INNOVATIONS IN SWEDISH IT INDUSTRY - THE ROAD TO 5G AND IOT

- 5TH RUSSIAN- SWEDISH INVESTMENT FORUM

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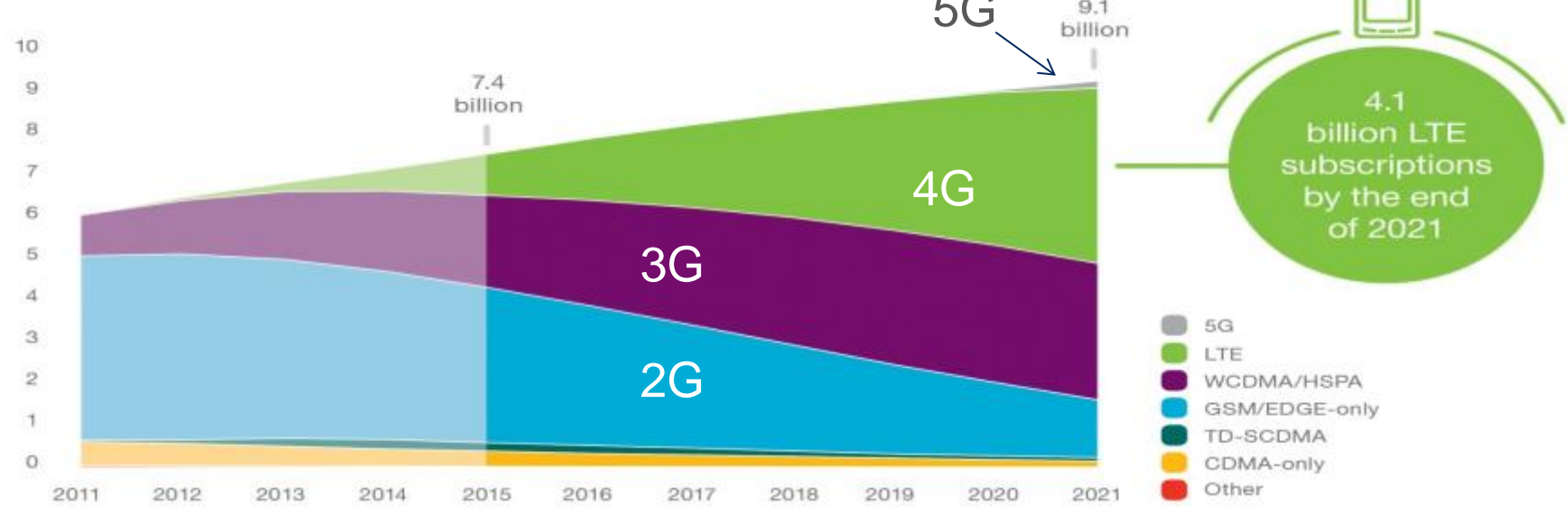
GLOBAL SUBSCRIPTION OUTLOOK – GROWTH IN 3G/HSPA AND 4G/LTE

In 2021:

› 9.1 billion mobile subscriptions
› 4.1 billion LTE subscriptions
› 3.2 billion WCDMA/HSPA subscriptions
› 5G will be commercially deployed

Mobile subscriptions by technology (billion)

5G

9.1 billion

7.4 billion

4G

3G

2G

Legend:
- 5G
- LTE
- WCDMA/HSPA
- GSM/EDGE-only
- TD-SCDMA
- CDMA-only
- Other

2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021

4.1 billion LTE subscriptions by the end of 2021

MOBILE SUBSCRIPTIONS: BY REGION AND TECHNOLOGY

Mobile subscriptions by region and technology (percent)

Middle East and Africa, Asia Pacific and Latin America will make a shift from mainly GSM/EDGE-only markets to WCDMA/HSPA and LTE

Western Europe is at the forefront of mobile broadband due to early LTE roll-out, and well-developed 3G networks

North America is the region with the highest share of LTE subscriptions in the world due to rapid migration from CDMA and WCDMA/HSPA-based networks

Legend:
- LTE/5G
- WCDMA/HSPA
- GSM/EDGE-only
- TD-SCDMA
- CDMA-only
- Other

Middle East and Africa — 2015: 75% GSM/EDGE-only; 2021: 50% WCDMA/HSPA

Asia Pacific — 2015: 50% GSM/EDGE-only; 2021: 50% LTE/5G, 30% WCDMA/HSPA

Latin America — 2015: 50% WCDMA/HSPA; 2021: 40% LTE/5G

Central and Eastern Europe — 2015: 50% WCDMA/HSPA; 2021: 35% LTE/5G

Western Europe — 2015: 55% WCDMA/HSPA; 2021: 95% LTE/5G

North America — 2015: 30% WCDMA/HSPA; 2021: 95% LTE/5G

REGIONAL MOBILE TRAFFIC

Mobile data traffic increase between 2015 and 2021:

Central Europe and Middle East and Africa : X12
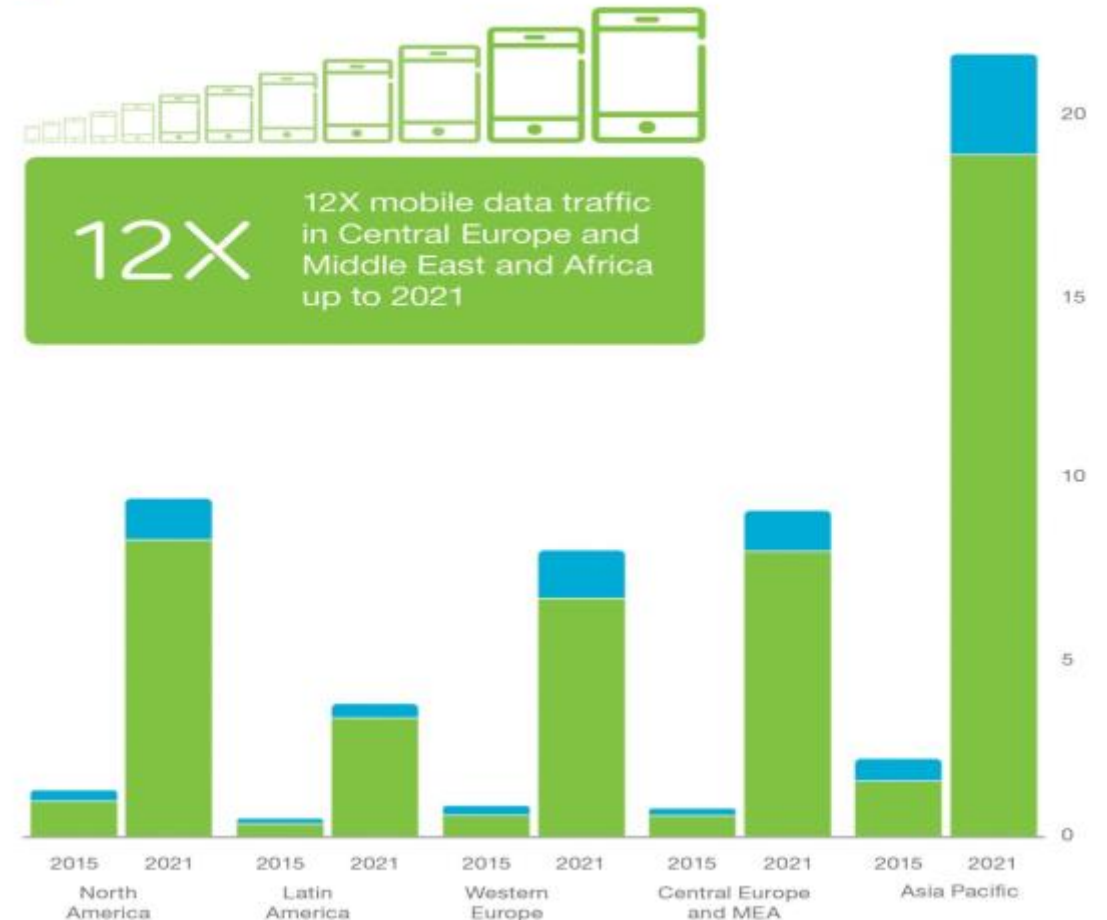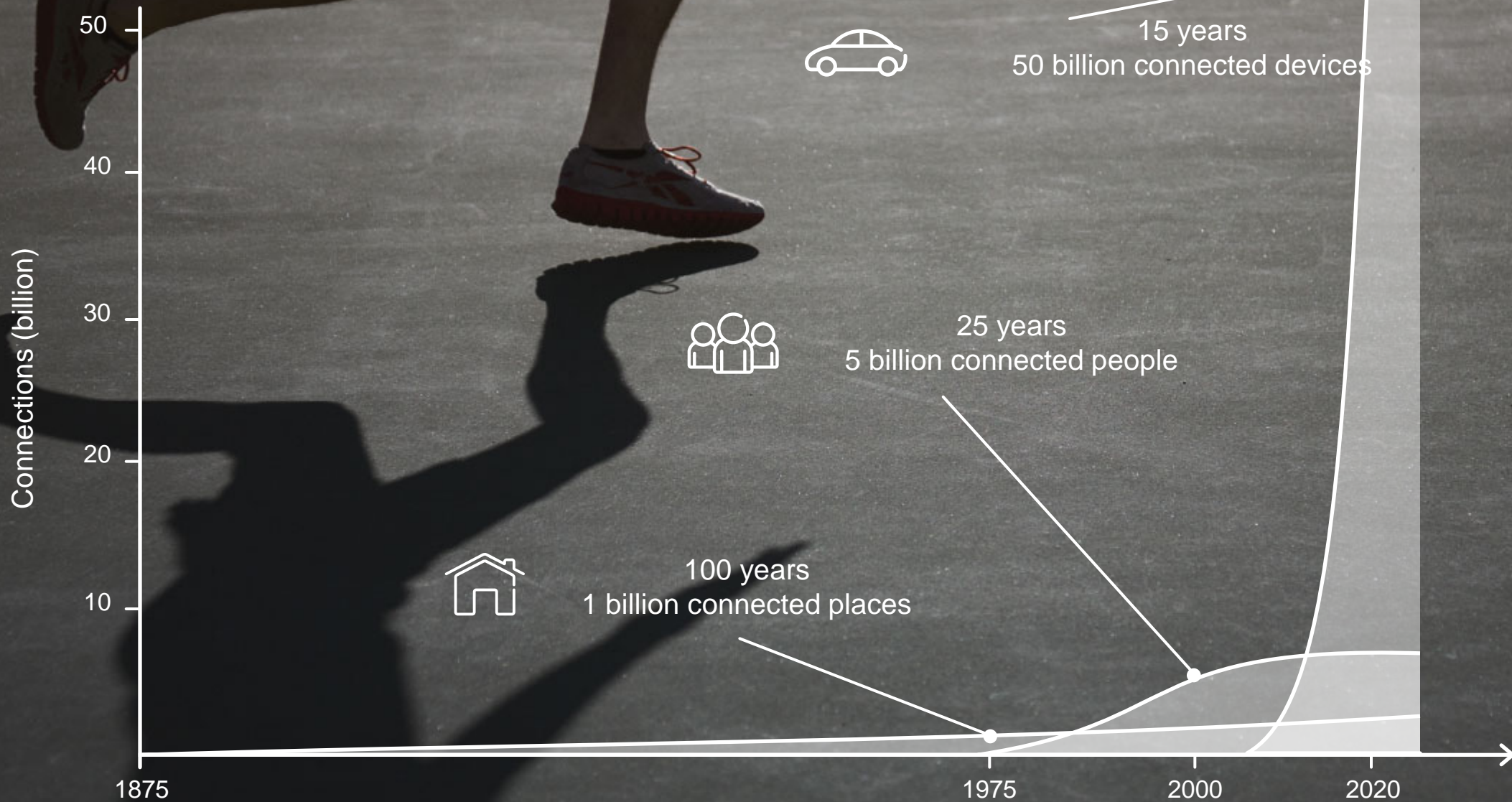Asia Pacific: X10
Western Europe: X10
Latin America: X8
North America: X7

Global mobile data traffic (monthly ExaBytes)

- Mobile PCs, tablets and mobile routers
- Smartphones

12X — 12X mobile data traffic in Central Europe and Middle East and Africa up to 2021

RAPID PROGRESS

15 years
50 billion connected devices

25 years
5 billion connected people

100 years
1 billion connected places

Connections (billion)

50

40

30

20

10

1875   1975   2000   2020

28B CONNECTED DEVICES IN 2021

Connected devices
In our forecast a connected device is a physical object that has an IP stack, enabling two-way communication over a network interface.

› Anticipating the effects of increased industry focus, 3GPP standardization of LTE-based Narrowband-IoT technology and other enhancements – e.g. in provisioning, device management, service enablement – the number of cellular connected devices is expected to grow

› In total, around 28 billion connected devices are expected by 2021, of which more than 15 billion will be connected M2M and consumer electronics devices.

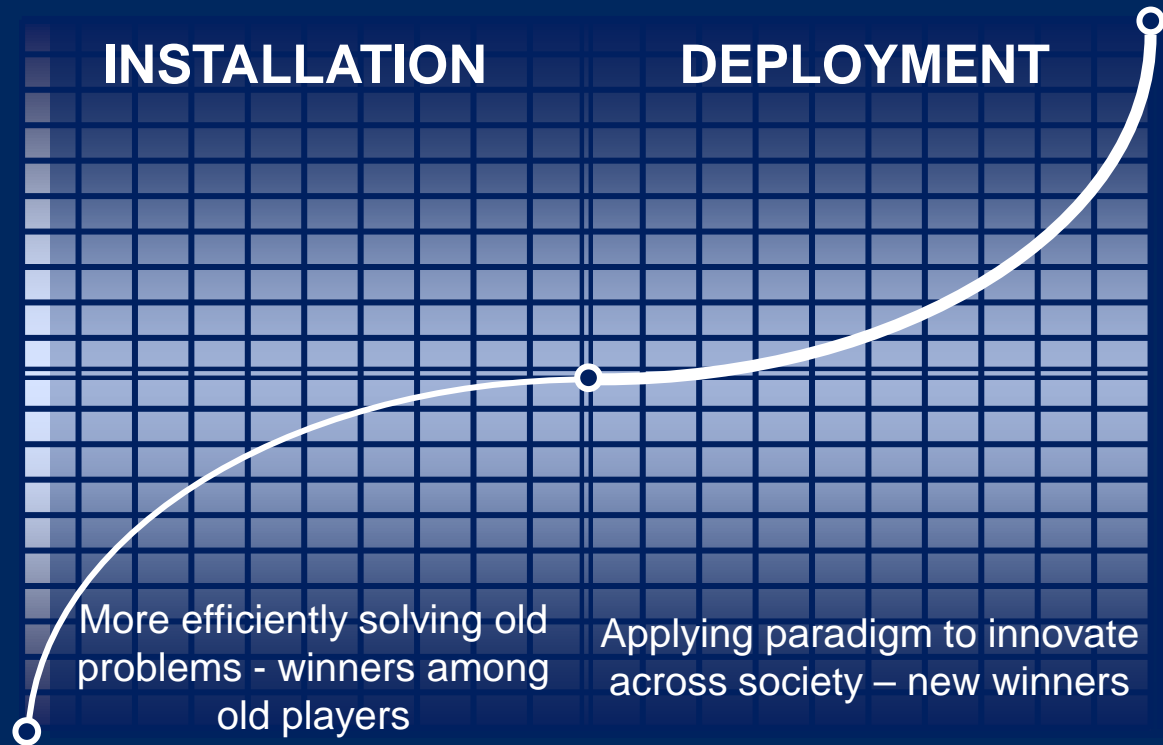› 1.5 billion M2M and consumer electronic devices with cellular subscriptions by 2021

Connected devices (billions)
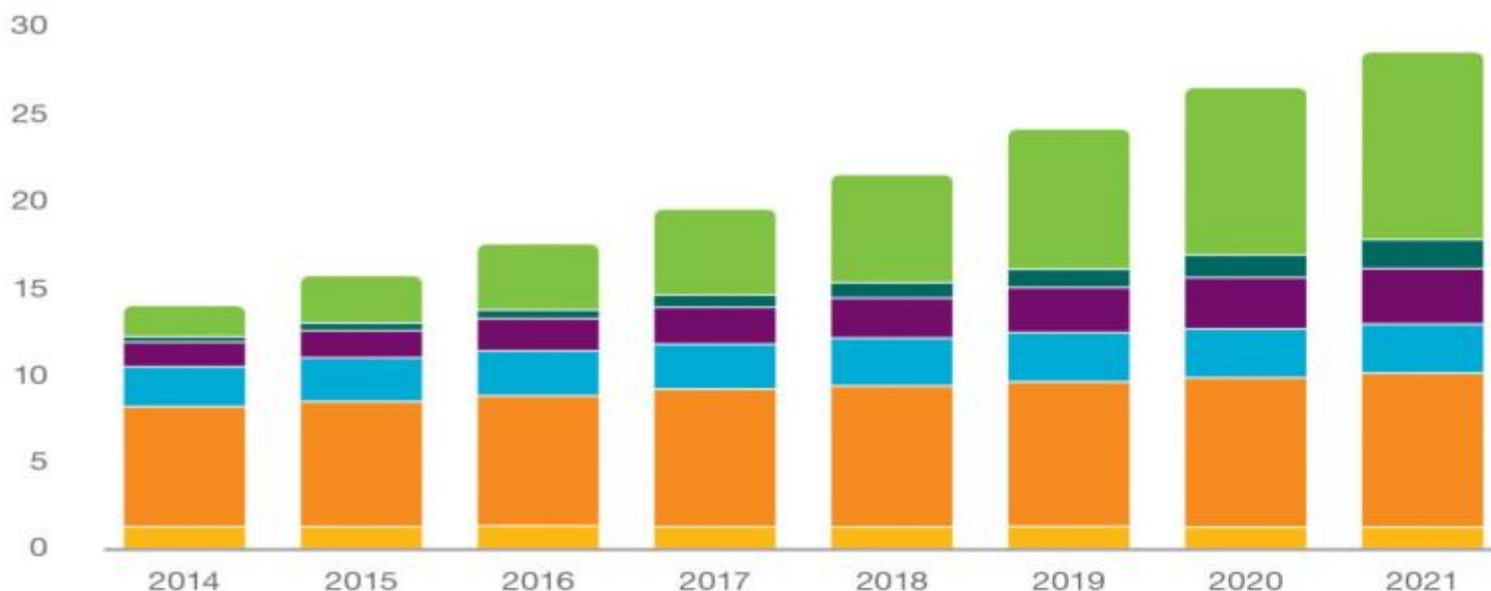
	15 billion	28 billion
M2M: non-cellular	2.6	10.7
M2M and consumer electronics; cellular	0.4	1.5
Consumer electronics; non-cellular	1.6	3.1
PC/laptop/tablet	2.4	2.8
Mobile phones	7.1	8.7
Fixed phones	1.3	1.4
	2015	2021

ICT - A CATALYST FOR THE NETWORKED SOCIETY

Examples

	Tranformation	
Transport		Intelligent transport
Energy	Consumption	Smart grid
Security	Distribution	Networked security
Societal services	Production	Smart cities
Healthcare		E-health
Education	Business models	Individualized e-learning
Industries	Industry structure	Industry 4.0 (Smart Factory)
ICT		**ICT**
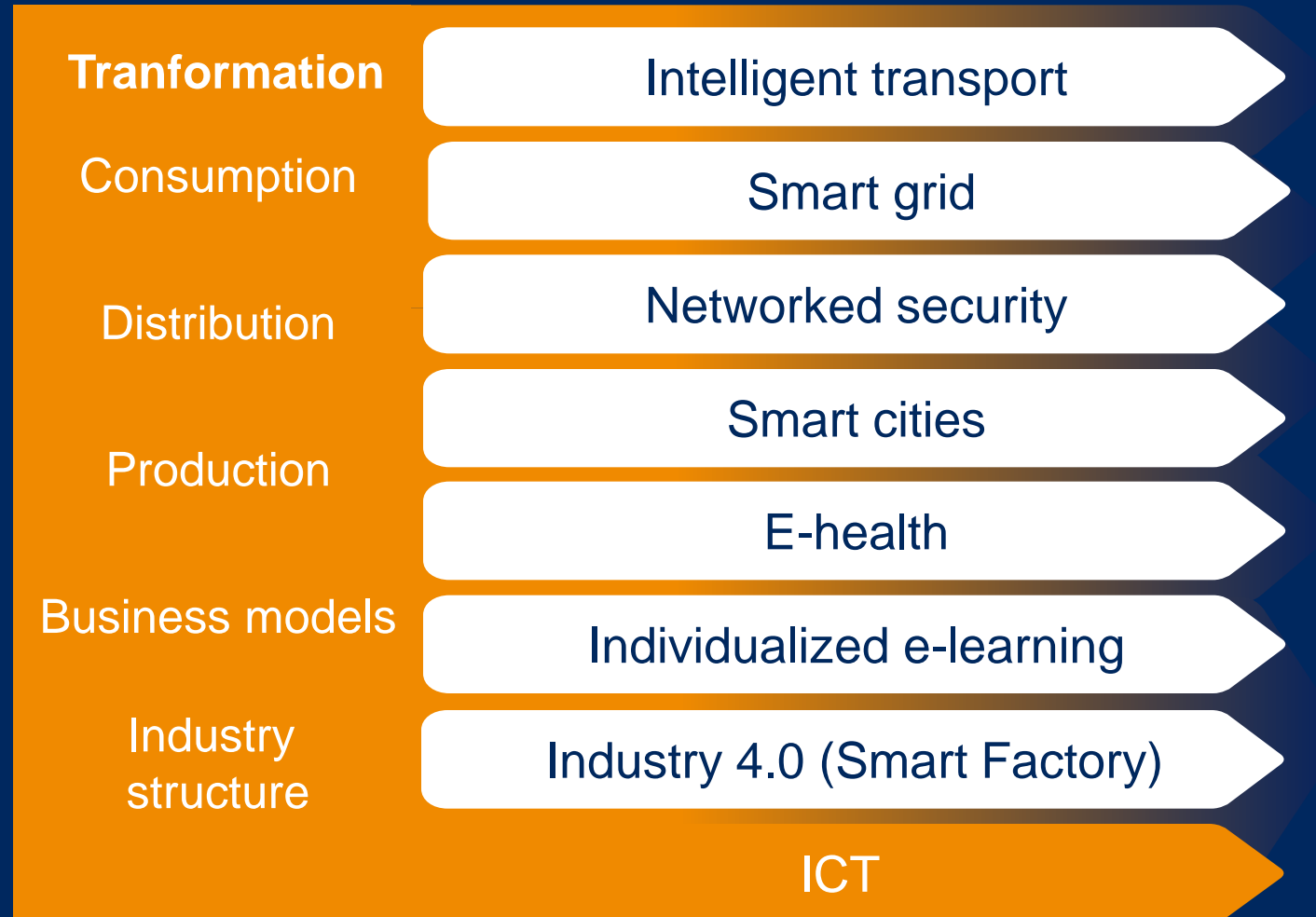
5G REQUIREMENTS AND USE CASES

5G Requirements
Extreme & Diverse

Sustainable

Secure

5X Lower Latency

1000X Mobile Data Volumes

10X Battery Life

10-100X End-user Data Rates

10-100X Connected Devices

Common Network
Dynamic & Secure Network Slices

Critical Communications

<5ms E2E delay

99.999% transmission reliability

500 Kmph relative velocity

Massive Communications

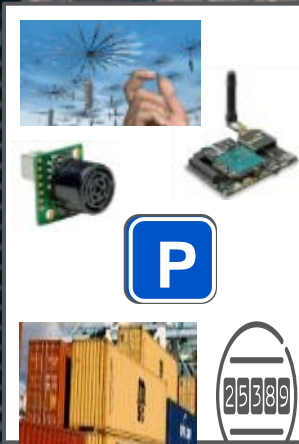>10 years battery lifetime

>80% cost reduction

20dB better coverage

5G USE CASES

Broadband experience everywhere anytime

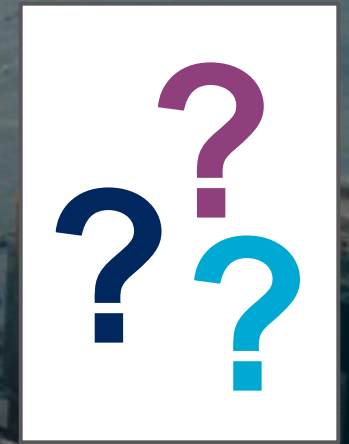**Mass market personalized media and gaming**

Meters and sensors, "Massive MTC"

Remote controlled machines

Smart Transport Infrastructure and vehicles

Human machine interaction

And much more

Multiple use-cases supported by a common network platform

5G
FOR SWEDEN

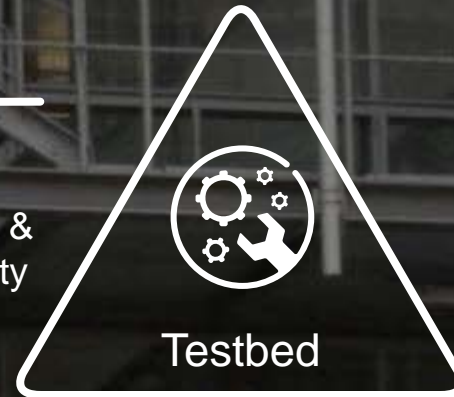› 5G program with industry and academic partners

PROGRAM FOCUS

Industry pilots with Swedish industries representing

| Energy & Utilities | Transport & Automotive | Safety & Security |

Testbed

Innovation projects that enables smaller companies

Establish a strong research community on ICT and its integration in industry process, products and services

5G FOR SWEDEN PARTNERS

INDUSTRY PARTNERS

| Scania | ABB | Volvo | Construction Equipment | Sandvik | Telia |

ACADEMIA

| KTH (Royal Institute Of Technology) | Chalmers University Of Technology | Linkoping University | Lund University | Swedish foundation for strategic research |

RESEARCH INSTITUTES

| SICS | RISE |

FUNDING

| Vinnova |