

ALMA MATER STUDIORUM Università di Bologna Blockchain per la filiera produttiva: potenzialità, caratteristiche e barriere

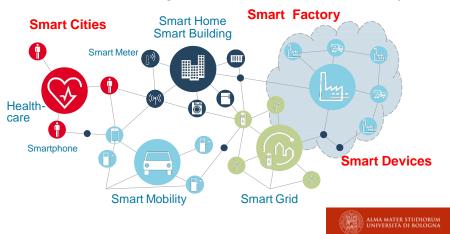
Webinar BI-REX Bologna, 19 Novembre 2020

Rebecca Montanari

Dip. Informatica – Scienza e Ingegneria (DISI) Alma Mater Studiorum - Università di Bologna

Mobile Middleware Research Group

security models, infrastuctures 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 barrriers

Blockchain in the Top 10 strategic technology trends

	People-Centric		Smart Spaces
Ĩ/>	Hyperautomation	182	Empowered Edge
	Multiexperience	0.0	Distributed Cloud
Ŏ,	Democratization	Ť	Autonomous Things
रु	Human Augmentation	0.0 0.0	Practical Blockchain
·⊡	Transparency and Traceability	0	Al Security



ALMA MATER STUDIORUM

Is blockchain still a hype?

reblockchain	Public Blockchain	Public, Private Consortia Blo		Programmable-Econom on Blockchain	y-Based
2	009 2012 I I	2016 I	2020 2022	2025 I	
	Phase 1: Enabling Tech	ologies		Trough of Disillusionment	
			se 2: Inspired Solutions		
			Phase 3: 0	Complete Solutions	
				Phase 4: E Solut	
artner.co	om/SmarterW	ithGartner			
				Gar	nor

Blockchain ≠ Bitcoin

Bitcoin (cryptocurrency	/)
	Bitcoin: A Peer-to-Peer Electronic Cash System
based on	Satoshi Nakamoto satoshin@gmx.com www.bitcoin.org
Blockchain ("technology")	Abstract. A purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another without going the sent financial institution. Digital signatures provide page of the sent sentence of the



Blockchain

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

- distributed on many nodes of a P2P network
- decentralized (nobody owns it)

to

composed by a chain of immutable blocks

based on cryptography and on the digital signature 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



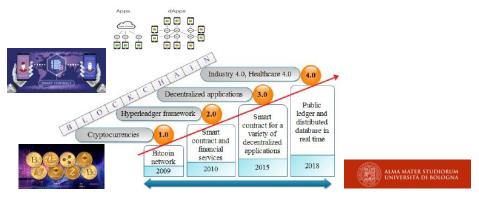
Blockchain 1.0: Cryptocurrency

Blockchain 2.0: Smart Contracts

Blockchain 3.0: DApps

Blockchain 4.0: blockchain in real businesss

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 FASCHION 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

Industry 4.0 Fusion of the physical and the virtual world into smart cyber physical systems							
	Core value drivers						
	Smart products and services enabling new value propositions and business		n embraces the ution of ideas al borders	Smart Supply Chains Highly integrated and automated supply chains enabled by digital technologies and cyber physical systems		Smart Factory New level of self-organisation and process optimisation is enabled in the use of cyber physical system integration and decentralised production control	
	Technology enablers (selection)						
Internet of Things	Robotics and Autonomous Systems	3D Printing	Augmented Reality	Cloud Computing	Intelligent Data Analytics and Al	Cybersecurity	Community Platforms
	Blockchain New way for securing trust, transferring value and storing data						

C Capgemini



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

ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA

ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA

Blockchain taxonomy

 Depending on access regulation: Public blockchains Private blockchains Consortium or federated 	 Depending on permissions: Permissionless blockchains Permissioned blockchains
Depending on the kind of incentives:	Depending on the operation mode:
Tokenized blockchains	Logic-oriented blockchains
Non-tokenized blockchains	Transaction-oriented blockchains

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

ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA

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)





ALMA MATER STUDIORUM Università di Bologna

Rebecca Montanari

Dip. Informatica – Scienza e Ingegneria (DISI) CIRI ICT

rebecca.montanari@unibo.it

www.unibo.it