Transformative Power of ICT

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More connections

- 15 years: 50 billion connected devices
- 25 years: 5 billion connected people
- 100 years: 1 billion connected location
ACCELERATING THE NETWORKED SOCIETY

5G, Internet of Things and Cloud accelerate the Networked Society

Growth
Agility
Innovation
Efficiency
Ecosystem
Industry Transformation Underway

**BUSINESS MODELS**
- Innovation
- Digitalization

**PLATFORMS**
- Analytics
- Security
- OSS/BSS

**INFRASTRUCTURE**
- Mobility
- Broadband
- Cloud

**Keywords**
- Vertical Silos
- ICT
- M2M
- Cross-industry Collaboration
- Enterprise & Line of Business
- IoT

Industry Transformation Underway
28 BILLION

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

15 billion
IoT DEVICES

Source: Ericsson Mobility Report, Nov 2015
5G
USE CASES

What will happen in the next five years?
Industries will be transformed by new capabilities brought on by 5G. Examples of these capabilities include:
1. The ability to download a full-length HD movie in seconds.
2. The quick reaction time (low latency) to enable remote real-time tactile control.
3. The ability to spin up virtual networks on-demand with network slicing.
4. Battery lifetimes beyond 10 years for remote cellular devices.
5G Radio Access

Overall 5G solution

Evolution of LTE
Backwards compatible

New spectrum below 6 GHz

Interworking

New radio-access technology

Gradual migration

Existing spectrum

Below 6 GHz

Above 6 GHz
New spectrum below 6 GHz

1 GHz 3 GHz 10 GHz 30 GHz 100 GHz
5G examples: A real game changer

- Full-length HD movie in seconds
- 10 year battery life for remote sensors
- Fixed wireless broadband
- Stop a self-driving car faster
- Drone control & communication
- Remotely operate robots
- Virtual Reality / hologram
ONE network with dynamic and secure Network Slices
1. The Lifestyle Network Effect
With diversifying online use, social effects like crowd intelligence and the sharing economy multiply.

2. Streaming Natives
Teenagers watch more YouTube video content daily than other age groups.

3. AI Ends The Screen Age
Artificial Intelligence will enable interaction with objects without the need for a smartphone screen.

4. Virtual Gets Real
Consumers want virtual technology for everyday activities such as sports, and 3D food printing.

5. Sensing Homes
Bricks used to build homes could include sensors that monitor mold, leaks and electricity issues.

6. Smart Commuters
Commuters want to use their time meaningfully and not feel like passive objects in transit.

7. Emergency Chat
Social networks may become the preferred way to contact emergency services.

8. Internables
Internal sensors in our bodies that measure wellbeing may become the new wearables.

9. Everything Gets Hacked
Most smartphone users believe hacking and viruses will continue to be an issue.

10. Netizen Journalists
Consumers share more information than ever and believe it increases their influence on society.
Biggest risk?
ROI
Risk of ignorance
Win ³

ERICSSON

TECHNOLOGY LEADERSHIP

INNOVATION

INDUSTRIAL PROJECTS

STRATEGIC THINKING
University Partnerships

-Launching and supervising University projects
-Ind. Internship for undergraduate and PhD students
-Cooperation on EU projects
-Participation in University Education
-Launching and supervising PhD thesis
-Strong relationship between universities and R&D dept.
7 principles

1. Fight fire with fire – embrace the threat
2. Disrupt yourself
3. Leverage the right assets
4. Focus on value, not structure
5. Rethink your core business
6. Don’t stare in the mirror
7. Focus on platform engagement
Transformation changing industry logics

Industrial age logics:
- Value-chains
- Products & services
- In-house innovation
- Customer solutions
- Scale with assets
- Transactional partnerships

Networked Society logics:
- Value- & ecosystems
- SW & platforms
- Collaborative innovation
- Customer value-(co)creation
- Scale with scope and speed
- Strategic partnerships
Performance diversification on the road to 5G

- Reduced Device Cost
- Improved Coverage
- Improved Battery Life

150 MBPS
LTE Cat 1
Power Saving Mode (GSM & LTE)

300 MBPS
LTE Cat 0 & HD-FDD

450 MBPS
Extended DRX (GSM & LTE)

600 MBPS
Extended Coverage (GSM & LTE)

1 GBPS
LTE Cat-M
LTE NB-IoT (180-200kHz Narrowband)

New Categories of Cellular Connected Applications

HIGH BW CRITICAL
LOW BW MASSIVE
Where is the Money?

- Industry Verticals
- Applications & Services: 75%
- Analytics & Data Monetization: 10%
- Service Enablement: 10%
- Connectivity mgmt: 5%
- Connectivity: <1%

Source: Ericsson report and Machina Research 2016
<table>
<thead>
<tr>
<th>Year</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>1991</td>
<td>Ericsson Hungary launches R&amp;D</td>
<td>1992</td>
<td>High Speed Networks Lab (BME VIK) launched</td>
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<td>1996</td>
<td>Traffic Lab at Ericsson Hungary</td>
<td>2000</td>
<td>Comm. Networks Lab (ELTE TTK) launched</td>
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<td>2005</td>
<td>Hardware development at Ericsson Hungary</td>
<td>2006</td>
<td>&lt;100 Ericsson PhD at universities</td>
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<tr>
<td>2007</td>
<td>Ericsson Hungary development dept. expanding again</td>
<td>2008</td>
<td>Complex Hardware Lab (BME VIK) launched</td>
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<tr>
<td>2011</td>
<td>Software Technology Research starts at Ericsson Hungary</td>
<td>2011</td>
<td>Software Technology Lab (ELTE IK) launched</td>
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<tr>
<td>2012</td>
<td>Innovation Org. founded</td>
<td>2014</td>
<td>Joined EIT ICT Labs</td>
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<td></td>
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<td>2015</td>
<td>Ericsson Garage launched</td>
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<td>2013</td>
<td>Budapest receives Cloud product development responsibilities, strong gain</td>
<td>2014</td>
<td>Cloud partnership with BME and SZE</td>
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<td>2015</td>
<td>Growing strong at Analytics</td>
<td>2015</td>
<td>SZTAKI Partnership at Analytics</td>
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From Idea to Product

Universities

Ericsson Research Ericsson Traffic Lab
- IP QoS and routing
- Analytics
- Conformance testing
- Cloud performance

Development of Ericsson services and products
- Router and SDN products
- Ericsson Expert Analytics
- Automated Testing System
- Cloud Systems