BUSINESS
FINLAND

IMMERSIVE TECH DRIVING THE NEXT ERA OF INDUSTRIAL OPERATIONS

Metaverse Deep Dive Session 4

March 2026

Business Finland Project Scope

Topics

Landscape Assessment
- Elements of XR Ecosystem
- Major XR Ecosystem Suppliers and OEMs

Evolution Analysis
- Recent Market Trends
- Ecosystem Evolution: XR Tech & Form Factors
- XR Market Size And Forecast
- Patent Landscaping Trends
- Tech Development Status
- Evolution Of Major XR Platforms
- Emerging Challengers In The XR Market
- Cybersecurity Challenge Overview
- Strategic Insights – European Perspective

Applications Analysis
- Application Landscape – Industry Overview
- Application Analysis – Consumer
- Application Analysis – Automotive

Topics

- Application Analysis – Healthcare
- Application Analysis – Manufacturing
- Application Analysis – Retail
- Application Analysis – Aerospace & Defense
- Application Analysis – Education
- Application Analysis – Others

Analysis and Recommendations
- XR Industry-Wise Patent Comparison
- Finland's Key Strengths and Weaknesses
- XR Market in Finland & Sector Landscape
- XR Investments
- Opportunity Matrix
- Recommendations

Appendix

BUSINESS
FINLAND

Evolution of Immersive Tech for Industrial Application

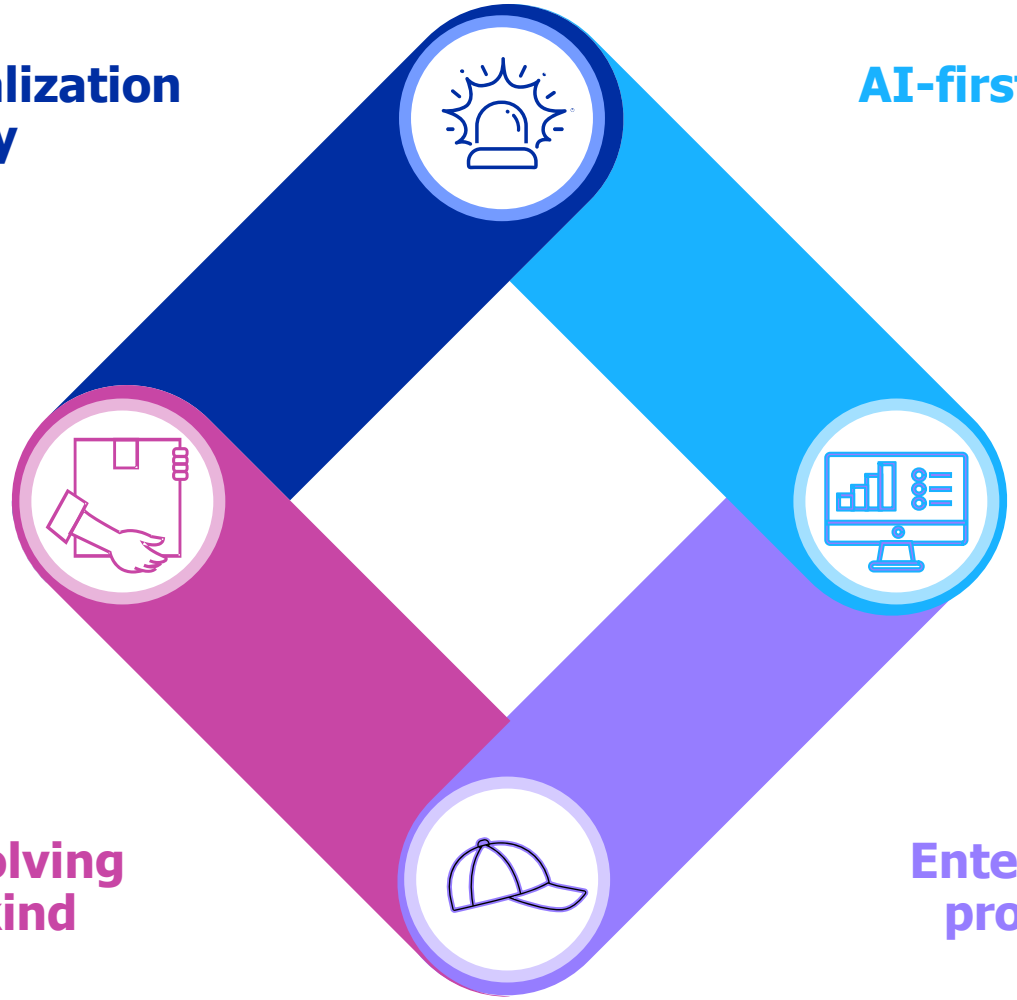
Immersive Tech's Industrial Journey – Trends & Impact

XR is shifting from visualization to decision-critical utility

- Factory line troubleshooting
- Utility grid inspection
- Aircraft maintenance

AI-first, on-device intelligence is becoming essential

- Predictive maintenance assistance
- Warehouse picking optimization
- Oil & gas site inspections



- Smart warehousing
- Assembly line operations
- Construction site supervision

Device form factor is evolving to ambient & wearable kind

- Connected factory operations
- Aerospace quality assurance
- Energy and utilities asset management

Enterprise adoption demands proof, integration, and trust

Source: Frost & Sullivan

Evolution of XR Platforms

- Some companies are adopting the approach of **less iterations of hardware** with **longer lifecycles**
- **New silicon** & **on-device AI** are making it possible to **enhance** passthrough quality, resolution, and runtime efficiency, significantly
- Companies are creating **clear distinction** between its **consumer** and **enterprise** offerings, with **dedicated development and partnership**

	Platform Evolution
Meta	• Meta made a **rapid move from PC-tethered VR to standalone device** with the Quest line
	• Apple is believed to be **prioritizing AI smart glasses**, as per patents filed in US patents.
VALVE	• In 2025, Valve officially announced the **Steam Frame**, a **lightweight** & **dedicated** XR system designed to work seamlessly with the **Steam Deck** and other **PC-based Steam services**.
VIVE	• In 2025, HTC agreed to sell part of its XR unit to Google to bolster Android XR, while exploring **AI smart glasses**, shifting its focus to **more partner-driven roadmap**.
PICO ByteDance	• In 2024, ByteDance adopted **higher-end chipset** (Snapdragon XR2 Gen-2) in its **mixed reality** focused Pico 4 Ultra, adding an **enterprise variant** and enhanced **device-management** capabilities.
SONY	• Sony is pursuing a **two-track roadmap**: **console VR** anchored on PS VR2 with growing PC support, and an **enterprise creator line** cantered on SRH-S1 & associated tools.

Source: Frost & Sullivan

Evolution of XR Technology & Form Factors

- XR is shifting from mature, **task-specific headsets** in controlled environments to continuous, wearable, **sensory-rich computing**, as consumer AR glasses and advanced haptics driven, always-on, tactile, real-world spatial interaction

Current Mainstream

1. **Immersive VR Headset**
2. **Mixed Reality Headset (Passthrough MR)**
3. **6DoF controllers / hand-tracking**
4. **Spatial Mapping Sensor / Depth/SLAM sensors**
5. **Spatial Audio Wearables**

Fast Emerging (Near-term Commercialization)

- Biometric Sensing Module for XR
- Automotive AR HUDs / helmet HUDs
- Consumer AR Glasses
- Force-Feedback Haptic Glove
- Ultrasonic Mid-Air Haptics
- Electrical Stimulation Haptics
- 3D Volumetric Capture System

Niche & Upcoming (Long-term Commercialization)

- Spatial Projection AR System
- Screenless AI Wearable
- Distributed Compute Module for AR
- Neural Input Wristband
- Wearable Electronic Skin
- Adaptive Focus XR Headset
- Retinal Display Glasses
- Smart Contact Lens
- Light-Field Display Headset

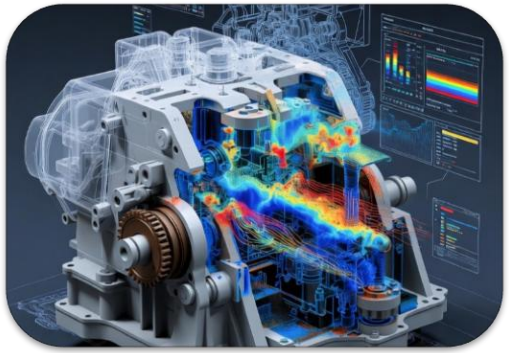
Source: Frost & Sullivan

Evolution of Metaverse

- **The initial consumer wave was defined by experimental social networking and immersive gaming**
- **The convergence of Digital Twins, XR, and AI is transitioning the Metaverse from a novelty into a robust enterprise engine**
- **Are we witnessing a fundamental shift with the Metaverse maturing from a consumer playground into a critical industrial utility?**

Operational Digital Twin

These implementations aim to create real-time, data-driven virtual replicas of physical assets, industrial environments, and infrastructure systems across operations.



Engineering & Product Design

The focus is to enable immersive and collaborative design, prototyping, testing, and validation of products and physical spaces within highly realistic 3D environments before they are built in the real world.

Workforce & Collaboration

The objective is to enhance workforce productivity, training, knowledge transfer, and teamwork through immersive learning experiences and persistent virtual collaboration spaces.

Customer Experience & Sales

This transforms how organizations engage with customers by enabling immersive product exploration, personalized buying journeys, virtual showrooms, and interactive experience environments that strengthen brand connection and accelerate decision-making.

Source: Frost & Sullivan

Capability-Gap Impact Matrix – Essential for Industry Readiness of Immersive Technologies

Target Gap Areas → / Key Capabilities ↓	Device Affordability & Deployability	Security, Privacy & Data Governance	Runtime Performance, Fidelity & Comfort	Optics & Perceptual Accuracy	Input & UX Standards	Network & Compute Readiness	Pipelines & Data Ingest	Spatial Accuracy & Physical Validation	Enterprise & Institutional Adoption	Evidence, Localization & Accreditation	AI Readiness & On-Device Intelligence	Haptics & Embodied Feedback
Tech Prowess & Infrastructure	◐	◐	●	◐	◐	●	●	●	◐	○	●	◐
Talent & Innovation	◐	●	●	●	●	◐	●	●	◐	◐	●	●
Global Market Maturity	●	◐	○	◐	◐	◐	◐	◐	●	●	◐	○
Supply & Partner Ecosystem	●	◐	◐	●	◐	◐	◐	◐	●	◐	◐	●
Policy, Trust & Standards	○	●	○	○	●	●	◐	◐	◐	●	◐	○
Capital & Incentives Engine	●	◐	◐	◐	○	◐	○	◐	●	◐	◐	◐

● High Impact: This capability is a primary driver or solution for gap area

◐ Medium Impact: This capability supports improvements but is not the sole driver

○ Low or Indirect Impact: Minimal direct influence

BUSINESS FINLAND

Source: Frost & Sullivan

BUSINESS FINLAND

FROST & SULLIVAN

Thank You

HEENA JUNEJA
INDUSTRY PRINCIPAL,
TECHVISION (ICT)

EMAIL:
HEENA.JUNEJA@FROST.COM

SOUMYADEEP ROY CHOWDHURY
SENIOR INDUSTRY ANALYST,
TECHVISION (ICT)

EMAIL:
SOUMYADEEP.CHOWDHURY@FROST.COM