



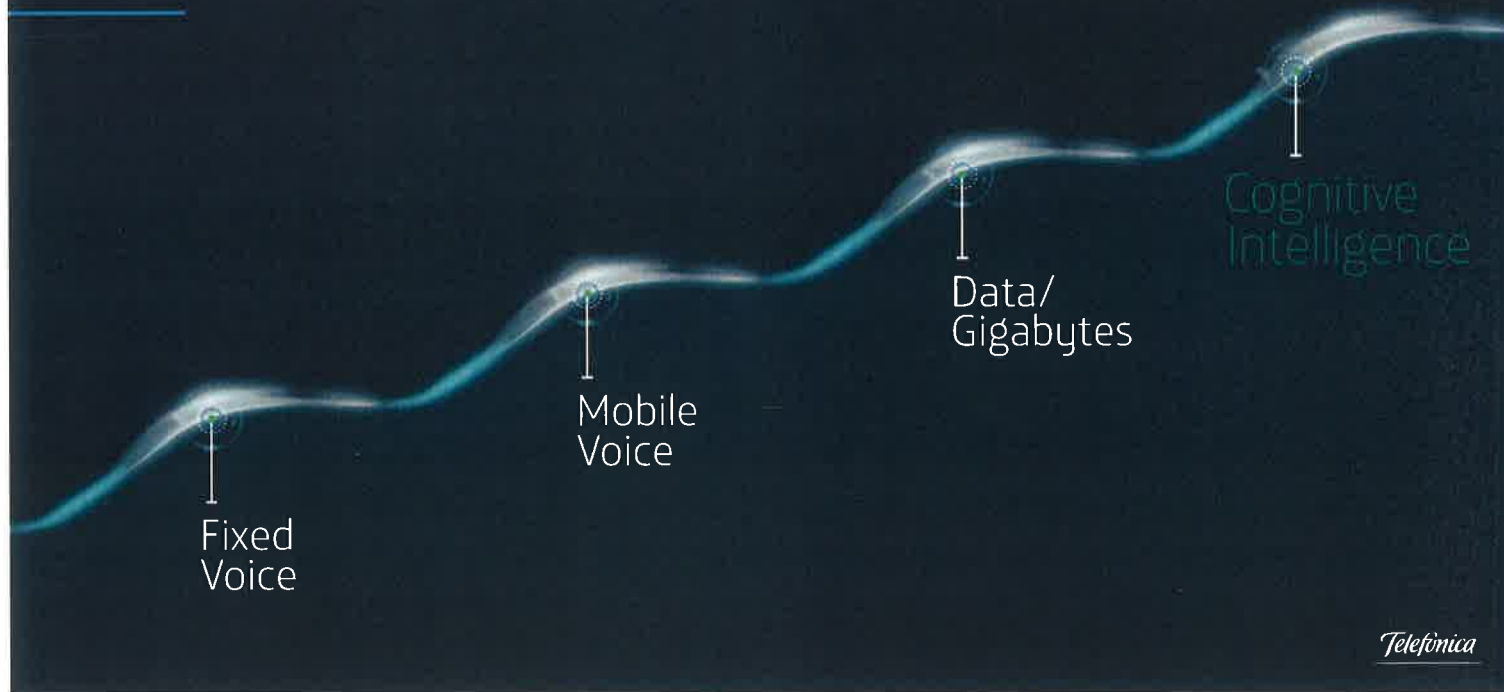
## MWC: traditional way to approach **Telco's**

XaaS    GPON    Smartphon  
FullStack    FTTH    DocSis 3.0    Cloud  
SDN    EPC    IoT    3GPP    VoLTE    VoIP  
GFAST    Smart Meters    VoWiFi  
FTTx    Cloud of clouds    SRVCC  
NFV    5G    4k video    LTE

# Exponential disruption



# Exponential disruption



# Cognitive Intelligence

◦ A *new*  
**customer**  
relationship

Telefónica

Our  
**path**

Telefónica

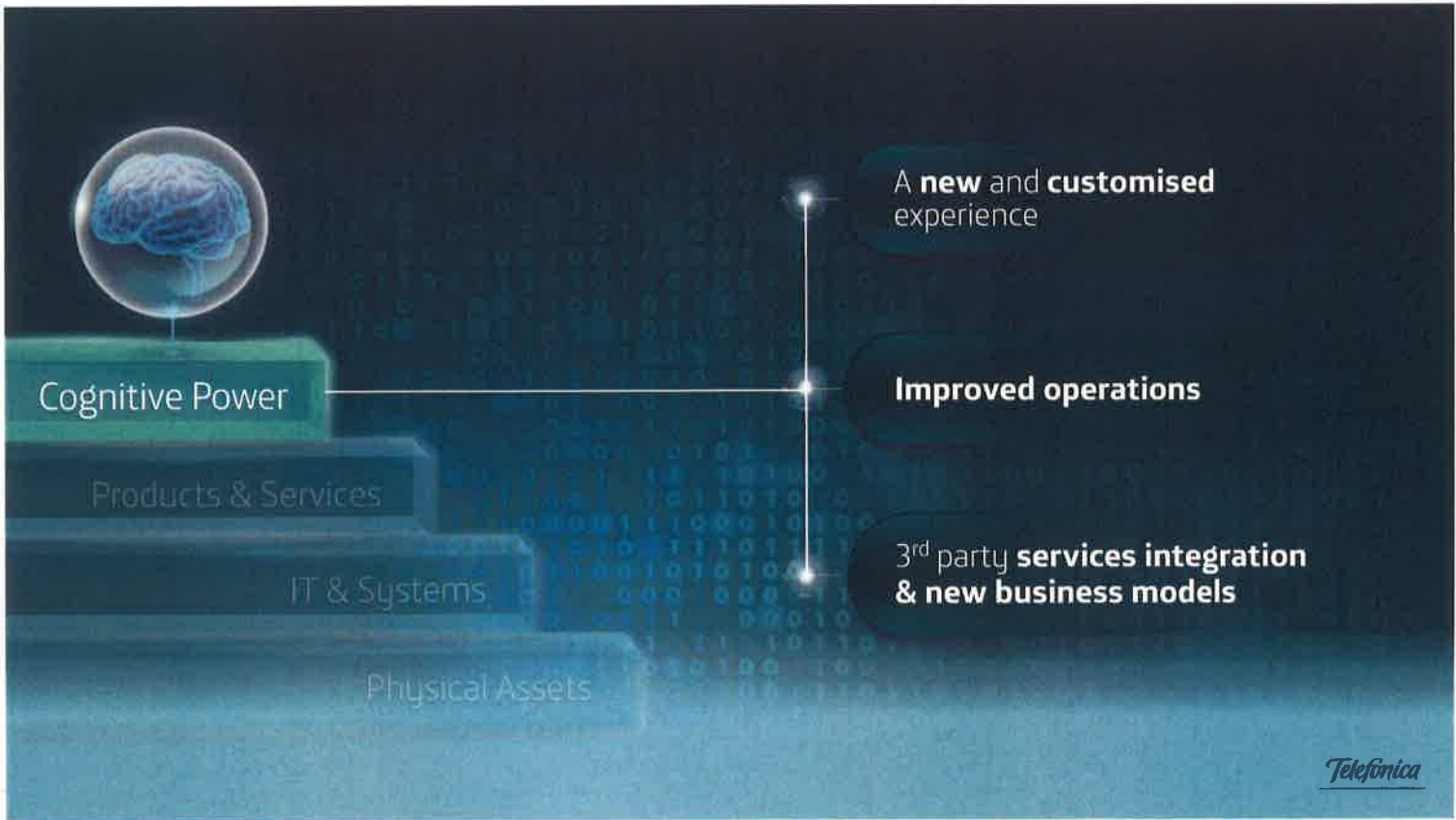


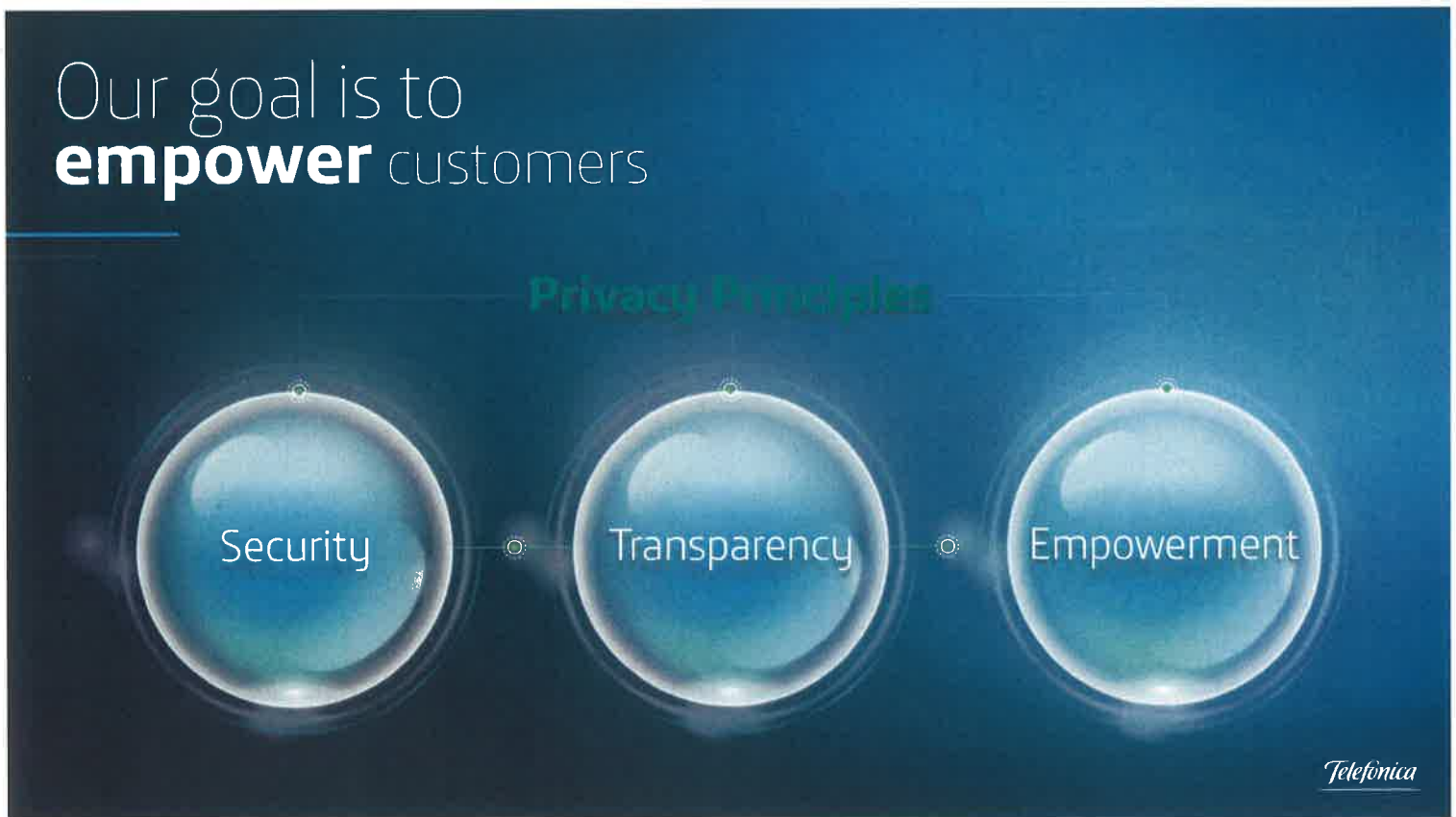














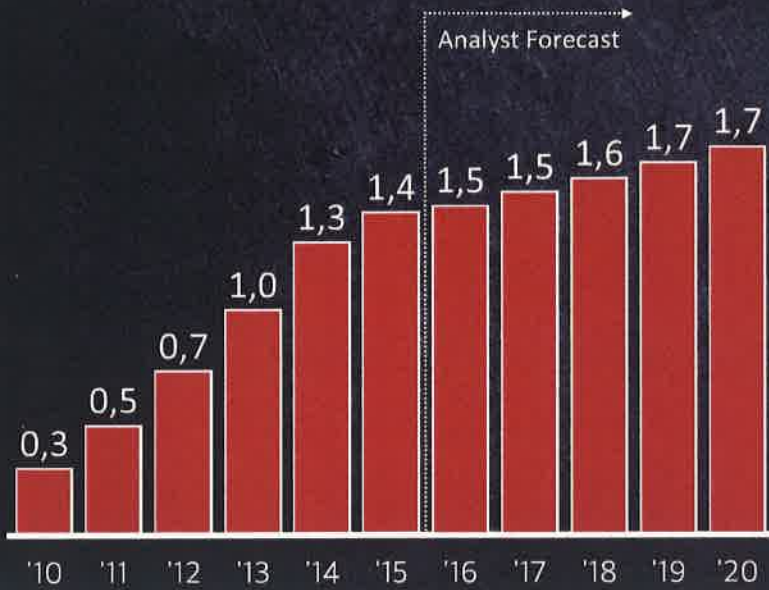




Inconvenient Truth

# Smartphone Shipments

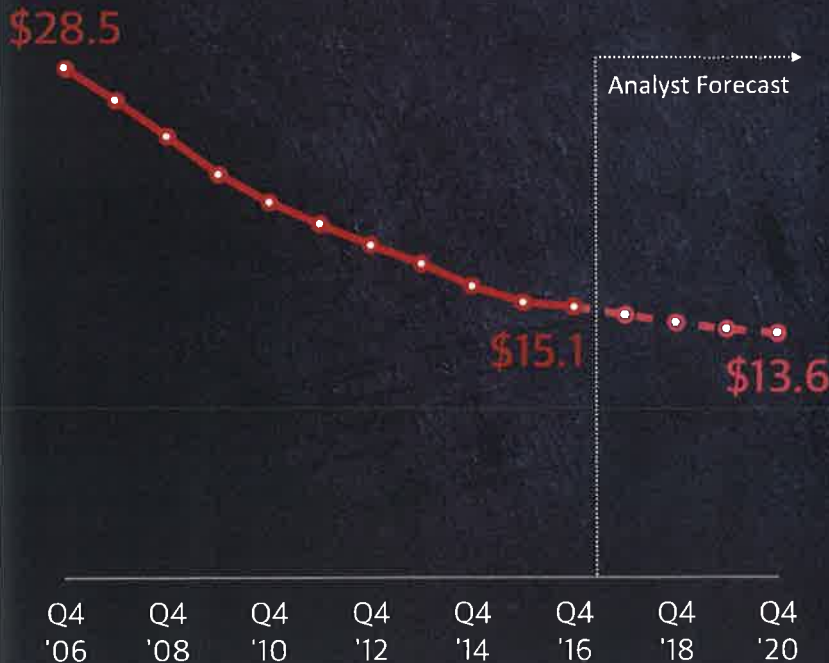
(Bn)



**CAGR**  
**37%** → **4%**  
 (2010-2015) (2016E-2020E)

Source: IDC

# ARPU (blended)



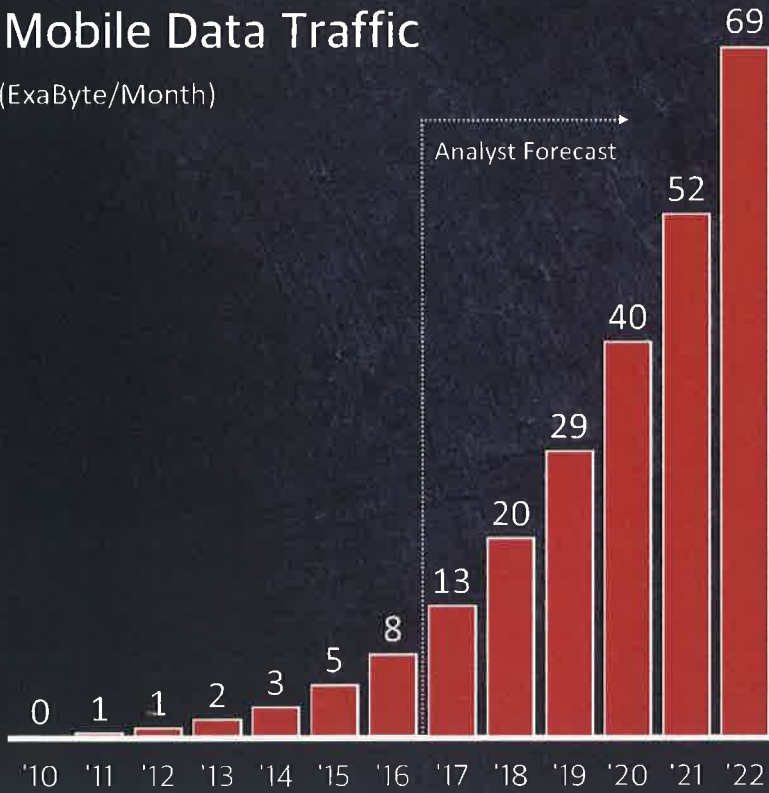
**47% Down**  
 (2006-2016)

Source: GSMA



# Mobile Data Traffic

(ExaByte/Month)



# 8x

(2016E-2022E)

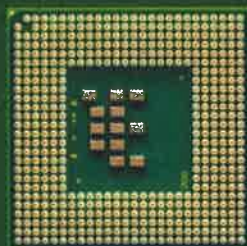
## Requires more CAPEX

Source: Ericsson

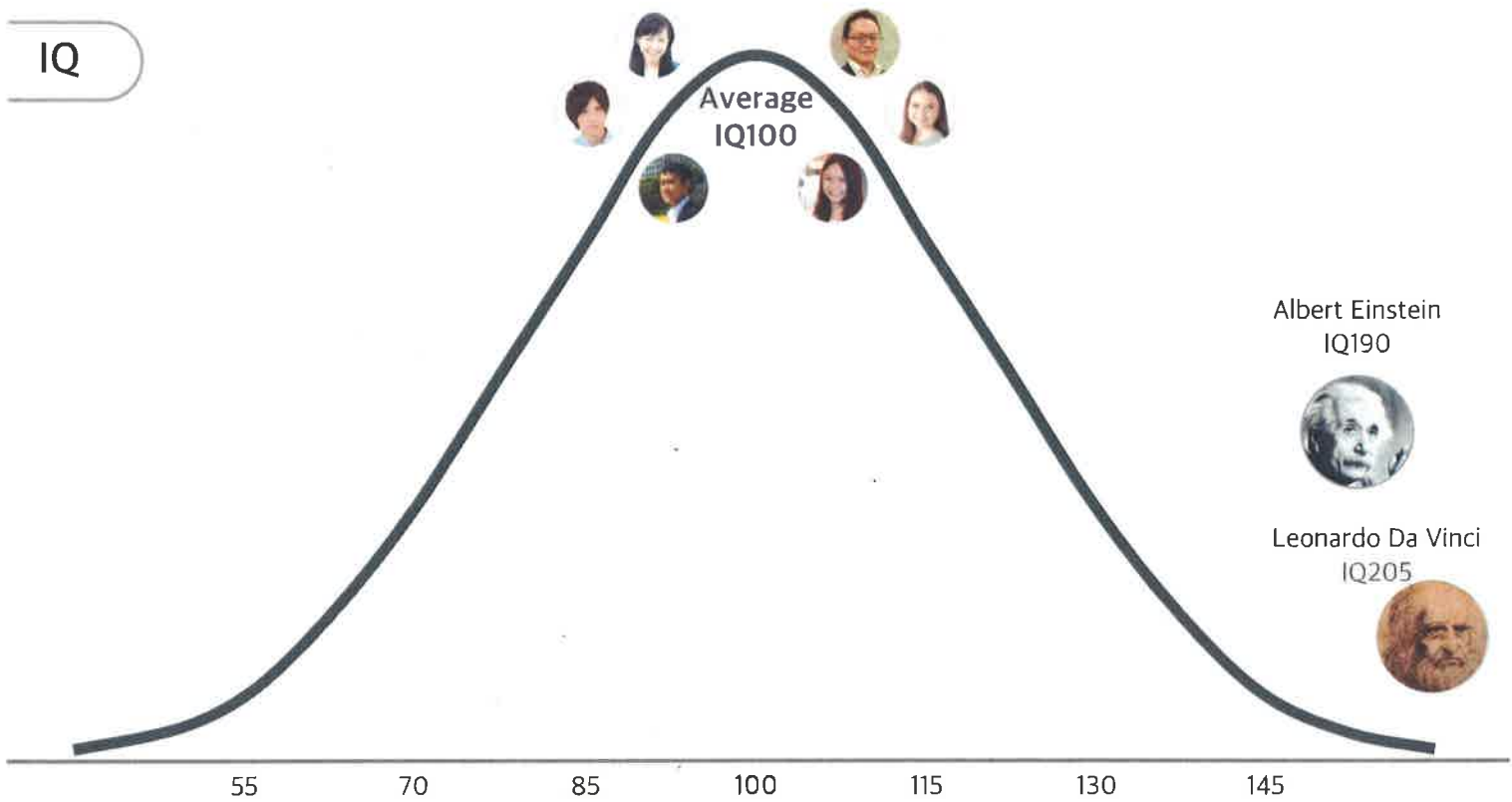
# Future

# SINGULARITY

The day computers exceed  
the human brain



IQ



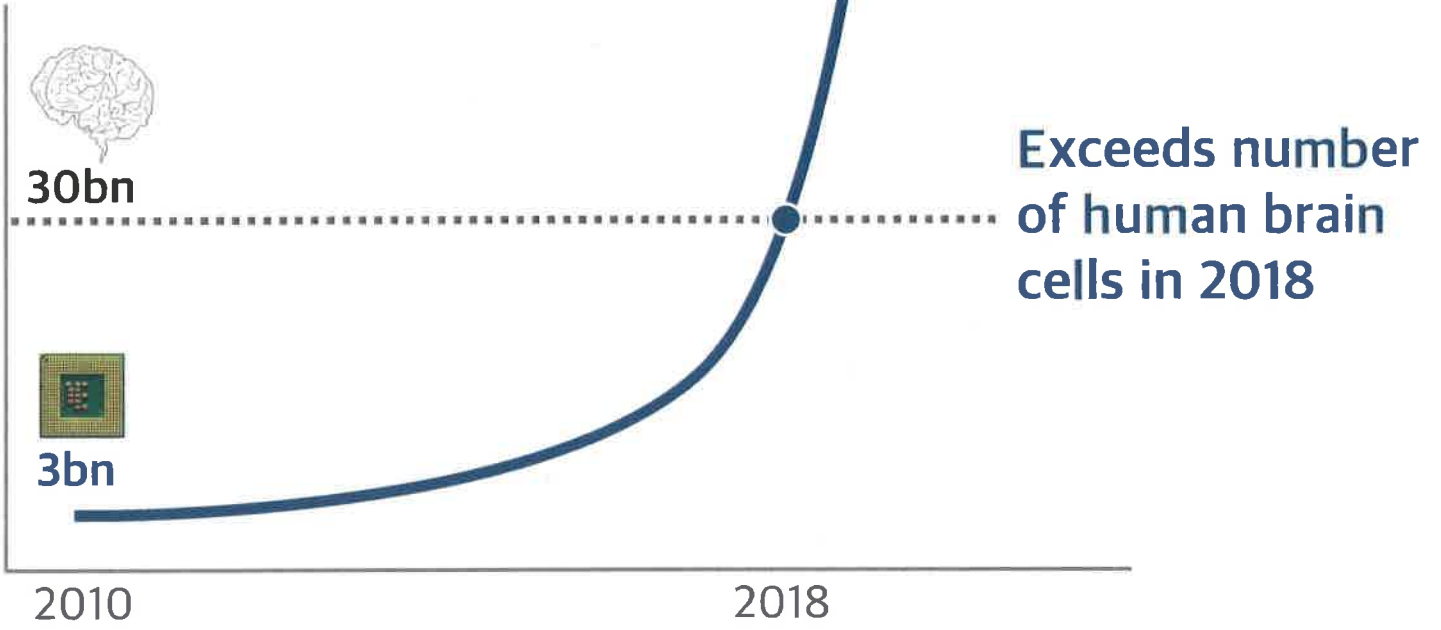
IQ





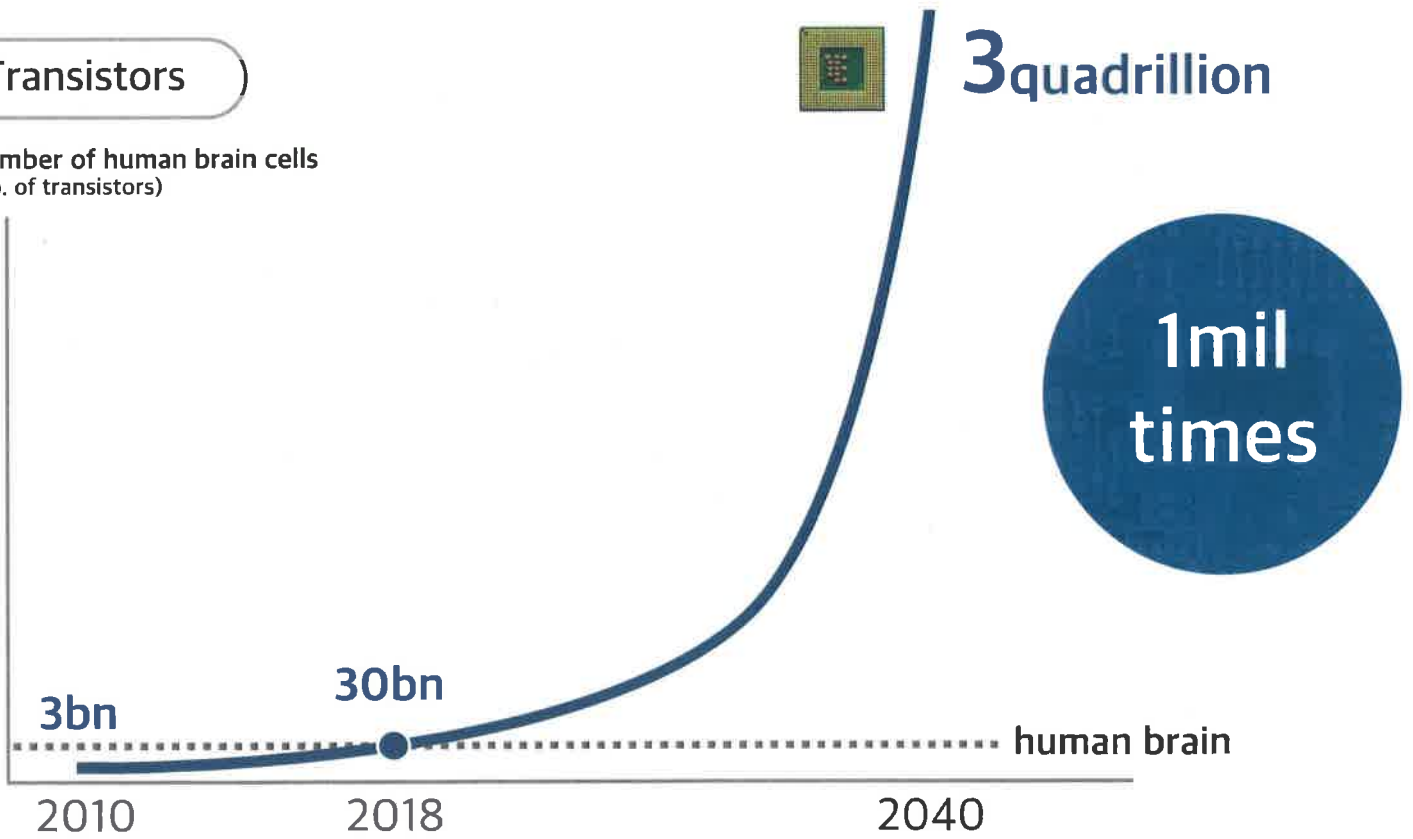
## Transistors

Number of human brain cells  
(No. of transistors)

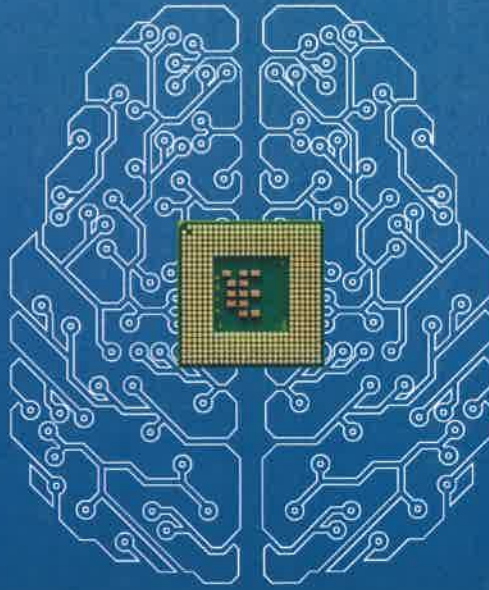


## Transistors

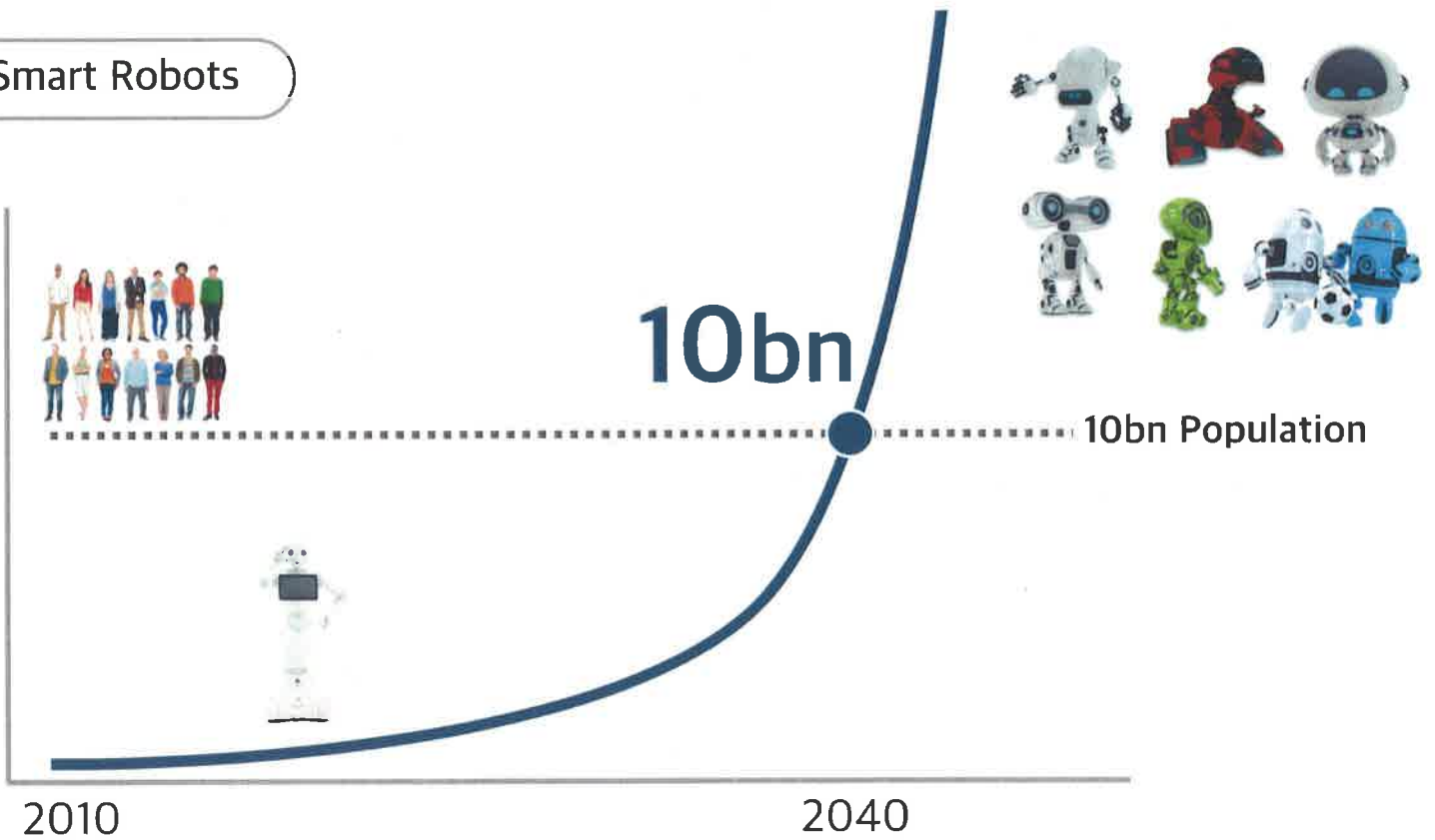
Number of human brain cells  
(No. of transistors)



# Birth of Super-Intelligence



Smart Robots



# IoT (Internet of Things)

# 1trillion

## 100 things per person (2035)

2 devices per person (2010)

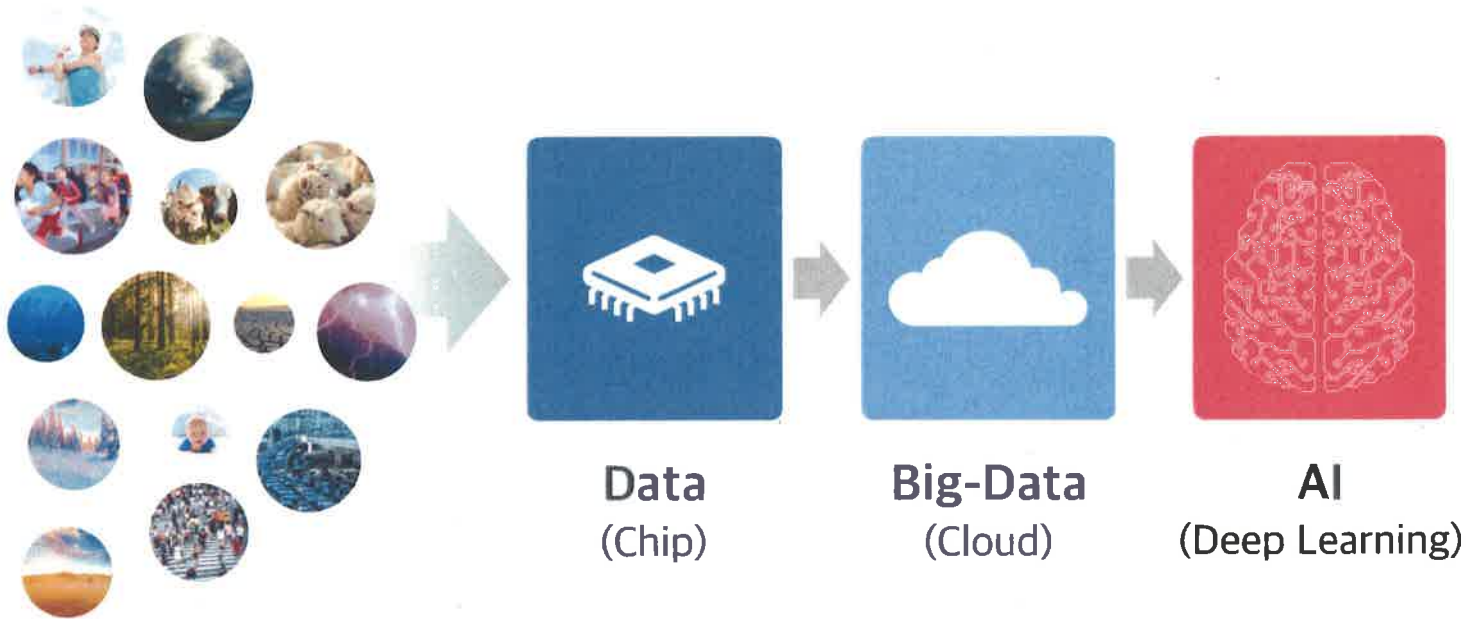


Note: Created by SoftBank Corp. based on data by Cisco IBSG, 2011





## Huge Value Generated by IoT



## Huge Value Generated by IoT (Automotive)



Autonomous driving eliminates traffic accidents

## Huge Value Generated by IoT (Healthcare)



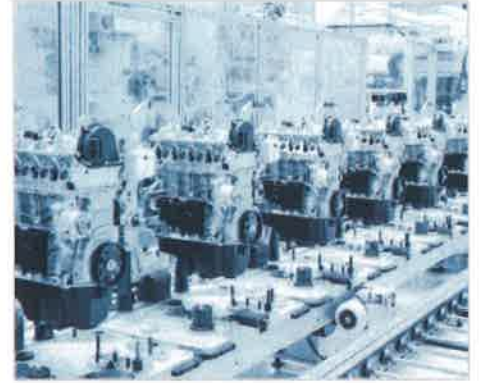
Constant monitoring prevents diseases

## Huge Value Generated by IoT (Consumer Service)



Detailed analysis greatly improves services

## Huge Value Generated by IoT (Industrial)



Demand forecast improves profitability

Key Technology to IoT Era

# ARM<sup>®</sup>

## Key Technology to IoT Era



## Key Technology to IoT Era

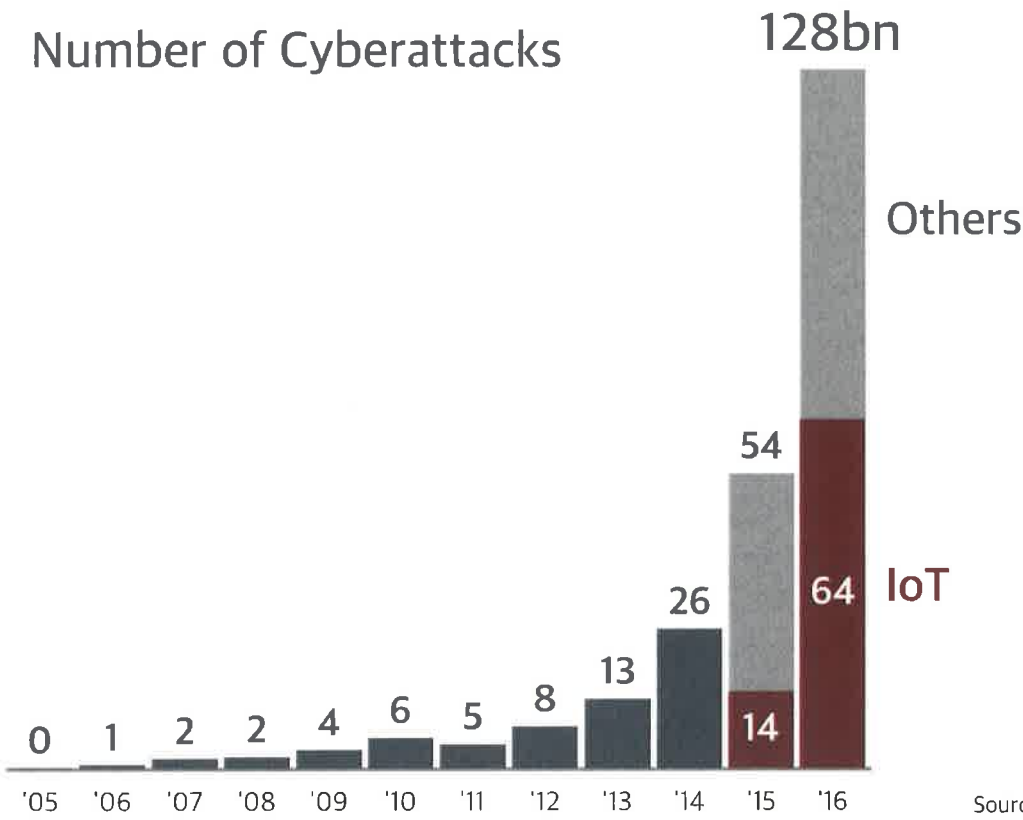






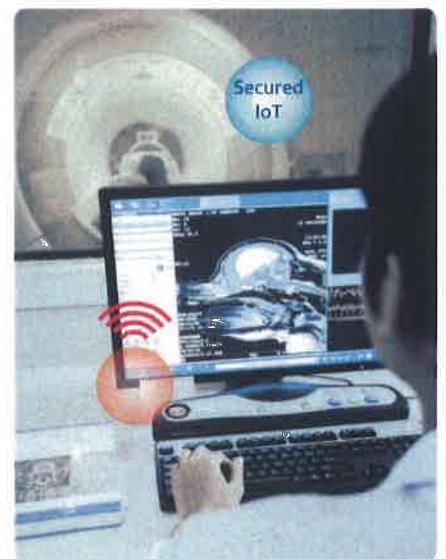
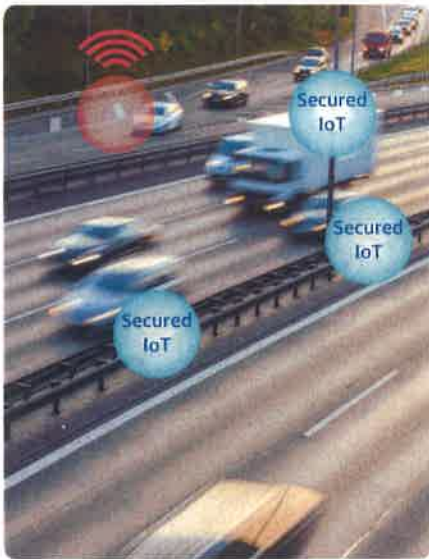
Japan

# Number of Cyberattacks

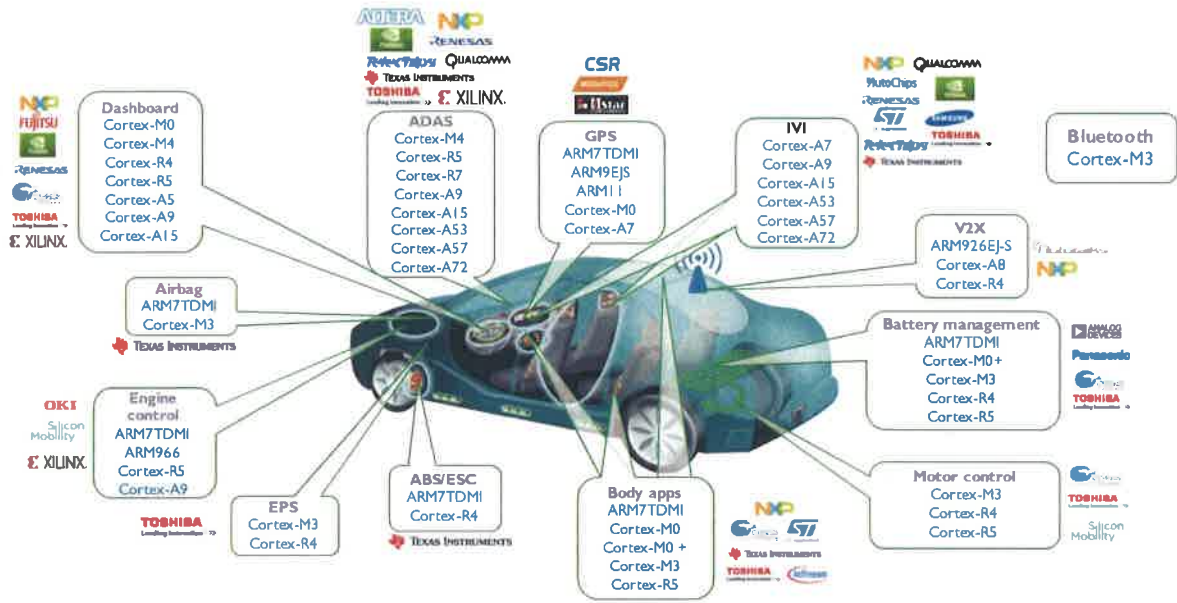


Cyberattacks against IoT  
**YoY 4.5x**

Source: NICT Note: Not Classified (2005-2014)

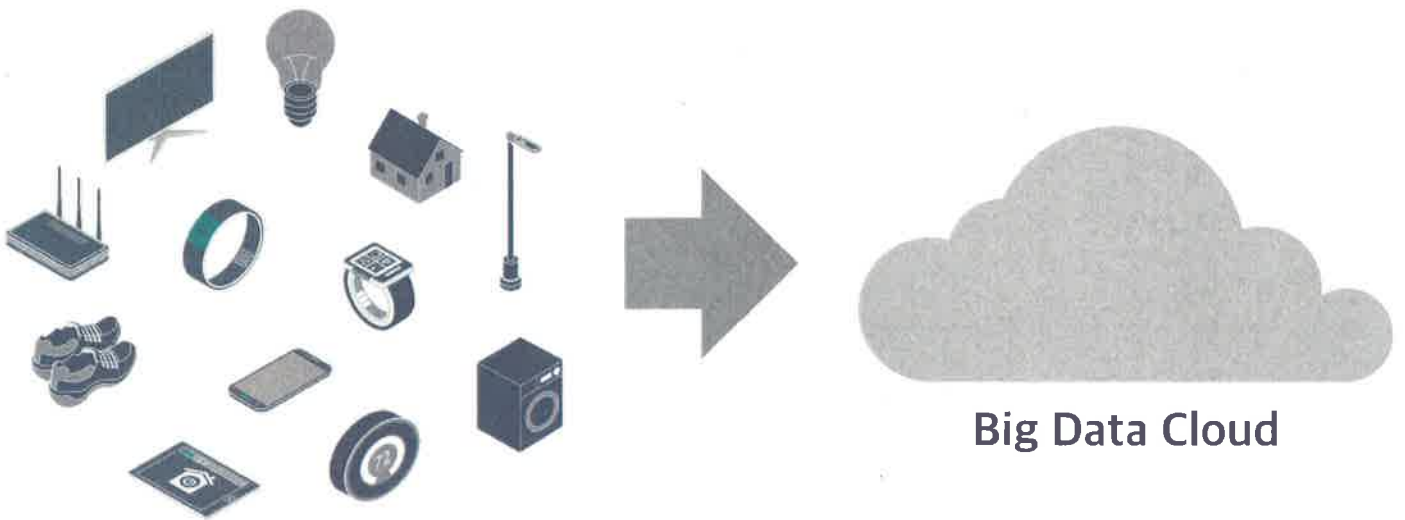


Security is essential for IoT devices

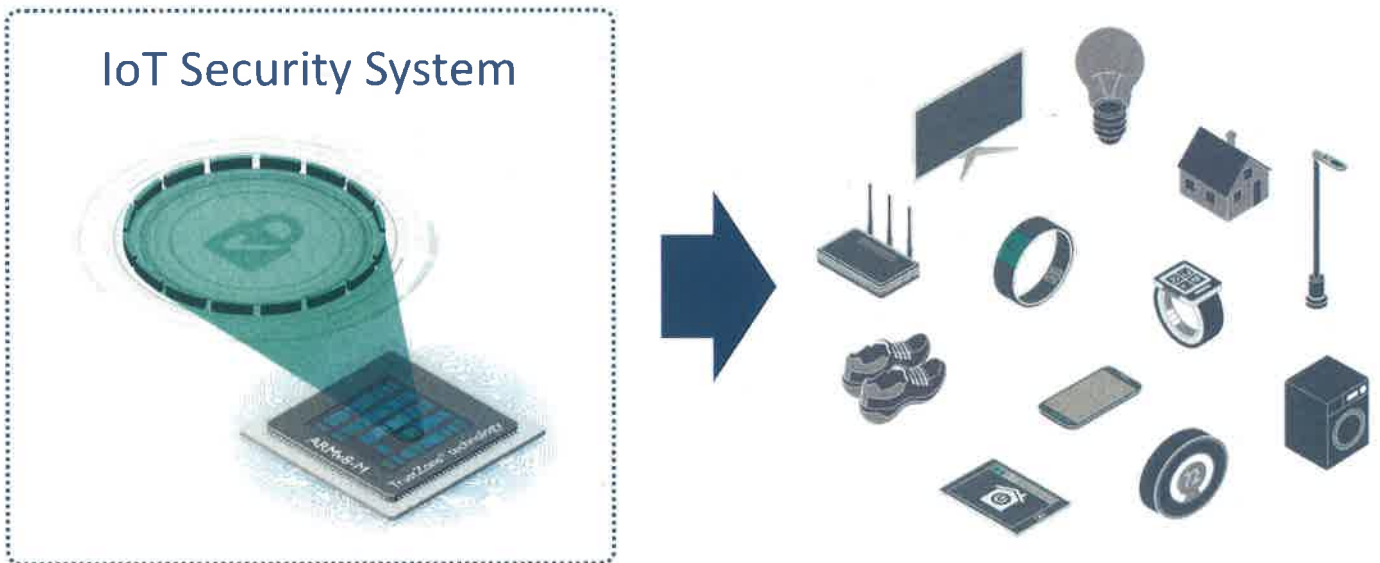


# Many chips in a car





IoT devices have to be connected to cloud securely



ARMv8-M: Bringing TrustZone to all IoT devices

## Key Technology to IoT Era



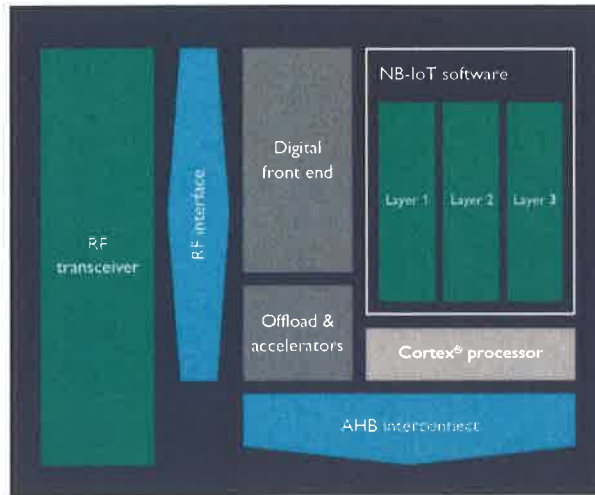
**ARM**

## NB-IoT for Low Power Wide Area Connectivity





# Cordio-N: NB-IoT Solution



ARM will engage with lead SoC vendors in Q3 2017 to enable chipsets in 2018

# NB-IoT: Smart Parking Meter



ARM mbed Cloud

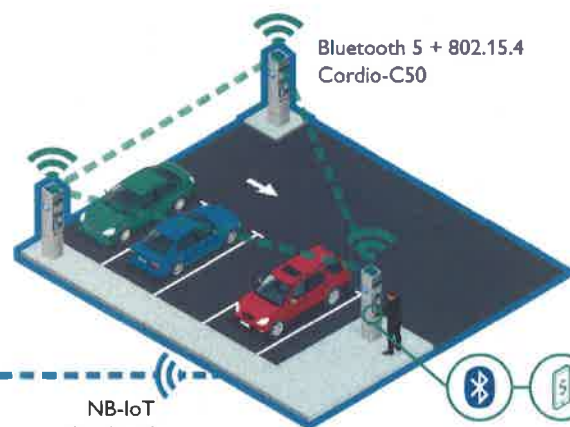
## ARMCORDIO

Radio core IP

Bluetooth 5  
802.15.4 mesh  
NB-IoT



Infrastructure



Bluetooth 5 + 802.15.4  
Cordio-C50

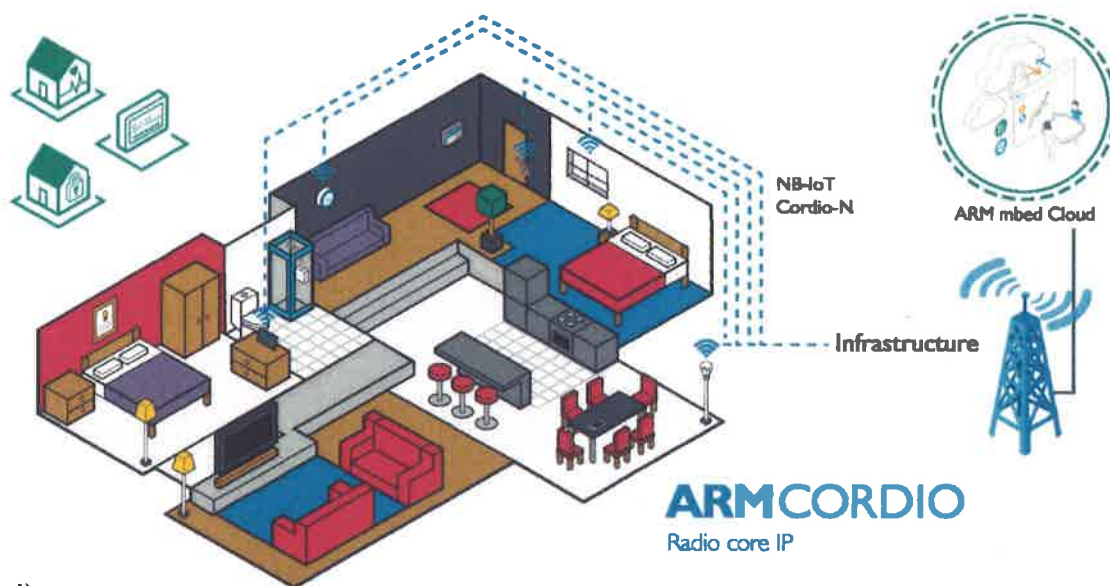
NB-IoT  
Cordio-N



Bluetooth 5 + 802.15.4  
Cordio-C50

(Theoretical)

# NB-IoT: Smart Home



(Theoretical)

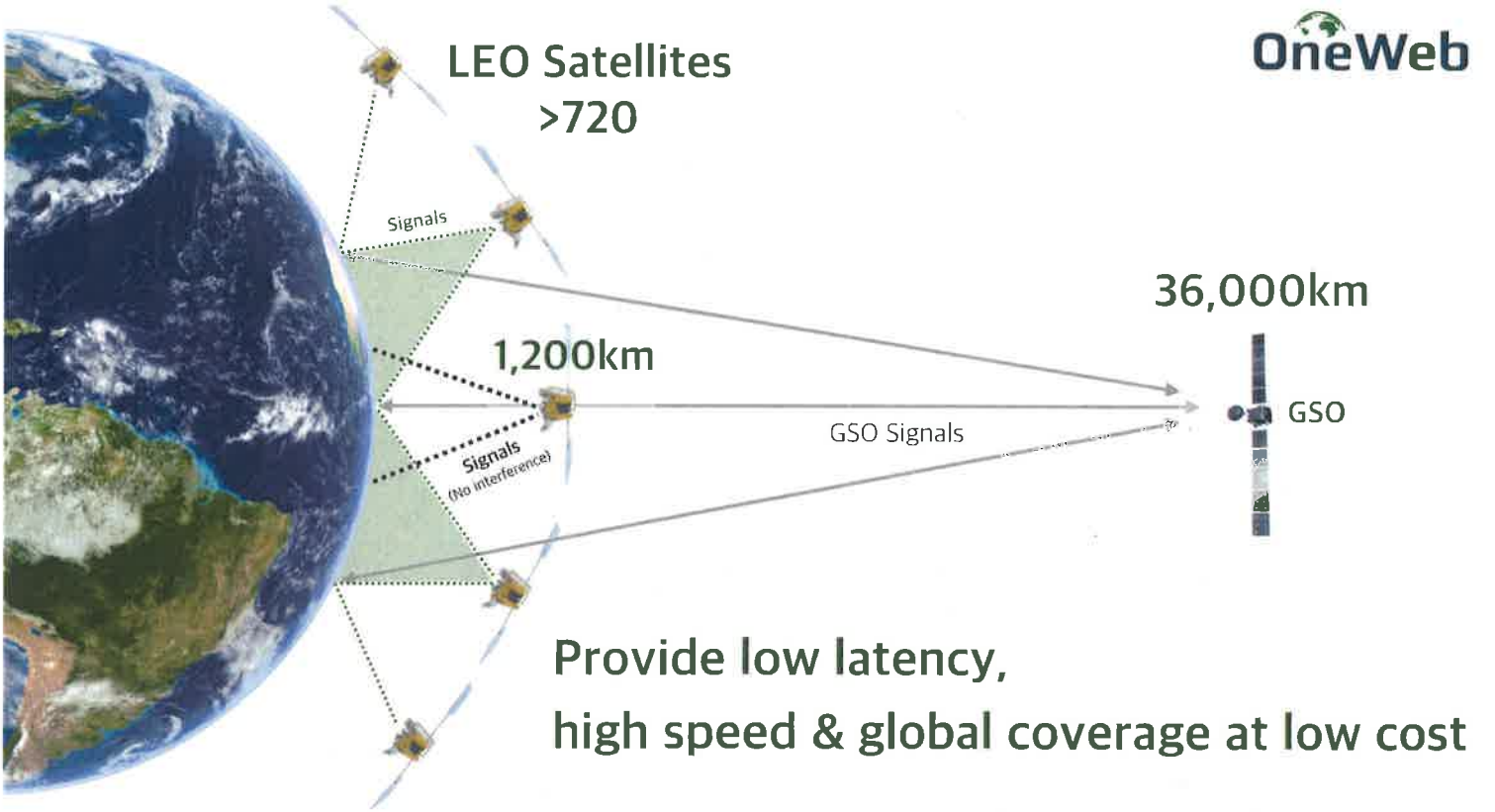


On top of that,

  
**OneWeb**

Wireless Backhaul  
for Ubiquitous Network







# Communication Speed

Downlink (max.)	Uplink (max.)
200Mbps	50Mbps



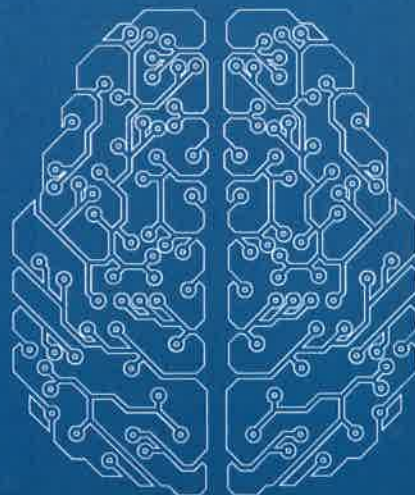


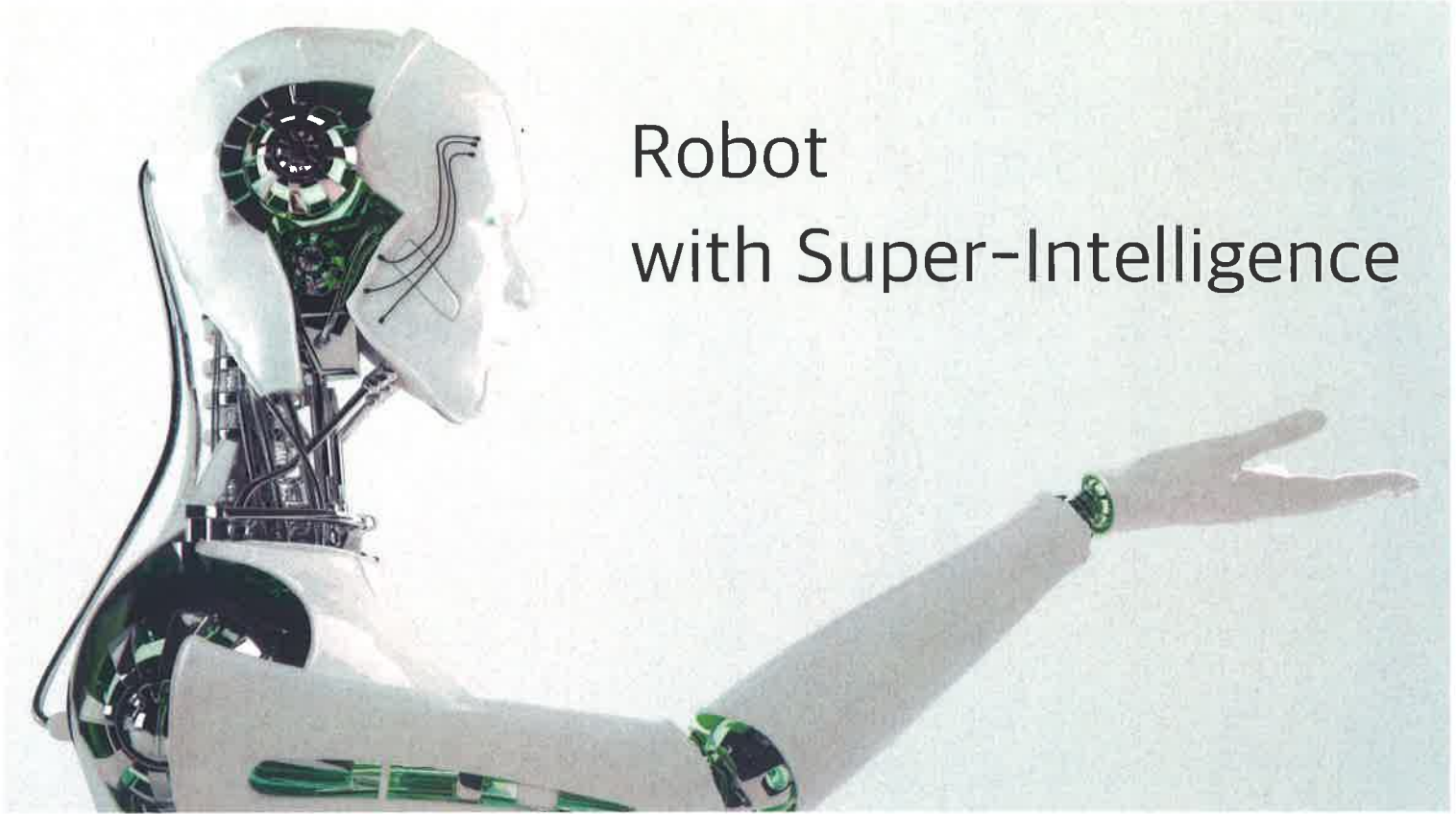


# Ubiquitous Coverage for 1 bn Subscribers



# Birth of Super-Intelligence





# Robot with Super-Intelligence

SINGULARITY



# SINGULARITY

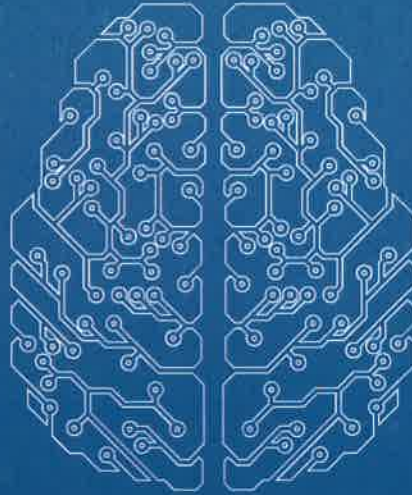
## Good or Bad ?

### 12 Risks That Threaten Human Civilization



Source: University of Oxford

# Super-Intelligence Might Solve 11 Risks



## Accelerating Evolution of Human



People can predict the future



The world will be united



Life expectancy of over 100 years

# Connectivity for Singularity

 SoftBank  
Group



 **MOBILE**  
WORLD CONGRESS  
BARCELONA 27 FEB-2 MAR 2017



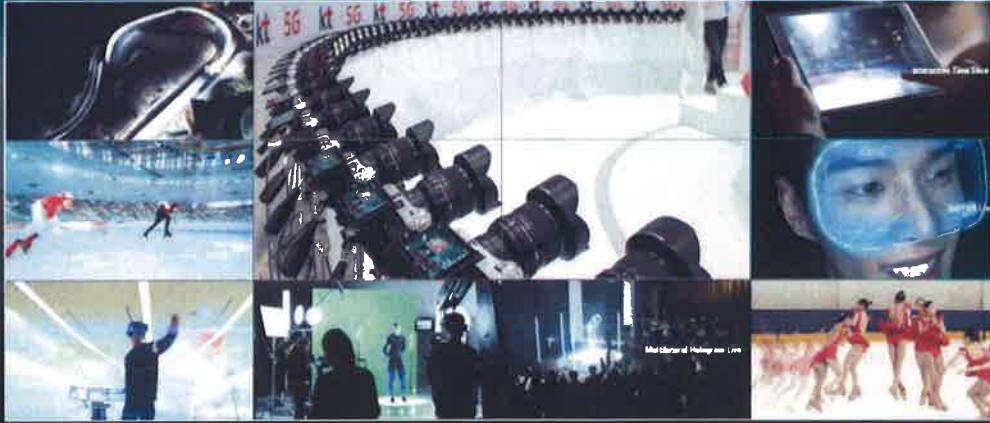
# THE NEXT ELEMENT

AN EVENT OF  
MOBILE  
WORLD CAPITAL  
BARCELONA





# Pyeongchang 5G



# Moving Towards 5G





# Making 5G a Reality









- Sync View
- 360° VR Live
- Omnidirectional Camera
- Interactive Time Slice
- 5G GiGA Bus
- K-Live Hologram Theater
- Holographic Signage
- Interactive Guide
- VR Goggles
- 24/7 Disaster Monitoring System
- Smart Traffic Control
- Sports IoT









**2D**

Mapping Application  
Outdoors: **3~10m**  
Indoors: **30m**



**3D**

**KT GiGA  
3D Locator**

5F J North building  
8614 Broadway St,  
Edgar Springs, MO 65462

Emergency call **09:58**  
Delay time **0:01:57**  
BPS **108**



BEACON  
Base Station  
Wi-Fi  
GPS

# 3D

KT GiGA  
3D Locator  
radius < 1m



5F, J North building  
8614 Broadway St  
Edgar Springs, MO 65462

Emergency call <sup>sm</sup> 09:58  
Delay time 0:01:57  
BPS **108**

The advertisement features a wireframe 3D model of a building on the left. In the center, four hexagonal icons represent different technologies: BEACON, Base Station, Wi-Fi, and GPS. To the right, a smartphone displays a 3D locator interface with a red target on the building model, location details, and emergency call statistics.



# 2D 3D

Mapping Application  
Outdoors: 3~10m  
Indoors: 30m

KT GiGA  
3D Locator  
radius < 1m



5F, J North building  
8614 Broadway St  
Edgar Springs, MO 65462

Emergency call <sup>sm</sup> 09:58  
Delay time 0:01:57  
BPS **108**

The advertisement shows two smartphones. The left one displays a 2D mapping application with a red location pin. The right one displays the 3D locator interface. The background features a firefighter and a man in a high-visibility vest.



Network coverage  
50km

Network coverage  
200 km

EMERGENCY

### Over The Horizon Antenna Satellite Life Jacket

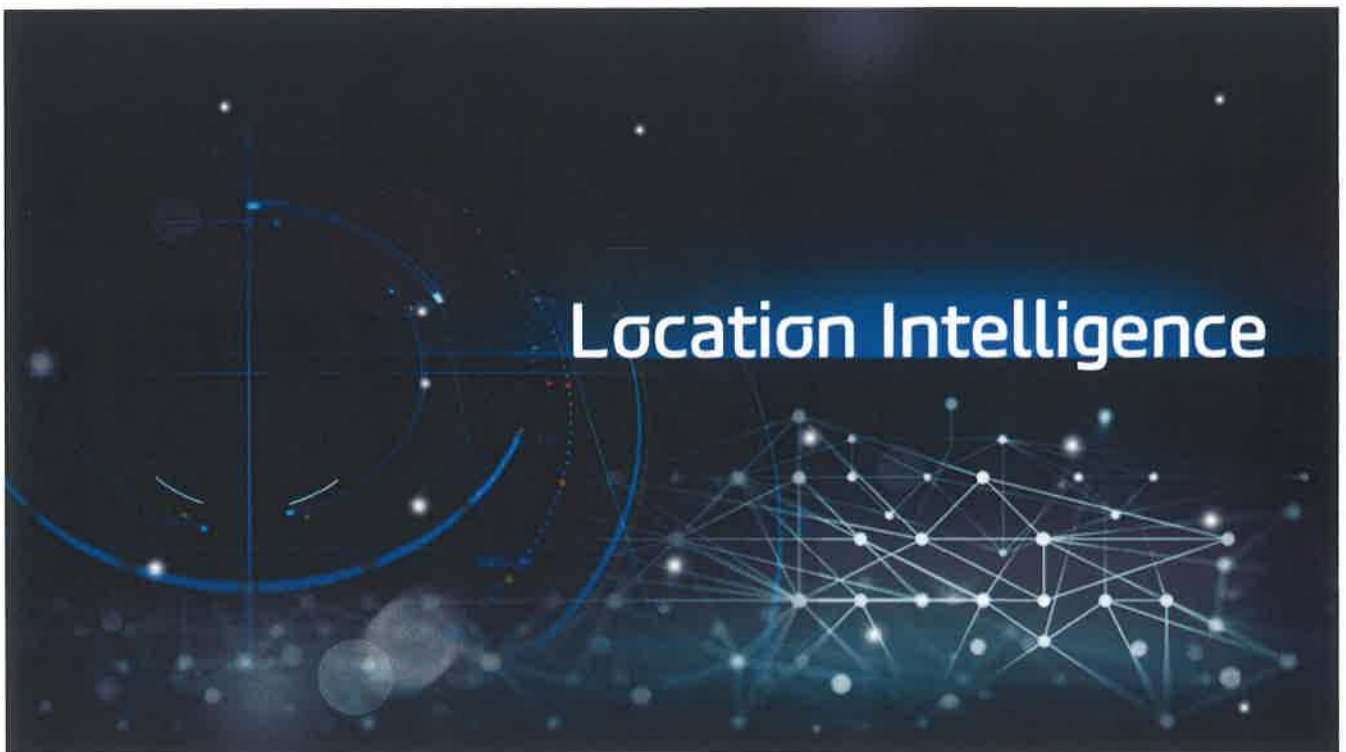
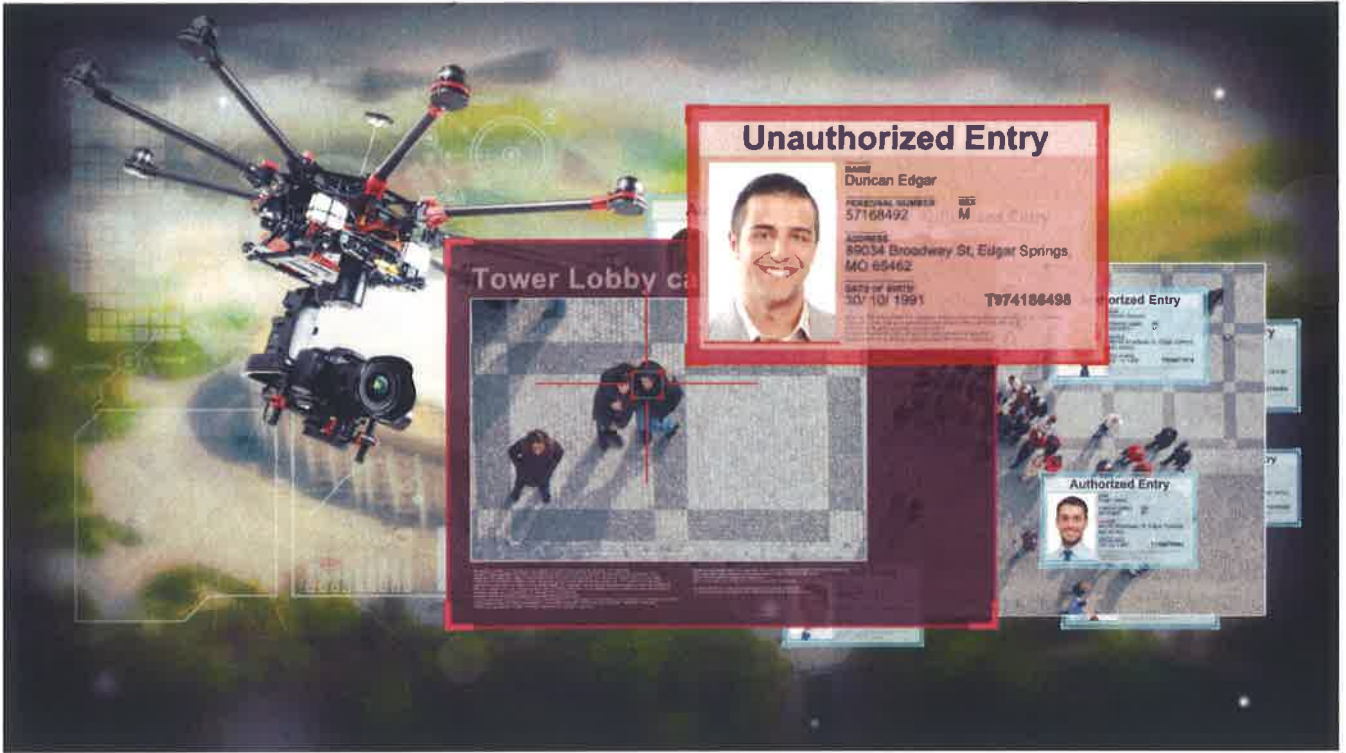
GPS

HEART RATE

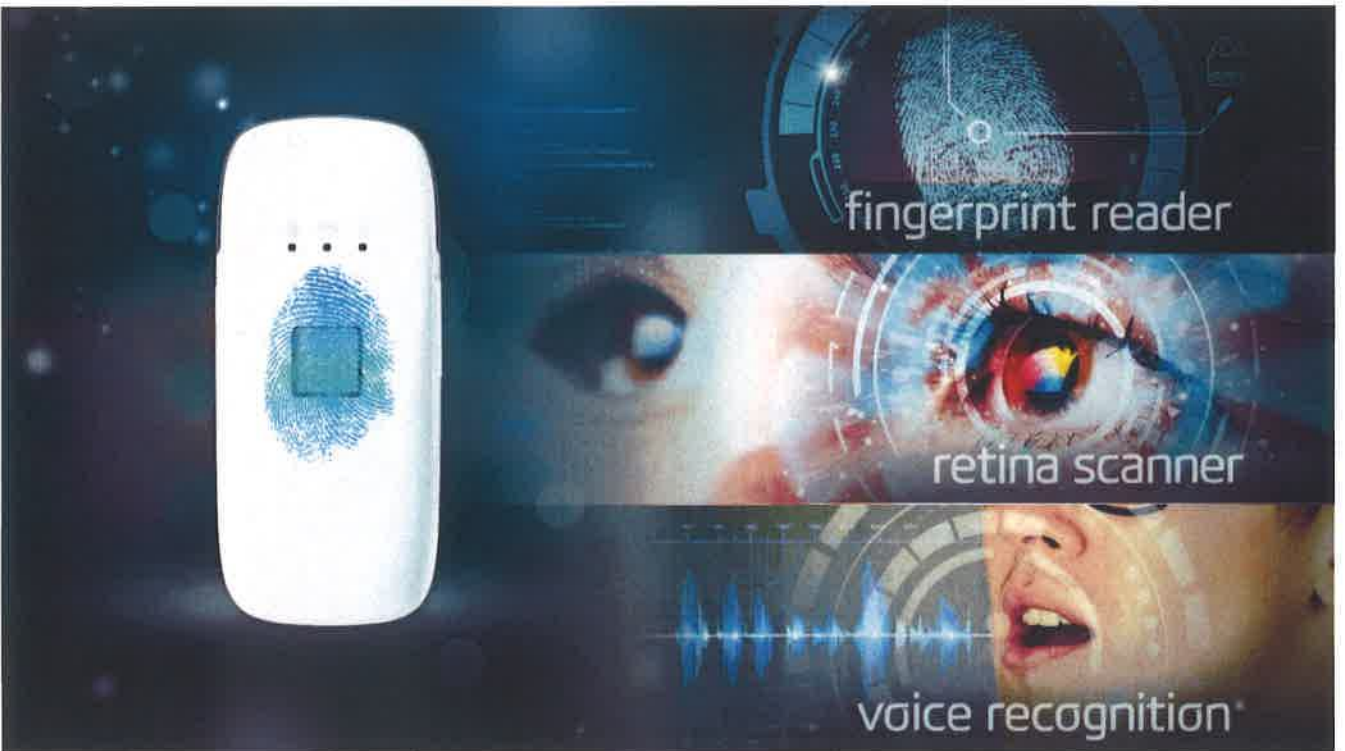
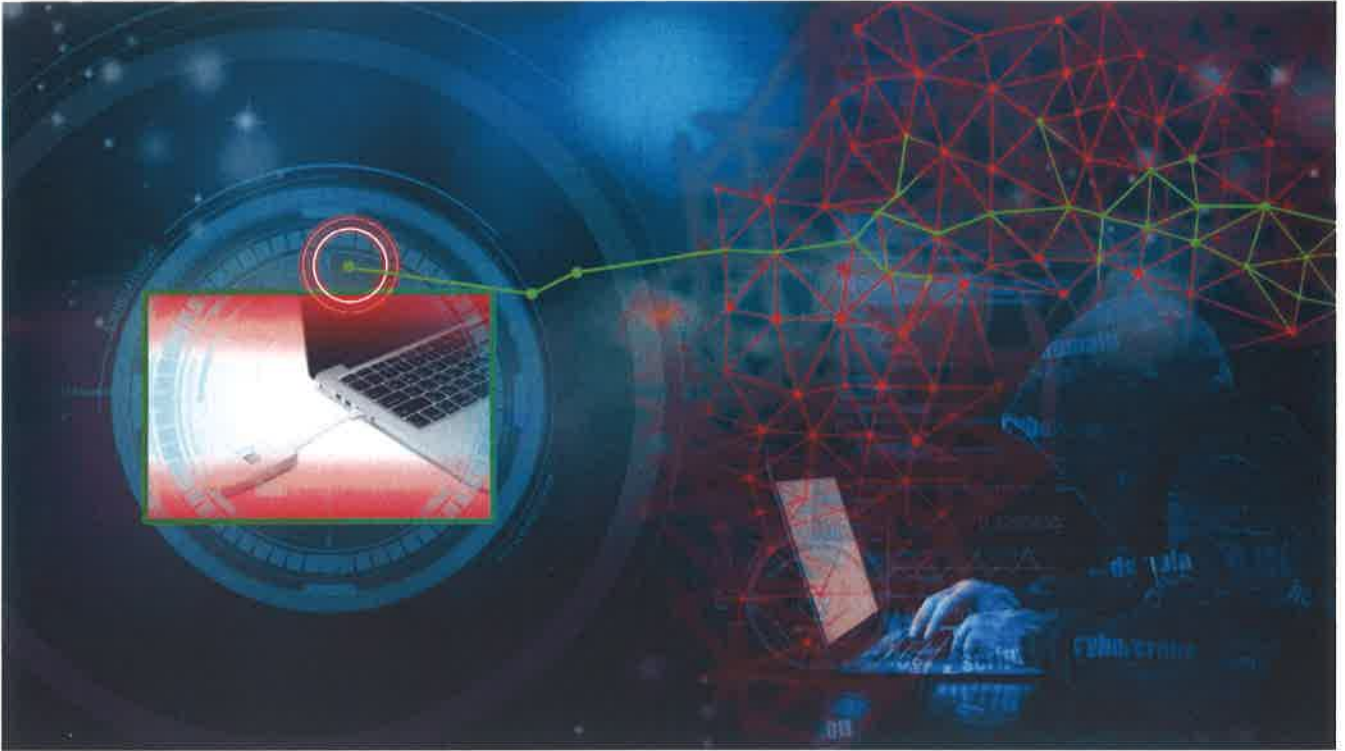
TEMPERATURE  
33

















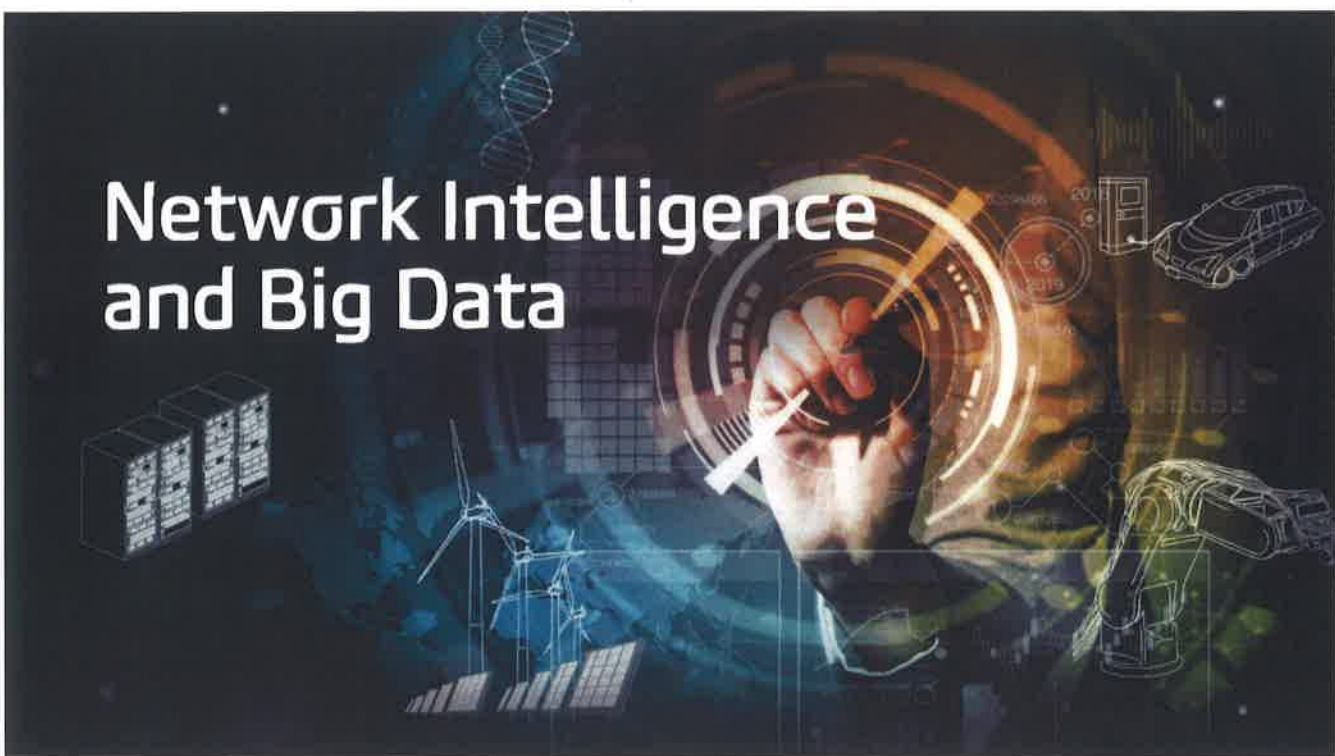




# Network Intelligence and Big Data



# Network Intelligence and Big Data























World's First  
**5G**  
in 2019

Economic value by 2035  
**\$12.3** Trillion

Source : IHS Markit 'The 5G Economy Report' (January 2017)





# CORE OF DIGITAL LIFE

Force behind Innovation -  
Key enabler of the 4<sup>th</sup>  
Industrial Revolution –  
Cloud/ AI/ VR/ IoT



Generates ~4.4% of global  
GDP, employing ~29mln  
people. Provided ~\$450bln  
to public funding in 2016

Developing Countries-  
“Mobile Only” – 65%  
internet usage on  
mobile



Fundamental Shift in  
Payments, Commerce,  
Healthcare, Education,  
Governance

Enabling a shared economy  
and fostering socio-  
economic development



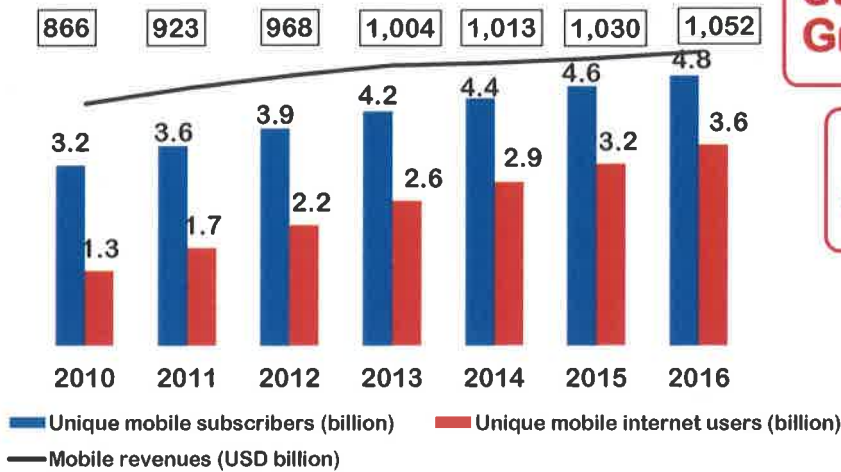
Digital Transformation of top  
5 industries –will add  
\$100trillion in value in next  
decade





# SNAPSHOT

## Subscriber Base and Revenues



**Subscriber Growth: +7%**

**Data User Growth: +18%**

**Operator Revenue Growth: +3%**

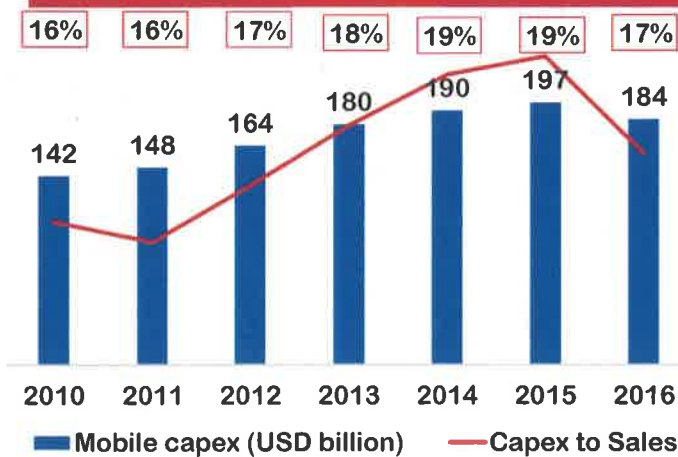


**However, telecom at cross roads...**

Source: GSMA Intelligence

# OPERATOR INVESTMENTS CONTINUE

## Annual Industry Capex and Capex/Sales



**Industry spending ~\$200bln each year in Capex**

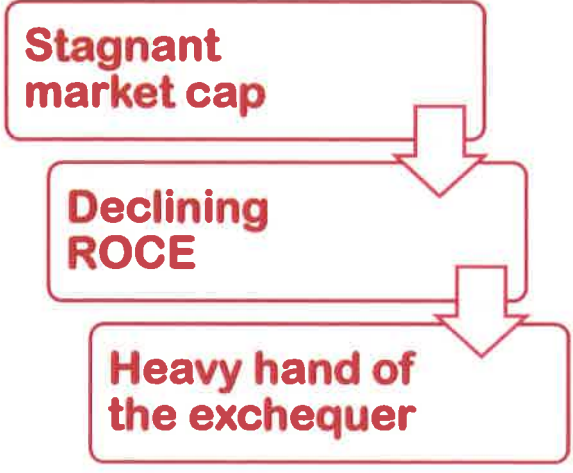
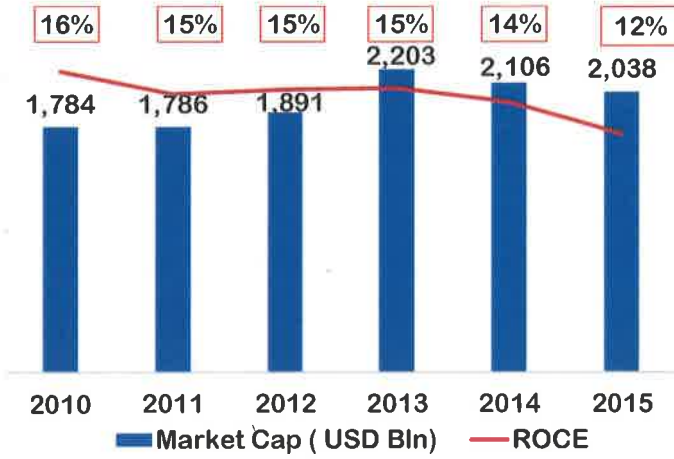
**Cumulative Capex since inception: \$2.25 trillion**



Source: GSMA Intelligence

# DECLINING INDUSTRY RETURNS

Industry Market Cap and Returns



Source: Bloomberg

