

DIAGNOSTICA PREDITTIVA E INDUSTRIA 4.0

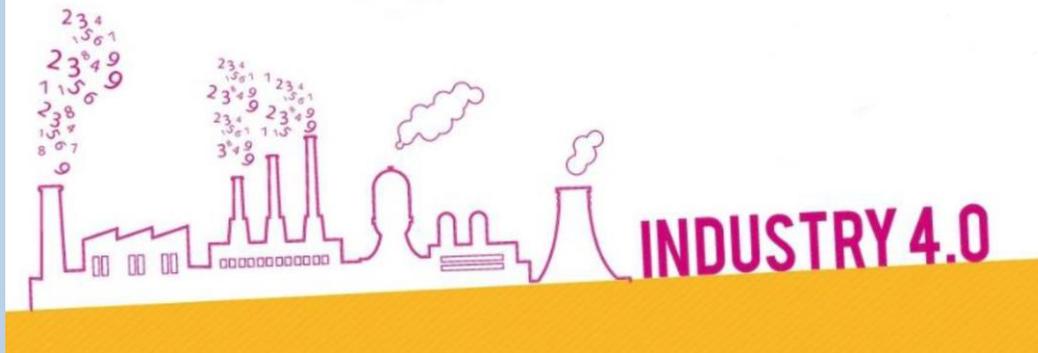
Il Nuovo Paradigma per la PMI del Futuro

Seminario OPUS - Regione Toscana

Stazione Leopolda Pisa, 24 Febbraio 2017

Internet delle Cose → 5G → Industria 4.0

Competere o perire



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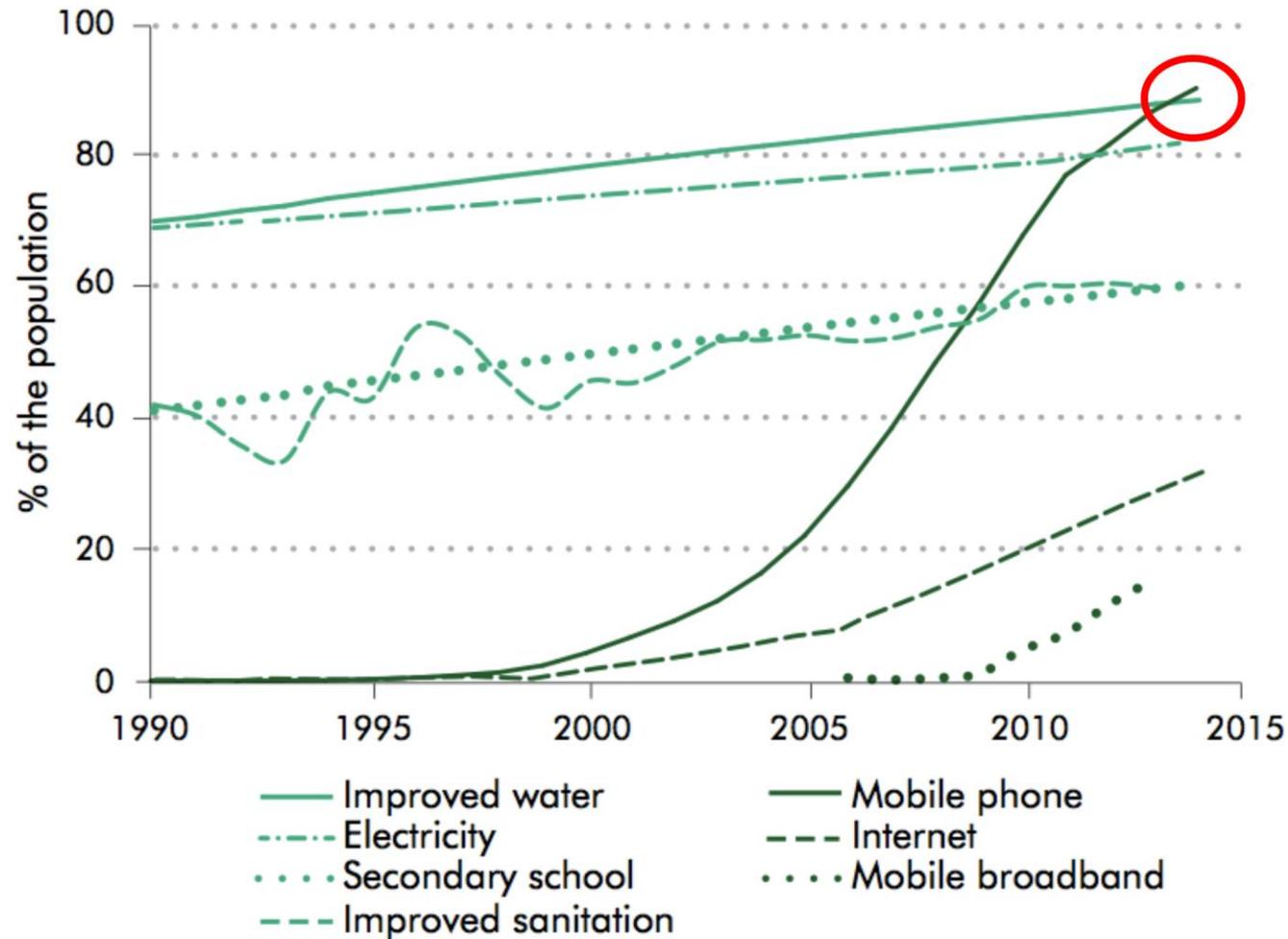


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Before IoT: Trends in Mobile



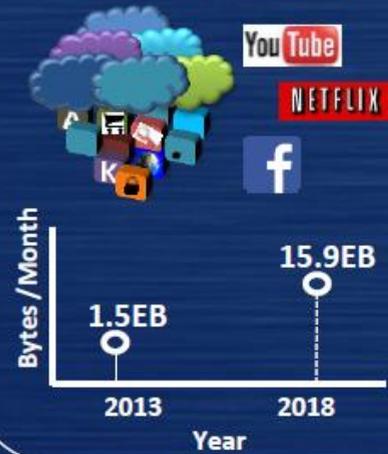


Now: Trends in Mobile

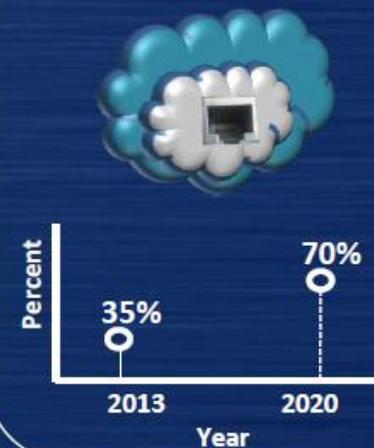
Mobile Connections^[1]



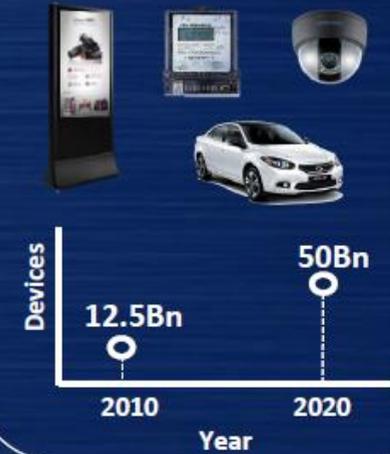
Mobile Data Traffic^[1]



Mobile Cloud Traffic^[2]

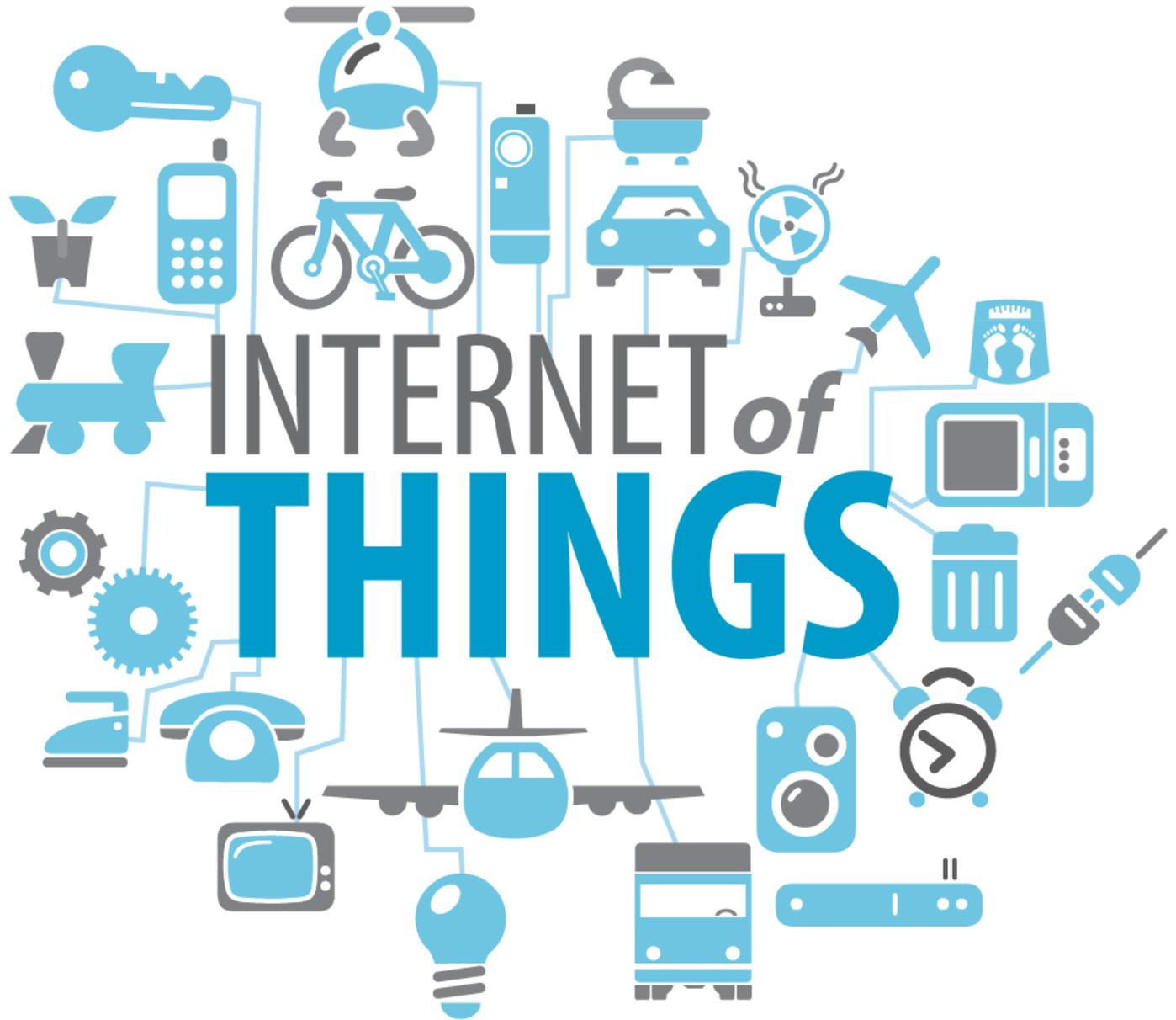


Things Connected^[3]





Internet of People





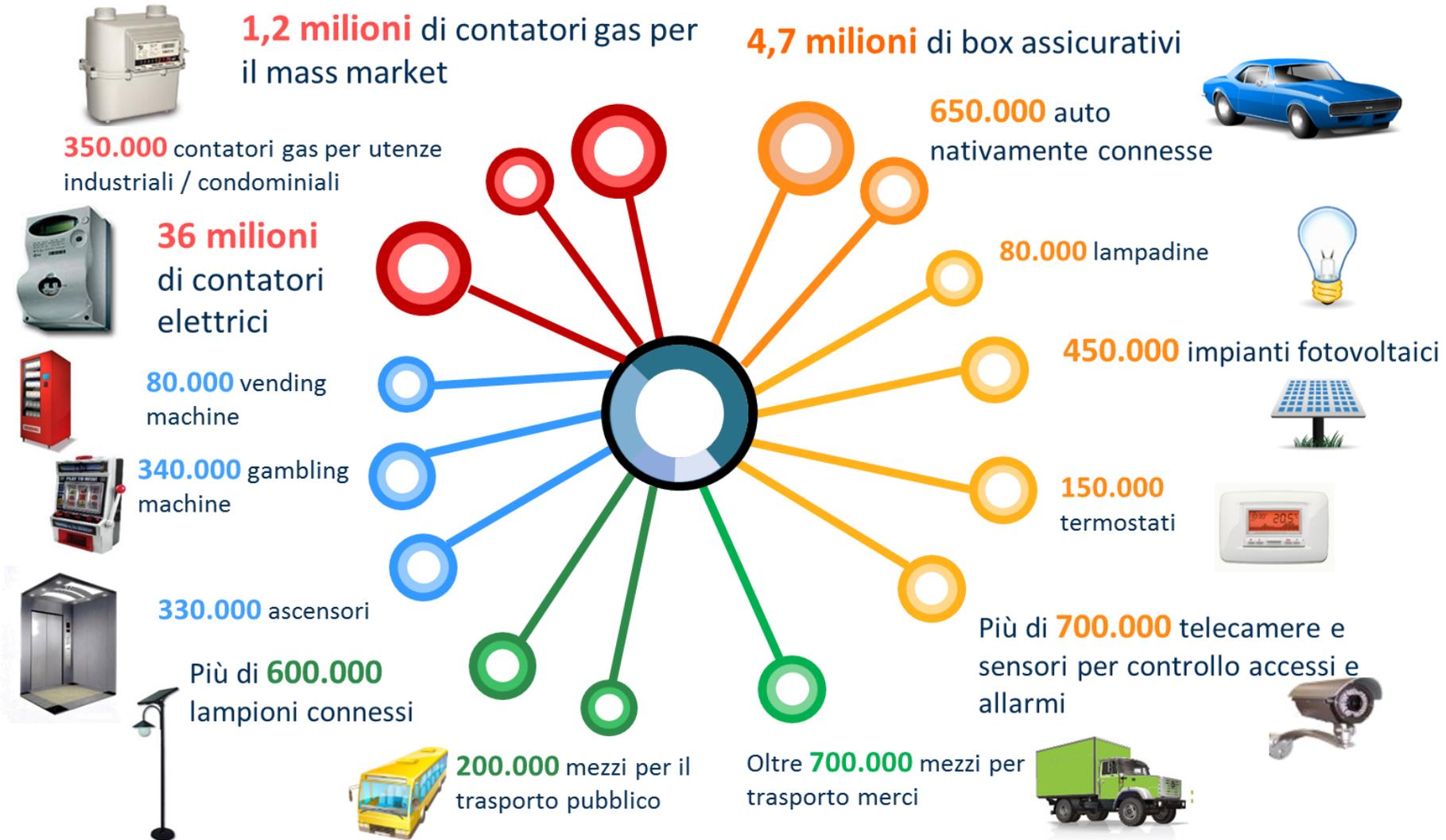
Che cos'è l'IoT

L' «Internet delle cose» è la rete degli oggetti fisici (cose) che dispongono intrinsecamente della tecnologia necessaria per rilevare e trasmettere informazioni riguardo al proprio stato e/o all'ambiente circostante. L' IoT è un ecosistema che include le cose, gli apparati di comunicazione, le applicazioni e gli apparati per l'analisi dei dati.



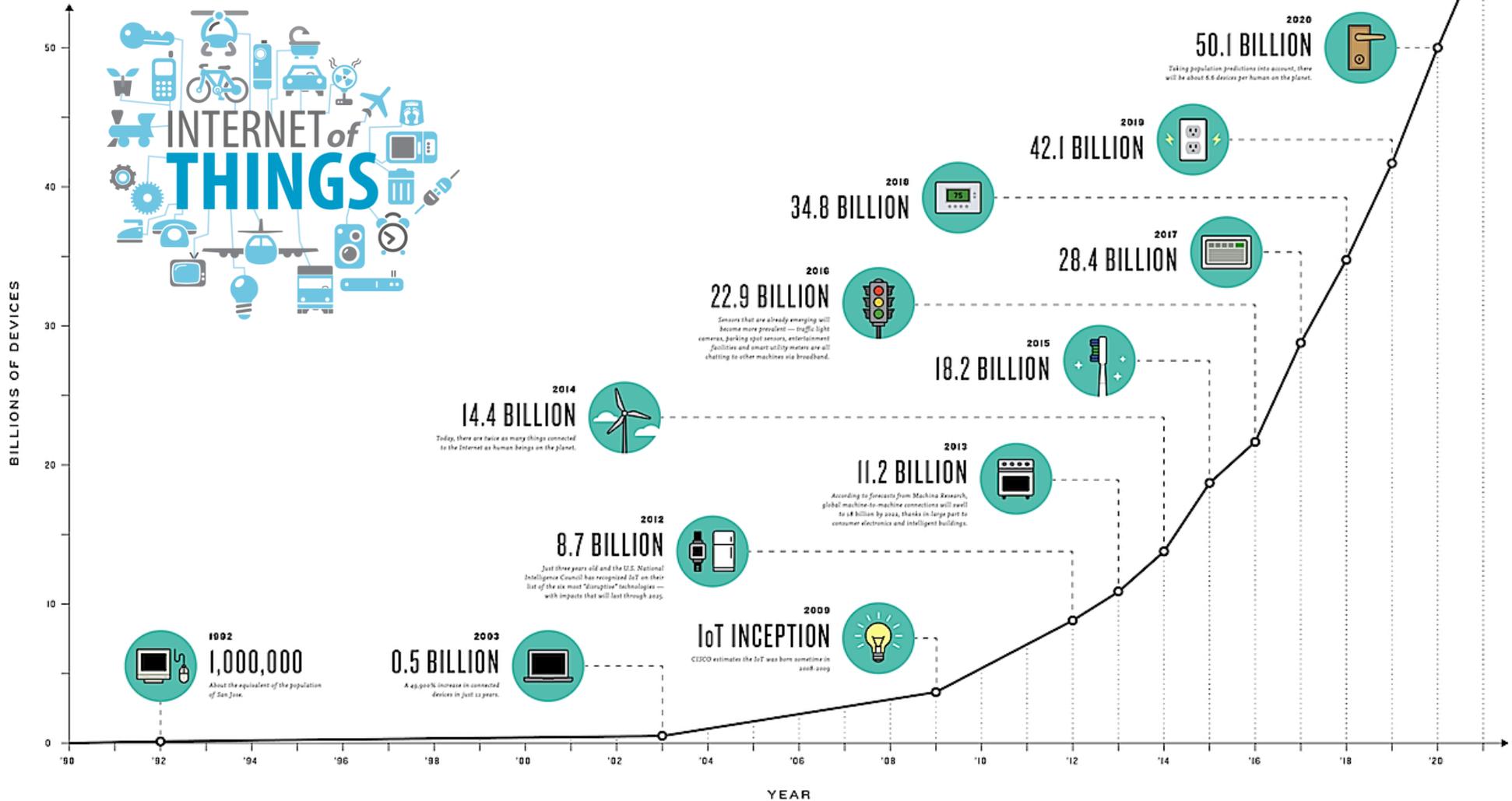


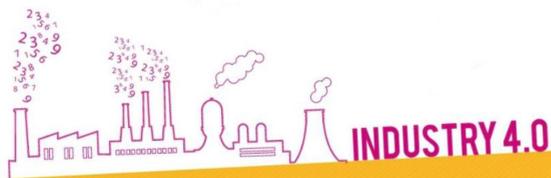
Oggetti Connessi in Italia (2015)





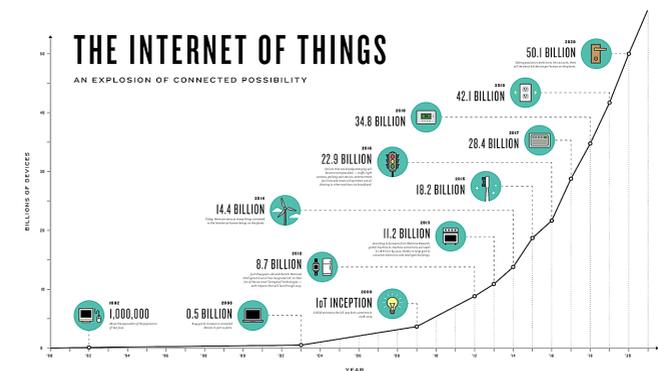
Forecast





IoT: Nuovo paradigma di rete

- Si chiamava: Machine-to-Machine communications (M2M, D2D)
- Comunicazioni Sporadiche
- Enorme Numero di accessi
- Accesso non coordinato e rete auto-organizzata
- Bassissimo bit-rate medio
- Efficienza energetica (piccola batteria o energy harvesting)





IoT Trasforma tutto quanto

 <p>Driverless Cars</p>	 <p>Power by the Hour Contracts</p>	 <p>Connected Medicine</p>	 <p>Traffic Management</p>	 <p>Earthquake Detection</p>
 <p>Water Quality Monitoring</p>	 <p>Smart Power Grid</p>	 <p>Security and Access Control</p>	 <p>Fleet Management</p>	 <p>Electronic Payments</p>
 <p>Keyless Entry</p>	 <p>Connected Appliances</p>	 <p>Adaptive Shopping Experiences</p>	 <p>Agriculture Monitoring</p>	 <p>Machine to Machine Connection</p>

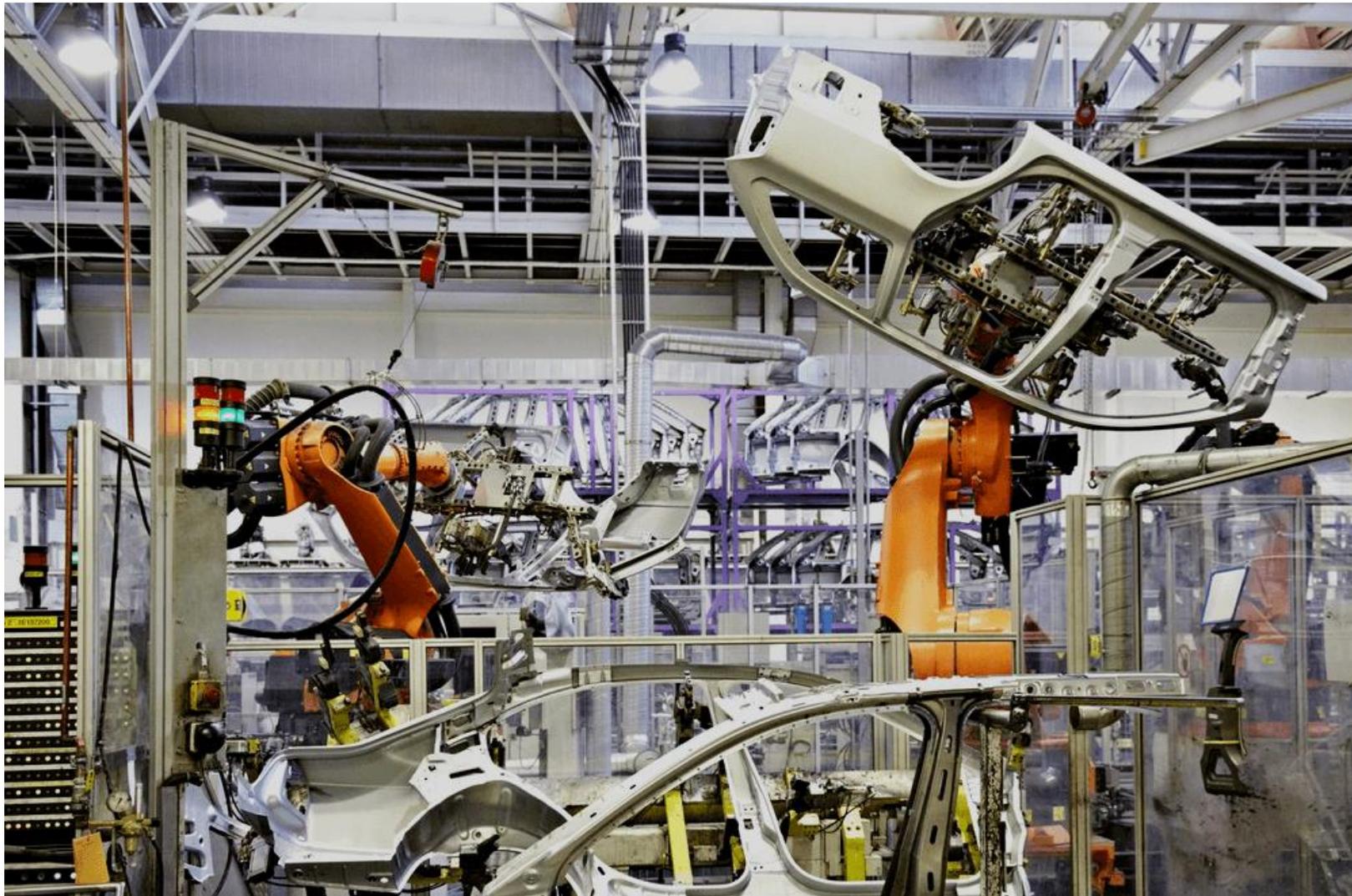


Smart Home Scenario





Smart Factory Scenario



The 5G Vision

Everything on Cloud

Desktop-like experience on the go



Immersive Experience

Lifelike media everywhere



Ubiquitous Connectivity

An intelligent web of connected things



Intuitive Remote Access

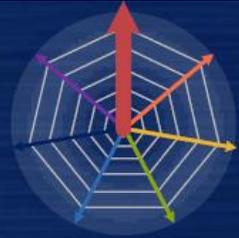
Real-time remote control of machines



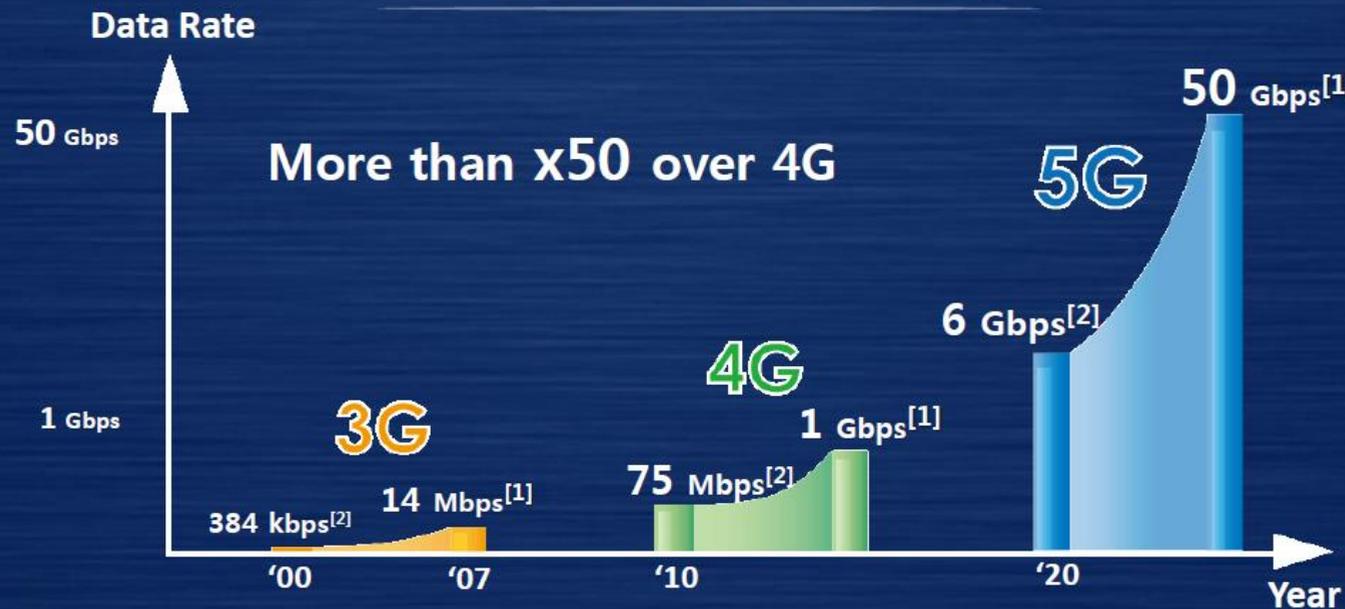


An example: the data rate

Order of Magnitude Improvement in Peak Data Rate



Peak Data Rate > 50 Gbps





Everything on Cloud

As-Is

Lagging Cloud Service

Latency : ~ 50 ms^[1]

~ 20 min (Worldwide Avg.)
to download HD movie (1.2GB)

Cloud Service Initial Access Time*		LTE Downlink Performance ^[2]	
Provider A	82 ms	World	7.5 Mbps
Provider B	111 ms	Korea	18.6 Mbps
Provider C	128 ms	America	6.5 Mbps



To-Be

Instantaneous Cloud Service

Latency : ~ 5 ms

~ 9.6 sec
to download HD movie (1.2GB)

Requirements for Mobile Cloud Service

- E2E NW Latency < 5 ms
- Data Rate > 1.0 Gbps

Desktop HDD ^[3]	
Access Time	8.5 ms
Transfer Rate	1.2 Gbps



Ubiquitous Connectivity

As-Is

Human Centric, Limited Connections



To-Be

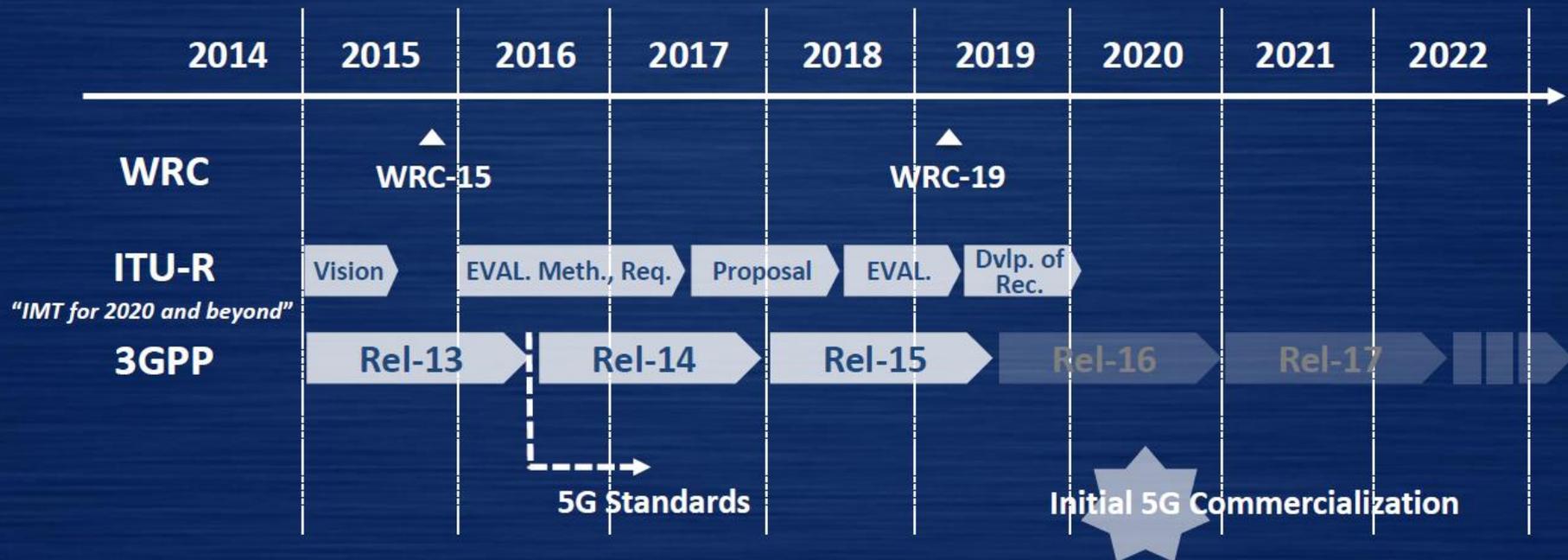
An intelligent web of connected things (IoT)





Standardization Status / Perspectives

Standards in 3GPP Rel-14/15, Spectrum Allocation in WRC-19, ITU Approval in 2020

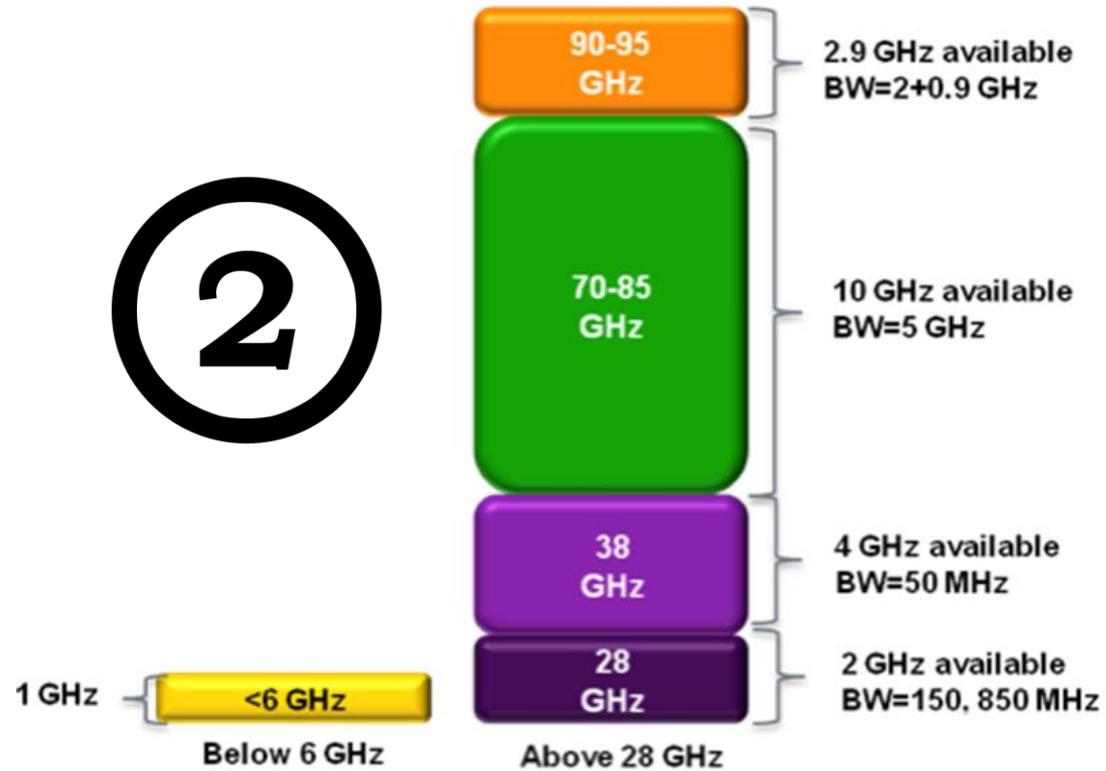


1- Massive MIMO

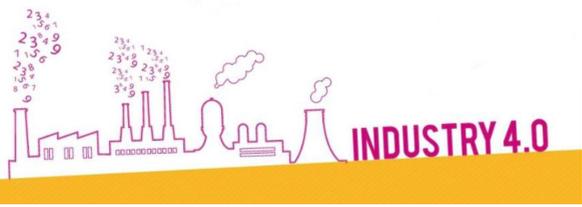


ONE

2 - mm-waves



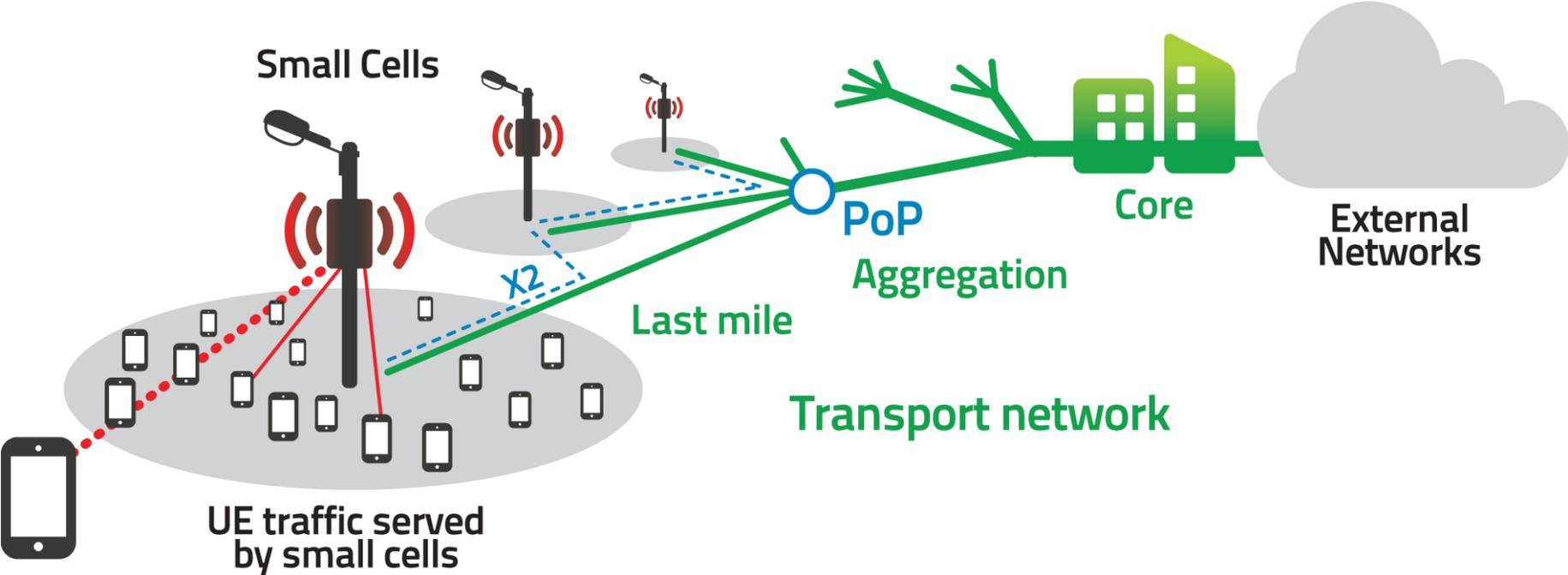
TWO

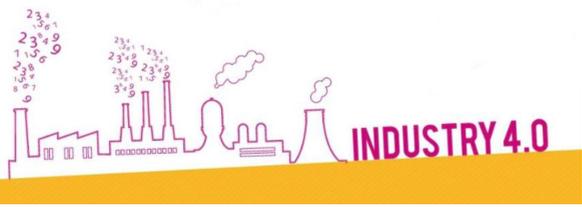


5G Technologies 2/2

3 – Small Cells

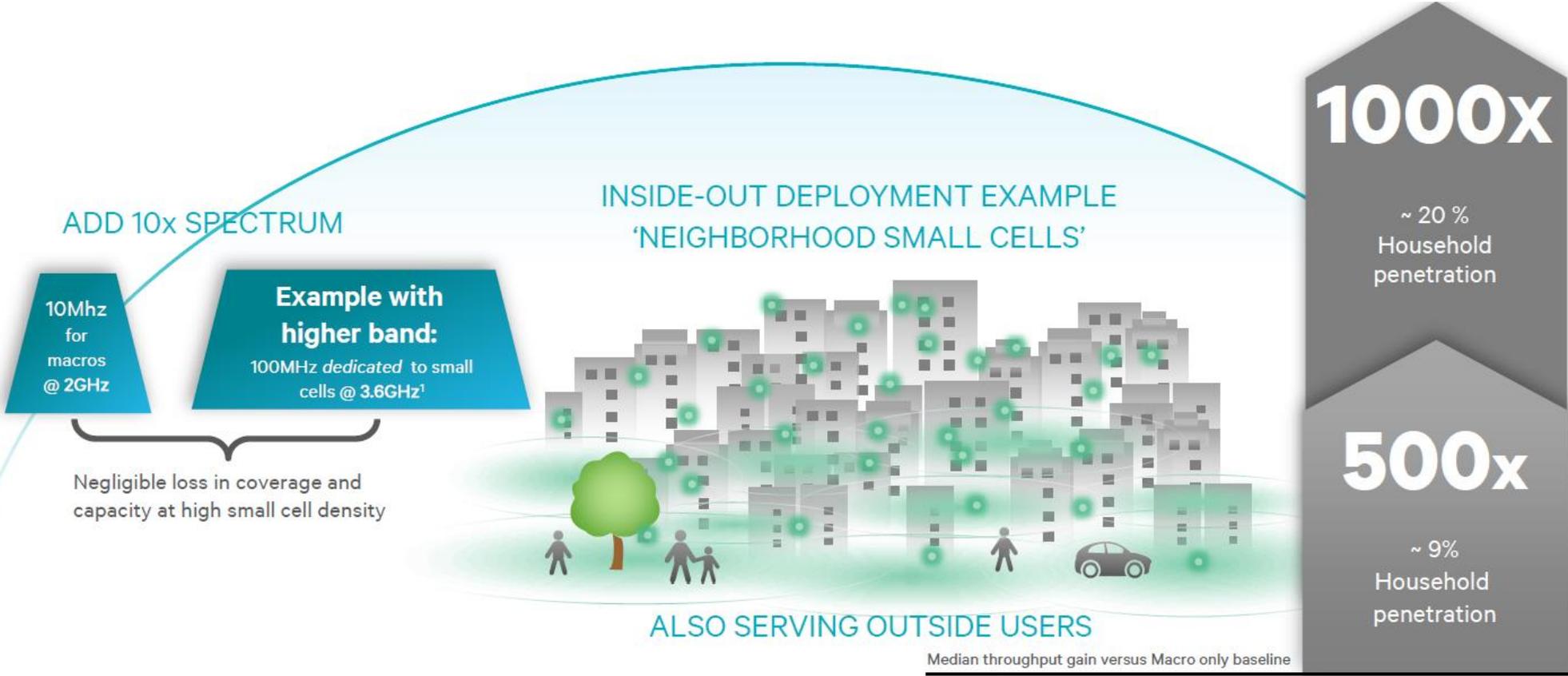
3





Small Cells 2/2

Commercial product by Qualcomm





5G: Per riassumere...

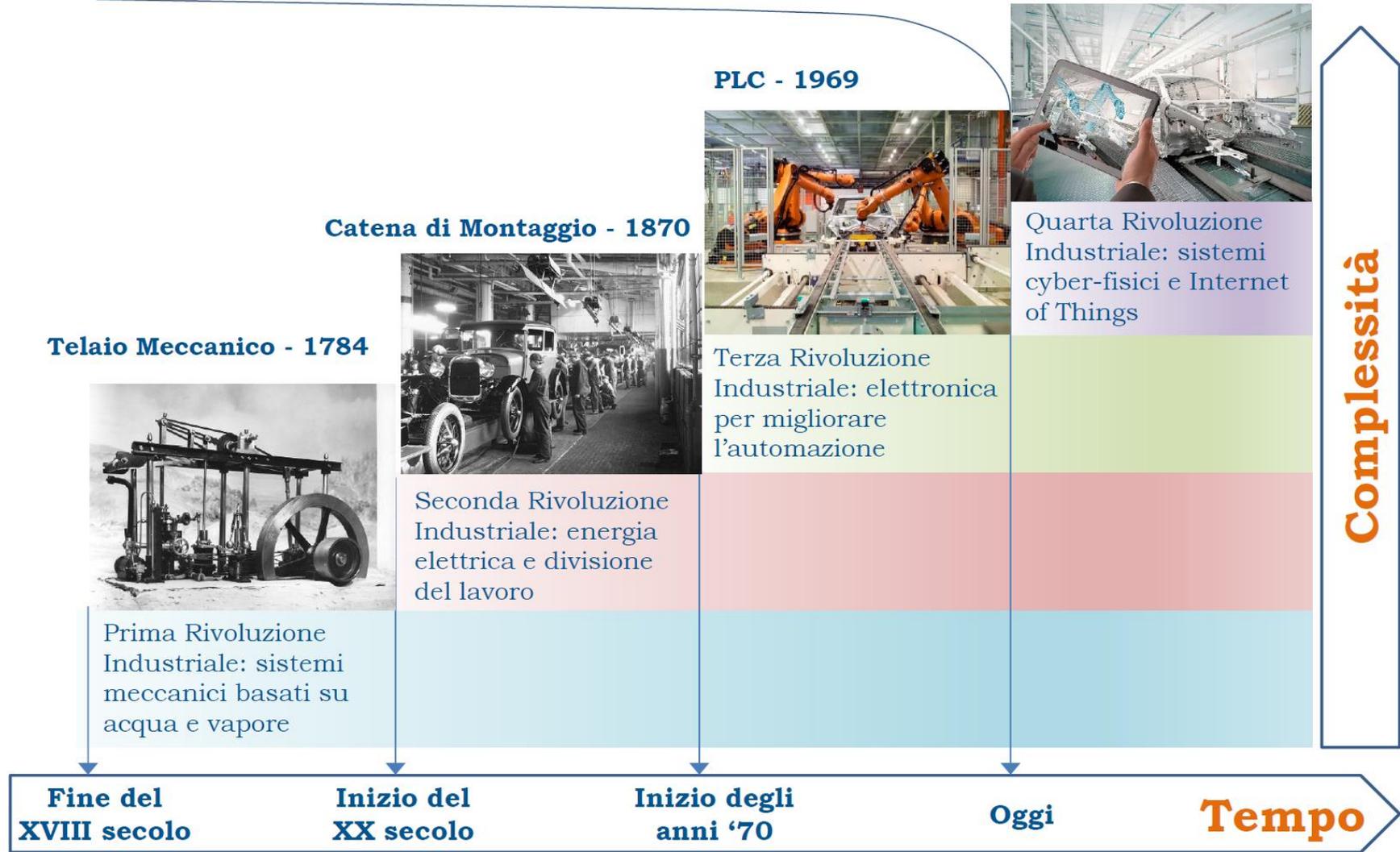
I Principali paradigmi di rete per il 5G saranno

- Enhanced mobile broadband (eMBB)
- Massive machine-type communications (mMTC)
- Ultra-reliable and low-latency communications (URLLC)

Che comporteranno nuove tecnologie 5G per

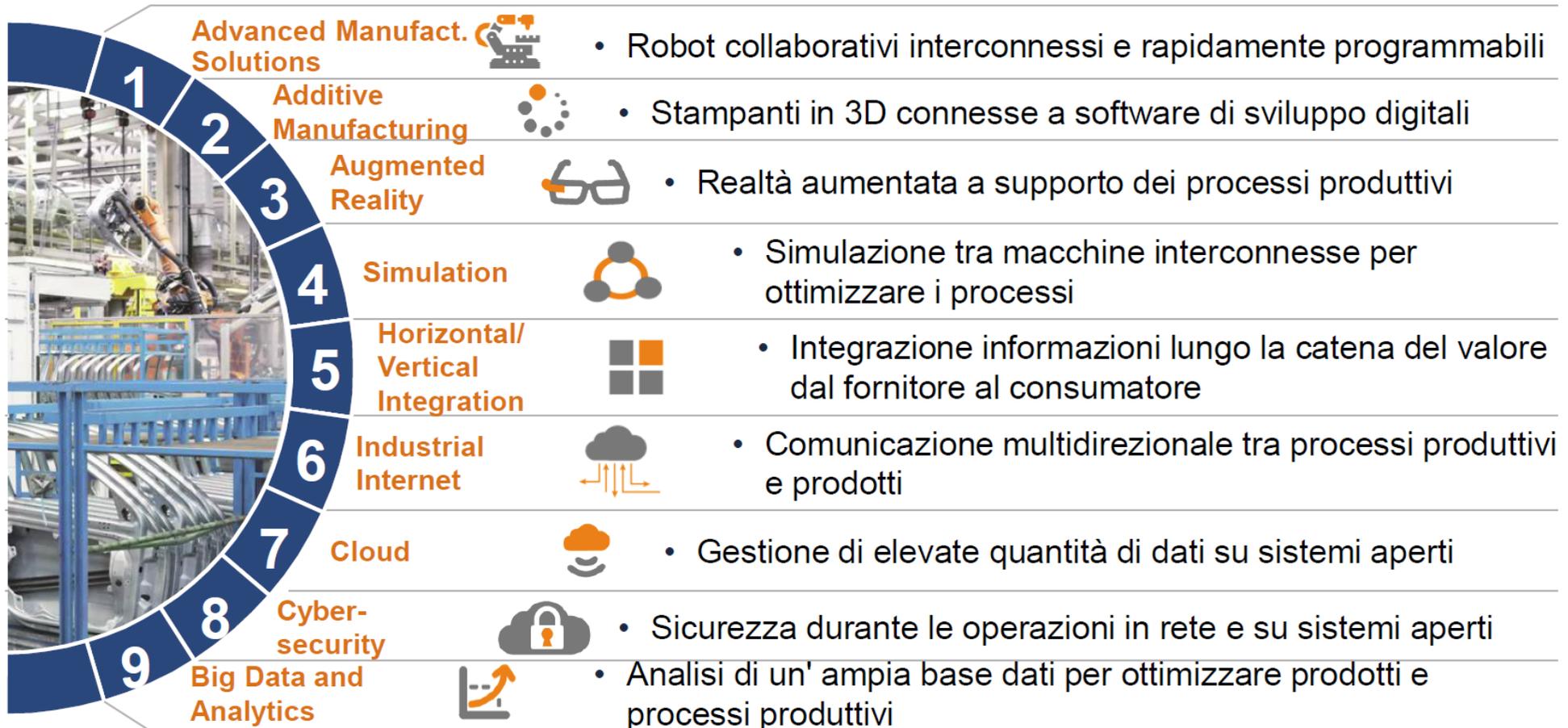
- Progettare l'adeguata tecnologia per ogni particolare servizio
- Far coesistere le differenti “virtual networks” entro l'unica rete 5G





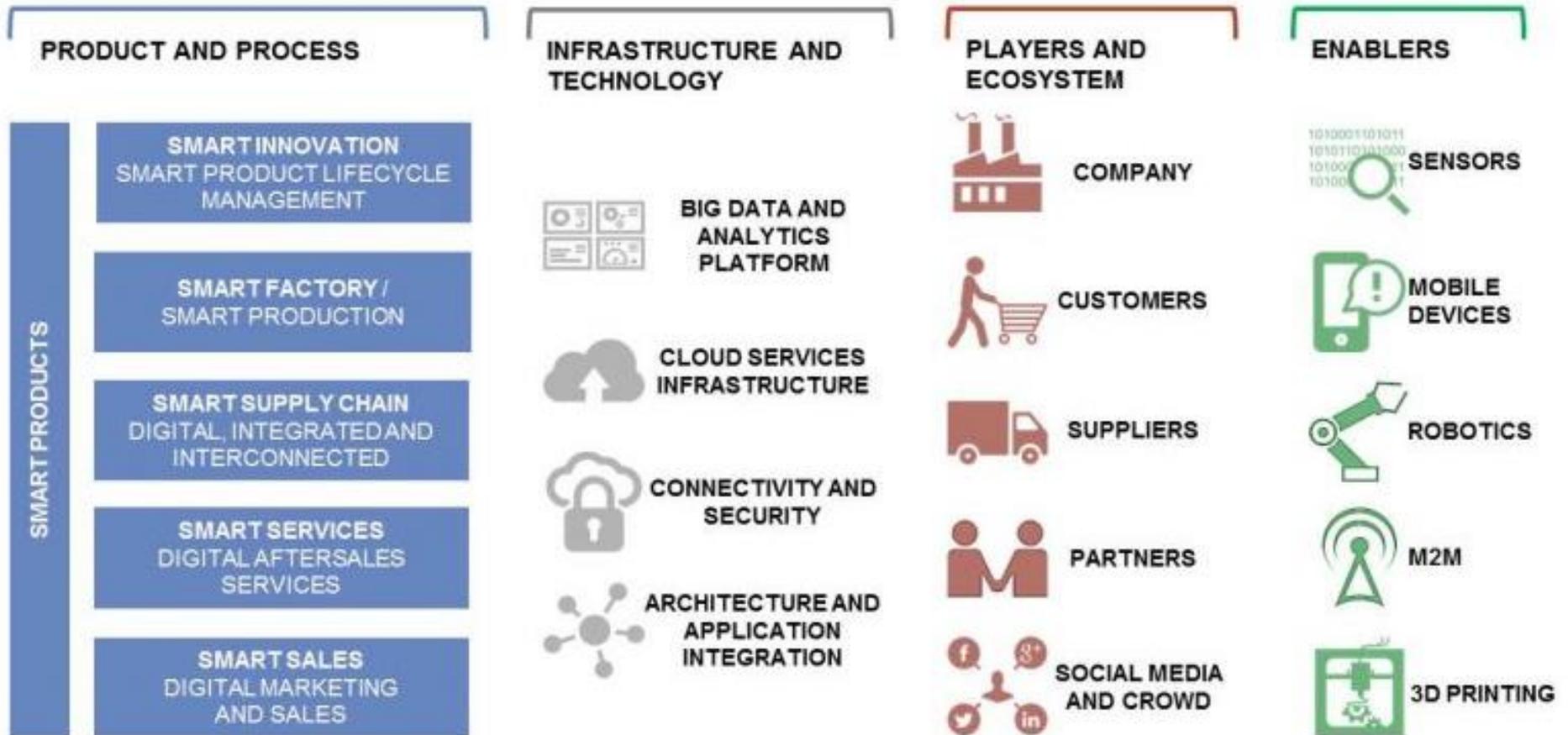


Tecnologie Abilitanti





Digital Strategy - Attori





Position of the European Parliament

In a [2012 own initiative resolution](#), the European Parliament expressed the view that the EU should support SMEs especially in relation to high value-added and technologically advanced manufacturing. In another 2014 own initiative resolution on [reindustrialising Europe](#) (in response to the Commission's 2012 updated communication on industrial policy), Parliament underlined the potential of advanced manufacturing to regenerate the EU's industrial base. Parliament called for the creation of a Knowledge and Innovation Community (KIC) for advanced manufacturing⁶ and for greater synergies between initiatives in this field in Member States, research institutes and industry.





Alcune Sfide

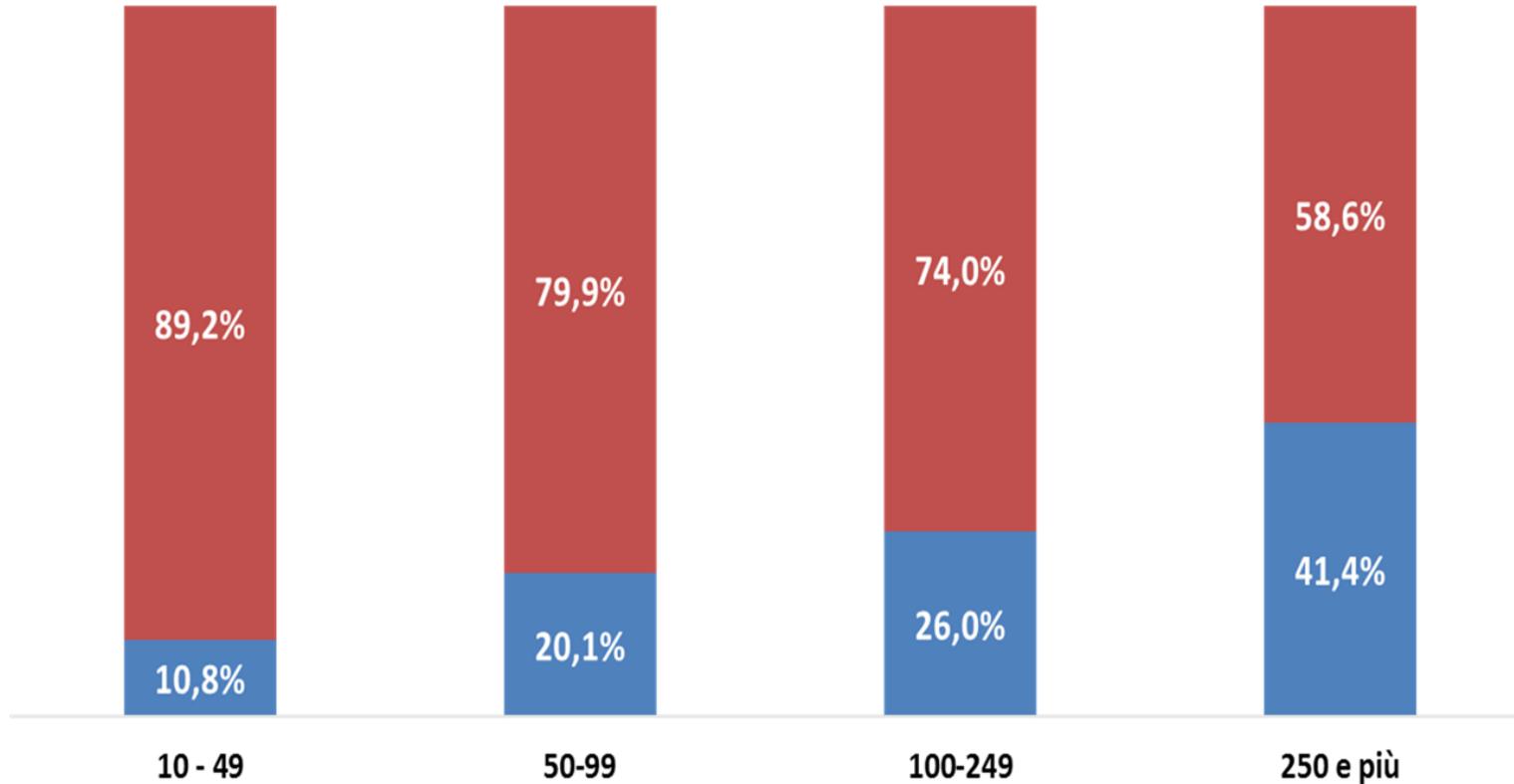
- **Investire e Governare il cambiamento**
 - Investire in IT
 - Accettare partnership
- **Sicurezza e Proprietà dei Dati**
 - Condividere i dati con fornitori/clienti fedeli
- **Stabilire nuovi standard**
 - Benefici solo con standard accettati a livello industriale
- **Formazione e Occupazione**
 - Creare nuovi skill per creare nuove opportunità
- **Questioni legali**
 - Per regolare l'effetto «Grande Fratello»
 - Per regolamentare i nuovi business





Digitalizzazione delle PMI Italiane (2015)

Indice di digitalizzazione in Italia per dimensione di imprese (2015)



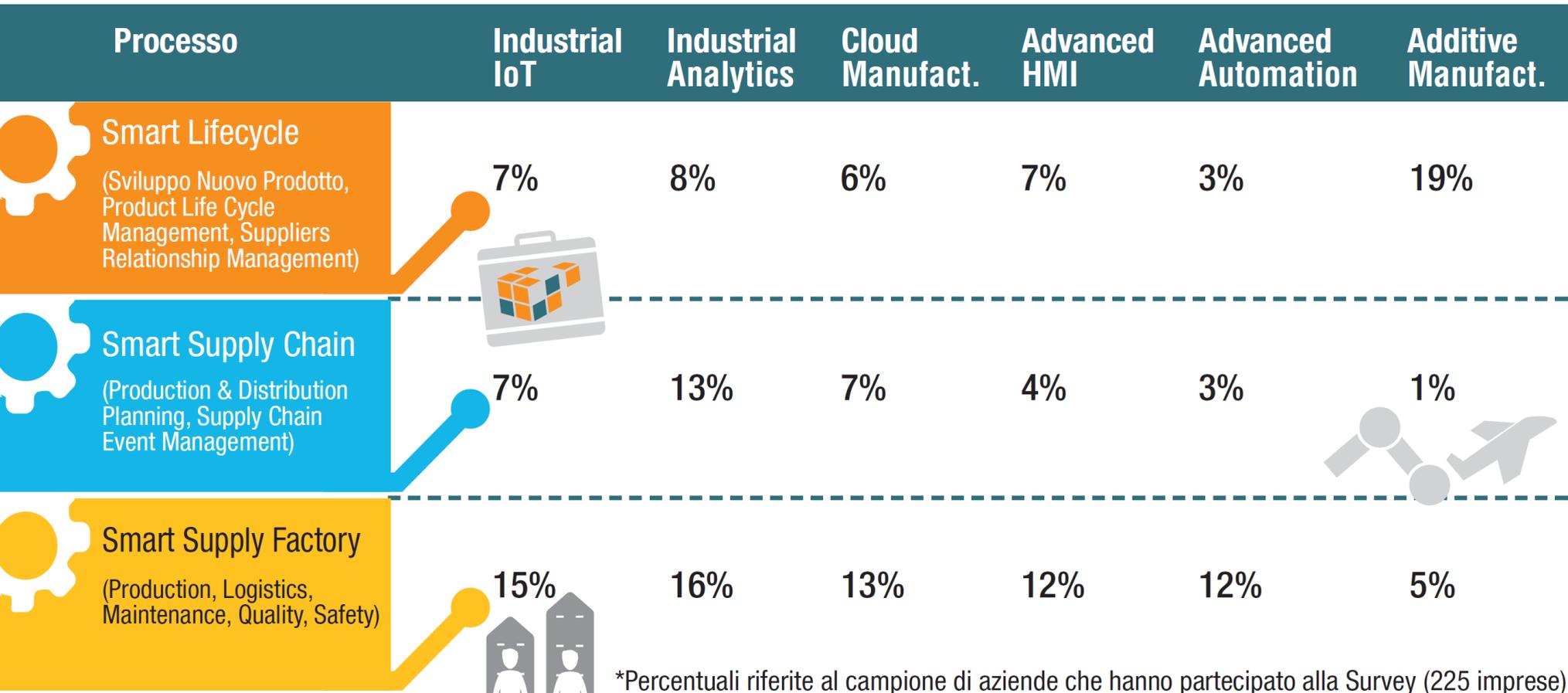
■ % imprese con indice di digitalizzazione "molto basso" e "basso"

■ % imprese con indice di digitalizzazione "alto" e "molto alto"





Diffusione delle Smart Technologies



Fonte: ASSINFORM, 2016





Conclusioni

- **Industria 4.0 amplificherà le differenze**
 - Le competenze digitali diventano ancora più necessarie
 - Molte aziende perderanno competitività
- **Le nuove tecnologie sono un'occasione**
 - Genereranno nuovi prodotti e processi
 - Non necessariamente saranno indispensabili per tutte le applicazioni
- **Be Smart or Perish**
 - In un paese manifatturiero come l'Italia adeguarsi sarà indispensabile
 - Le SME sono... avvantaggiate perché possono rispondere più velocemente al cambiamento
 - Il Trasferimento tecnologico tra ricerca e azienda è indispensabile
- **Creare le Filiere**
 - E' ancora più necessario individuare e puntare sulle Smart Specialization e creare le relative filiere



