



5G for Industries

ITU Regional Forum for Europe on 5G Strategies, Policies, and Implementation 22-23 October 2020, Online Meeting

Silvana Apicella – Southern Europe Network Evolution Lead, Ericsson

The first 18 months of 5G in numbers





200

5G devices commercially available, almost doubled since end-May 2020*.

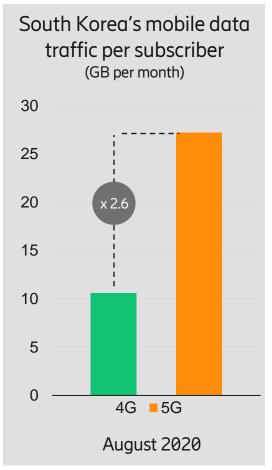
8.7M

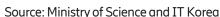
5G subscribers in South Korea by August 2020.

32% of traffic on 5G network

5G SA

5G stand alone in commercial use for wide area





on top of data and speeds, many Operators are starting to offer 5G Private Networks, B2B and B2B2X services to Enterprises, based on 5G capability

* Source: GSA

The first 18 months of 5G for Industries



1

700 billion

Industrial digitalization business potential by 2030 (USD) 2

5.2 billion

Cellular-IoT connections by the end of 2025, driven by Industry Digitalization 3

>100

Private 5G trials by the end of 2020

4

50+

Ericsson references for Industry 4.0

Should CSP address the 5G industrial opportunity?

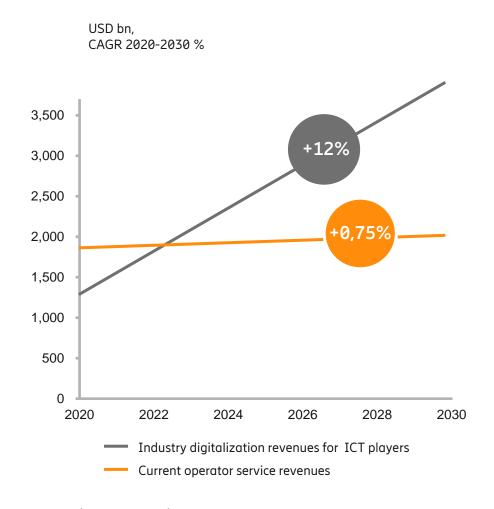
What will the 5G industrial ecosystem look like in 2025?

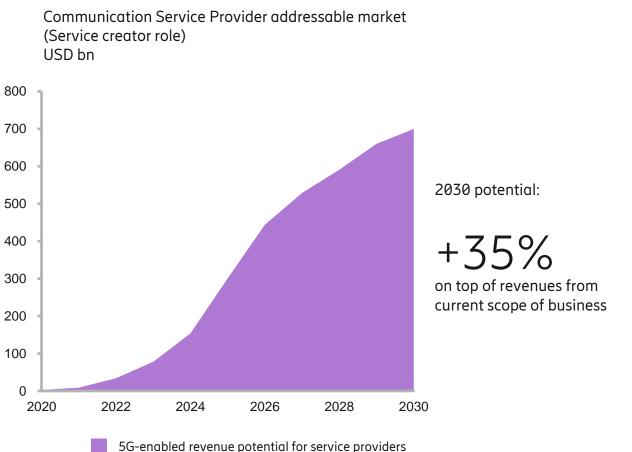
How will 5G for Industries become a commercialized service?

Which Industry use cases will be the most compelling for 5G?

5G Industry Digitalization Business Potential







Source: Ericsson and Arthur D. Little

Cellular IoT — Multiple use cases, Multiple Industries



Massive IoT

Extreme coverage Small data volumes Low cost devices

NB-IoT + Cat-M

Broadband IoT

High data rates Large data volumes Low latency (best effort)

LTE, NR

Critical IoT

Ultra-low latency Ultra-reliable data delivery **Bounded latencies**

NR

Industrial automation IoT

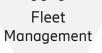
Ethernet protocols integration Time sensitive networking Clock synchronization service

NR

















Traffic Safety & Control





Collaborative robotics



Industry Digitalization with Cellular Connectivity

Entertainment Automotive Railways Manufacturing











Smart city Ports Oil & gas Media production





Cellular IoT — 3GPP Standardization Status



2016 2017 2018 2020 2019 Massive IoT 3GPP Rel 13: 3GPP Rel 14 & 15: 3GPP Rel 15+: 5G Introduction of Massive IoT **Enhancements of Massive IoT** Massive IoT and co-Mobility, voice, positioning, load existence with NR Coverage, Battery life, Low & capacity, service optimization Complexity devices **Broadband IoT** 3GPP Rel 13+: 3GPP Rel 15+: LTE Advanced Pro NR & IoT Items Work for new use cases beyond Smartphones (C-V2X, Drones communications, Private Networks, Public Safety, Multi-Gigabit LTE) Critical IoT 3GPP Rel 15: URLLC 3GPP Rel 16+: Ethernet Industrial automation IoT based protocols, TSN, etc

Why Cellular IoT for Industry?



Flexible Deployment



- Fully Isolated at enterprise premises (Dedicated Network, Stand-Alone)
- Fully Integrated into **Mobile Operator** Network (E2E Network Slice)
- Voice, Data, Video, IoT

Capacity & Coverage & Mobility



- Private licensed spectrum and/or **Public National** Spectrum
- Local and/or Wide Areas
- Various spectrum and bandwidth
- Interoperability with Public Mobile **Networks**

Low Latency and Reliability



- URLLC
- Licensed Spectrum
- Quality of Service

Security



- 3GPP based security
- Secure device authentication

Thriving Ecosystem and Future Proof



- Evolving ecosystem
- Aligned with 3GPP 5G evolution





Private Networks — Which Spectrum?



Countries where spectrum for industries is debated or local spectrum is assigned



Mid band

Chile, China, Finland, France, Germany, Japan, Luxembourg, Netherlands, Norway, Poland, Slovenia, Sweden, UK, US

High band, mmW

Australia, Finland, Germany, Hong Kong, Italy, Japan, Malaysia, Netherlands, Sweden, UK

MNO Shared Spectrum

- Short term vs long term expectations
- SLAs fulfillment: i.e. production stop or safety issues
- Hesitant to be "locked-in" to MNOs, Trust.

Unlicensed Spectrum

- Useful in many applications, but it can't offer full URLLC.
- Risk for costly outages

New Regulated Spectrum

- **CBRS**
- Driven by e.g."5G ACIA". Getting traction in e.g. EU

Leased Spectrum

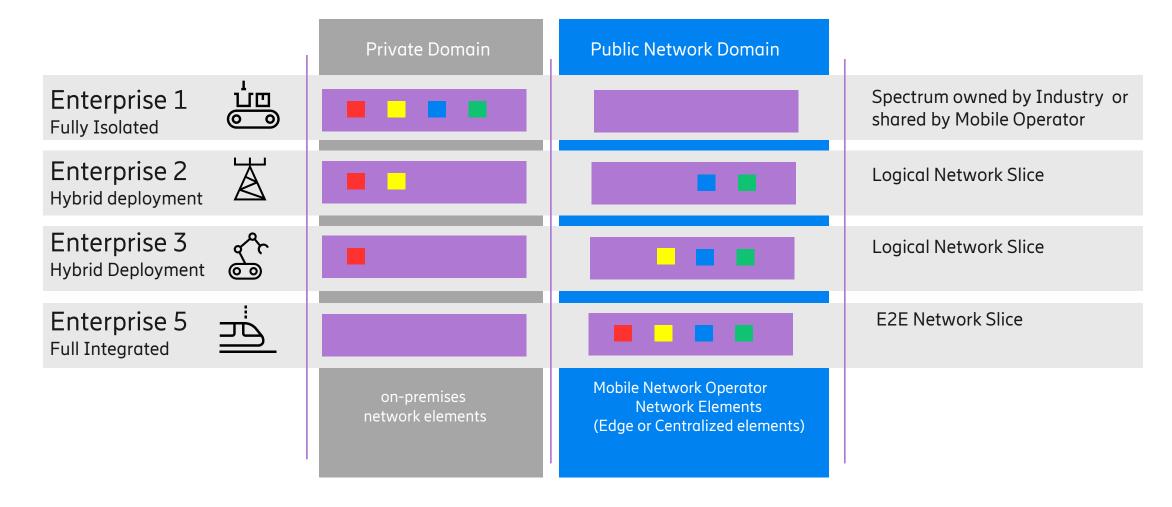
- Not an established market
- New rules & business case
- No benefit from MNO knowhow and expertise

Dedicated Spectrum for Industry: "Local" and "Real-Estate" Principles should preferably apply Ericsson White Paper: https://www.ericsson.com/en/reports-and-papers/white-papers/5g-spectrum-for-local-industrial-networks

Private Networks — Deployment Flexibility

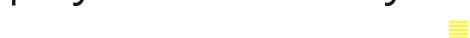


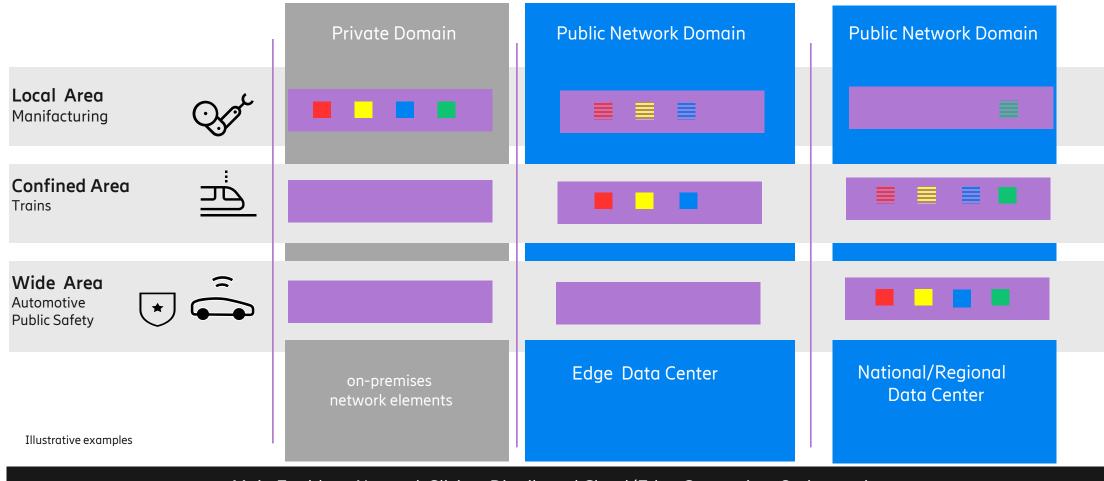
Leveraging existing Mobile Operators assets and operations



Private Networks — Deployment Flexibility



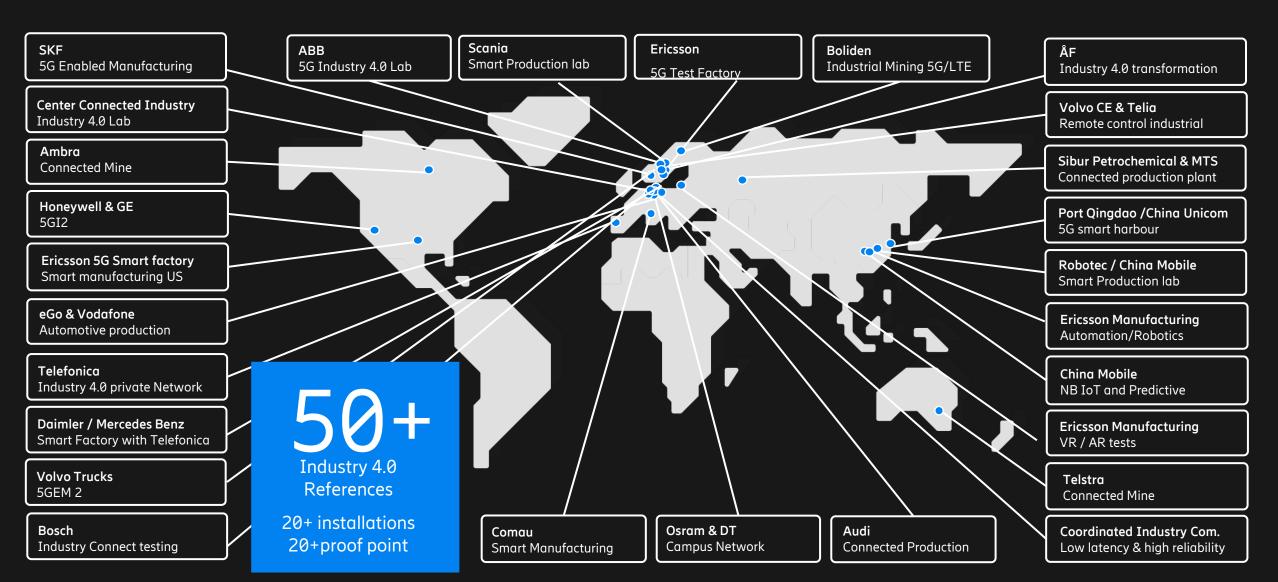




Main Enablers: Network Slicing, Distributed Cloud/Edge Computing, Orchestration

To cope with different critical needs

Industry 4.0 at Ericsson

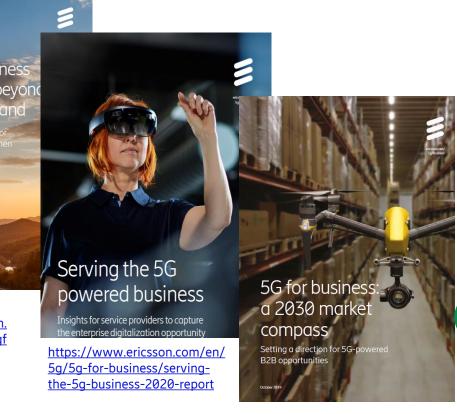


Ericsson Studies and some References





https://www.ericsson. com/en/5g/forms/5gf orbusiness-2019report



https://www.ericsson.com/en/ 5g/5g-for-business/5g-forbusiness-a-2030-marketcompass

Real-time media

Virtual reality

Output

Outpu

https://www.ericsson. com/en/blog/2017/5 /its-all-green-flagsfor-5g-at-theindianapolis-motorspeedway

Quality Life

Augmented reality

https://www.ericsso n.com/en/news/201 8/3/5g-augmentedreality

Mobility automation Cooperative maneuvers Autonomous truck



https://5gcar.eu/



https://www.ericsson.co m/en/pressreleases/2018/11/ericsso n-einride-and-teliapower-sustainable-selfdriving-trucks-with-5g

Remote control

Remote bus driving



https://www.youtube. com/watch?v=IPyzGT D5FtM



Remote mining

https://www.youtub e.com/watch?v=C4I 0UKZ-FCc&t=7s

Industrial control

Manufacturing jet engines

Manufacturing vehicles



https://www.youtu be.com/watch?v=X ZWC ttighM



https://www.ericsso n.com/en/networks/ cases/acceleratefactory-automationwith-5g-urllc

