the world consider AI as a game-changing technology with the potential to help them achieve their public purpose or mission, as well as drive economic growth in their region. Generally, public-sector organizations are looking to AI technologies to:

- Increase effectiveness, efficiencies and automation across internal operations
- Improve the safety of their workforce
- Deliver better experiences to citizens, businesses and customers that rely on their services

Due to the public sector's diversity of missions, the drivers progressing AI adoption differ greatly. Adoption and selection of use cases are also influenced by the high expectations communities place on government organizations when it comes to ethical behavior, accountability, discrimination, bias and respect for privacy. To date, public-sector organizations have targeted narrowly focused implementations of AI as they build confidence in the various technologies involved.

Chatbots have been a popular starting point for those focused on service delivery. Public-sector taxation, administration and regulatory organizations are applying machine learning techniques in areas such as anomaly identification and fraud detection. Computer vision is being used by municipalities, transport, regulatory, environmental, social services, justice and public safety organizations for a range of initiatives aimed at accelerating response times, improving consistency or scaling monitoring functions. Similarly, natural language technologies (NLTs) are being used for initiatives across the public sector with objectives such as improving document processing, search, gaining insight into citizen sentiment, extending multilingual support capabilities or improving case management functions.

As AI adoption in the public sector accelerates, the highly governed nature of the public sector will demand an increased focus in areas such as AI governance and AI engineering.

Analyst resources: Dean Lacheca, Ben Kaner, Irma Fabular, Daniel Snyder

*Research resources:*

- Hype Cycle for Digital Government Services, 2022
- Infographic: Top Priorities, Technologies and Challenges for Federal and National Government CIOs in 2023
- Infographic: Top Priorities, Technologies, and Challenges of State and Local Government CIOs in 2023
- Infographic: Artificial Intelligence Use-Case Prism for Smart Cities
- Case Study: Computer-Vision-Based Environmental Monitoring
- Case Study: AI and Automation to Support Government Regulation for Product Safety (Denmark)
- Case Study: Environmental Monitoring With Sensors, AI and Predictive Modeling
- Case Study: Advanced Analytics in Taxation Fraud Detection
- Robotic Process Automation in Action in Government

**Retail**

Back to top

AI is seen as a game-changing technology for the retail industry, and retailers should view it as the primary tool for connecting their data to business results in a fast-moving digital business world. Their already voluminous data hoards are becoming more and more complex and unmanageable as retailers begin to feel the additional impact of IoT-generated data and other real-time data sources. AI can be used to deliver both cost and revenue optimization for dynamic in-store operations, at the right time, based on the goal of enhancing both employee and customer experiences.

On the back-office enterprise side, AI is used, for example, to improve demand forecasting for more targeted planning, and to optimize the cost of goods — the largest cost category for a retailer. The cost of goods includes the costs of selection, assortment, pricing, promotion, inventory levels, and the distribution and delivery of products and services offered. In addition, AI can be deployed in product development, pricing scenarios, assortment planning, product selection, customer segmentation and generation of real-time offers. Generative AI is emerging as a significant disruptor in retail. ChatGPT and other solutions including DALL-E (also from OpenAI), Claude, Sparrow, Bard (powered by LaMDA) and Character AI represent a significant shift for the AI industry. By leveraging generative models and predictive capabilities, a new generation of applications will serve as a catalyst for AI adoption.

Analyst resources: Robert Hetu, Kelsie Marian (digital workplace, smart robots, human-centric AI), Sandeep Unni (IoT and computer vision in-store)

*Research resources:*

- Infographic: Artificial Intelligence Use-Case Prism for Long Life Cycle Retail
- Infographic: Artificial Intelligence Use-Case Prism for Short Life Cycle Retail
- Quick Answer: What Should Retailers Know About ChatGPT?
- Emerging Technologies and Trends Impact Radar: Artificial Intelligence in Retail
- Retailers Must Drive Customer-Centric Merchandising With an AI Core
- Preparing for the AI-Based Retail Nervous System
- Market Guide for Intralogistics Smart Robots in Retail
- Hype Cycle for Retail Technologies, 2022
- Predicts 2023: Immersive Stores Are a Critical Focal Point for Retail Profitability

**Semiconductors**

Back to top

Semiconductor manufacturing and design constitute a complex process that generates vast amounts of data from each step in the process. With such complexity, the data processing required to derive analytic insights from this data is very sophisticated. Chip companies are now seeking to leverage AI-based tools to parse through this complex data to identify patterns and provide insights to help save cost, optimize processes for new and existing products, reduce time to market, and improve yields.

For applications such as automotive, medical devices, aerospace and consumer electronics that rely on complex microelectronics, implementing these tools can improve the long-term reliability and performance of products. Additionally, chip design at leading-edge nodes is getting very complex, and chip designers are starting to use AI for specific tasks, such as design optimization, modeling, flow automation, routing, and placement. This has been accelerated by incorporation of AI in software tools by electronic design automation (EDA) companies that are moving their tools into the cloud.

Analyst resources: Gaurav Gupta

*Research resources:*

- Emerging Tech Impact Radar: Semiconductor and Electronics Technologies
- Innovation Insight for Generative AI
- Infographic: AI Use-Case Prism for Chip Manufacturing and Design

### Technology Providers

Back to top

AI serves as a source of innovation for new products and services, including ones that are completely new or ones that can be built on AI-based foundation models. AI is maturing with the latest innovations clustered around AI-enabled applications, workforce productivity and human-centric AI. The innovation is being used for multiple purposes in products and services, such as extracting better insights for product enhancements, enabling better adaptive user interfaces and helping create customer personas. Technology providers must understand timing and impact for various AI technologies in order to effectively embed them, and to add intelligence to their solutions for competitive advantage.

*Analyst resources:* Jim Hare, Rajesh Kandaswamy, Annette Jump, Radu Miclaus, Danielle Casey, Craig Roth, Eric Goodness, Alan Priestley, Kevin Quinn, Arup Roy, Tracy Tsai

*Research resources:*

- Predicts 2023: AI's Profound Impact on Products and Services
- Top Growth Strategies for Tech CEOs of AI Technology Providers
- Emerging Tech Impact Radar: Artificial Intelligence
- Quick Answer: How Software Engineering Teams Can Leverage AI
- Infographic: Artificial Intelligence Use-Case Prism for Software Development and Testing
- Emerging Tech Roundup: ChatGPT Hype Fuels Urgency for Advancing Conversational AI and Generative AI
- Quick Answer: What Technology Companies Should Know and Do About ChatGPT

### Telecom

Back to top

AI is expected to contribute to value generation and optimization initiatives and to improve customer experience for communication service providers (CSPs). To a large extent, CSP business units and executive leadership recognize the value that AI can bring when included as part of the business strategy and planning. However, there seems to be a lack of focus in using AI for new and differentiating value generation by CSPs.

CSPs are struggling to measure the business value of AI and are challenged in aligning AI initiatives to business outcomes. The interdisciplinary AI teams of AI, IT, operational and business experts are established with executive oversight and accountability in order to align the needed resources from AI ideation to prototyping, development and implementation. Without the proper investments into teams, skills and capabilities, CIOs are unlikely to realize the expected value from AI initiatives.

Nevertheless, challenges in aligning AI initiatives to business outcomes remain — after the ideation and prototyping stages, business leaders seem to be less involved in the implementation stage.

*Analyst resources:* Kameron Chao, Peter Liu, Amresh Nandan, Sylvain Fabre, Susan Welsh de Grimaldo

*Research resources:*

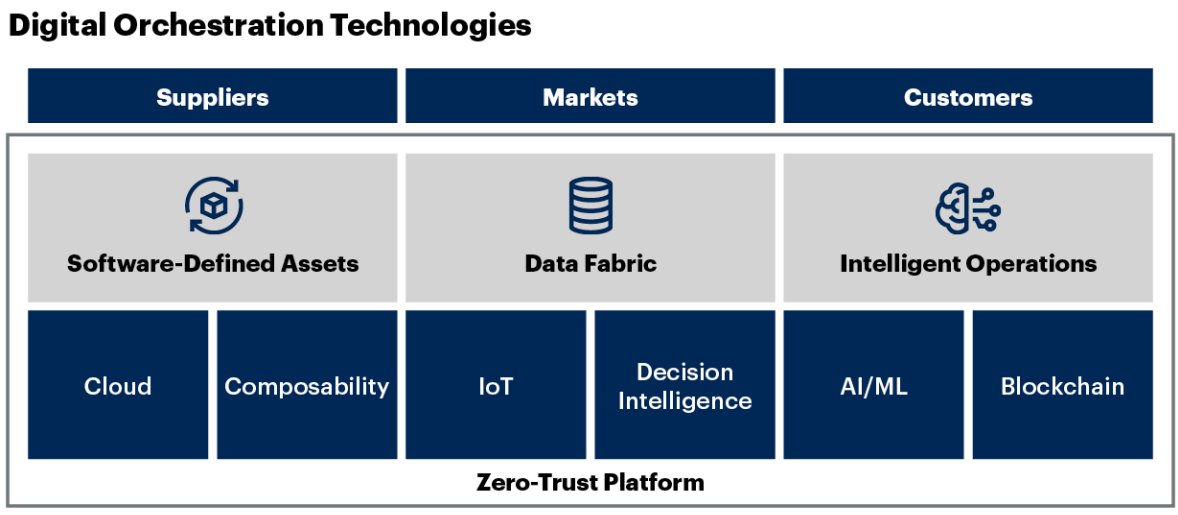
- How Can the Telecom Sector Be Successful With AI?
- Must-Have AI Innovations for Your Product Roadmap to CSPs
- Infographic: 3 Things to Evaluate When Creating AI Product Roadmap for CSPs
- AI in Organizations: A Telecommunications Perspective
- Market Guide for AI Offerings in CSP Network Operations

### Utilities

Back to top

Faced with the challenges of the energy and water transition to provide available, acceptable and affordable energy and water, utilities are moving toward intelligent operations, adapting the design of business and operating models to significantly advancing operations capabilities. This will be accomplished through a combination of digital and physical augmentation and automation (see Figure 2).

Figure 2: Digital Orchestration Technologies for Utility Intelligent Operations

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AI plays a vital role in this, as it is developed for and integrated with situational awareness and analysis systems, smart robotics and software-defined capabilities applied to asset management, network operations and optimization. AI will also play a critical part in field service, customer service and most other business operations including energy and water management. AI will be increasingly sought across the entire utility value chain — supply, transmission, distribution, retail and end use — and across all utility commodities, including electricity, water, natural gas, steam and district thermal.

Analyst resources: Ethan Cohen, Lloyd Jones, Nicole Foust, Sruthi Nair, Lauren Wheatley, Pieter den Hamer

*Research resources:*

- 2023 Utility Trend: Establish Decision Intelligence Before Chasing Autonomous Business
- Utility CIO Priorities 2023: Insights for Technology and Service Provider Product Plans
- Hype Cycle for Digital Grid Transformation Technologies, 2022
- Hype Cycle for Utility Industry IT, 2022

## Industry Themes

### Consumer Products With AI

Back to top

AI in consumer products will reduce friction and create efficiencies, especially in mundane tasks for users and buyers. Today, AI is most visible in consumers' lives in the form of virtual personal assistants (VPAs) on smartphones (e.g., Siri, Cortana, Google Assistant, Baidu) and VPA speakers in the home (Amazon Echo, Google Home). VPAs are now rapidly being introduced into mobile settings (automotive platform integration) and new device categories (Amazon Echo Input, Echo Auto).

AI is being used to visualize products inside the home and on consumers themselves (for example, Warby Parker's Virtual Try-On of its range of glasses, Madison Reed's virtual hair color assistant, and L'Oréal's color concierge services). Another use is with an edge computing device, such as Nima (gluten/peanut allergen tester), LG washer dryers (sensing the right settings and the amount of detergent) and at-home exercise equipment like Peloton, NordicTrack and Mirror. Gamification can also play a role, such as Colgate-Palmolive's Magik smart toothbrush, which teaches kids how to brush their teeth through an interactive game (toothbrush connected to the app).

CG manufacturers are actively assessing opportunities and best investment bets within the metaverse.

*Analyst resources:* Michelle DeClue, Ellen Eichhorn, Roberta Cozza, Annette Zimmermann, Roger Sheng

*Research resources:*

- Top Strategic Technology Trends in Manufacturing and Transportation for 2023
- Top Strategic Technology Trends in Consumer Goods Manufacturing for 2023
- Hype Cycle for Consumer Goods, 2022
- Quick Answer: What Are the 5 Essential Attributes of an Emerging Metaverse in Manufacturing?
- Infographic: Artificial Intelligence Use-Case Prism for Supply Chain

### Regional AI Perspectives

Back to top

The EU has issued guidance on how it plans to regulate artificial intelligence. [1] Regulation will have complex effects both in the EU and globally. China is putting forth similar, though different, regulatory requirements [1] on the use of AI. At the time of writing, enforcement actions have already taken place regarding the (il)legality of the use of third-party-provisioned democratized Generative AI, such as in Italy. [2] CIOs should address the requirements such regulations will impose on their AI strategies. For example, the European Data Protection Supervisor (EDPS) has previously called for a stricter approach to the use of face recognition technology. [3]

Ethical and human rights concerns have also been addressed by the Office of the Privacy Commissioner of Canada, [4] as well as by the HRC in Australia. [5] Several jurisdictions are investing in AI and simultaneously attempting to enhance transparency, fairness, privacy protection and explainability through frameworks and regulations or codes of conduct.

In China, booming AI investment in a rapidly evolving ecosystem will drive local innovations and expand use-case scenarios. Alibaba, AWS, Baidu, Microsoft and Tencent compete in cloud-based AI services with a full range of offerings — from AI applications to ML services.

Amid these different preferences and perspectives, it is very well possible that over time, CIOs who are developing, deploying and using AI technology may find it necessary to regionalize the details of the model's functioning. Such regionalization pertains not only to where and how AI may assist in achieving your goals, but also to what extent risks to the use of AI are managed. AI trust, risk and security management (TRiSM) will provide an increasingly critical set of capabilities to adequately regionalize your AI deployments.

*Analyst resources:* Bart Willemsen, Frank Buytendijk (AI ethics topics), Arnold Gao, Arun Chandrasekaran, Avivah Litan

*Research resources:*

- What Executives Need to Do to Support the Responsible Use of AI
- Quick Answer: How Can Executive Leaders Manage AI Trust, Risk and Security?
- Market Guide for AI Trust, Risk and Security Management

### Smart Cities and Smart Spaces

Back to top

AI is increasingly applied in a great variety of smart city and urban ecosystem scenarios. Examples include the use of AI in dynamic traffic management, air quality management, crowd management, social welfare, green space management, waste management, smart public lighting and smart dynamic parking. With the help of AI, sustainability operations have become possible that show impacts of climate-induced challenges like flooding, heat islands in cities or pollution.

Smart spaces include smart homes, (office) buildings, campuses, venues and factories. In the next few years, smart space technology will evolve rapidly from the fusion of smart edge devices, the IoT and AI. The data of smart buildings is valuable for developing insights into microgrid energy and resource consumption or on-site generation of energy, as well as user experiences. Connecting building data together allows AI to manage those assets like small districts or campuses.

Analyst resources: Bettina Tratz-Ryan, Bill Finnerty, Milly Xiang, Roberta Cozza, Bart Willemsen, Annette Jump, Janel Everly

*Research resources:*

- Predicts 2023: Sustainable Smart City Decision Making Using Urban Data
- Hype Cycle for Smart City Technologies and Solutions, 2022
- Maverick Research: Metaverse Is the Ally for Smart Cities and Urban Sustainability
- Creating Sustainable and Innovative Smart Buildings Through Data
- Infographic: Artificial Intelligence Use-Case Prism for Smart Cities

### Sustainability and ESG

Back to top

AI for sustainability can significantly impact the social and governance aspects of ESG performance, and it can generate value for organizations by delivering competitive advantage and reducing environmental impact via more efficient management of resources. As outlined in the Hype Cycle for Sustainability, 2022, AI for sustainability has the potential to improve:

- Monitoring and prediction operations by, for example, sensing, automating decisions and taking actions
- Resource optimization, materials usage and circularity
- Reporting and disclosure by enabling stakeholder-centric sustainability narratives and reporting
- Energy cost and risk mitigation by, for example, enhancing the use of distributed energy resources and microgrids

- Traceability and trust by recording transactions and creating a tamper-proof log of sensitive activity

The Infographic: AI Use-Case Prism for Sustainability and ESG comprises numerous use cases covering a variety of industries and applications, such as materials discovery and AgTech, or, for example, water, vegetation and energy grid management. The top four use cases listed below share the common goals of enhancing business operations and optimizing difficult-to-abate processes (e.g., in manufacturing, utility or transportation) to reduce environmental footprint and mitigate material risks:

- Climate and weather change monitoring and prediction
- Waste management and recycling optimization
- Route optimization, transportation and mobility
- Air quality and transportation emissions

Analyst resources: Gabriele Rigon, Bettina Tratz-Ryan, Pieter den Hamer, Anthony Mullen, Jim Hare, Erick Brethenoux, Simon Mingay

*Research resources:*

- Hype Cycle for Sustainability, 2022
- Infographic: AI Use-Case Prism for Sustainability and ESG
- Quick Answer: What Are the Differences Between the Terms CSR, EHS, ESG and Sustainability?
- Quick Answer: How Do I Make AI Environmentally Sustainable?
- Emerging Tech Impact Radar: Artificial Intelligence

## Evidence

[1] A comparison on fundamental differences between EU and China's efforts in regulating AI is provided in Confucius, Cyberpunk and Mr. Science: Comparing AI Ethics Principles Between China and the EU, AI and Ethics.

China has recently added specific guidance regarding the use of Generative AI: Notice of the Cyberspace Administration of China on Public Comments on the "Administrative Measures for Generative Artificial Intelligence Services (Draft for Comment)", Cyberspace Administration of China.

[2] Artificial Intelligence: Stop to ChatGPT by the Italian SA. Personal Data Is Collected Unlawfully, No Age Verification System Is in Place for Children, Garante per la Protezione dei Personali (translated from the Italian original).

[3] Artificial Intelligence Act: A Welcomed Initiative, but Ban on Remote Biometric Identification in Public Space Is Necessary, European Data Protection Supervisor, European Union.

[4] Privacy Guidance on Facial Recognition for Police Agencies, Office of the Privacy Commissioner of Canada.

[5] Human Rights and Technology Final Report, 2021, Australian Human Rights Commission.

## Document Revision History

Applying AI in Industries - 26 July 2021

| Industry Sectors | Industry Themes |
| --- | --- |
| Automotive and Transportation | Consumer Products With AI |
| Banking and Investment Services | Regional AI Perspectives |
| Consultancies and System Integration | Smart Cities and Smart Spaces |
| Defense and Law Enforcement | Sustainability and ESG |
| Education | |
| Healthcare and Life Science | |
| Insurance | |
| Manufacturing | |
| Media | |
| Public Sector | |
| Retail | |
| Semiconductors | |
| Technology Providers | |
| Telecom | |
| Utilities | |