Internet of Things

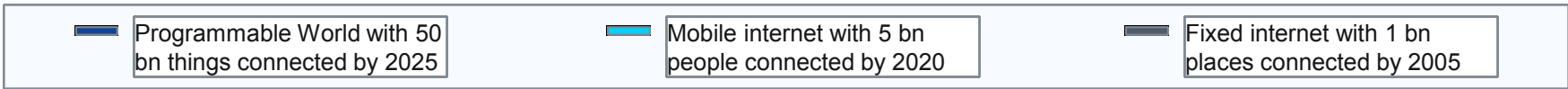## Towards a more collaborative model
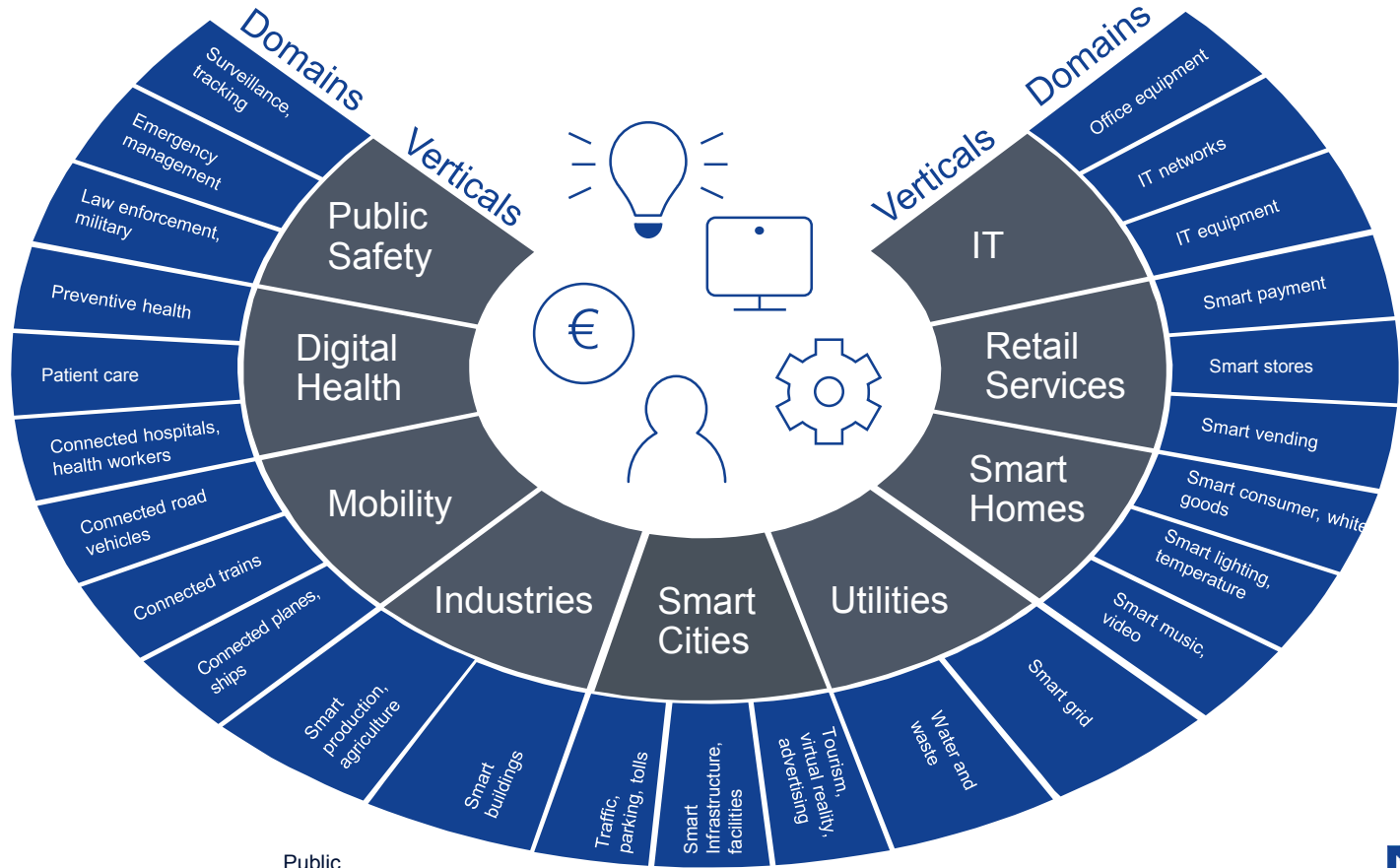
- Brahim GHRIBI
- Head of Government Relations MEA
- NOKIA

NOKIA

Past has been about connecting people, the future is about connecting things Improving personal life, optimizing business processes

Programmable things ③

Connected things ②

Many things ①

People

Places
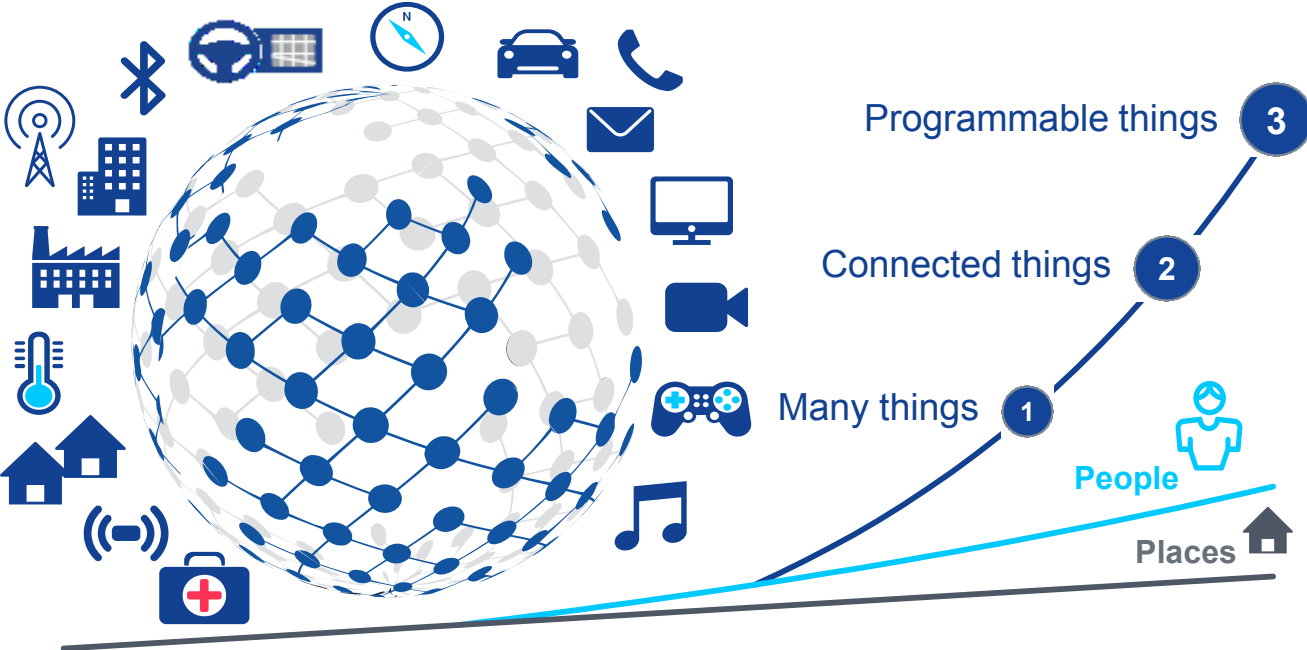
The **Internet of things** (**IoT**) is the inter-networking of physical devices, (also referred to as "connected devices" and smart devices"), vehicles, buildings, and other items - embedded with electronics, software, sensors, and network connectivity that enable these objects to collect and exchange data

| Programmable World with 50 bn things connected by 2025 | Mobile internet with 5 bn people connected by 2020 | Fixed internet with 1 bn places connected by 2005 |

The Internet of Things has a transformational impact on all industries, re-shaping business models, value chains, and entire industry configurations

Domains (left): Surveillance, tracking; Emergency management; Law enforcement, military; Preventive health; Patient care; Connected hospitals, health workers; Connected road vehicles; Connected trains; Connected planes, ships; Smart production, agriculture; Smart buildings

Verticals (left): Public Safety; Digital Health; Mobility; Industries

Verticals (bottom/right): Smart Cities; Utilities; Smart Homes; Retail Services; IT

Domains (bottom): Traffic, parking, tolls; Smart Infrastructure, facilities; Tourism, virtual reality, advertising; Water and waste; Smart grid

Domains (right): Smart music, video; Smart lighting, temperature; Smart consumer, white goods; Smart vending; Smart stores; Smart payment; IT equipment; IT networks; Office equipment

NOKIA

To fully capitalize the Digital Value & Internet of Things opportunity,

five main challenges have to be addressed

Robust connectivity: availability, coverage, latency.

1

Standardization: Standard connectivity for billions of things

2

Interoperability and open interfaces: Enabling platforms to talk with each other

3

Privacy and security: Prevent malware injection and data misuse

4

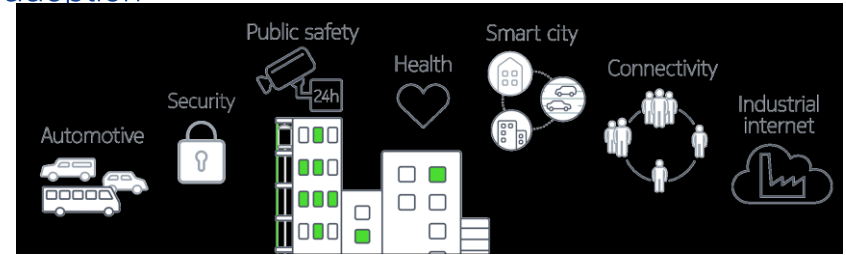Domain knowledge: Deep, vertical-specific insights

5

NOKIA

A layered and horizontal approach to enable IOT mass adoption

Applications & ecosystem

Platform

Infrastructure

Vertical Point Solutions are expensive
- High Cost for integration
- Duplication of effort
- Underutilized resources
- No Economies of Scale

Horizontal approach drives down cost
- Adopt Best Practices
- Streamline Operations & Reduce Costs
- Mix and Match devices and Applications

NOKIA

Urbanization is putting increased pressure on cities

2%
of Earth's land taken up by cities

55%
of all people live in cities

70%
of the global population will live in cities by 2050

41
mega-cities of at least 10 million inhabitants by 2030

76%
of global energy use and carbon emissions are from cities

$1 trillion
estimated cost of air pollution in OECD countries due to road transport emissions

+15%
average crime rate when population of a city doubles

65%
of global GDP growth generated by 600 largest cities by 2025

"Managing urban areas has become one of the most important development challenges of the 21st century. Our success or failure in building sustainable cities will be a major factor in the success of the post-2015 UN development agenda."

John Wilmoth
Director, UN DESA Population Division

Sources: UN DESA, Intergovernmental Panel on Climate Change, IDC, Organisation for Economic Co-operation and Development, McKinsey Global Institute

NOKIA

Connecting Multiple Verticals Together For A Truly Smart City

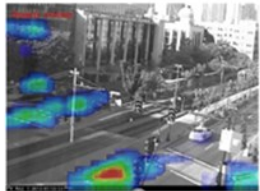Tourism growth through immersive mixed reality and 3D mapping

Loss prevention through asset management

Sustainability through energy management
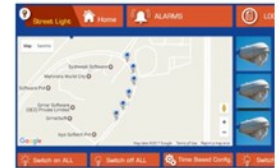
Efficiency through waste asset management

Citizen Safety through video analytics and AR public safety updates.

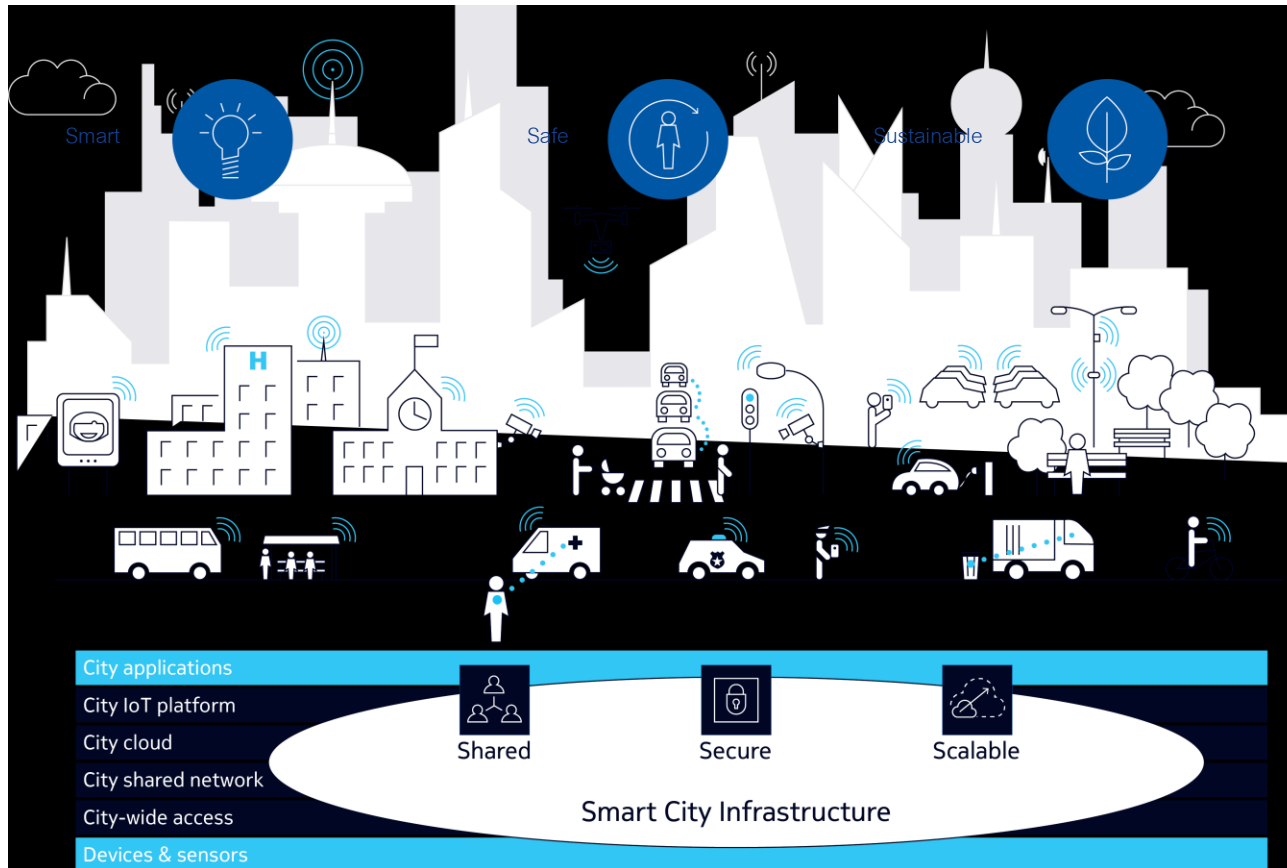Education improvements and cost reductions through VR interactive training

Improved health and cost reductions through real-time remote telemedicine and tele-care robots
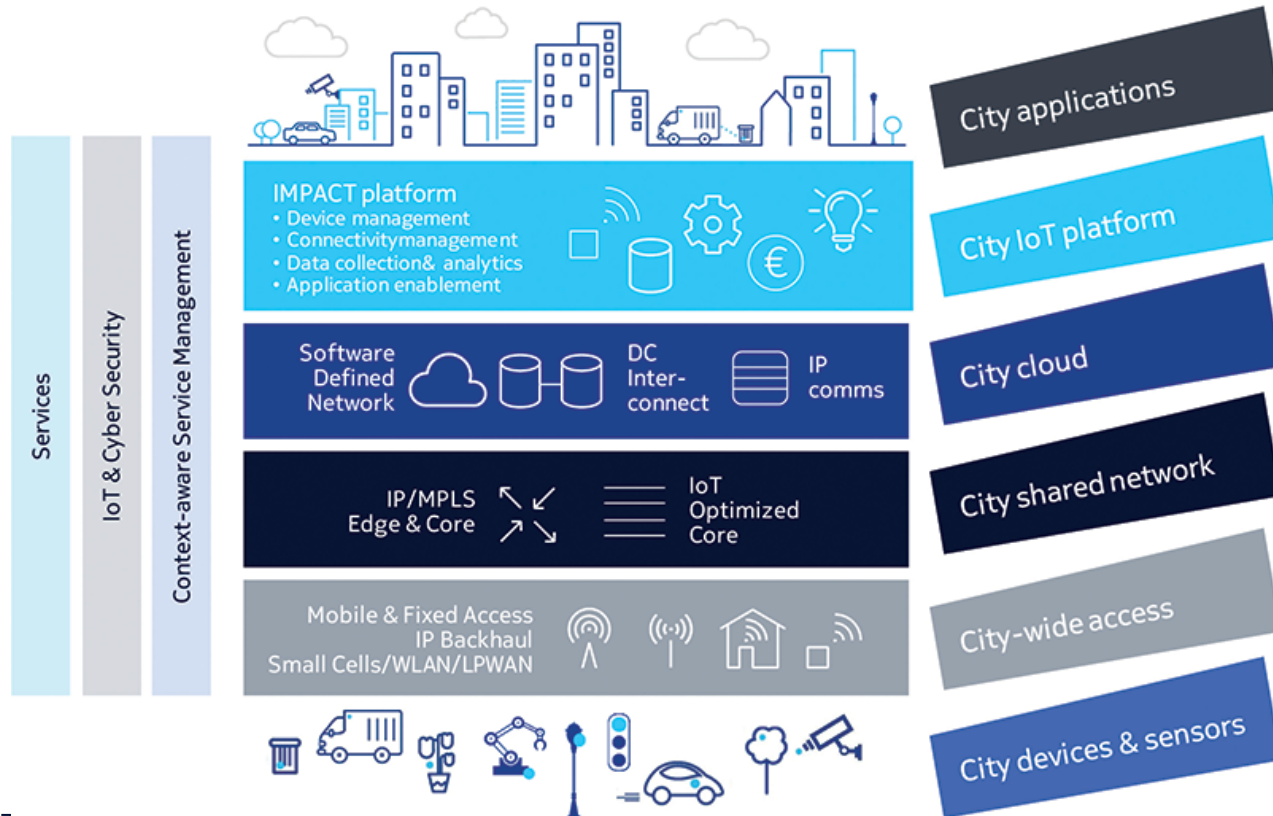
Citizen Services & Safety through lamp post asset management

Creating smart, safe and sustainable cities with the Internet of Things

© Nokia 2016, 2017   Confidential

NOKIA

The building blocks of smart, safe and sustainable cities

Shared, secure and scalable technologies

Vertical bars (left):
- Services
- IoT & Cyber Security
- Context-aware Service Management

IMPACT platform
- Device management
- Connectivity management
- Data collection & analytics
- Application enablement

Software Defined Network — DC Inter-connect — IP comms

IP/MPLS Edge & Core — IoT Optimized Core

Mobile & Fixed Access IP Backhaul Small Cells/WLAN/LPWAN

Right-side labels:
- City applications
- City IoT platform
- City cloud
- City shared network
- City-wide access
- City devices & sensors

NOKIA

Three routes to becoming a smart city

Key findings from the Smart City Playbook

Anchor
Cities add working applications in series, starting with an "anchor" application that addresses specific needs. Others are then added as priorities dictate.
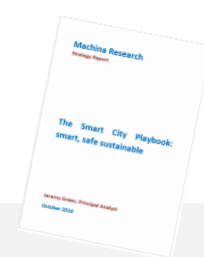
Platform
Cities focus on deploying the network infrastructure or platform first so that a number of different applications can be delivered later.

Beta city
Cities experiment with multiple applications without a plan for bringing them to full operational deployment, often prioritizing hands-on experience over short- or medium-term benefits.

NOKIA

100+ member companies spanning a wide range of industries to collaborate, test, and unleash the business potential of the Internet of Things.
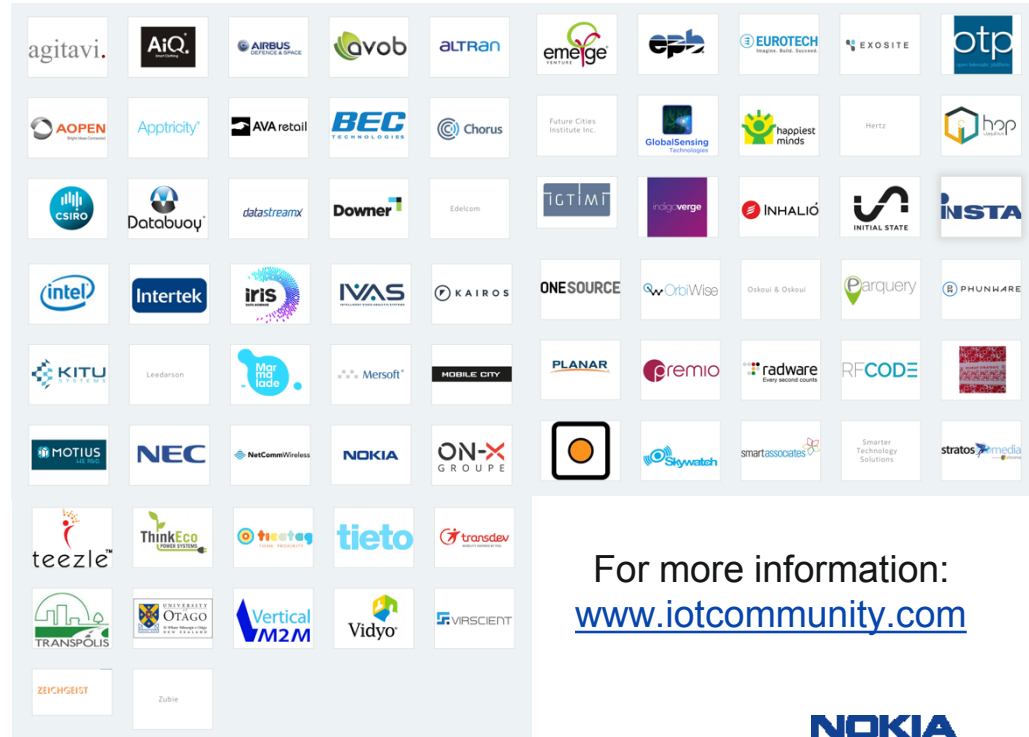
Innovation Ecosystem

Agile Prototyping

Concept Showcase

Market Trials

For more information:
www.iotcommunity.com

NOKIA