



POLITECNICO
MILANO 1863

SCHOOL OF MANAGEMENT



Industrial IoT & Artificial Intelligence

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Osservatorio Industria 4.0
Osservatorio Internet of Things
Osservatorio Artificial Intelligence

Brescia, 05.02.19



#OI4.0

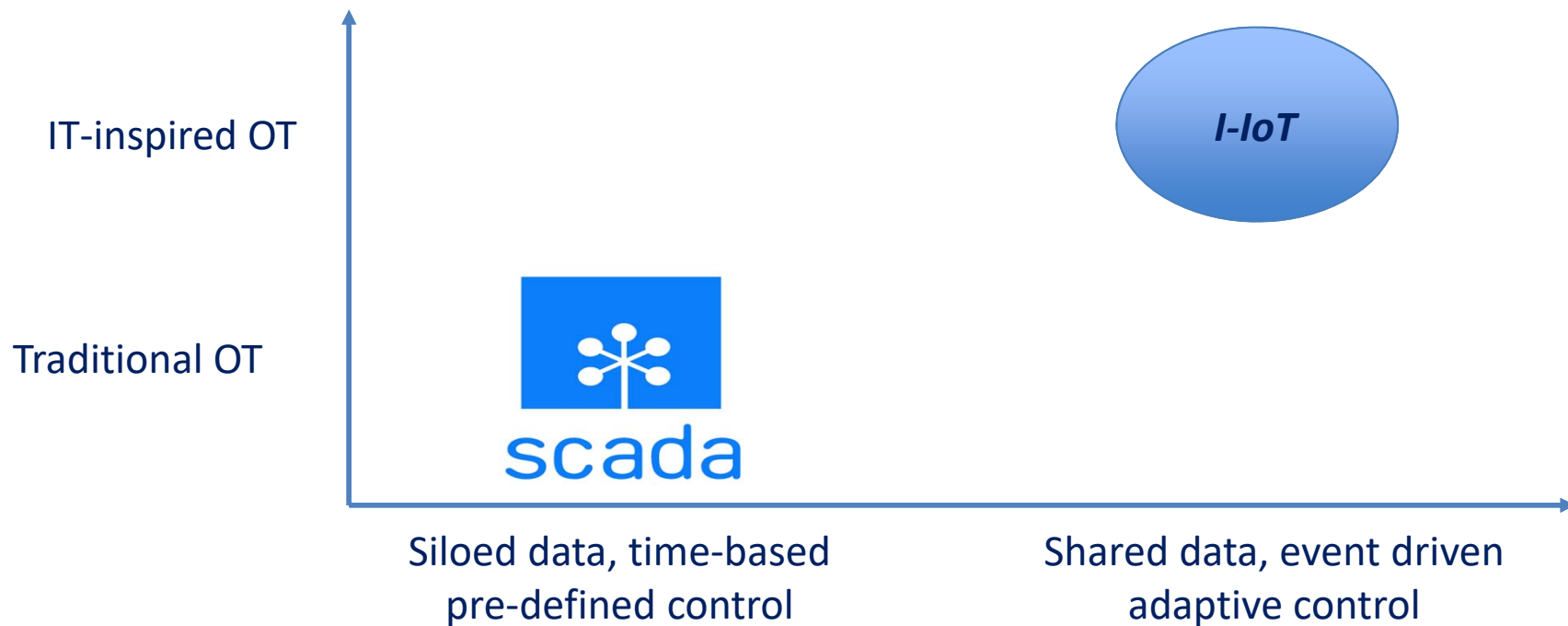


Agenda

- Industrial IoT
- Democratization of the Data Economy: please welcome AI
- Managing the change

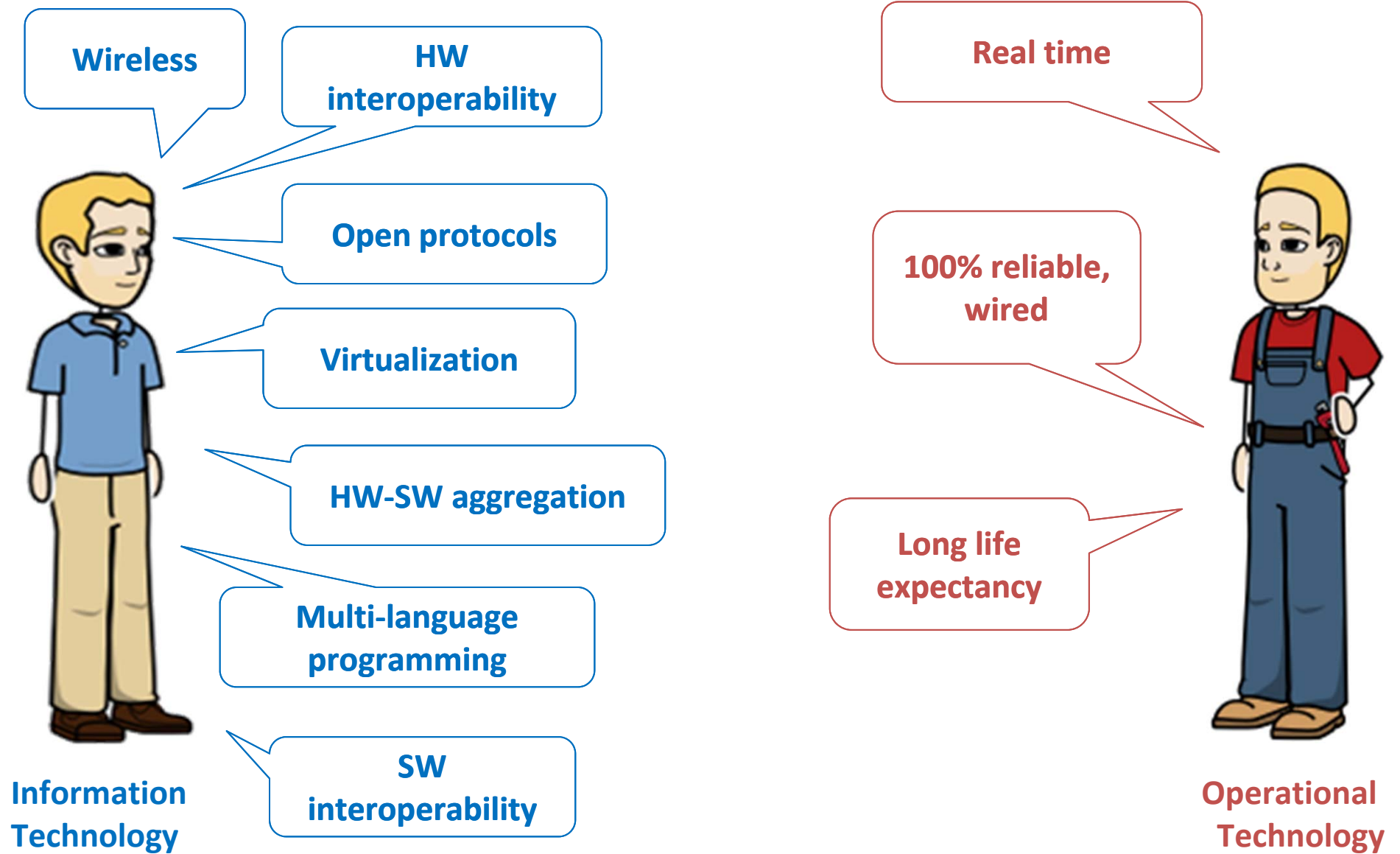
What is Industrial IoT?

"The Industrial IoT draws together different fields^(*) to **ingest data** from industrial assets and machines, **analyze it** (often in real-time) and use it to **optimize operations**"



(*) Such as traditional automation and M2M, Cyber-Physical Systems, big data and machine learning

Industrial IoT: IoT in working suit



Non just Industry ...



Laboratory



Distributed Assets

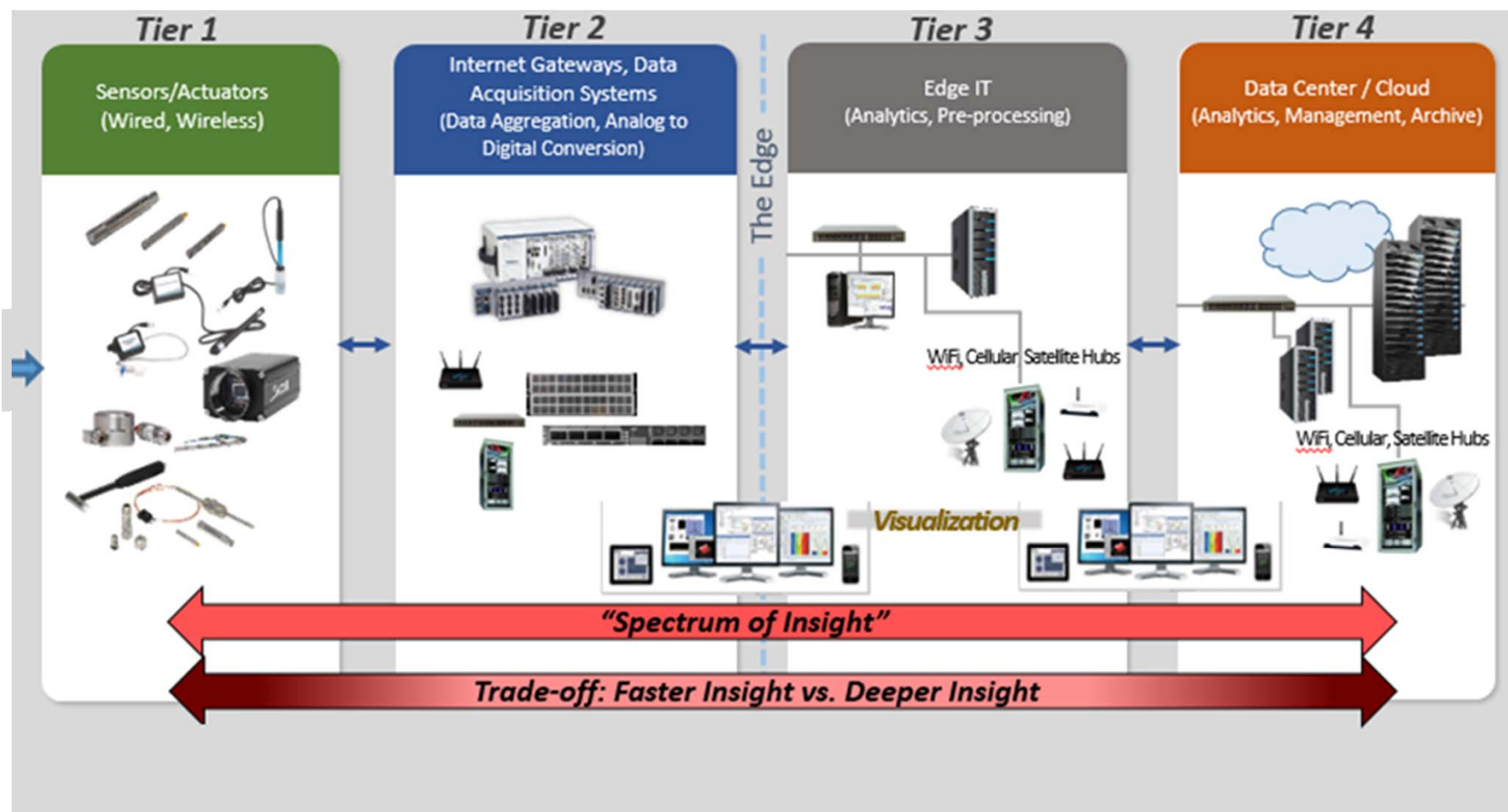


Airports












Harbour & Customs

Industrial IoT: architecture

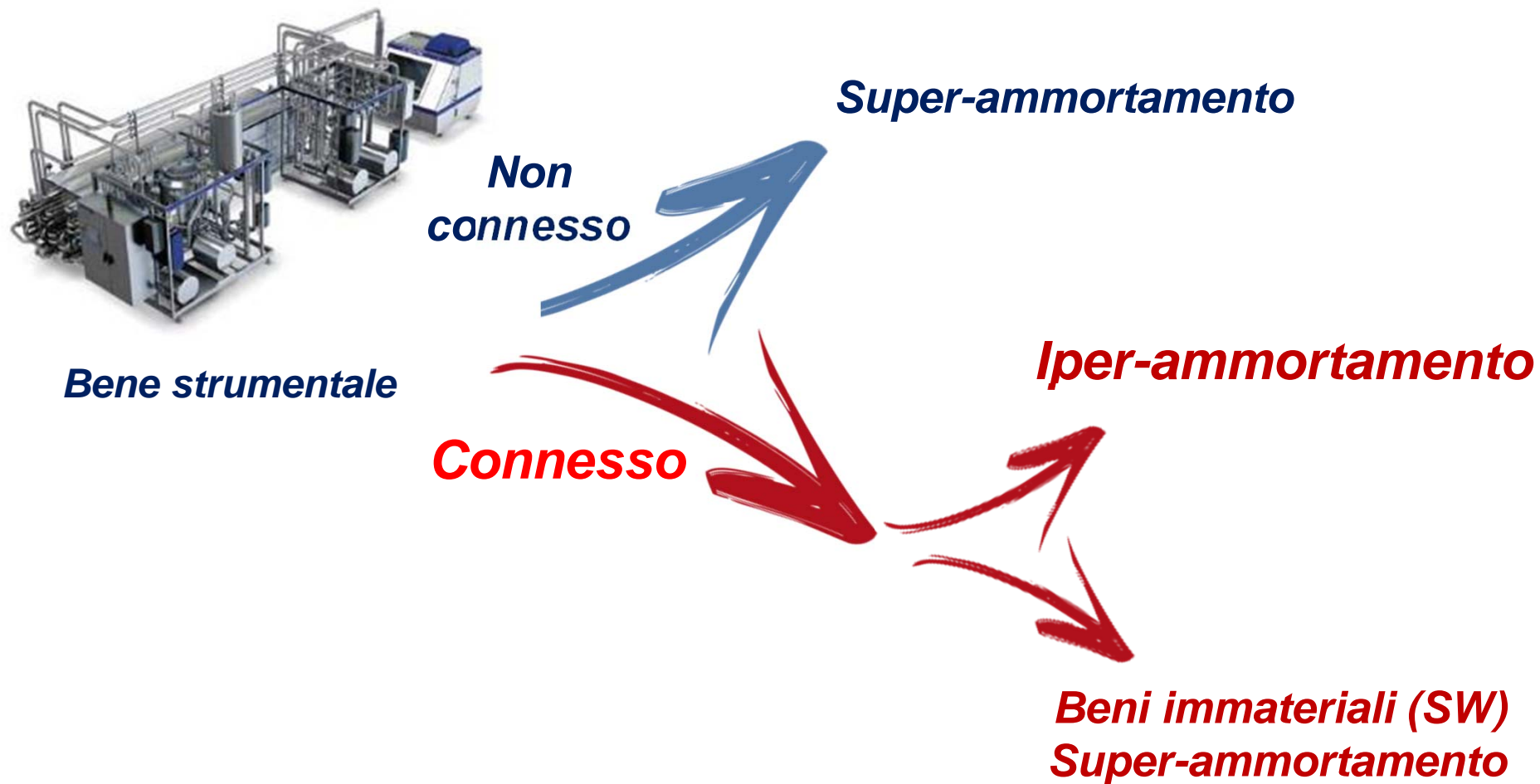


Industrial IoT in Italy: the application scenario

		PROCESS AREAS		
		 Smart Lifecycle	 Smart Supply Chain	 Smart Factory
SMART TECHNOLOGIES	 Cloud Manufacturing	16%	18%	21%
	 Industrial Analytics	23%	27%	34%
	 Industrial IoT	24%	16%	31%
	 Advanced HMI	20%	5-10%	39%
	 Advanced Automation	0-5%	0-5%	33%
	 Additive Manufacturing	22%	0-5%	14%

Base rispondenti: 236 aziende, domanda a risposta multipla

La connettività al centro del Piano Nazionale I4.0



Connected machine

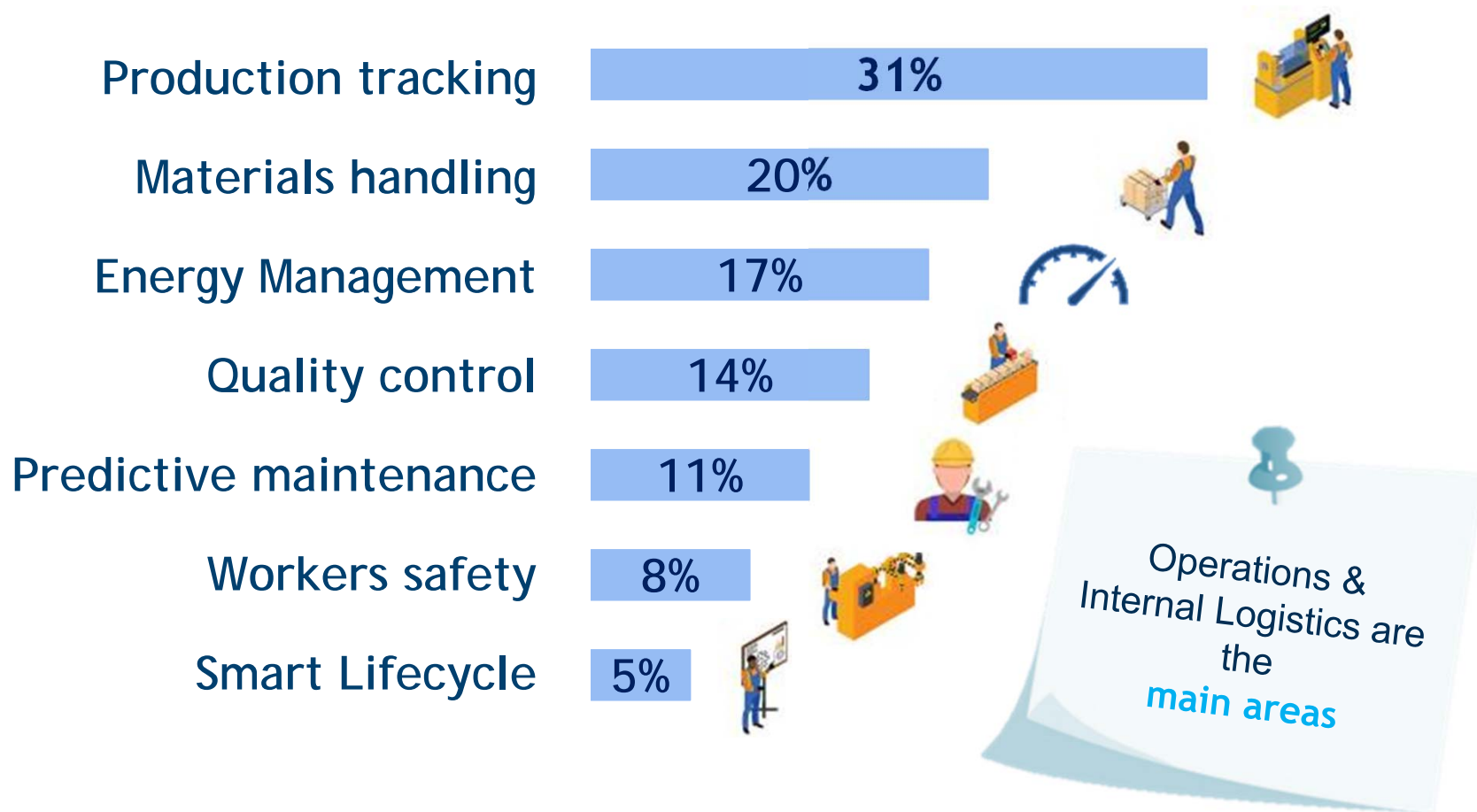


Energy optimization
Consumables wear optimization
Predictive Maintenance
Production control, cost allocation

Pay per performance

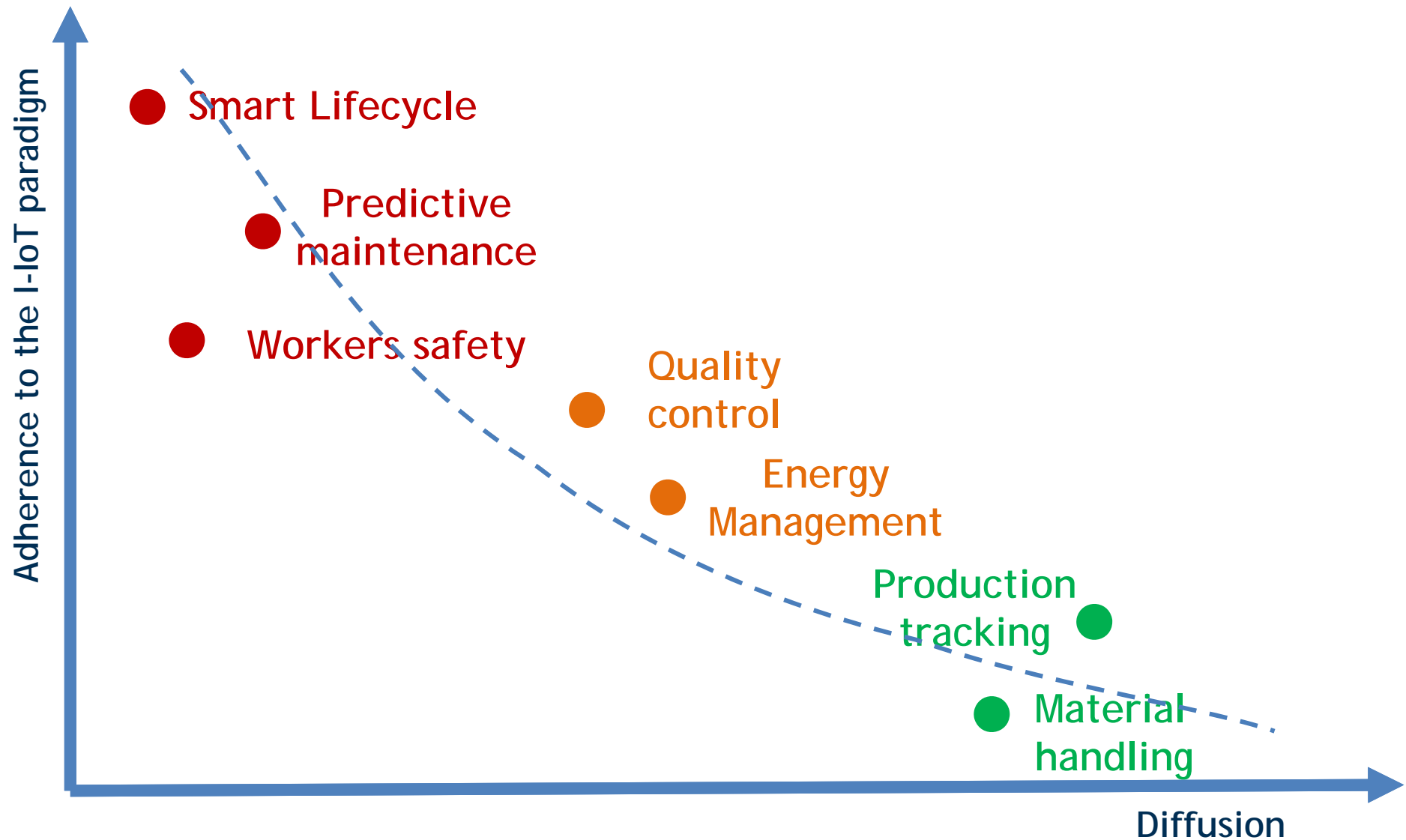
Pay per use business models
Illegitimate trade control

Industrial IoT in Italy: the application scenario



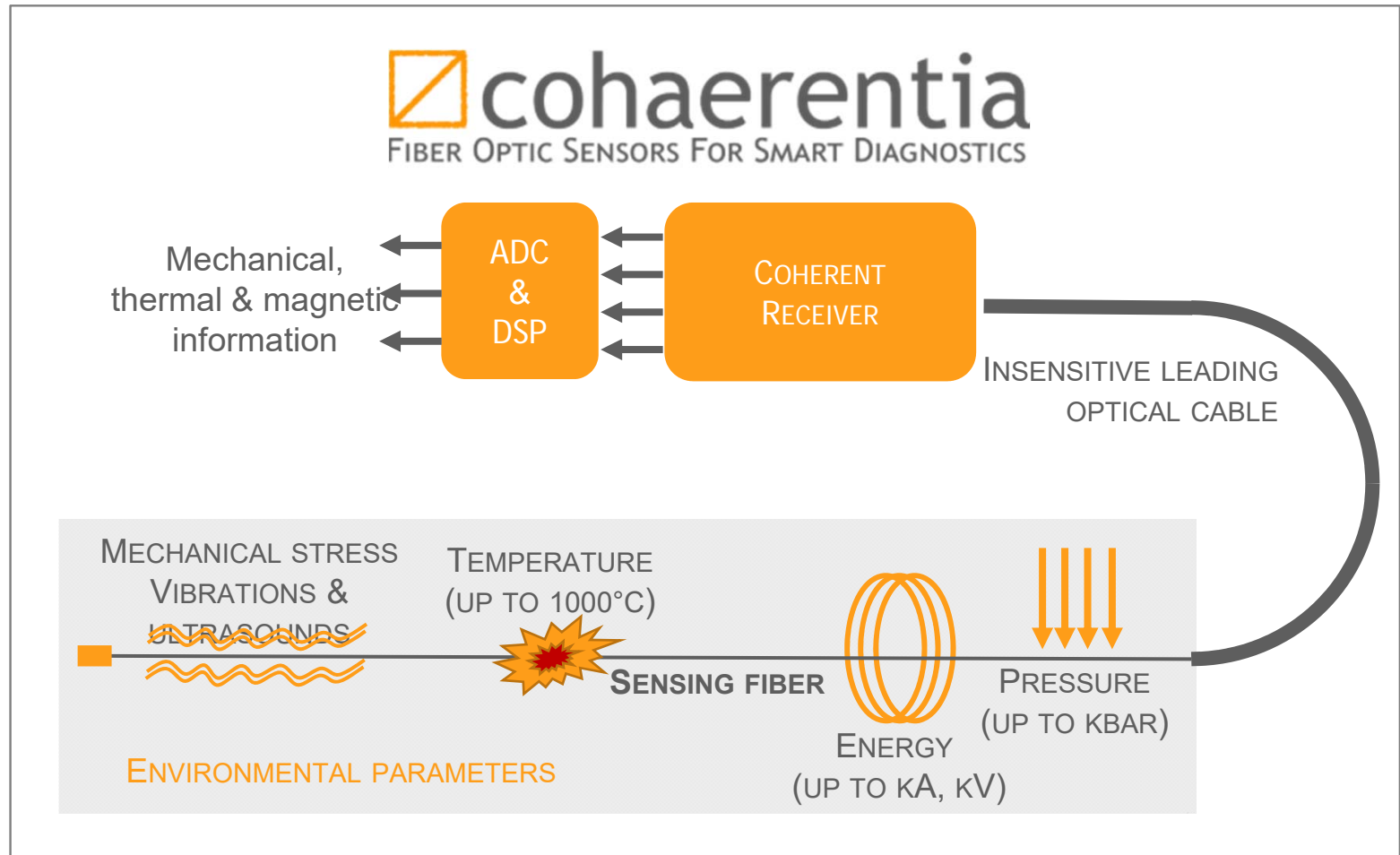
77 projects launched by 45 companies

Industrial IoT: the application scenario



New IoT tech opportunities

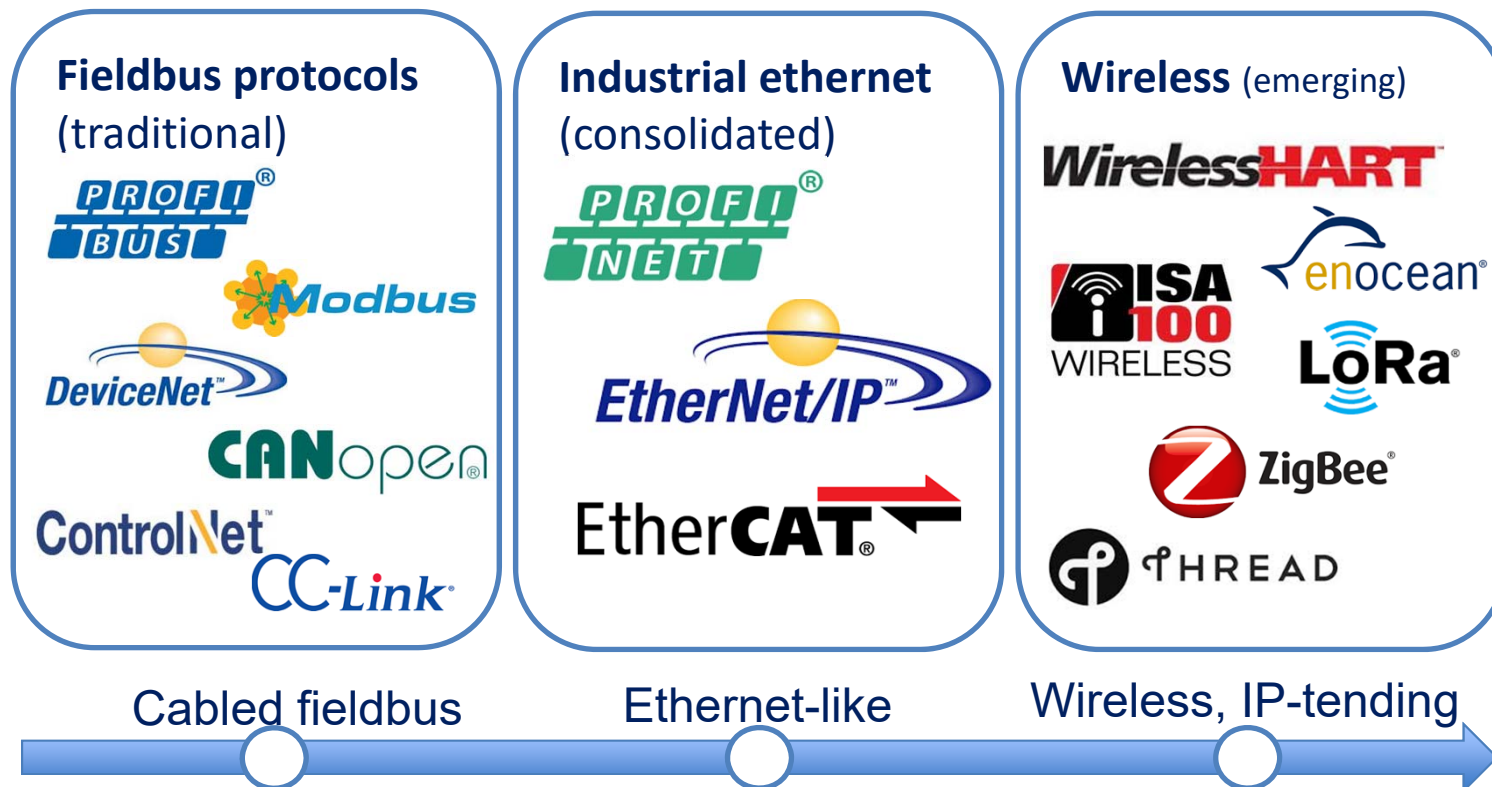
New Industrial sensors and new sensing



New IoT tech opportunities

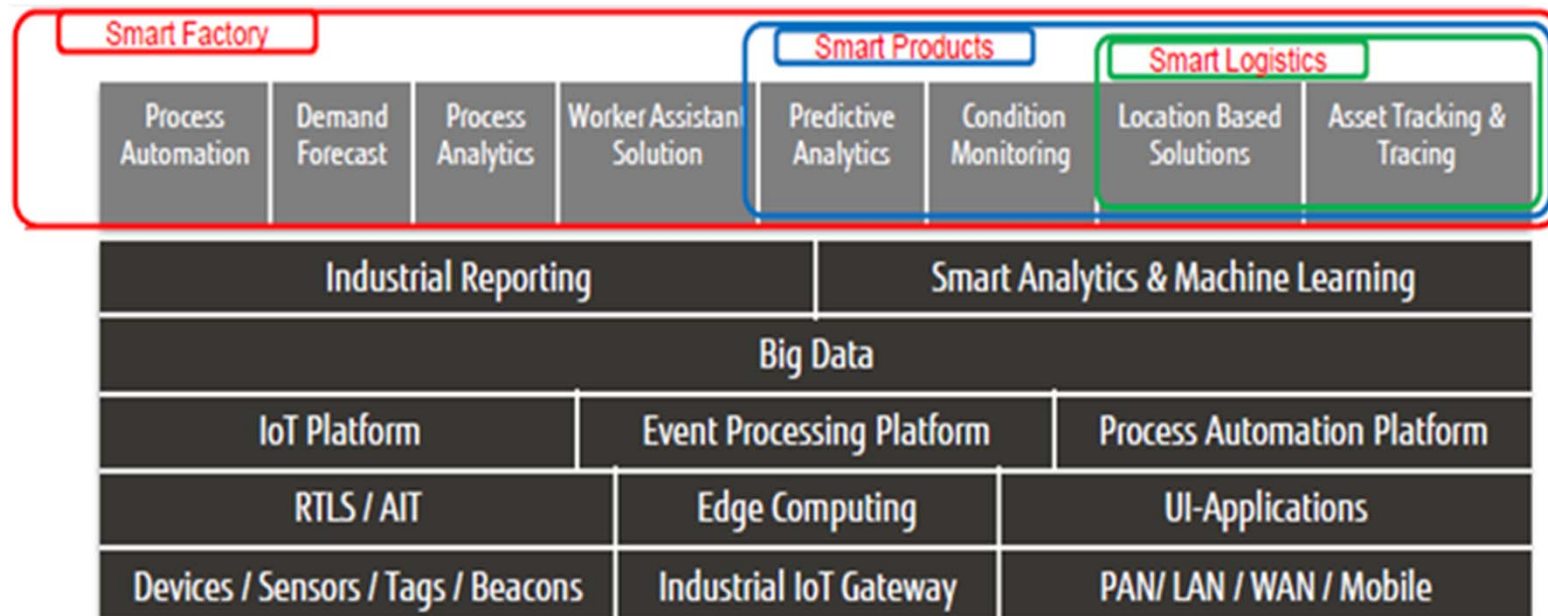
New Industrial sensors and new sensing

New wireless protocols for factory-environments



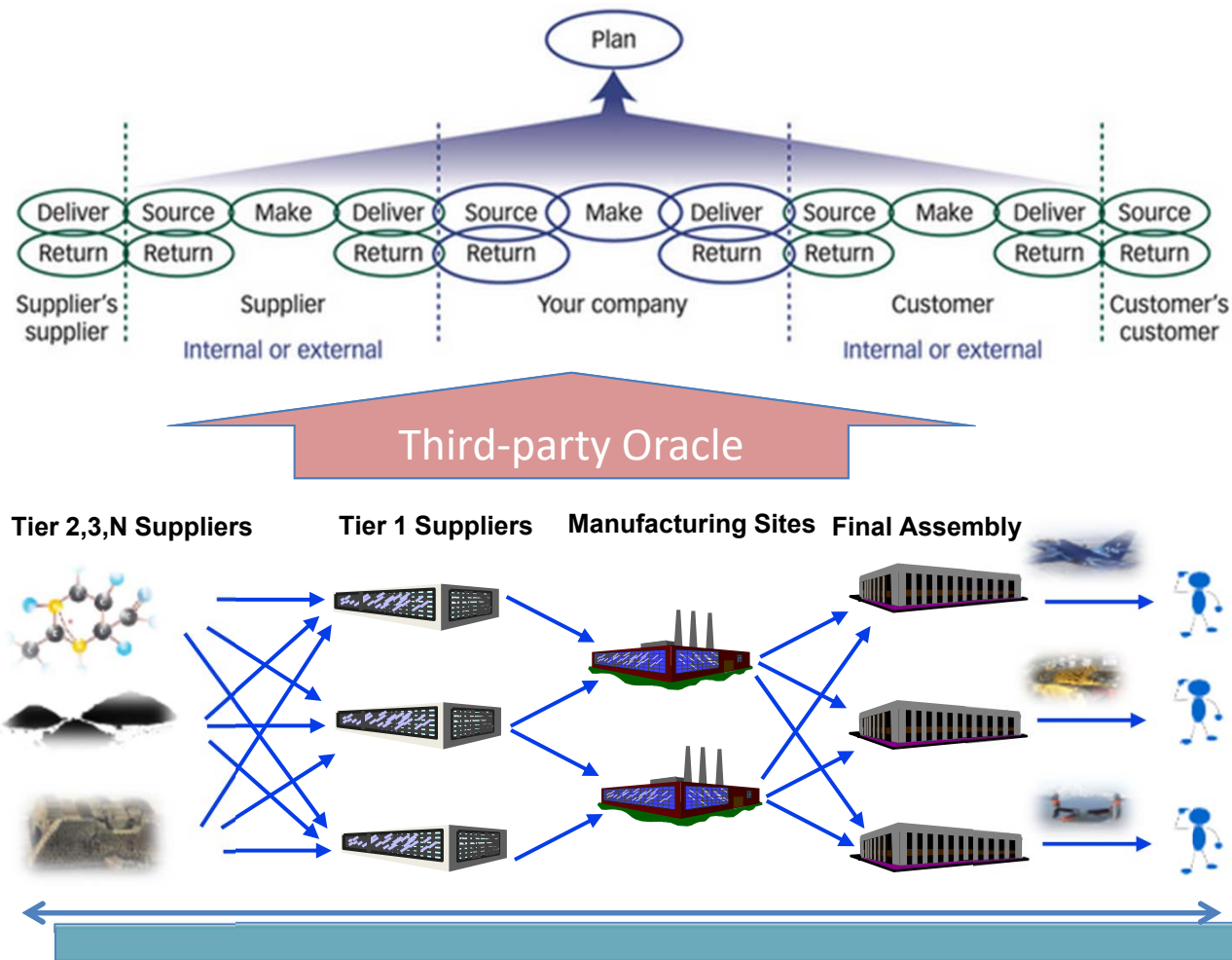
New IoT tech opportunities

New Industrial sensors and new sensing
New wireless protocols for factory-environments
New Industry-focused IoT Platforms



New IoT tech opportunities

New Industrial sensors and new sensing
New wireless protocols for factory-environments
New Industry-focused IoT Platforms
New synergic technologies

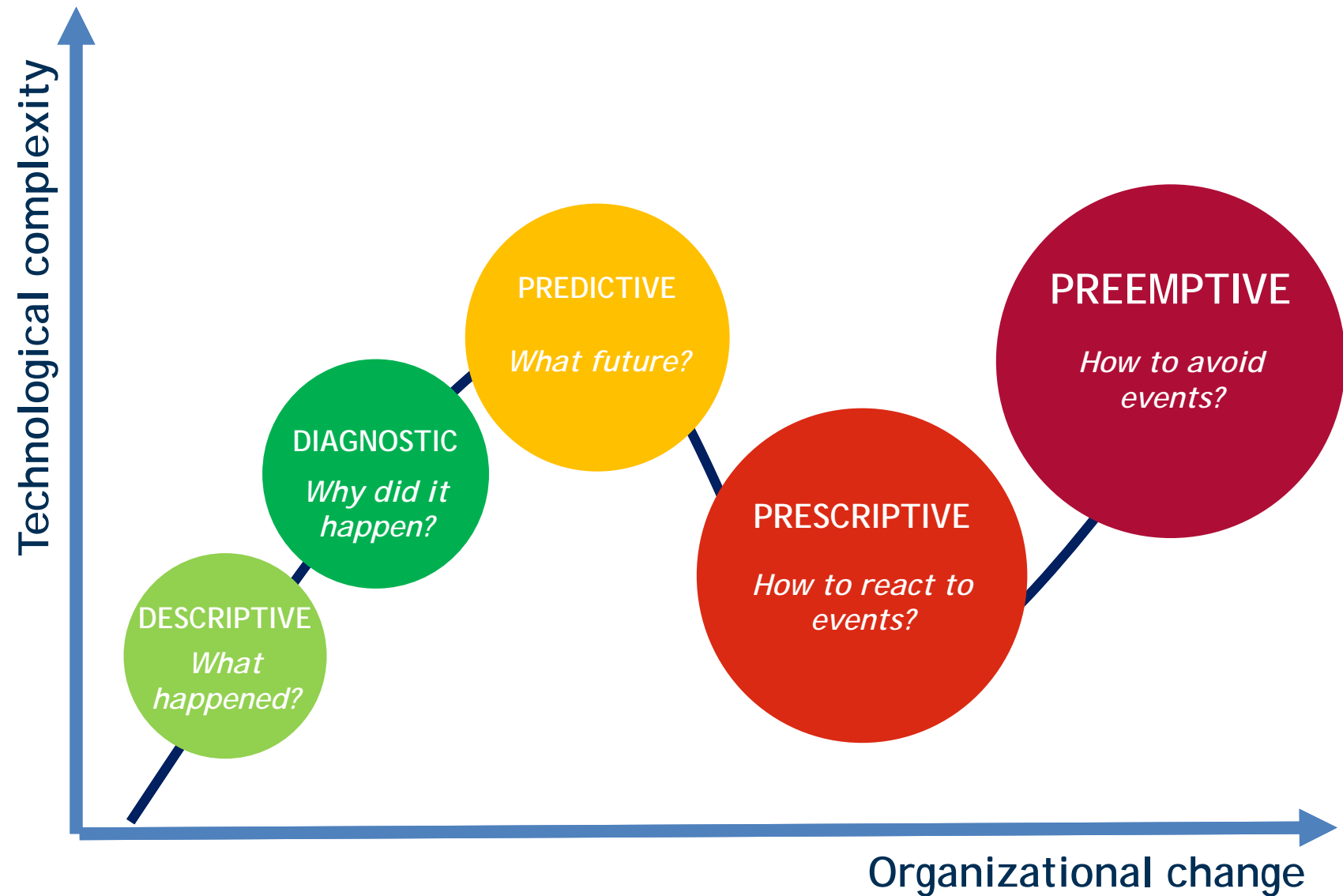


Certifies the digital data



Acquires digital data about physical processes

IoT and Analytics



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Data Economy

“Data are to this century what oil was to the last one: a driver of growth and change. Flows of data have created new infrastructures, new businesses, new monopolies, new politics and—crucially—new economics.

Digital information is unlike any previous resource; it is extracted, refined, valued, bought and sold in different ways. It changes the rules for markets and it demands new approaches from regulators.

Many a battle will be fought over who should own, and benefit from, data.”

May, 2017

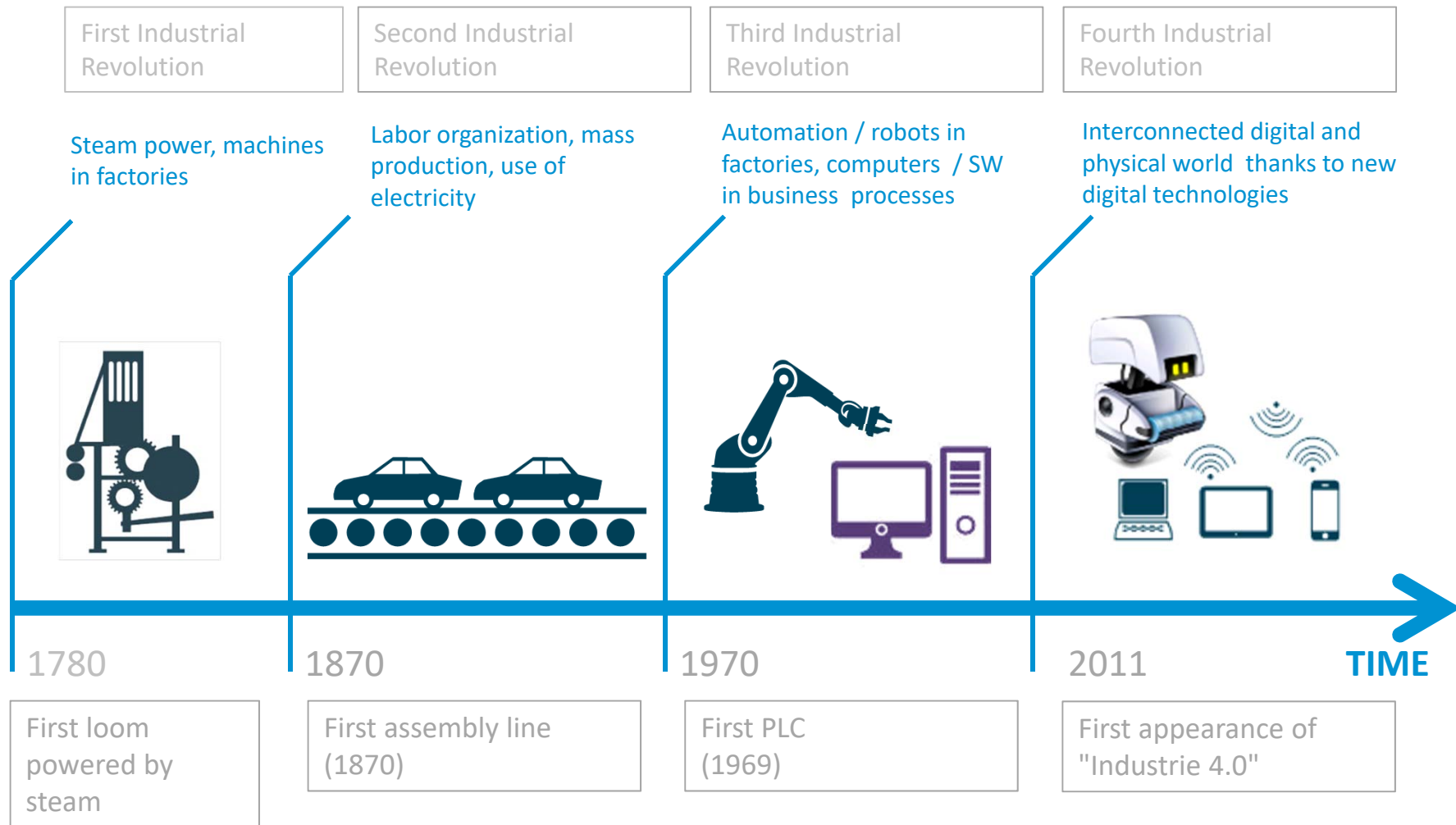


Data Economy so far....



Fonte: Cumulus Media, Ott 2017

...and now enter The Fourth Industrial Revolution



The Fourth Industrial Revolution...and beyond

Interconnection of physical and digital worlds

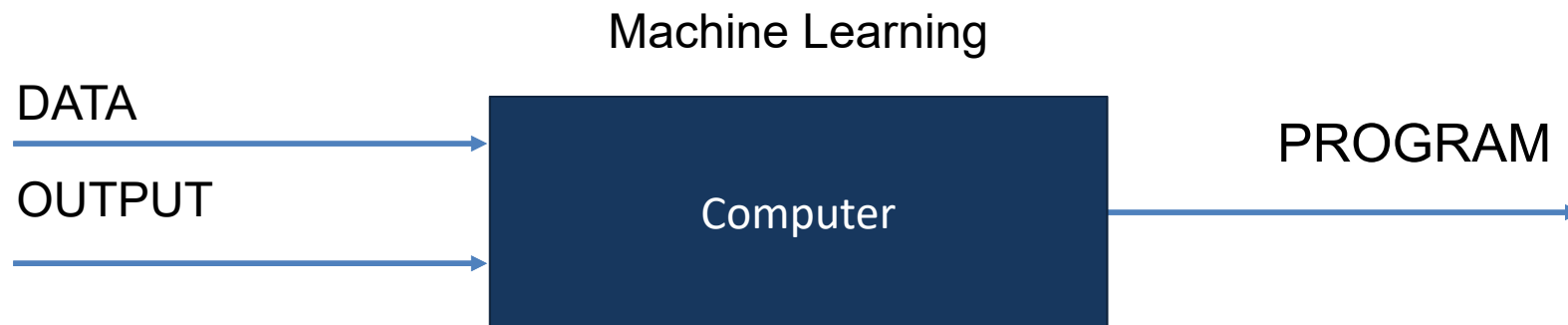
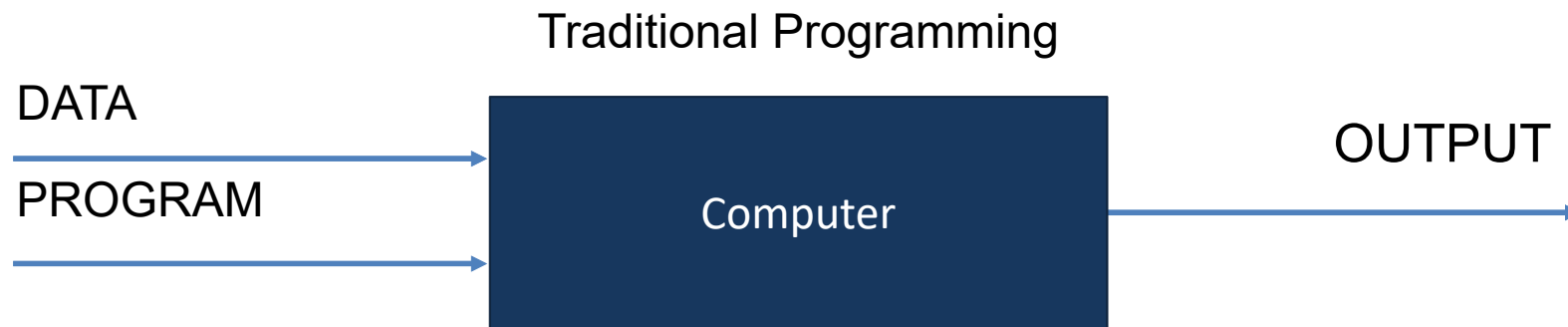


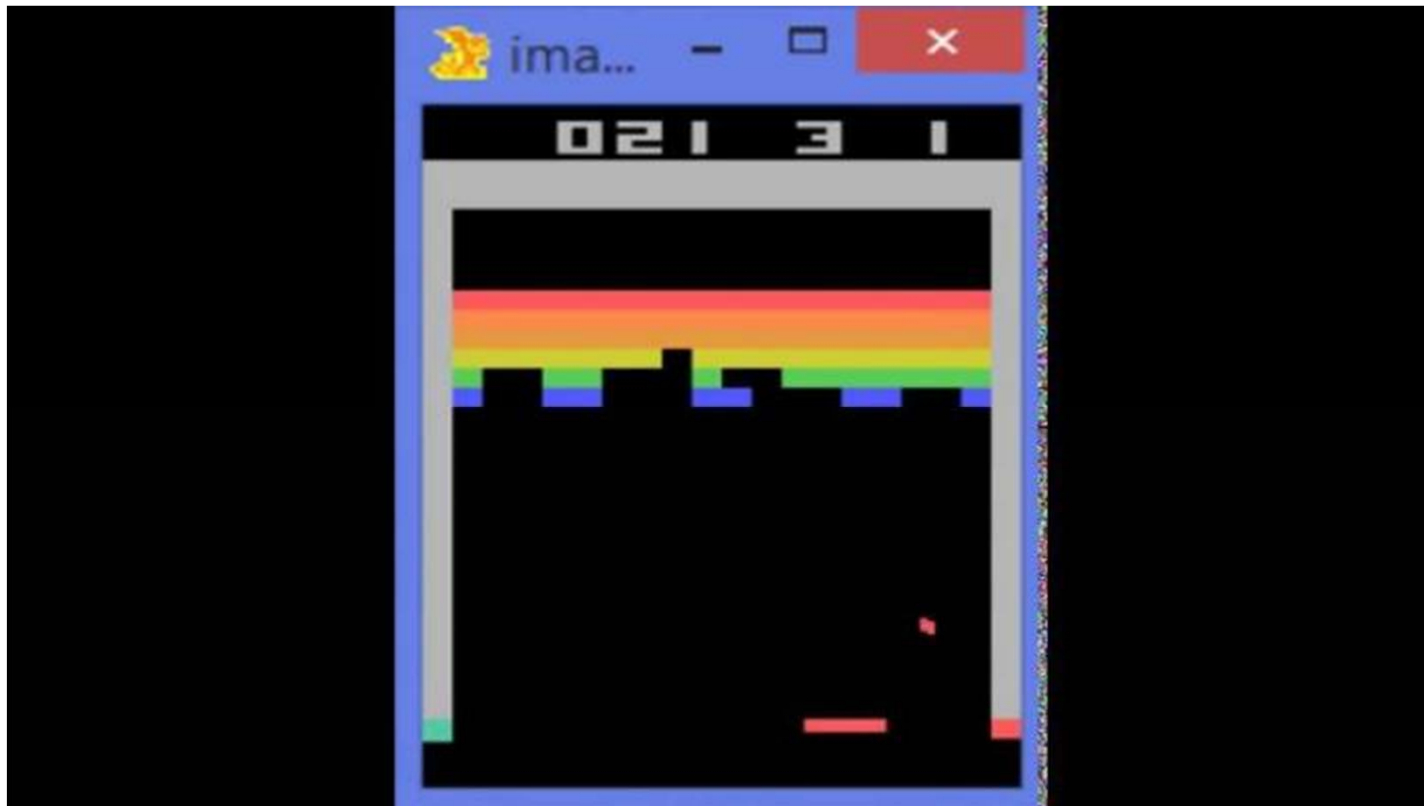
Tons of (new) data



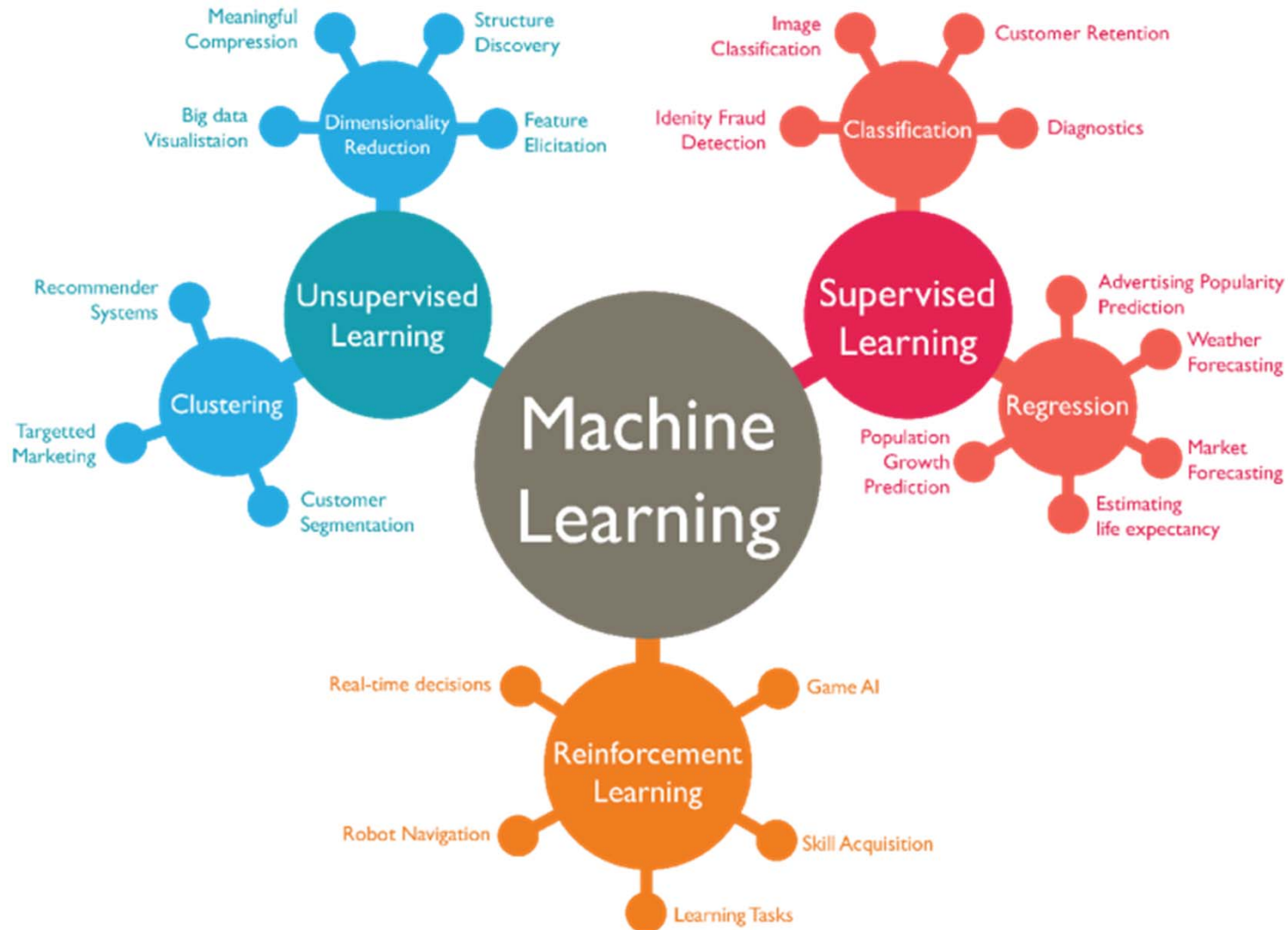
Need for new approaches

The world upside down

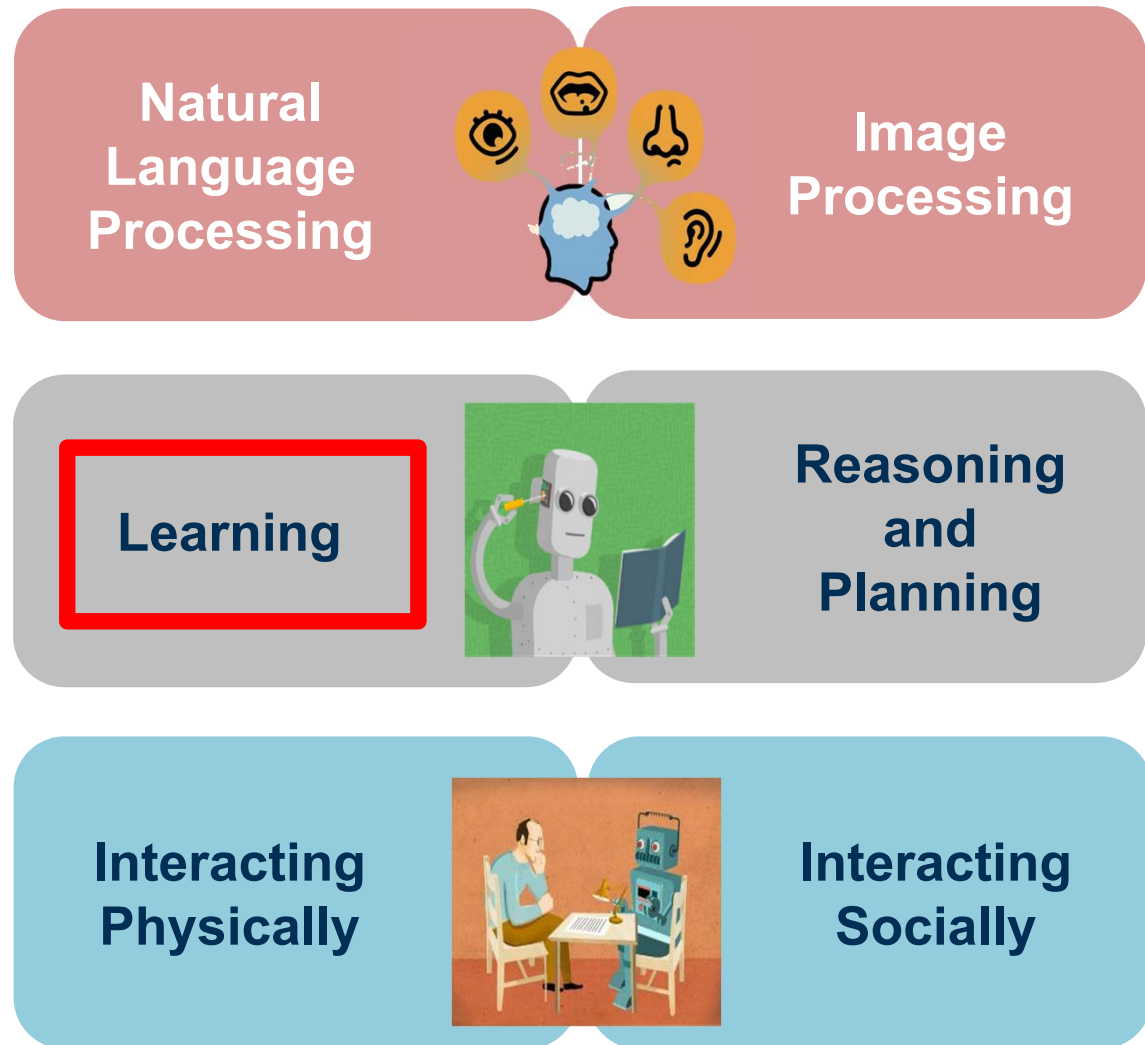




Welcome to machine learning!



From Machine Learning to Artificial Intelligence



Artificial Intelligence

“Artificial Intelligence is the branch of computer science dealing with the development of **hardware-and-software systems** endowed with **human-like capabilities**, and able to **autonomously pursue** a given goal by **making decisions** that, **until that moment**, were usually assigned to humans”

AI in Manufacturing



AI in Manufacturing

The Wirecomp case^(*)



Objective: real-time monitoring of location and state of the returnable asset (drum)

Sensing:

- GPS (**location**)
- MEMS accelerometer (**shocks, rotation**)
- **Smart energy management** (sleep mode, LPWA ready)

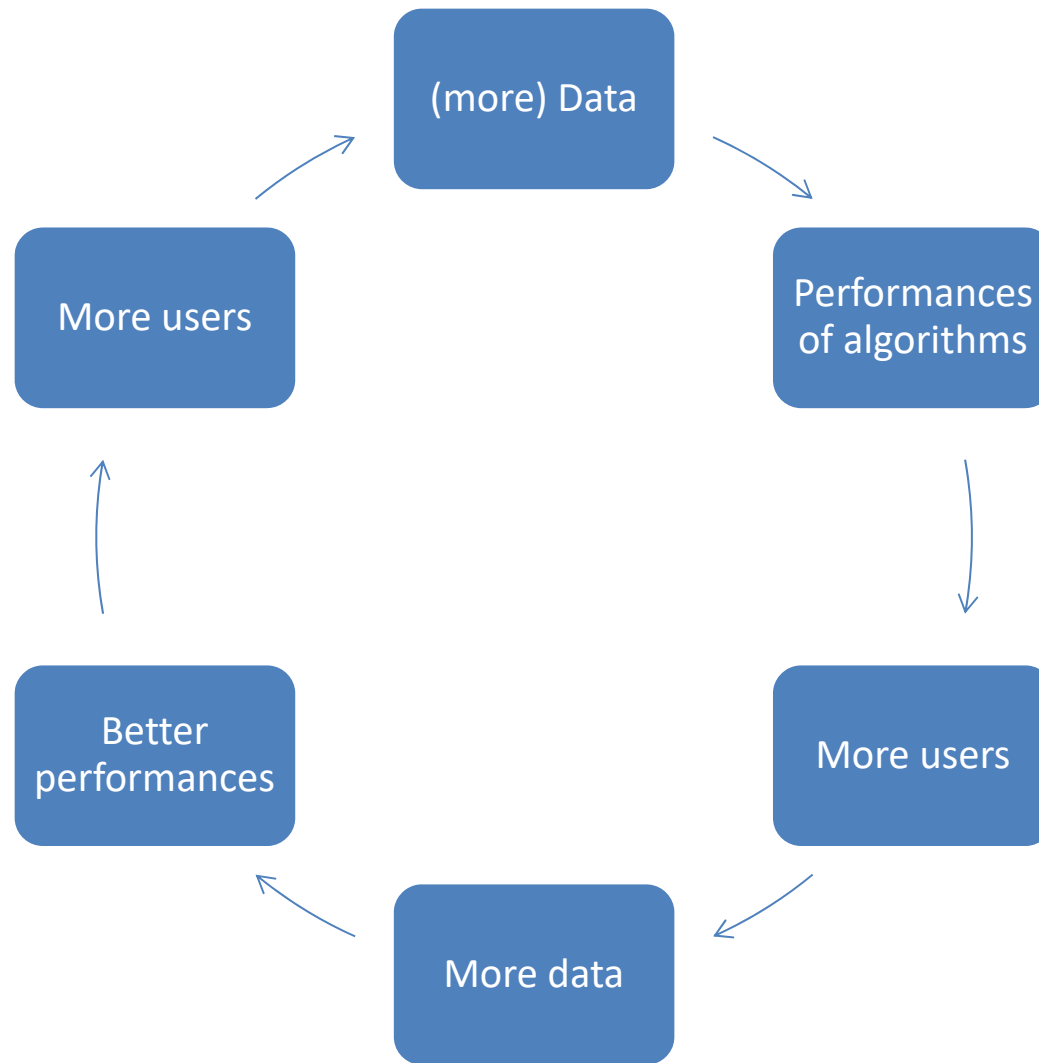


Functionalities:

- 2-year operating life, with real time monitoring (location, shocks)
- Local algorithm to estimate the remaining wire (as a function of wire thickness and number of revs)

^(*) Fictional name due to confidentiality reasons

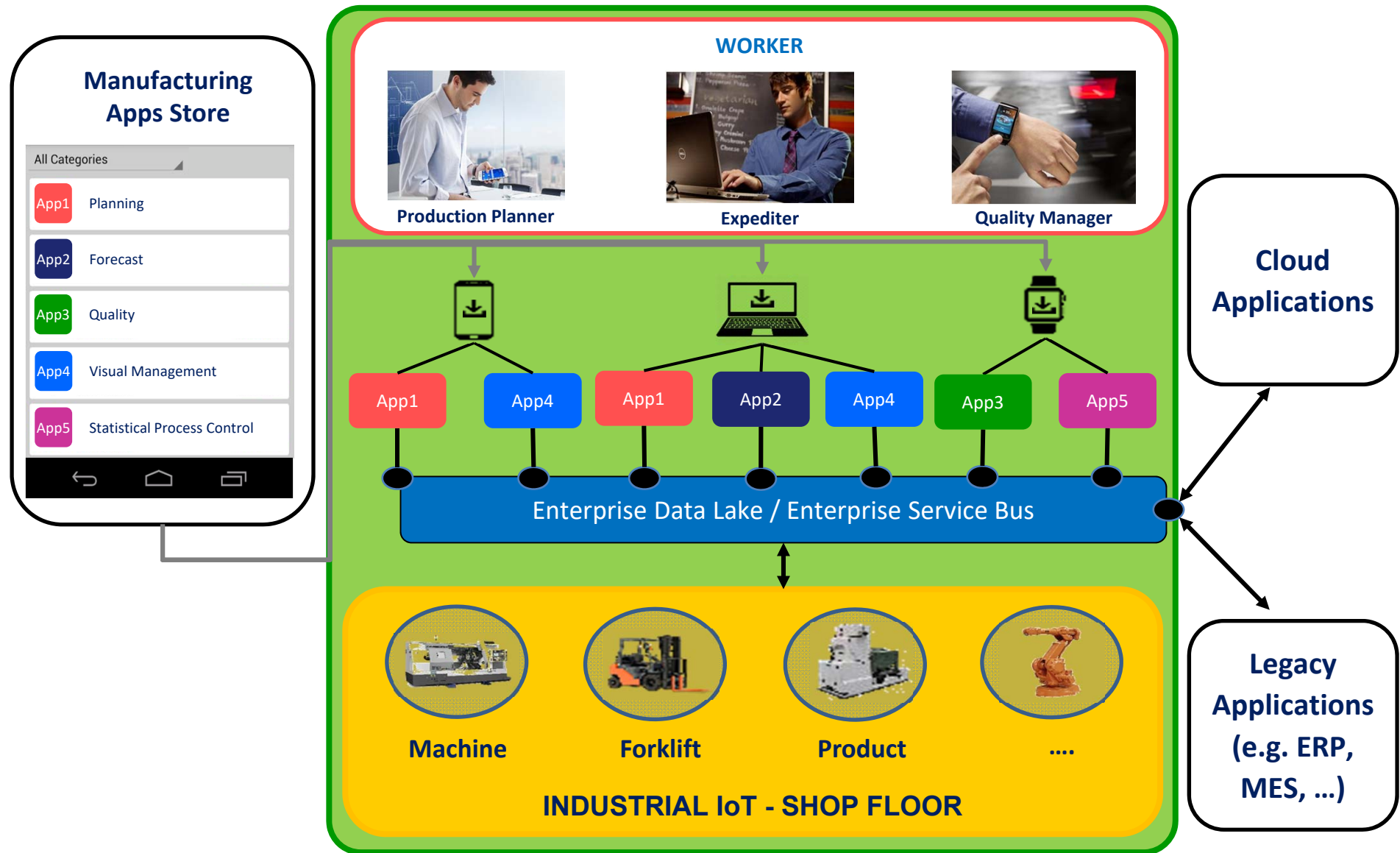
Artificial Intelligence and Data



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Redesigning data architecture



Q&A

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Who am I?

- Professor of Advanced Supply Chain Planning @ Politecnico di Milano
- Senior director at Osservatori.net, 100-people research group on Digital Innovation:
 - Internet of Things
 - Industry 4.0
 - Artificial Intelligence
- Responsible of the Internet of Things Lab, the applied research lab of Politecnico di Milano (www.iotlab.it)
- More than 100 cooperation projects with leading Italian and International companies
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