

# AI in the Utility Construction Industry: Key Market Trends, Applications & Best Practices



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Presented by:





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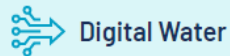


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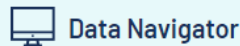


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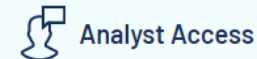


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## **Eric Bindler**

Senior Research Director,  
Bluefield Research

We advance strategies for utilities, companies, and organizations addressing the challenges and opportunities in water.



What Is AI (and What Is It Not)?

AI Market Drivers & Trends

AI Applications for Utility Construction

## Defining AI & Related Terms

### ARTIFICIAL INTELLIGENCE

- Artificial intelligence (AI) is the ability of machines to **sense, reason, engage and learn** in a manner that seems intelligent.
- Current AI systems are considered “**narrow**” (i.e., only able to perform specific functions), with various predictions about Artificial General Intelligence or Artificial Super Intelligence in the future.

### MACHINE LEARNING

- Machine learning is a subset of AI which involves enabling machines to **learn and improve** based on data or experience, without being explicitly programmed.
- Deep learning is a further subset of machine learning which uses **multiple layers** of data processing and analysis to mimic the **neural structure** of the human brain.

### GENERATIVE AI

- Generative AI is a form of AI that leverages machine learning and deep learning to generate **brand-new content** (e.g., text, code, images, videos) in response to user prompts.
- Generative AI chatbots, like ChatGPT, are trained on **massive text-based datasets** from the open internet to produce human-like text (e.g., essays, emails, poems) in response to user prompts.

Source: Arcadis, Bluefield Research



“Artificial intelligence” is an umbrella term that encompasses a wide range of related, but distinct, techniques and technologies.

## Debunking Common AI Myths & Misconceptions

### WHAT IS AI (AND WHAT IS IT NOT)?

- 1) AI is not always **right**, always **unbiased**, or always **superior** to human intelligence.
- 2) AI is not going to result in **massive job losses**.
- 3) AI is not **purely digital**.
- 4) AI is not a **silver bullet**.
- 5) AI is not **all or nothing**.

Source: Bluefield Research

 AI can be a powerful tool for companies and workers, but business leaders must have a clear understanding of its risks and limitations.

## Relative Strengths of Artificial vs. Human Intelligence



### Artificial Intelligence

- Process very large datasets quickly and accurately
- Identify patterns and trends, make predictions, and spot anomalies
- Perform complex calculations and solve problems without human error
- Work continuously and repetitively without fatigue
- Generate highly personalized output



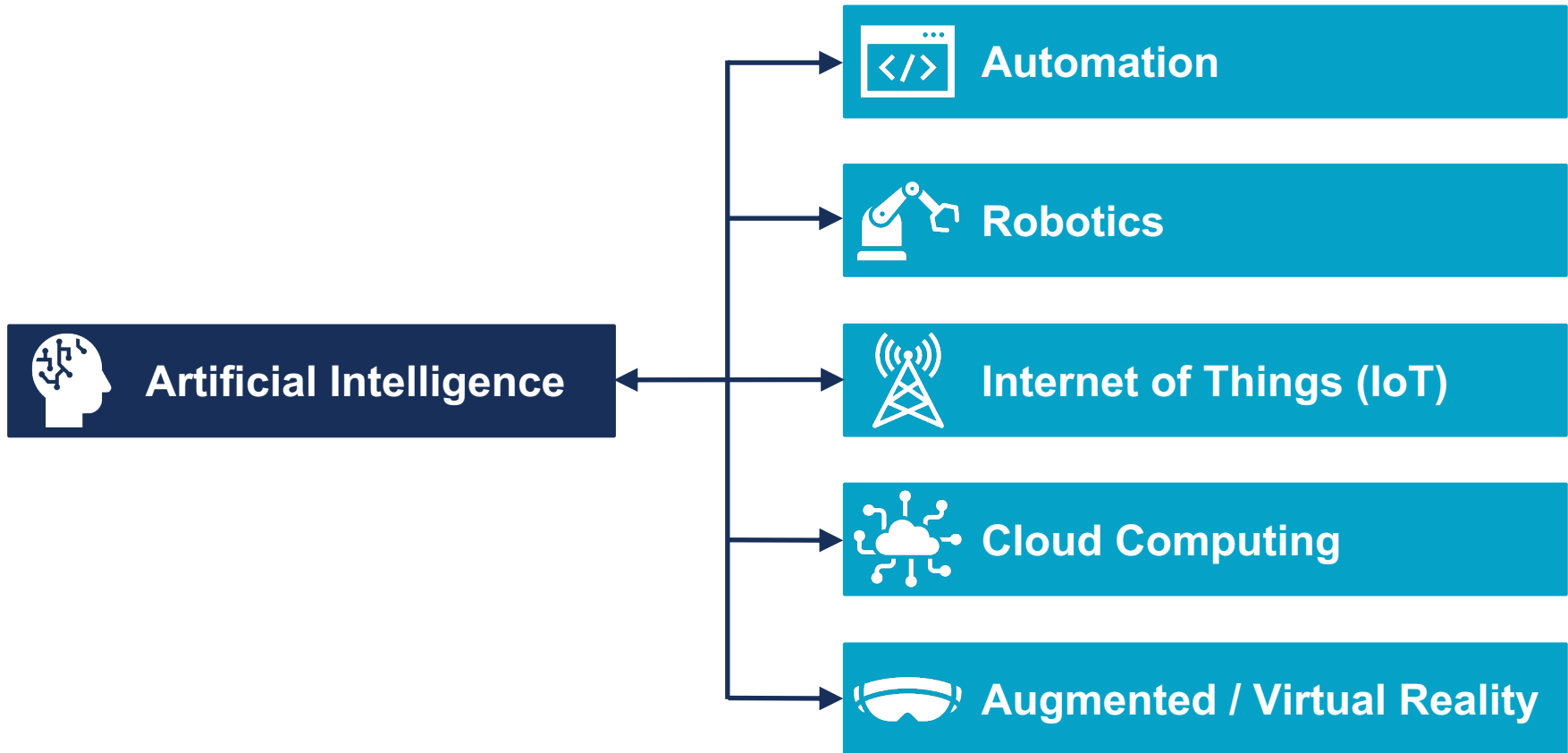
### Human Intelligence

- Display empathy and emotional intelligence
- Make decisions based on ethics, morals, or cultural norms
- Develop common sense, contextual understanding, and domain knowledge
- Learn and adapt continuously based on new information
- Think creatively or “outside the box”

Source: Bluefield Research

**➤ AI can augment but not replace human intelligence, creating an opportunity for “collective intelligence” which uses the best of both.**

## AI vs. Adjacent Digital Technologies



Source: Bluefield Research

➤ AI is distinct from, but synergistic with, several other cutting-edge digital technologies and solutions available in the market.



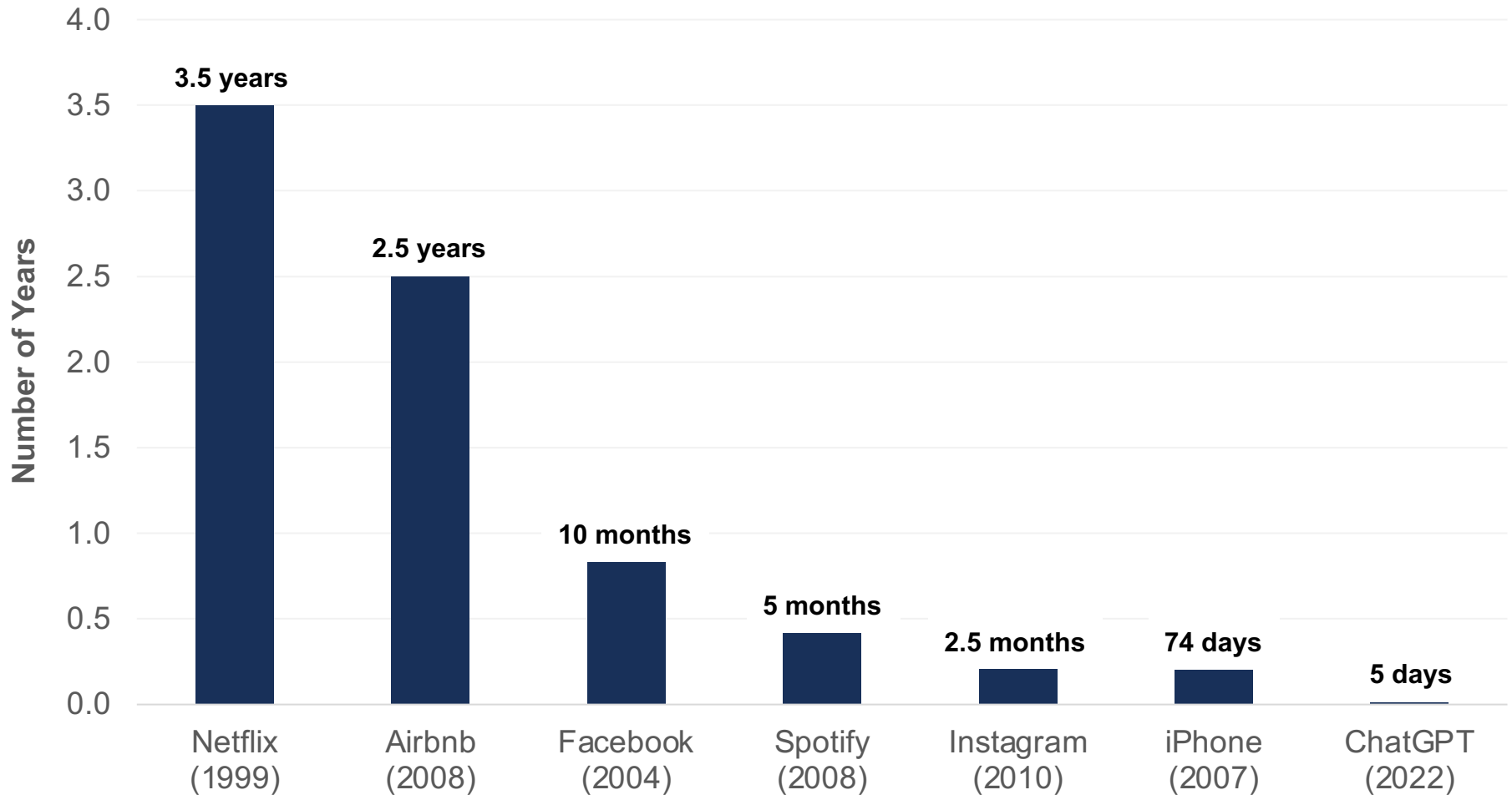
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## Time to Reach 1 Million Users by Platform

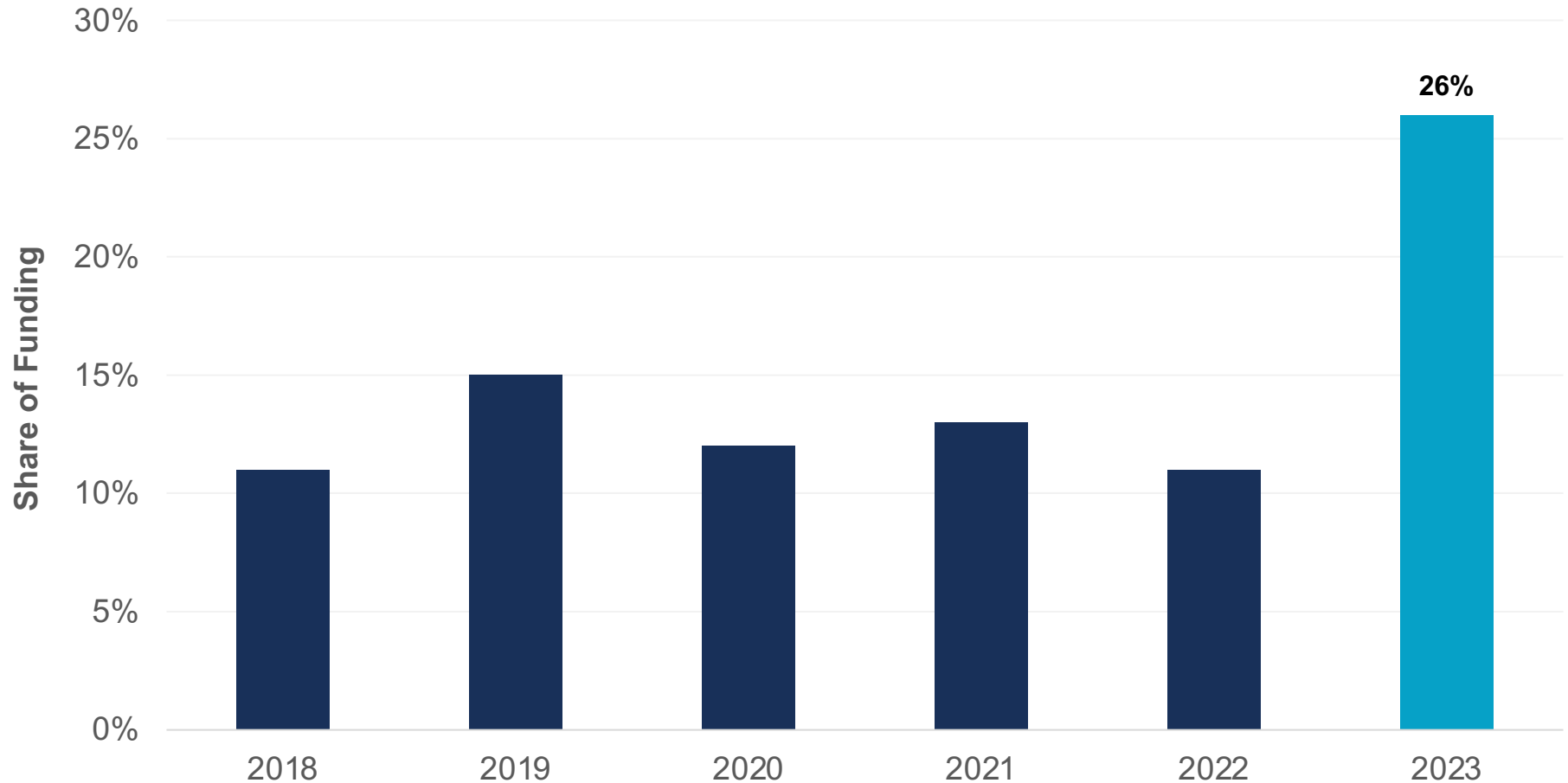


Source: Exponential View, Bluefield Research



**ChatGPT hit 1 million users in five days and 100 million users in two months, far exceeding the growth of other popular digital platforms.**

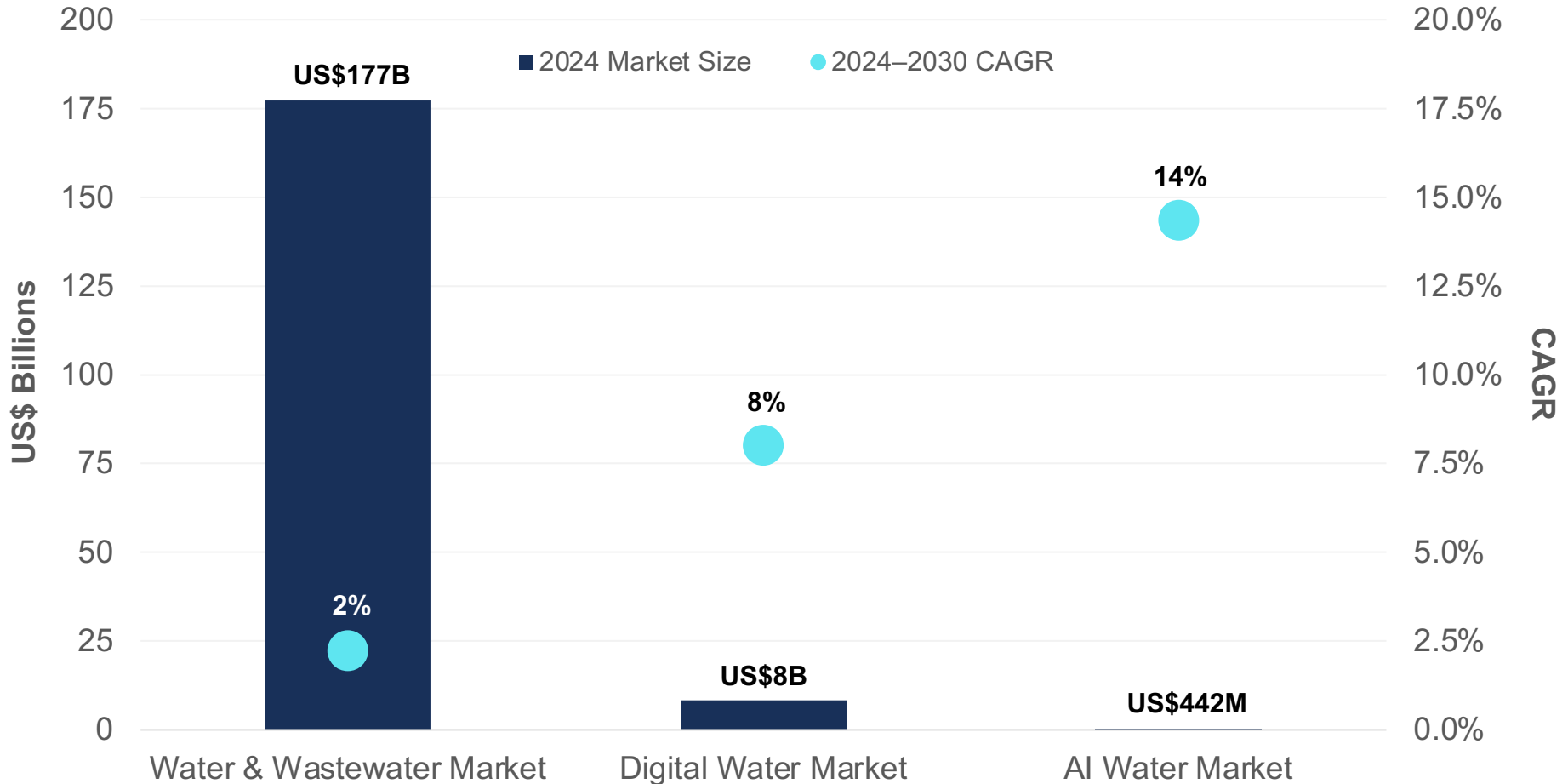
## Share of U.S. VC Funding for AI Startups



Note: 2023 data available through August  
Source: Crunchbase, Bluefield Research

➤ **AI startups accounted for more than a quarter of all U.S. venture investment in 2023, up from an average of 12% from 2018 to 2022.**

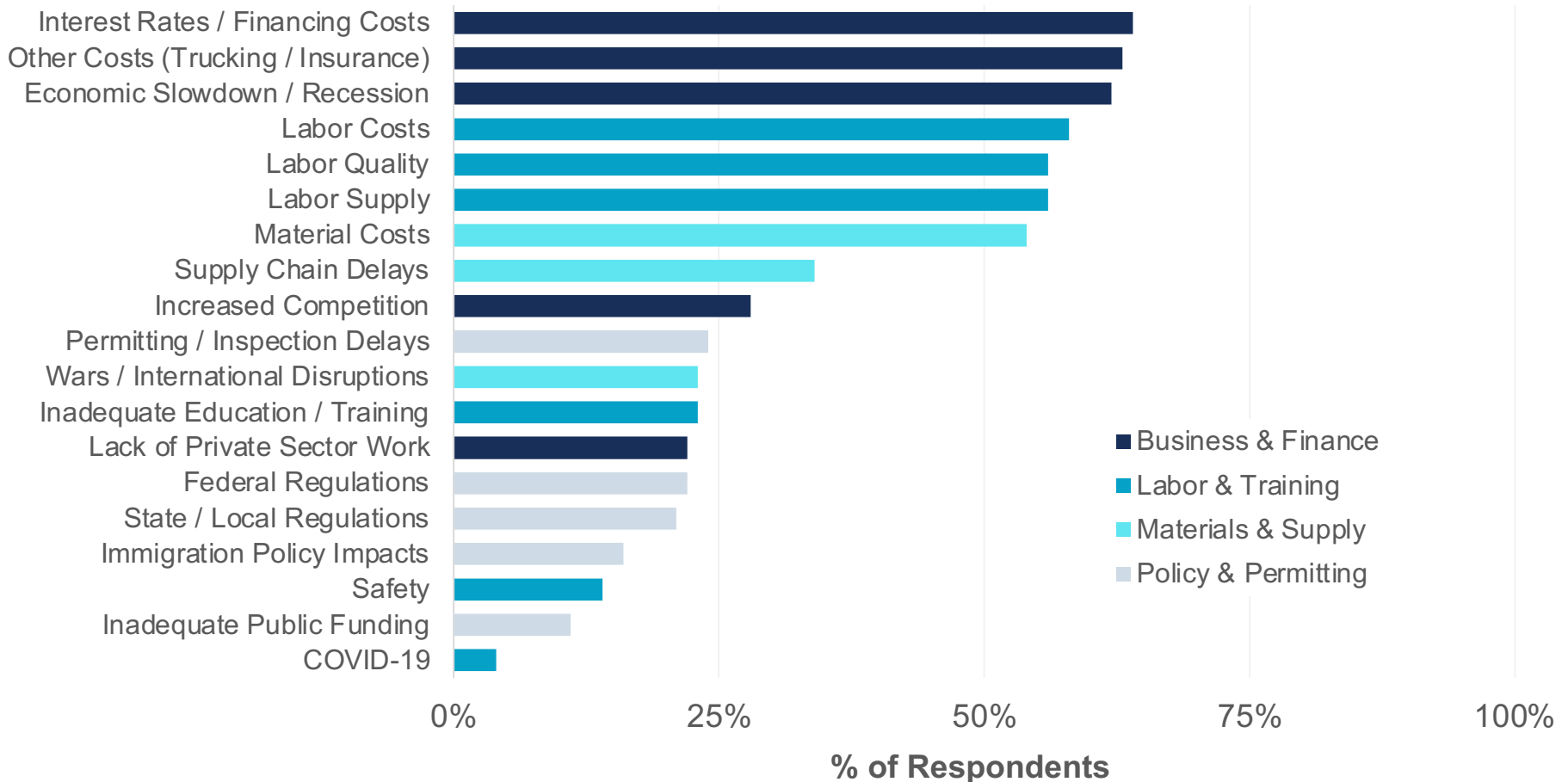
## U.S. Water Utility Market Size & Growth by Segment, 2024–2030



Source: Bluefield Research

➤ While still just a sliver of the broader water utility infrastructure and technology markets, AI is poised to see rapid growth through 2030.

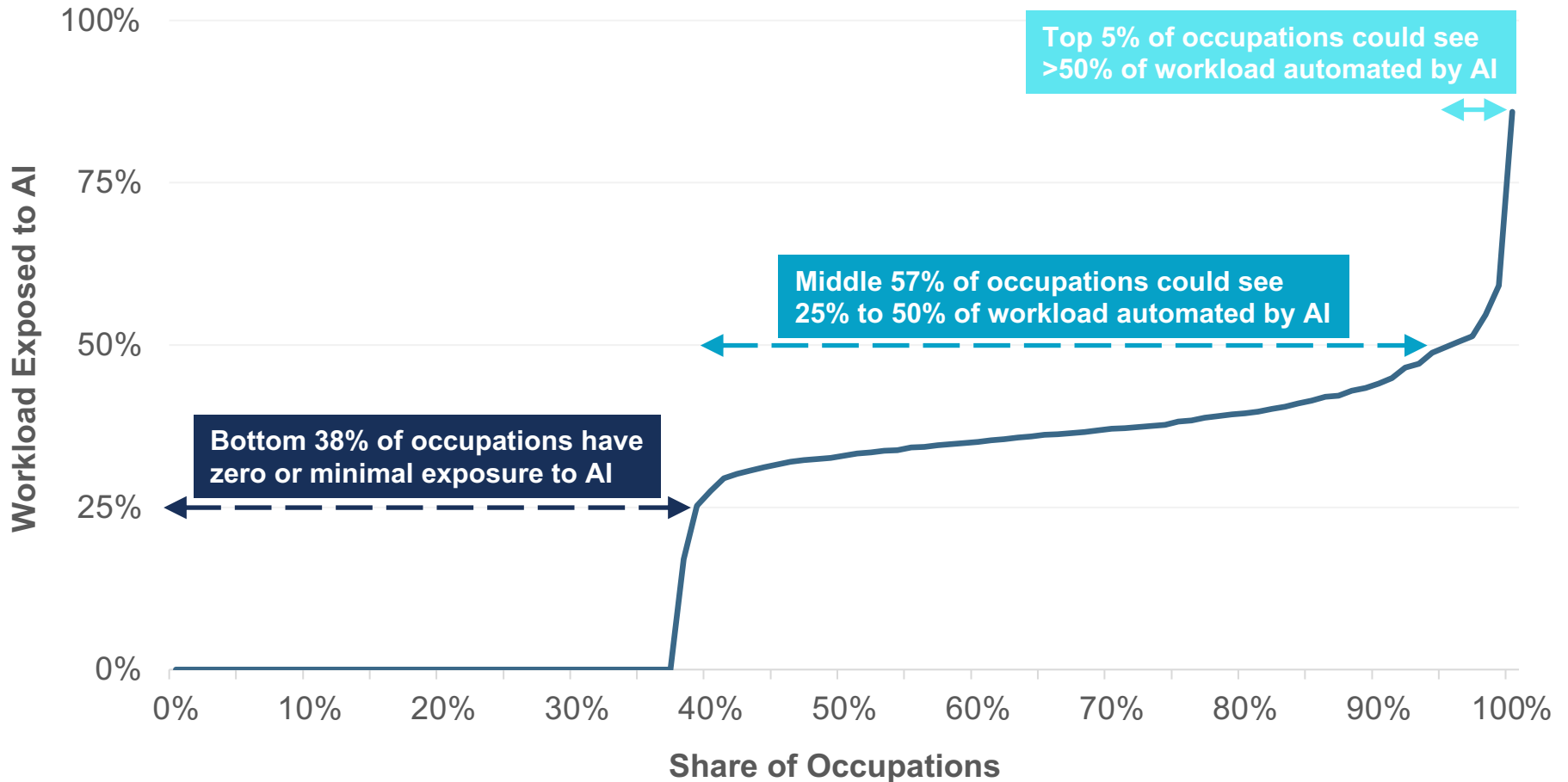
## U.S. Construction Firms' Top Concerns for 2024



Source: Associated General Contractors of America, Bluefield Research

**➤ AI applications can help to alleviate many of the top challenges facing the construction industry, including labor, supply, and policy.**

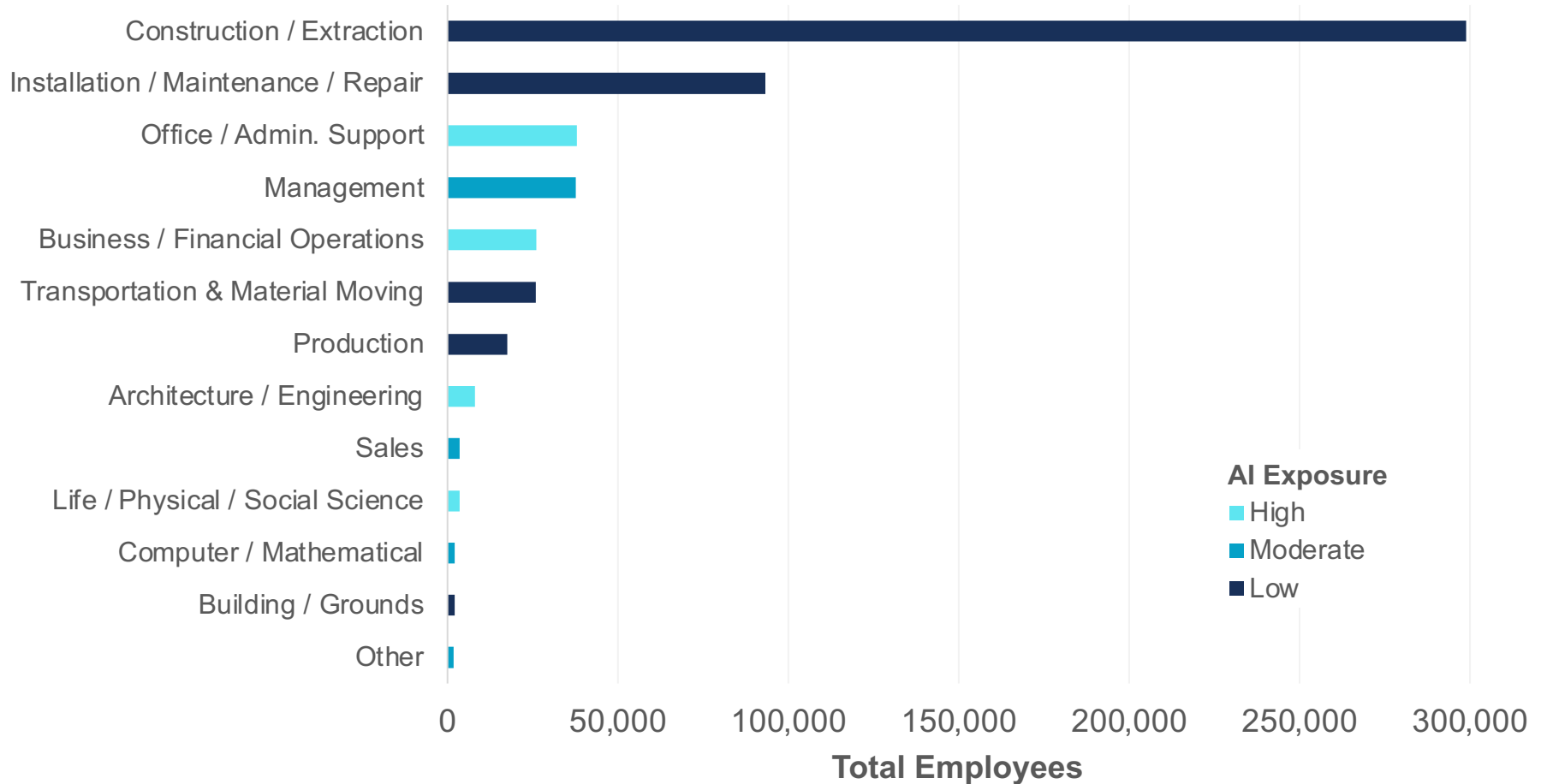
## Share of U.S. Occupations by Degree of Exposure to AI



Source: Goldman Sachs, Bluefield Research

➤ **Nearly two-thirds of U.S. occupations are expected to see at least 25% of core workload automated by AI, driving productivity gains.**

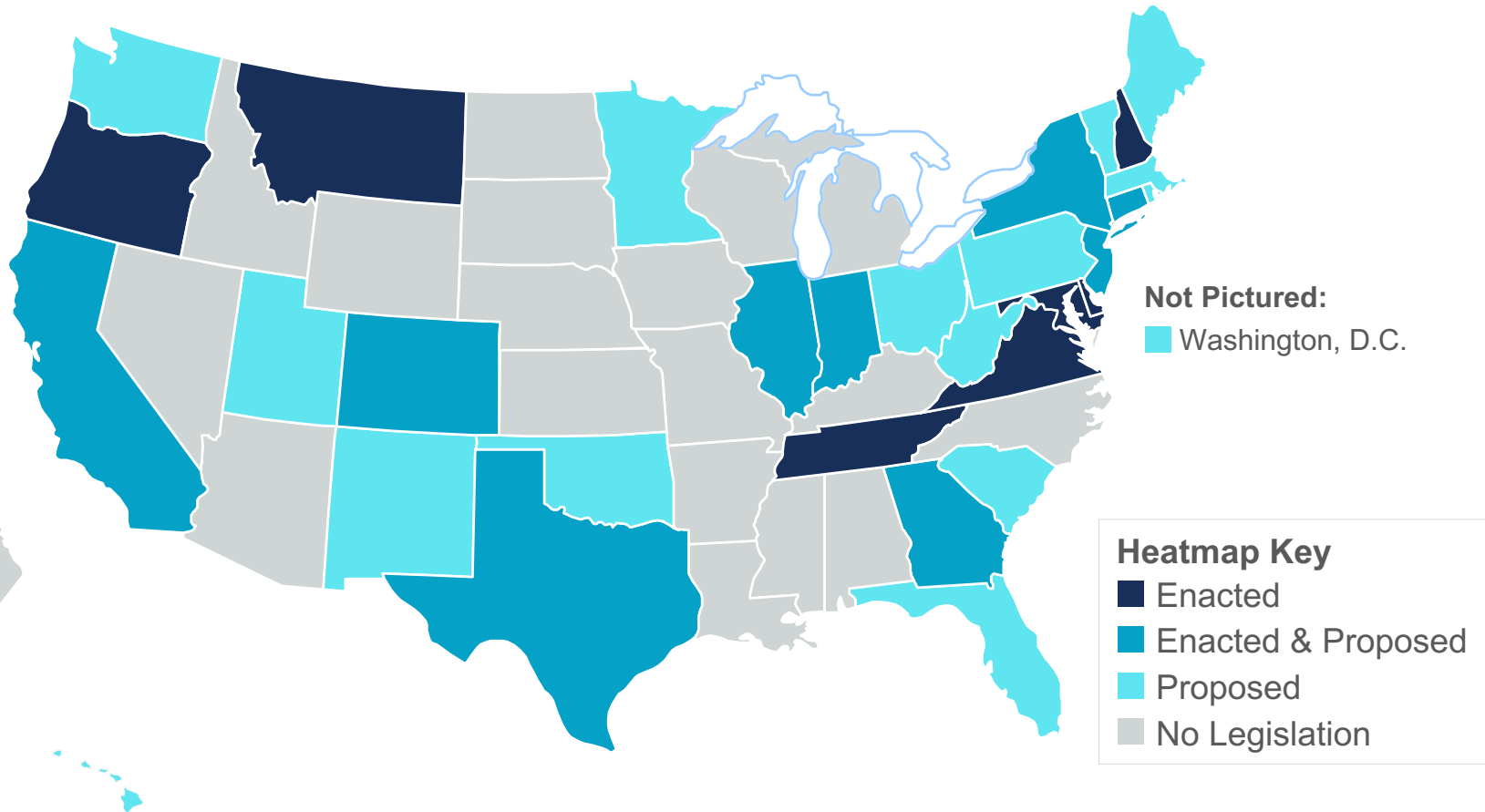
## U.S. Utility Construction Employment by Occupation & AI Exposure



Source: U.S. Bureau of Labor Statistics, Goldman Sachs, Bluefield Research

**➤ AI is not expected to replace core utility construction labor, though skillsets will change and support functions will be impacted.**

## AI Legislative Status by State

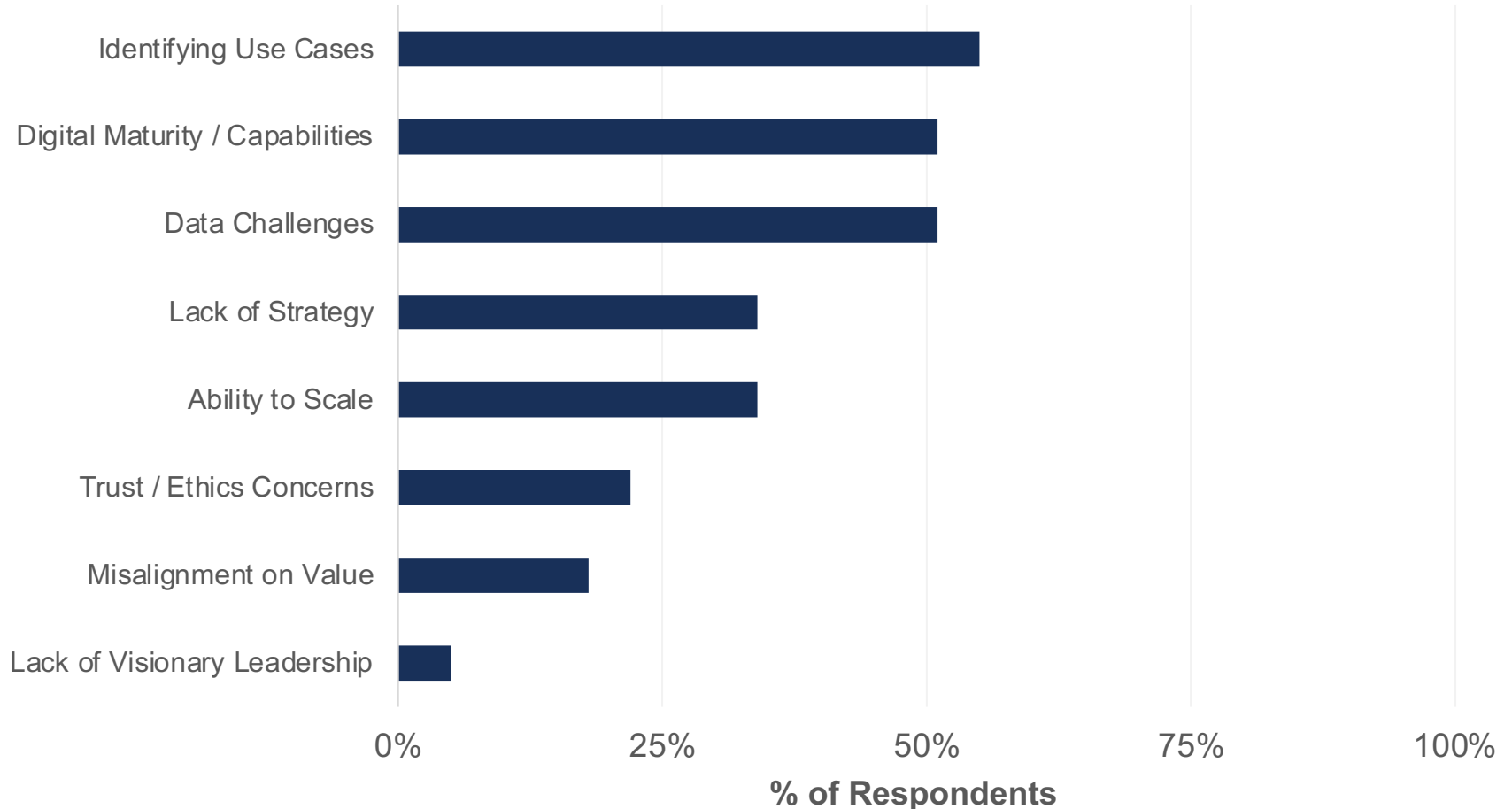


Source: BCLP, Bluefield Research

➤ **16 states have enacted at least one piece of legislation governing business applications of AI, with bills proposed in another 16 states.**



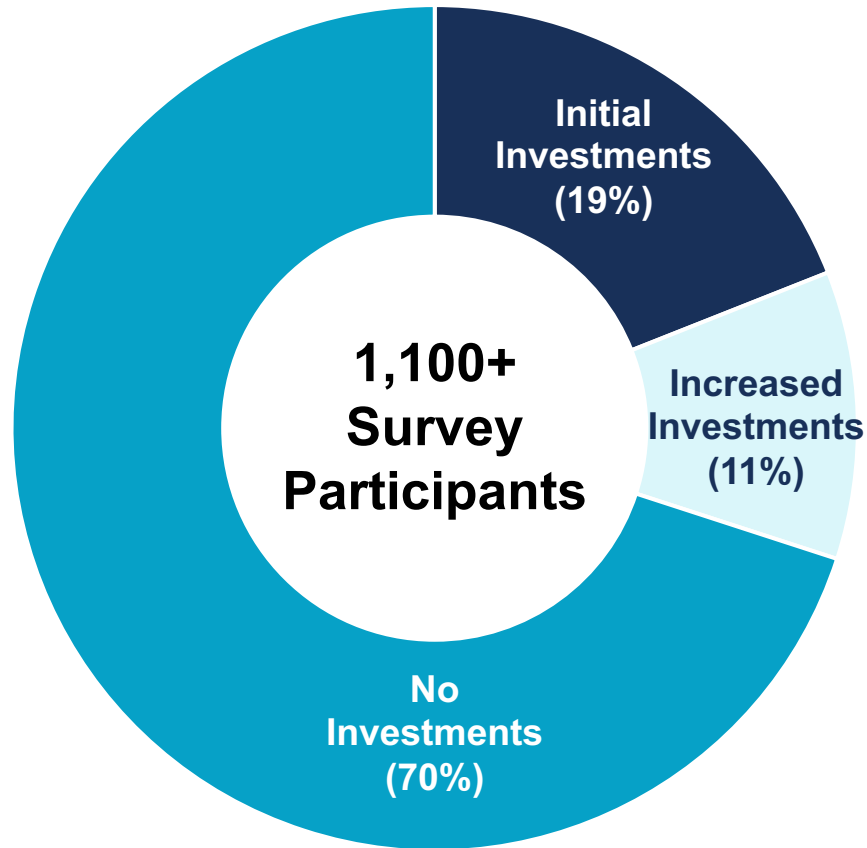
## Global CEOs' Top Barriers to AI Adoption



Source: Deloitte, Bluefield Research

**➤ Business leaders' top barriers to implementing AI highlight key knowledge, skill, and data gaps in a fast-moving market landscape.**

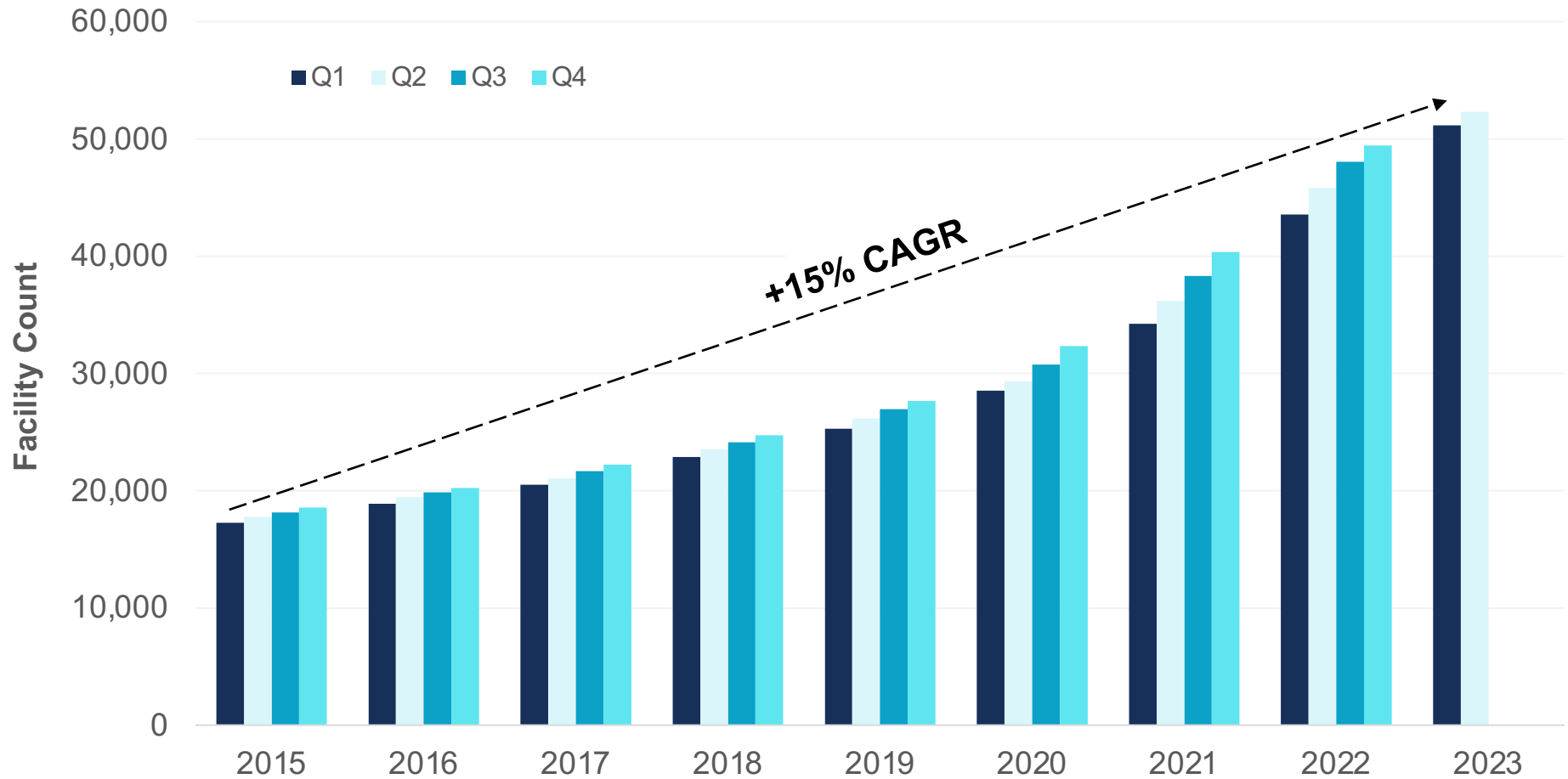
## U.S. Construction Firms' AI Investments, 2024



Source: Associated General Contractors of America, Bluefield Research

➤ **70% of U.S. construction firms have not made any investments in AI, with only 11% progressing beyond initial investments, pilot projects.**

## U.S. Data Processing & Hosting Facility Count, Q1'15–Q2'23



Source: U.S. Bureau of Labor Statistics, Bluefield Research



The number of U.S. data processing & hosting facilities has tripled since 2015, driving significant demand for new utility infrastructure.






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## Top AI Use Cases & Sample Companies for Preconstruction

	Description	Sample Companies
<b>Generative Design</b>	AI enhances the design process by automating preliminary design, clash detection, quantity takeoff, and model optimization.	 Transcend <b>Augmenta</b>
<b>Cost Estimation &amp; Schedule Optimization</b>	AI algorithms analyze project parameters, historical project data, material costs, and labor rates to generate accurate cost estimates and optimized construction schedules.	 <b>ALICE</b> TECHNOLOGIES  <b>Cost-OS</b>
<b>Document Review &amp; Analysis</b>	AI can extract key information from documents for efficient searching, review contracts for key terms and risks, and check plans for compliance with codes and regulations.	 <b>DOCUMENT CRUNCH</b> <b>SKANSKA</b>
<b>Supply Chain &amp; Materials Optimization</b>	AI can analyze supply chain data to manage inventory, optimize procurement processes, and ensure timely delivery of materials.	 <b>SubBase</b> <sup>®</sup> <b>KOJO</b>

Source: ChatGPT, Bluefield Research

 **Available AI solutions can improve safety, efficiency, productivity, quality, and compliance during preconstruction and construction.**

## Top AI Use Cases & Sample Companies for Construction

	Description	Sample Companies
<b>Project Management</b>	AI can optimize project schedules, resource allocation, and budgeting through predictive analytics and optimization algorithms.	 
<b>Safety Monitoring &amp; Compliance</b>	AI analyzes data from sensors and cameras to detect safety hazards, ensure compliance with safety protocols and regulations, and prevent accidents.	 
<b>Quality Control &amp; Inspection</b>	AI algorithms analyze drone footage and sensor data to assess construction progress, detect defects and deviations from specifications, and ensure quality.	 
<b>Construction Robotics &amp; Automation</b>	AI-enabled robotics can automate site surveying and construction processes, improving speed, accuracy, efficiency, and safety.	 

Source: ChatGPT, Bluefield Research

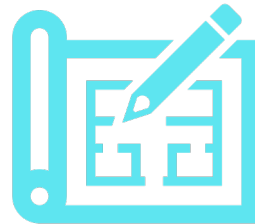
 Available AI solutions can improve safety, efficiency, productivity, quality, and compliance during preconstruction and construction.

## AI Business Impacts for Construction & Infrastructure



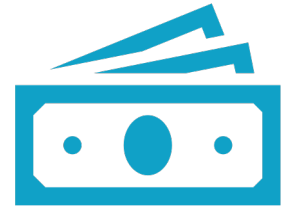
**10-20%**

*reduction in budget & timeline deviations*



**10-30%**

*engineering hours saved*



**10-15%**

*total construction project cost savings*

Source: Deloitte, Bluefield Research



**Selective use of AI-enabled technologies can lead to tangible business results for utility construction firms and workers.**

## Recommendations & Best Practices for AI Implementation

### WHERE SHOULD YOU START?

- 1) Prioritize **specific use cases** that make sense for your business.
- 2) Smart small and **scale over time**.
- 3) Good data is required – but **perfect data** is not.
- 4) Build **AI expertise**, internally or through partnerships.
- 5) Invest in **people**, culture, and change management.
- 6) Just **get started!**

Source: ChatGPT, Bluefield Research

 **AI is not all or nothing – business leaders have a range of low-cost, low-risk opportunities to evaluate AI for their organizations.**



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**questions?**