Europe and blockchains: keep trust in disruptions

DECENTRALIZED 2017
2-3 November 2017- Limassol, Cyprus

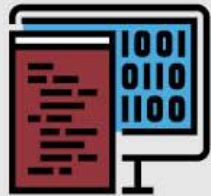**Chiara Mazzone**
Innovation Policy Officer
DG CONNECT- European Commission

Blockchain: a digital revolution?

WHAT IS BLOCKCHAIN TECHNOLOGY?

A digital ledger that keeps a record of all transactions taking place on a peer-to-peer network

All information transferred via blockchain is encrypted and every occurrence recorded, meaning it cannot be altered

It is decentralised, so there's no need for any central, certifying authority

It can be used for much more than the transfer of currency; contracts, records and other kinds of data can be shared

Encrypted information can be shared across multiple providers without risk of a privacy breach
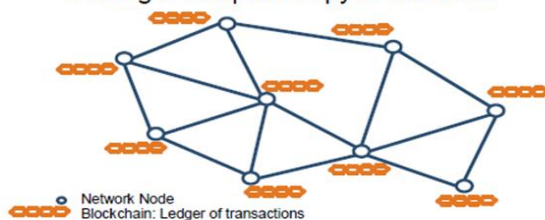
Source: *IoT World News*

Main Concepts

A chain of « blocks »

Blocks aggregate transactions
- Transaction …
- Transaction …
- Transaction …

But a blockchain also relies on a network

Each node ("miners") of the network is a server hosting a complete copy of the chain

○ Network Node
Blockchain: Ledger of transactions

Replication of information makes the blockchain resilient and secure

Adding information in a blockchain requires validation by the network

Blocks can only be added at the end of the chain

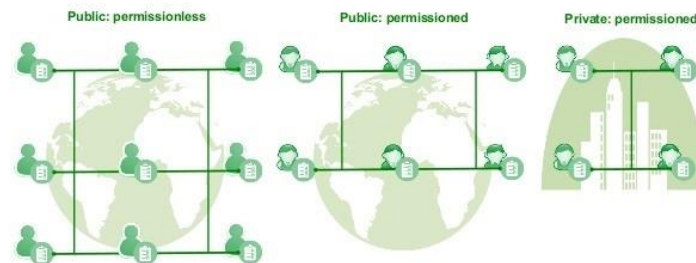The nodes of the network verify that the new set of transaction is valid

Once added blocks cannot be deleted

The first node to validate a block gets a financial reward

₿ ⇨ ○

The competition process incentivizes nodes to participate to the validation of transactions

Public: permissionless   Public: permissioned   Private: permissioned

© 2016 IBM Corporation
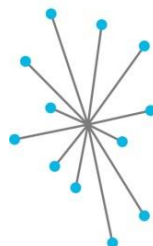
Centralized   Decentralized   Distributed Ledgers

The New Networks

Distributed ledgers can be public or private and vary in their structure and size.

Public blockchains

Require computer processing power to confirm transactions ("mining")

- Users (•) are anonymous

- Each user has a copy of the legder and partipates in confirming transactions independently

- Users (•) are not anonymous

- Permision is required for users to have a copy of the legder and participate in confirming transactions

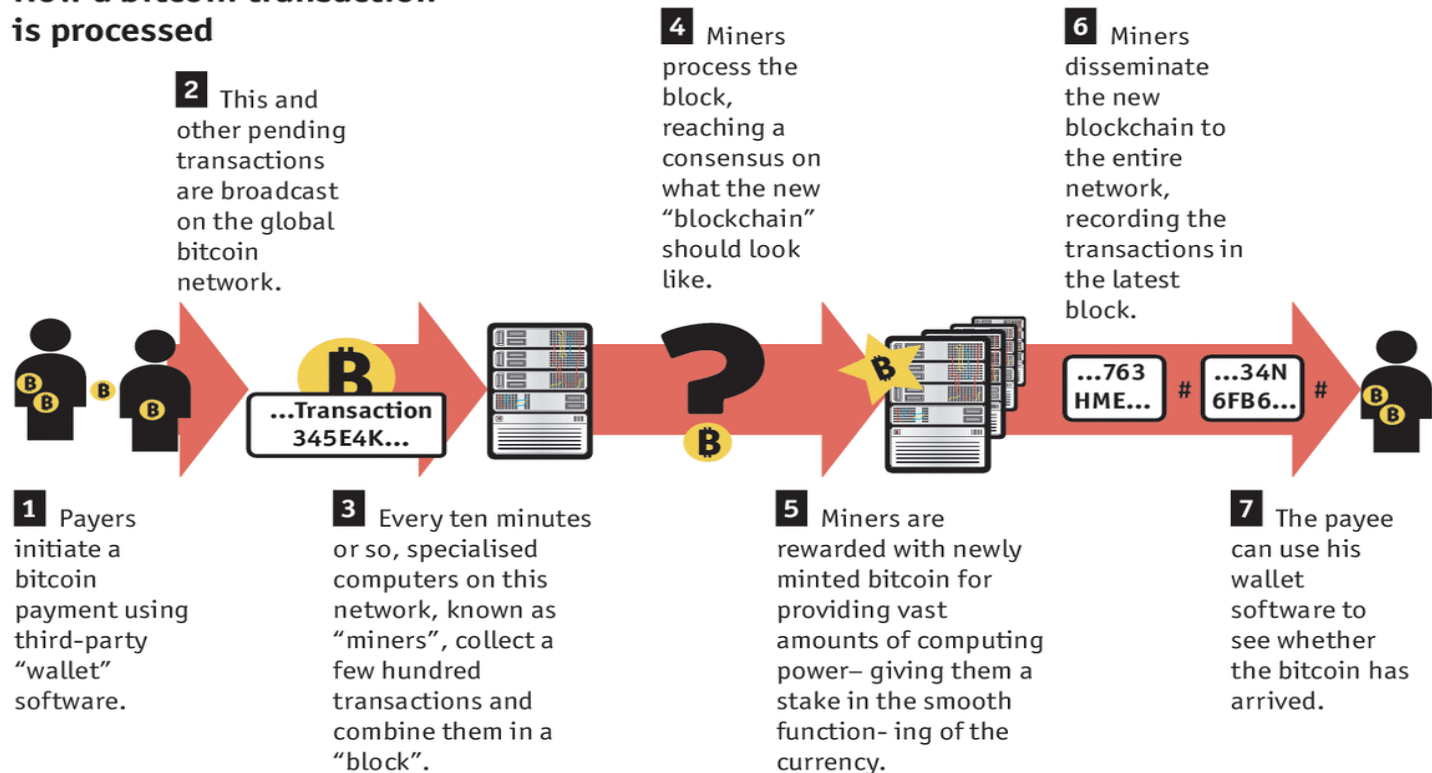**Blockgeeks**

Features of Blockchain

- Decentralization / distributed nature
- Disintermediation & trustless exchange
- Distributed consensus mechanism/protocols
- Security and Resilience: no single point of failure
- Immutability/Cryptography
- Incentive mechanism= Tokenization
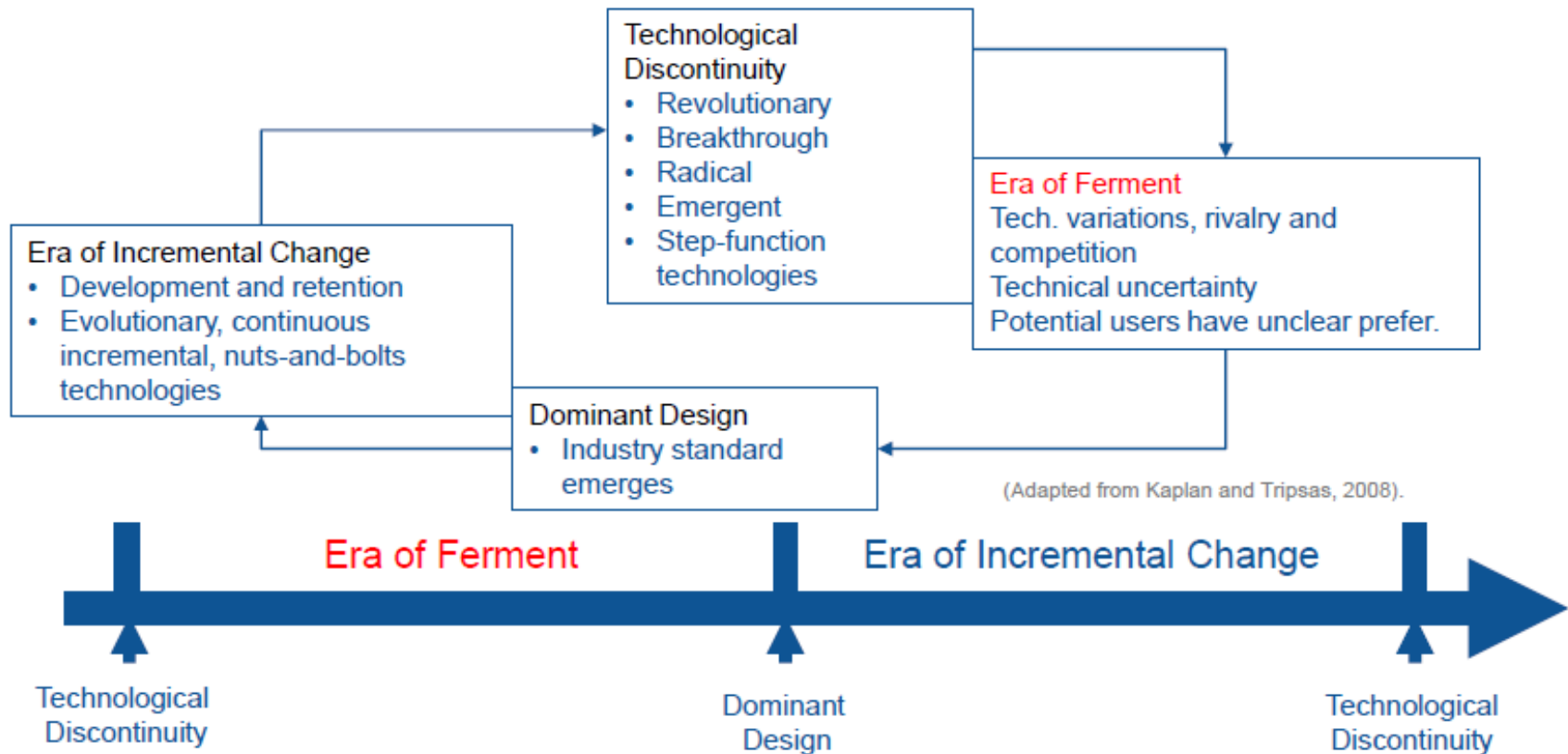- Architecture: Blocks…or not!

Allowing for:

- Transparency: publicly reliable and accessible
- Traceability/Control
- Accountability
- Automation (Faster transaction time / Lower transaction costs (?) / Easier reconciliation
- Ecosystem simplification

The first "killer application": Bitcoin
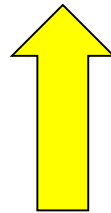

How a bitcoin transaction is processed

1 Payers initiate a bitcoin payment using third-party "wallet" software.

2 This and other pending transactions are broadcast on the global bitcoin network.

3 Every ten minutes or so, specialised computers on this network, known as "miners", collect a few hundred transactions and combine them in a "block".

4 Miners process the block, reaching a consensus on what the new "blockchain" should look like.

5 Miners are rewarded with newly minted bitcoin for providing vast amounts of computing power– giving them a stake in the smooth function- ing of the currency.

6 Miners disseminate the new blockchain to the entire network, recording the transactions in the latest block.

7 The payee can use his wallet software to see whether the bitcoin has arrived.

...Transaction 345E4K...

...763 HME... # ...34N 6FB6... #

Economist.com

Timeline of Blockchain Evolution

Technological Discontinuity
- Revolutionary
- Breakthrough
- Radical
- Emergent
- Step-function technologies

Era of Ferment
Tech. variations, rivalry and competition
Technical uncertainty
Potential users have unclear prefer.

Era of Incremental Change
- Development and retention
- Evolutionary, continuous incremental, nuts-and-bolts technologies

Dominant Design
- Industry standard emerges

(Adapted from Kaplan and Tripsas, 2008).

Era of Ferment — Era of Incremental Change

Technological Discontinuity — Dominant Design — Technological Discontinuity

Credit: Paolo Tasca, Blockchain standardisation workshop, DG CONNECT
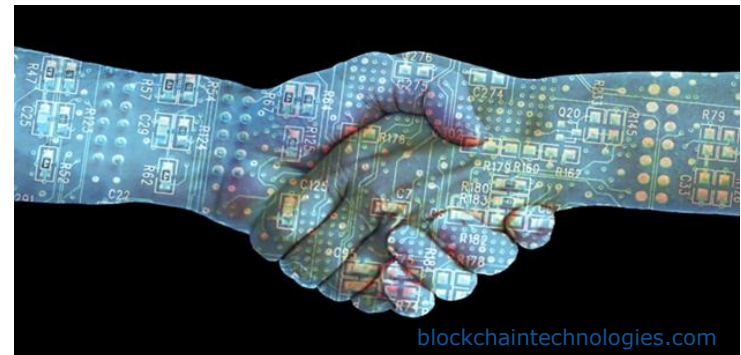
It 's all about trust!

TRUST

⬆ **Blockchain**

Trustless environment – trustful society

A fascinating trustless technology which at the end allows to disintermediate in daily business processes?

blockchaintechnologies.com

Blockchain in its infancy

Comparison to the first days of the Internet…

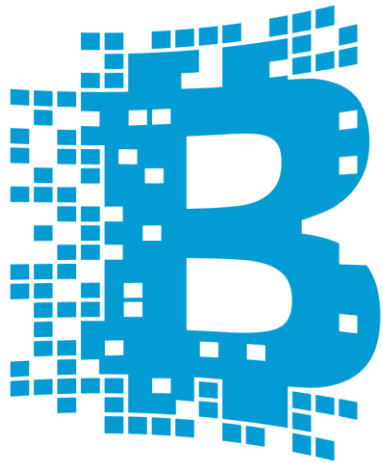Market players were still operating in the gray-areas of businees and legislation…

news.mit.edu

Regulation:
Tame the beast?

Is there a monolithic beast to tame?

e.g. regulation on technology/activities?

Law of the horses?

Law of the poneys?
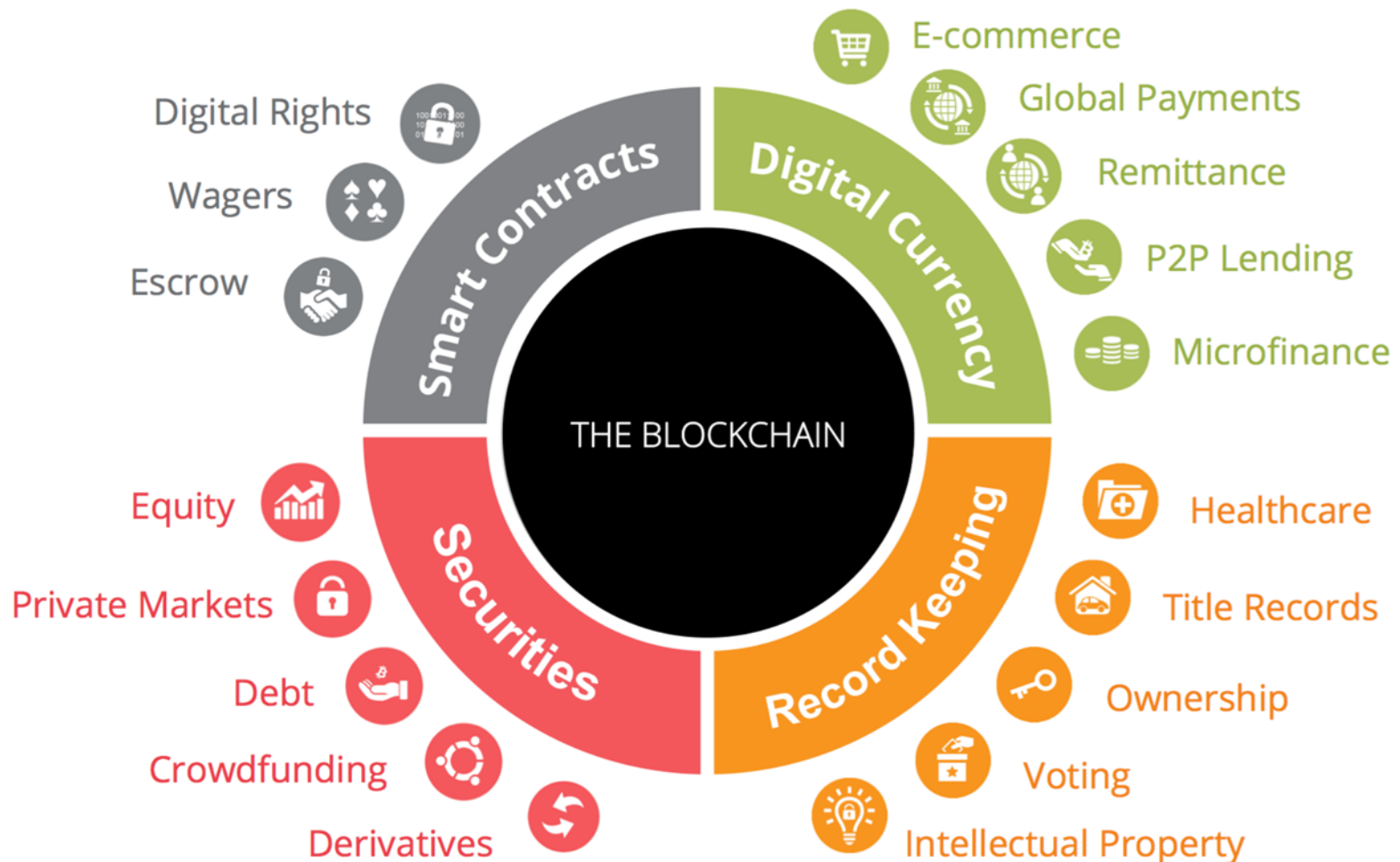
How to look at ICOs?

Applications and Challenges

Source: support.purse.io

Blockchain Potential Applications & Disruption

The blockchain is radically changing the future of transaction based industries

THE BLOCKCHAIN

Smart Contracts
- Digital Rights
- Wagers
- Escrow

Digital Currency
- E-commerce
- Global Payments
- Remittance
- P2P Lending
- Microfinance

Securities
- Equity
- Private Markets
- Debt
- Crowdfunding
- Derivatives

Record Keeping
- Healthcare
- Title Records
- Ownership
- Voting
- Intellectual Property

Blockchain

**Countless opportunities in various sectors...
and still un-envisaged ones**

.... And what else to expect?

- RegTech
- Environmental reporting
- Emission Trading System
- Tax and customs collection
- eID management
- P2P energy trading

Courtesy: PwC

	Industry	Use cases	Start-ups
	Energy, utilities & mining	• Smart utility metering system • Decentralised energy data platform	Bankymoon AutoGrid
	Entertainment & media	• Control of ownership rights of digital media • Disintermediation of record labels	Ascribe Mycelia
	Financial services	• International P2P transactions • Anti-money laundering	Bitcoin Coinfirm
	Government & public services	• Land ownership records • Tamper-proof voting records • Digital identity of citizens	Factom Follow My Vote Tradle
	Healthcare	• Storage of healthcare records • Population health and clinical studies	HealthNautica Tierion
	Hospitality & leisure	• Loyalty programmes	Loyyal
	Insurance	• Peer-to-peer flight insurance policies • Micro-insurance	InsurETH Stratumn
	Transportation & logistics (freight transport)	• Trade documentation (e.g. Bill of Lading) • Trade finance • Supply chain transparency	Wave Skuchain Provenance
	Transportation & logistics (aviation)	• Distribution of tickets and ancillary services • Loyalty programmes (cf. H&L) • Passenger identity management	Loyyal

Challenges

- **Technical challenges**: Scalability, interoperability, technical standards, technical development

- **Regulatory challenges**: compliance with EU and national rules, development of technologically neutral, innovation-friendly, future–proof legislation, enabling regulatory framework (e.g. sandboxing)

- **Legal & Policy challenges:**
  - borderless technology: which jurisdiction?
  - "Right to be forgotten"
  - privacy (compliance with GDPR), legal validity, enforcement by a court, mediation and arbitration, liability, identification and verification

- **Legal challenges for smart contracts:**
  - How to include elements of 'traditional' contracts ?
  - Degree of subjectivity or judgement on a case-by-case basis?
  - Circumstances and conditions, e.g. force majeure
  - What about transactions needed to be in writing form, future-proof legislation?

- **ICO's**: some jurisdictions regulate them as securities/they will be regulated in the future but as what?
  - Financial and legal risks for investors? Guarantee consumer and investor protection without hamper innovation potential

EU policy context
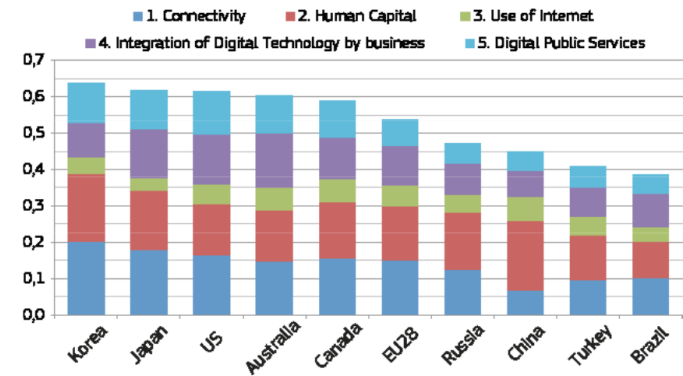
Challenges for the EU

European Commission

1. European digitisation in a global context

All important economies in the world are investing heavily in digitisation.

While Europe as a whole lags its key competitors, several Member States are world-leading.

Completion of the Digital Single Market will put Europe in a better position to succeed.

Legend: 1. Connectivity 2. Human Capital 3. Use of Internet 4. Integration of Digital Technology by business 5. Digital Public Services

Countries: Korea, Japan, US, Australia, Canada, EU28, Russia, China, Turkey, Brazil

Source: International Digital Economy and Society Index (I-DESI) (CapGemini) data refer to 2015 or earlier

...but Europe has all the necessary assets to succeed

- A world-class science base and well-educated population

- Entrepreneurial spirit and creativity

- High-quality public services in areas such as healthcare

- A predictable regulatory environment that provides the basis for sustainable growth and investment

- A Digital Single Market after 2018, if the European Parliament and the Council adopt all proposals by the end of 2017

All Member States are making progress, but significant differences remain

DSM Mid Term Review

- *Blockchain/DLT as a breakthrough technology*
- *A European Observatory and Forum on Blockchain/DLT*
  - to map and monitor developments
  - build expertise / knowledge hub
  - promote use cases and debate EU actions
- *As blockchain emerged with Bitcoin, initial EU focus was on financial markets*
  - EP report on blockchain and virtual currencies
  - Creation of the FinTech Task Force
  - One work stream on blockchain / DLT
- *But applications far beyond Financial sector*

10th May 2017

EU Council conclusions

To successfully build a digital Europe, EU needs:

- *a sense of urgency to address emerging trends: this includes issues such as **artificial intelligence and blockchain technologies**, while at the same time ensuring a high level of data protection, digital rights and ethical standards. The European Council […] calls on the Commission to put forward the necessary initiatives for **strengthening the framework conditions** with a view to enable the EU to explore new markets through **risk-based radical innovations** and to reaffirm the **leading role of its industry**;*

Brussels, 19th October 2017

EU vision and initiatives

EU approach

Need for a vision, but also an enabling framework

- **Technology's evolution pace is light years ahead of regulatory framework's: how can regulators react?**
- **Governance and interoperability are key**

Europe is moving : from active monitoring to action

- **1st EU joint conference**
- **Launching the EU Blockchain Observatory and Forum**
- **Joint partnerships : EU instit, EU-MS-local initiatives**
- **Broader engagement : industry, innovative ecosystems, use cases**
- **Funding R&I in the EU**
- **International Standardisation work**

EU initiatives: the European Blockchain Observatory and Forum

- Launch of a EU hub to access, share and disseminate and build knowledge on blockchain, with objectives to
  - Mapping existing initiatives (PoC), knowledge sharing
  - Monitor technical development of blockhain/DLT
  - Develop expertise and community building
  - Address sectoral and cross cutting issues (governance, scalabilty, compliance, interoperability…)
  - Build on EU interest use cases
  - Inputs / recommendations for EU policies / actions

- ✓ Starting beginning of 2018

EU Initiatives: feasibility study on a possible EU blockchain Infrastructure

- Setting the right conditions for the advent of an open, innovative, trustworthy, transparent, and EU law compliant data and transactional environment

- Assess the opportunity, benefits, and challenges of creating at EU level an enabling framework or infrastructure supporting blockchain-based services

✓ To be launched in few days (beginning November)

EU initiative: Standardisation, Interoperability & Piloting

- Participant to ISO TC 307 works
  - Terminology
  - Reference Architecture, taxonomy and ontology
  - Smart contracts
  - Use cases
  - Security and privacy
  - Identity

- Proposal for a blockchain standardisation EU white paper

- Organise cooperation workshop between standardisation stakeholders

- Identify priority use cases for piloting

- Financial Data Standards project

- Launch EU pilot for financial reporting gateway

Other Actions   at EU level

- **Regulatory and legal aspects: urgency and needs for Europe to move forward**

- **Enabling framework for interoperability, trust and governance, enabler for uptake**

- **Engaging with MS initiatives, public services, startups ecosystems and industry**

- **FinTech Action Plan** (beginning 2018)

- **Supporting pilot actions** upscaling PoC, industry and ecosystems (e.g. through Horizon 2020, EP pilots)

- **Preparing** for (EU) **public services on blockchain**

- **Assessing needs** for a (trusted) **EU blockchain infrastructure**

Thank you - ευχαριστώ!
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