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# How AIoT Is Reshaping Industrial Efficiency, Security, and Decision-Making

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# Table of contents

**Click any title to navigate directly to that page.**

# Executive summary

AI and IoT are converging to reshape industrial operations, enabling smarter, faster, and more autonomous decision-making. This InfoBrief explores how organizations are adopting AIoT to drive efficiency, innovation, and competitive advantage.

**Primary research of mid-to-large companies across multiple industries validates hypotheses regarding the usage and perception of AIoT:**

- Industrial companies are likely to see AI and IoT become even more deeply embedded into their operational environments.
- Operational technology (OT) and IT leaders expect AI and IoT to be integral components of operational and business ecosystems, driving higher efficiency, greater automation, and more intelligent, real-time decision-making across a wide range of industrial sectors.
- The technologies will not only streamline operations but also help companies remain competitive in a rapidly evolving market landscape.

## OT and IT decision-makers

- IT personnel work in technology, data, product development, engineering, or customer experience roles, focusing on digital systems and analytics.
- OT personnel are involved in manufacturing, operations or supply chain roles, concentrating on physical processes and industrial systems.

## What is AIoT?

AIoT is the use of AI technologies in conjunction with sensor, system, or product data being generated by connecting things or endpoints, either wired or wirelessly connected, for use in decision-making, product planning, or process improvement. These AI technologies include deep learning, machine learning, natural language processing, voice/speech recognition, image/video analysis, and others to develop AI-enabled solutions that enterprises deploy in a wide variety of use cases and industries.

# Key findings

### AI enables users to unlock big gains

Organizations that heavily use AI in IoT are twice as likely to report that benefits significantly exceed expectations.

### AI and IoT go hand in hand

Roughly 72% of organizations using IoT extensively are also heavily using AI, highlighting the synergy between intelligent analytics and connected devices.

### AI enables OT improvements

AI significantly enhances operational technology by increasing revenue (51%), improving security (48%), and streamlining operations (45%).

### AIoT momentum builds

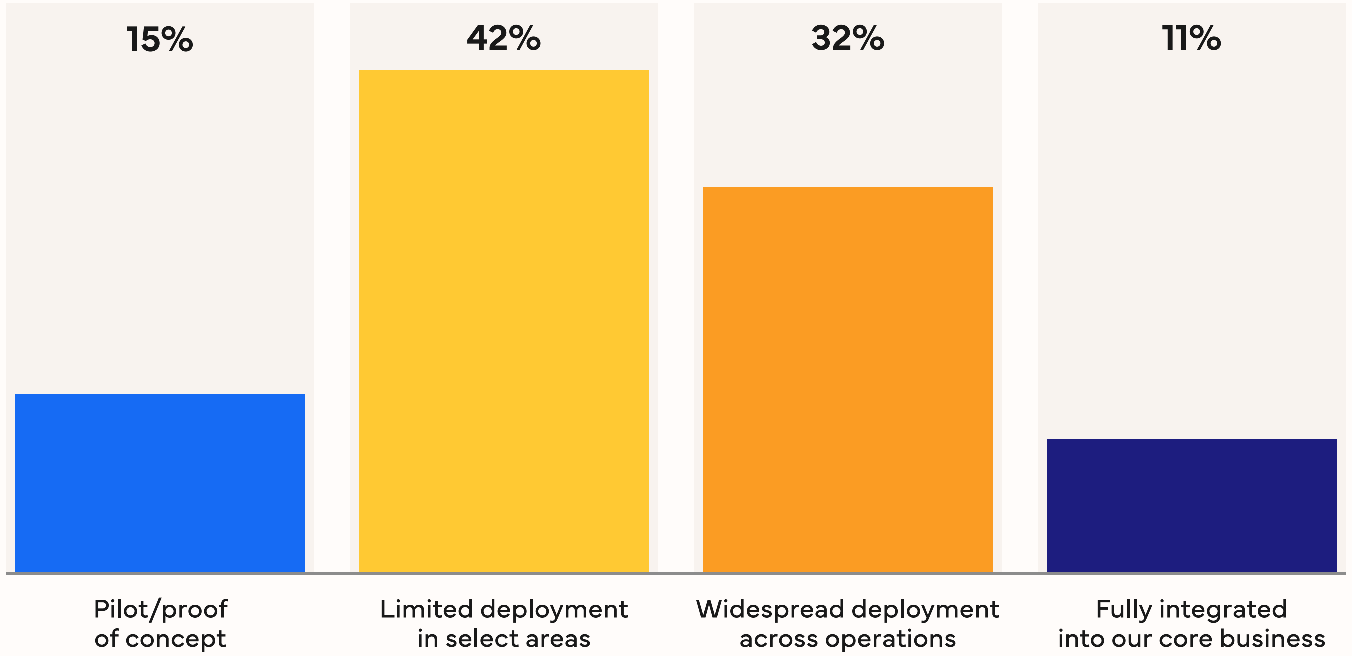
About 62% of organizations globally have adopted a combination of AI and IoT.

### AIoT dominates predictive maintenance adoption

Some 71% of organizations use AIoT for predictive maintenance, making it the most widely adopted use case.

# Stage of AIoT adoption: Over half of organizations still have limited or pilot/proof-of-concept deployments

**Stage of AIoT adoption**
(Percentage of respondents)



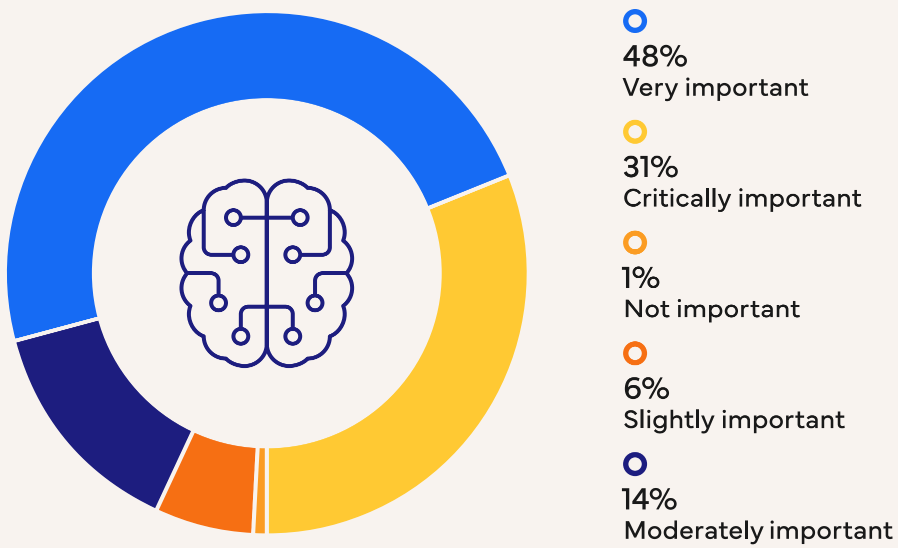

**62%**
of organizations globally have adopted a combination of AI and IoT, and another 31% report they plan to use it.

Of those currently using AIoT, almost 57% are in limited deployment or pilot/proof-of-concept stages. Conversely, 43% are in widespread or fully integrated deployments across the organization.

# The importance of AI combined with IoT

## A clear majority see AIoT as very or critically important.

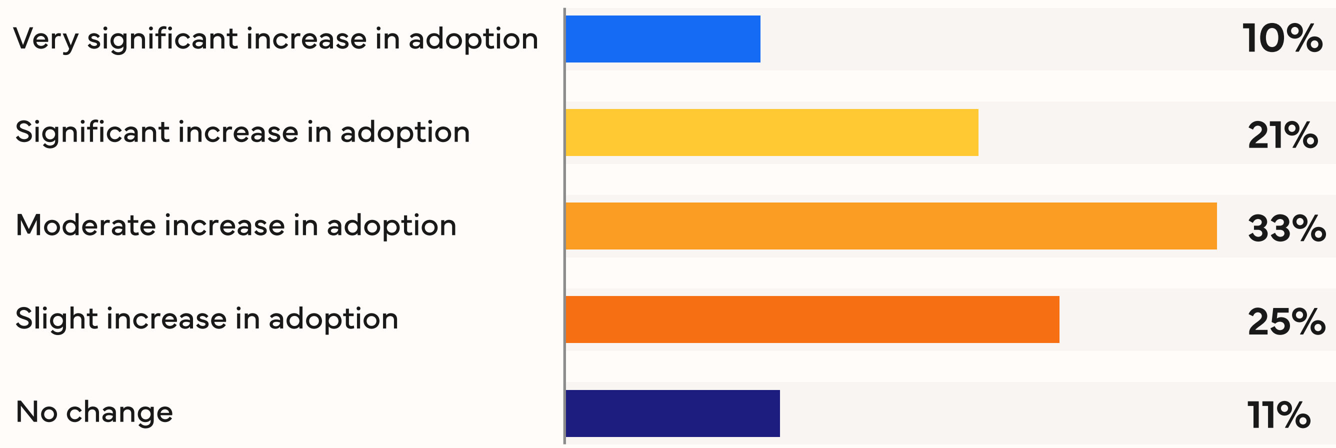
### Importance of AIoT for maintaining competitive advantage over the next 3 years




About 79% of respondents say that AIoT is very or critically important over the next three years. This sentiment is shared worldwide and across various industries.

Looking ahead to the next 12 to 24 months, 64% of organizations expect moderate to significant growth in AIoT adoption, indicating continued momentum for both adoption and enhancement of current deployments.

### Planned AIoT usage in 12–24 months

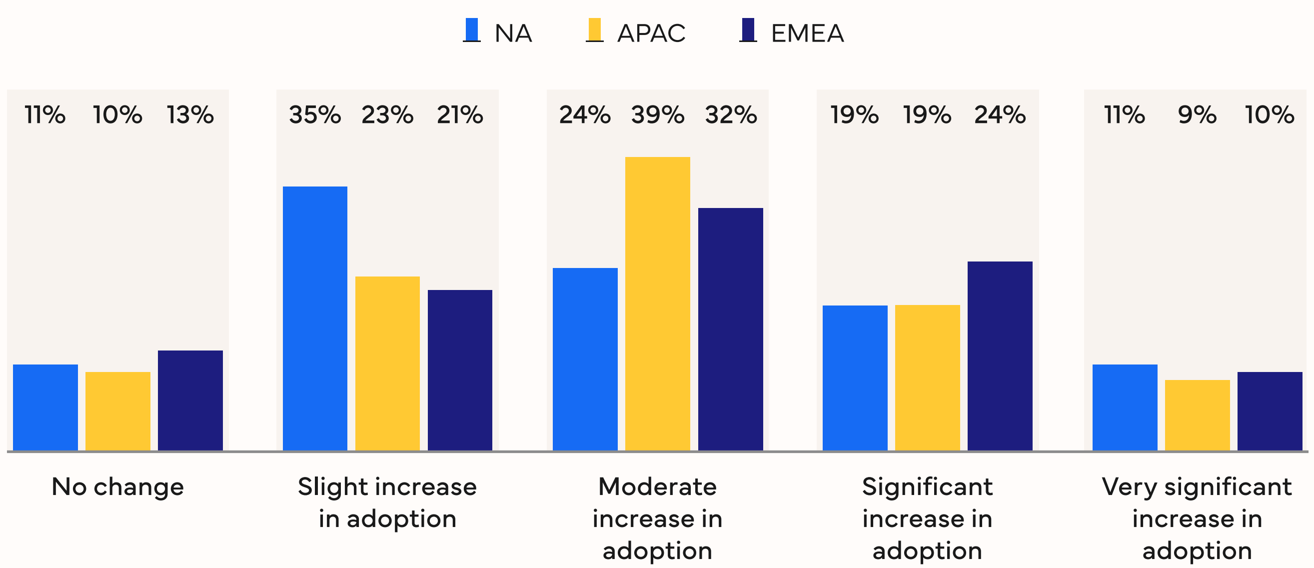


# Regional outlook: APAC and EMEA catching up with North America

## APAC leads in moderate adoption; NA shows a strong push for significant growth; and EMEA remains optimistic across all levels.

### AI adoption by region

See the figure data in an accessible table format.




IoT growth expectations by region vary. APAC leads in moderate adoption, NA shows a strong push for significant growth, and EMEA remains optimistic across all levels.

Compared to the 2019 study, North America led all regions in the heavy usage of AI within IoT.

Today's research suggests that APAC and EMEA are investing in AI to catch up with leaders.

# AI technologies gain traction for industrial operations

## Anomaly detection and prescriptive and predictive analytics lead adoption, while NLP and computer vision show strong momentum. Most organizations are actively planning broader AI integration across operations.

### AI and machine learning technologies used for analyzing sensor data

See the figure data in an accessible table format.

| | Heavily use | Use in some projects | Planning to use | No plans to use or don't know |
|---|---|---|---|---|
| Machine learning algorithms to detect anomalies | 22% | 43% | 27% | 8% |
| Predictive analytics | 23% | 39% | 27% | 11% |
| Prescriptive analytics | 23% | 39% | 25% | 13% |
| Natural language processing | 18% | 36% | 32% | 14% |
| Computer vision | 19% | 31% | 38% | 12% |
| Conversational AI | 17% | 31% | 30% | 22% |
| AI-based audio processing | 18% | 29% | 28% | 25% |

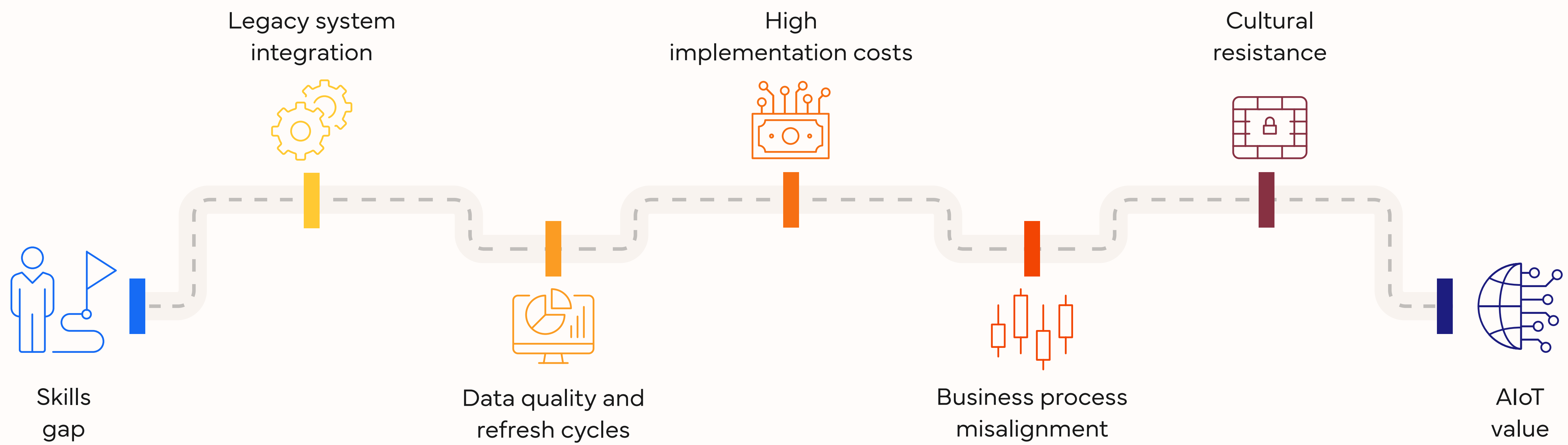
The survey examined the AI and machine learning technologies that various industries prefer and found that:

- In the high-tech electronics sector, machine learning for anomaly detection was the most highly ranked tool.
- In chemical manufacturing, AI-based audio processing was the most commonly used tool.
- In consumer goods manufacturing, predictive analytics was recognized as the top tool.
- In energy utilities, predictive analytics and anomaly detection were tied as the highest-ranked AI/ML tools.

# AIoT: Unlocking big gains and navigating big barriers

From cost savings to smarter innovation, the rewards are real. However, there are significant roadblocks to success.

**Roadblocks on the path to AIoT**



# AIoT: Unlocking big gains and navigating big barriers (continued)

## AIoT delivers KPIs that matter

Users expect AIoT to supercharge business performance

**Costs drop**

54%
anticipate major savings.

**Innovation ignites**

52%
predict smarter, faster breakthroughs.

**Efficiency accelerates**

49%
of respondents expect streamlined operations.

**Productivity increases**

63%
say AIoT boosts productivity and competitiveness.

**"Skills-related challenges now top the list — up from number 5 in 2019."**

- Cultural or organizational resistance moved from the top challenge in 2019 to number 6 in 2025.
- Data quality and refresh cycles have maintained their relative importance since 2019.
- Since 2019, new challenges have risen to the top of obstacles, including business process misalignment, high implementation cost, and legacy system integration.

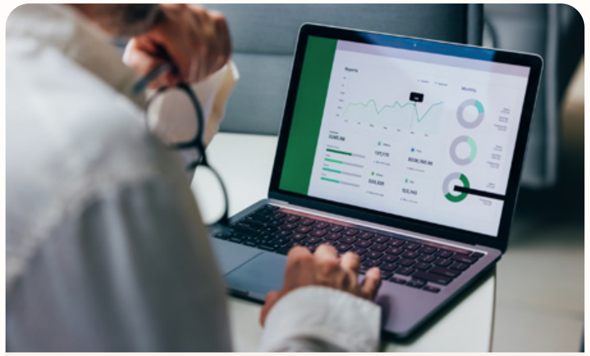
# AIoT powers diverse industrial use cases

## AIoT value realization across top use cases

**Predictive maintenance:**
AIoT powers predictive maintenance initiatives to help industrial organizations reduce unplanned downtime, optimize asset performance, and lower operational costs by turning real-time data into actionable insights.

**IT automation:**
Within IT operations, including software deployment, configuration management, network management, monitoring, and incident response, there is clear growth in cost savings, security, and resource efficiency, signaling AIoT's growing role in streamlining IT operations and enhancing service delivery.

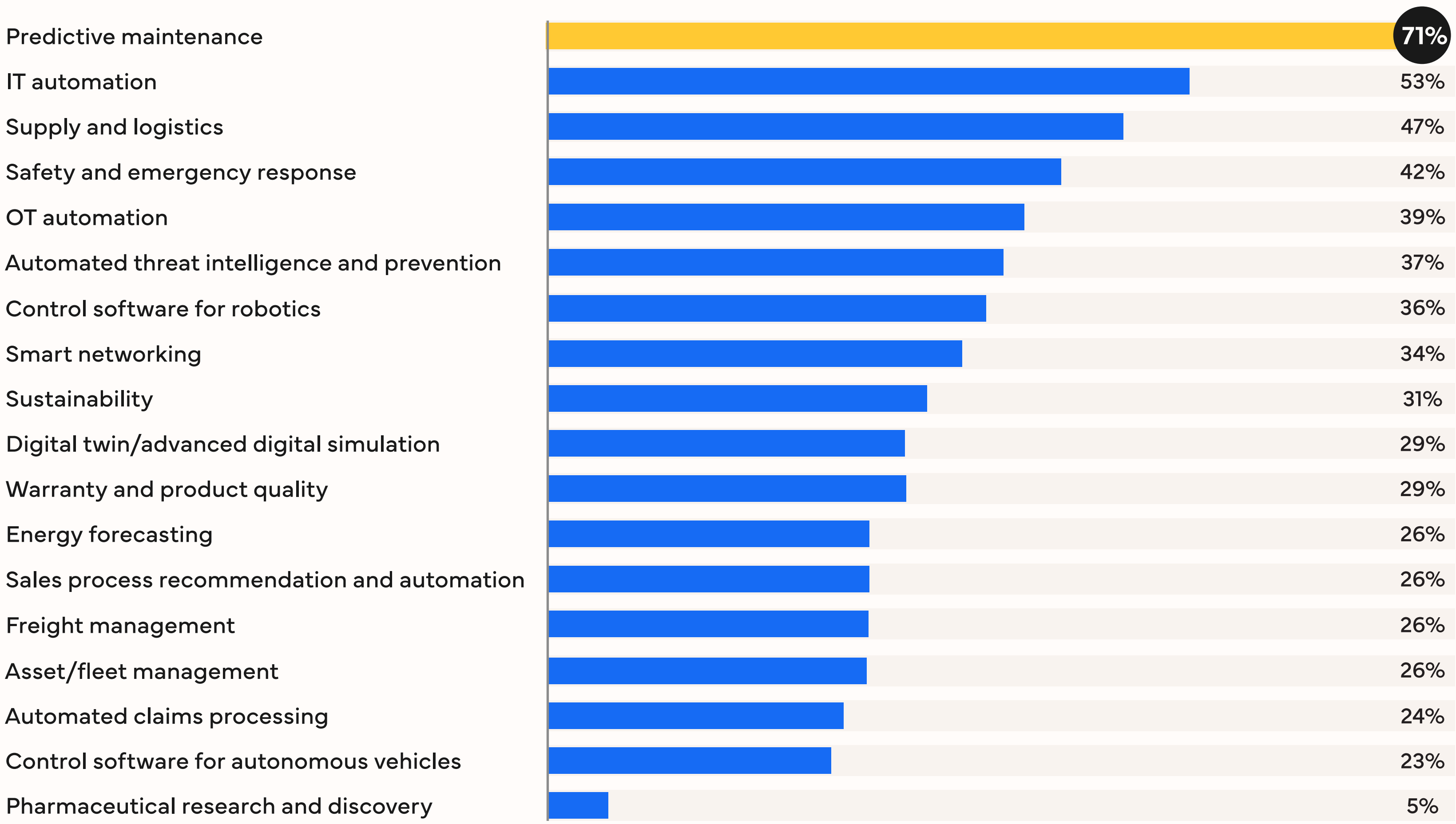
**Supply and logistics:**
AIoT provides tangible improvements in inventory control, agility, and cost management, with ongoing efforts to expand capabilities and strengthen safety across dynamic supply chains.

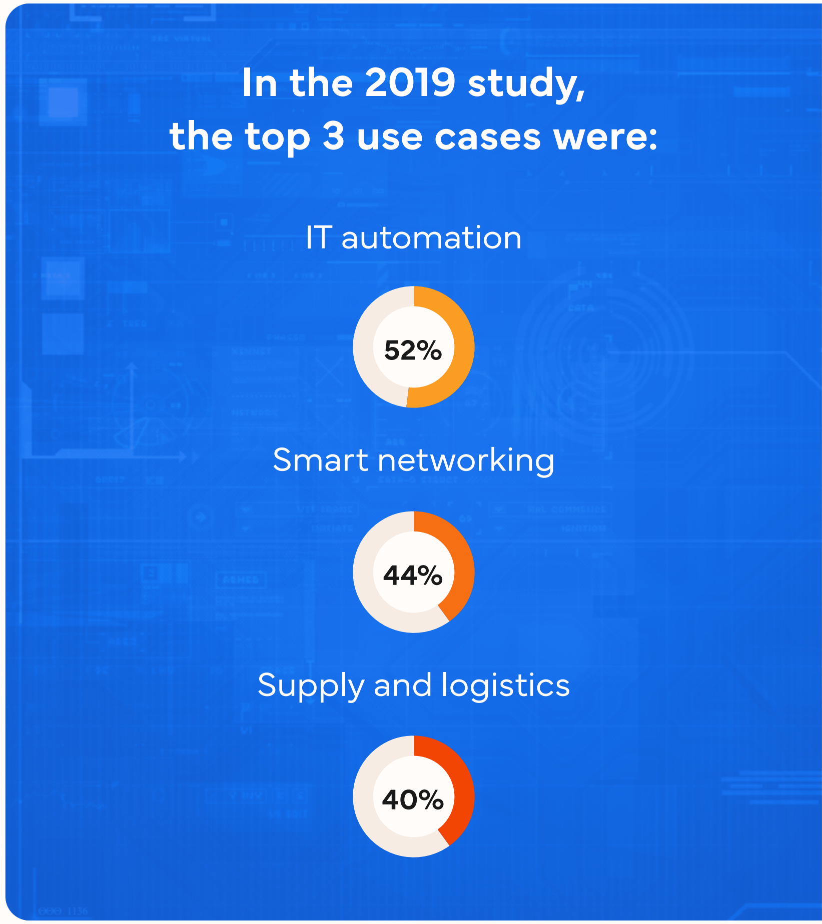


**Safety and emergency response:**
AIoT enhances productivity, reduces risk, and speeds up crisis response through real-time data and intelligent automation.

# AIoT use cases

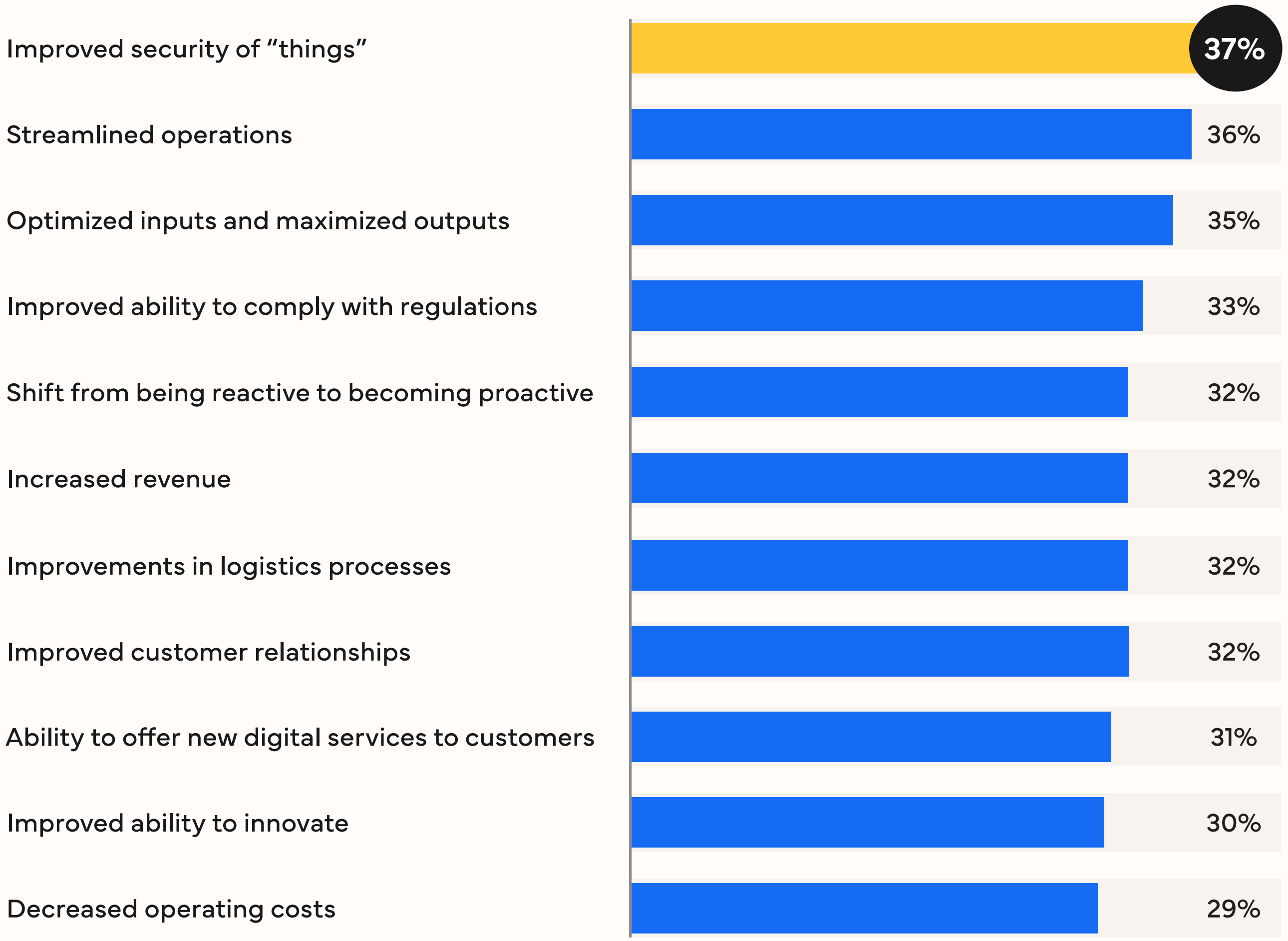
## Predictive maintenance and IT automation responses are the most popular.



# AIoT transforming operations

## Benefits of respondents that achieved significant value from AIoT




The integration of AI into IoT platforms yields overall performance benefits for industrial operations.

A key finding is the bolstering of security for operational systems, with 37% of respondents achieving significant value from AIoT.

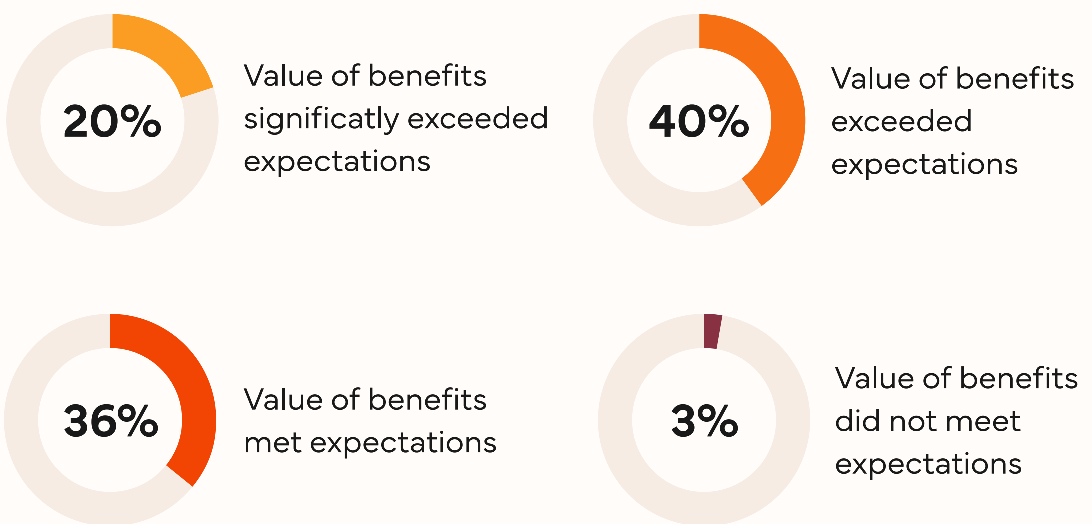
This is closely followed by the streamlining of operations, a direct result of data-driven operational improvement, which AI spearheads.

# Greater AIoT usage drives higher value realization across initiatives

Less than 3% say the value of AIoT "did not meet expectations."

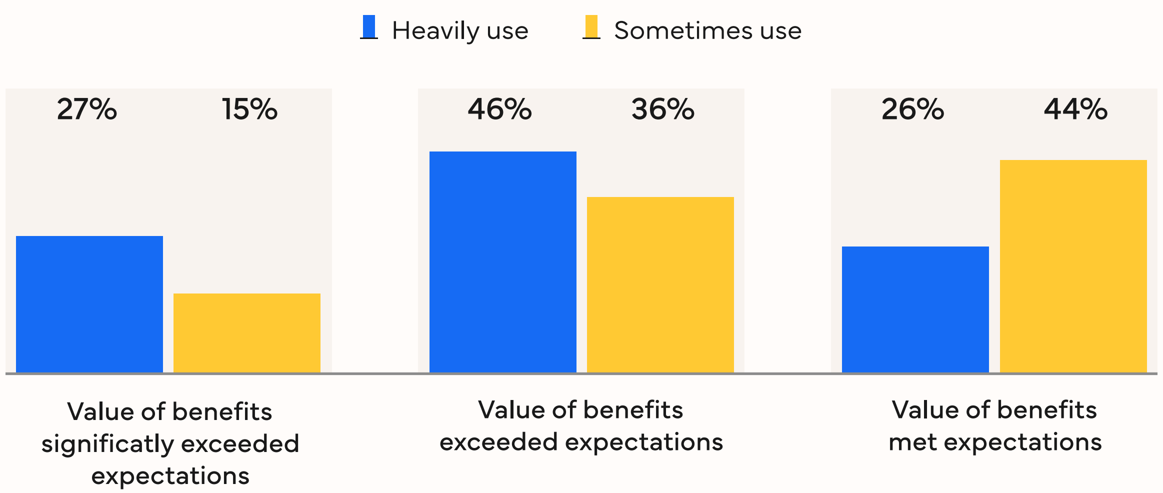
Organizations that "heavily use" AIoT are twice as likely to see value "significantly exceeding" expectations.

## Value of AIoT initiatives




## Value derived by AIoT usage level

See the figure data in an accessible table format.



# IDC recommendations

### Accelerate AIoT adoption strategically

- Prioritize use cases with proven ROI, such as predictive maintenance, IT automation, and supply chain optimization.
- Focus on scalable deployments that align with business goals and operational needs.
- Target regions strategically to meet demand because regional expectations are divergent, with EMEA currently accelerating fastest, followed by APAC (slide 7).

### Invest in workforce enablement

- Address the growing skills gap by upskilling teams to work with AI-driven systems.
- Capture legacy knowledge and build internal AI literacy to support long-term transformation.
- Determine which changes most contributed to worker skills gaps and skills-related challenges rising from the fifth-most-impactful challenge in 2019 to the number 1 most important in 2025 (slide 9).

### Modernize infrastructure for integration

- Ensure readiness by upgrading legacy systems and improving data governance.
- Leverage edge computing and 5G to support real-time AIoT capabilities.
- Assess the current state of integrations to better focus efforts on the highest-impact integrations first to allow for greater automation and remove barriers for AIoT value (slide 9).

### Continue to improve overall operations by implementing AIoT

- Foster collaboration between IT and OT teams to unify data, processes, and decision-making.
- Use AIoT to bridge digital and physical operations for greater efficiency and resilience.
- As AI continues to integrate into the business, overall operational benefits will continue to gain momentum (slide 13).

### Start accelerating OT adoption

- Prioritize training and education on solution benefits to overcome cultural resistance from traditionally non-technical operations workers (slide 9).
- Invest in expanding OT adoption in areas that are most tied to quick cost savings, increased revenue, or overall rapid efficiency gains (slide 13).

# Appendix: accessible data tables

This appendix provides an accessible version of the data for any complex figures in this document. Click “Return to figure” to get back to the data figure.

### AI adoption by Region

| Adoption status | NA | APAC | EMEA |
|---|---|---|---|
| No change | 11% | 10% | 13% |
| Slight increase in adoption | 35% | 23% | 21% |
| Moderate increase in adoption | 24% | 39% | 32% |
| Significant increase in adoption | 19% | 19% | 25% |
| Very significant increase in adoption | 11% | 9% | 10% |

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### AI and machine learning technologies used for analyzing sensor data

| Technologies | Heavily use | Use in some projects | Planning to use | No plans to use or don’t know |
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# Appendix: accessible data tables (continued)

## Value derived by AIoT usage level

| Adoption status | Heavily use | Sometimes use |
|---|---|---|
| Value of benefits significatly exceeded expectations | 27% | 15% |
| Value of benefits exceeded expectations | 46% | 36% |
| Value of benefits met expectations | 26% | 26% |

Return to figure

# About the IDC analysts

**Carlos Gonzalez**

Research Manager
of Industrial Internet of Things and Intelligence Strategies, IDC

Carlos M. González leads IDC's IoT Ecosystem and Trends program. He is responsible for research on the IoT hardware and software innovations that transform operations within and across industries. In addition to assisting clients in maximizing the value of their technology investments and minimizing technology risk, he provides guidance on the human evolution and process changes required for digital transformation.

More about Carlos Gonzalez →

**Kathy Lange**

Research Director, AI Software

Kathy Lange is Research Director for IDC's AI and Automation practice, focused on Machine Learning Life-Cycle Tools and Technologies. Ms. Lange's core research coverage includes machine learning life-cycle technologies and platforms, trends, end-user requirements, business models, use cases, associated regulations, and market sizing for this critical, fast-growing segment. Additionally, her research covers AI life-cycle automation, model pipelines, trustworthy AI, and data annotation and labeling services.

More about Kathy Lange →

# About the IDC analysts (continued)

**Andrew Gens**

Research Analyst, AI Software

Andrew Gens leads IDC's research and thought leadership initiatives for Computer Vision (CV) and Multi Modal AI Tools and Technologies. In this role, Mr. Gens tracks the software tools, technologies, and ecosystem trends that are catalyzing the expansion of CV and multi modal AI more broadly across business and consumer use cases. Mr. Gens has been conducting research at IDC since 2020. Andrew has previously covered AI for Climate Intelligence, AI for the Metaverse, and continues to support coverage of business-to-business middleware and Integration and Automation Software.

More about Andrew Gens →

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