Next-generation Industrial AI research

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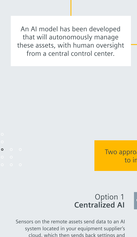
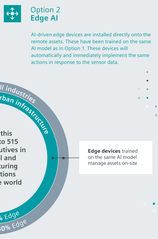
# AI in Urban Infrastructure

Where do you keep your AI?



**Imagine** your organization has several high-value assets, such as equipment and machinery, located in remote areas...

An AI model has been developed that will autonomously manage these assets, with human oversight from a central control center.



Two approaches are being considered to implement this model

## Option 1 Centralized AI

Sensors on the remote assets send data to an AI system located in your equipment supplier's cloud, which then sends back settings and actions that are implemented automatically.

## Option 2 Edge AI

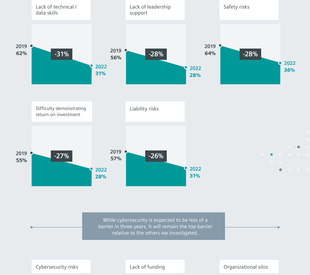
AI-driven edge devices are installed directly onto the remote assets. These have been trained on the same AI model as in Option 1. These devices will automatically and immediately implement the same actions in response to the sensor data.


Assets are managed by an AI model on your equipment supplier's **Cloud**

**Edge devices** trained on the same AI model manage assets on-site

In practice, we will often see hybrid models, where some data goes to the cloud, while other data is processed by edge devices.

But which factors are important to how we make these decisions? Which factors drive how we design AI applications to interface with IoT networks and Edge devices?




* i.e. one update to the cloud vs. multiple Edge devices

** i.e. within the Edge devices, not in the cloud

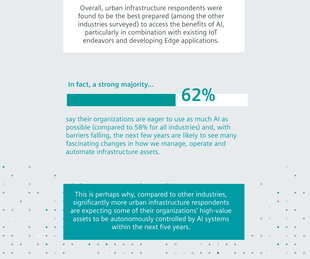
Cybersecurity risk is the most important factor for respondents considering both centralized IoT and Edge scenarios. For the former, the concern would often be that data could be stolen or corrupted in transmission between the central location and the remote assets, whereas those considering Edge may be concerned about direct cyber attacks on those devices.

In both cases, it is a potential concern, given only 53% of respondents feel their organizations have access to all the skills needed to manage current AI-related cybersecurity risks.

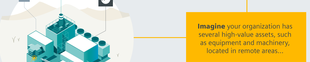
However, the findings indicate that urban infrastructure organizations are building the skills they need: in three years time, cybersecurity risks will be much less of a barrier to progress with AI than today...

What are the significance of barriers (combined moderate and major) today and in three years time?

Major barriers, such as data integration and resistance to change, are expected to fall much more dramatically...




While cybersecurity is expected to be less of a barrier in three years, it will remain the top barrier relative to the others we investigated...




Within the next five years, will an AI system autonomously control some of my organization's high-value assets?

**63%** Urban infrastructure

**54%** All industries

Overall, urban infrastructure respondents were found to be the best prepared (among the other industries surveyed) to access the benefits of AI, particularly in combination with existing IoT endeavours and developing Edge applications.

In fact, a strong majority...

**62%**

say their organizations are eager to use as much AI as possible (compared to 58% for all industries) and, with barriers falling, the next few years are likely to see many fascinating changes in how we manage, operate and automate infrastructure assets.

This is perhaps why, compared to other industries, significantly more urban infrastructure respondents are expecting some of their organizations' high-value assets to be autonomously controlled by AI systems within the next five years.

**What is AI?**
In this report, and the research that supports it, 'artificial intelligence' or 'AI' refers to a broad spectrum of methods or technologies that perform tasks which would normally require functions of human intelligence such as learning, judging, and problem-solving. This is more in keeping with the contemporary business understanding of AI, rather than any technical or academic conventions.



**About the research**
Siemens and our research partner Longitude conducted primary research into the uses of, attitudes to, and outlooks for AI in industrial organizations. We surveyed 515 senior business leaders in the energy, industrial/manufacturing, urban infrastructure, and transportation sectors. In order to qualify for the survey, respondents needed to be responsible for, involved in, or knowledgeable about their organization's existing or planned use of AI and related technologies, strategies, budgets, and applications. The research included respondents from North America, Latin America, Europe, the Middle East and Africa, and Asia Pacific and was concluded in September 2019. All respondents were from organizations with an annual revenue of at least $100 million.

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