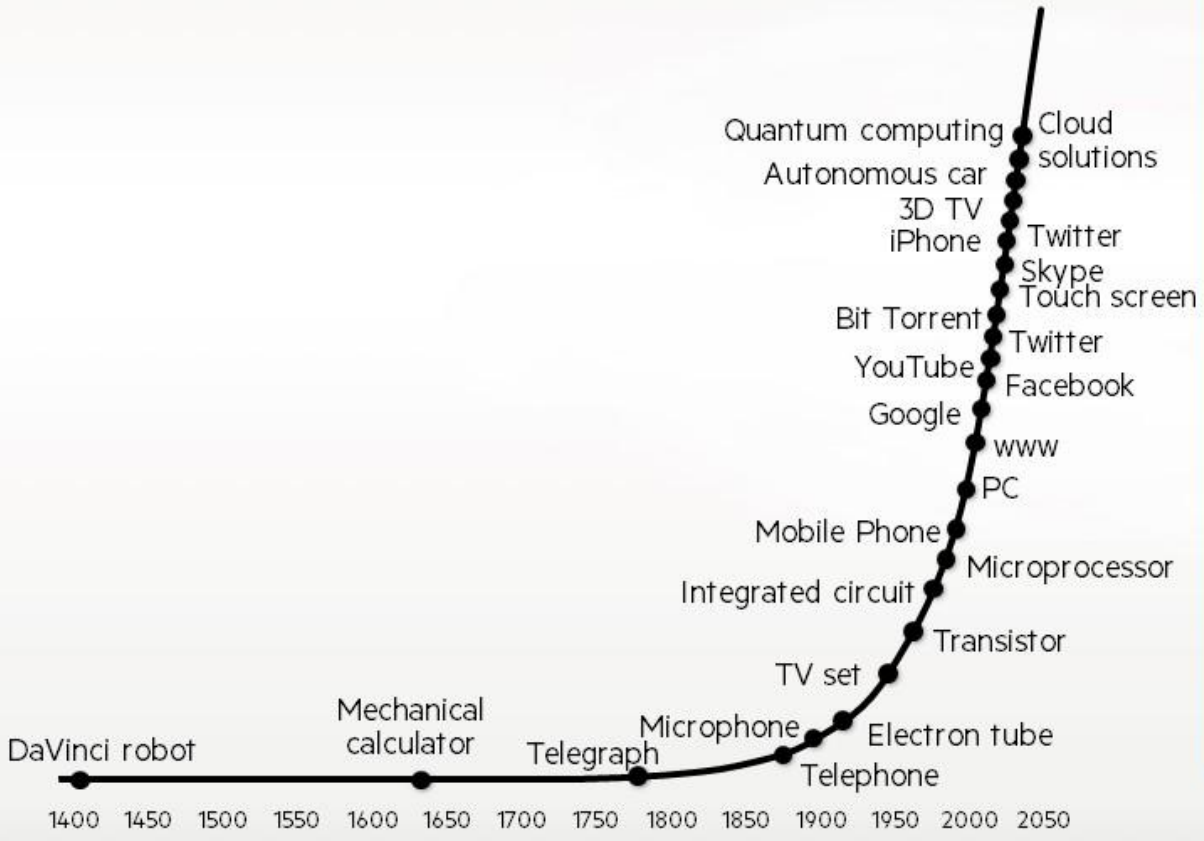
lmt
5G development
Facing the new digital reality
Prof. Juris Binde, Dr.oec
President of LMT

CHANGE IN THE WORLD WILL NEVER BE AS SLOW AS TODAY

The acceleration of technology development



Today's smartphones have more computing power than NASA used to go to the Moon

Smartphone processor performance
(iPhone X – 2.4 GHz) is
60 000 times higher than NASA equipment
(Apollo Guidance Computer - 0.04 MHz)

INDUSTRIAL REVOLUTIONS

1.0
Water and steam power is used to create mechanical production facilities

2.0
Electricity lets us create a division of labor and mass production

3.0
IT systems automate production lines further

4.0
IoT and cloud technology automate complex tasks

1800

1900

2000

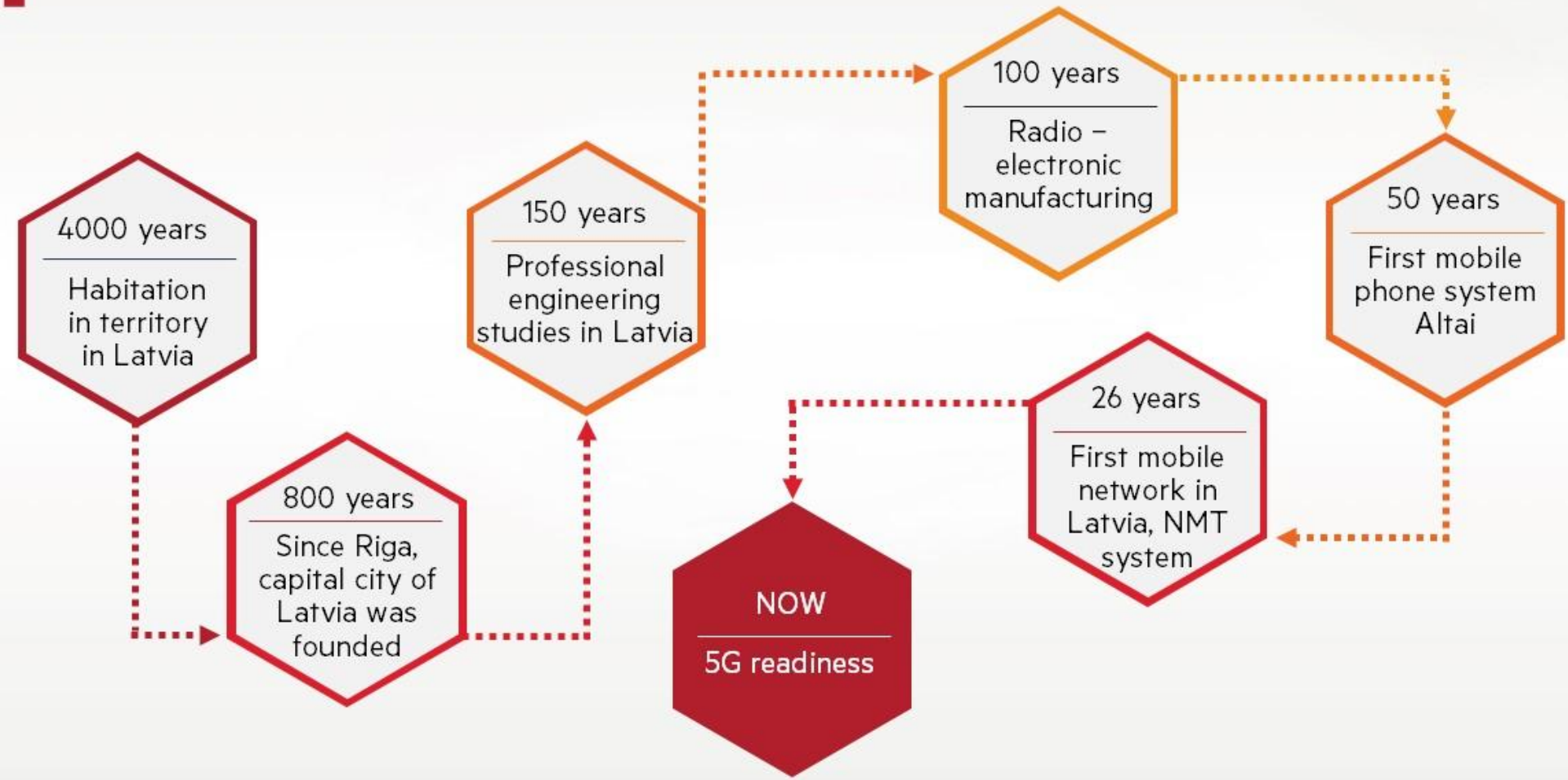
1784 - First mechanical loom

1870 - First assembly line

1969 - First programmable logic controller

First commercial IoT technologies

SUSTAINED TECHNOLOGY LEGACY FOR 100 YEARS



EVOLUTION OF MOBILE TECHNOLOGY

5G started with trying to define a wide range of applications first and define a very flexible 5G NR numerology to support most of them

1961-Altai

1G Voice

2G Voice, SMS

3G Voice, SMS, Internet

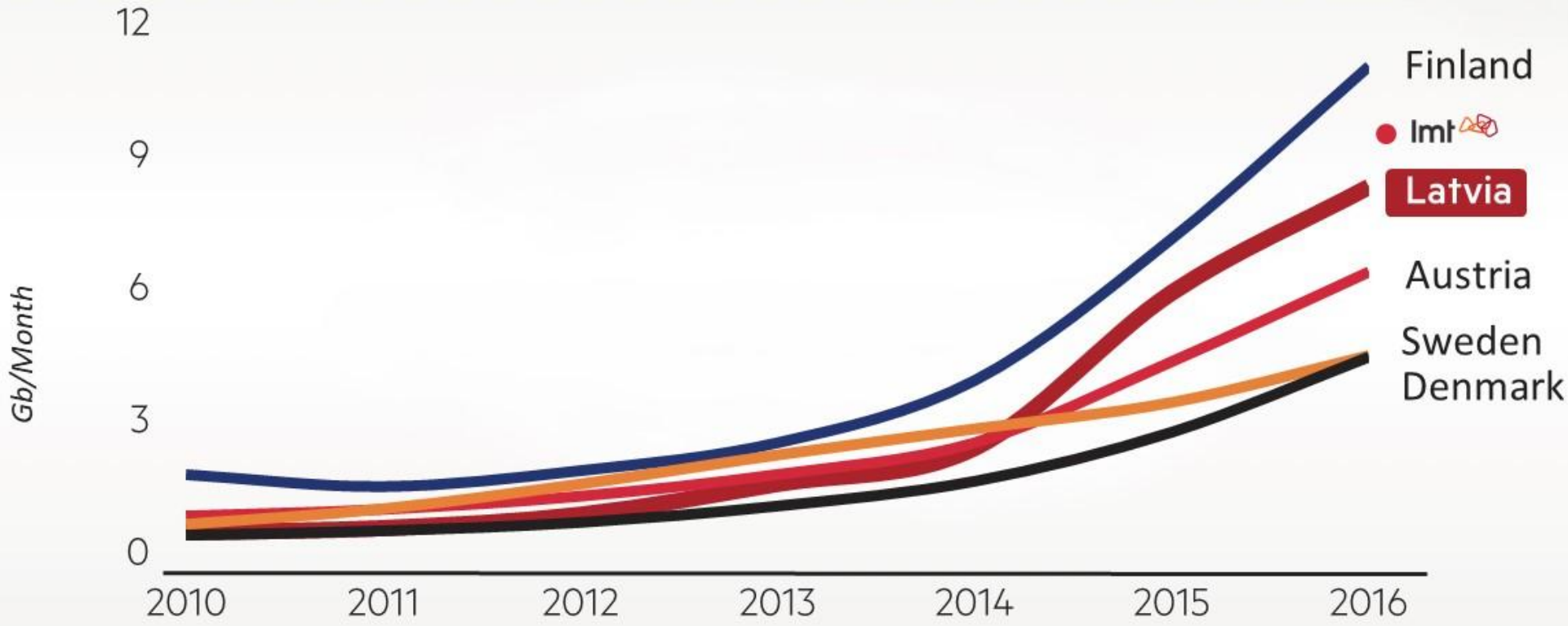
4G Audio, Video, Apps

5G
Audio, Video, Apps, VR (eMBB)
Sensors (mMTC)
Sensors/Robots (URLLC)

1980 1990 2000 2010 2020 2030

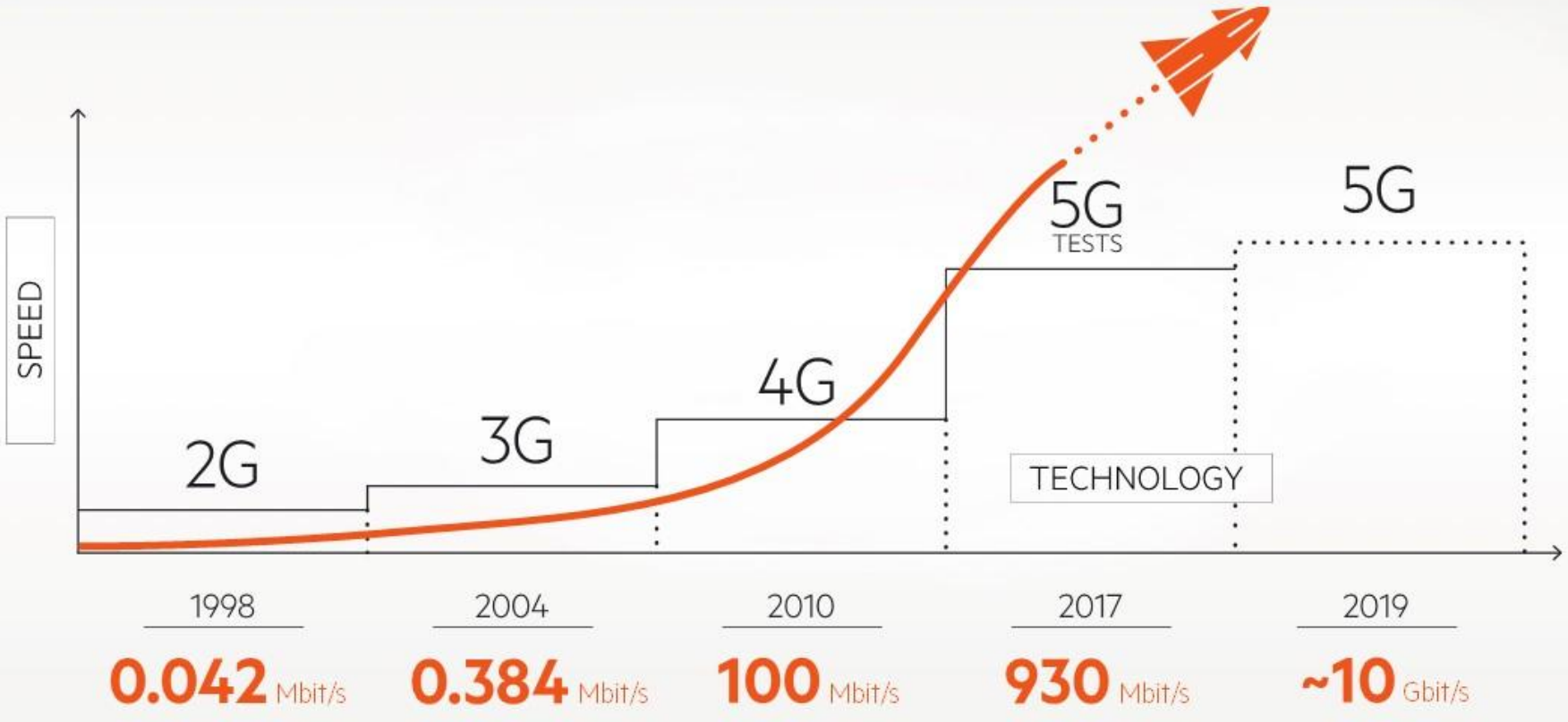
THE ROLE OF MOBILE NETWORK CHANGES

LATVIA IS A REAL GIGABYTE SOCIETY



Source: OECD Digital Economy Outlook 2017

INTERNET DEVELOPMENT PHASES



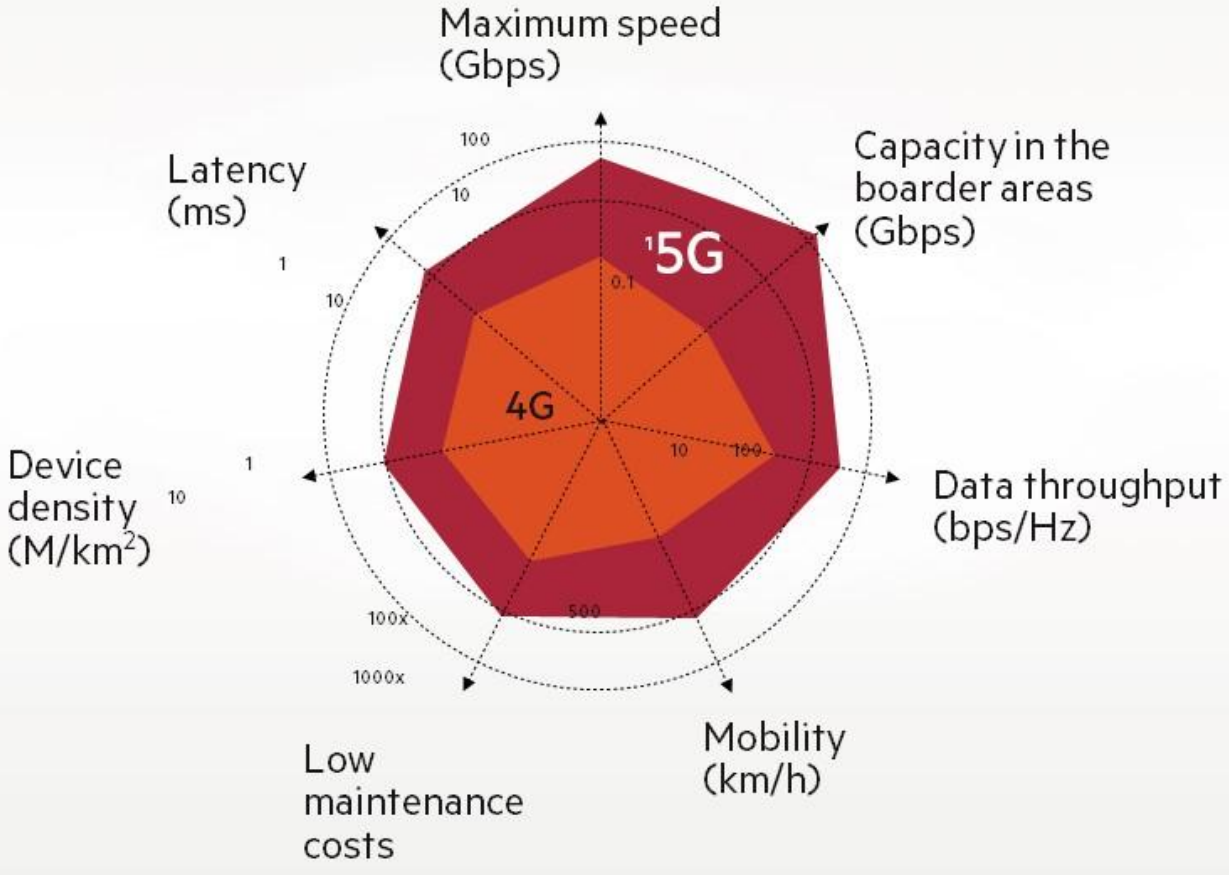
TEST@ 5G TECHRITORY 27.-28.09.2018.

1.4 Gbit/s

4 ms

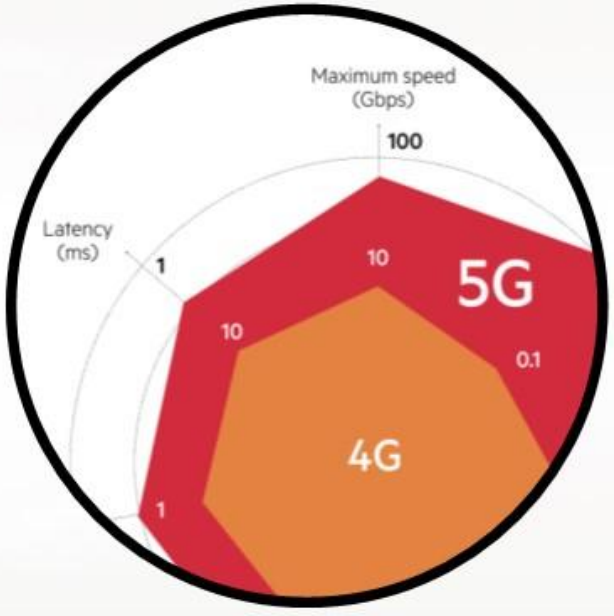
Models
vehicles
Engagement
Industrial
Mobile
Big
track
Activity
Algorithms
Drone
GDPR-ready
Development
Future
Integration
Infrastructure
Control
Self-driving
Connected
Flow
Machine
5G
Smart
Apps
city
Traffic
Information
Cyber-range
TV
Exploration
Start-up
Smartphone
Planning
Rocket
Android
UVA
Access
Implementation
Garage-method
Performance
Broadband
Voice
Analysis
Content
Security
Internet
mapping
tunnel
Communications
Intelligence
Experiments
Innovation
Streaming
Coverage
Telecom
source
Open
Capacity
Partners
LTE
Computer
learning
Digital
Research
Real-time
Ecosystem
add-ons
Network
Online
Data vision
Cloud
Test
IOT
data
cars
feed

5G IS MORE THEN COVERAGE AND SPEED



SUPER LOW LATENCY

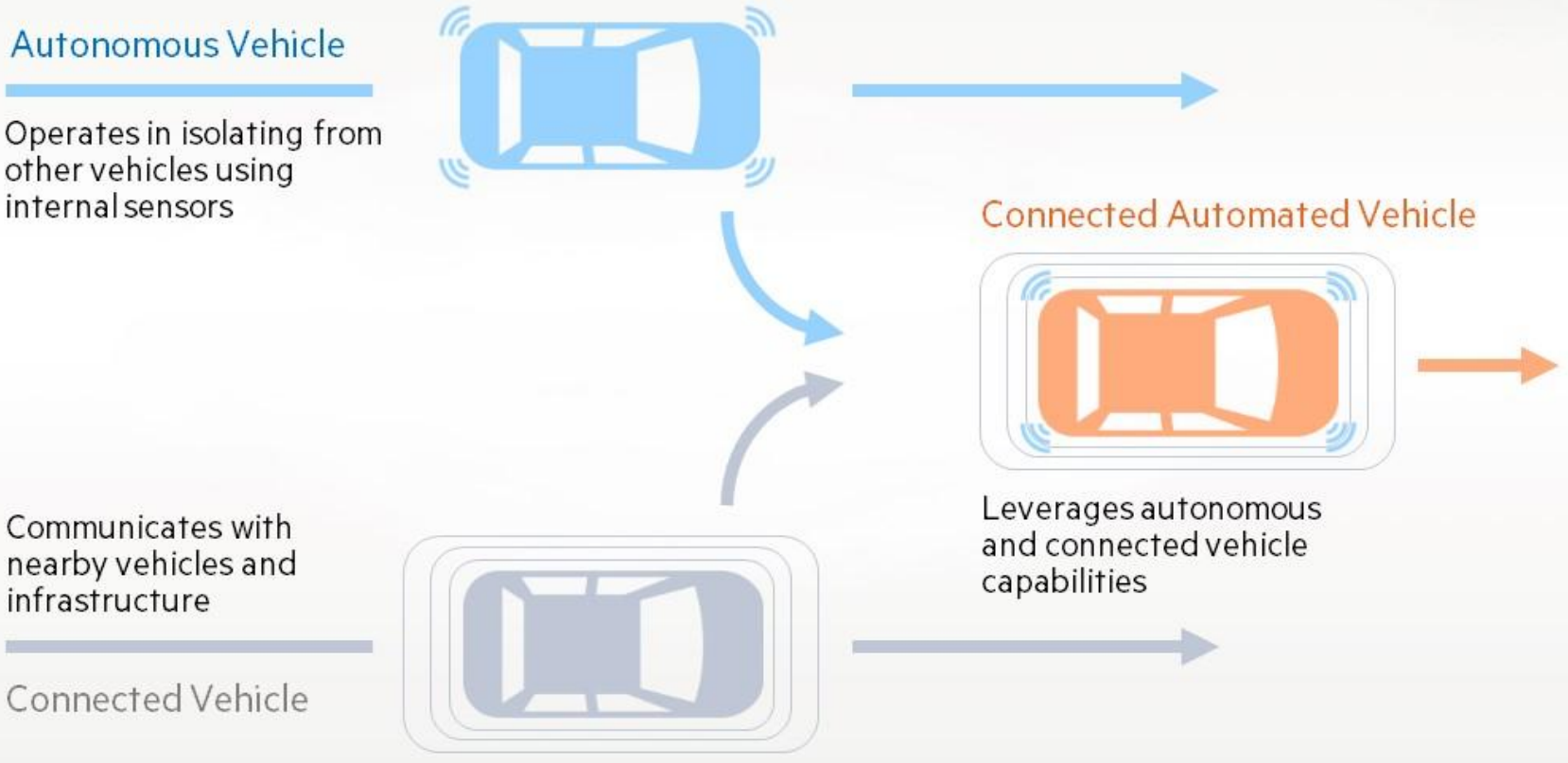
1 s **30** ms **1** ms



SELF-DRIVING CARS

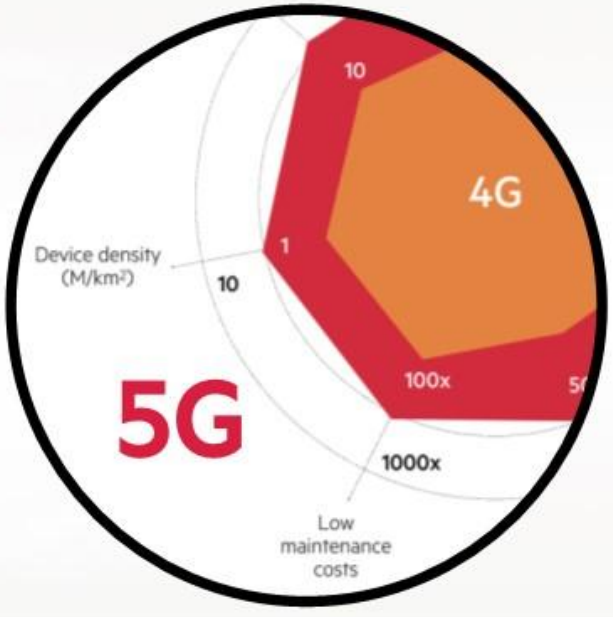
Illustration: Renault EZ-GO @ Paris Mondial Auto 2018

SELF-DRIVING CARS



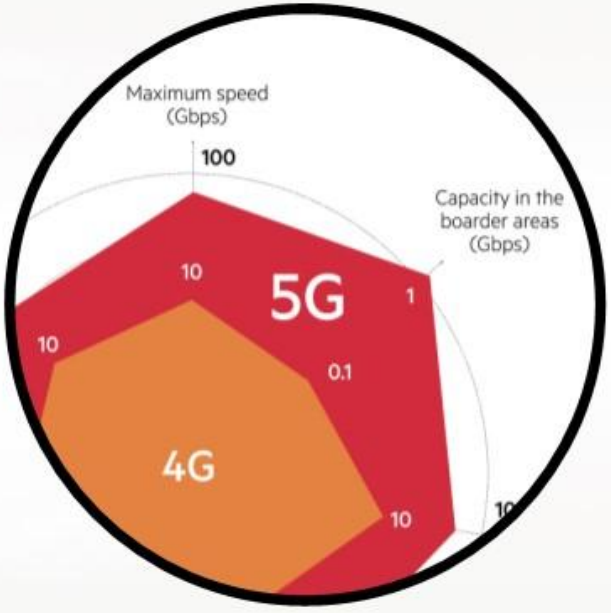
LOW MAINTENANCE COSTS AND ENERGY EFFICIENCE

1 year **10** years



INTERNET SPEED

The required time to download a two-hour long movie



BENEFITS

Money

Time

Productivity

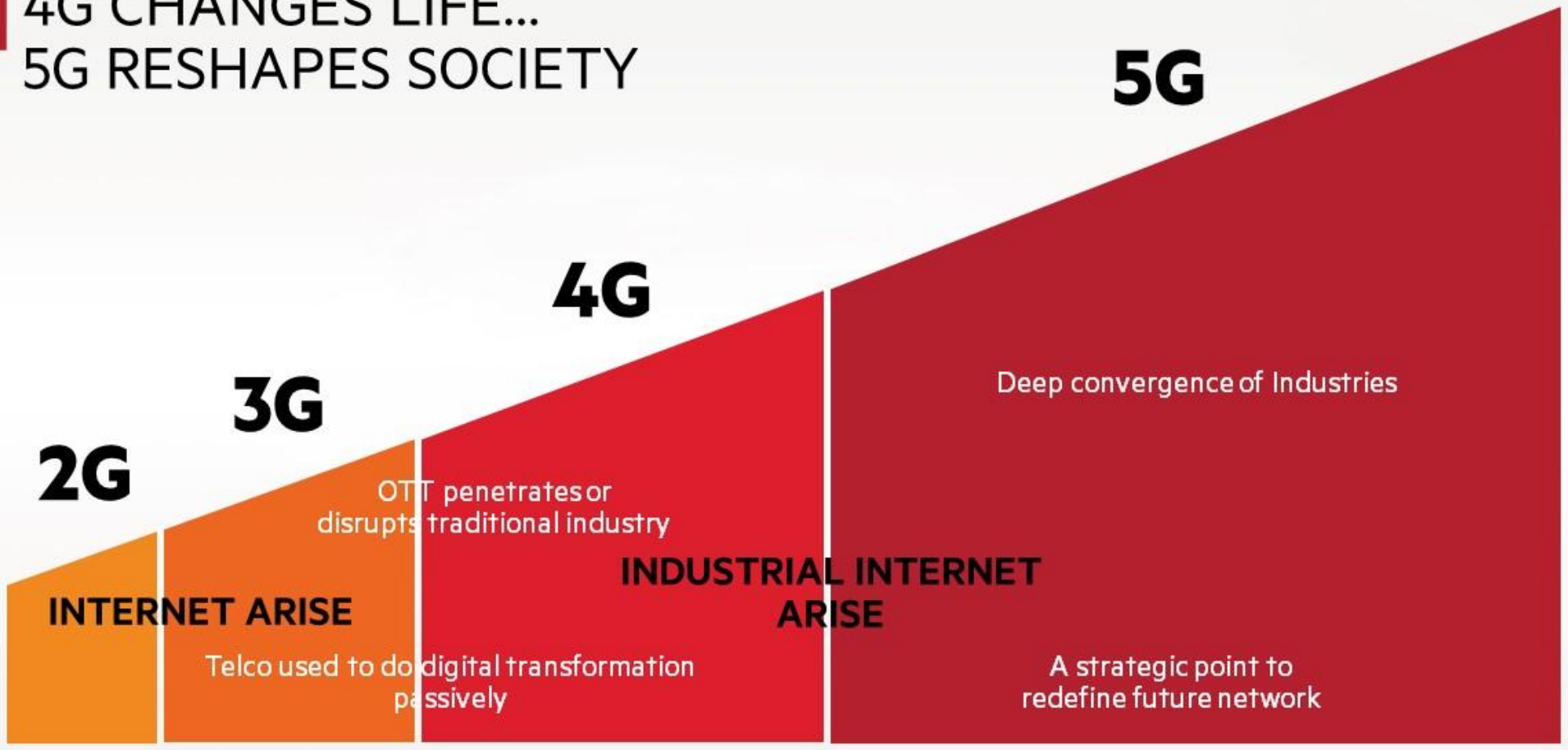
BRIGHTER FUTURE FOR HUMANS

No dull

No dirty

No dangerous

4G CHANGES LIFE...
5G RESHAPES SOCIETY



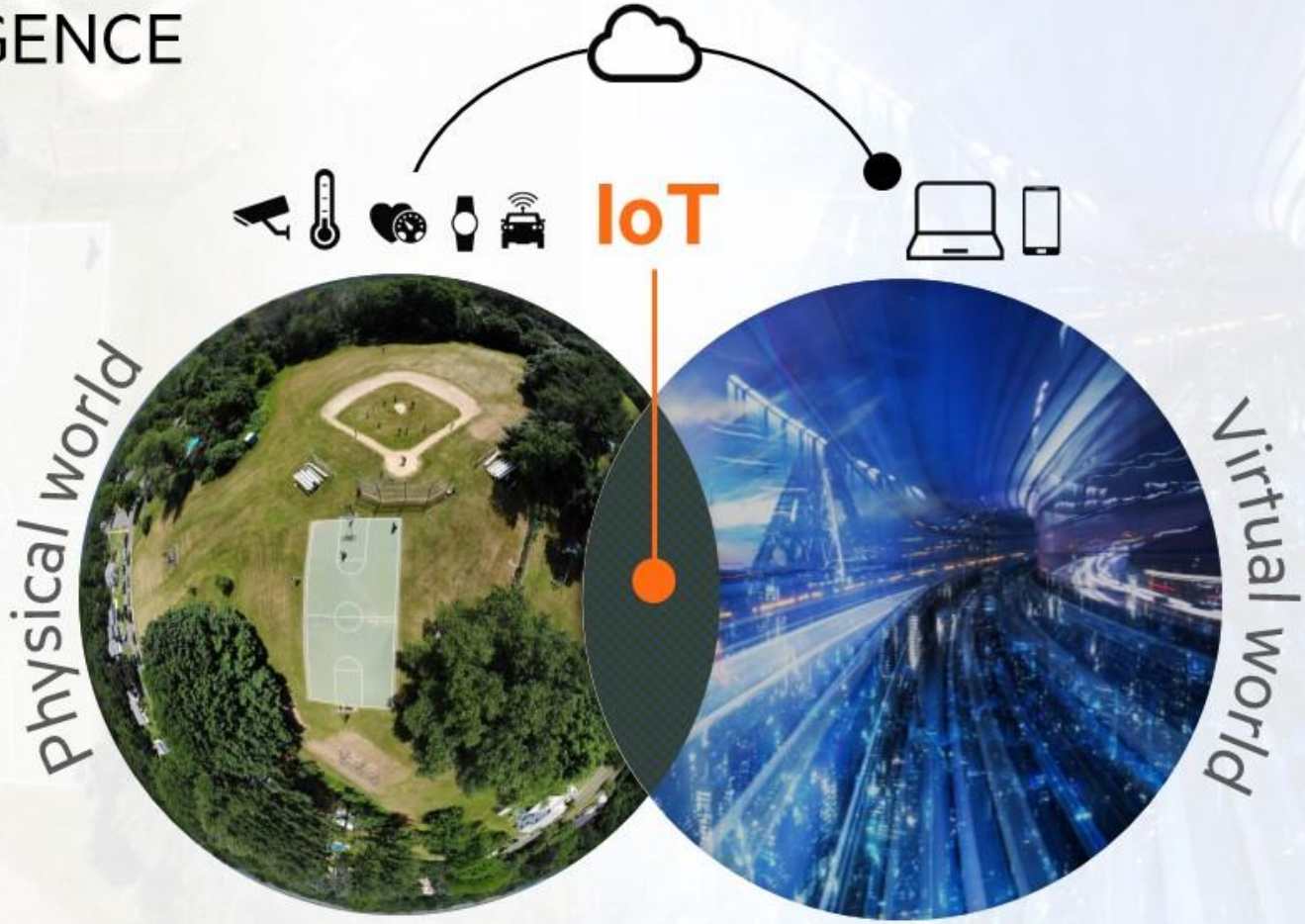
SHARED ENVIRONMENT

PAST

PRESENT

FUTURE

VULNERABLE POINT OF CONVERGENCE



LAUNCH OF NB-IOT IN LMT NETWORK

1 OUT OF 4 SIM CARDS ON LMT NETWORK ALREADY EMPLOYED BY A SMART DEVICE

OPPORTUNITIES TO ENABLE INNOVATIONS

1

Business Application Layer

Applications and services available directly to consumers and top-level application providers

2

Business Enabler Layer

APIs and interfaces to enable providers to create 5G services

3

Infrastructure Layer

The physical cabling, nodes and base stations that handle communications

5G USE CASES

5G

Enhanced mobile broadband

- Multi-Gbps data rates
- Extreme capacity
- Uniformity
- Deep awareness

Mission-critical services

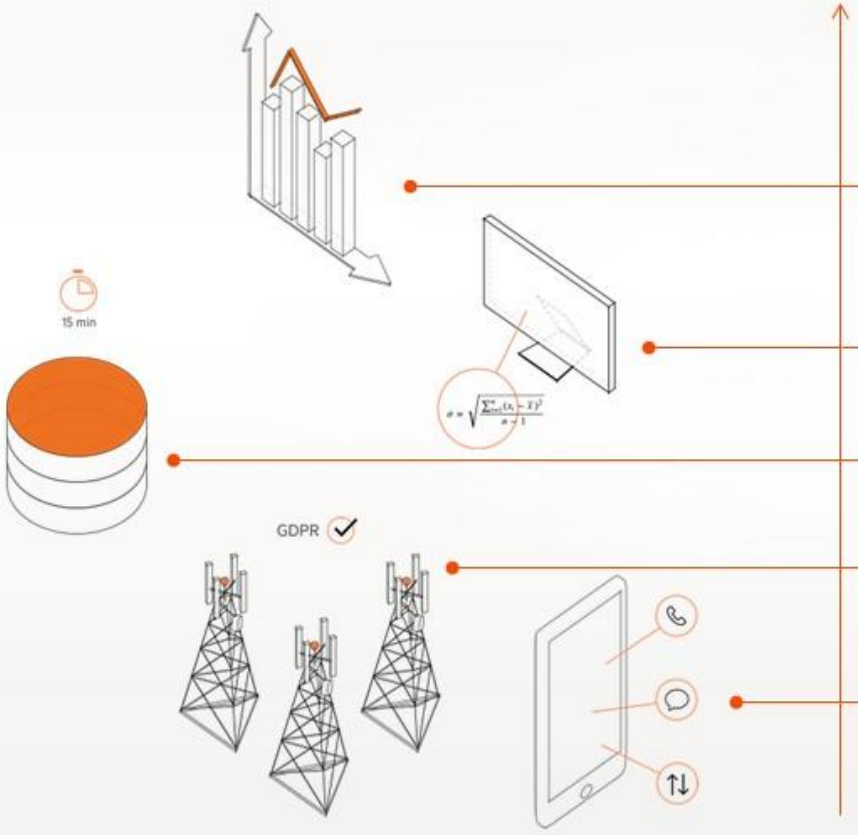
- Ultra-low latency
- High reliability
- High availability
- Strong security

Massive Internet of Things

- Low cost
- Ultra-low energy
- Deep coverage
- High density

BIG DATA ANALYTICS IN MOBILE NETWORKS

GDPR-compliant data collection



As a result, reliable location-specific real-time statistics and observations are available to decision makers

The collected data is analysed by applying an advanced mathematical model developed in partnership with scientists

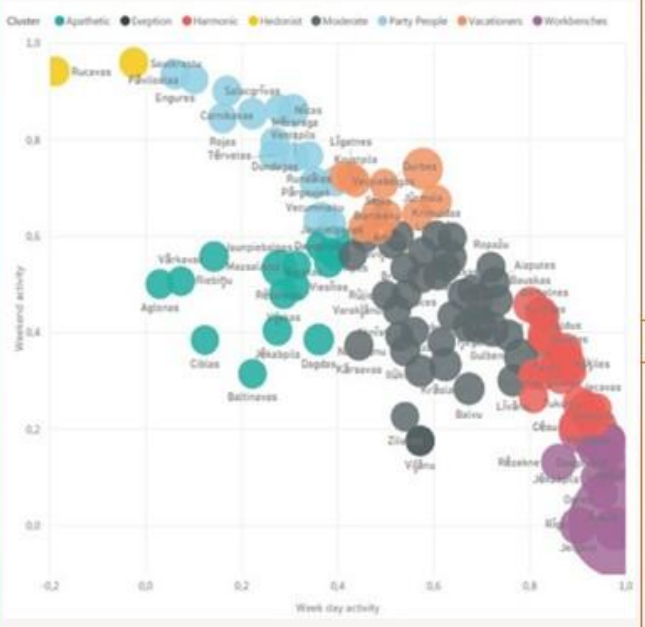
Information on number of events and location is recorded every 15 min

Information on number of calls, SMS and data sessions is collected in compliance with GDPR

Mobile network stations throughout the country record mobile events

ECONOMIC ACTIVITY ANALYSIS

Clusters of Counties by Economic Development Index

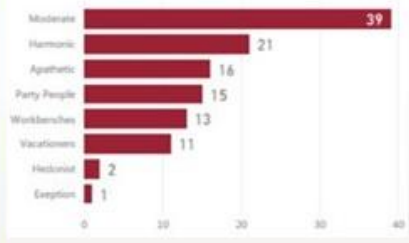


Cluster classifications

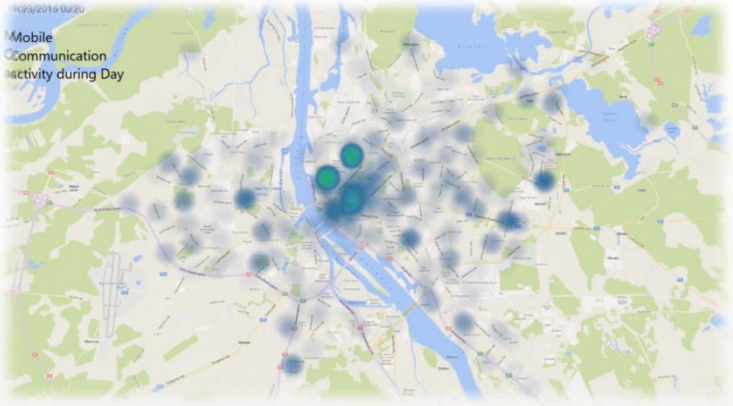
Select Region

- Kurzemes region
- Latgales region
- Rigas region
- Vidzemes region
- Zemgales region

Number of Counties in Cluster



65 million
calls and SMS



FROM EGO-SYSTEM TO ECO-SYSTEM

Mobile Operator

Infrastructure focus
Slow time to market
Traditional local sales channels

Mobility Operator

Product-centric
Effective and agile innovations
Strong digital cannel presence, cross-border focus

CREATING NEW PARADIGMS AND DEVELOP CONCEPTS

Data mobility

- Voice
- Internet
- Broadband
- Television
- Big data
- Private LTE

People mobility

- **MaaS (Mobility as a Service)**
- Ride sharing
- Car sharing
- Connections between vehicles, infrastructure and pedestrians (V2I2P)

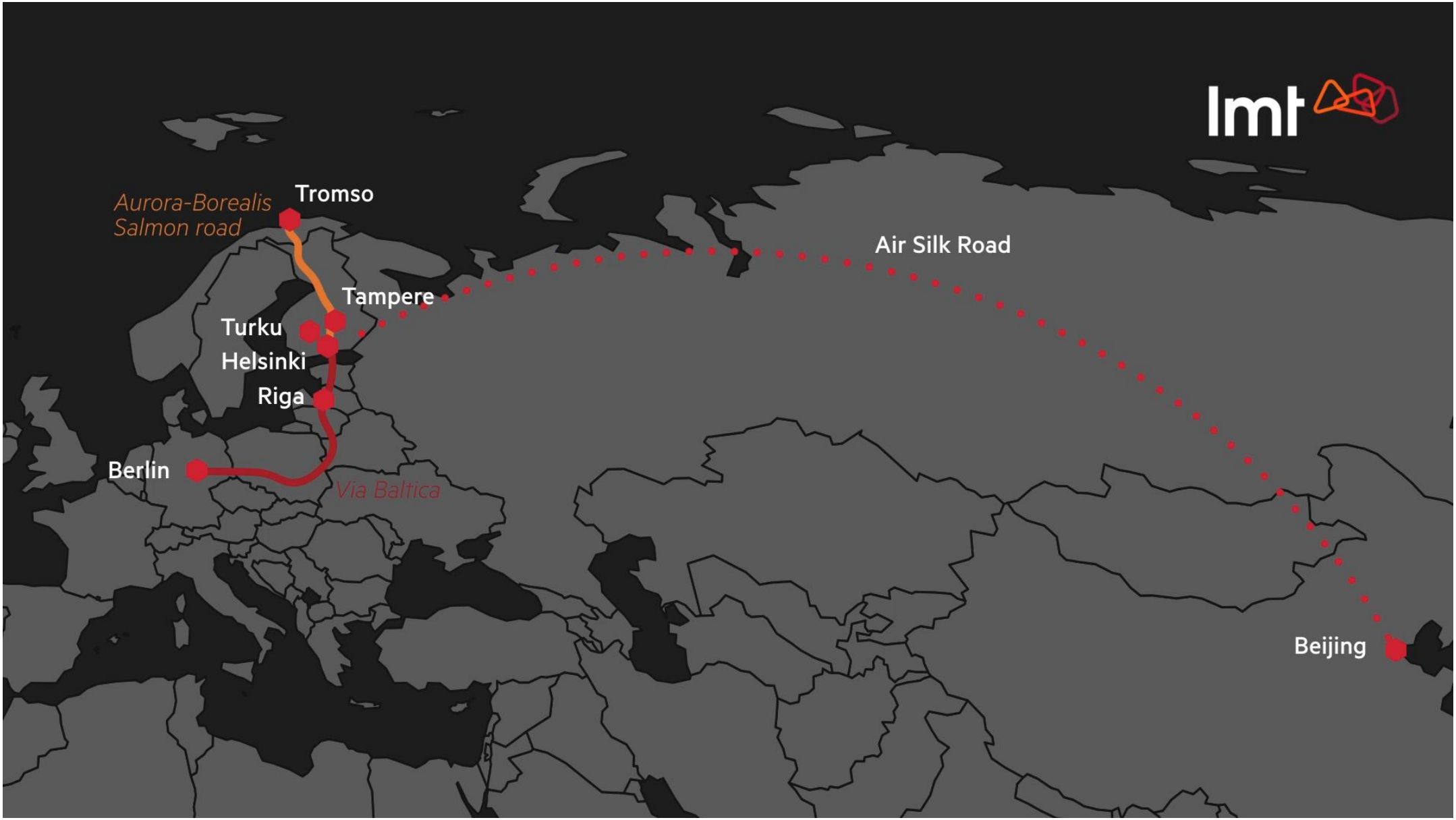
MOBILITY services provider

Things mobility

- **CaaS (Corridor as a Service)**
- C-ITS development
- Multimodal, cross-border interoperability
- Tracing & tracking
- Logistics & optimization solution
- Drone as a Service

5G PRIORITY DIRECTIONS OF INNOVATION

- Digital transport systems
- Security and protection solutions
- Unmanned aerial vehicle coordination systems
- Sensors and Big data systems


Aurora-Borealis
Salmon road
Tromso
Air Silk Road
Tampere
Turku
Helsinki
Riga
Berlin
Via Baltica
Beijing

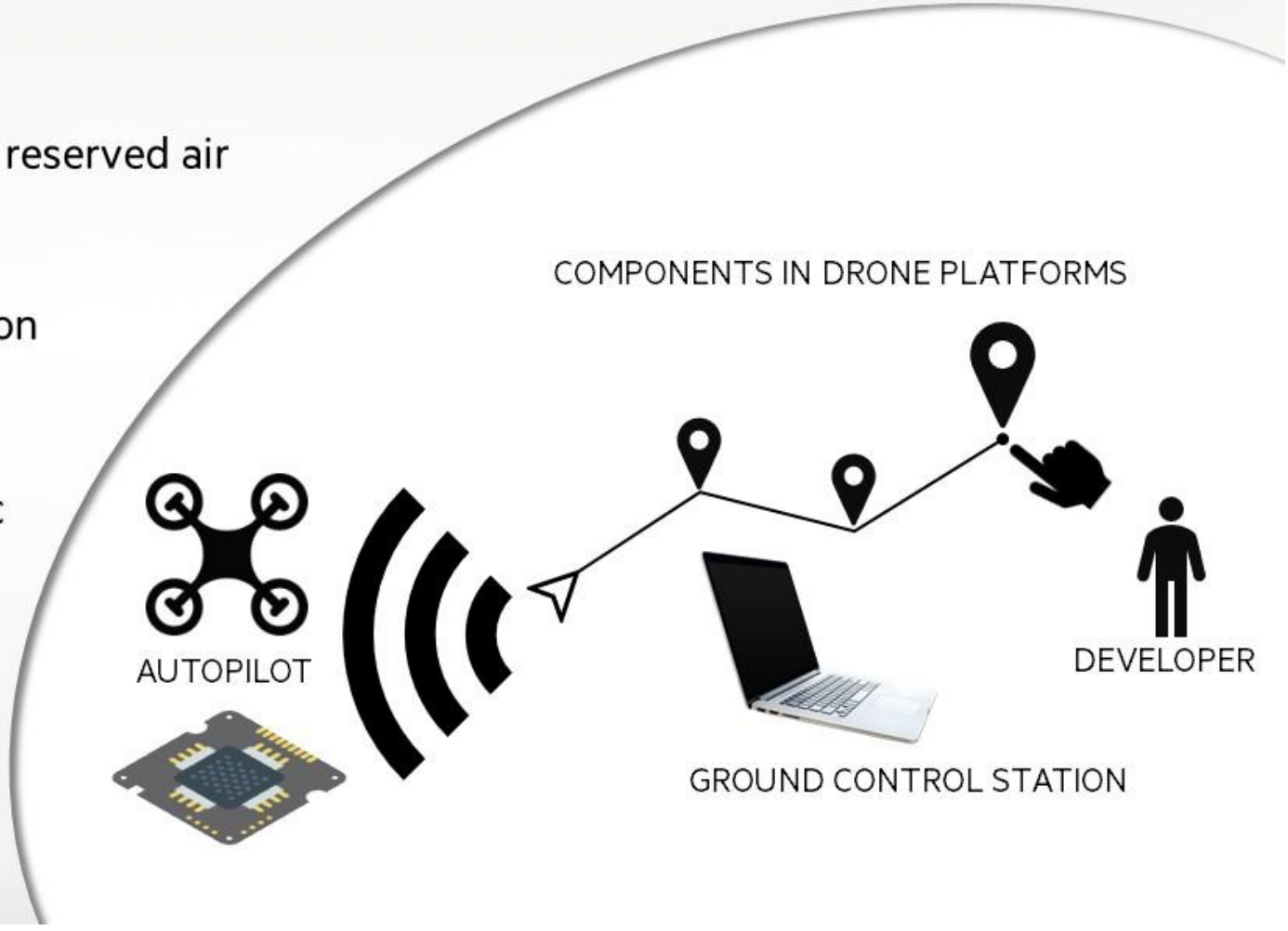
Signing Memorandum of the Digital Baltic Road

28.09.2018.

lmt >
straume

DRONES

- Particularly isolated area and reserved air space for BPLA pilot flights
- Customized telecommunication infrastructure, 5G, MEC
- Possibility to attract scientific resources (LU, RTU)



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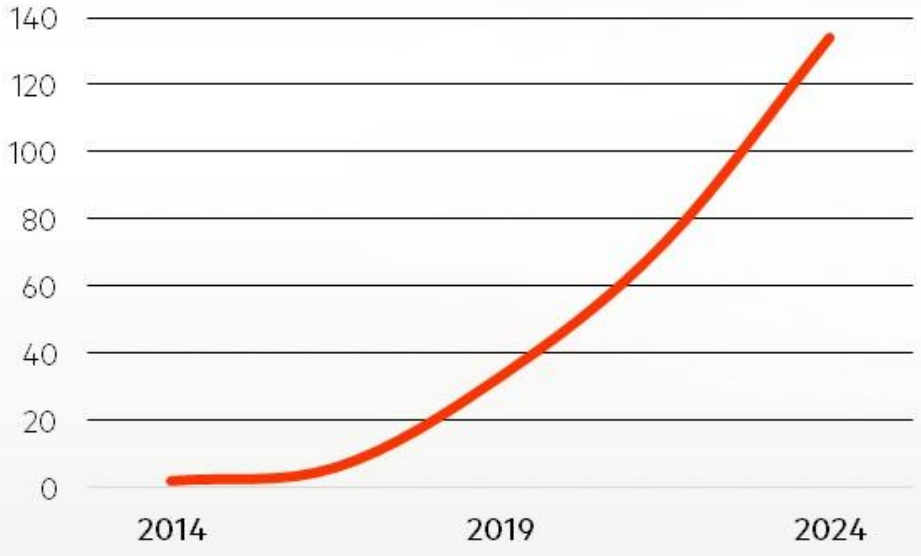
FUTURE IS MOBILE

GLOBAL MOBILE DATA USAGE
(exabytes EB/month)



Ericsson Mobility Report, 2018

SMARTPHONE SHARE
Year 2021

of mobile data traffic

of global connections

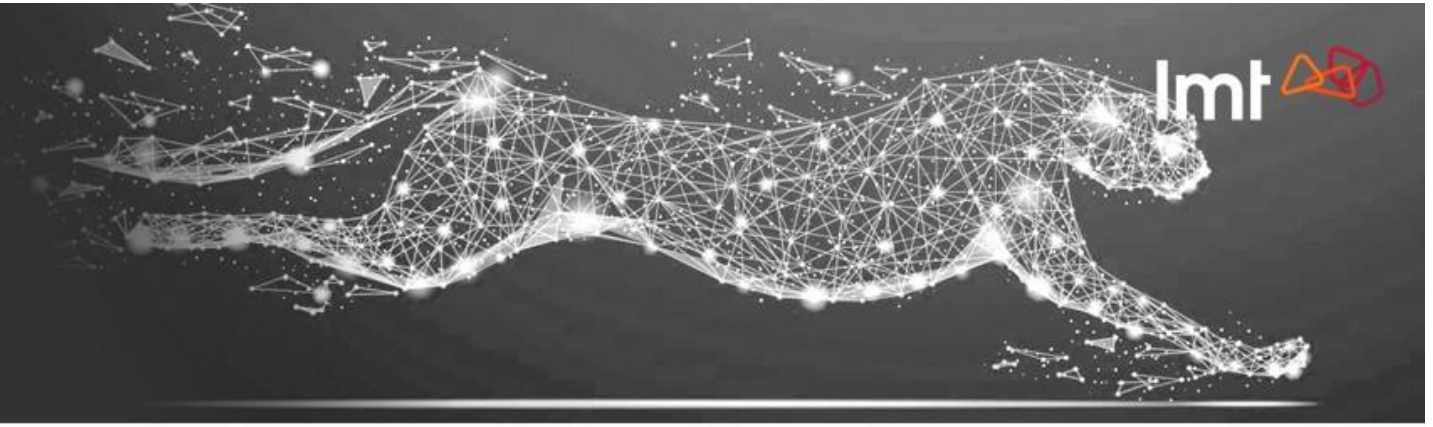
Cisco, 2017

PARADIGM SHIFT

This is not an era of change but a change of era

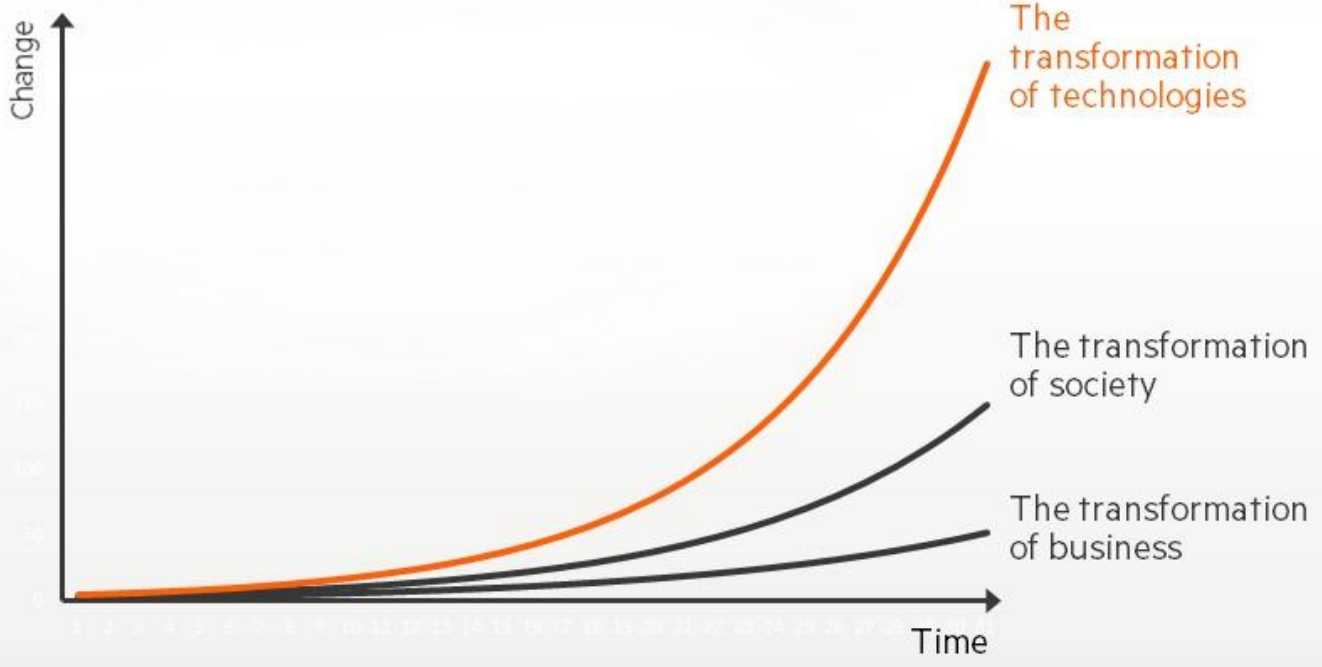
Jan Rotmans (2014)

DIGITAL DARWINISM



We live in a new era where technology and society are evolving faster than businesses can naturally adapt

It is not the strongest or the most intelligent who will survive but those who can adapt to change the best

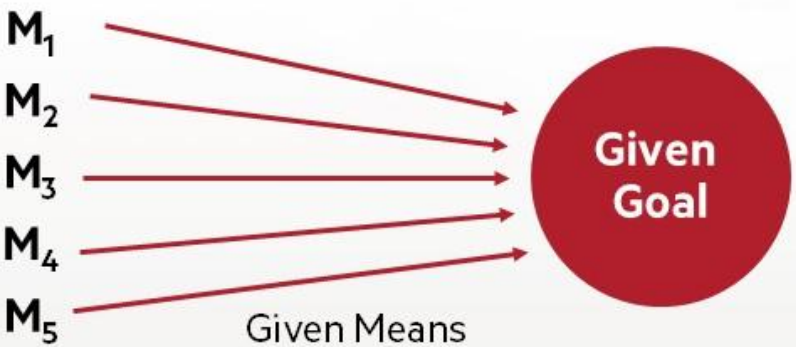


CAUSAL vs EFFECTUAL REASONING

Managerial Thinking (Causal)

Distinguishing Characteristic

Selecting between given means to achieve a pre-determined goal



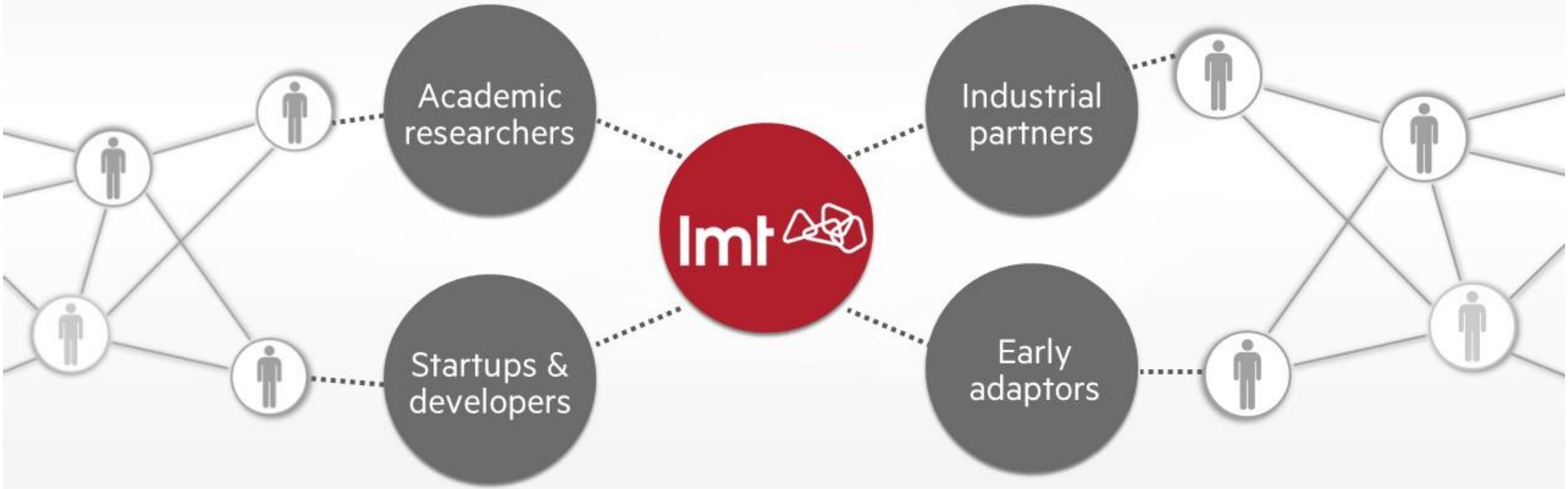
Entrepreneurial Thinking (Effectual)

Distinguishing Characteristic

Imagining a possible new end using a given set of means

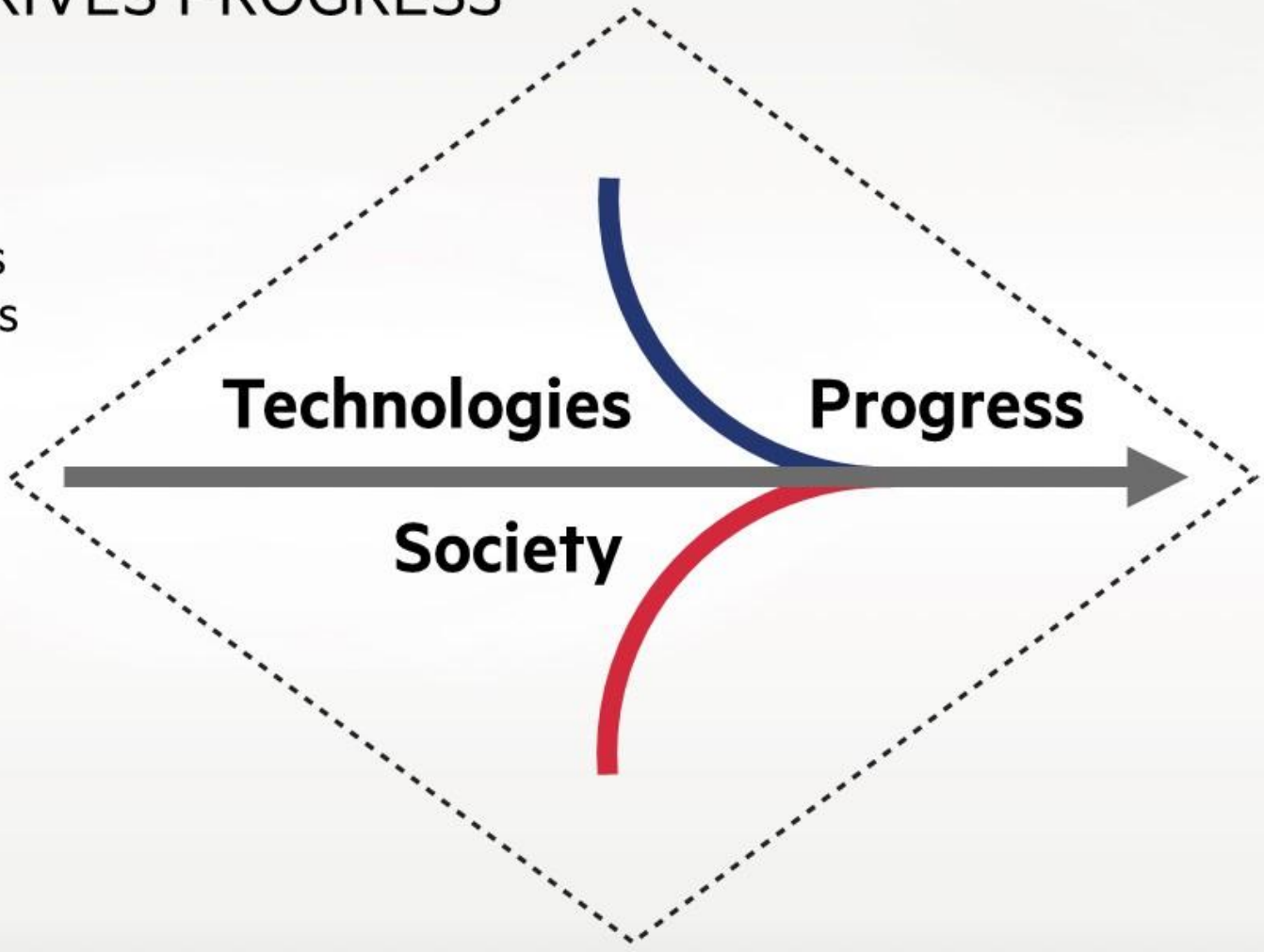
Source: https://www.effectuation.org

NETWORKING IN SEARCH FOR IDEAS AND SKILLS



COOPERATION DRIVES PROGRESS

Cooperation and symbiosis between society and technologies create and drive progress (and innovations)



Source: Alexander Bard, Netocracy, 2002

Imt
THE FUTURE IS
MOBILE ONLY