



ALMA MATER STUDIORUM  
UNIVERSITÀ DI BOLOGNA

## Blockchain per la filiera produttiva: potenzialità, caratteristiche e barriere

Webinar BI-REX

Bologna, 19 Novembre 2020

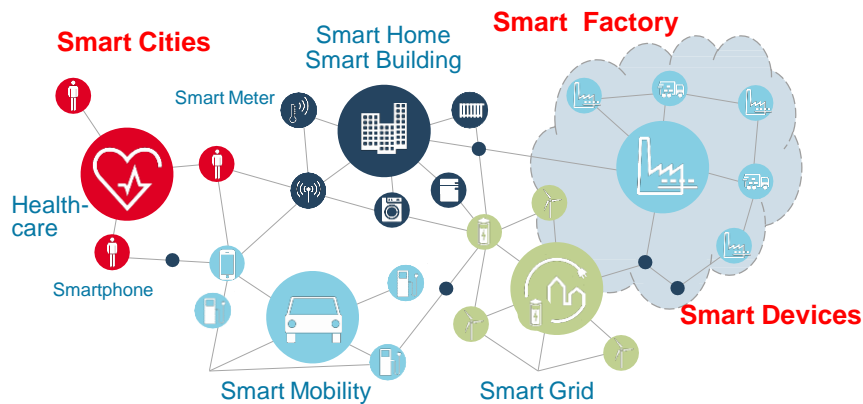
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### Mobile Middleware Research Group



**security models, infrastructures in mobile,  
pervasive and IoT environments, blockchain  
technologies (POR FESR Smartchain project)**

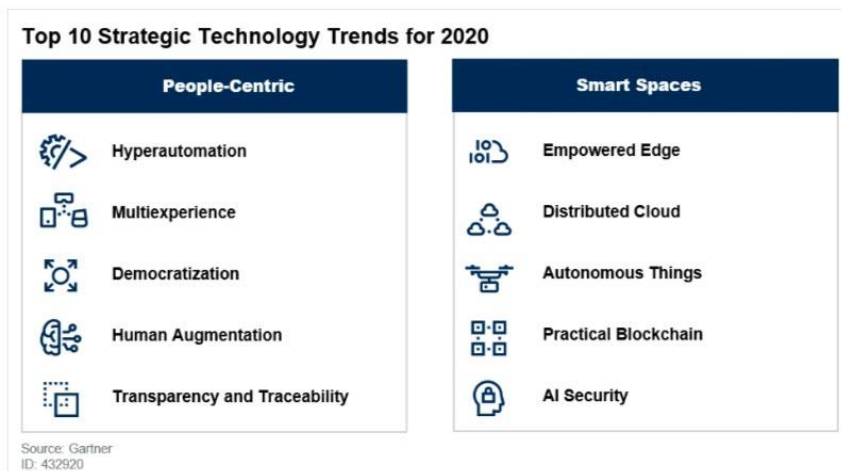


## Agenda

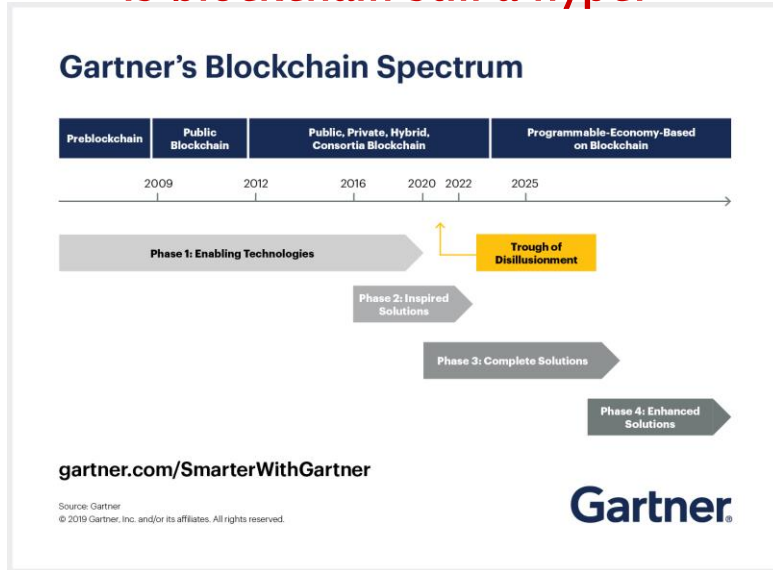
- Blockchain: definition and potential benefits
- Blockchain taxonomy and guidelines for adopting a blockchain infrastructure
- Transforming the technology value in business value: current barriers



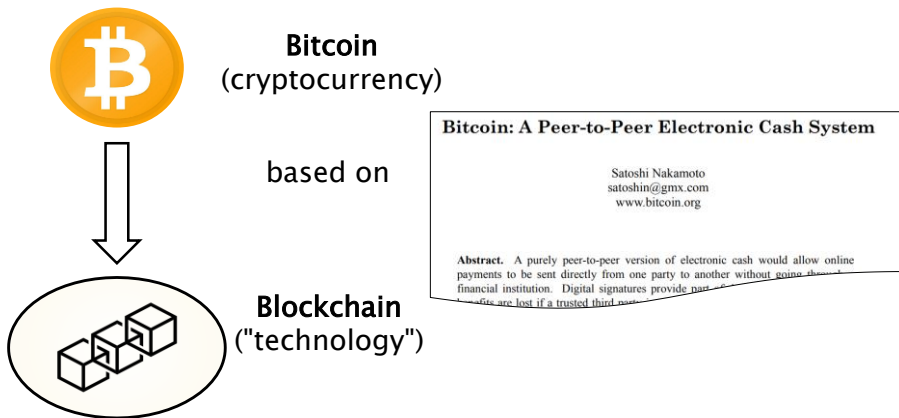
## Blockchain in the Top 10 strategic technology trends



# Is blockchain still a hype?



## Blockchain ≠ Bitcoin

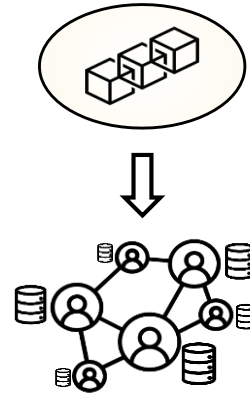


# Blockchain

A **blockchain** is an **append-only ledger**

- **distributed** on many nodes of a P2P network
- **decentralized** (nobody owns it)
- composed by a **chain of immutable blocks**

based on **cryptography** and on the **digital signature** to guarantee user anonymity, integrity, and authenticity.



To **append new data** (a *block*) to the blockchain, the blockchain provides a protocol to ensure that:

- only valid transactions are inserted in the blockchain
- all the nodes agree on the same version of the blockchain (**distributed consensus**), thus making it **really immutable**



## Evolution of the Blockchain Technology

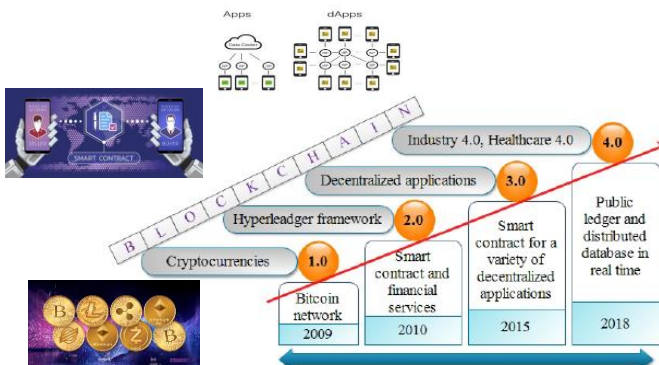
**Blockchain 1.0:** Cryptocurrency

**Blockchain 2.0:** Smart Contracts

**Blockchain 3.0:** DApps

**Blockchain 4.0:** blockchain in real business

cases ( industry 4.0)... .....at the beginning....



# Use cases

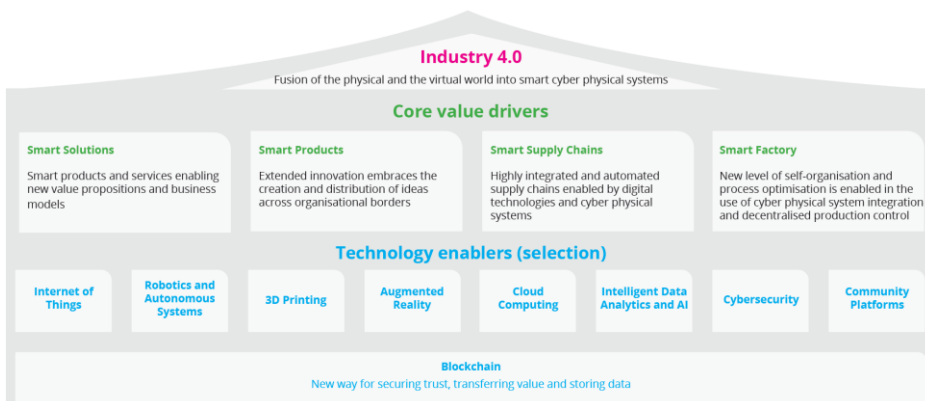
<https://consensys.net/blockchain-use-cases/>

CAPITAL MARKETS	CENTRAL BANK DIGITAL CURRENCIES	DIGITAL IDENTITY	ENERGY AND SUSTAINABILITY	FINANCE
GOVERNEMENT AND THE PUBLIC SECTOR	HEALTHCARE AND THE LIFE SCIENCES	LAW	MEDIA AND ENTERTAINMENT	REAL ESTATE
RETAIL FASHION AND LUXURY	SOCIAL IMPACT	SPORTS	SUPPLY CHAIN MANAGEMENT	SYNDICATED LOANS

## Blockchain benefits:

- Accessibility
- Transparency
- Cost reduction
- Automation
- Data/process integrity, tracking and timestamping

# Blockchain and Industry 4.0



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## Blockchain and Smart Supply Chain

### Blockchain benefits:

- Transparency into provenance of goods from sourcing all the way to the point of consumption.
- Accurate asset tracking
- Automation
- Greater visibility into participant's activities along the value chain



## Blockchain taxonomy

<p><b>Depending on access regulation:</b></p> <ul style="list-style-type: none"> <li>• Public blockchains</li> <li>• Private blockchains</li> <li>• Consortium or federated</li> </ul>	<p><b>Depending on permissions:</b></p> <ul style="list-style-type: none"> <li>• Permissionless blockchains</li> <li>• Permissioned blockchains</li> </ul>
<p><b>Depending on the kind of incentives:</b></p> <ul style="list-style-type: none"> <li>• Tokenized blockchains</li> <li>• Non-tokenized blockchains</li> </ul>	<p><b>Depending on the operation mode:</b></p> <ul style="list-style-type: none"> <li>• Logic-oriented blockchains</li> <li>• Transaction-oriented blockchains</li> </ul>



## Now the crucial question: should I adopt the blockchain paradigm?

The answer depends on various factors:

- trust relationships among participants
- which and how many are the interactions/processes that need a notarisation support to prevent participants from propagating fake data or tampering information of interest
- if information state should be really shared among participants
- level of integration among ERP systems
- tradeoff between business benefits and blockchain infrastructure/integration/transaction costs and



## Transforming the technology value in business value: current barriers

**Cultural barriers:** complexity of technology and difficulty to understand how to transform the technology value in business value

**Technological barriers:** great effort toward infrastructure building blocks, less attention and technological immaturity of advanced tools for supporting the design/deployment of enterprise business applications (tools for data collection, state verification and analysis, for facilitating collaboration among companies..); interoperability; data privacy

**Economical barriers:** lack of fee models for predicting and calculating transaction fees

**Legal and tax barriers:** some legal initiatives but none well established yet (Decreto legge135/2018 DL Semplificazioni, Gazzetta Ufficiale12 Febbraio2019, European Parliament resolution of 3 October 2018 on distributed ledger technologies and blockchains: building trust with disintermediation)





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