

**BUSINESS  
FINLAND**

**INVEST IN  
FINLAND**

An aerial night view of Europe, showing the continent illuminated by city lights against a dark blue background. The lights are concentrated in major urban centers and spread out across the landmass. The sea is dark, and the overall scene is a high-angle, wide shot of the continent.

# **FINLAND DEFINING THE FUTURE**



# WHY FINLAND



1 Global Innovation Index 2016 / 2 World Economic Forum, The Global Competitiveness Report 2016-2017 / 3 PFI innovativeness scoreboard, Copenhagen Economics 2016  
4 The Fund for Peace, Fragile States Index 2016 / 5 Grant Thornton, Global Dynamism Index 2015 / 6 Bloomberg, Bloomberg 2017 Innovation Index  
7 Education First (EF), The world's largest ranking of countries by English skills / 8 UN 2018 World Happiness Report / 9 The Consumer Technology Association (CTA)™ 2018



# FINLAND IS A PIONEER AND GLOBAL LEADER IN DIGITALIZATION

*Finland is a leader in the development of wireless technologies and Europe's leading country for 5G, 6G, AI, and sustainable digitalisation in the future of advanced manufacturing – going beyond Industry 4.0*

*\* (EU-DESI report February 2019)*



# Digital Landscape of Intelligent Connectivity in Finland



## CONNECTIVITY



## IoT & AI PLATFORMS



## DATA TO VALUE

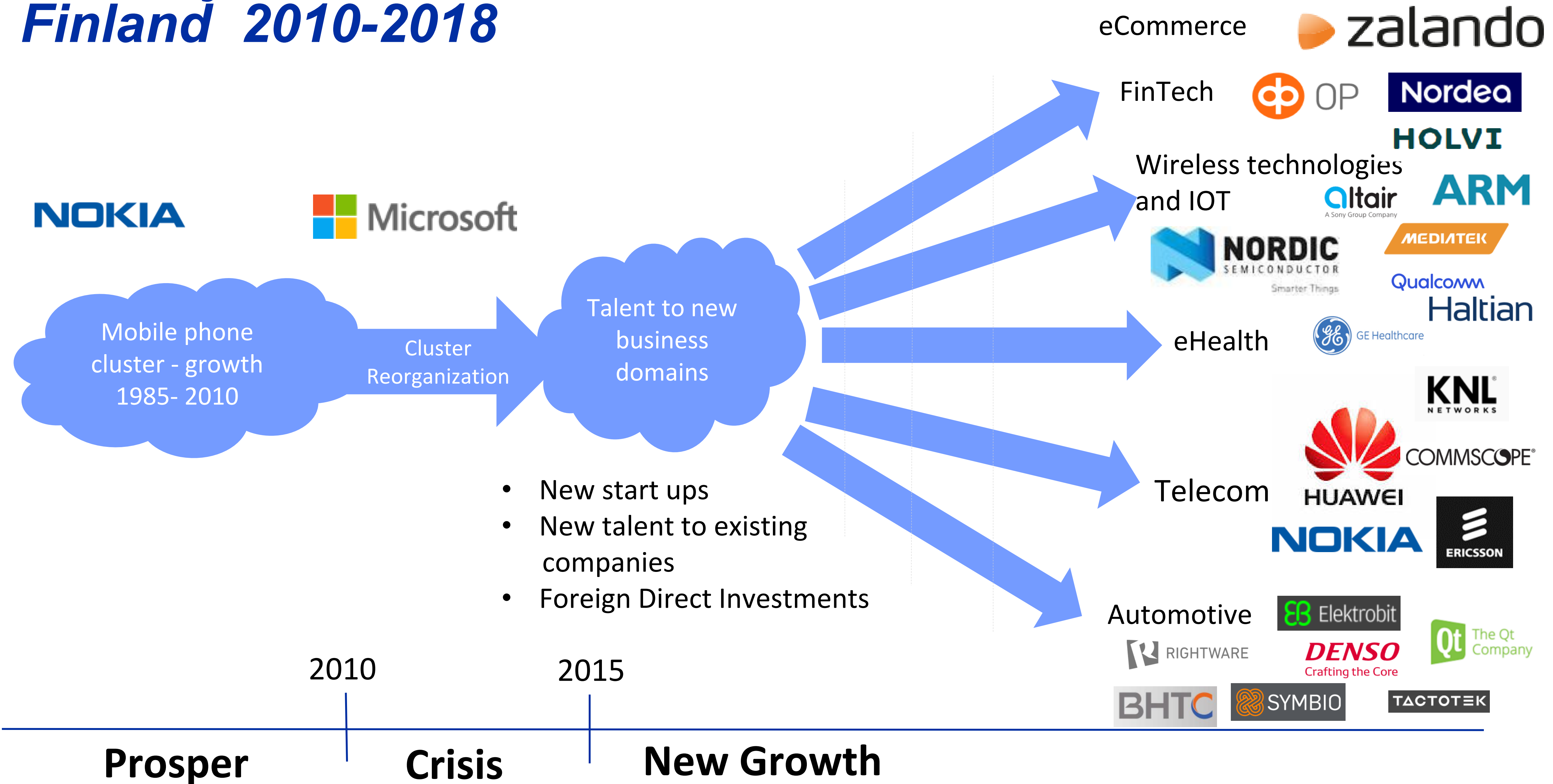


## INDUSTRY VERTICALS

<h3>Core NW</h3> <p>NOKIA TECNOTREE EXFO Radiator TELESTE qvantel KATOTEK elisa ERICSSON SANTA MONICA methics LINIKIE crea NORD exomi omnitele SAROKAL TEST SYSTEMS AJECO NSF Telecom Cloudstreet The Network Slicing Company</p>	<h3>Access &amp; Radio NW</h3> <p>Bittium KNL NOKIA Cloudstreet The Network Slicing Company Cumucore SATEL Verkotan Full bars ahead Etteplan ELTEL APS HIGH TECHNOLOGY CABLES &amp; CONNECTIVITY SOLUTIONS SASKEN OPTENNI TELESTE CONVERTKA SAROKAL TEST SYSTEMS Pulse A YAGEO Company Fairspectrum Radiantum INDAGON ECE ExcellAnt</p>	<h3>IoT Connectivity</h3> <p>Haltian DELFOI DISTINCE DISTRIBUTED INTELLIGENCE TOSIBOX IONSIGN Smart Connections TREON PehuTec ABITRON CROSS control NOKIA wizense SASKEN refecor tikitin exafore CoreHW WIREPAS MEDIATEK NORDIC SEMICONDUCTOR</p>	<h3>IoT - AI Integrators</h3> <p>Haltian SOLITA ATOSTEK Atos MOVIAL BDS Bynfo PROSYS Etteplan NEXTFOUR RDVELHO enfo FINWE streamr ROIMA LINIKIE</p> <h3>IoT Platforms</h3> <p>Wapice REALIN ioLiving HOUSTON POLKU Base<sup>n</sup> REMION DATA RANGERS HitSeed absent Thingsee URJS Nokeval</p> <h3>Digital Twin</h3> <p>Mevea Simulation solutions VISUAL COMPONENTS IDEAL PLM STEREO variantum eniram SCAPE PEHATOO Systemik</p> <h3>Sensors &amp; Other IoT Devices</h3> <p>Haltian nordic id EPEC ASQUELLA pegasor ABAX EXERTUS URJS Wapice TOSIBOX MIRASYS Quuppa Ladimo MELUTA HitSeed Bittium pixact</p>	<h3>Analytics &amp; AI</h3> <p>THE CURIOUS AI COMPANY QUVA VALOSSA Indalگو HOUSTON ANALYTICS digia BDS Bynfo SIMANA LYTICS enfo DATA RANGERS bluugo SILO.AI valuemotive VALVO AUTOMATION invenco VIMAI Bitfactor VALAMIS aito SOLITA QPR TOPdata science Qlik Quru ioLiving ramentor OPTOFIDELITY ZENROBOTICS</p>	<h3>Data Visualization</h3> <p>profium Process Genius enfo GOFORE soluteive hahimota ED DESIGN VAISTO SOFTABILITY HAVAMAX SOLUTIONS VAISTO augumenta Clearnex Qlik</p> <h3>Cloud / SaaS</h3> <p>UpCloud Nordcloud efecte enfo elisa SANTA MONICA Magic Cloud NETOX HONKIO ATTIDO VARAANI ambientia LogiNets Base<sup>n</sup> FUJITSU ramentor Leanware/ Wapice</p>	<h3>Business Integration</h3> <p>tieto TIETOKESKUS digia enfo Soltec GOFORE Nordcloud INNOFACTOR SULAVA Reaktor siiii BITWISE Bitfactor futurice eficode</p>	<h3>Factories (production &amp; processing)</h3> <p>PROSYS 8760 Fastems DELFOI Protacon Nokeval zyfra ROIMA SIMANA LYTICS QUVA Process Genius REMION NOVOTEK Leanware/ MAPVISION procemex VISY ABB nordic id COMATEC pixact MIRASYS Etteplan</p> <h3>Logistics hubs (harbors, airports, railyards)</h3> <p>KALMAR DEDUCTIVE LABS ATOSTEK COMATEC PROXION SOLUTIONS ROIMA VISY eniram intopalo SATEL IDAMIN MIRASYS nordic id bluugo Etteplan</p> <h3>Mining</h3> <p>NOVATRON SENSMET GOFORE Robit UKKOVERKOT ms VISUAL COMPONENTS wizense Etteplan CYBERCOM GROUP MOVIAL ROIMA Outotec ZURE VIMAI ABITRON timegate ATOSTEK intopalo ARNON TECHNION VARAANI ASTROCK VINCIT pixact Radiantum SANDVIK</p> <h3>e-Agriculture and Forestry</h3> <p>ioLiving intopalo SATEL arbonaut AGCO POWER e-Agriculture and Forestry ATOSTEK Technion GrainSense</p>	
<h3>Network Management</h3> <p>Telia Cinia elisa NDC NETWORKS DNA MPY ERILLISVERKOT UKKOVERKOT</p>		<h3>Microelectronics</h3> <p>VTT MEMSFAB LTD NORDIC SEMICONDUCTOR ROHM SEMICONDUCTOR UNISOC Rockley OKMETIC ANALOG DEVICES OXFORD INSTRUMENTS VTT AJAT ATHLOS ELFYS ADVACAM GASERA dispelix GrainSense TACTOTEK Minima</p>						<h3>Smart Cities</h3> <p>PREMIX INDAGON SITOWISE TELESTE VAISALA NOKIA Bell Labs ENSTO LuxTurrim ZENROBOTICS SolarCity streamr GASERA RUMBLE TOOLS</p>
<h3>Security</h3> <p>Zen-mod Solution XXLSEC SSH.COM 2NS Second Nature Security FORCEPOINT VIRIA ControlThings Mideye me pin SPARTA FleXinets Jetico Granite PRIVANCE CAP cysec icelwall F-Secure capricode Cyberwatch SYNOPSIS INSTA enfo Patria Deltago</p>						<h3>Security</h3> <p>UBISECURE Suomen Huolto YARMOUS data oy Bittium SILVERSKIN REDICOM RUGGED TOOLING Secrays FORCEPOINT VIRIA ControlThings Mideye me pin SPARTA FleXinets Jetico Granite PRIVANCE CAP cysec icelwall F-Secure capricode Cyberwatch SYNOPSIS INSTA enfo Patria Deltago</p>		



# Industry Transformation in Finland 2010-2018



# Complexity of Manufacturing



**Need**

Strategy Brand  
New products Reliability Customer Requirements  
Quality Marketing Responsibility  
Logistics Materials  
Modularization 3D-printing Digital Manufacturing Skills  
Process control IoT Management Product Service  
Reliability of delivery Adaptability/Flexibility  
AI & Data analysis  
Delivery time Operational environment  
Cobotics Robotics Agility  
Networks Zero Failure, Zero Waste  
Product renewal Business Models  
Asset Management  
Automation

**Opportunities**



# SMART DIGITAL MANUFACTURING

## Focus Industries

**Pharmaceutical  
manufacturing**

**Electronics  
components**

**Industrial  
Machinery**

**Harbour  
equipment**

**Space**

**Aeropace  
/Defence**

**Automotive**

**Maritime**



# SMART DIGITAL MANUFACTURING



Thanks to its internationally competitive telecom and ICT sectors, Finland is one of the world leaders of innovation in the digital transformation of manufacturing, production and processing industries – going beyond industry 4.0.

Technologies and applications in *5G wireless connectivity, Artificial Intelligence, and Industrial IoT* have been developed in the Finnish innovation ecosystems for decades.



Base<sup>n</sup>



tieto

NOKIA



GE Healthcare



Etteplan

FINWE

Haltian

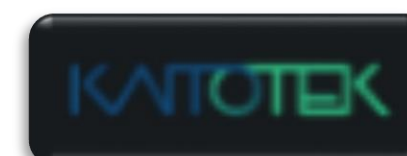
HOUSTON  
ANALYTICS



SOLITA

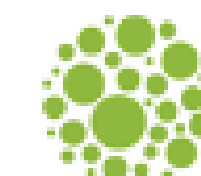
MEDIATEK

PONSSE



Quoppa

UNIS



WIREPAS  
Things connected - Naturally



# INTELLIGENT INDUSTRY ECOSYSTEMS in Finland

**DIM-ECC**

**5G TNF**



**Reboot IoT Factory**

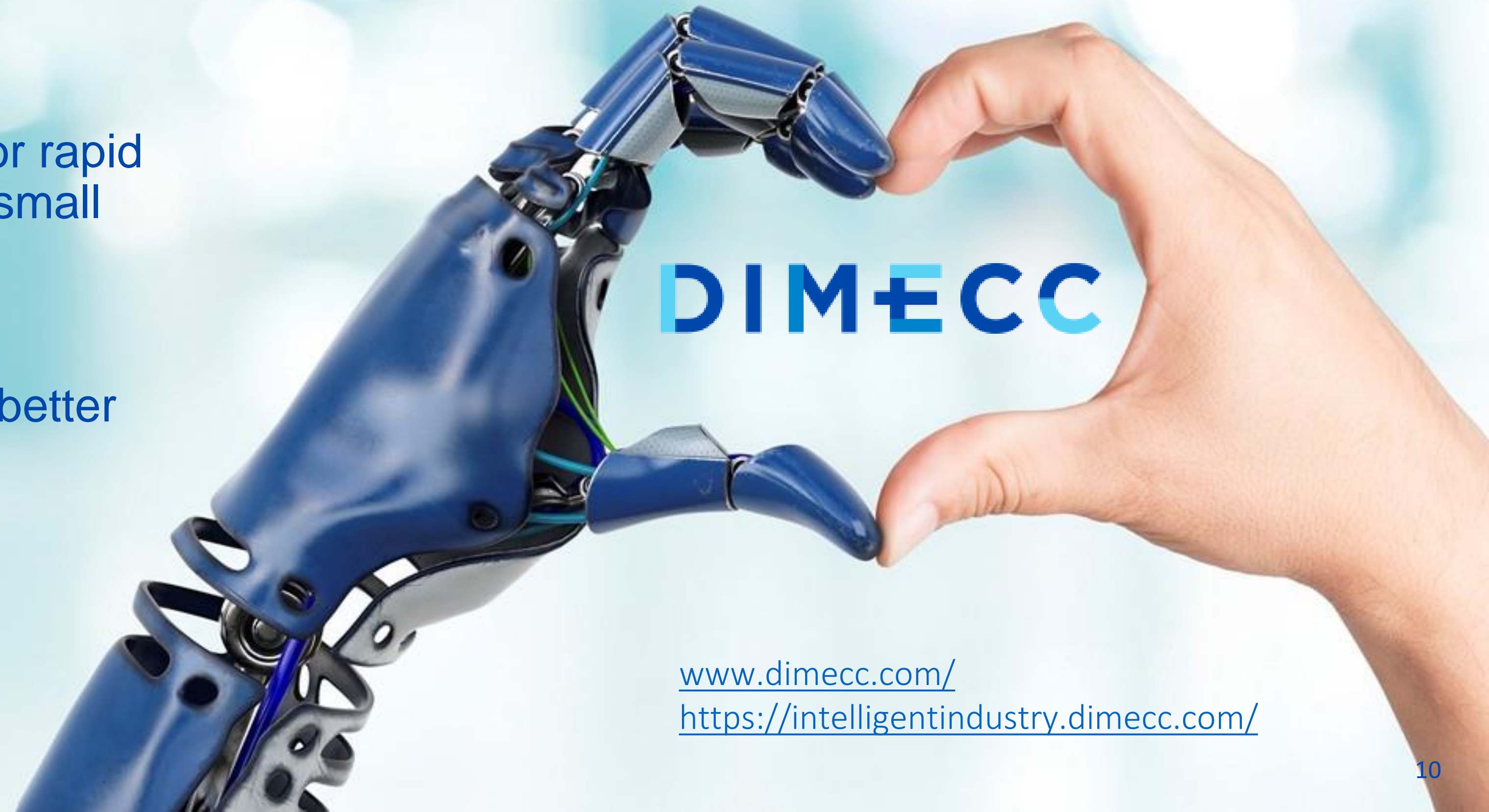


# DIMECC – Intelligent Industry

Leading industry-led co-creation ecosystem for boosting digital transformation and disruption aiming to **speed up time to market.**

Key services include, e.g.

- DIMECC Demobooster - service model for rapid commercialization with the aim to match small and large companies
- Demola - global and local organizations challenge university students to create a better future



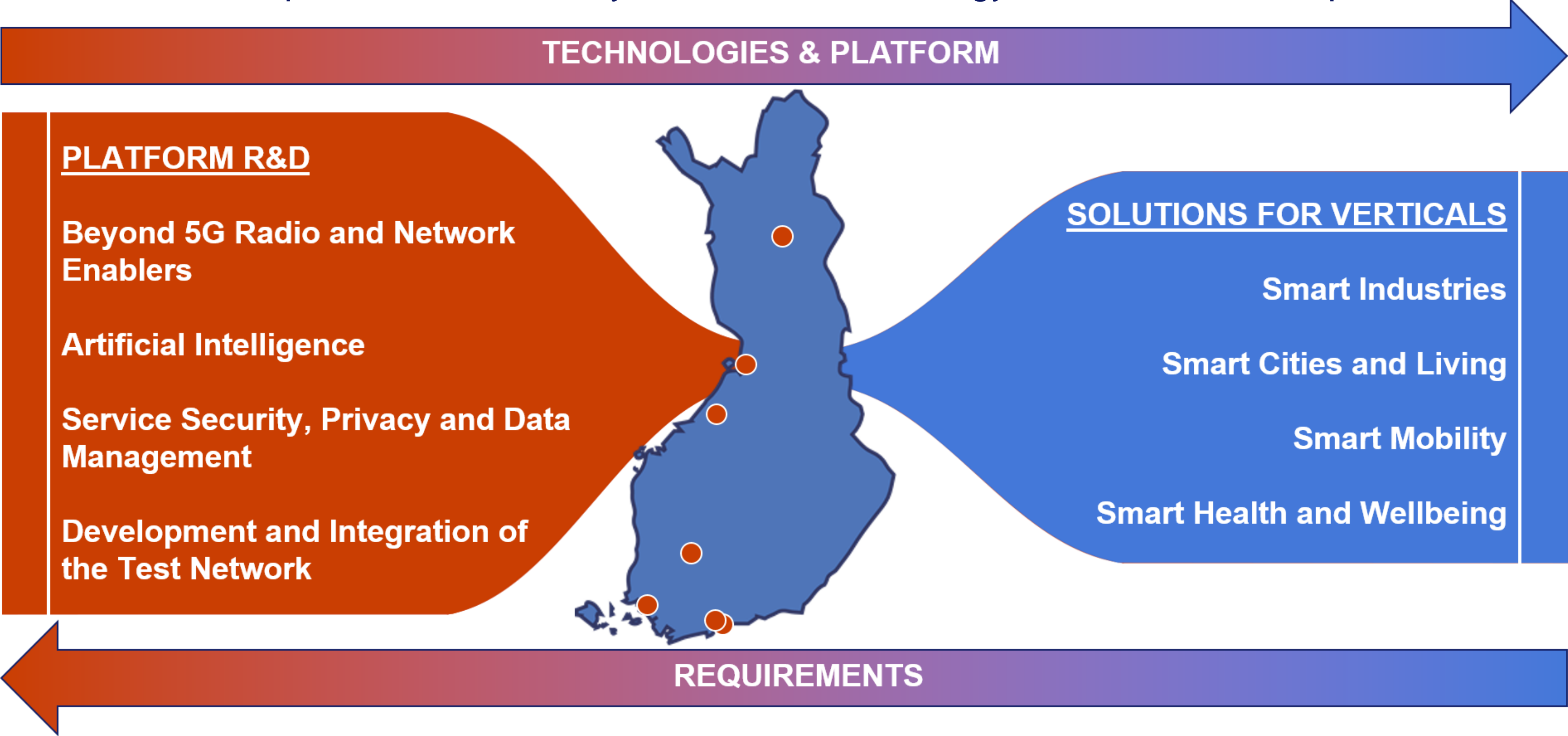
[www.dimecc.com/](http://www.dimecc.com/)

<https://intelligentindustry.dimecc.com/>



# 5G TEST NETWORK FINLAND Finland (5GTNF)

5GTNF - open innovation ecosystem for 5G technology and service development



[www.5gtnf.fi](http://www.5gtnf.fi)



# FINLAND TAKES DIGITALIZATION TO NEW HEIGHTS

## MOST ADVANCED 5G TEST NETWORK:

- Powerful test-bed for IoT, smart traffic, media, energy and eHealth solutions
- World's only commercially available 5G open test network

### ACCESSIBILITY

**OPEN 5G TEST  
NETWORK**

### NETWORK

**COOPERATION  
BETWEEN  
COMPANIES AND  
GOVERNMENT**

### SCOPE

**MOST EXTENSIVE  
SELECTION OF 5G  
TECHNOLOGIES**

### USABILITY

**ALREADY IN  
PILOT USE**

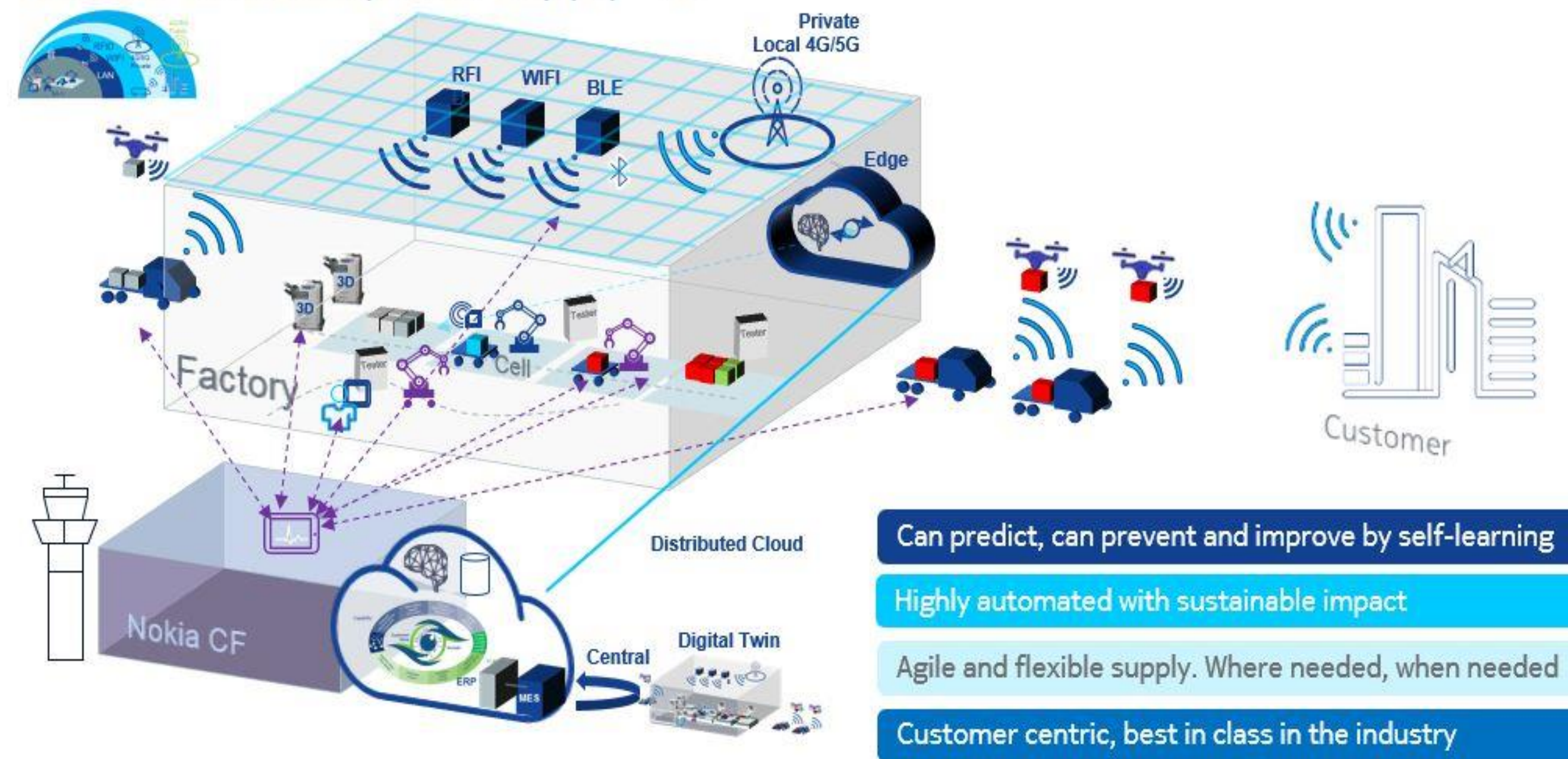


## Case – Nokia Conscious Factory

Nokia's 5G-connected [Conscious Factory](#) goes beyond the conventional manufacturing focused Industry 4.0, as it focusses on **overall supply chain**. Through the substantial number of connected objects and extremely low latency, 5G networks enable true **data-driven value systems**.

- All manufacturing and logistics assets in the factory are connected to make all transactions visible in real-time in *a control center*
- Entire factory is virtualized in a '*Digital Twin*' for improved transparency of data
  - Data from R&D, suppliers, production, and field performance are brought into a common system
- 5G connectivity enables also:
  - Improved automation and flexibility of robotization
  - Virtual Reality (VR) training and simulation in transfer to volume production around the world
  - Real-time [quality control](#) by video analytics
  - Small autonomous vehicles used in parts and components delivery

## Conscious factory and Supply 4.0



Can predict, can prevent and improve by self-learning

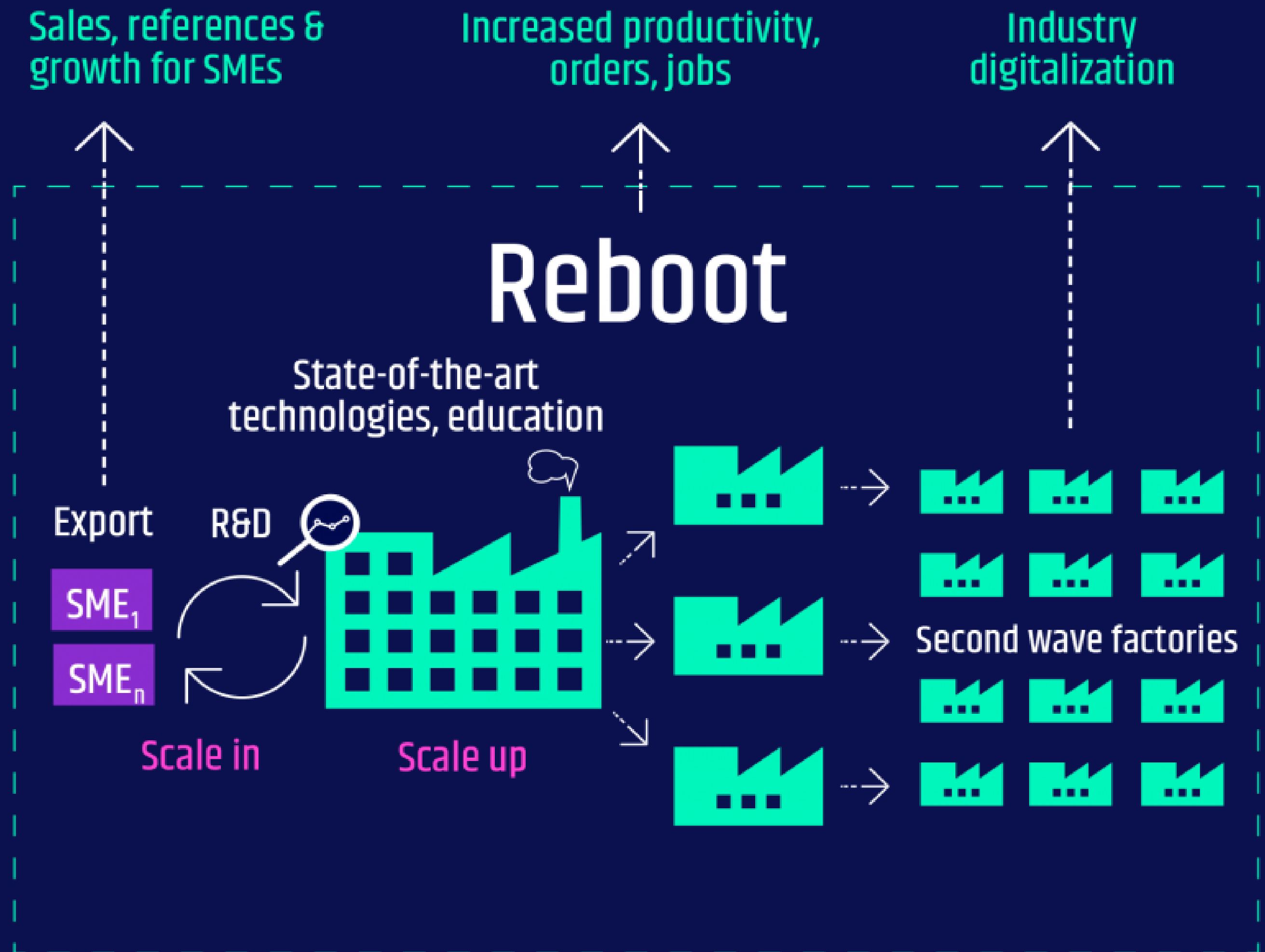
Highly automated with sustainable impact

Agile and flexible supply. Where needed, when needed

Customer centric, best in class in the industry



We bring together forerunner factories, IoT solution providers and top-class research organizations to revolutionize the competitiveness of manufacturing industry through digitalization





# Reboot IoT Factory

## Beyond Industry 4.0 - Together



Vaasa

Rauma

Turku

### APPLICATIONS AND SERVICES



### DEVICES AND R&D SOLUTIONS












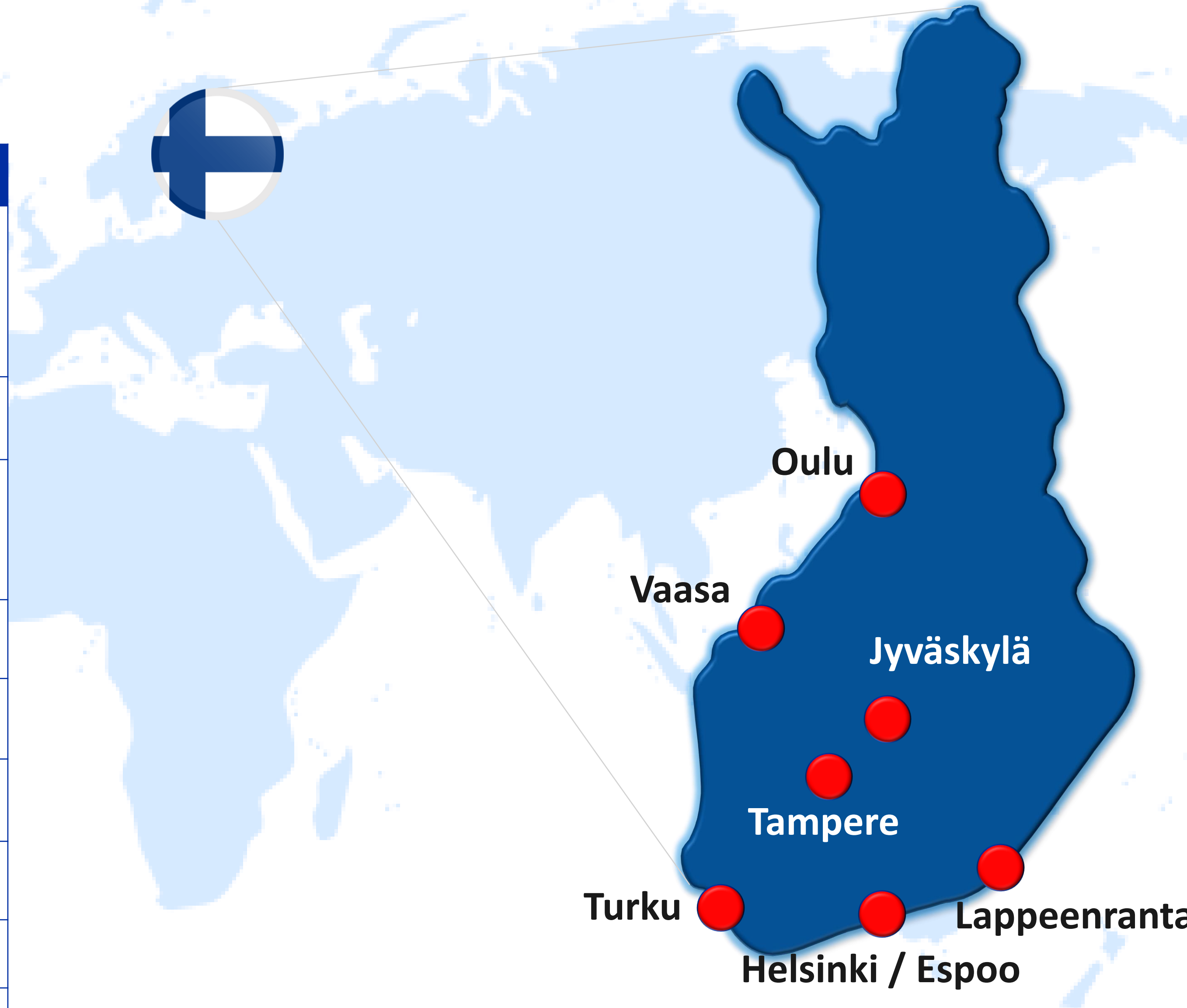
Allied ICT Finland      AVR      Fiif

**SUPERIOT**      SMACC      Analytics+

DIGITAL BOOST FOR FINNISH INDUSTRY



University	Essential research topics include
 <b>Aalto University</b>	<ul style="list-style-type: none"> <li>• 5G</li> <li>• Autonomous systems</li> <li>• Networked control</li> <li>• Digital transformation</li> <li>• Industrial internet</li> </ul>
 Lappeenranta University of Technology	<ul style="list-style-type: none"> <li>• Manufacturing 4.0</li> <li>• Smart Grid</li> </ul>
 <b>TAMPERE UNIVERSITY OF TECHNOLOGY</b>	<ul style="list-style-type: none"> <li>• 5G</li> <li>• Autonomous robots</li> <li>• Hydraulics</li> <li>• smart energy</li> </ul>
 HELSINGIN YLIOPISTO HELSINGFORS UNIVERSITET UNIVERSITY OF HELSINKI	<ul style="list-style-type: none"> <li>• Big data utilization</li> <li>• complex systems computing</li> </ul>
 UNIVERSITY OF JYVÄSKYLÄ & JYVÄSKYLÄN YLIOPISTO	<ul style="list-style-type: none"> <li>• Digital design</li> <li>• Industrial optimization</li> </ul>
 <b>UNIVERSITY OF OULU</b>	<ul style="list-style-type: none"> <li>• 5G, B5G, 6G</li> <li>• UbiComp</li> </ul>
 Turun yliopisto University of Turku	<ul style="list-style-type: none"> <li>• Futures studies</li> <li>• Digital port</li> </ul>
 University of Vaasa	<ul style="list-style-type: none"> <li>• Smart energy business</li> </ul>
	<ul style="list-style-type: none"> <li>• Smart factory</li> <li>• Industrial internet</li> </ul>





# THESE ASIAN COMPANIES ARE ALREADY IN FINLAND

ARM



FUJITSU



PowerVision

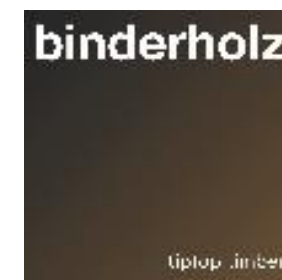


Tencent 腾讯

ZTE中兴



# THESE EUROPEAN COMPANIES ARE ALREADY IN FINLAND





# THESE AMERICAN COMPANIES ARE ALREADY IN FINLAND





FINLAND

**#1**

**COLLABORATE.  
INNOVATE.  
EXPERIMENT.  
BE ONE STEP AHEAD.  
WITH FINLAND.**



**BUSINESS  
FINLAND**



**KIITOS  
THANK YOU**