

2019 DIGIWORLD SPRING SESSION



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April 17, 2019

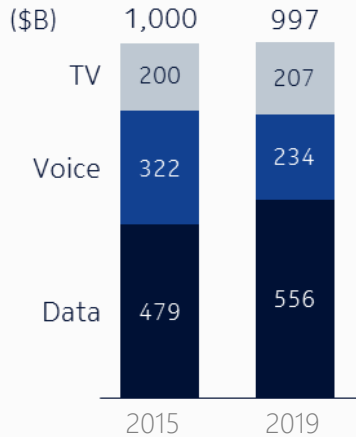


Telco Market Opportunity and New Value Creation

Consumers

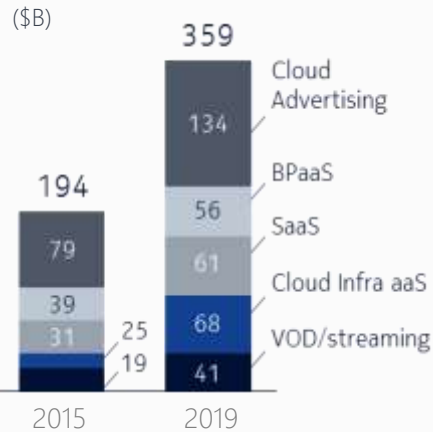
Traditional Market flat

Traditional CSP service revenues in mature markets* are flat



* Western Europe, Canada, USA, Japan, South Korea, Singapore, Australia, and NZ Source: Gartner

Cloud Services growth but limited value captured by CSPs

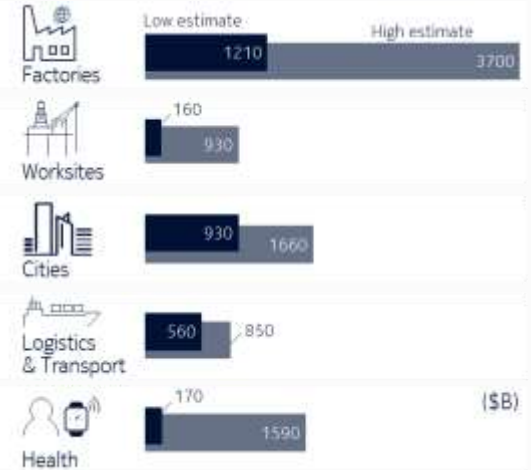


Source: Gartner
BPaaS = Business Processes as a Service

Industry

New DSP markets

offering significant revenue expansion



Estimated 2025 value creation potential of the IoT - McKinsey Global Institute

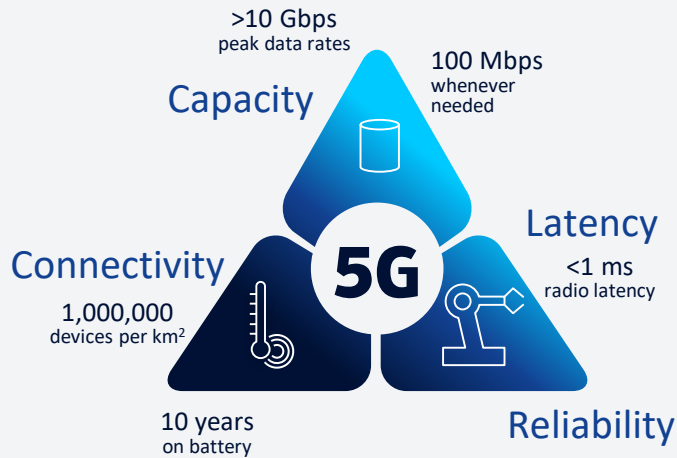
x 3

MUST DO

MUST BECOME

5G is a giant leap powered by a set of new technologies

Requirements



New 5G technology building blocks

New spectrum options

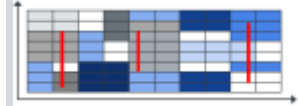


<3 GHz, 3-6 GHz, cm/mmWave

Massive MIMO & beamforming



Flexible air interface



Multi-connectivity



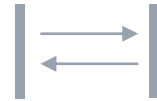
Aggregation and duplication

Cloud native & network slicing



Centralized and distributed

Connectionless communication



Efficient massive IoT

5G is a giant leap - mandatory to make the 4th industrial revolution happen

Endless possibilities

New technologies

New business case

New revolution



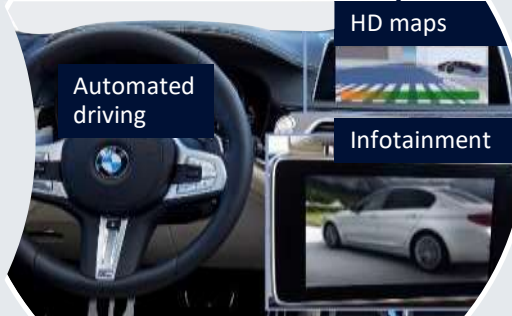
Smart sea port



Traffic lights management, data processing from mobile sensors and virtual reality



V2X connectivity



Different automotive and public safety slices running over the same network



Industrial automation

Ultra-reliable, low-latency connectivity



Coupling advanced interactive robots with wireless perimeter intrusion detection

5G market traction – the market is accelerating

North America
deploying now
Commercial deployments
Q4 2018
28 & 39GHz main bands
600Mhz one operator
FCC put 3.7-4.2GHz on
agenda
Cable operators in trials

Latin America
– early trials

Europe - trialling
5G spectrum auctions
since mid 2017
Focus on 3.5GHz band
First launches in late
2018 – led by Sweden,
Finland and Italy
Several 5G pilots

- MISE in Italy
- Hamburg Harbour
- 5GPPP – Horizon 2020
- FIFA 2018

MEA – **early trials**
Targeting initial 5G
deployments for
2H 2018 and
early 2019

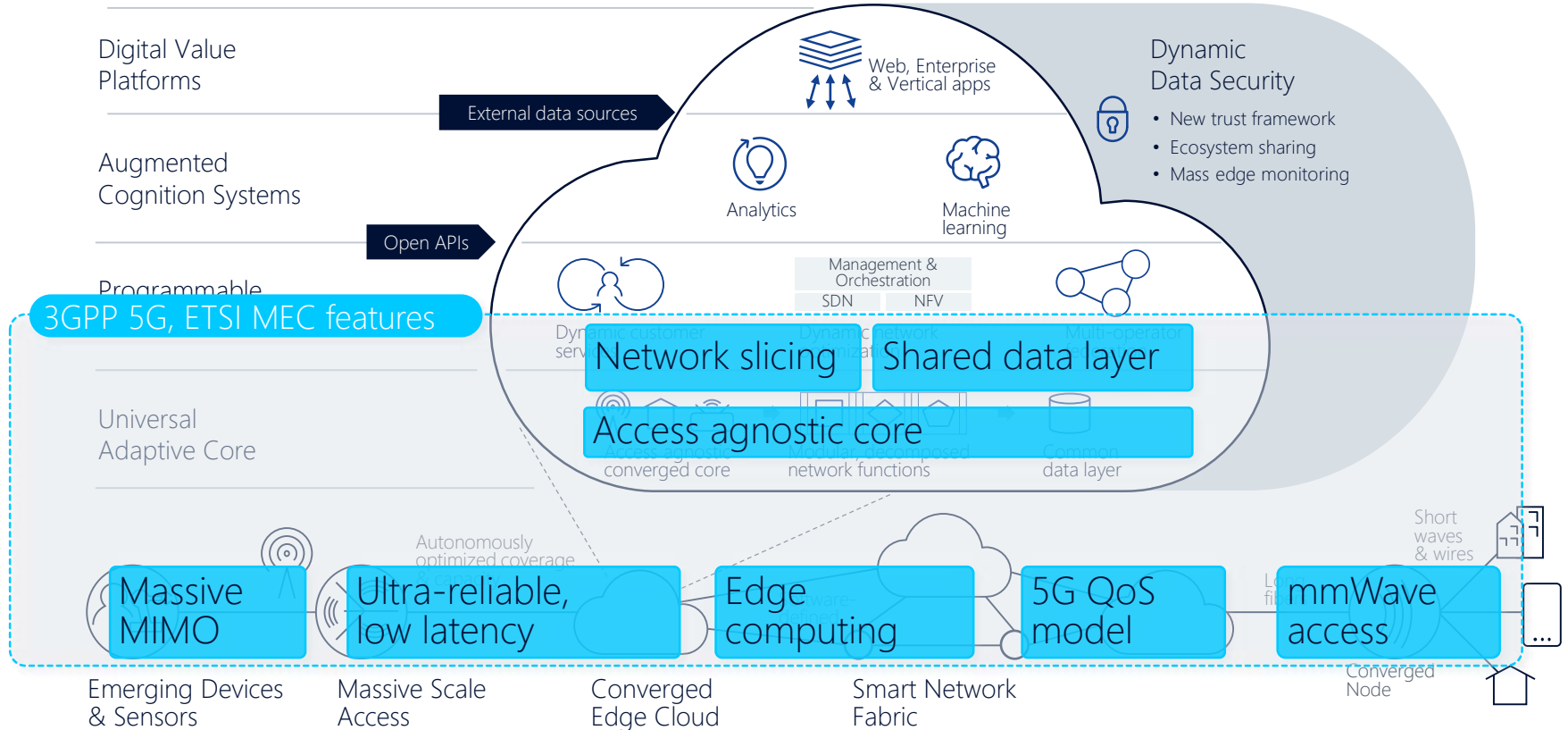
- UAE Expo 2020
- Qatar FIFA 2022
- Saudi Vision 2030

Korea deploying 2018
5G spectrum licencing done
5G RFPs - Vendor selection ongoing
Commercialization – rollout late-2018,
launch April 2019

China – huge scale
trials
Government is
pushing 5G readiness
NDRC large scale
trials
Accelerated CSP field
trials to target 2H2019
commercial readiness

Japan deploying 2019
5G tests in 2018
Wide-scale field trial
2019 ; DoCoMo pilot
operation Sept. 2019
5G IoT trials
CSP refocus to
verticals
5G Commercial launch
in 2020 with Tokyo
Summer Olympics

Nokia Bell Labs' Future X vision set the direction for 3GPP's 5G architecture



Nokia 5G commercial references in key markets

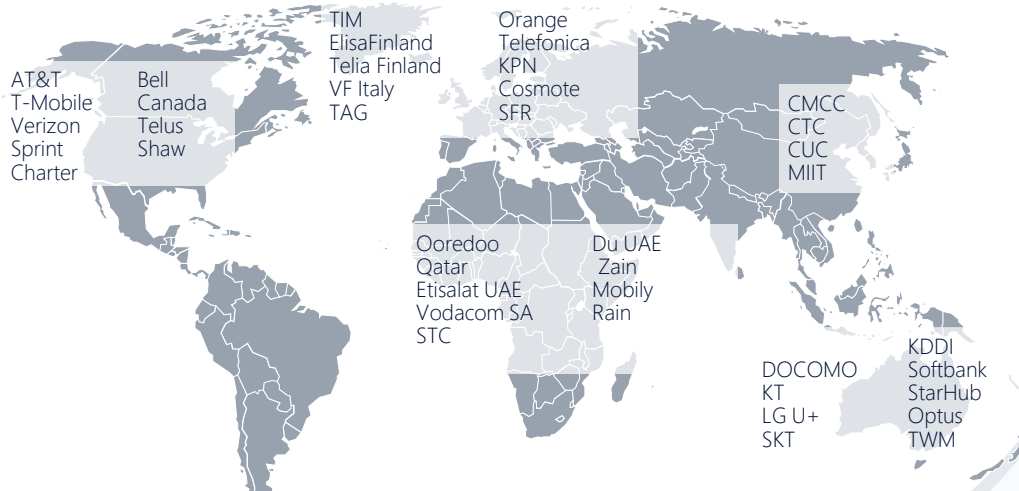
Market leading momentum



Nokia speed of innovation with the wider 5G ecosystem

Driving the deployment of 5G

Nokia 5G trials and contracts



Collaborating with leading chipset and device manufacturers



3GPP compliant 5G smartphones expected to be available by 1H 2019

Piloting with leading verticals

5G smart sea port / airport



5G V2X connectivity



Smart power grids



5G industrial automation

