

CdL Data Science 2021-22
Service Science
F9101Q022

**SSME = Service Sciences,
Management and Engineering**

Roberto Boselli
roberto.boselli@unimib.it

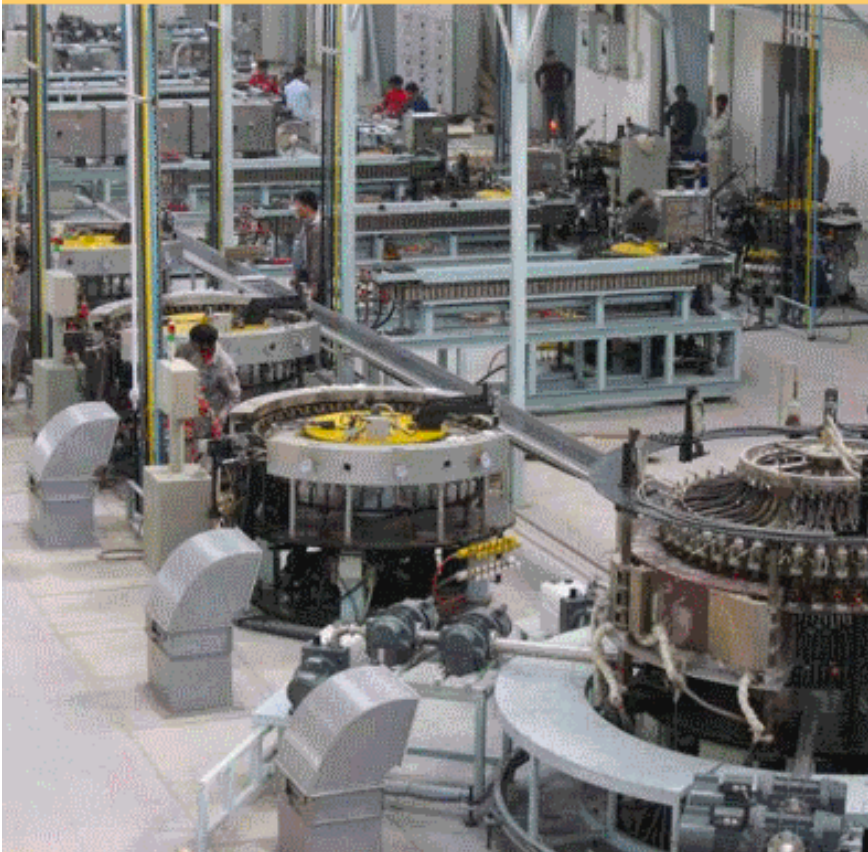
IoT e Industry 4.0



Differences

INDUSTRIA 4.0

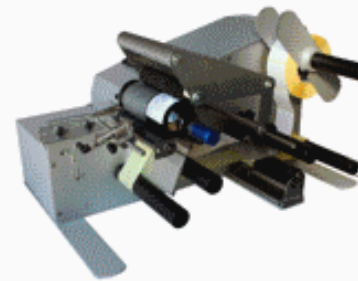
all'interno della fabbrica
che crea prodotti



VS

INTERNET OF THINGS

all'interno dei prodotti
che escono dalla fabbrica



Industry 4.0

1° Industrial revolution



Historical loom

Through introduction of mechanical production plants using water and steam power

Late 18th century

2° Industrial revolution



Mass production and assembly line

Through introduction of work-division mass production using electrical energy

Early 20th century

3° Industrial revolution



Automated industrial robot in manufacturing

Through use of electronics and IT to further automate production

Early 1970s

4° Industrial revolution



Connection between physical and digital systems, complex analyses of big data and real-time settings

Through use of smart machines, inter-connected and connected to internet

Today and near future



Service Transformation

IERI

L'azienda vende **Prodotti**



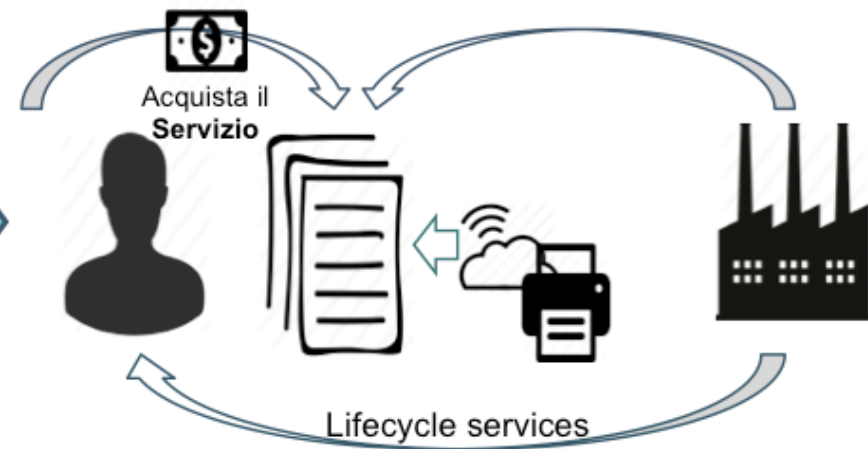
Il cliente acquista la stampante: il valore sta nel **possesso** del prodotto.

- Vendere il prodotto
- Transazione
- Produzione
- Servizio come "male necessario"

 **Modelli di business tradizionali**

OGGI

L'azienda progetta **Soluzioni**



Il cliente acquista le copie stampate: il valore sta nell'**uso** del prodotto.

- Servire il cliente (sia B2B, che B2C)
- Relazione
- Progettare soluzioni prodotto-servizio
- Servizio come vantaggio competitivo

 **Modelli di business orientati al servizio**

Keywords

- Skills
- Complexity
- Connections
- Data
- Quickness
- Clients

Skills and Professions

The key professions for Industry 4.0:

1. professions relating to **processing and analysis of information** (big data, business intelligence);
2. professions related to **design of applications** associated with new media and social networks;
3. professions related to **automation of production** and logistics processes

Required Skills and Professions

Ambiti in cui rafforzare le competenze attuali in ottica Industria 4.

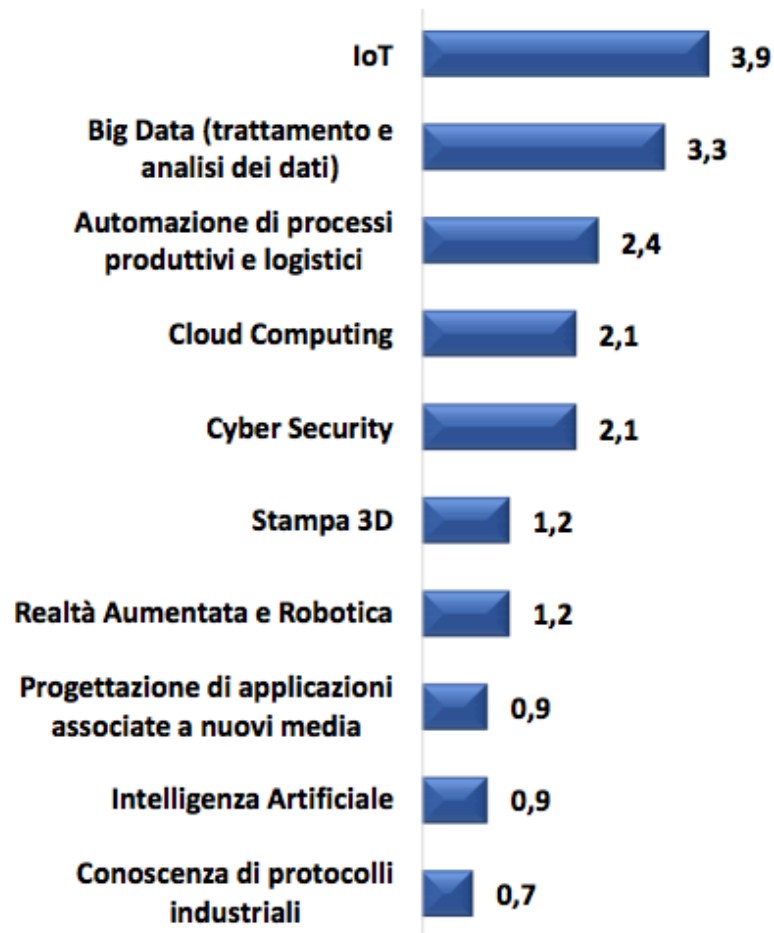


Figure maggiormente ricercate

Robotics & Automation Manager



IoT Expert

IoT Engineer

Big Data Scientist



Technology Innovation Manager



Cognitive Computing Expert

Artificial Intelligence Expert

Enabling Technologies

Operation Technology



Information Technology

Industrial Internet

The adoption and impact of the Industrial Internet will have 4 phases ranging from the short to the long term: 1) use as an asset, 2) pay-per-use sale, 3) pay-per-outcome sale, 4) the complete automation of processes thanks to machinery with IoT technology



IoT and Services

- The advent of the IoT enabled to connect products online to collect data and control their operation in real time and remotely
- Reliability has become a measurable and demonstrable quality
- Thanks to data analysis algorithms, companies can do predictive maintenance and not intervene only in case of failure, reducing downtime and keeping product performance high

IoT and Customer Experience

- **Process digitization and automation**

Thanks to the IoT, processes can be optimized and services can be offered at a level of quality never before achieved

- **Customer behavior analysis**

Thanks to the IoT it is possible to monitor the behavior of use of products by users

- **Process optimization involves sending suggestions for use**

E.g., we can know how many hours a day an industrial printer is on, how much electricity it consumes and even when it is actually used, from here it is possible to suggest to turn it off when not in use to save energy

Where are the services in this scenario?

- Networked products open up new business scenarios in which we no longer speak of product but of service, and therefore of **Product-as-a-Service**
- With remote control, the customer no longer buys a product but a **subscription to a service** with a recurring fee for the use of the product itself

E.g., pay-per-use, the customer pays according to how much he uses the product

Product-as-a-service

- A fundamental component for transforming a product into a Product-as-a-Service is the **application part**: the interface, web or mobile, with which the user analyzes the usage parameters and checks their operation

E.g., A manufacturer of industrial refrigerators can sell the refrigeration service, charging a subscription only for the actual use of the refrigerator, guaranteeing a constant pre-established temperature and including maintenance and overhauls in the cost of the subscription. The refrigerator is connected online, the temperature and consumption data, and usage data in general, are always visible and the refrigerator can be controlled remotely via a web application or a mobile app

Digital Servitization

**Digital
Servitization**



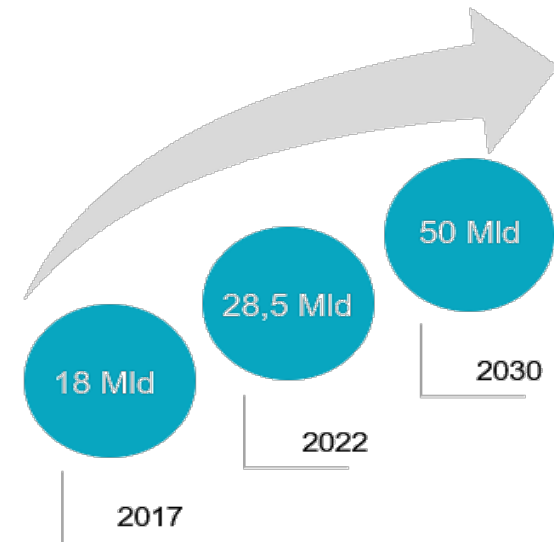
Process of integrating digital services into physical products

Internet of Things

- 1998 → Kevin Ashton coins the term “Internet of Things”

Extension of the internet to real objects and places for:

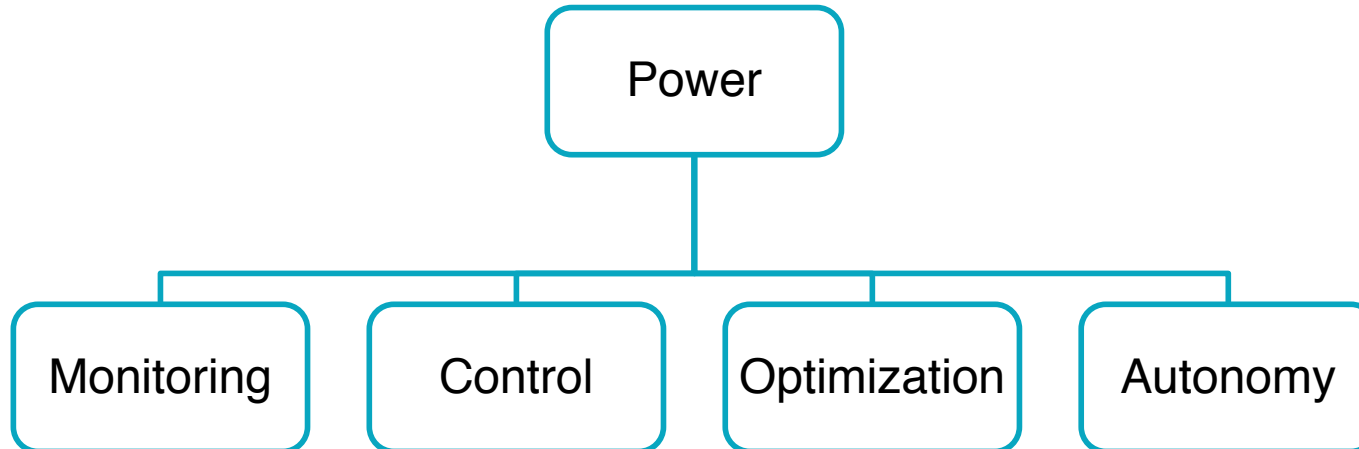
- ✓ Communicate data
- ✓ Exchange information with the surrounding objects and environment



Number of objects connected to Internet (Cisco 2018)

Smart Connected Products

Physical products, which have become "intelligent" thanks to the inclusion of digital and connectivity technologies in the product itself or remotely



Smart Speaker

Google Home

- Music Streaming (YouTube)
- Search for information online

Amazon Echo

- Music Streaming
- Radio online
- Smart home
- Audiobooks

...and tomorrow what will we use them for?



Siri – Apple



Cortana – Microsoft



Google Now



Alexa – Amazon