



L'impatto dell'intelligenza artificiale su Human Resource Management

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Materiale riservato e strettamente confidenziale

Outline (1)

● ICT - Information and Communication Technology

✓ Information Technology

- Pervasiveness of ICT: Computing, sensing and Information are Everywhere
- Information as rough digital Data, towards semantic data representation
- Smart everything (workplace, car, home, city...world)
- The power of data: new revolutionary paradigms for our daily lives

✓ Communication Technology

- Local data vs global data: networks empower use of data
- Actors of communication: not only humans! Machine to machine communications...
- ...new revolution (again): value added services: **The Internet of (every-)Thing(s)**

✓ Artificial Intelligence

- Can machines think?
- Advanced interfaces
- The power of Algorithms
- How this will affect **Human Resources Management?**

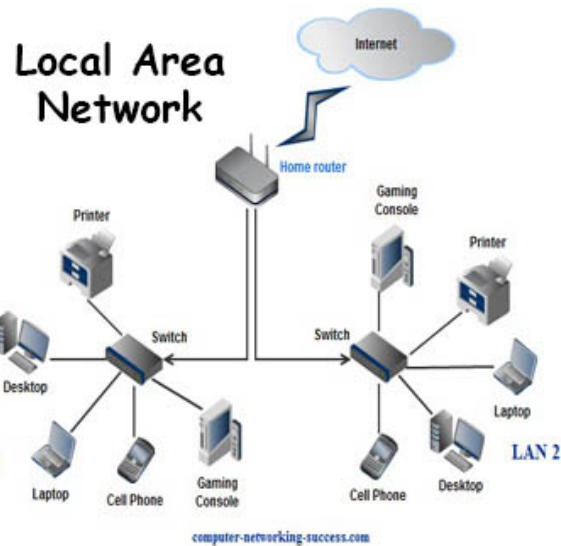
Pervasive communications: historical perspective

Pervasive communications: mobile devices communication platforms connected to the Internet

Yesterday
(local area networks up to Internet)
Static services (email, web)

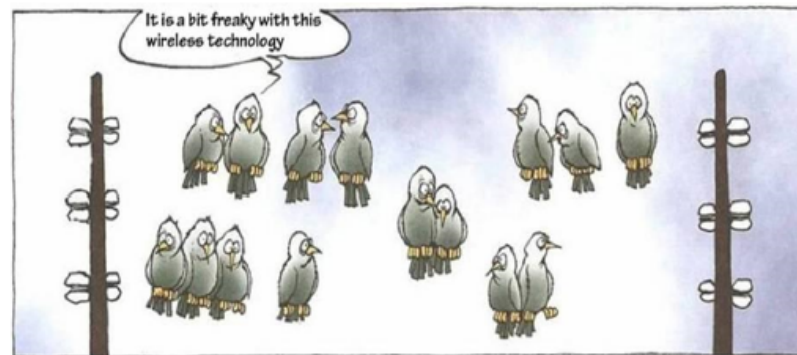
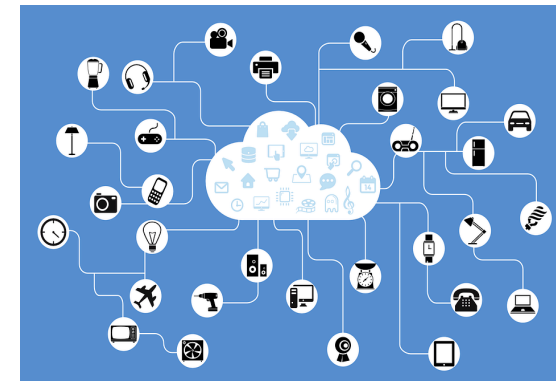
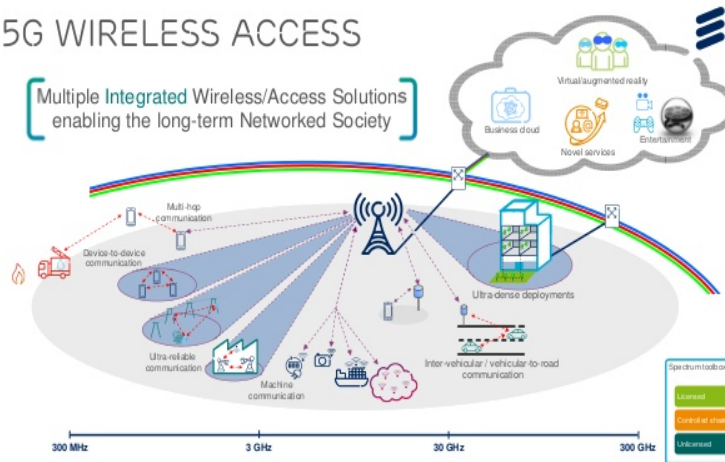
Today
Wireless Mobile ubiquitous Internet access,
Cloud Mobile Services & Resources

Today/Tomorrow
Machine to machine (M2M)
Internet of Things (physical/virtual)
Smart World services



5G WIRELESS ACCESS

Multiple Integrated Wireless/Access Solutions enabling the long-term Networked Society



Pervasive sensing: more sensors than ever

- ✓ Pervasiveness of Sensing devices (digital data)
 - E.g. current smartphones are equipped with a number of embedded sensors

A Mobile Smartphone can provide a lot of context information about you and your activities:

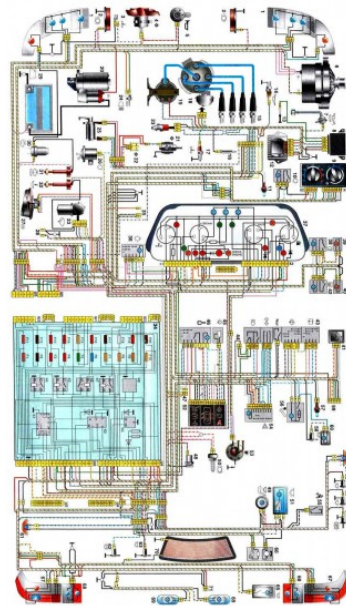
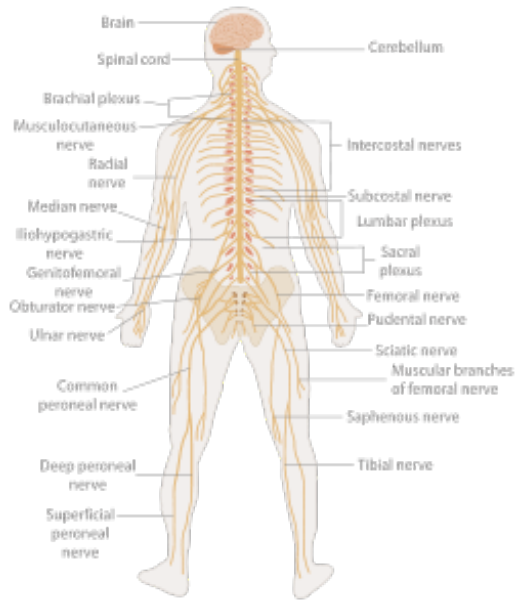
- your mobility (even without GPS)
- your movement between floors in a building
 - your speech
 - your contacts
- your interaction with other objects...
 - YOUR LIFE!



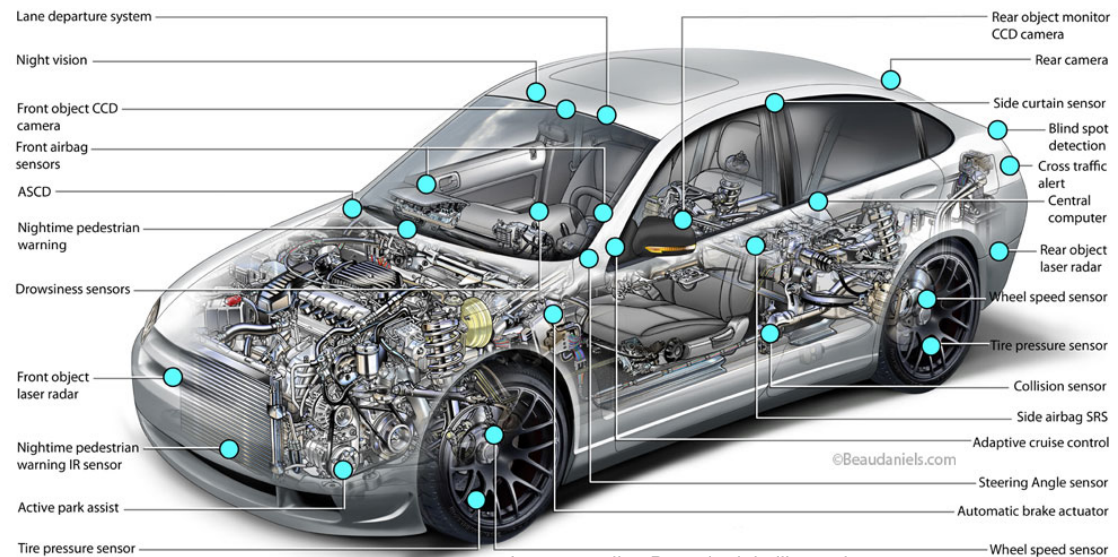
Pervasive sensing: more sensors than ever

✓ Pervasiveness of Sensing Devices (digital data)

- e.g. economy car: more than 200 sensors (brakes, belts, air bags, doors, etc.)
 - A luxury car: more than 600 sensors (A/C, ABS, lights, radar, road conditions, etc.)
- 70 sensors just in the engine of a 2002 Ford Focus (today 15X w.r.t. 15 years ago)
- Vehicle safety and comfort has improved via sensors and actuators



Vehicle Sensors



The vehicle's automatic control (beyond driver) is more likely a **"nervous system"** reacting to possible problems, obstacles and contributing to comfort and safety

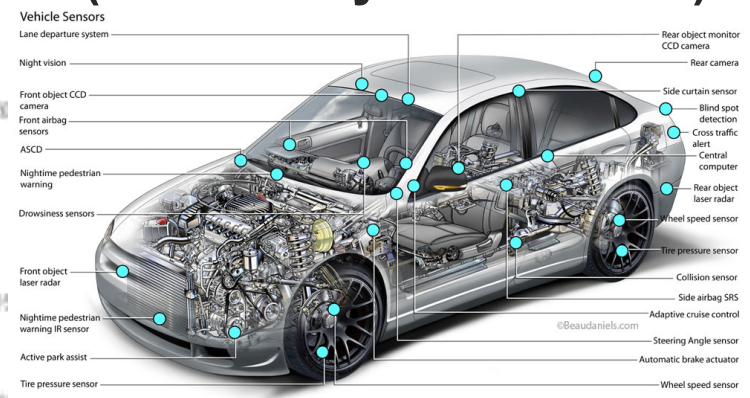
Pervasive sensing (data) + algorithms = real innovation

- ✓ Pervasiveness of Sensing Devices (digital data + formalized models)
 - Just add some algorithmic innovation... (more on this later), what could be achieved?
 - The triggering of decisions and Actions

Algorithms (brain)



+ Data (nervous system stimuli)



Autonomous vehicle (self-determined actions)



WayMo: Google car



Pervasive sensing and Actuators: smart things

Smart Objects (or Smart Things): Digital devices provided with sensors and actuators

Sensor: a connected device enabling the sensing of physical parameters of the scenario or controlled environment, whose values are transformed into digital data.

Actuator: a connected device enabling the activation of actions on the controlled environment.

Controller: a connected device implementing an algorithm to transform input data in actions.

Smart things: digital devices providing service functions realized by the synergy between sensors, actuators and controllers (possibly implemented by local/distributed execution platforms and M2M/Internet communications).

...given a collection of smart objects, could we make a whole **smart environment**?



The Internet of Things

● Internet towards the Internet of Things

- ✓ A new platform based on existing Internet... extended to Things
- ✓ Enabling a new level of communication and service paradigms
- ✓ The Things proactively sense, collect and share information
 - ... including participation of many (and some really unexpected) things
- ✓ The Things produce a incredible amount of data
 - Like a global/local nervous system
 - ...potential for “understanding” the data context, geo-position, activity, etc.
- ✓ A new programming paradigm for the users
 - (possibly) simply a user will simply state his/her objectives
 - The coalition of Things will work in synergy to achieve the users’ goals
 - As much transparently as possible for the users
- ✓ Which risks will be emerging for users’ privacy, security and trust?
 - autonomy and control, social control, political manipulation, design, environmental impact, human ethics and decision making, identity fragmentation, decisions’ liability, etc.



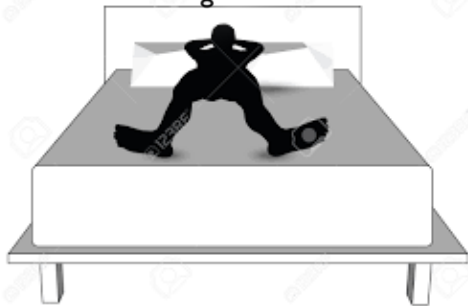
One example to clarify the concept and scenario...

● One typical evening planning next working day...

Tomorrow first
office meeting
at 8.30am

Typical car trip
in these days:
1 hour time

45 minutes
to wake up and
get ready...



**I decide to set my alarm
to wake up at 6:45am**

One example to clarify the concept and scenario...

● One typical evening planning next working day...

Tomorrow first office meeting at 8.30am

Typical car trip in these days: 1 hour time

45 minutes to wake up and get ready...

What could (will) possibly go wrong?

- 1) At 4.30am it starts snowing
- 2) Truck obstruction along the usual path
- 3) Traffic congestion on alternative paths
- 4) No parking at destination
- 5) Bathroom cold when having shower
- 6) Coffee cold when having breakfast
- 7) Left my car keys at home when in garage
- 8) Elevator busy when leaving my flat
- 9) Total time to get ready+breakfast: 55 min.

Leaving 10 minutes late + 30 minutes additional travel time

I missed the morning meeting!



I decide to set my alarm to wake up at 6:45am

One example to clarify the concept and scenario...

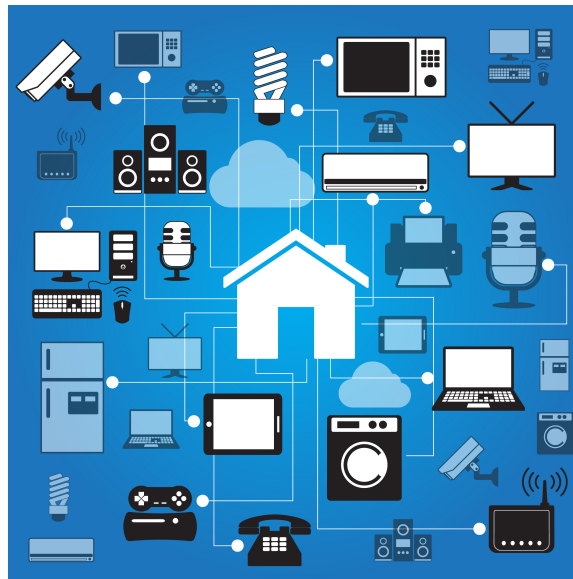
● The IoT scenario...

This is the **PROGRAMMING** effort!

Define your user's objective!

Smart IoT Services

Tomorrow first
office meeting
at 8.30am



45 minutes
to wake up and
get ready...

Typical car trip
in these days:
1 hour time

Based on my typical habits
decides to set my alarm
to wake up at 6:45am



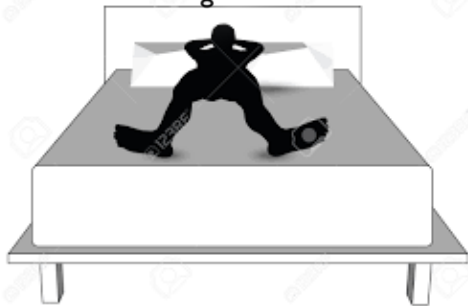
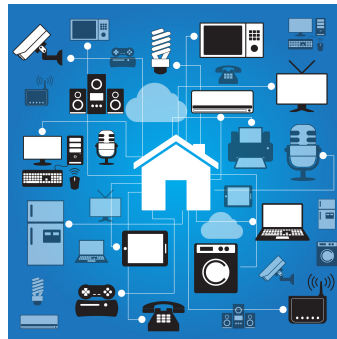
One example to clarify the concept and scenario...

● The IoT scenario...

This is the PROGRAMMING effort!

Tomorrow first
office meeting
at 8.30am

Smart IoT Services



Based current info
decides to set my alarm
to wake up at **6:30am**



45 minutes
to wake up and
get ready...

~~Typical car trip
in these days:
1 hour time~~

What could (will) possibly go wrong?

1) At 4.30am it starts snowing

Get notified in real time by the
weather monitoring system
or device.



Based on forecasts it anticipates the
alarm clock to 6:30am (15 minutes before)

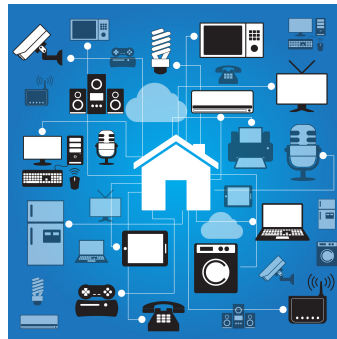
One example to clarify the concept and scenario...

● The IoT scenario...

This is the PROGRAMMING effort!

Tomorrow first
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Smart IoT Services



Based current info
decides to set my alarm
to wake up at **6:00am**



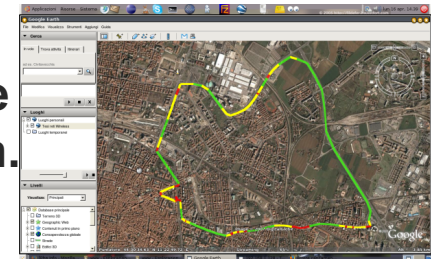
45 minutes
to wake up and
get ready...

~~Typical car trip
in these days:
1 hour time~~

What could (will) possibly go wrong?

- 1) At 4.30am it starts snowing
- 2) Truck obstruction along the usual path
- 3) Traffic congestion on alternative paths

Get notified in real time by the
Traffic monitoring information.

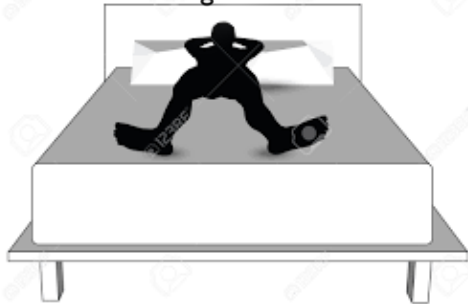


Computes a new path and evaluates
congestion delay, it further anticipate
alarm clock to 6:00am (30 minutes before)

One example to clarify the concept and scenario...

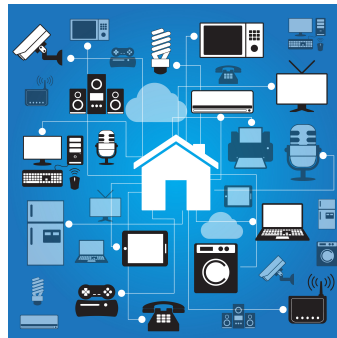
This is the PROGRAMMING effort!

Tomorrow first
office meeting
at 8.30am



Based current info
decides to set my alarm
to wake up at **6:00am**

Smart IoT Services



45 minutes
to wake up and
get ready...

~~Typical car trip
in these days:
1 hour time~~

What could (will) possibly go wrong?

- 1) At 4.30am it starts snowing
- 2) Truck obstruction along the usual path
- 3) Traffic congestion on alternative paths
- 4) No parking at destination**

Based on previous experience data and the available parking reservation services decides to reserve a indoor parking slot in a garage.



Reservation code uploaded on the mobile phone to access garage at destination



One example to clarify the concept and scenario...

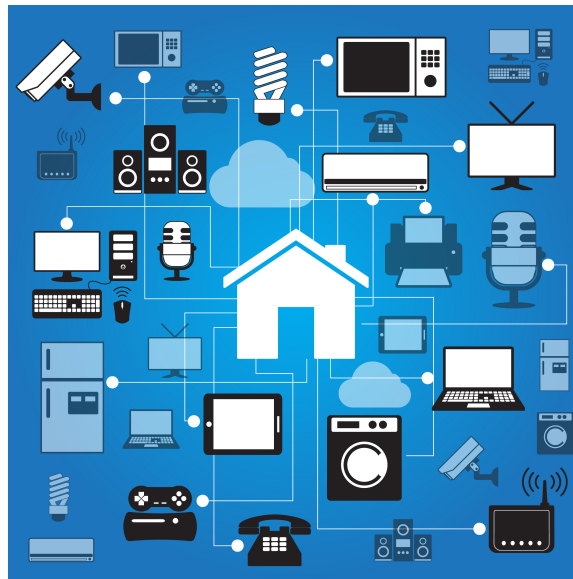
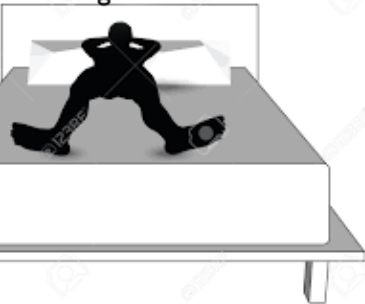
● The IoT scenario...

This is the PROGRAMMING effort!

Define your user's objective!

Smart IoT Services

Tomorrow first
office meeting
at 8.30am



45 minutes
to wake up and
get ready...

ALARM activated at 6:00 am



5) Bathroom cold when having shower

**HOWEVER, 10 minutes before at 5:50am...
started warming up the bathroom to 23 degrees**



One example to clarify the concept and scenario...

● The IoT scenario...

This is the **PROGRAMMING** effort!

Define your user's objective!

Smart IoT Services

Tomorrow first
office meeting
at 8.30am

45 minutes
to wake up and
get ready...

6) Coffee cold when having breakfast

The mirror notifies I am leaving the bathroom, and while I get dressed in my bedroom, the **COFFEE MACHINE** is activated in the kitchen, and the warming up of the bathroom is switched off.



One example to clarify the concept and scenario...

This is the **PROGRAMMING** effort!
Define your user's objective!

Smart IoT Services

Tomorrow first
office meeting
at 8.30am

45 minutes
to wake up and
get ready...

When I leave my home passing through the main
door I got a message on my phone advising me
that I do not have the **CAR KEYS** with me...



One example to clarify the concept and scenario...

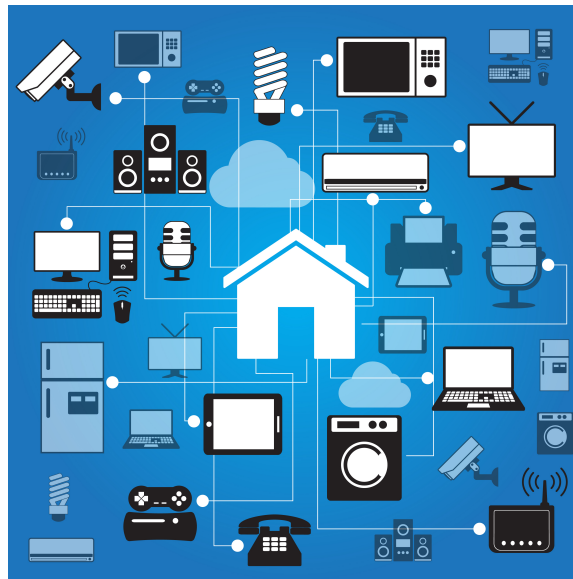
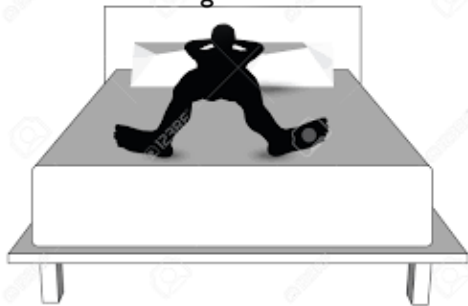
This is the **PROGRAMMING** effort!
Define your user's objective!

Smart IoT Services

Tomorrow first
office meeting
at 8.30am

45 minutes
to wake up and
get ready...

When I re-enter the door my phone informs me
that the keys are in proximity of the lamp on the
table in the living room, and the LAMP flashes to
help me to find the KEYS

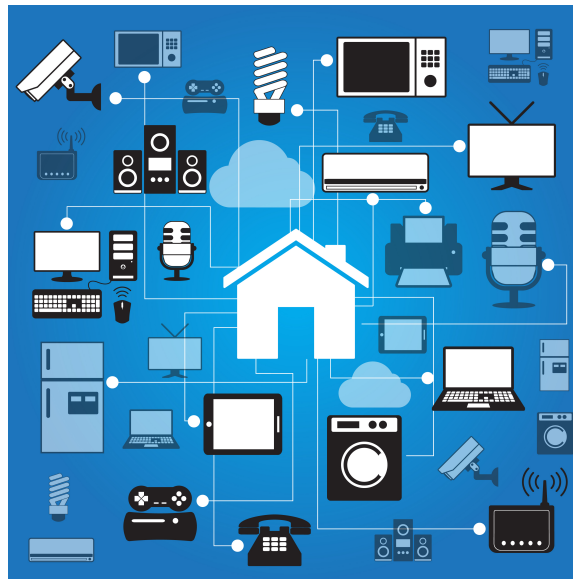


One example to clarify the concept and scenario...

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Smart IoT Services

Tomorrow first
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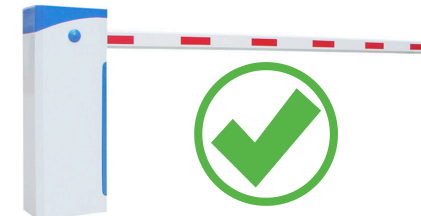


Check possible
delays on the
path...

I am leaving with my car right in (planned) time,
with my path already set in the navigation system,
getting alerted of any problem on the path and
need to make detours in real time.



... and when at destination I will have my car
parked in reserved indoor garage with no delays.
Barriers open with my contactless smartphone
code...



One example to clarify the concept and scenario...

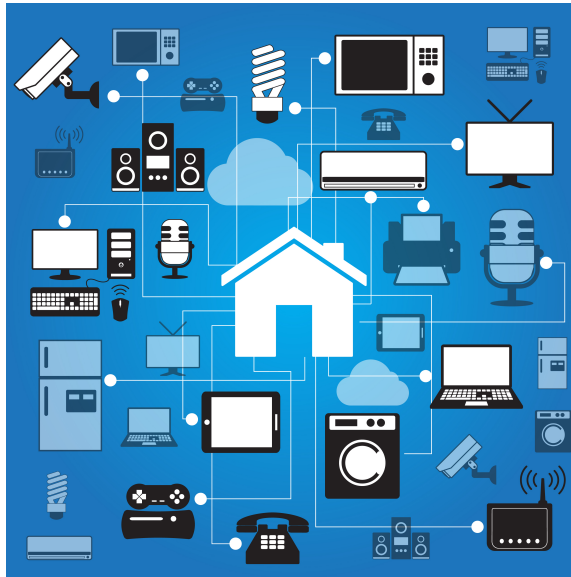
This is the **PROGRAMMING** effort!
Define your user's objective!

Smart IoT Services

Tomorrow first
office meeting
at 8.30am

Resolved all
the troubles...

I participate at the 8:30am meeting
Right in Time!



One example to clarify the concept and scenario...

New Programming paradigm

Tomorrow first
office meeting
at 8.30am



Semantic *-thing

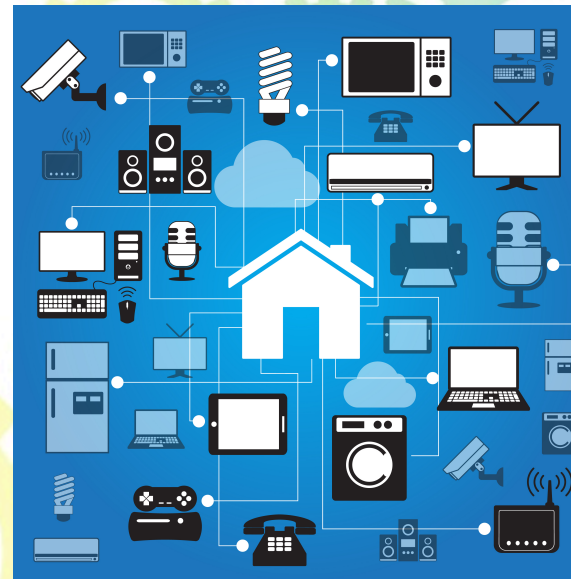
Smart-objects
Artificial intelligence

Pervasive Computing
and Communications

Smart IoT Services

Things and M2M
Communication

Human-centered Design



A galaxy of IoT objects already available today...

IDC: 50-220 Billions things connected in 2020-2025

IDC: market volume of 14.4 Trillions

HAPIfork

The HAPIfork is an electronic fork that helps you monitor and track your eating habits. It also alerts you with the help of indicator lights and gentle vibrations when you are eating too fast.



<http://www.hapi.com/eng/our-hapifork.asp>

Smart Egg Tray

Egg Minder syncs with your smartphone to tell you how many eggs you've got at home (up to 14 eggs) and when they're going bad.



<http://www.cathy.com/about/egg>

Smart Socks

Socks infused with proprietary, 100% textile sensors. They are paired with a Bluetooth Smart cool and detachable mat that delivers accuracy in step counting, speed, calories, altitude and distance tracking.



<http://www.genie.com/Products/socks>

Smart Doorlock

The Genie Smart Lock - A door lock that allows you to lock and unlock your home using your smart phone, bluetooth keyring or computer.



<http://www.genie.com/Products/doorlock>

MyVessyl Cup

It can hold 13 ounces of liquid. The battery takes 80 minutes to fully charge and will last for 5-7 days. Also has wire-free charging.



<https://www.myvessyl.com/>

Glucose Monitoring

A cellular-powered glucose meter transmits each test result to a secure server and provides instant feedback and coaching to patients. This equips doctors, nurses, diabetes educators with real-time clinical data.



<http://www.telcare.com/>

Bluetooth-Enabled Insoles

Shares navigation, directions and orientation.



<http://pohol.com/products.html>

Smart Home Security

Canary is a complete security system packed into a single device. It adapts to your home over time and sends intelligent notifications with HD video directly to your smartphone.



<http://canary.me/>

Smart Tooth Brush

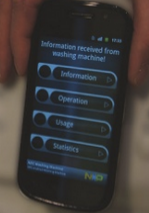
The Beam Brush is a connected toothbrush that engages users with their daily hygiene routine.



<http://www.beamtoothbrush.com/toothbrush/>

Smart Washing Machine

Smart Aqualis is the first Indesit Company washing machine designed to be integrated in 'Smart' ecosystems, covering a wide range of use cases.



<http://iifbee.com/Product/ByStandard/AIISanctus.htm>

Smart Shirt

Monitors how your body behaves over time, includes heart rate recovery and breathing at rest, to monitor improvements in health.



<http://zoms.kim.com/>

Internet-Connected Mirror

We are looking to bring a product to market that can make your life easier, while doing something you already spend time doing each day, looking at a mirror.



<http://www.f2c3.com/Products/8869298/mini2>



Industry 4.0 concept

...so, why not to adopt these new paradigms in the industrial world?
Could we expect some benefits?

Industry 4.0 !

- to sense the environment and gather observation data
- to realize a new paradigm of data analysis and control
- to push automation, scalability, efficiency of processes
- to reduce costs/overheads and increase revenues and business
- etc.

Pervasive sensing in industry

- **Industrial Internet:** has improved production processes via sensors/communications
- **Industry 4.0:** added value services through sensors/IoT, e.g. predictive maintenance concept
- from asset to data (value) => process (efficiency) => business optimization

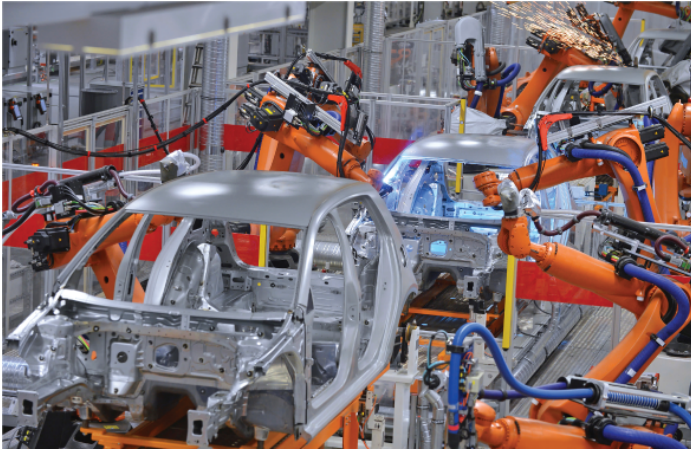


Image credits: maximintegrated.com

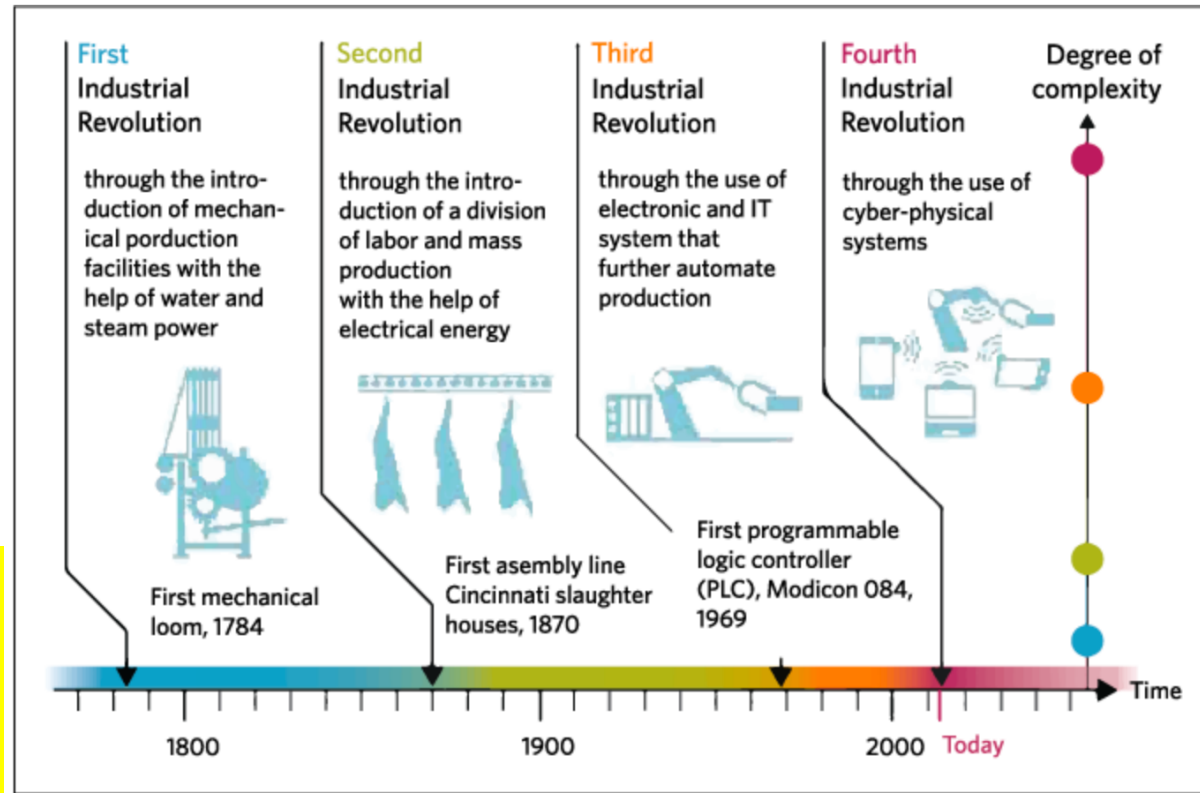


Image credits: maximintegrated.com



Industry 4.0 challenges and drivers

SIEMENS

Industrial challenges and drivers

Shorten time to market



- Shorter innovation cycles
- More complex products
- Greater data volumes

Increase flexibility



- Individualised mass production
- Volatile markets
- High productivity

Boost efficiency



- Energy efficiency and resource efficiency are critical competition factors



Industry 4.0: example of valorisation of data

Industry 4.0: from DATA to value, e.g. predictive analytics

Data Analyst as the new guru (data scientist)

- Many analyses' perspectives possible: process critical analysis
 - business critical analysis.
 - Data visualization
 - Prognostics (machine learning on big data)
- e.g. predictive analytics

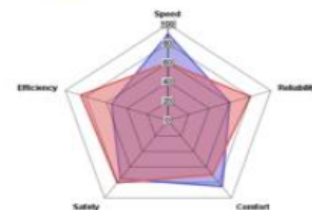
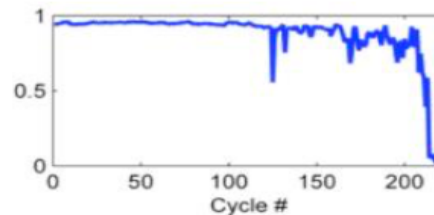


Image credits: cineca.it

Predictive analytics and maintenance services

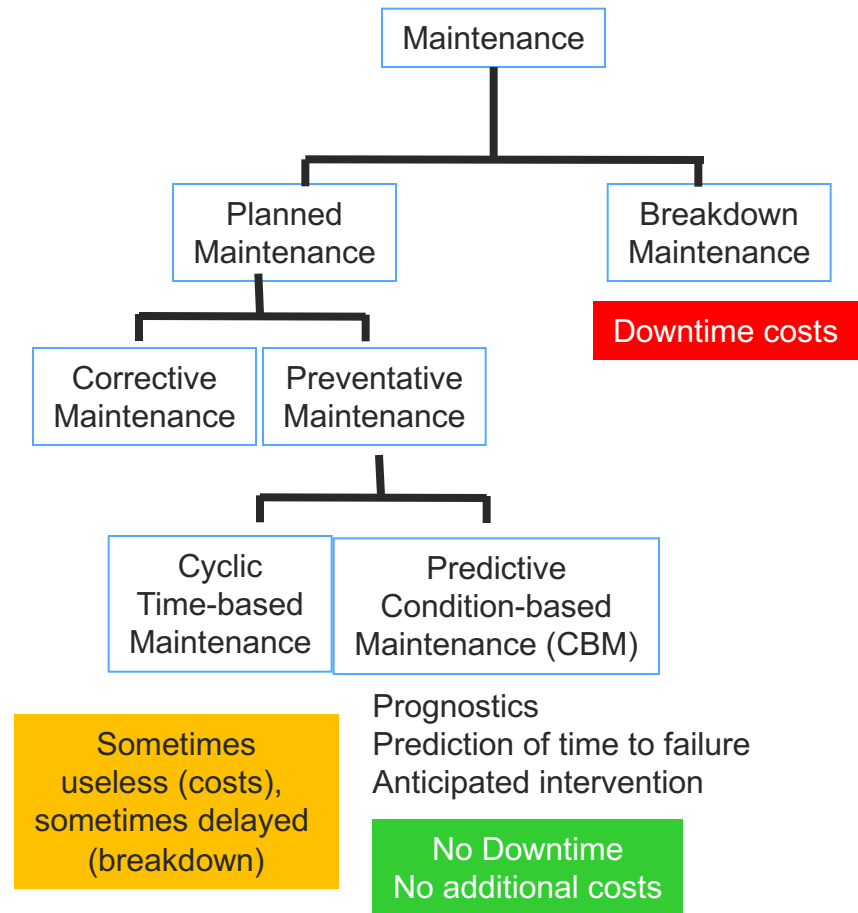
e.g. Predictive analytics and maintenance

Some concrete examples:

Rolls-Royce can now identify **correlations between different part failures** and different operational environments. This is allowing the company to **predict engine failures** several days before they occur, with high accuracy and low false alarms.

General Electric announced recently that revenues from its Predictivity solutions, which make machines **more productive**, exceeded \$1 billion in 2014.

Solair predictive maintenance as a fee-based customer services to AEG's household appliances (via app)

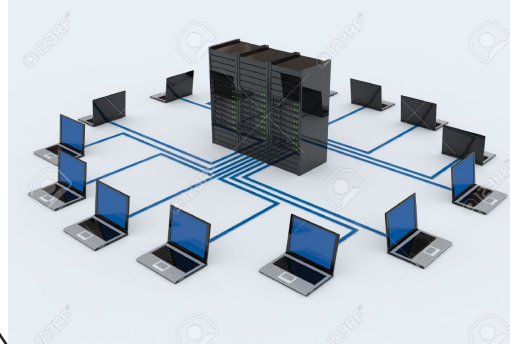


Industry 4.0 enablers: the Cloud concept

✓ ...but where is the data stored and processed?

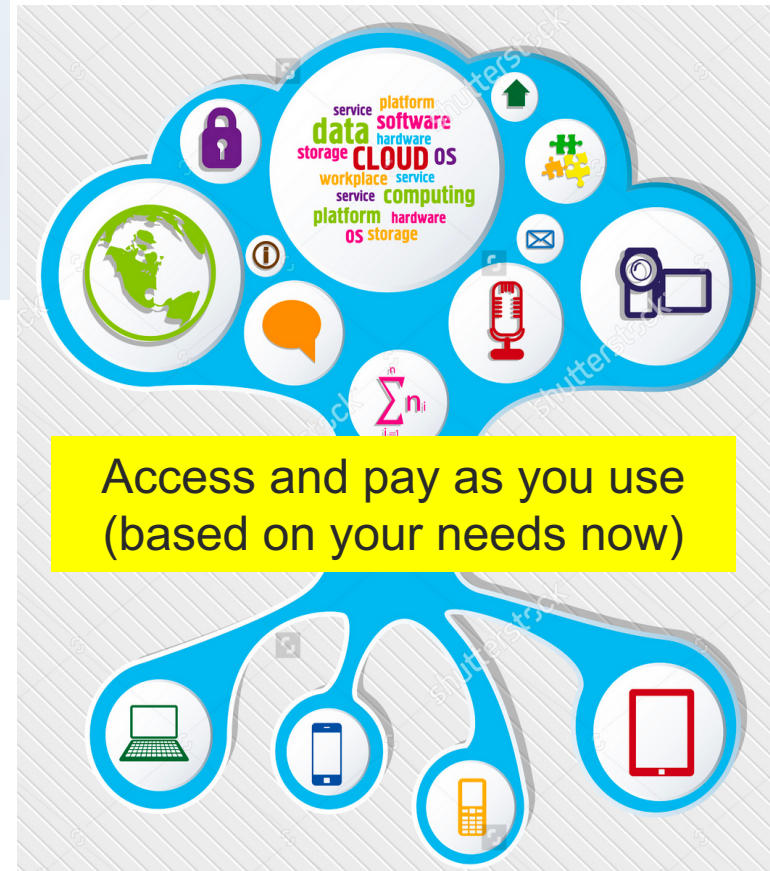
Local (owned) server pool

SERVER (computing) platform
Scalability (variable needs)
Purchase & Maintenance costs
fault tolerance, availability
COSTS!!!!

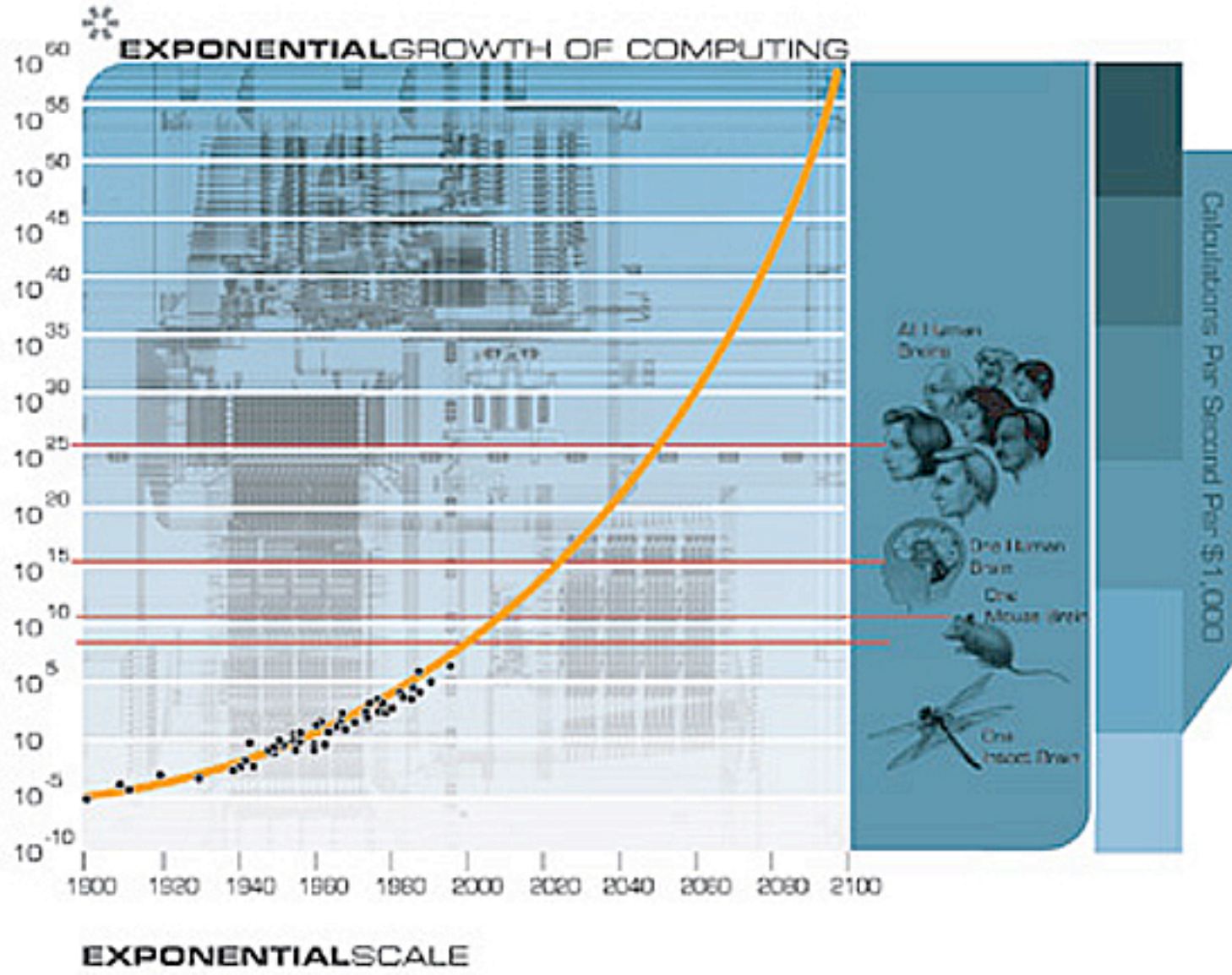


Local NETWORK connectivity platform
Scalability
availability
security/
COSTS!!!!

The **CLOUD** (computing/storage) services
+ **Internet** (communication) access

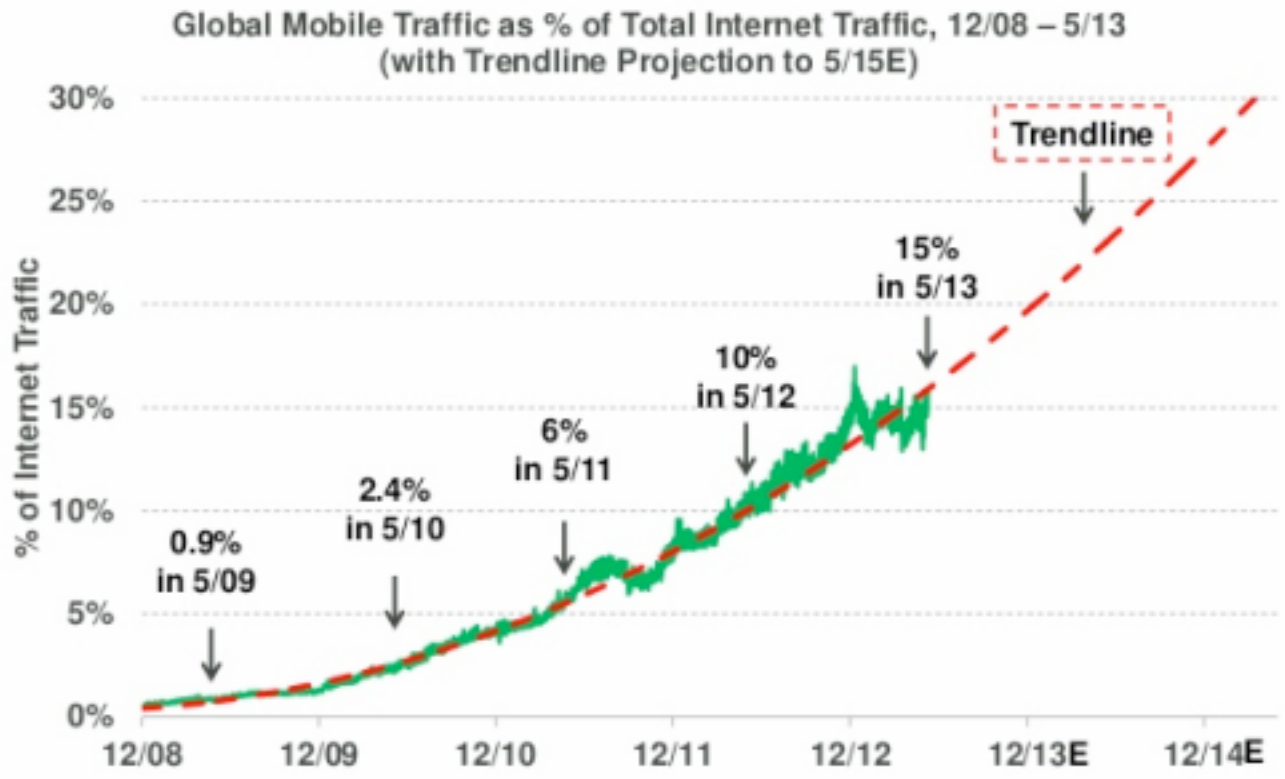


Exponential growth in computing power

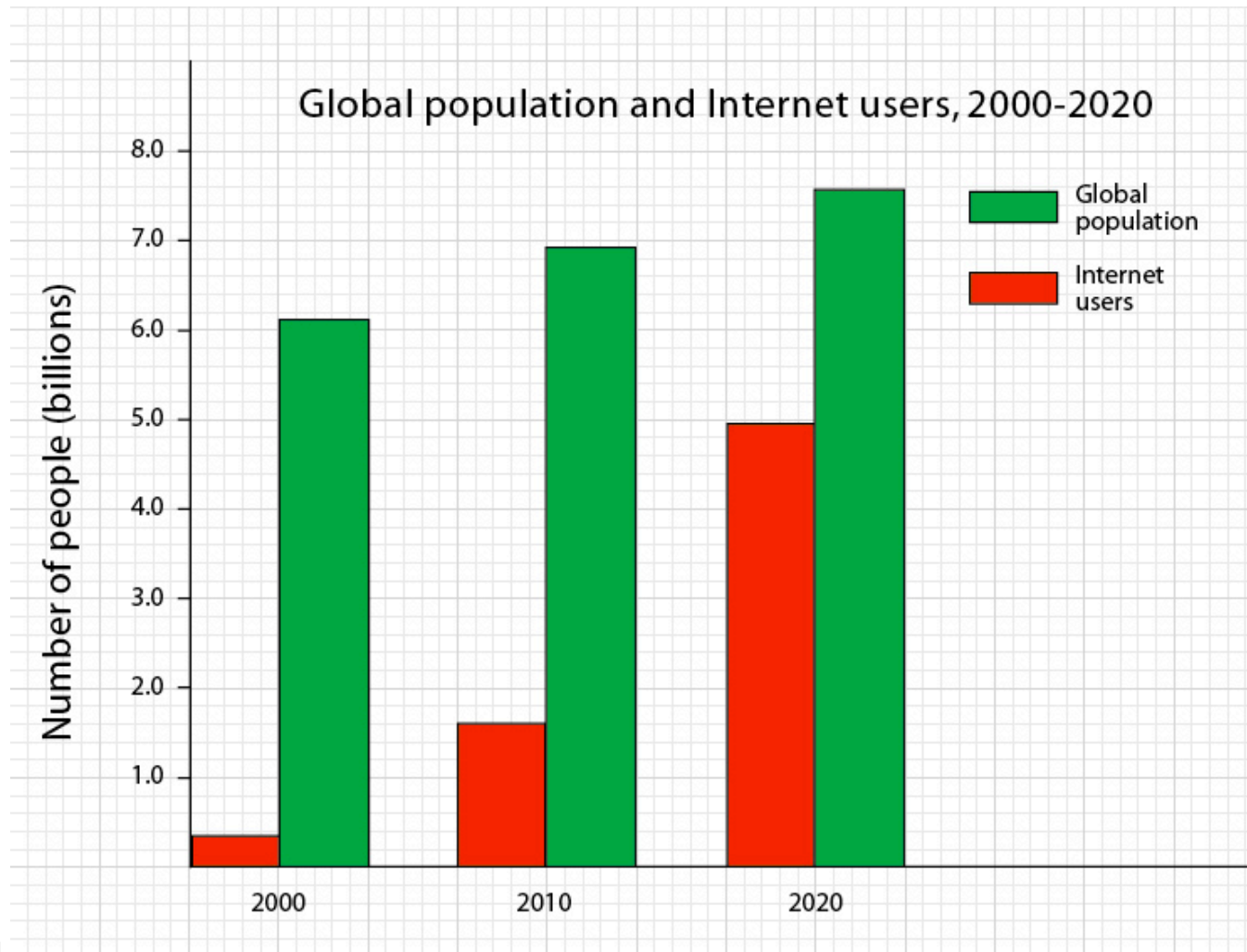


More and more people connected every day

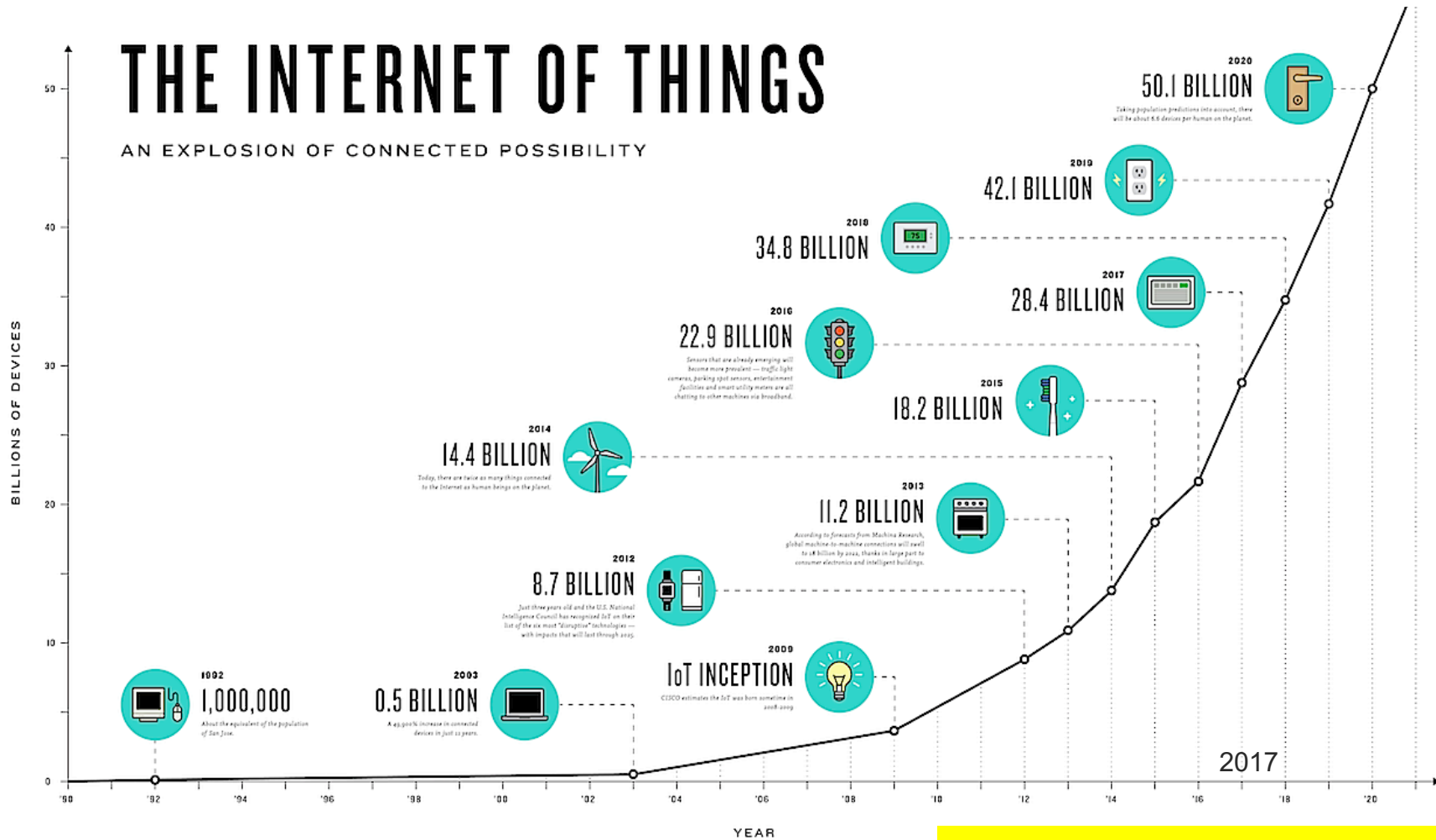
Mobile Traffic as % of Global Internet Traffic = Growing 1.5x per Year & Likely to Maintain Trajectory or Accelerate



More and more people connected every day



Not just people, but also things



50-220 Bn connected devices in 2025!!!



How much big is the Big Data?

- ✓ Big Data: how much BIG data are produced per year?

WHAT'S A ZETTABYTE?

1 kilobyte	1,000
1 megabyte	1,000,000
1 gigabyte	1,000,000,000
1 terabyte	1,000,000,000,000
1 petabyte	1,000,000,000,000,000
1 exabyte	1,000,000,000,000,000,000
1 zettabyte	1,000,000,000,000,000,000,000

40 ZB/year in 2020

1 ZB = 1Mx1M GB
1 ZB = 1Kx1Gx1G Bytes
(e.g. whole big data produced in Jan 2017)

In 10 years IoT will provide **2X new data every 12 hours!!!**

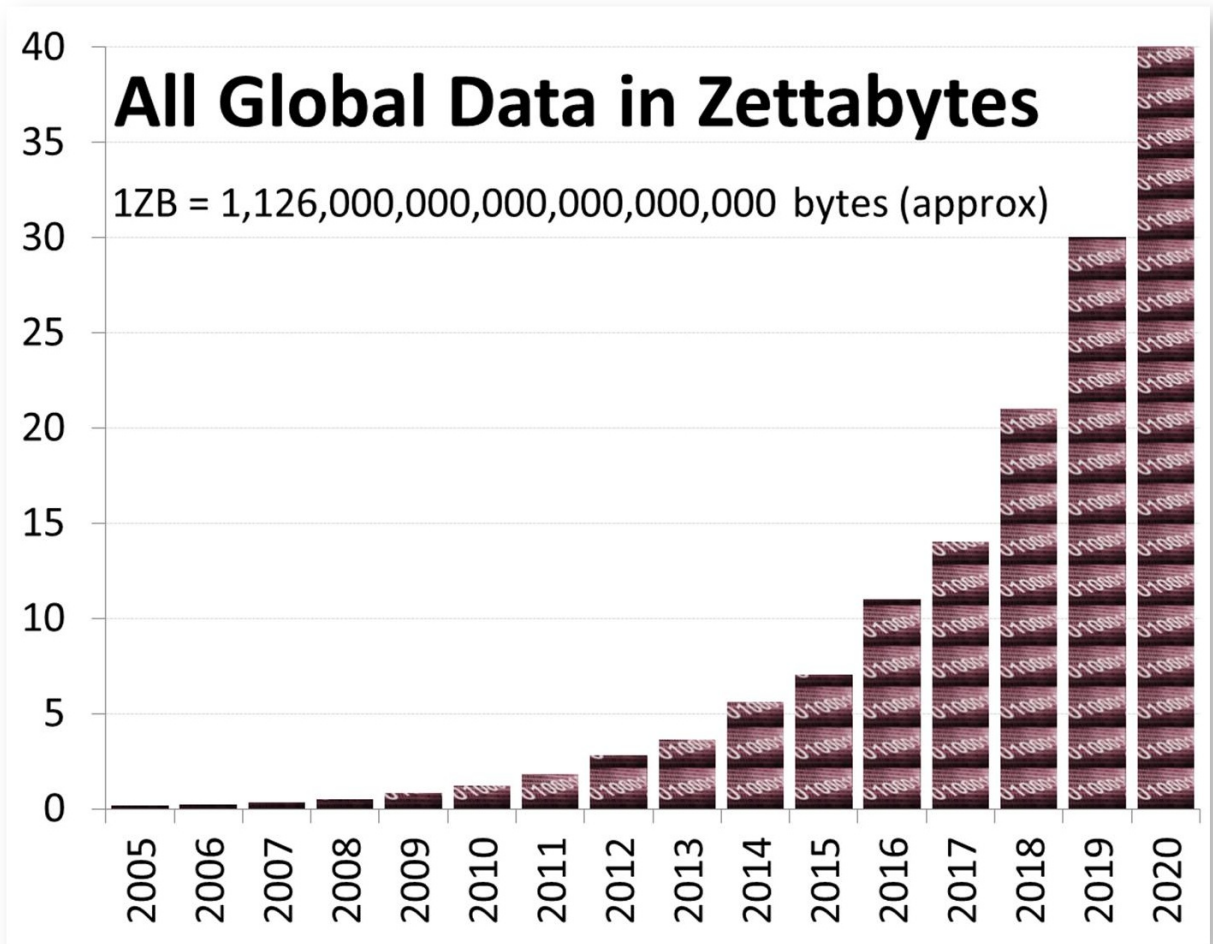


Image credits: unece.org

Big Data: concept

Big Data: take all the data you can collect about anything, aggregate it and make it available somewhere (ZettaBytes storage in the Cloud) for ANY purpose. So what to do now?

DATA is the NEW OIL!!!!

(Clive Humby, CNBC)

In its raw form, oil has little value.
Once processed and refined, it helps power the world.

“NYT: ...declared data a new class of economic asset, like currency or gold.

Deepak Advani, IBM's predictive analytics group Head:
Increasingly, businesses are applying analytics to social media such as Facebook and Twitter, as well as to product review websites, to try to “understand where customers are, what makes them tick and what they want”.

Industry 4.0: is there a Data/Oil Well in your backyard?



How to manage Big Data for Industry 4.0

Big Data: huge amount of heterogeneous, possibly correlated, complex, (un)structured data which require complex computing and analysis methodologies (e.g. learning-based) on big volumes and in real-time.



✓ Creation of added value from data insights

- Usually through identification of complex features like patterns, clusters, rules (relationships and similarities between datasets), causal effects and dependencies, evolutions up to the ability to predict future behaviors and scenarios

✓ Tools and methodologies

- Have to be scalable
- Have to provide results in real-time
- Have to provide accuracy indicators

✓ Analysis evolution: towards cognitive computing

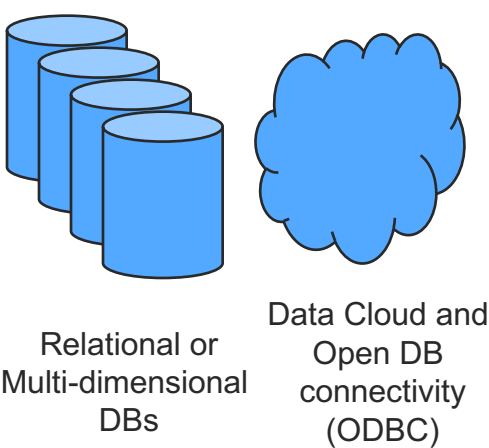
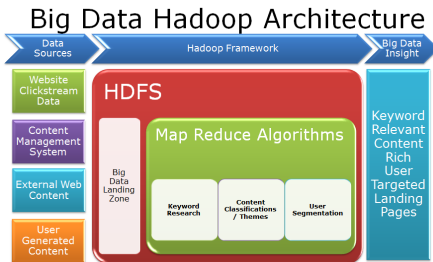
- Learning and building knowledge
- Understanding natural language
- Interacting in a natural way with humans beyond current programmable systems

Evolution of Analytics methodologies towards Cognitive

HIGHLY STRUCTURED DATA

UNSTRUCTURED DATA

BIG DATA architectures
e.g. Hadoop and Spark



DESCRIPTIVE

What is our customer segmentation by country/territory?
What products are selling best?
Clarify as to where a company stands related to defined business measures

Online analytical processing
OLAP

PREDICTIVE

What will be our campaign return for Q4? What combination of products are selling best? What are customer segmentation attributes associations according to past campaign results?
Analyse current and historical data to predict future events and business

Data Mining

PRESCRIPTIVE

In order to foster a certain product to sell, we need to promote through 15% discounts on this customer segment with this channel, to obtain the highest profit based on costs, budgets, constraints and benefits associated with the campaign.

Take advantage of a future opportunity/risk and show implications of decisions adopted

Early Cognitive Computing

COGNITIVE

What is driving our revenue? Answer: X & Y are driving revenue and here are three identified areas to help future growth. What concepts are associated with this customer claim or opinion? What words/offers will engage her/him?

Take advantage of a future opportunity/risk and show implications of decisions adopted. Mimics conscious mental activities (such as thinking, understanding, learning, and remembering)

Cognitive Computing
Artificial Intelligence

Business Intelligence & Visualization (dashboards) Tools
FARETE 2017 – Luciano Bononi



Advanced Tools

“Yet to come” Tools
IBM’s Watson

New Algorithms' economy

Peter Sondergaard (Gartner) puts algorithms at the center of business growth

“Data is inherently dumb. Algorithms are where the real value lies [...] Algorithms define actions”.

Dynamic, digital algorithms are at the core of new customer interactions, and companies will be successful not only based on their big data, but on algorithms that turn that data into actions and impact customers.

“People will trust software that thinks and acts for them”.

e.g. **Amazon's recommendation engine**,

e.g. **William's Sonoma multichannel digital strategy**
that marries its physical and digital stores

Examples of relevant algorithmic categories:

Regressive analysis, linear programming, game theory, heuristic and stochastic algorithms, dynamic programming, graph theory, branch & bound, queueing networks and Markov chains, simulation, neural networks, etc.



Peter Sondergaard,
senior vice president at Gartner
and global head of Research (2016)

Artificial Intelligence (AI)

Artificial Intelligence (AI)

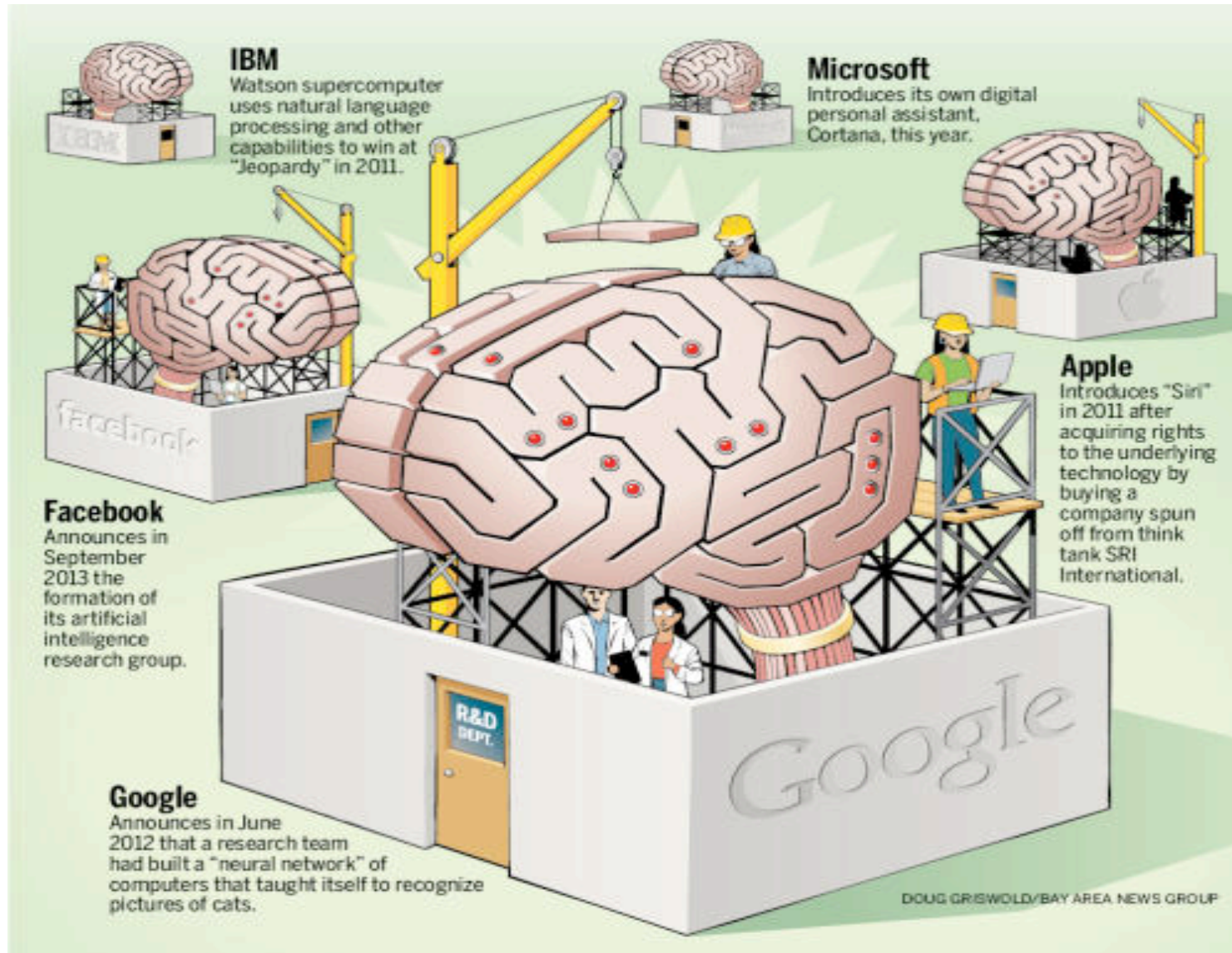


But first of all .. what is AI?

- Officially: The ability of a computer to perform tasks commonly associated with intelligent beings
- Peter Norvig (Director of Research, Google): “Knowing what to do when you don’t know what to do”
 - We may not be able to observe everything
 - We may not know the exact result of an action
- That is, provide solutions for what you do not know how to solve and how it would evolve during the solution implementation.
- As opposed to computer science’s algorithmic design
 - Solving problems we know how to solve, being prepared to react to any possible event it may occur.



Increasing interest for AI in the companies



AI is already here in the real world



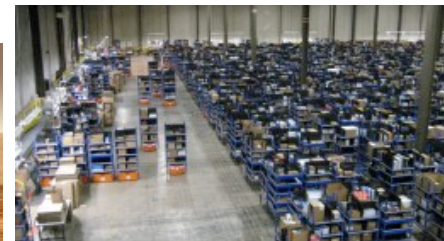
Google translate

From: Tamil To: Telugu



Customers Who Bought This Item Also Bought

<p>Oliver Twist (Dover Thrift Editions) Charles Dickens ★★★★☆ (213) Paperback \$3.50</p>	<p>David Copperfield (Dover Thrift Editions) Charles Dickens ★★★★☆ (196) Paperback \$5.00</p>	<p>JANE EYRE Charlotte ★★★★☆ (196) Paperback \$2.99</p>
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AI in the media

La scalata di Facebook all'intelligenza artificiale

Zuckerberg pronto a scommettere nel settore investendo in Vicarious. I suoi alleati sono Elon Musk, il fondatore di Tesla e l'attore Ashton Kutcher



Il Ceo di Facebook Mark Zuckerberg



e.g. listen to a computer generated song that “sounds like” Beatles style

https://youtu.be/LSHZ_b05W7o. (Sony CSL Res. Lab)

Quando un romanzo scritto da un computer ‘rischia’ di vincere un premio letterario: e se il nuovo Balzac fosse di plastica e metallo?

di Maurizio Di Fazio

Nell'era dello storytelling di massa, l'intelligenza artificiale sceglie la scrittura di fantasia per tornare a mostrare i propri muscoli di microchip. La notizia viene dal Giappone: un importante premio letterario fantascientifico nazionale, il Nikkei Hoshi Shinichi Literary Award, per un pelo non è stato vinto da un romanzo scritto da un robot. Il libro s'intitola programmaticamente 'The Day A Computer Writes A novel'

di Maurizio Di Fazio | 31 marzo 2016

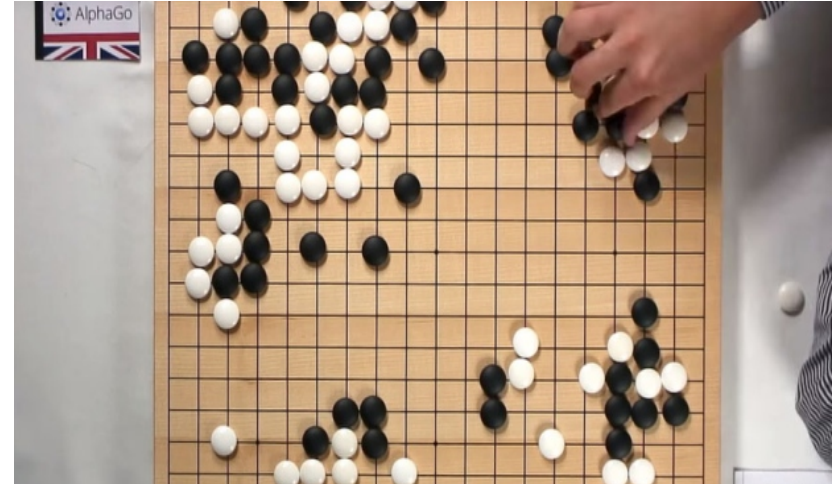


AlphaGo beat the world champion of Go

Go: game 2500 years old, very common in Asia (40M players)

Very simple rules but very complex game: possible positions $10^{365} > \#$ atoms in the universe 10^{85}

March 2016: AlphaGo win against Lee Sedol



Natural language understanding and QA



Watson (IBM) won at Jeopardy, 2011 !

Jeopardy: Given an answer must find a question

Language understanding + Question Answering

Uses 4 terabytes of data (Encyclopedia etc.)

Analyses 200 M pages of content in 3 second



Practical applications of Watson



Financial domain: Bridgewater Associates (managing 160 \$ bn) hired the chief developer of Watson to create a system for managing daily operations. **Long term goal is to have in 5 years $\frac{3}{4}$ of the managing decision done by software**

Health domain: Watson Oncology is a cognitive computing system developed at Memorial Sloan Kettering Cancer Center to interpret cancer patients' clinical information and identify individualized, evidence-based treatment options.

Personalized tutoring The Teaching Assistant of the 2016 Artificial Intelligence course at Georgia Tech was a program (based on IBM Watson). It was answering students questions on-line with a success rate of 97%.

Weather forecast Watson used to analyze data from over 200000 stations



Self-driving cars



Stanley, 2005 DARPA Grand Challenge



Google self-driving cars,
announced in 2010, appearing in 2016



Limitations and risks of AI (e.g. the autonomous vehicle case)

Ethical issues

- e.g. decide about someone's life or death in driving emergence decisions.

Needs for philosophical and ethical "thinking"

- not a decision of car manufacturers
- not a decision for SW developers
- not only a decision for policy makers

Not all about the rules

- AI could decide to create or by-pass rules

We need to be careful.... And cautious!



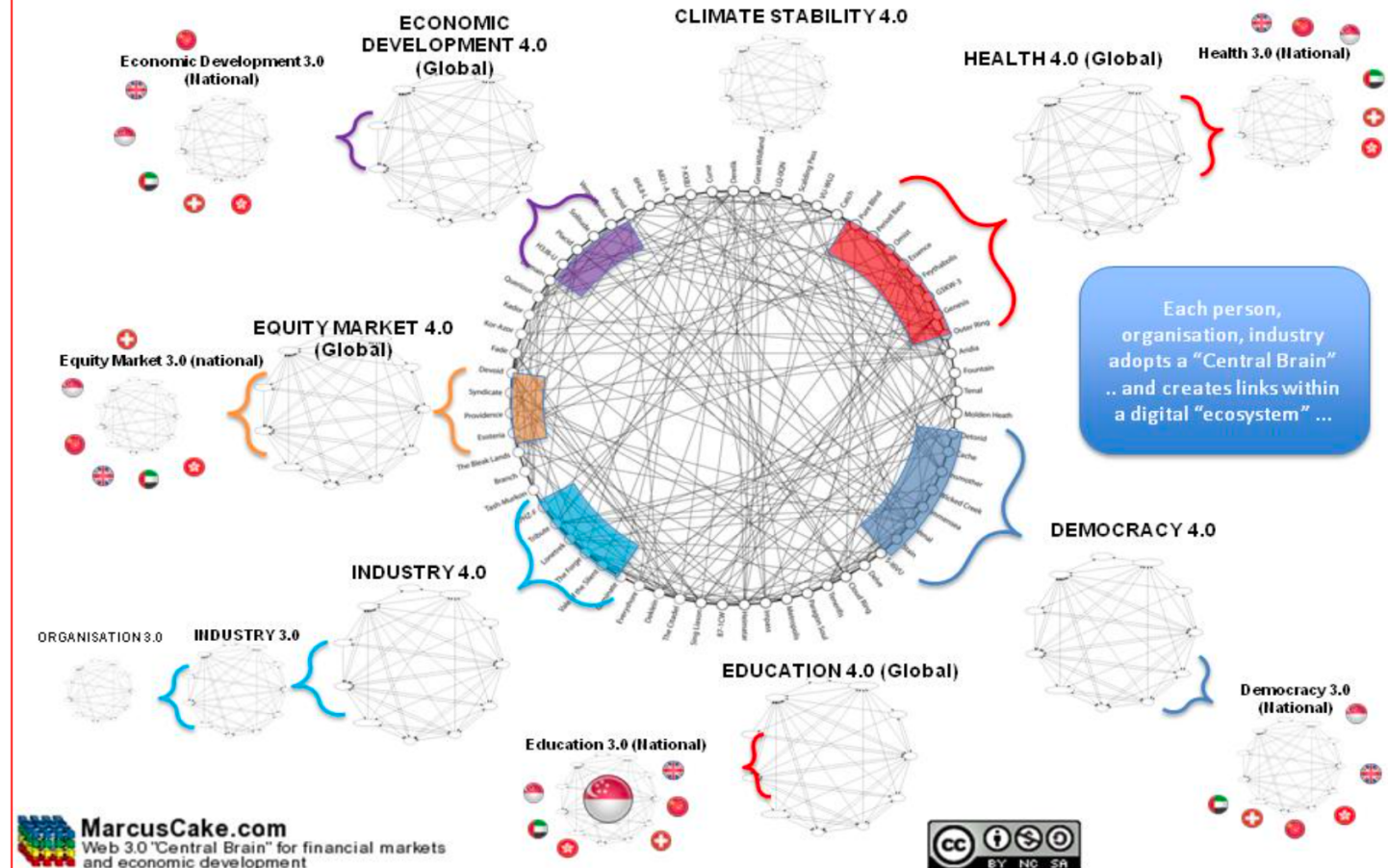
AI as a “brain” of the Digital Ecosystems

Co-dependent ecosystems will align to address consumer, regulatory and environmental concerns, as well as developing product ideas and other industry innovations

Intersection with the innovations of other industries will enable new business models and revenue streams

Synchronization of product cycles and time to market - will drive more modularization and “plug and play”

The central brain of the Co-dependent ecosystems



Digital Competence and HRMs

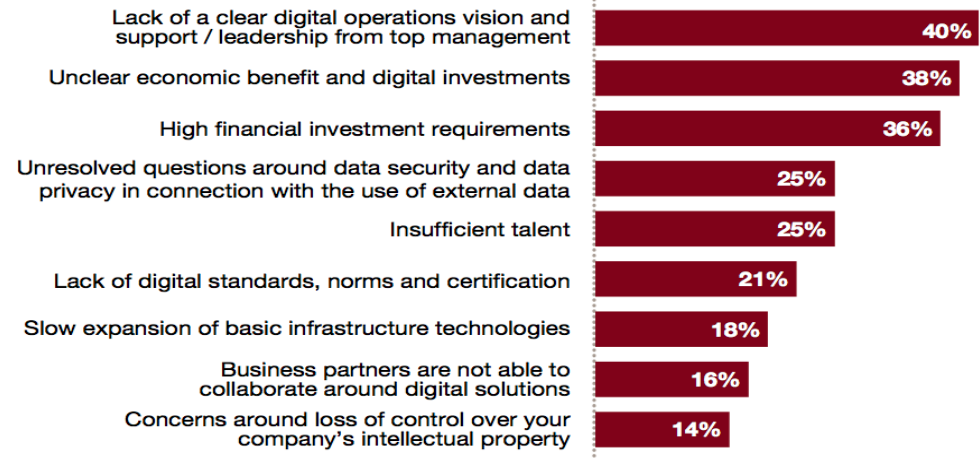
Digital Competences and eLeadership

Digital Literacy / Digital Competence is receiving great attention by the OCSE, UNESCO, UE due to **potential impact on economy and society**.

Digital transformation of companies and industry: need support from **infrastructures and formation for digital competence**, otherwise there is a Risk for second-level digital divide.



Lack of digital culture and training



Note: Included as one of three possible responses

Q: Where are the biggest challenges or inhibitors for building digital operations capabilities in your company?



Digital Disruption and eLeadership: some facts

Disruptive business models are emerging: a minimal startup somewhere could cancel a B\$ business in 10 years.

Silicon Valley as the core of the digital earthquake (e.g. Apple devices and Google car).

e.g. Kodak: 1984: 45,000 people, 2012: bankrupt!

Instagram: 2012: 13 people, recently sold to FB for \$1 Billion

Foxconn (electronics components manufacturing)

Is getting an army of 1 Million robots!

Digital Disruption and eLeadership: some facts

Speed factor: 12 months from concept to industrialization are too much.
Rhythm of innovation is accelerating.
Agile development and zero-prototyping are new paradigms.
Highly flexible manufacturing.

“Digital Darwinism” (Brian Solis): you quickly adapt your company DNA to “digital” and survive or you will die.

Need for **Industry 4.0 managers** well aware of the digital transformation opportunity and **data valorization**.

Note: **Chief Data Officers (CDO)** almost **doubled** worldwide in 2013-2014 and again in 2014-2015. (Russel Reynolds & McKinsey - Sept.2015 - McKinsey Journal)



Analytics market (estimate) and situation in Italy

An estimate of the Analytics market in Italy (12/2015) was about 790 MEUR (+14% w.r.t 2014) (src. osservatori.net)

790 MEUR Share in 2015:



Growth trend in 2015: Big Data Analytics: +34%

Business Intelligence: +11% (structured data)

Driven by banks, industry, telco and media in sectors like marketing and sales, finance and control, information systems, purchases, production and supply chain.

Analytics market (estimate) and situation in Italy

In 2016 Analytics have been priority for investments for 44% italian CIOs.

Italian companies understood the importance of data insights but still far from data driven business strategies.

26% of organizations have a **Chief data officer** (executive mgmt team member to transform data value as a company asset), 30% have a **Data Scientist** (multi-disciplinary expertise: computer science, math/stats, business, able to model complex problems and extract info from data finalized to business). But decision responsibility is today almost totally (still) in the hands of CIO and Business Intelligence managers.

Still many difficulties to find experts in relevant roles (see table)



Analytics market (estimate) and situation in Italy

An estimate of the Analytics market in Italy (12/2015) continued...

Consolidated analytics (high adoption but low growth):

Supply chain analytics (29%),

Human Resources analytics (26%),

production planning & Sales (26%)

High adoption and interest (currently):

CRM analytics (56%),

finance & accounting analytics (52%),

top management dashboard Solutions (41%)

Emerging (low penetration but high interest):

e-commerce analytics (18%),

customer experience analytics (11%),

Social & Web analytics (7%)

Niche sectors:

Security analytics (8%),

telecommunication analytics (8%),

transportation analytics (2%)

Analytics market (estimate) and situation in Italy

Which company functions use analytics today in Italy?

marketing & sales (77%)

Administration, finance and control (76%),

Information systems (60%),

purchases (55%),

production (44%),

supply chain (43%),

Human resources (31%),

R&D (20%)

But the analytics produce mainly Data Visualization (65%) and reports (68%) and only 19% of the companies consider this support suitable enough for their needs.

Analytics market (estimate) and situation in Italy

An estimate of the number of **new Analytics startups worldwide** (2013-2015) was about 500 (14,5 B\$ investments) of which 33 in Italy (src. osservatori.net)

Three main areas of products:

Infrastructure: processing, analyzing and storing data

Analytics technologies providing specific analytics technologies

Application, vertical data analysis solutions for specific fields

The existing **start-ups are influencing** the following (customer) company sectors:

50% *Marketing & Sales*

47% nel *CRM & Customer Experience*

Security (15%),

Finance (15%),

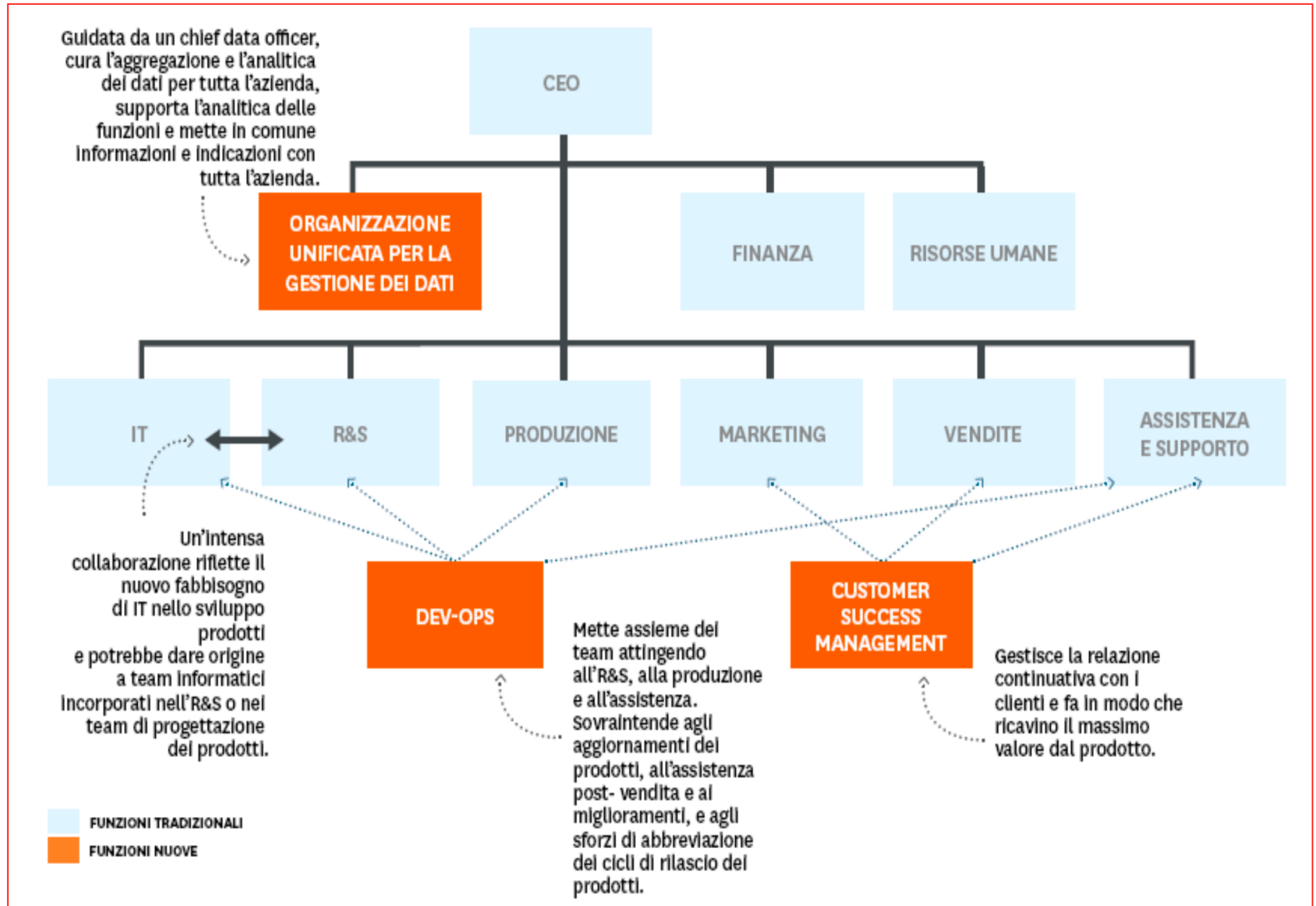
Supply Chain, Logistics & Operations (8%),

***Human Resources* (6%)**

IT (3%).



Example of a new organization structure (HBR)



The future of jobs

- 77% of jobs in China and 69% of jobs in India at risk
- Greater inequalities: divergence in penetration rates of technology adoption can account for the 82% of the increase in the income gap across the globe in the last 180 years.

In 1820, incomes in Western countries were 1.9 times those in the non- Western. In 2000, 7.2 times !

Technology at Work v2.0: The Future Is Not What It Used To Be.
University of Oxford report. 2016 .



The future of recruitment of Human Resources

Head Hunting algorithms: e.g. KF4D, Talla (<https://talla.com/>), etc.

Considering multifactorial analysis

- Analysis of Language, voice, emotions, Gestures, face expressions, micro-signs
- Organization culture, role
- Chatbots, Natural language recognition

From multiple data sources

- Web information, video, posts, emails, etc.
- A 15 min video could reveal more than 20.000 signals

Automate screening, reports and elimination of biasing factors

- Look, Gender, affinity, predilections



Gli algoritmi che pensioneranno il curriculum

(prof. Max Bergami, UNIBO and Bologna Business School), Sole 24 ore, 3/9/2017

Can an Algorithm Hire Better Than a Human?

(Claire Cain Miller, NYT, June 25 2015)

The Future Workplace Experience: 10 Rules For Mastering Disruption in Recruiting and Engaging Employees (book)

Nov 2016 (Jeanne C. Meister, K. Mulcahy)

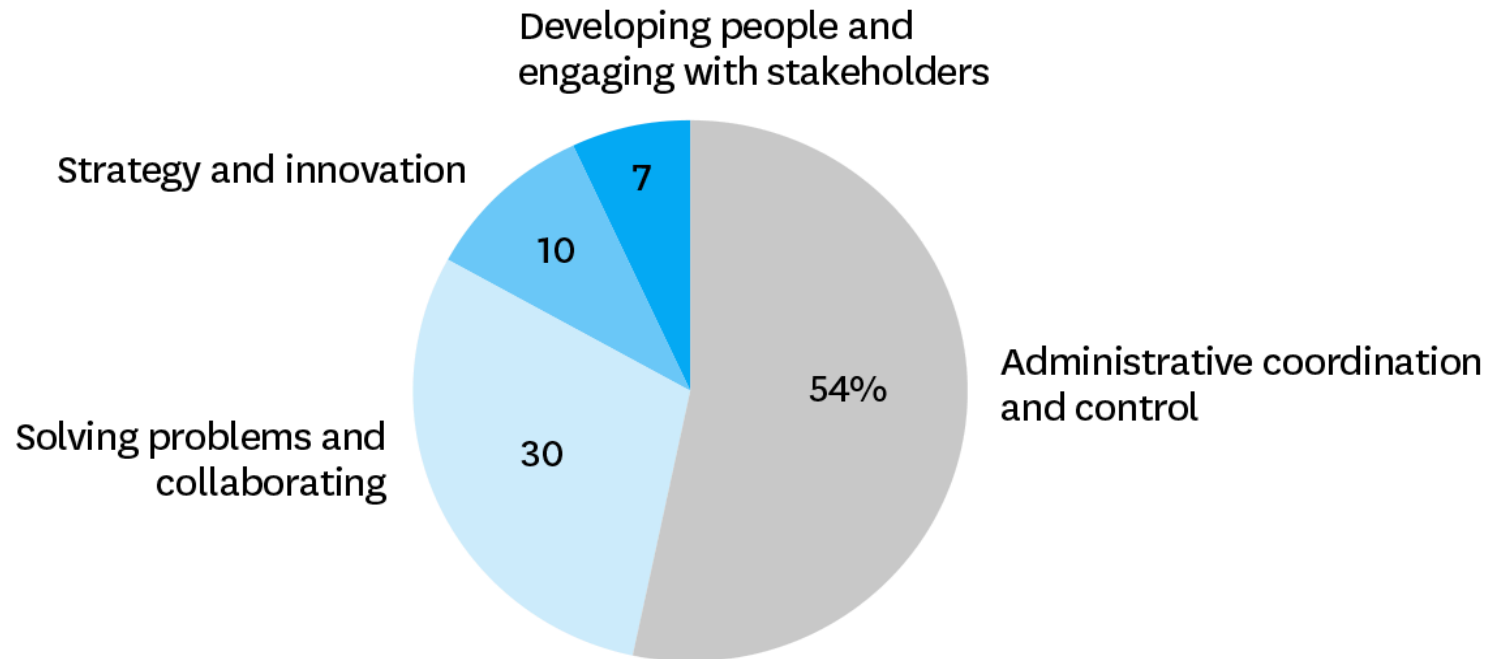


AI and management

How Managers Spend Their Time

The bulk of it is spent on administrative tasks.

PERCENTAGE OF TIME RESPONDENTS SPEND ON CATEGORIES OF WORK



JRCE ACCENTURE SURVEY OF 1,770 FRONTLINE, MID-LEVEL, AND EXECUTIVE-LEVEL MANAGERS FROM 14 COUNTRIES



Five practices that successful managers will need to master [1]

1) Leave Administration to AI

Data analytics company Tableau and NLP company Narrative Science developed a software that automatically creates written explanations for Tableau graphics.

86% of the surveyed managers like AI support for monitoring and reporting.

2) Focus on Judgment Work

Many decisions require knowledge of organizational history and culture, empathy, ethical reflection. AI provides support for decision, not replacement... so far...

3) Treat AI Machines as “colleagues” not competitors

AI can provide decision support, data-driven simulations, search and discovery activities.

78% believe they will trust the advice of AI in making business decisions

Kensho Technologies system allows investment managers to ask questions in plain English, such as, “What sectors and industries perform best three months before and after a rate hike?”

[1] *How Artificial Intelligence Will Redefine Management*. Vegard Kolbjørnsrud, Richard Amico, and Robert J. Thomas. November 2016. Harvard business review.



Five practices that successful managers will need to master [2]

4) Work Like a designer

ability to harness others' creativity

33% of the managers identified **creative thinking and experimentation** as a key skill area they need to learn to stay successful

5) Develop Social Skills and Networks

The managers undervalued the social skills critical to networking, coaching, and collaborating that will help them in a world where **AI carries out many of the administrative and analytical tasks** they perform today.

More Suggestions

- a) **Explore AI early.** Disruption is arriving
- b) **Adopt new key performance indicators.** AI will bring new criteria for success: collaboration capabilities, information sharing, learning and decision-making effectiveness, and the ability to reach beyond the organization for insights.
- c) **Develop training and recruitment strategies** for creativity, collaboration, empathy, and judgment skills. Leaders should develop a diverse workforce



Thanks!

Thanks!

Any questions?

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