



EUCloudEdgeIoT.eu

Impacts and Value Chains of the Cloud-Edge-IoT Continuum in the Manufacturing sector





EUCloudEdgeIoT.eu

Impacts and Value Chains of the Cloud-Edge-IoT Continuum in the Manufacturing sector

How does the Cloud-Edge-IoT Computing Continuum work?

The Cloud-Edge-IoT (CEI) Continuum is an emerging framework that combines the strengths of cloud computing, edge computing, and the Internet of Things (IoT) into a cohesive and transformative ecosystem in which the Cloud serves as a centralised powerhouse, the Edge brings power closer to the data source, and the IoT creates a web of data collection and exchange. The CEI Continuum presents opportunities such as contributing to large scale pilots financed by the European Commission. Our mission is to support companies in harnessing these opportunities.

Why is the CEI continuum important for the Manufacturing sector?

The Manufacturing industry is by far the largest segment of the overall European CEI market. In 2022, spending was estimated to be

EUR 49.6 billion.

79%

Cloud Computing adoption rate by companies in manufacturing

42% extensive,

37% limited adoption

56%

IoT adoption rate by companies in manufacturing

25% extensive,

31% limited adoption

38%

edge computing adoption rate by companies in manufacturing

9% extensive,

29% limited adoption

Edge Computing is less present, as it is a more recent innovation. However, both IoT and Edge generate interest in increased adoption rates within the manufacturing sector, with **21%** and **27%** respectively being planned to implement by 2025.

These numbers highlight the growing demand for a CEI Continuum that can answer the industry's most pressing needs. The main concerns are related to Digital Sovereignty, Security and Trust Issues, and Affordability.

What are the main opportunities for CEI in Manufacturing?

Edge computing efficiently processes large amounts of data coming from sensor-networks, cameras or robots on the shop-floor. The pre-processing of data near its production source reduces data volume significantly, easing storage and real-time processing demands.

Transferring CEI solutions in Manufacturing is challenging due to unique plant setups, regulatory demands, and diverse pre-existing IT landscapes with varied standards and interfaces. Some systems even intentionally hinder data repurposing.

While large manufacturers manage CEI technologies internally, SMEs often collaborate with external service providers, requiring close coordination with management, IT, and production teams. This ecosystem includes solution providers (e.g. analytics, AI, robotics), component suppliers (e.g. sensors, robots), and infrastructure providers (e.g. platforms, network services).



Funded by
the European Union



EU CloudEdgeIoT.eu

Impacts and Value Chains of the Cloud-Edge-IoT Continuum in the Manufacturing sector

The Manufacturing sector has numerous CEI Continuum applications, such as employee safety monitoring, process automation, fleet tracking, and decentralised decision-making. Three in particular show great promise:



Asset Monitoring and Maintenance

Using IoT systems for asset monitoring and maintenance to optimise operations by detecting equipment anomalies. This solution minimises costs, prolongs equipment lifespan, boosts productivity, and seamlessly integrates with other automation systems.



Automated Guided Vehicles (AGVs) and Robots

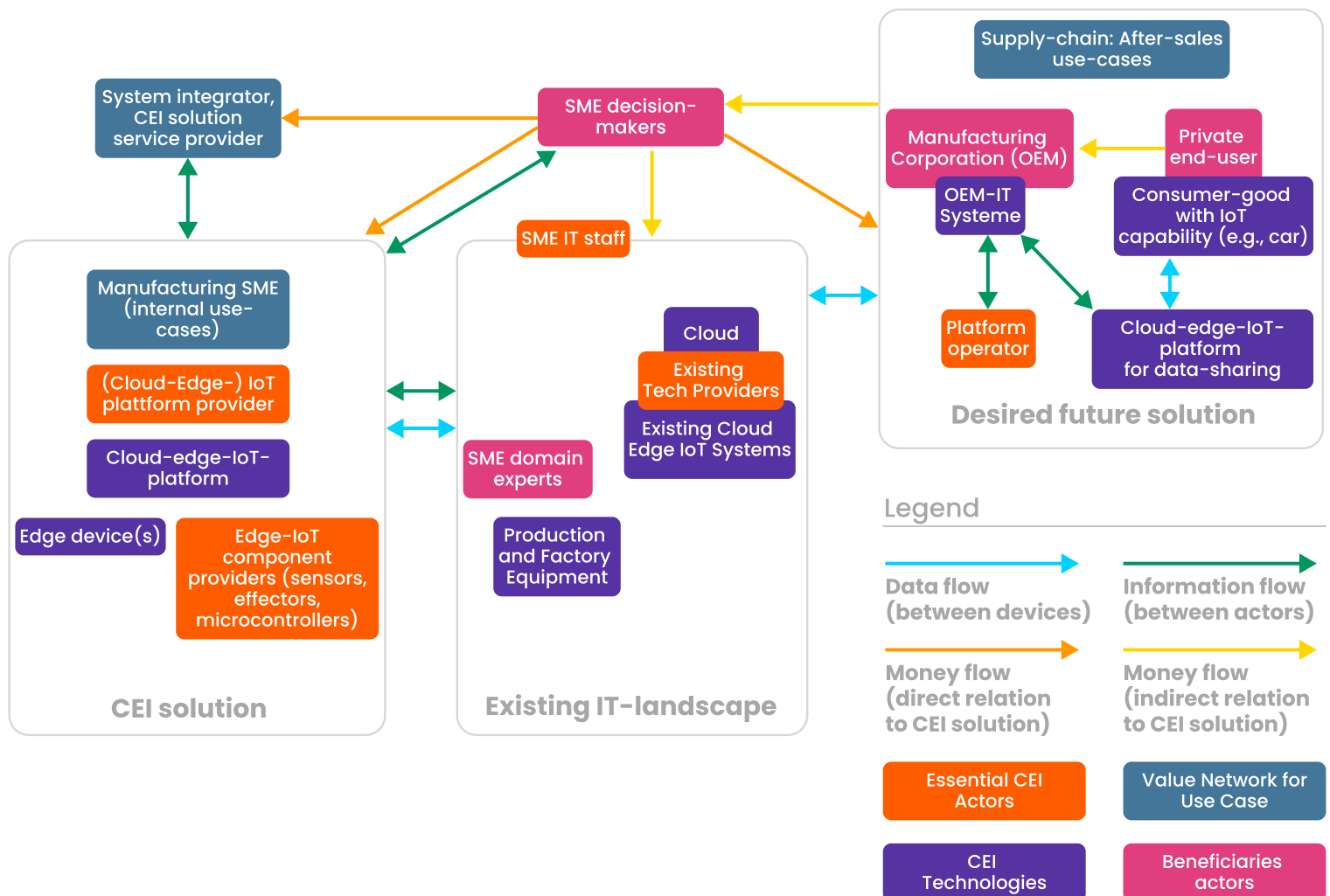
Implementing automation with AGVs and robots to enhance efficiency and safety in factory and warehouse operations. Leveraging edge computing and IoT for reliable and low-latency communication. Cloud computing facilitates management and analytics for seamless control.



Visual Inspection and Quality Control

Deploying cameras and AI analytics for visual inspection and quality control in manufacturing, identifying production errors to improve efficiency and customer satisfaction. It leverages AI-powered image analysis, commonly adopted in manufacturing processes.

What are the data, value and information flows in Manufacturing?



Funded by the European Union

The diagram highlights in-house use cases involving a Manufacturing SME and its tech providers. Revenue streams flow from the SME to various CEI solution providers. While OEMs don't directly influence these internal CEI cases, their evolving requirements can impact CEI technology adoption.

Implementing internal CEI solutions in manufacturing is complex, demanding tailored solutions for specific production setups and integration into existing IT systems. This involves components from various suppliers, including Cloud-Edge-IoT tech providers and cloud providers.

Deploying a new CEI solution often requires a technical IoT platform, as creating a personal runtime environment, like Kubernetes, is not always viable for SMEs. Developers of data connectors and interfaces are crucial, and additional IoT equipment might introduce new suppliers to the network.

For internal CEI solutions, key decision-makers include the Manufacturing expert affected by the CEI system, company leaders, and IT staff overseeing integration and operation.

What are the key service requirements for the manufacturing sector?

Manufacturing companies prioritise workplace safety, addressing skilled labour shortages through automation, preparing for market shifts (including CEI-readiness, resilience, OEM demands, and sustainability), marketing benefits, and gaining a competitive edge by offering superior products or services. To effectively address these priorities, several aspects of system implementation and operation need to be considered:



Design

- ☛ Solutions should be customised to on-site processes, offering tangible benefits.



Installation

- ☛ Cost-effectiveness is key, with system integration and customisation being major cost factors. Standardising data formats and interfaces can reduce these costs.
- ☛ For future solutions providing post-sales consumer data, the value derived from the data should justify the service cost.



Operation

- ☛ The system must operate in near-real-time, even with internet disruptions, relegating only offline processes like AI-model-learning to the cloud.
- ☛ A user-friendly interface is essential for non-engineers, ensuring seamless integration



Value-added Supplements

- ☛ Data can enable external monetization strategies, like enhancing OEM customer service



Maintenance

- ☛ The system should require minimal maintenance, considering SMEs' limited on-site staff.
- ☛ Non-engineers should handle basic maintenance tasks, and customer service should be reliable with a dedicated contact.



Disposal/Upgrade

- ☛ The system should be long-lasting, with upgrades causing no interruptions.
- ☛ Major upgrades should come with staff training options.

What are the value chain catalysts for CEI adoption?

1. Collaborate with Expert Providers

Partner with CEI service providers, R&D, and technology experts to bridge expertise gaps and facilitate communication with other technology providers, leveraging their knowledge to streamline CEI customization and integration efforts.

2. Empower Domain Experts

Involve domain experts whose workflows are affected by CEI systems as key decision makers. Design CEI solutions to support and assist domain experts, capturing their valuable knowledge and addressing skill gaps..

3. Innovate for Future Readiness

Exploit CEI solutions as drivers of innovation and competitive advantage, helping the sector prepare for upcoming market changes. Explore collaborative data-sharing applications along the supply chain to unlock additional value and partnerships.



EUCloudEdgeIoT.eu



If you're interested in growth opportunities in this sector or want to learn more, contact us at: info@eucloudedgeiot.eu