

Life Fact Future at Nokia Espoo Campus

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Key facts about Nokia in Finland today

Employees in total

6 600

Trainees annually

~500

Employees by location

Espoo 2 850
Oulu 2 850
Tampere 900

Different nationalities

80

Espoo – Nokia Global HQ

- Global HQ functions
- Mobile Solution Center
- All of the BGs represented
- Executive Experience Center

Oulu – Home of Radio

- Radio Research & Design Center
- End-to-end system level integration & verification
- Radio and Baseband manufacturing

Tampere – Home of System-on-Chip (SoC)

- Home of Network management
- Greenest & coolest data center
- Leading SoC Hub development

Our focus in Finland



Our global head office functions are located in Espoo, where the focus is also on mobile networks and cloud product development, on software business and advanced radio and mobile networks research incl. standardization.



Tampere site continues to be a specialized technology center being the home of System-on-Chip (SoC) development and home of Network management. Tampere also hosts the greenest & coolest data center.



In Oulu, the focus is on the 5G and 6G radio HW, SW and SoC development, including the most advanced Over-The-Air (OTA) and beamforming testing capabilities and new product introduction factory.

Our Campus

- Nokia global headquarter where all business groups are present, majority of employees working in Mobile Networks
- Product development for mobile networks and cloud, software business and advanced radio & mobile networks research including standardization
- Research, innovation and educational collaboration with universities, working closely with e.g. Aalto University
- Co-operation with operators and related partners, including enterprise and industrial verticals, e.g. Veturi and 5G Test Network Finland
- Executive Experience Center showcasing our product demos to visitors
- One of the Nokia's largest data center serving product development and research



Our people

Ca. 3000 employees

80

Different nationalities

25%

Females

300

New hires in 2023,
including

200

Trainees

26%

Non-Finns



NOKIA

Nokia Espoo Campus - Heart of Networking

#2 with international IT students in Finland

#4 with IT students in Finland - also in 2024



1	Wolt	↑+2
2	Nokia	↓-1
3	Nordea	NEW
4	Supercell	↓-2
5	Microsoft	NEW
6	OP	NEW
7	KONE	↑+1
8	Google	↓-2
9	Zalando	↓-2
10	Reaktor	↓-5
10	Rovio	↓-1
10	Smarty	NEW

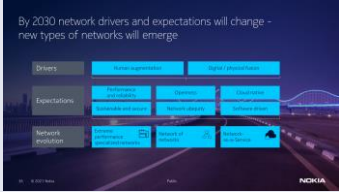

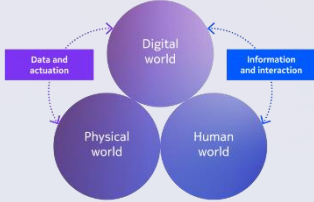
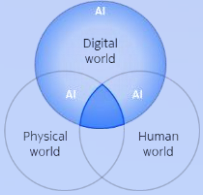


A row of large satellite dishes is shown from a low angle, receding into the distance. The dishes are illuminated by the warm, golden light of a sunset or sunrise, creating a strong lens flare effect. The sky is a mix of orange, yellow, and blue. The dishes are made of a grid of small, reflective panels.

Our Veturi mission

LEAD the way to Sustainable
Digital-Physical World

The evolution of the Nokia technology vision

Year	2021	2022	2023	2024
Timeframe	2030	2030	2030	2035+
Theme	TechVision	Metaverse	Physical, human and digital world	Digital acceleration toward the Quantum era
				
Key topics	<ul style="list-style-type: none"> • Physical-digital fusion • Human augmentation 	3 Metaverses: <ul style="list-style-type: none"> • Enterprise • Industrial • Consumer 	<ul style="list-style-type: none"> • Metaverse • Environmental sustainability (2024) 	<ul style="list-style-type: none"> • AI proliferation • Spatial computing • Web 3 maturing • Quantum Tech. 2.0

The smart world ahead feels more human



Device evolution

AI integration, new capabilities and form factors revolutionize user interactions.

- Smartphones remain as a hub
- Natural language and multimodality
- Device innovation driven by medical engineering
- Evolved sensors for physical & emotional status and low/no energy technology



Enablers

Integrating physical, human and digital worlds creates deeper & richer connections.

- Spatial computing
- AI-enabled understanding of physical and human world
- Open / sharable 3D mapping and spatial anchors
- Digital twin evolution towards cyber-physical entities
- Web3 enabling decentralized trust



Solution & service evolution

Solutions and services are solidly linked to changing patterns of consumption.

- From Quality of Service to Quality of Personalized Experience
- 3D audio augmentation for tailored soundscapes
- Generative AI-created media and personalization
- Rise of smart agents and humanoid robots

Technology Vision 2030 on the metaverse opportunities

Concepts of 'Human Augmentation' and 'Digital-Physical Fusion' frame this vision

Metaverse enablers



Human Augmentation

Handhelds
VR HMDs
Tethered AR glasses
Haptic-enabled remote control

Connected bio-medical implants
Industrial exoskeletons
Ergonomic, untethered XR glasses
XR interoperability



Digital-Physical Fusion

Basic, organization-level digital twins
Smart sensor networks
Persistent virtual worlds & objects

Complex, enterprise-wide digital twins
Ecosystem interoperability
Interactive 3D digital twins

Metaverse opportunities

Consumer Metaverse

Enterprise Metaverse
(IT-centric)

Veturi scope of work

Industrial Metaverse
(OT-centric)

~ today

~ 2030

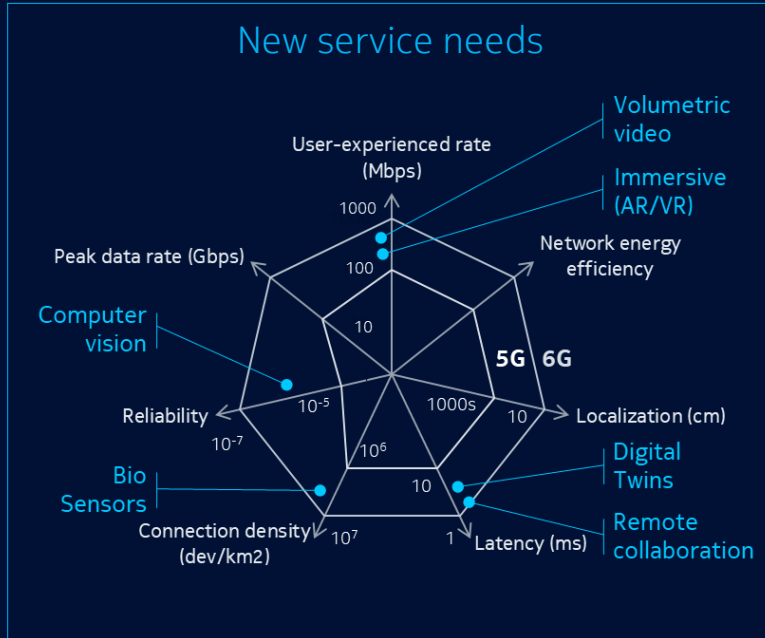
* Virtual Reality Head-Mounted Displays

** Augmented Reality

*** Extended Reality

Triple Challenge - New service needs, security and cost of energy

... requiring transformed capabilities and versatile integrations



Cost of Energy

According to GSMA Intelligence, energy consumption accounted for between 15% and 40% of teleoperators' OPEX in 2021 and is expected to heavily increase in 2022 onwards.

The energy costs associated with running the world's mobile networks are expected to exceed 24 B€ annually due to the ongoing energy crisis and inflation. Estimated annual increase of energy cost will be 8-12 %

Source: GSMA Intelligence & Telecommunications, 2021

Security

Global cyberattacks increased by 38% in 2022, compared to 2021. Global cybercrime costs are estimated to grow by 15 percent per year over during the coming years, reaching 10 trillion euros annually by 2025

Source: Check Point Research (CPR) & Cybersecurity Ventures, 2021

Our solution

Building the core capabilities for sustainable industrial metaverse

Main focus areas

1

Technology enablers for industrial metaverse

Define and build new hardware and software enablers for the industrial metaverse architecture, platforms and use cases

2

Architecture and platforms for sustainable industrial metaverse

Build essential capabilities to enable networks and platform's security, energy efficiency and optimal performance

3

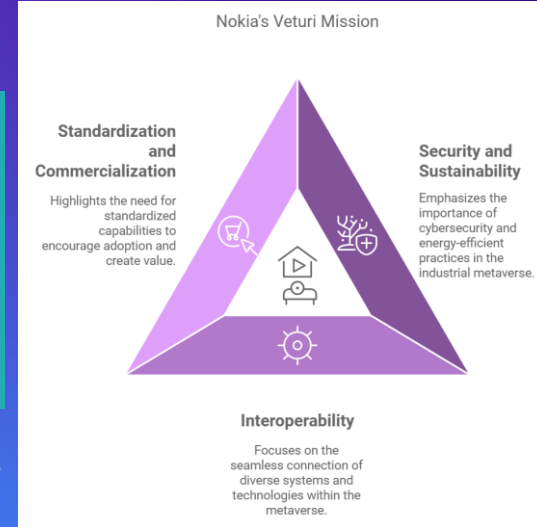
AI/ML-enabled industrial applications

Create and validate future capabilities for real-time XR media communication and industrial applications

4

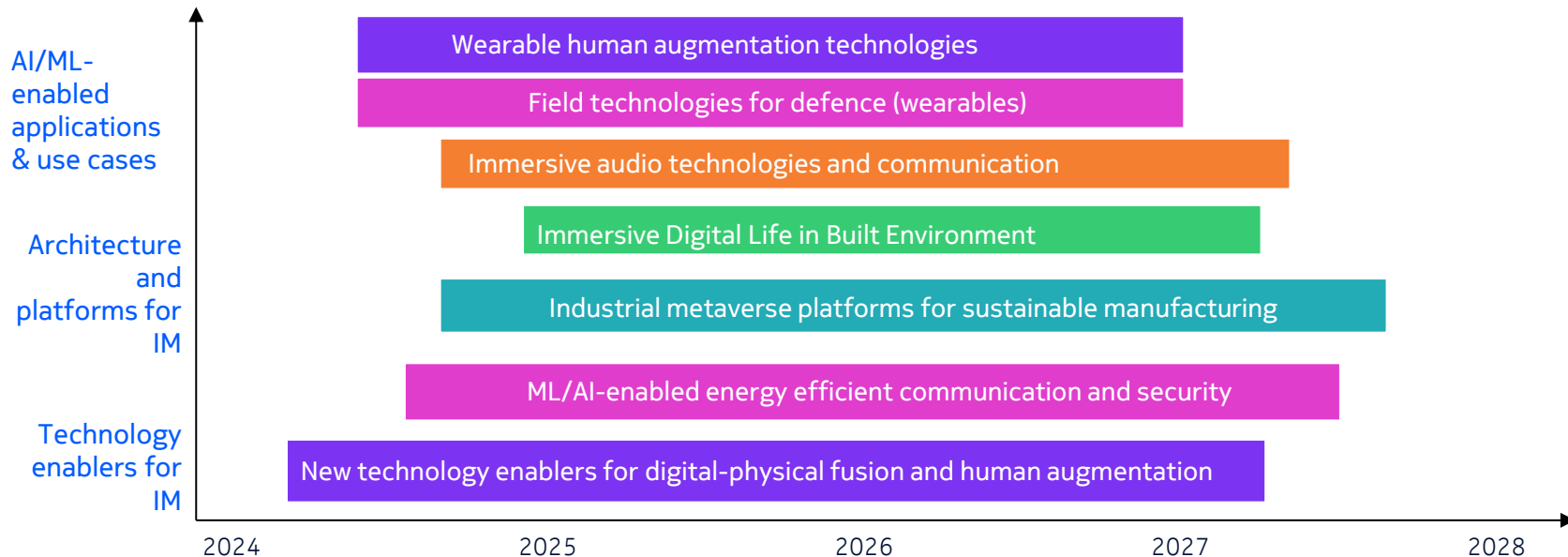
Industrial Metaverse ecosystem, new business opportunities and commercialization

Lead activities to build the Finnish Industrial Metaverse Ecosystem to accelerate global business opportunity development and commercialization



Roadmap themes and planned Co-Innovation projects (TRL 5)

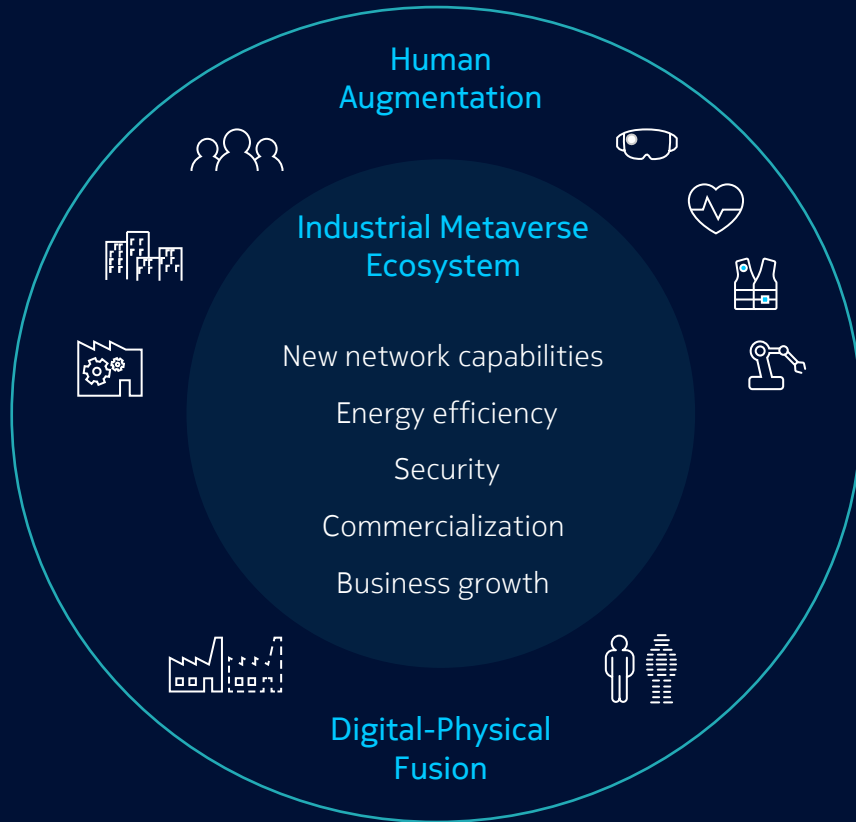
Driving value capturing with 100+ ecosystem partners in 15 planned projects Feb 2025



<https://www.businessfinland.fi/suomalaisille-asiakkaille/palvelut/rahoitus/yrittysten-ja-tutkimusorganisaatioiden-yhteistyö/co-innovation>

NOKIA

Creating global business opportunities and growth with the committed ecosystem partners



Nokia is an active player in the local Finnish ICT ecosystem

