INDUSTRY AND ACADEMIA

@BJORNEKEKELUND
@ERICSSONLABS
CONNECTED DEVICES IN 2021

28 BILLION

13 BILLION
MOBILE PHONES, PC'S, LAPTOPS, TABLETS

15 BILLION
IoT DEVICES

Source: Ericsson Mobility Report, Nov 2015
TODAY IS AS SLOW AS IT GETS

2.7 BILLION LIKES ON FACEBOOK

$13 MILLION CROWDFUNDING

1.9 MILLION NEW SMARTPHONE SUBSCRIPTIONS

$2.7 BILLION E-COMMERCE

500,000 AIRBNB STAYS

3X UBER REVENUE OVER SIZE OF TAXI MARKET, IN SAN FRANCISCO

133 MILLION HOURS YOUTUBE VIDEO WATCHED

24H
DIGITAL DISRUPTION

THE VALUE OF DATA

CUSTOMER INTIMACY

REMOTE OPERATION

CONTINUOUS EVERYTHING & DEVOPS

SERVITIZATION

SECURITY

AUTOMATION

THE VALUE OF DATA

CUSTOMER INTIMACY

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CONTINUOUS EVERYTHING & DEVOPS

SERVITIZATION

SECURITY

AUTOMATION
INDUSTRY TRANSFORMATION

HEALTH
WELLNESS

EDUCATION
LEARNING

MEDIA
CULTURE

TRANSPORT
MOBILITY

BANKING
TRANSACT

UTILITY
FUNCTION

RETAIL
EXCHANGE
ERICSSON TRANSFORMING

<table>
<thead>
<tr>
<th>COMPETITION</th>
<th>BUSINESS MIX</th>
</tr>
</thead>
<tbody>
<tr>
<td>80% TELECOM</td>
<td>73% HARDWARE</td>
</tr>
<tr>
<td>27% TELECOM</td>
<td>34% HARDWARE</td>
</tr>
<tr>
<td>20% ICT</td>
<td>27% SW &amp; SERVICES</td>
</tr>
<tr>
<td>73% ICT</td>
<td>66% SW &amp; SERVICES</td>
</tr>
</tbody>
</table>

1999 | 2014 | 1999 | 2014
THE NEED FOR 5G

- 10-100x: End-user data rates
- 1000x: Mobile data volumes
- 5x: Lower latency
- 100x: More devices
- Cost: Device cost reduction
- 10+: Years of battery life
- +20dB: Better coverage

One architecture supporting multiple industries
THE ROAD TO 5G

Driver of early EU projects for 5G

Radio Test Bed 5+ Gb/s

Network slicing demo

Industrial collaborations

Outdoor radio test network

Radio Test Bed 10+ Gb/s

Radio Test Bed 20+ Gb/s

Network slicing demo

Large trial

Several trials

US

Comms depl

Pyeong-Chang Olympics

3GPP R-14

NR phase 1

World Radio Conference

3GPP R-15

NR phase 2

Selected 5G services

First commercial deployments

73% of operators intend to be trialing 5G

Tokyo Olympics

5G Standardization started in 3GPP

Several trials

Comm depl

US

Network Slicing

RAN & core
5G FOR SWEDEN – THE PROGRAM

Industrial pilot projects

Energy & Utilities | Transport & Automotive | Safety & Security

Innovation testbeds

Strengthen research community
STRENGTHEN RESEARCH COMMUNITY

› WASP – 1800MSEK
› SSF IRC – 400MSEK
› Vinnova “Industripiloter” – 80MSEK
› Government “Samverkansprogram” – 830MSEK
› …and more
ACADEMIC PARTNERSHIPS

USA:
- Rutgers University, New Jersey (WINLAB)
- NY University
- Stanford University
- Carnegie Mellon University
- UC Berkeley

Europe:
- Italy: Scuola Superiore Sant’Anna, Pisa
- Germany: TU Dresden
- RWTH Aachen University
- Finland: Aalto University Helsinki
- Hungary: Budapest University of Technology and Economics
- UK:
  - Imperial College
  - King’s College

Asia:
- China Tsinghua University
- Beijing Institute of Technology
- Japan Keio University
- India: Indian Institute of Technology Madras

Sweden:
- Royal Institute of Technology (KTH)
- Chalmers University of Technology
- Malmö University
- Lund University
- Linköping University
- RISE

Canada:
- Ecole Polytechnique Montreal
- MCGill Montreal
- Universites du Quebec a Montreal
- Ecole de Technologie Superieure

Brazil:
- Federal University of Pará
- University of Brasilia
- CPqD (Campinas/SP)
- University of São Paulo
- Catholic Univ. of Rio
- Federal Univ. of Pernambuco
- Federal University of Ceará

Europe FP7 and Horizon 2020 projects:
- METIS
- Mammoet
- M3Tera
- Unify
- CityPulse
- METIS II
- mmMAGIC
- flex5ware
- XHAUL
- 5Gex
- Graphene
- Trax
- Compeit
- EMC2
- 5G Wireless
**INDUSTRIAL MOBILE COMMUNICATION IN MINING**

- Evaluate mobile communication infrastructure in an industrial context
- Consider strict requirements on safety and robustness in underground mining
- Increased productivity
- Improved Safety
- Industrial 5G requirements
- Understanding new eco system, business models, etc.

**5G-ENABLED WORLD CLASS MANUFACTURING**

- Evaluate 5G technology in manufacturing industry
  - Wireless factory communication
  - Industrial Internet of Things (IIoT)
  - Mission critical clouds (MCC)
  - Data analytics
- Improved production efficiency
- Increased flexibility
- Excellent traceability

**CONNECTED MOBILITY ARENA STOCKHOLM**

- Create Europe’s leading test site for connected mobility
  - Open innovation platform
  - Open cellular radio connectivity
  - Management and control platform
  - Efficient management of test activities
  - System configuration, road authority, etc.
- Emergency vehicle prioritization
- Remote-controlling of platoons
- Automatic service orchestration

**PILOT: CONNECTED ENERGY**

Cellular wireless technology and cloud solutions for the power system

- Utilize real time information from different power grid locations to optimize the operation and reduce cost of ownership
- Pilot: Stream with our requirements:
  - Sensor data
  - Cellular wireless communication
  - Cloud storage
  - Cloud service data
  - Define business model
- Other possible applications: water and sewage systems, railway traction, district heating
Ericsson Garage Technology & Knowledge Incubator

6 Garages Globally

Oct 13
Silicon Valley Garage opens

Streamr, Kiista
Contextual Communication Cloud, Kiista
Capillary Data Fusion, Kiista + Pop-up
Remote Vehicle Unlock, Silicon Valley
Retail Experience Management, Budapest
Haptic Control of Quadcopters, Kiista
SUMMARY

› Ericsson is transforming its research collaboration model

› Excellence, relevance and speed

› The world is only a click away