

**Prof. Dr. Christian Ramsauer**

Institute of Innovation and Industrial Management

Graz University of Technology

# Accelerating Innovation in the Digital Age

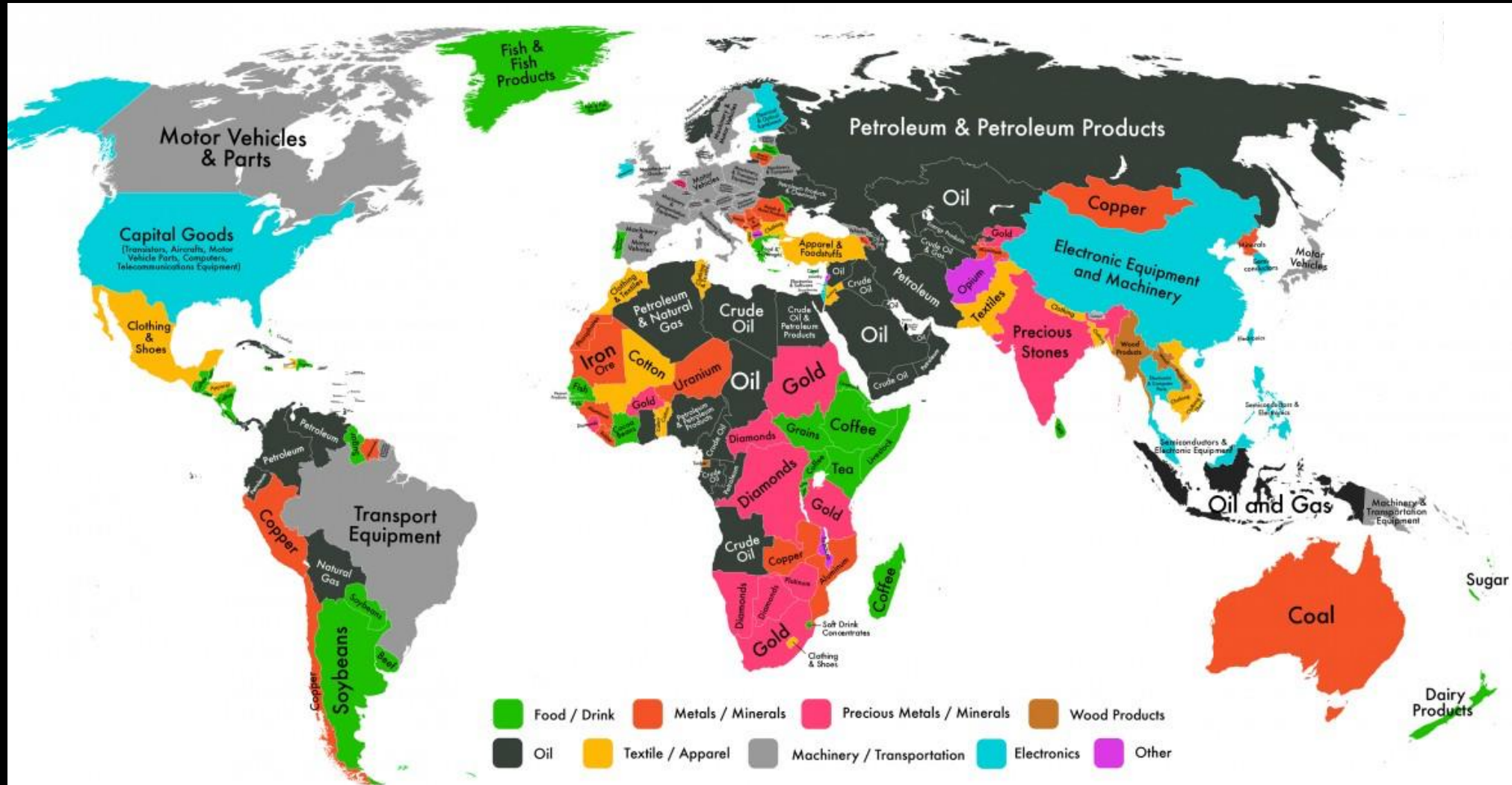
**# Selber Machen – Do Innovation Yourself**

Labor für Innovation - Graz, 18.06.2019



**INNOVATION AND INDUSTRIAL MANAGEMENT**  
UNIV.-PROF. DR. CHRISTIAN RAMSAUER

**Europe is short on natural resources**  
**Europe is rich on human capital (high-wage)**



SOURCE: World Commodity map / CIA FactBook <http://visual.ly/world-commodities-map>

# It is a fact - innovation is accelerating



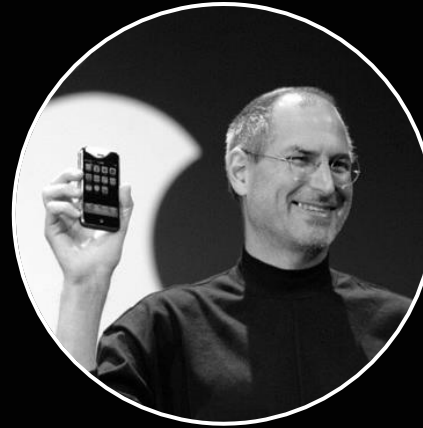
First Phone Call  
**1876**

**115  
YRS**



First Website  
**1991**

**16  
YRS**



First iPhone  
**2007**



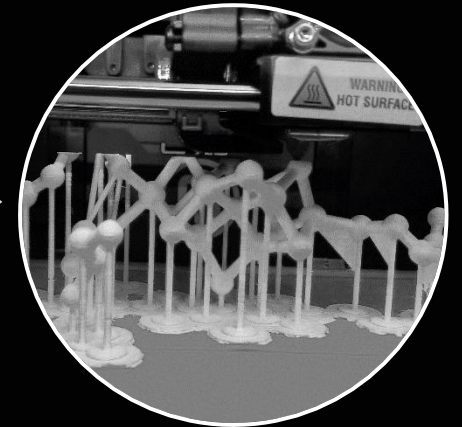
Printing Press  
**1476**

**505  
YRS**



Computer Printer  
**1981**

**25  
YRS**

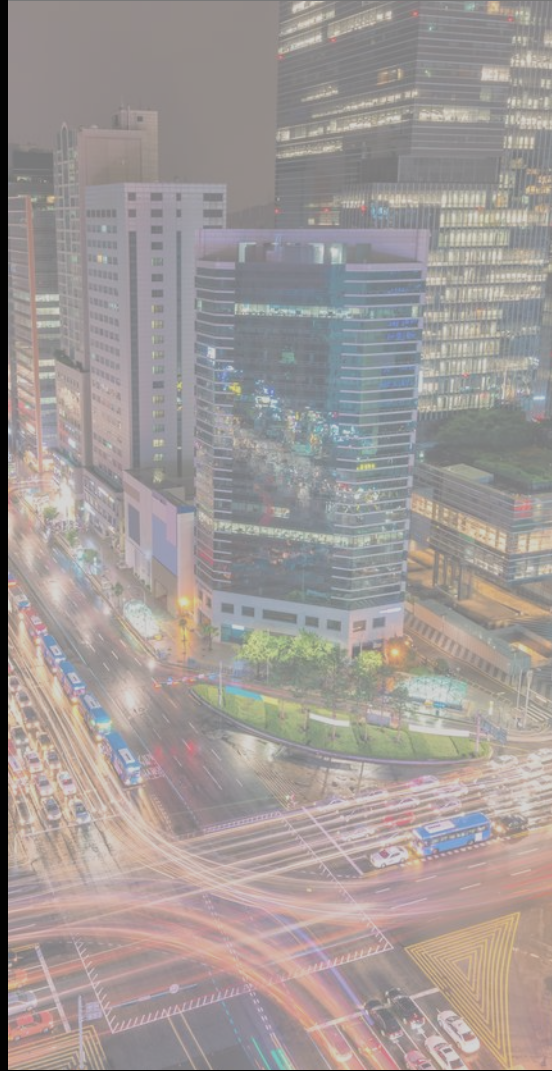


3-D Printer  
**2006**

SOURCE: No Ordinary Disruption by Richard Dobbs, James Manyika, Jonathan Woetzel (2015)





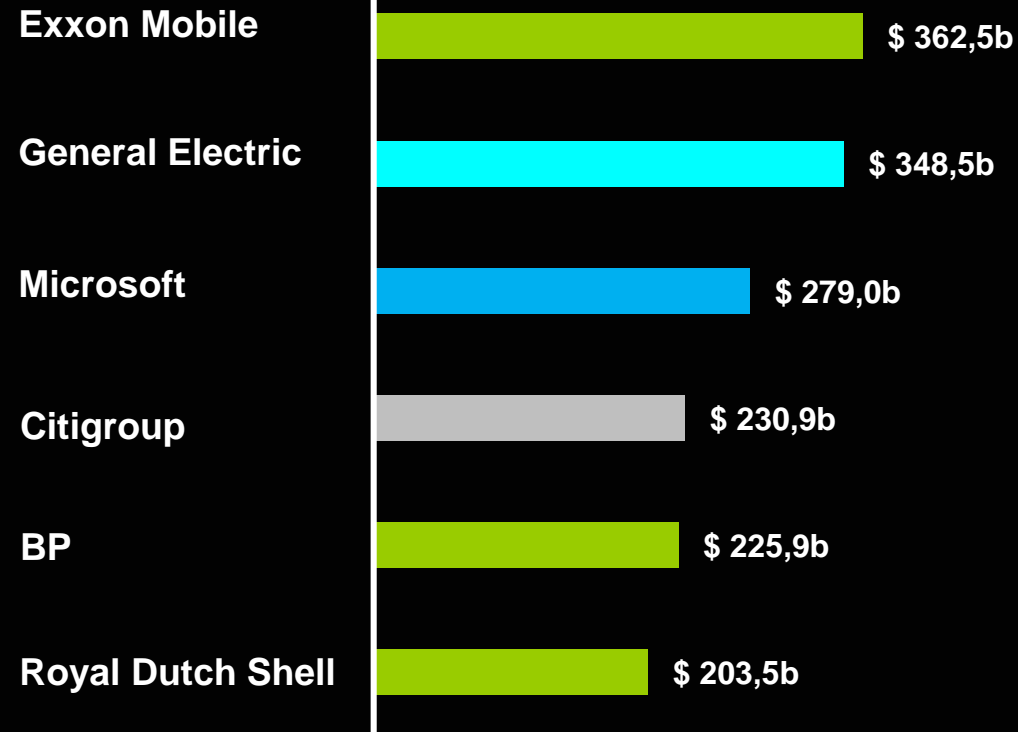


# The rise of tech (digital) companies

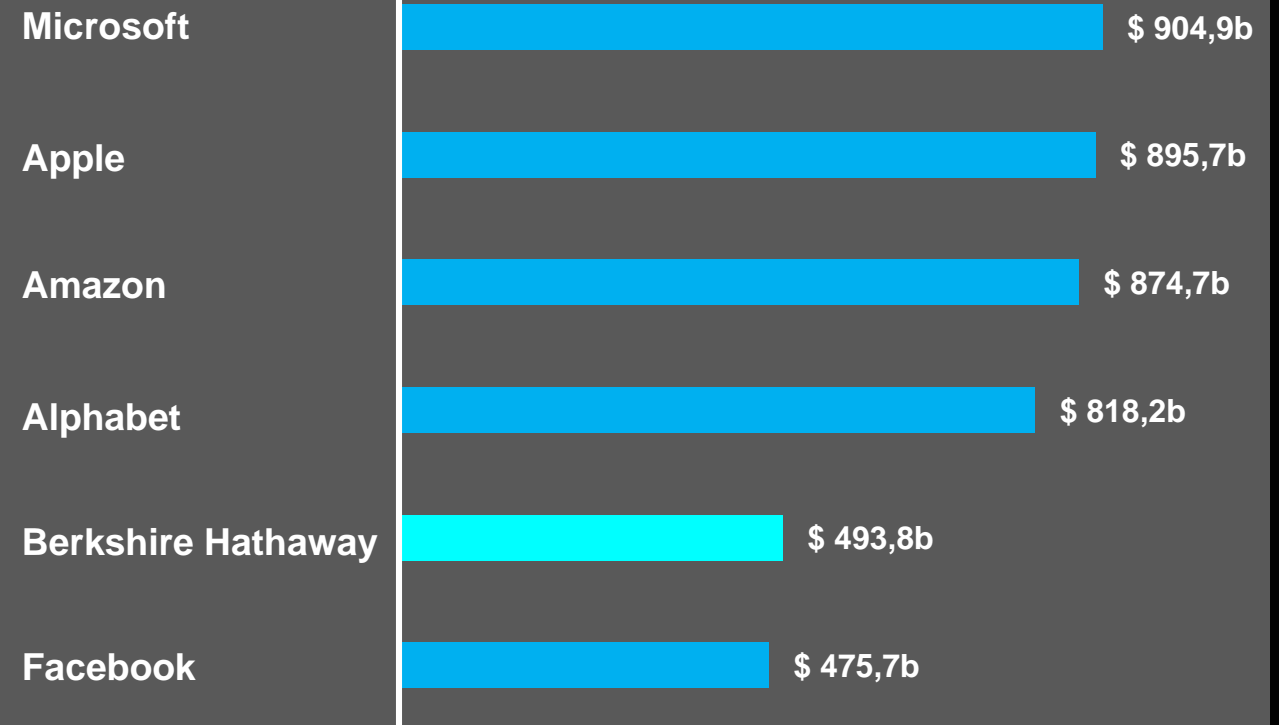
## Market capitalization of the world's most valuable public companies

Oil/Energy   Conglomerate   Tech   Financial services

2006



2019<sup>(1)</sup>



(1) As of March 31, 2019  
SOURCE: Yahoo! Finance, Forbes, Financial Times



# Tech (digital) companies are valuable without physical assets

**Q: What do the following brands have in common?**

**UBER | FACEBOOK | ALIBABA | AIRBNB**

**The value of “Zero” is almost 1 Trillion USD**

**A: Zero**

**UBER | FACEBOOK | ALIBABA | AIRBNB**

The world's largest taxi company owns **Zero** vehicles

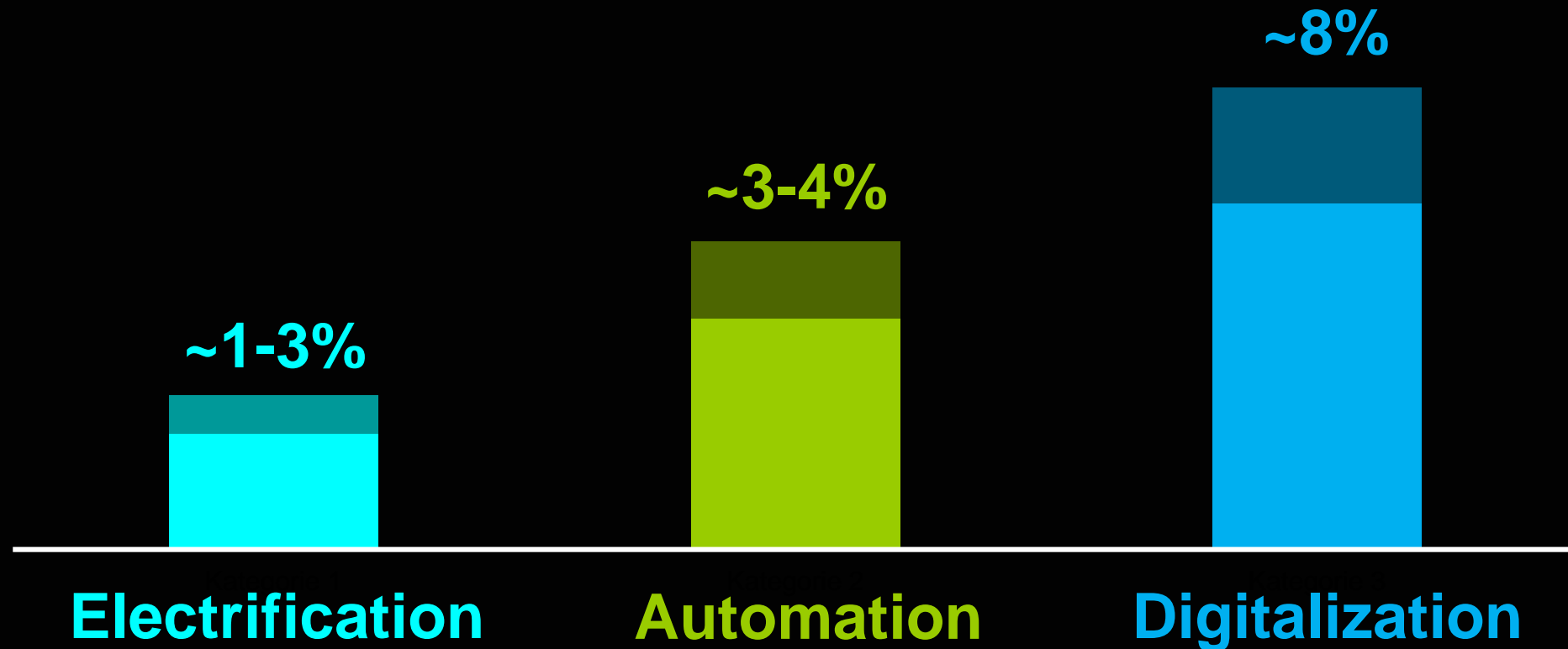
The world's most popular media owner creates **Zero** content

The world's most valuable retailer has **Zero** inventory

The world's Largest accommodation provider owns **Zero** real estate

# Market growth of electrification, automation and digitalization

(from 2018 – 2022, expectation Siemens AG)

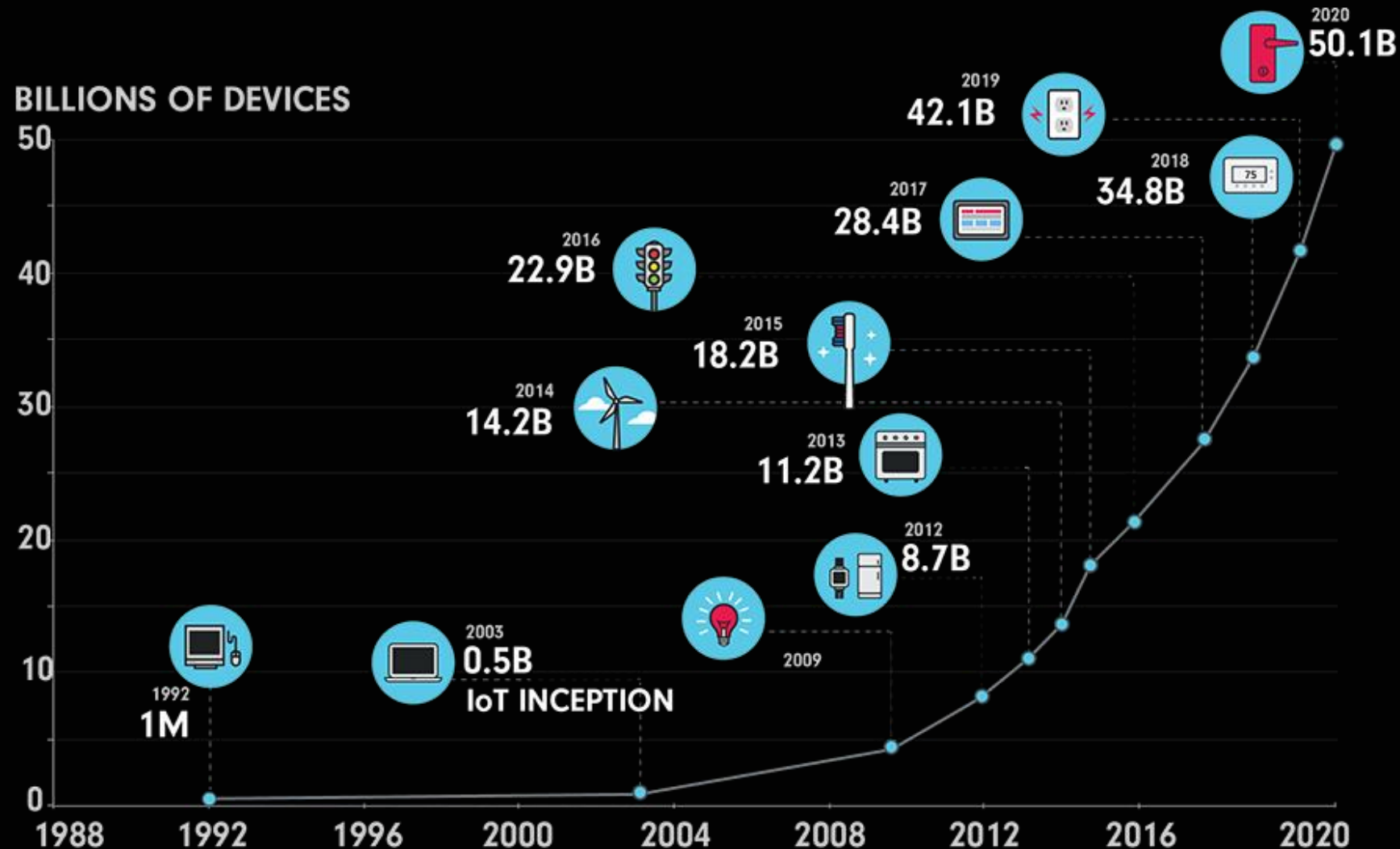


SOURCE: Dr. Roland Busch, CTO Siemens AG lecture at TU Graz, 02.04.2019



# Growth in the Internet of Things

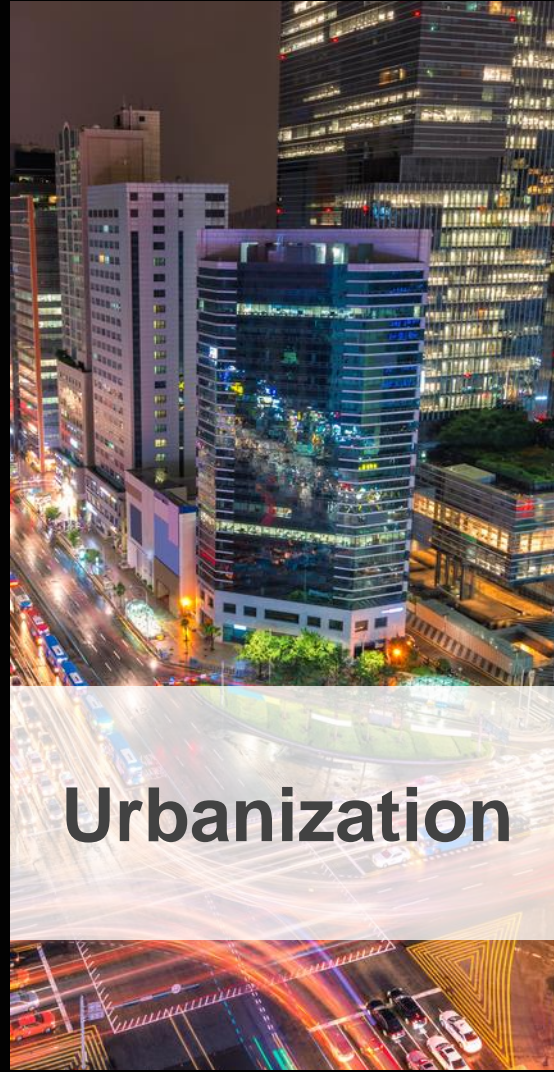
The number of connected devices will exceed 50 billions by 2020



SOURCE: <https://www.ncta.com/chart/> (2019)

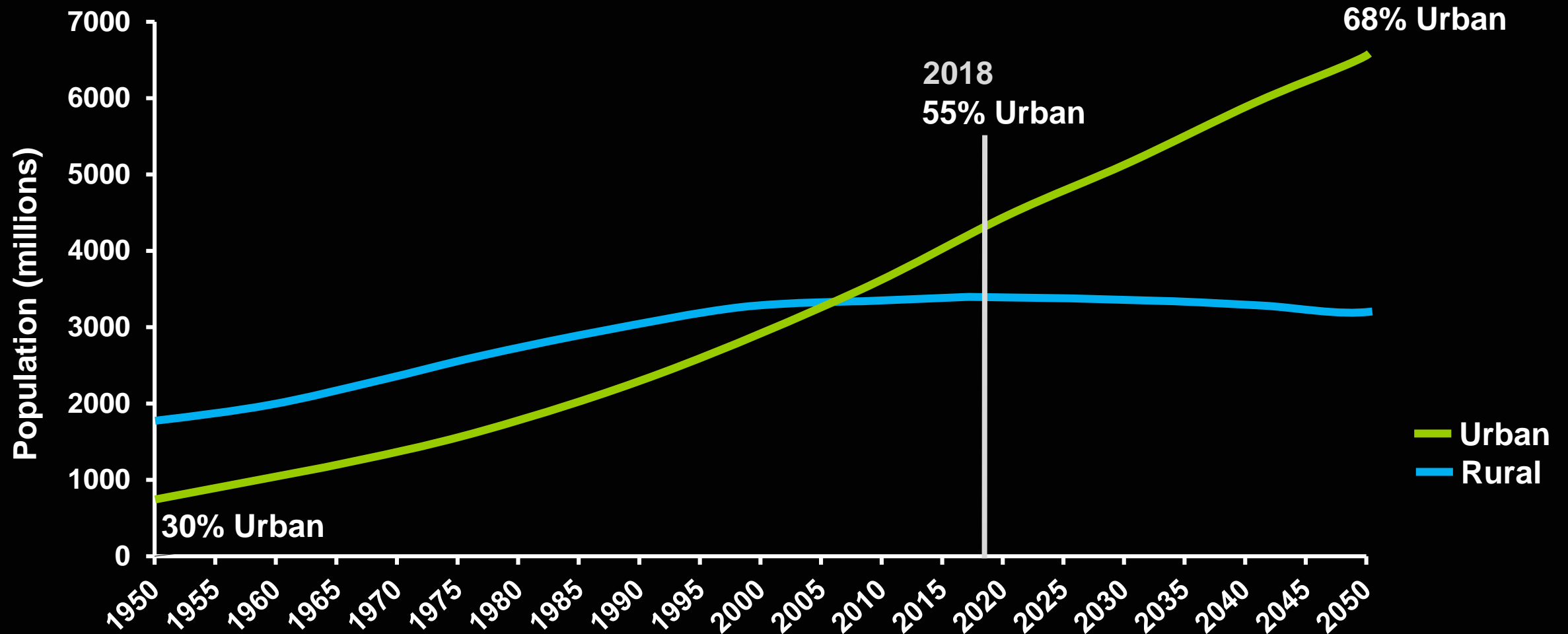






# Strong trend of urbanization until 2050

(Urban is defined as cities with more than 500.000 inhabitants)



SOURCE: United Nations; World Urbanisation Prospects: The 2018 Revision, Highlights

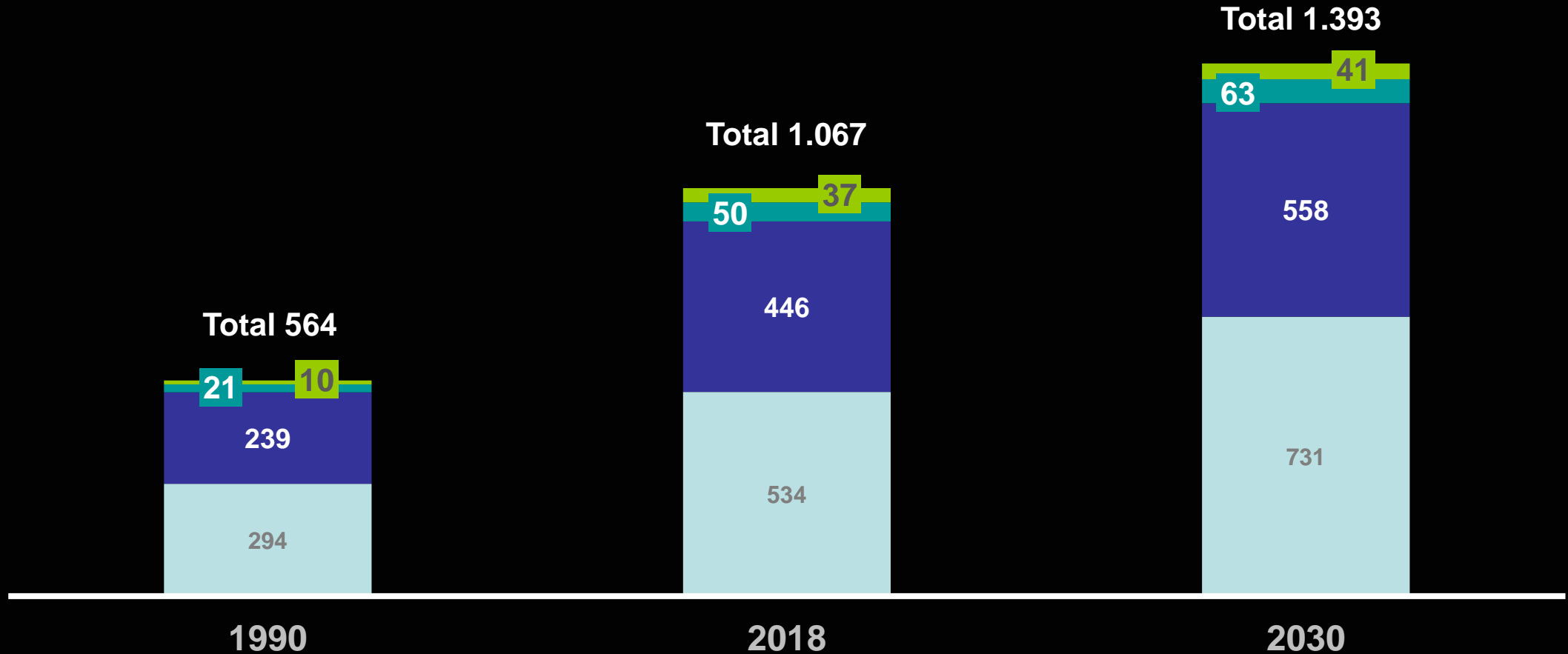


# The number of cities above 500.000 inhabitants are growing

## Number of cities

with more than  
500.000 inhabitants

- Megacities of 10 million or more
- Large cities of 5 to 10 million
- Medium-sized cities of 1 to 5 million
- Cities of 500,000 to 1 million



SOURCE: United Nations; World Urbanisation Prospects: The 2018 Revision, Highlights



# Global Talent Competitiveness Index (GTCI)

Annual benchmarking report that measures the ability of cities to compete for talent

## GTCI Cities maximize talents capabilities through

Educational system that match markets needs by developing...



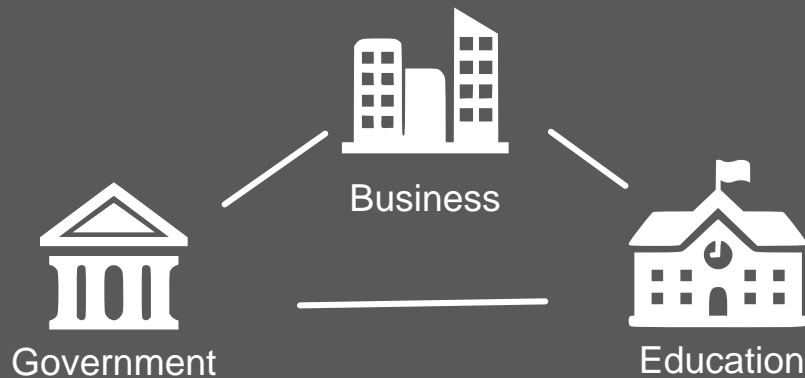
...ability to “learn how to learn“

Employment policies that...

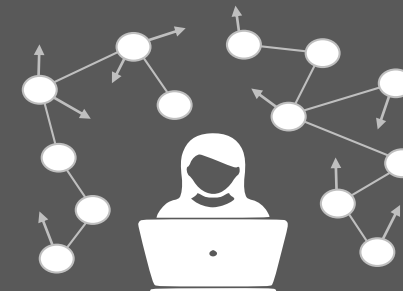


...combine flexibility and social protection

Connected stakeholders



High level of...



...Technological competence

# Top Cities are Talent Magnets



## Cities are talent magnets

Smaller cities as well as metropolises show ways to attract, grow and retain talent. The best combine high quality of life and international career opportunities



## The first global cities talent competitiveness index (GCTCI) shows that top cities

- ▶ Combine strong infrastructure & information connectivity
- ▶ Invest knowledge hubs
- ▶ Attract international companies

## TOP 20 Cities

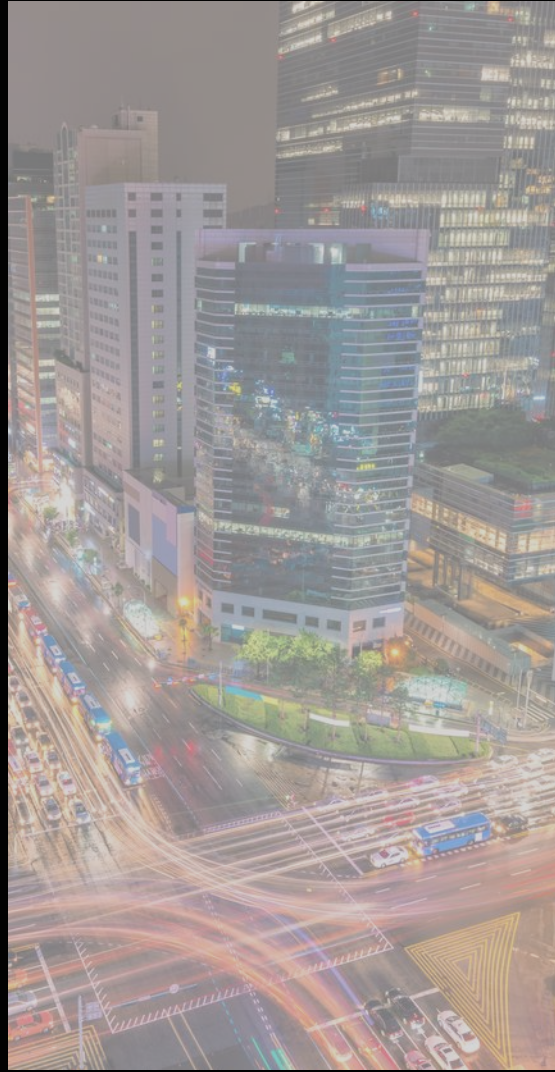
- |                  |                   |
|------------------|-------------------|
| 1. Copenhagen    | 11. Cardiff       |
| 2. <b>Zurich</b> | 12. <b>Berlin</b> |
| 3. Helsinki      | 13. Sydney        |
| 4. San Francisco | 14. New York      |
| 5. Gothenburg    | 15. <b>Vienna</b> |
| 6. Madrid        | 16. London        |
| 7. Paris         | 17. Birmingham    |
| 8. Los Angeles   | 18. Bilbao        |
| 9. Eindhoven     | 19. Singapore     |
| 10. Dublin       | 20. Barcelona     |



SOURCE: Alain Dehaze, CEO Adecco Group, World Economic Forum Annual Meeting 2017







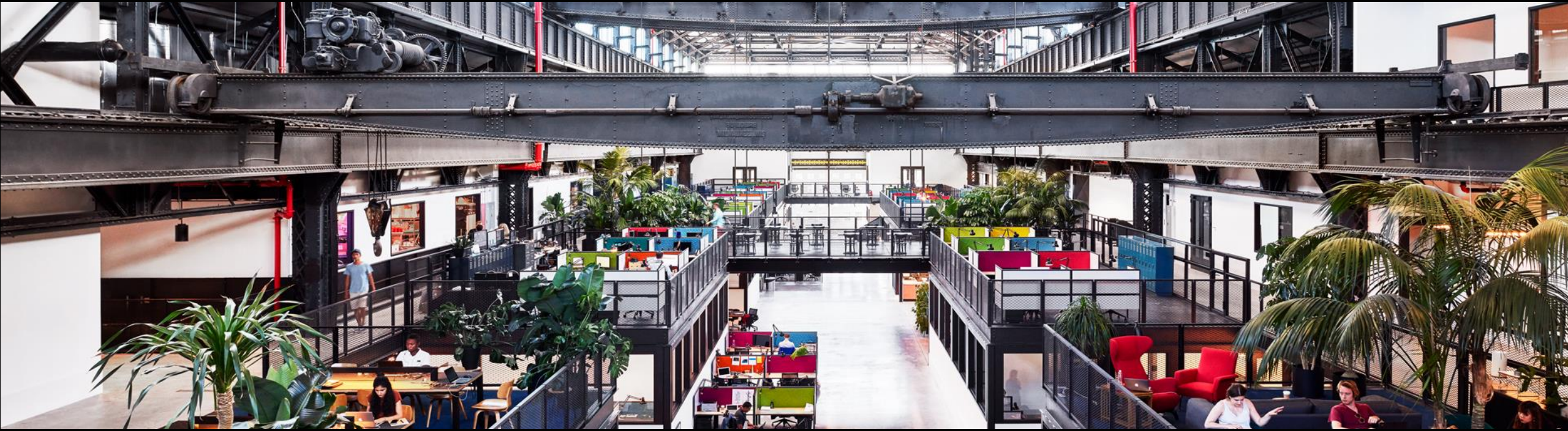
## Makerspaces

# The maker movement is based on the principle that everyone can design, manufacture and distribute own products

- ▶ The idea is to offer possibilities for **individuals** to produce **own things** by providing access to **digital manufacturing** tools
- ▶ FabLabs are a global initiative – **700 cities have FabLabs today**
- ▶ TechShop in the Bay Area catalyzed \$10B in shareholder value, \$2B in annual sales, \$200M in annual salaries....  
.....created by members who have **come in and picked up the skills that they needed to start a business.**
- ▶ Ford Motor Company invested \$750.000 in a TechShop in **Detroit** and **increases the number of patents dramatically**
- ▶ **BMW invested Makerspace** at TU **Munich** in 2015
- ▶ **New York City** opens a **new Makerspace** in 2016 in Brooklyn with 8.000 m<sup>2</sup>



# Maker Space in Brooklyn, New York City



**A cathedral of manufacturing –  
past, present, and future.**

84.000 square feet of landmark space, 9.000 tons of steel,  
home to 50 companies, set to open ist doors June 2016.

# Making is not new, but modern technologies, globalization, and cultural shifts have positively influenced the Maker Movement



**Demand for  
personalization**



**Open-source soft-  
and hardware**



**Common design  
file standards**



**Sharing economy  
with online  
repositories**



**Seed capital from  
crowdfunding sites**



**Inexpensive  
manufacturing hubs**



**International  
shipping**



**E-commerce  
distribution**



# European pioneer companies report beneficial impact on innovation process and culture

**Airbus (2013) - Protospace**



**Siemens (2015) – Maker Space**



**BMW (2015) - UnternehmerTUM**



**ADIDAS (2016) – MakerLab**





# Detroit Makerspace boosts creativity of Ford employees

## Press Release by Ford Motor Company

Jun 1, 2013 | Dearborn, Mich.



### TechShop and Ford Celebrate One Year of Innovation in Metro Detroit; Benefits Emerge from Entrepreneurial Spirit

- TechShop Detroit – a do-it-yourself workshop and fabrication studio where prospective inventors, makers and hackers can rent space to have access to high-tech equipment – celebrates its first anniversary with [an event June 1](#)

***“ 50% more  
patentable ideas ”***

In the past year, Ford's Employee Patent Incentive Program, in conjunction with TechShop, has in part led to 50 percent more patentable ideas by Ford employees

- TechShop offers members a chance to tinker and test out new, innovative ideas with equipment on site to better enable invention

Source: [media.ford.com](http://media.ford.com)

*“An **idea on paper** is easy to kill, but when you create a prototype of it and a supervisor can see it and experience it, it's harder to say no.*

*Once someone starts **thinking creatively** it's hard to turn that off.*

***People stop seeing problems and start seeing opportunities.”***

(Bill Coughlin, President & CEO at Ford Global Technologies)

# 800 m<sup>2</sup> Makerspace in Graz



**New space to foster product innovation  
for students, startups and industry**

# Summary

- ▶ Europe's future depend on the **ability to innovate**
- ▶ Megatrend **Digitalization** will play a **key role for Innovation**
- ▶ Megatrend Urbanization - **Cities are fighting for talents**
- ▶ **Talents** move to cities with **Top Universities**
- ▶ **Makerspaces** are **hubs** for creativity, innovation and start-ups in cities
- ▶ **TU Graz** operates the **leading Makerspace in Austria**

# Thank You

**Head of Institute**

Christian Ramsauer

Univ.-Prof. Dipl.-Ing. Dr.techn.

**Graz University of Technology**

Institute of Innovation

and Industrial Management

Kopernikusgasse 24 / II

8010 Graz / Austria

Phone +43 316 873 7291

Fax +43 316 873 7791

E-Mail [iim@tugraz.at](mailto:iim@tugraz.at)

Web [iim.tugraz.at](http://iim.tugraz.at)



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