

# State of Industrial AI 2021



122/53

CIRC BLOOD SYS DISPLAY - BR\_85229/A1

EXTENDED

E1 4.50  
E2 1.80 HAL %w

T1 36.8 °C  
T2 37.2 °C

SOURCE: ECG [1]

FEBRUARY

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## About the Survey

This survey was independently conducted from June 2021 to July 2021 by research specialist Vanson Bourne and commissioned by Aspen Technology, Inc. (AspenTech). Two hundred information technology (IT) and Operations decision makers in a variety of engineering, construction, procurement, and energy organizations across North America and Europe were surveyed for their thoughts on, and experiences with, Industrial AI, and the challenges they face in adopting or maximizing the value of Industrial AI in their organizations.

AspenTech had no role in the selection of respondents all responses were provided anonymously.

Respondents worked at organizations whose global workforces numbered at least 1,000 employees. The table below shows the breakdown by company size and region.

	NORTH AMERICA	EUROPE
COMPANY SIZE		
1,000-2,999 employees	47%	33%
3,000-4,999 employees	37%	43%
5,000 or more employees	16%	24%

In industrial organizations across North America and Europe, the majority of IT and Operations decision makers agree—Industrial AI is key. It has played a pivotal role in their organization’s digital transformation and promises to drive new business value in areas of cost, productivity and efficiency, while also providing a competitive advantage over peers. The benefits of Industrial AI, and the need to create a strategy around unleashing and maximizing the full potential of Industrial AI, are almost universally clear and embraced. Industrial organizations don’t need to be sold on the value of Industrial AI; the challenge is in realizing it.

To better understand these challenges, Aspen Technology, Inc. commissioned an independent survey of 200 North American and European IT and Operations decision makers from across the industrial sector, including companies in construction and engineering, chemicals, energy, oil and gas, pharmaceuticals, and metals and mining. The findings provided key insights into the current state of Industrial AI adoption, as well as the core challenges that are inhibiting organizations from realizing the full value of Industrial AI, namely industrial data quality and management, internal silos and a lack of collaboration among relevant teams and the lack of a clear strategy around Industrial AI.

Respondents worked at industrial organizations in the construction and engineering, chemicals (including bulk chemicals and specialty chemicals), energy (power generation and distribution), oil and gas, pharmaceuticals, and metals and mining sectors. The table below shows the breakdown.

		NORTH AMERICA	EUROPE
INDUSTRIES	Construction and engineering	19%	19%
	Chemicals	17%	20%
	Energy	14%	20%
	Oil and gas	21%	12%
	Pharmaceuticals	10%	21%
	Metals and mining	19%	8%

Respondents worked in either IT or Operations, across a breadth of positions within each department. The table illustrates the breakdown by department.

		NORTH AMERICA	EUROPE
DEPARTMENT	IT	69%	62%
	Operations	31%	38%

The table below shows the breakdown of IT titles.

		NORTH AMERICA	EUROPE
JOB TITLES	Chief Information Officer (CIO)	19%	19%
	Chief Technology Officer (CTO)	19%	21%
	Chief Digital Officer (CDO)	10%	5%
	VP of IT	10%	15%
	Director of IT	14%	15%
	VP of Transformation	7%	6%
	Director of Transformation	3%	2%
	Head of Data Science/Analysis	4%	3%
	IT/OT Data Scientist	3%	3%
	IT/OT Data Analyst	1%	5%



The table below shows the breakdown of OT titles.

		NORTH AMERICA	EUROPE
JOB TITLES	Chief Operations Officer (COO)	13%	16%
	VP of Operations	16%	11%
	Director of Operations	26%	13%
	VP of Transformation	13%	11%
	Director of Transformation	6%	18%
	Head of Maintenance/ Maintenance Manager	6%	5%
	Plant Manager	3%	3%
	Reliability Manager	6%	3%
	Process/Operations Manager	6%	11%
	Head of Data Science/Analysis	3%	5%
	IT/OT Data Scientist	0%	3%
	IT/OT Data Analyst	0%	3%

Global annual revenue for the respondents' organizations segmented by the following breakpoints:

		NORTH AMERICA	EUROPE
ANNUAL REVENUE	Up to \$3B USD	35%	34%
	\$3B USD-\$5BUSD	28%	32%
	\$5B USD or more	37%	34%

# Key Findings

## The status quo

- 83% of respondents say Industrial AI has played a significant or major role in their digital transformation strategy.
- 84% believe it is critical or very important to create an Industrial AI strategy to effectively maximize its value.
- 79% have a currently live or piloting Industrial AI project.
  - Just 1% have no plans to ever launch an Industrial AI project.
- COVID-19 did not slow down industrial organizations' investment in Industrial AI. To the contrary—79% increased their investments in Industrial AI in the past year of the pandemic.
  - These Industrial AI investments increased by an average 15%, worth \$16M USD.
- 75% of respondents say their Industrial AI projects have either exceeded their expectations or they expect they will.
- More needs to be done—including IT/OT convergence (87%); better ways for managing and using industrial data (85%); further investments in data science and analytics (82%); and better alignment among the teams most relevant to Industrial AI (77%)—in order to maximize the value of Industrial AI.

## Data quality and management

- 98% of respondents are struggling with at least one challenge impeding their ability for better data quality and management.
- The top challenges cited include:
  - Security of data
  - Data stored in disparate locations
  - Lack of skills to derive actionable insights from data
  - Lack of skills to manage data effectively
  - Too much irrelevant data

## Silos and a lack of collaboration and visibility

- 88% of respondents currently have either an in-house team of AI/ML experts or employ AI/ML contractors.
  - The remaining 12% plan to do the same in the future.
- 59% of AI/ML experts, data scientists and analysts either work completely in silos or have minimal collaboration between them.
  - Less than 25% collaborate in any substantial way.
- Perhaps not coincidentally, on average, industrial organizations only have visibility into about 66% of their industrial data.

## Lack of an Industrial AI strategy

- 99% of respondents are able to list at least one business driver for creating an Industrial AI strategy.
- Some of these top business drivers include:
  - Improving productivity
  - Increasing cost efficiency
  - Reducing asset downtime through predictive maintenance
- 84% say an Industrial AI strategy would give their organization a competitive advantage.
  - Despite this, only 35% of respondents say they have fully rolled out an Industrial AI strategy.
- 98% of respondents acknowledge that failure to have an Industrial AI strategy would create several new challenges or pitfalls.
- Some of these top challenges include:
  - Productivity losses
  - Increased downtime
  - Cost inefficiencies
  - Siloed data
- Altogether, not having an Industrial AI strategy costs an organization on average \$10M USD.

# The Status Quo

## Most organizations don't need to be sold on the value of Industrial AI; they already know it

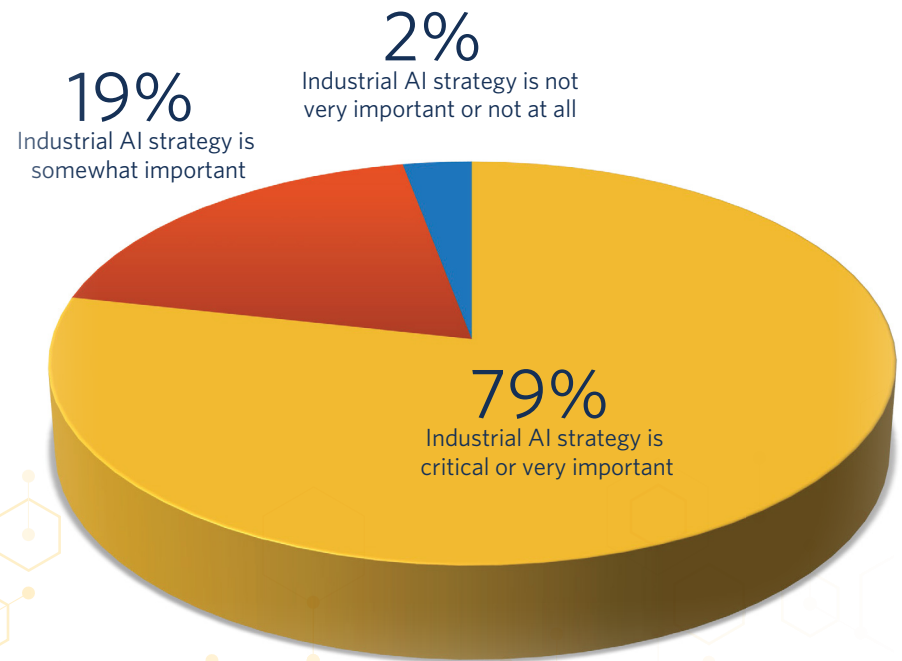
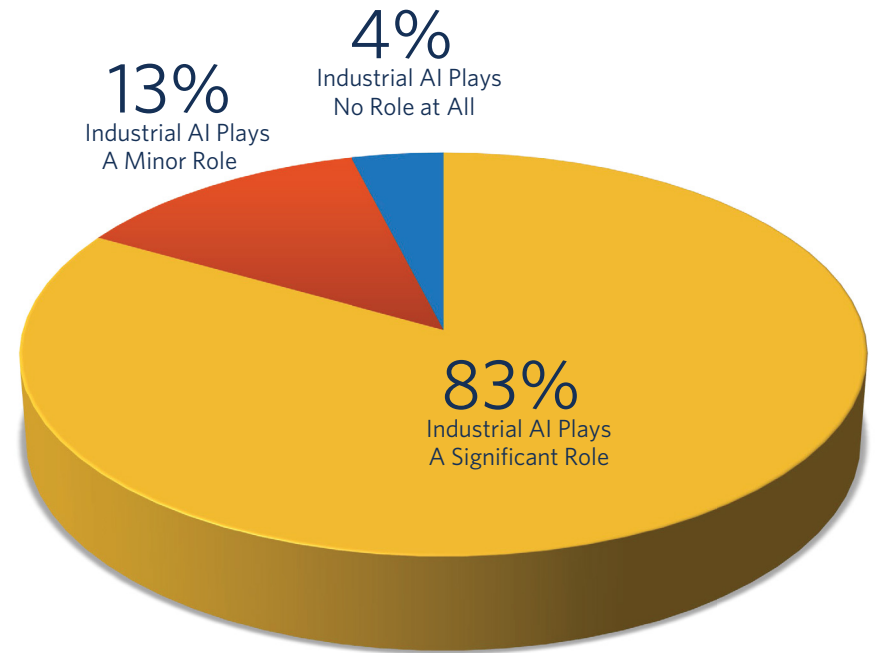
More than 8 in 10 say Industrial AI has played a significant or major role in their organization's broader digital transformation strategy in the last three years.

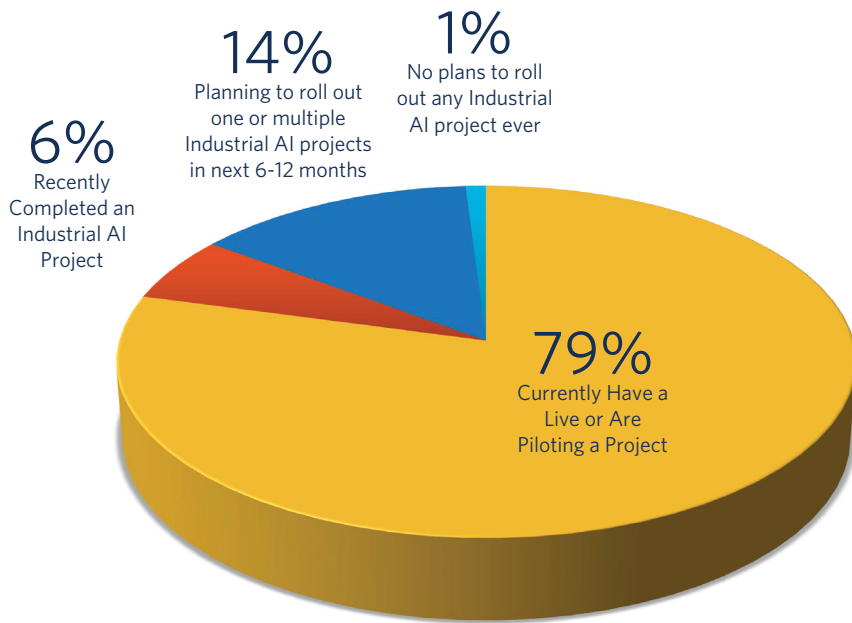
Similarly, 79% believe it is critical for organizations in their industry to adopt a strategy around Industrial AI to maximize its value.

## Most organizations either have a live or piloting Industrial AI project

Among the survey's respondents, 79% say they either have an Industrial AI project live right now or are piloting one.

But that doesn't mean the other 20% are deliberately staying away from Industrial AI. Just 1% of respondents say they have either no initiatives for Industrial AI in place, or no plans to develop one.





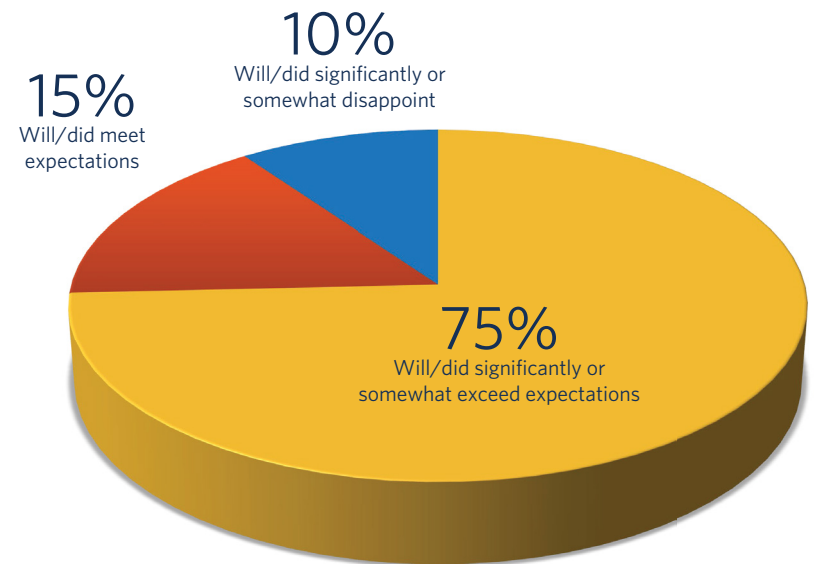
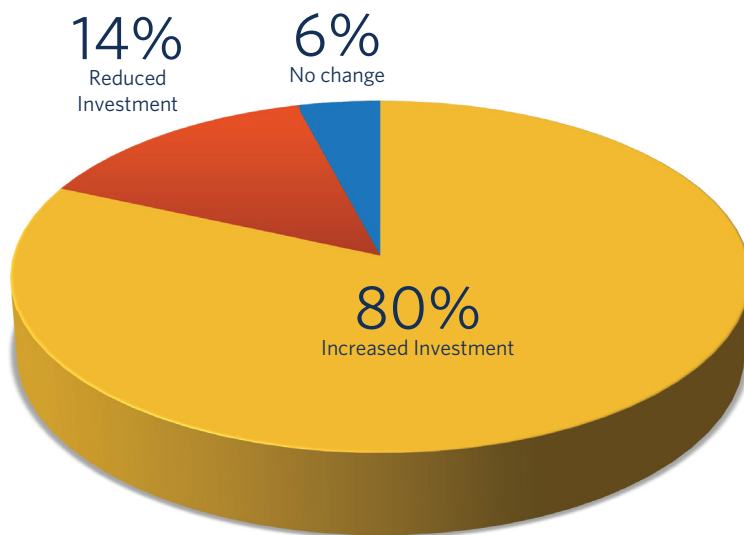
### COVID-19 further accelerated the need for Industrial AI

Across the organizations that have Industrial AI initiatives in varying stages of production—live, piloting, recently completed or currently planned—80% say that the pandemic prompted them to increase their investment in Industrial AI projects.

Despite broader economic downturns incited by COVID-19, most industrial organizations ramped up their investments in Industrial AI initiatives by an average of 15%, tantamount to \$16M USD in this financial year.

These organizations also have high hopes for their investment—75% say their Industrial AI project either has already exceeded their expectations, or they expect it to.

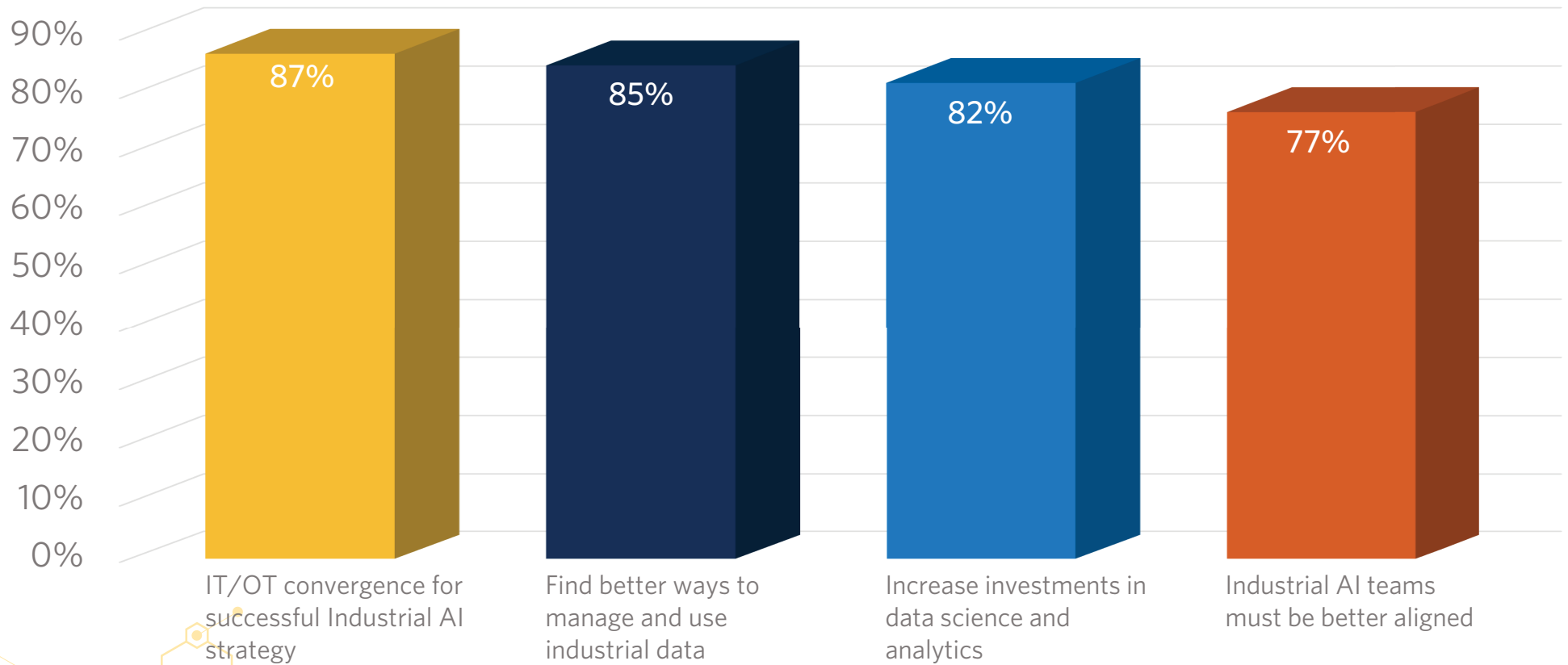
Industrial AI investments are up 15% during COVID-19 = **\$16M USD**





## Recognition of the need for further investments

Despite this success, though, industrial organizations already sense that there is more work to do on this front. The factors critical to continuing success named by respondents include:



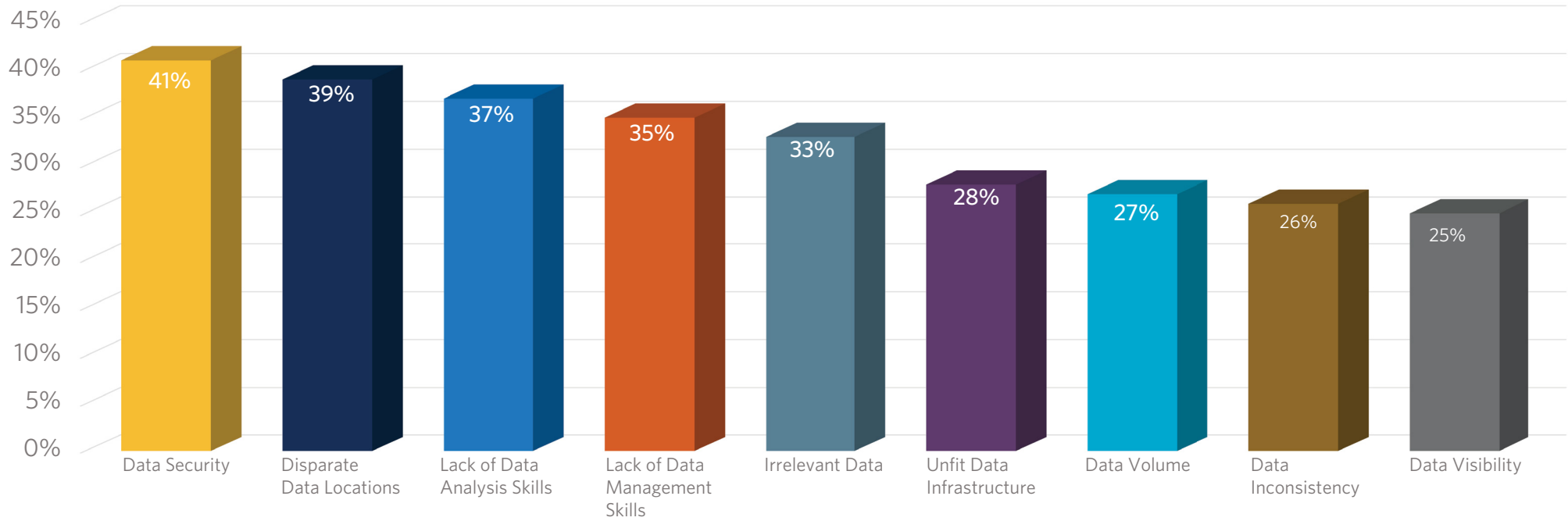
# The Challenges—Data Quality and Management

## The top roadblocks impeding data quality and management

Industrial AI depends on ingesting quality data. But industrial data is often left undiscovered and undiscovered due to a number of structural challenges.

Nearly all (98%) of the IT and Operations decision makers polled for this survey say their organization was currently experiencing at least one of these industrial data challenges, inhibiting their data quality and management practices.

The most commonly cited challenges are:



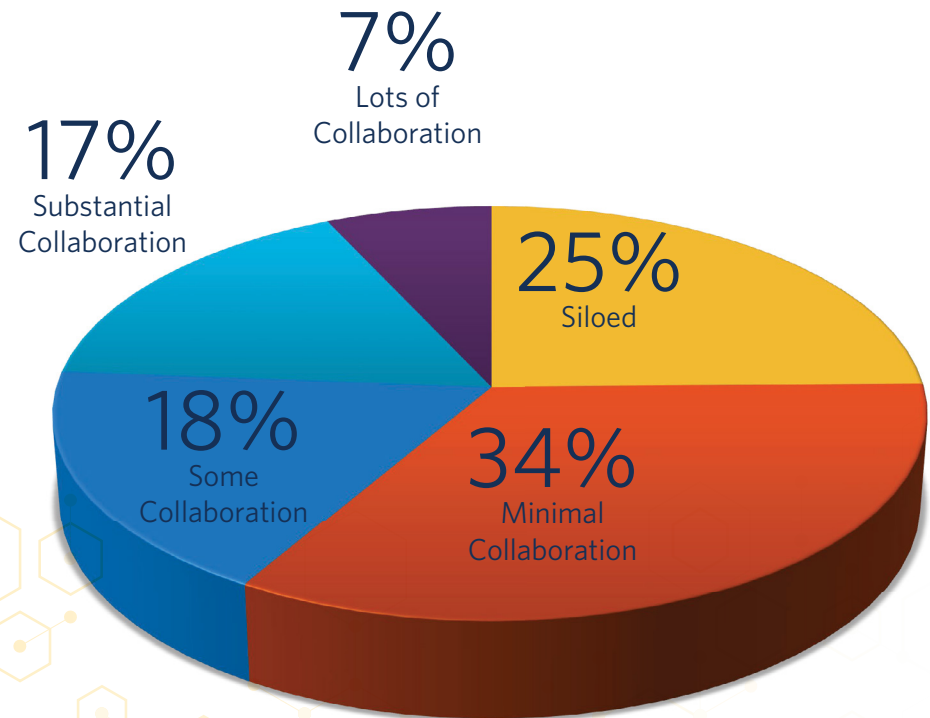
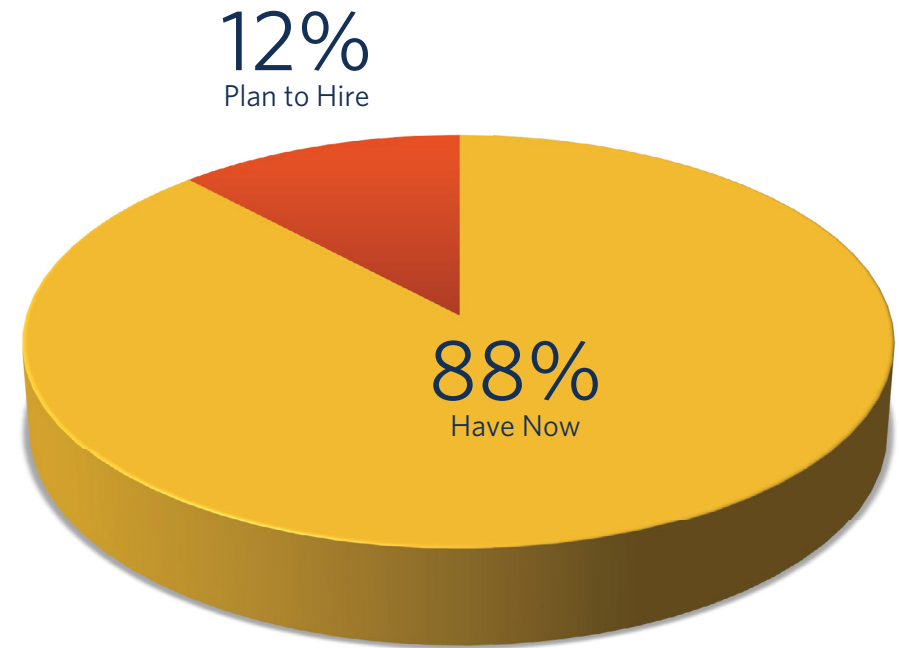
# The Challenges—Silos, Collaboration and Visibility

## AI and ML experts are universally embraced by industrial organizations, but few truly collaborate with each other

Many respondents in the survey indicate that simply making investments—into Industrial AI, data science, and analytics are initiatives—alone aren't enough. More than that, they say their organizations need to further work on the relationships between the teams and departments responsible for analyzing and utilizing their industrial data.

Nearly 9 in 10 (88%) of respondents say that their organization already employs an AI or machine learning (ML) expert.

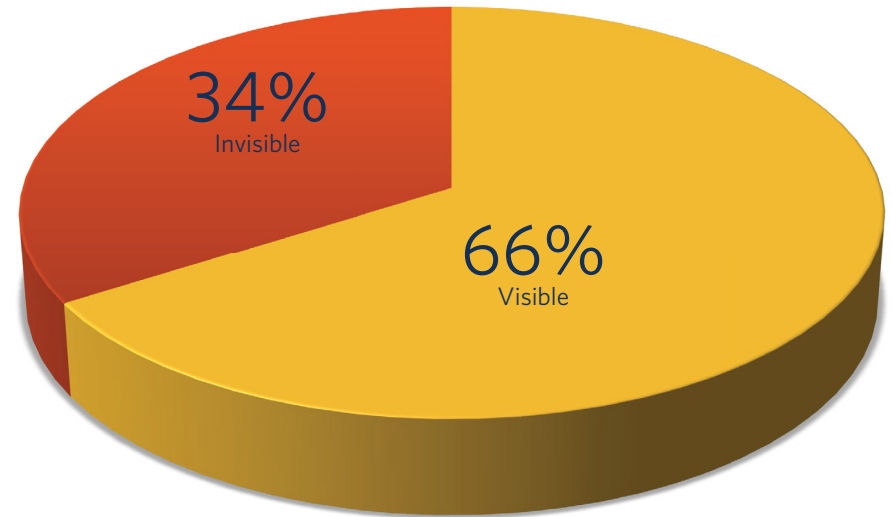
Despite all respondents saying their organization either has an in-house team of AI/ML experts and/or contractors, or plan to bring these experts/contractors onboard in the future, there is little to no collaboration between a majority (59%) of AI/ML experts, data scientists and analysts.



### One-third of industrial data is not visible

This lack of collaboration also reflects a broader challenge of visibility—or lack thereof.

While just 25% of respondents name visibility a challenge, on average, the decision makers surveyed estimate they only had visibility over about 66% of their organization's industrial data. That means industrial organizations, on average, have little to no visibility over fully one-third of the industrial data they've collected.



**84%** say that creating an **Industrial AI strategy** was crucial in giving their organization a **competitive advantage** over others.

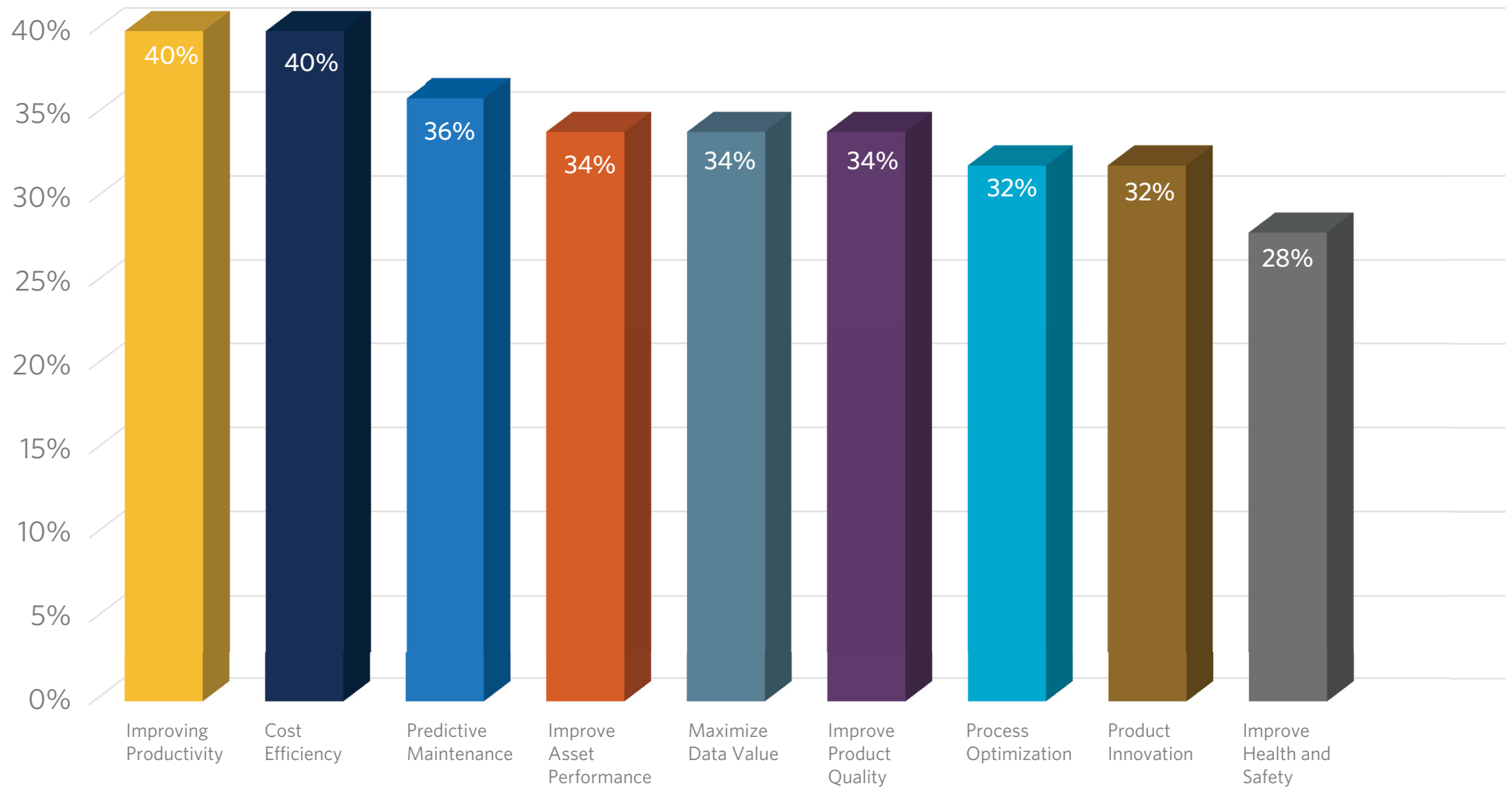


# The Challenges—Lack of an Industrial AI Strategy

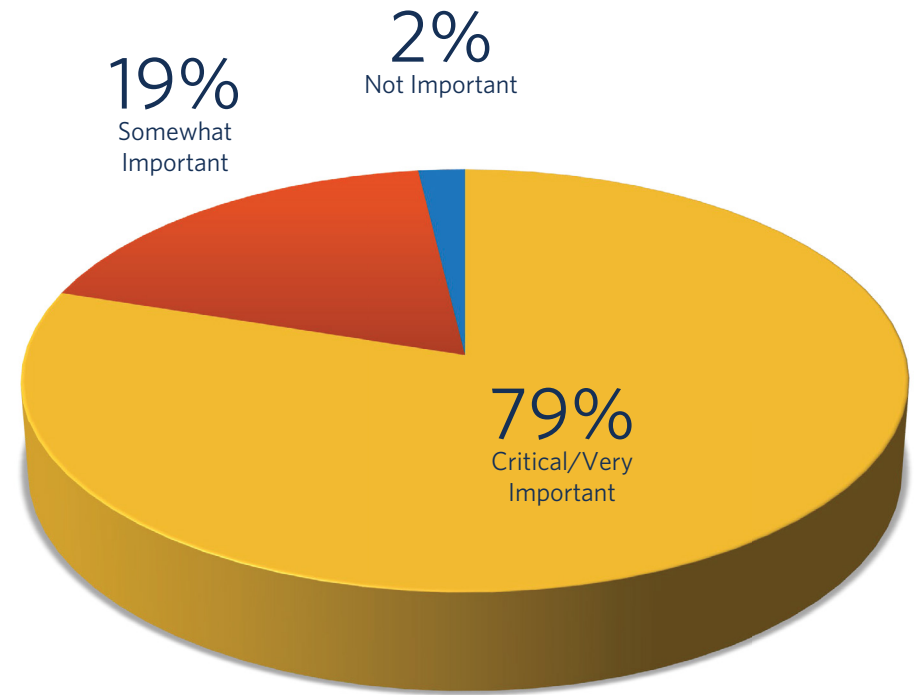
## Most recognize the importance of an Industrial AI strategy, but few actually have one

Nearly all respondents recognize the importance of Industrial AI to their organizations—99% could name at least one business driver for adopting an Industrial AI strategy.

The biggest drivers for Industrial AI adoption include:



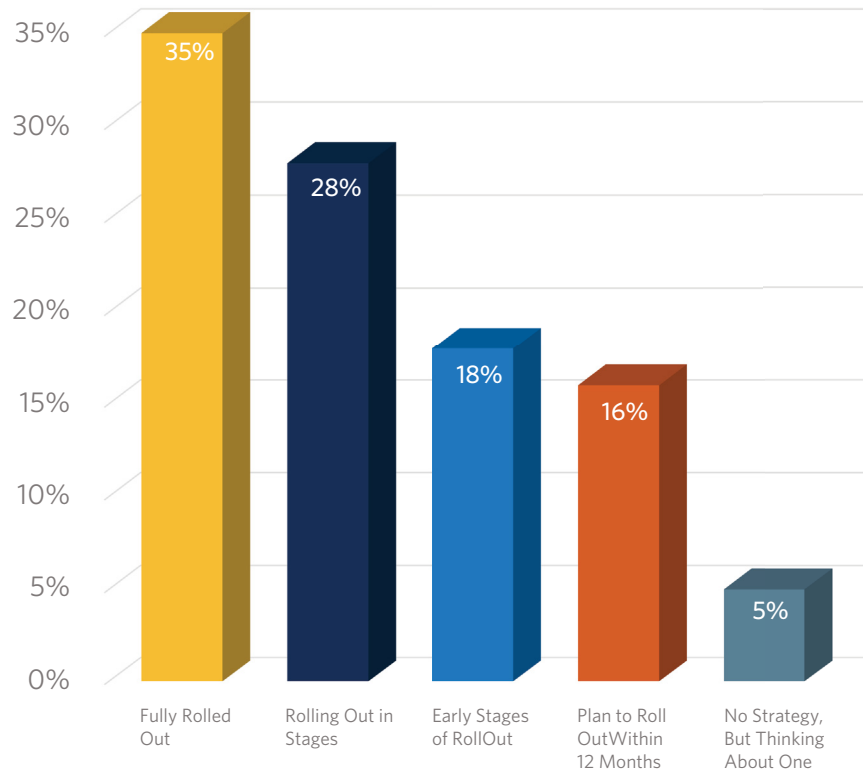
Despite this wide recognition of the need for an Industrial AI strategy, though, just 35% say they have rolled out such a strategy.



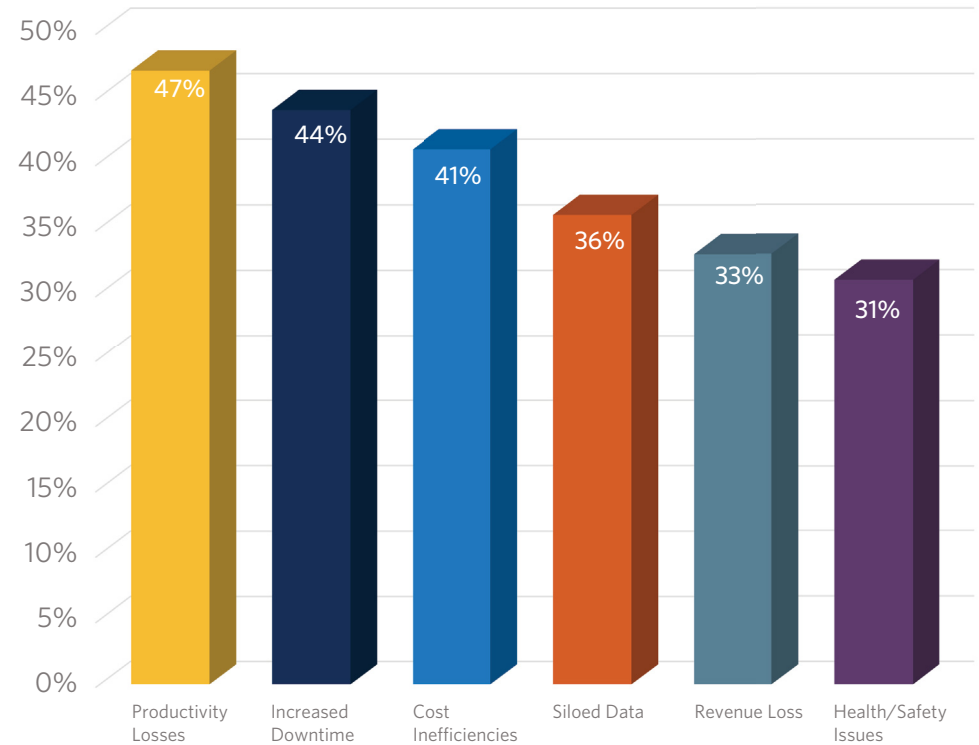
Just **35%** of those surveyed have rolled out an Industrial AI strategy.



## The pitfalls of failing to have an Industrial AI strategy

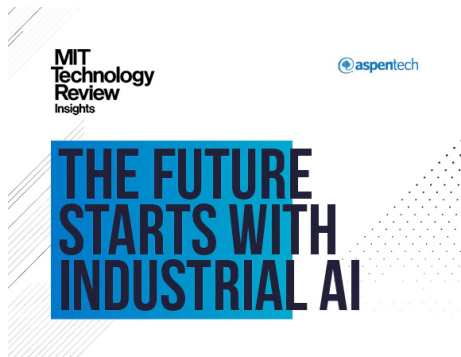


Virtually all respondents (98%) acknowledge that failing to have an Industrial AI strategy would create a number of new challenges and pitfalls for their organization. The top challenges named are:



The financial cost of not having an Industrial AI strategy: **\$10M USD**

# Additional Resources



## MIT Technology Review: The Future Starts with Industrial AI

This article published in MIT Technology Review explains three pivotal needs driving capital-intensive industries to digitize and implement purpose-built AI systems:

- Compelling need for knowledge automation
- Data value superseding data volume
- Competitors are digitally transforming



## How Data Historians Have Evolved to Make Industrial Data Actionable

This article published in CIO Magazine, explains industrial organizations have adopted new technologies as they've become available: smart sensors, Internet of Things (IoT) connected devices, the cloud and Industrial AI ... layered on top of legacy, plumbed-together on-premises technologies. This resulted in a pileup of tech that is generating data in completely different manners and how democratizing data can level the playing field and empower your workforce to make better, data-driven decisions.



## The Convergence of AI and IIoT

This ARC Advisory Group report explains how AIoT is built for industrial companies looking for better ways to:

- Connect their evolving workforce to data-driven decision tools
- Digitally augment work and business processes
- Make better use of industrial data already collected



**About Aspen Tech.**

Aspen Technology (AspenTech) is a leading software supplier for optimizing asset performance. Our products thrive in complex, industrial environments where it is critical to optimize the asset design, operation and maintenance lifecycle. AspenTech uniquely combines decades of process modeling expertise with machine learning. Our purpose-built software platform automates knowledge work and builds sustainable competitive advantage by delivering high returns over the entire asset lifecycle. As a result, companies in capital-intensive industries can maximize uptime and push the limits of performance, running their assets safer, greener, longer and faster.

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