

Euro-CASE Annual Conference 2016 | ATV's Technology Day
Copenhag November 14th

Computing Dissemination **And** Concentration: Drivers of the Next Digital Transformation



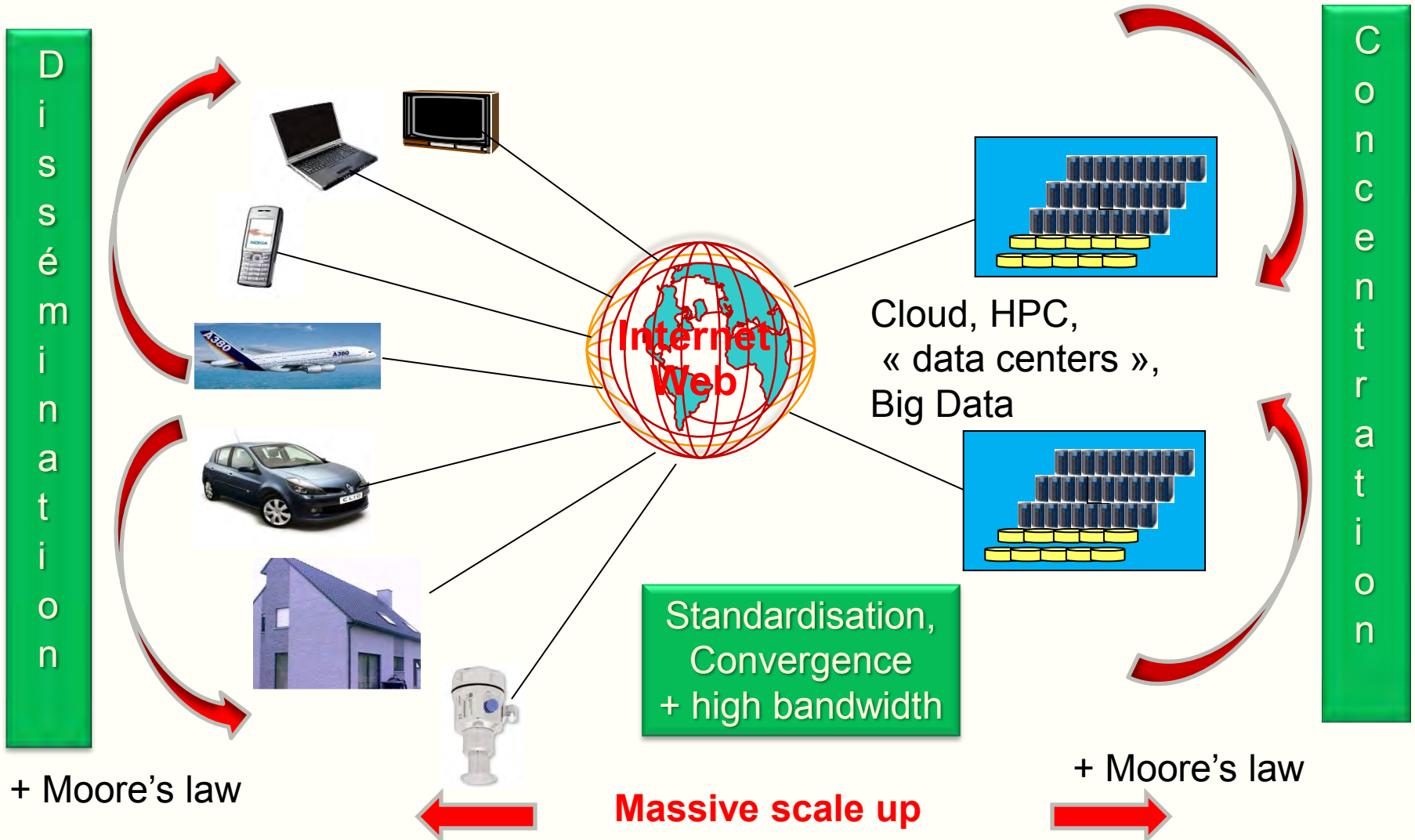
Prof. Dr. Gérard Roucairol

Chairman of Teratec

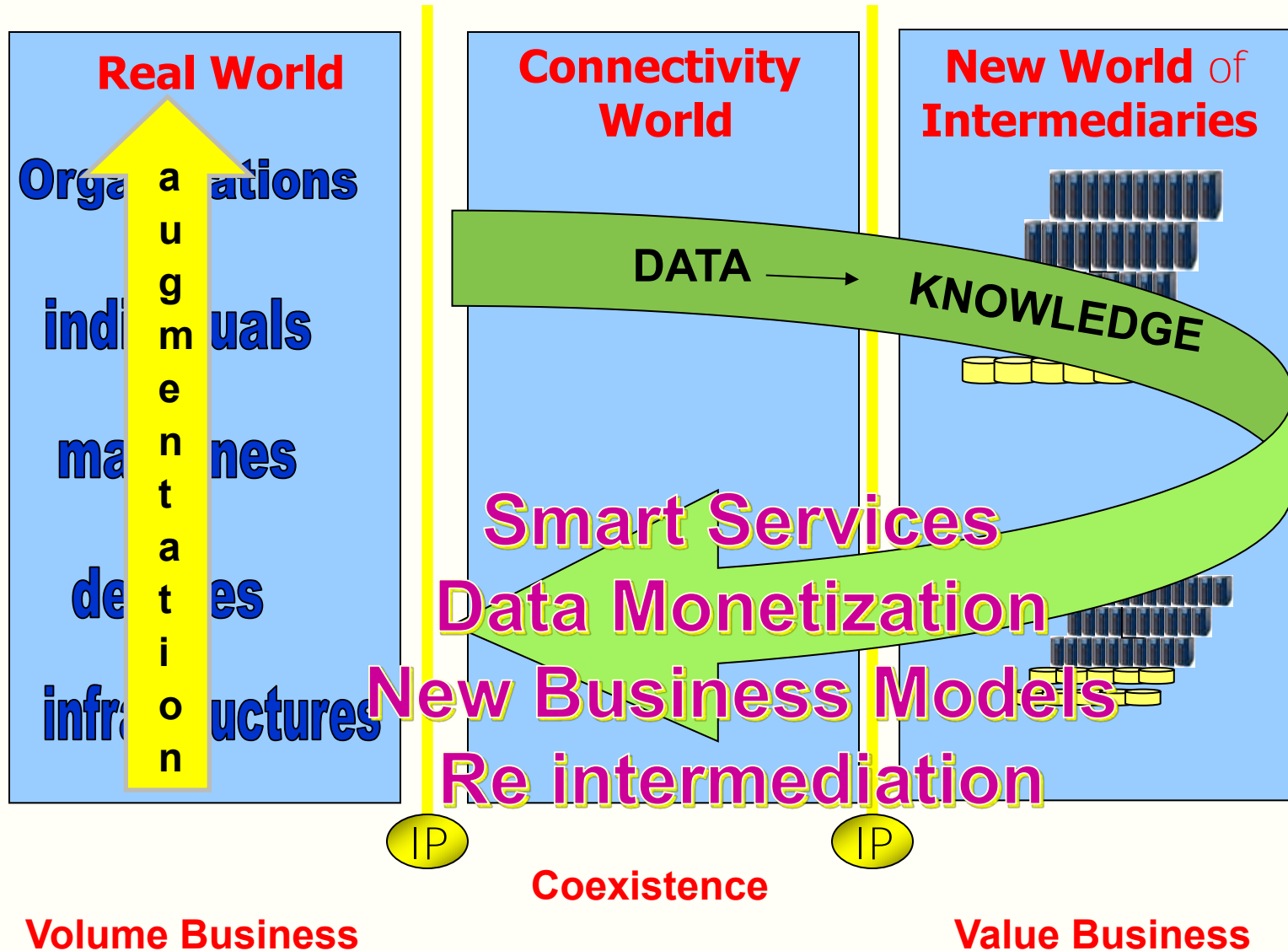
Honorary President of the National Academy of Technologies of France

Digital infrastructure

3 « tectonic » phenomena

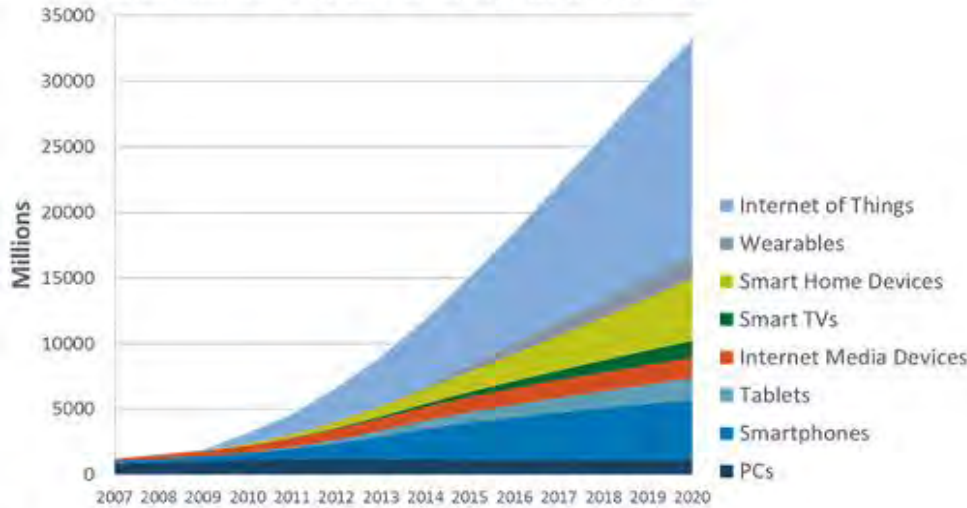


The basic transformation schema



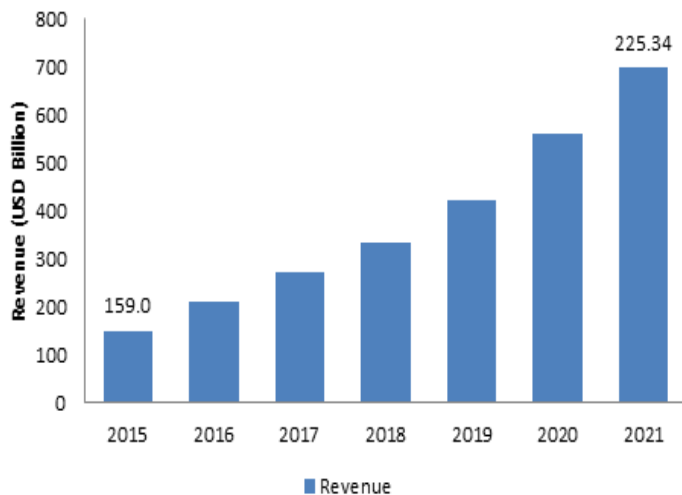
Dissemination a huge impact on our living environment

Global Internet Device Installed Base Forecast



Source: Strategy Analytics, October 2014

Global Embedded System Market Revenue, 2015- 2021 (USD Billion)

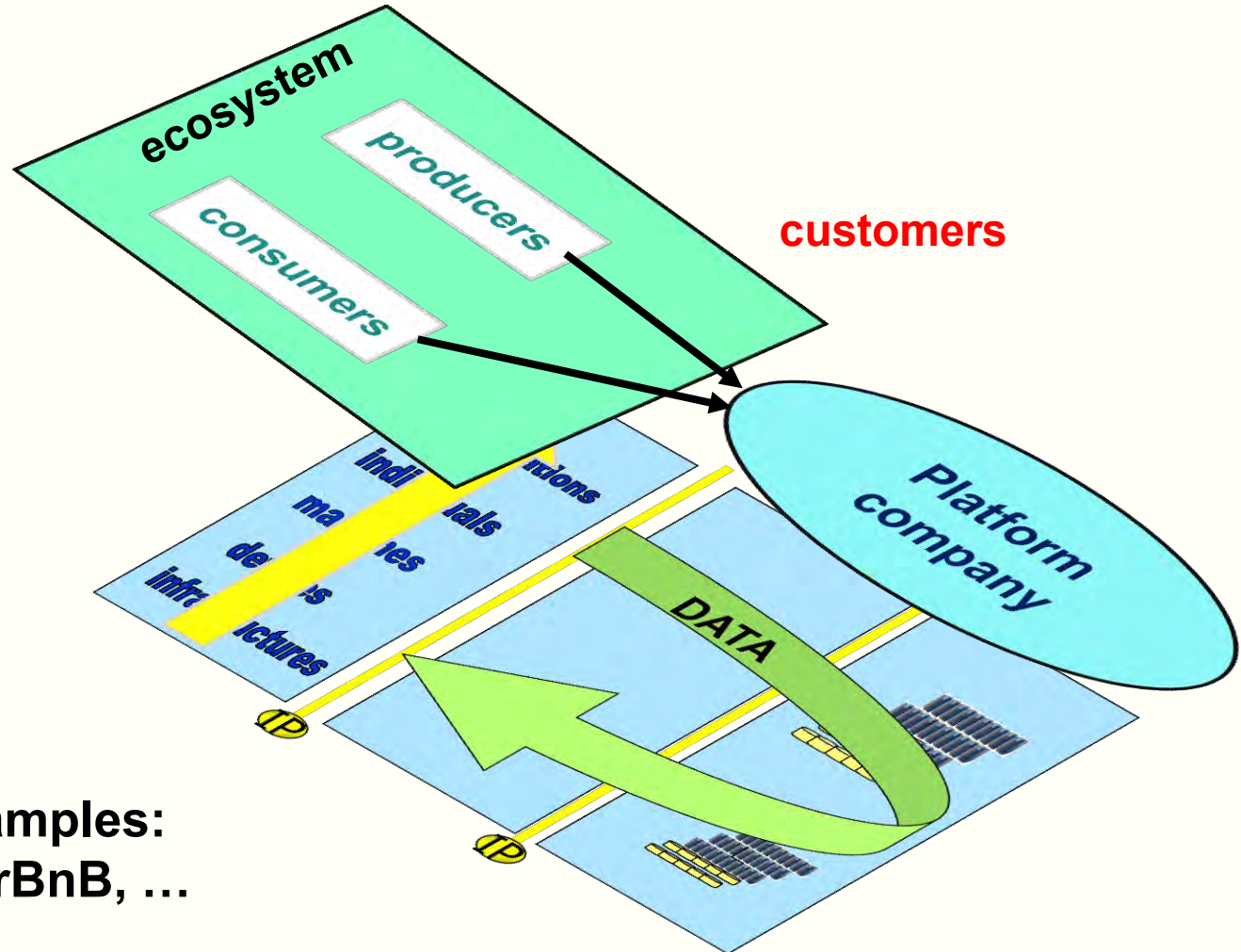


IoT market will become a multi-trillion dollars market by 2020 (IDC)



**The Schumpeterian Growth Paradigm:
In France 1.7 million jobs are at stake by
creating value with embedded systems
in manufactured products
(French survey)**

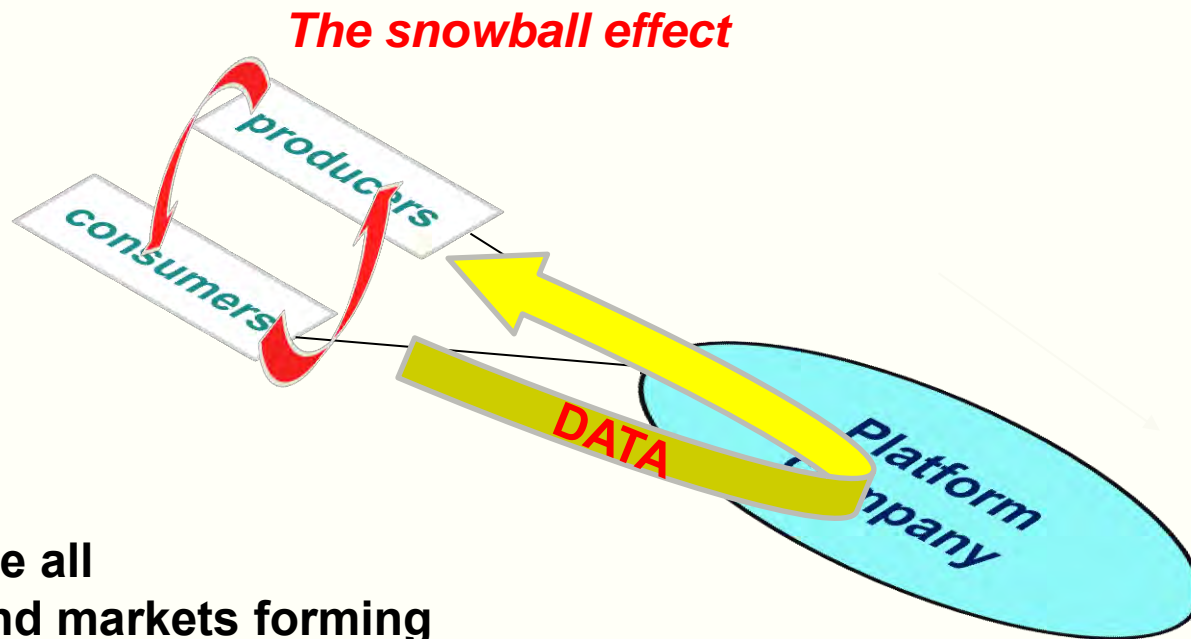
Concentration: the rise of platform companies



Well known examples:
GAFAs, Uber, AirBnB, ...

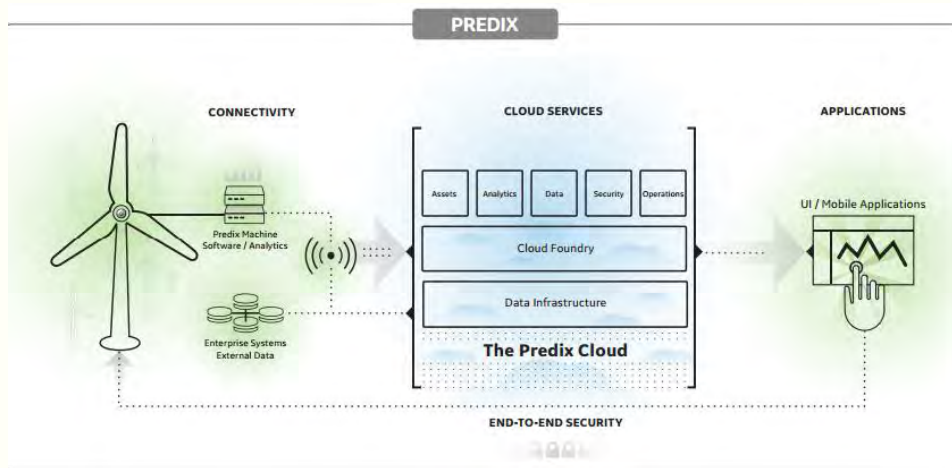
The snowball effect of platform companies

- Creation of two sided markets (Jean Tirole Nobel prize 2014)



- **Winners take all**
- **Networks and markets forming around are the maws into which traditional companies are now disappearing (Sangeet Paul Choudary: platform revolution)**

The rise of industrial platforms

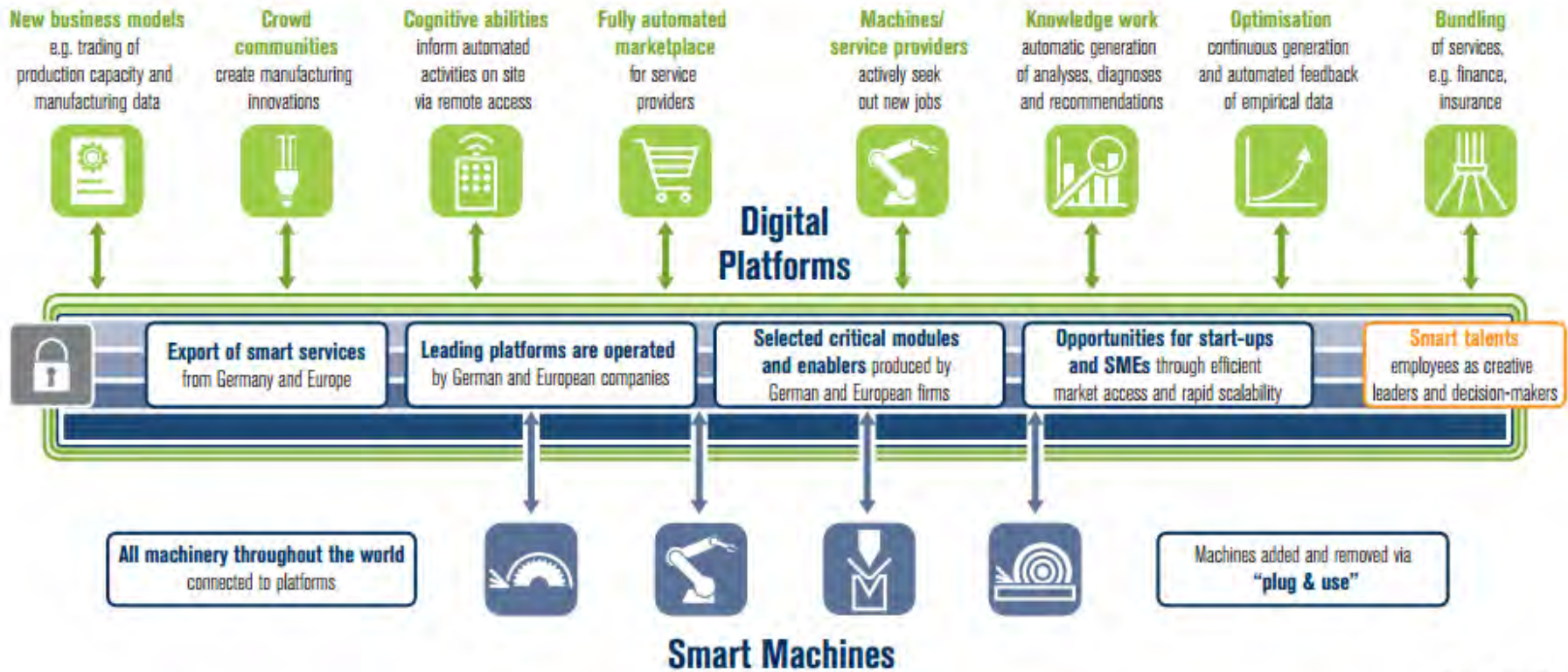


GE vision: Predix platform



The rise of industrial platforms

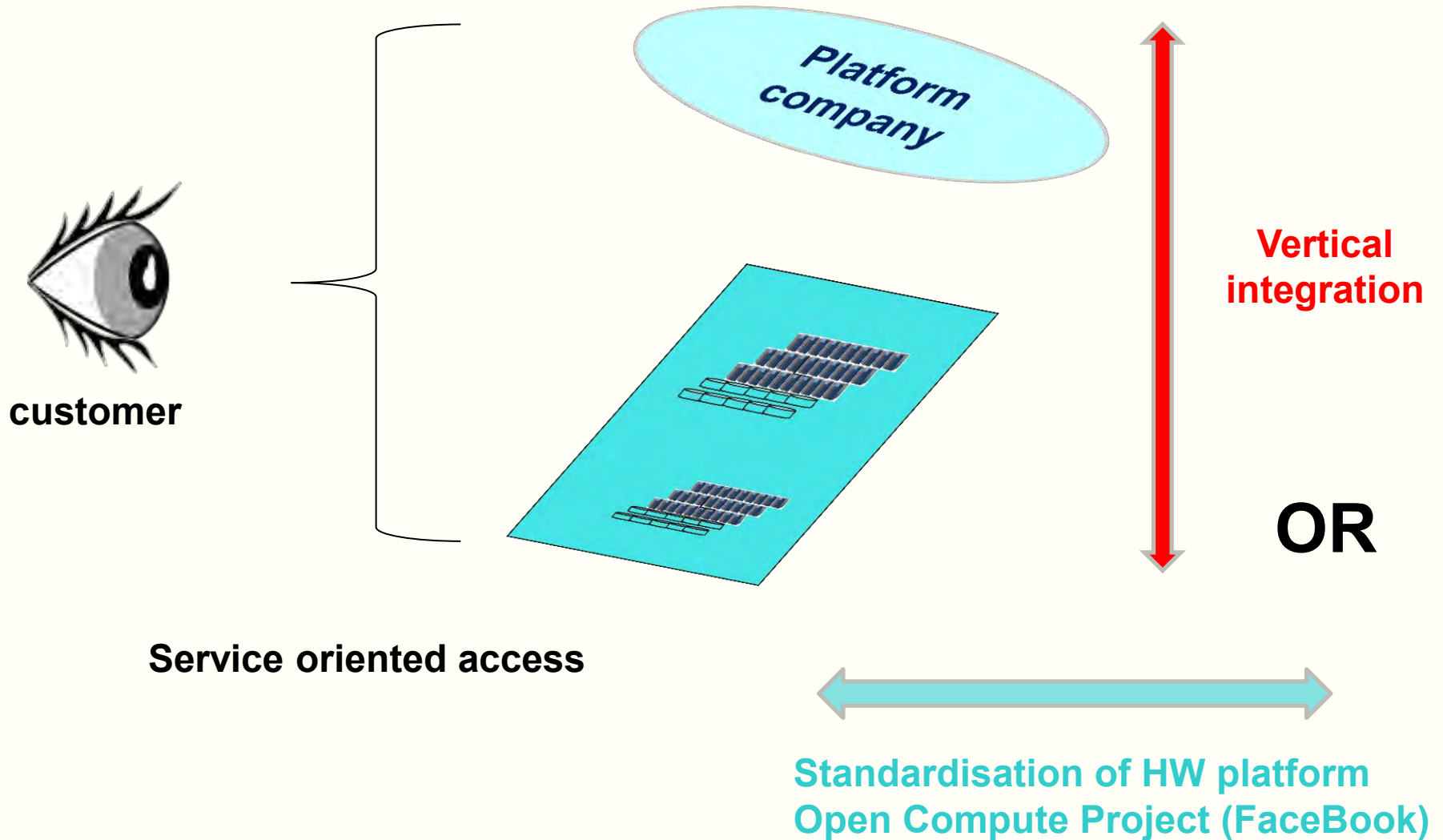
Smart manufacturing services 2025



Source: Siemens 2014

Siemens vision

Towards *re*-verticalisation of the computing value added chain ?



Who will become integrator and operator of large societal systems ?

Telemedicine

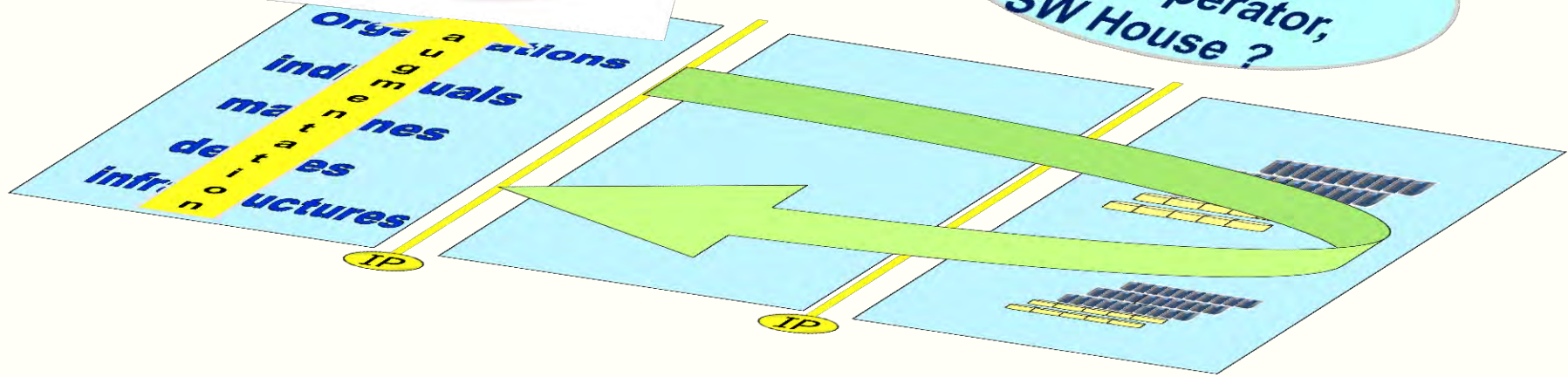


Smart city



Platform company:
Telco Operator,
SW House ?

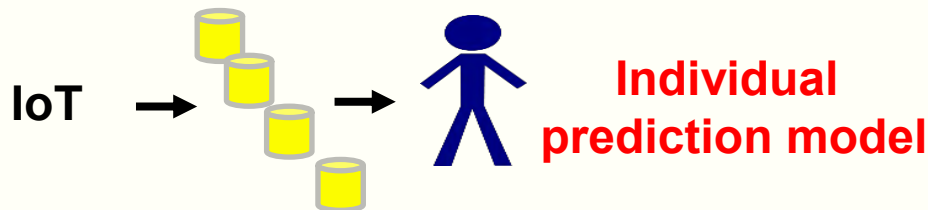
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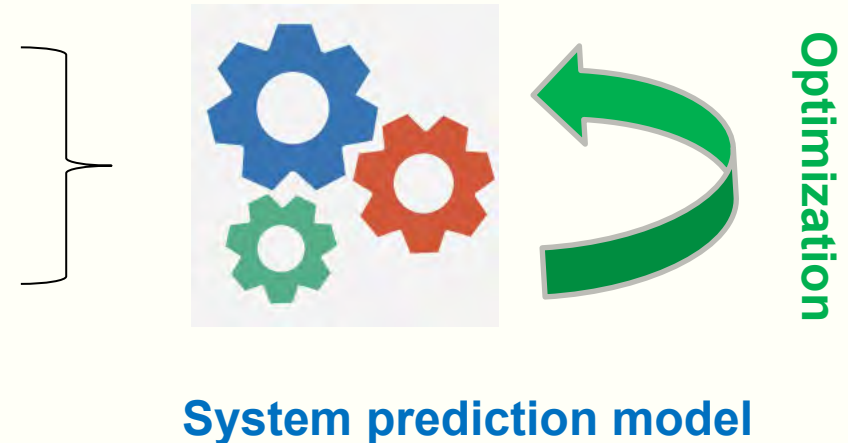
Combining Dissemination and Concentration into Smart Services

Reaching the Holy Grail of mass customization through prediction

Retail industry: to offer the right product for the right price via the right channel.



Healthcare: to deliver the right care at the right patient at the right time

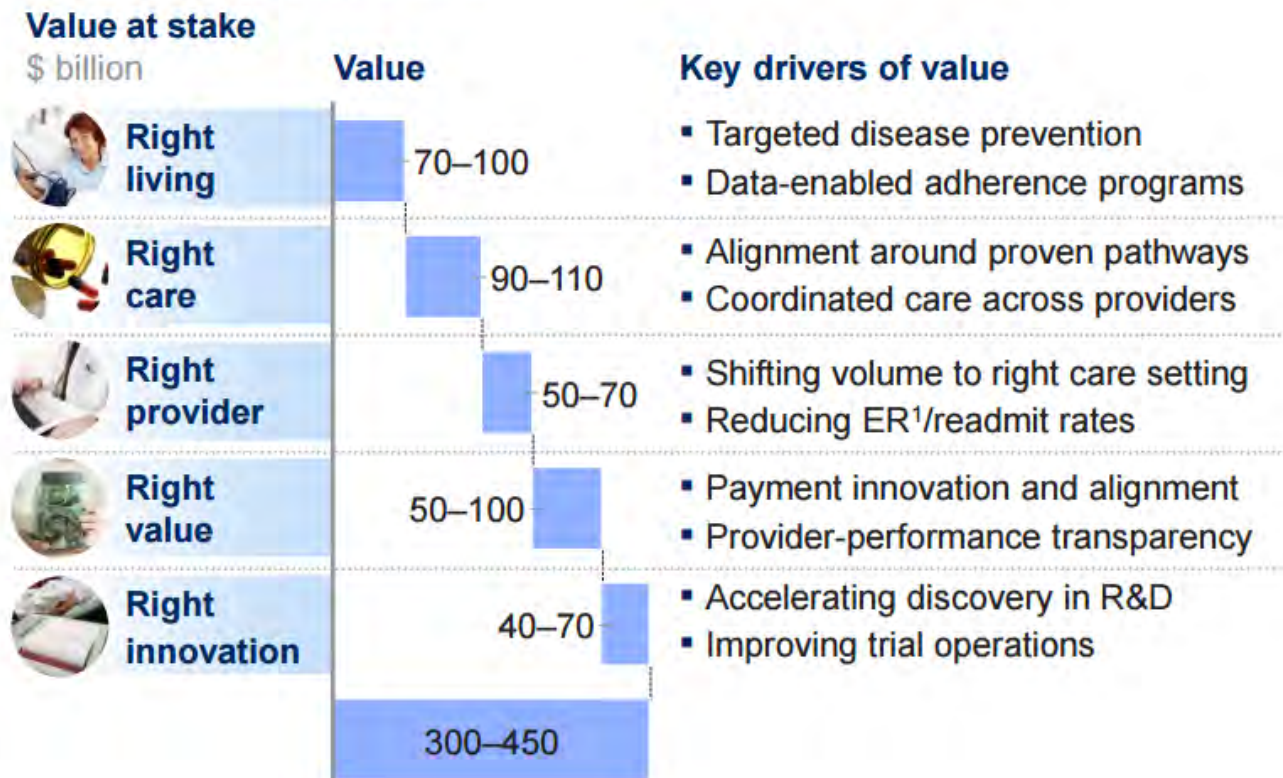


System prediction model

Conciling opposite goals

Personalized, Predictive, Preventive, Participative Medicine

Exhibit 4: Applying early successes at scale could reduce US healthcare costs by \$300 billion to \$450 billion.



The Big data revolution in healthcare: accelerating value and innovation Mc Kinsey 2013

Creation of a 3rd Healthcare Industry ? : the « therapeutic software industry »

Key technology enablers

- **Relevant and accurate models:**

pde, statistical models, computer created statistical models
i. e. machine learning

For methodology adoption self explanatory algorithms are mandatory

- **High Performance SuperComputer:**

the race to exaflops (billion of billions op/s), more than 100 millions processing cores

Major challenge: to maintain energy consumption below 20MW

- **Adapted middleware:**

- Massively parallel computing environment (more than Hadoop)
- Parallel file system, NoSQL databases

Seizing opportunities: the WW race to exaflops



U.S. President Barack Obama issued an executive order establishing the National Strategic Computing Initiative with initial allocation of \$ 450 M from the U.S. Department of Energy). (29/07/2015)

Jean-Claude Juncker
"Our goal is for Europe to become one of the top 3 world leaders in high-performance computing by 2020."
(09/2015)



Le Président François Hollande, annonce le Plan "supercalculateur" (07/05/2014)

Chinese President Xi applauds success of world's fastest supercomputer Tianhe-2 built by China's National University of Defense Technology with the fundamental purpose of

"providing a driving force for the construction of an innovation-oriented country". (18/06/2013)



On December 24, 2013, the Ministry of Education, Culture, Sports, Science and Technology selected RIKEN to develop a new exascale supercomputer that is expected to keep Japan at the leading edge of computing science and technology

Computer Industry

Combination of two major breakthroughs

- **Technology breakthrough**

massively parallel + cloud processing

- Prevents existing software to be reused
- Puts at stake acquired positions of dominant actors
- Enables new business models(HW+SW), reverticalisation of the industry

May lead to the birth of new processors, new actors

- **Market breakthrough**

- New applications (Healthcare, Smart cities, transportation systems, ...)
- New uses (Big Data, Real Time, ...)
- New users (Cloud, SMEs, ...)

Next Breakthrough

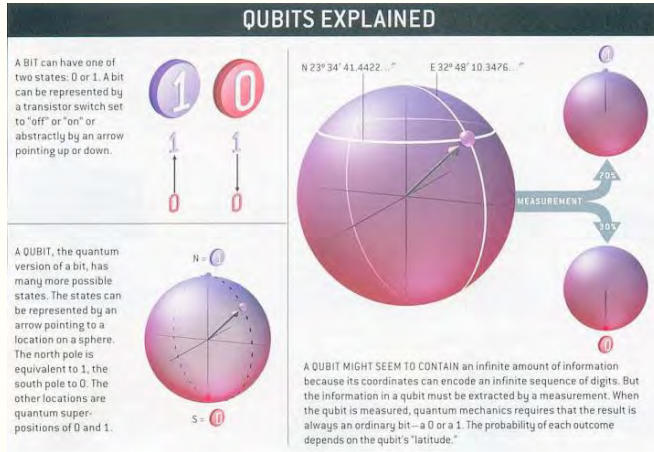
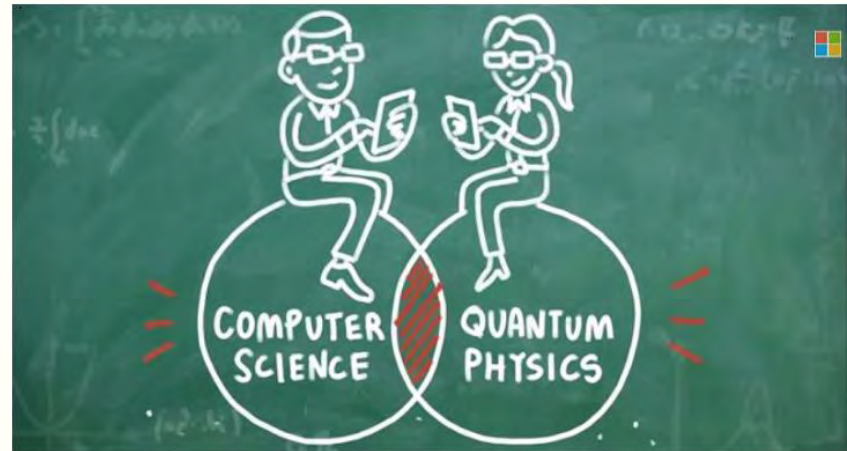


Image credit: Universe Review

Towards Quantum Computing?



Concluding Question 1

A huge societal and economic transformation is ongoing

But:

Larry Summers: « the age of secular stagnation »

Robert Gordon: « Innovation is dead, the end of growth »

Eurocase may formulate

Collective and European counter arguments

Concluding Question 2

Is there a Digital « Hygge » ?



Thank you for your attention



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DES TECHNOLOGIES

POUR UN PROGRÈS RAISONNÉ, CHOISI ET PARTAGÉ