EUROPEAN CENTRAL BANK

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# Deep Dive: ongoing developments and innovations in Payment and Settlement Systems

Global Payments Week 2018

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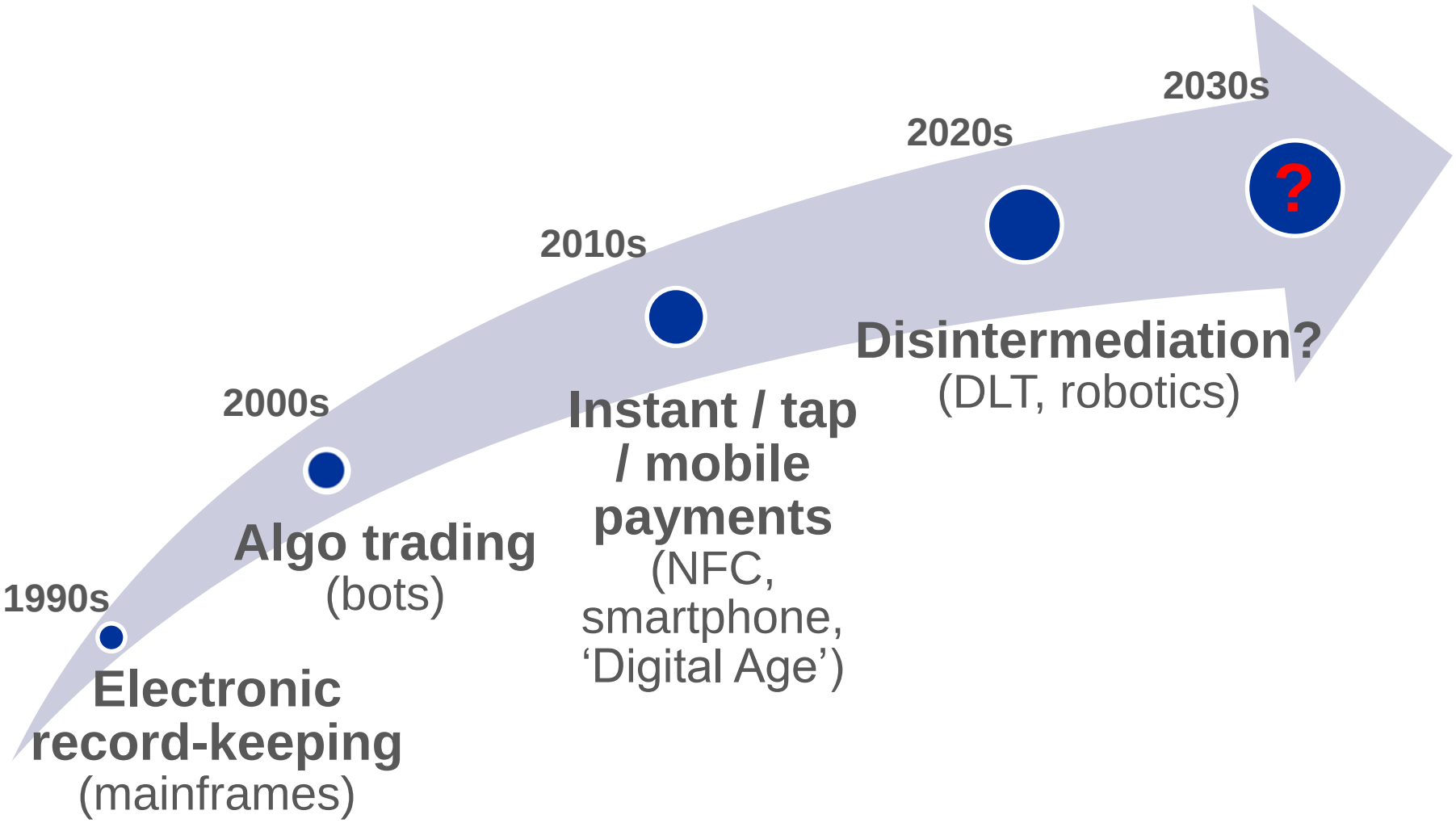
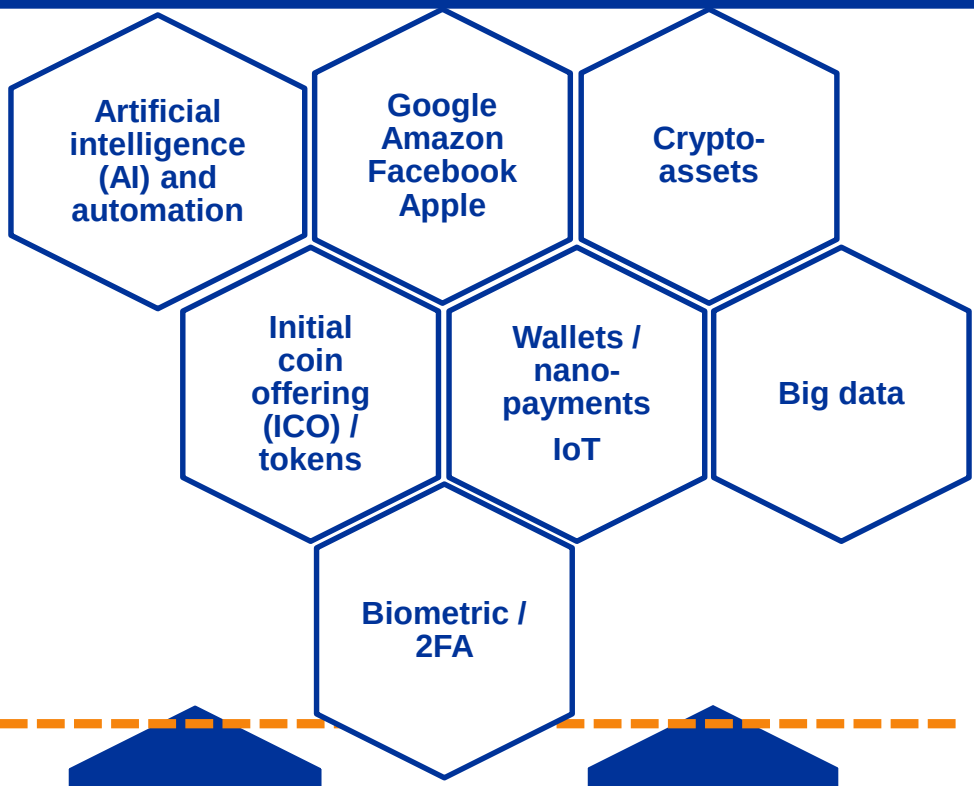
# Fintech: **application of (new) technology in a way that changes financial institutions' Adoption or products**



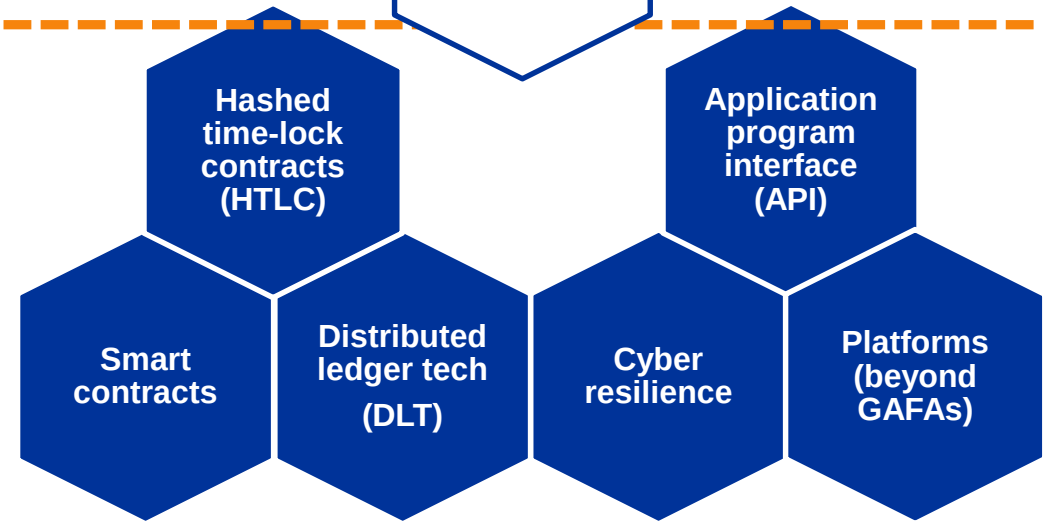
## FinTech addresses needs of users

- can be a ‘social phenomenon’
- risk for market to overreact
- central banks to be mindful of hype




## FMIs must remain up to date to:

- accommodate / foster innovation
- enforce safety
- avoid fragmentation



# Digital innovations and financial market infrastructures

- ***Distributed ledger technology and other digital innovations*** have the ***potential to induce change across the value chain***
  - Issuance, trading, payments, clearing and settlement
  - Data and identity management as well as regulatory reporting
  - Transfer of assets, record of ownership and asset services
- ***Pressure on business models, risk management and regulation***
  - ***Challenges to the intermediary function*** of FMIs
  - Market entry of ***new (unregulated) entities***
  - ***Changing user expectations*** in terms of speed, cost, transparency
- **Various possible scenarios**
  - ***Disintermediation*** by peer-to-peer networks
  - ***Usage*** of new technology by legacy FMIs to improve internal efficiency
  - ***New FMIs offering DLT based services***

# Implications for central banks

***Monetary policy and service provider role***

- assessing potential of digital innovations for efficient and safe central bank infrastructure services for settlement of payments and securities
- assessing impact on monetary operations and central bank money issuance

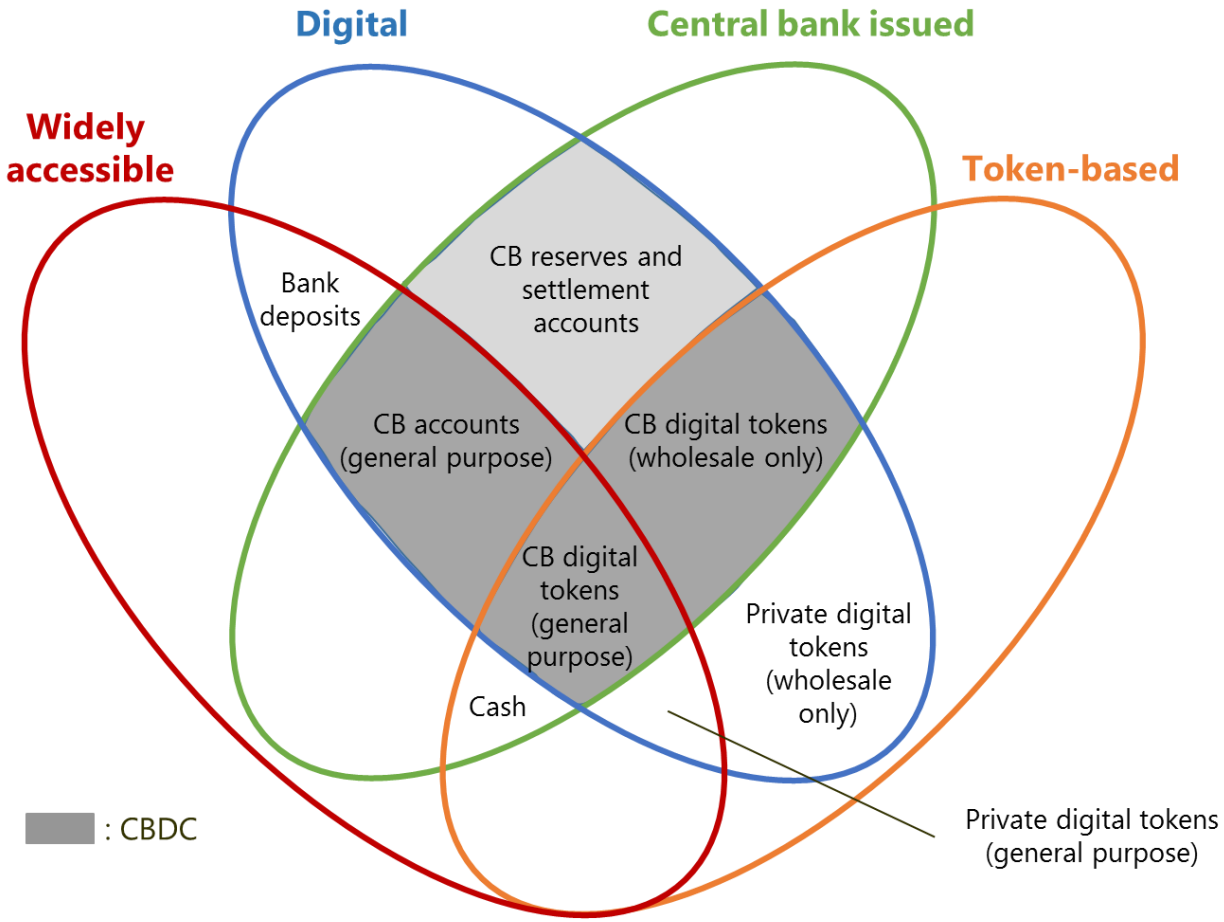
***Catalyst role***

- facilitating private sector efforts to improve market efficiency
- promoting work on standardisation and interoperability, countering the risk of silos and proprietary solutions

***Oversight, supervisory and financial stability role***

- assessing possible impact of technology adoption on overseen/supervised entities and their business models and the financial markets at large
- adapting central bank frameworks for data collection and handling

# The 2018 CPMI-MC report: Categorisation of central bank digital currencies – the “money flower”



# Central bank digital currency – Possible motivations

***Interest of a central bank*** can vary, as do their *mandates* (eg. smooth functioning of payments, financial stability, …):

- Reaction to ***declining cash usage*** (provision of safe means of payments, alternative to cash and private cryptocurrencies) or active promotion of a ***cashless society***
- New instrument to enhance ***settlement efficiency***
- ***Financial inclusion*** considerations
- Inhibit ***criminal activity*** or ***control*** of domestic currency
- Additional ***monetary policy*** instrument (reduce the lower bound on interest rates) and tool to improve ***financial stability***

⇒ ***No CBDC is like the other!***

# Key elements and design features

**CBDC key elements:**

- **liability of a central bank**
- **digital** form
- denominated in **sovereign currency** unit of account

**Optional design features**:

- ***Holders*** - *general public or restrictions* (eg wholesale only)

- ***Records*** of transfers and holdings - *on or off the central bank ledger*
- ***Transfer mechanism*** - *peer to peer or intermediated*
- ***Transparency*** – *full, limited or anonymity of holders*
- ***Availability*** **-** *24/7 or limited*
- ***Convertibility-*** *into cash and/or central bank deposits / limits or caps*
- ***Interest*** *bearing* – dependent on central bank policy

# Payments aspects

- Digital records could improve ***regulatory compliance***
  - ***KYC, AML and tax compliance*** might fall on central banks
  - the appropriate degree of ***privacy*** is a challenge in a digital environment

- CBDC could improve **financial inclusion**
  - but ***barriers to the use*** of any digital currency may be large
  - the ***preference for trusted alternatives***, such as cash, is strong

- **Cyber-security** and the **robustness of possible new technologies** remain a challenge

- **Legal issues** have to be considered
  - ***central bank authority*** to issue CBDC and "***legal tender***" status
  - ***legal qualification*** of CBDC (discharge of obligations, rules for holding and transfers of value, liability)
  - ***…***

# Monetary policy aspects

- Issuance of CBDC probably does ***not alter the basic mechanics of monetary policy implementation***

- CBDC could enrich the ***monetary policy toolkit***
  - allowing for a ***strengthening of pass-through of policy rate changes***
  - addressing the ***zero lower bound on interest rates***

- CBDC designed as a liquid and creditworthy asset could function as a ***highly liquid safe asset***
  - substituting ***short-term government bills*** or ***guaranteed bank deposits***
  - implications for the pricing and composition of banks' funding

# Financial intermediation, stability and cross-border aspects

- Impact on ***banks business models and financial intermediation***
  - need to reconsider ***appropriate roles of private and public sector***
  - similarities to discussion on ***narrow banking*** *or* ***full-reserve money***
  - commercial banks could lose **customer information**

- Challenges could arise in times of ***financial stress***
  - higher ***instability of commercial bank deposit funding***
  - a ***flight towards the central bank*** may occur on a fast and large scale

- The introduction of CBDC in ***one jurisdiction could affect others***
  - ***usage abroad*** and ***holdings by foreign entities***
  - ***cross-currency*** settlement

# State of play and outlook

- **Wholesale DC** may enhance settlement efficiency, but ***upgrades of RTGS*** systems may yield similar benefits
- **General purpose DC** could respond to diminishing cash usage, but faces significant challenges and risks (e.g. for bank business models, privacy, regulatory compliance); alternatives such as ***instant payments*** may be as efficient and convenient
- **Central bank money** remains the only ultimate safe settlement asset; other settlement assets require further assurances (e.g. ***investor protection***, collateralization of exposures)
- **Hybrid variants** (e.g. combining wholesale CBDC available to financial institutions with private digital tokens issued by banks/financial institutions to end-users) may emerge
- Opportunities remain for **enhancing cross-border payments**, but need to study ***policy, legal and regulatory implications*** as well as need for ***settlement infrastructure***, including FX

# Hammer looking for a nail?


## ECB stance

Eurosystem operates two of the world's largest market infrastructure services (TARGET2 and TARGET2-Securities) and has launched new projects (e.g. TARGET Instant Payments Settlement).

Technological innovation such as DLT has the potential to profoundly impact the financial market we know today. But any new technology-based market infrastructure service needs to be mature enough to meet high requirements in terms of safety and efficiency.

Against this background, the ECB cannot, at this stage, consider basing its market infrastructure on a DLT solution.

The ECB will continue to explore, analyse and test new technologies. In doing so we will ensure that tomorrow's market infrastructure not only is efficient and innovative but also remains safe and resilient.

*https://www.ecb.europa.eu/pub/annual/special-features/2016/html/index.en.html*

# ECB test lab

- Experimental work with blockchain / DLT
  (*to date: Hyperledger, Corda, Ethereum, elements*)

- <u>Work within EU central bank community</u>:
  - DLT learning tool for EU central banks established in March 2018 *(first version based on Hyperledger / cloud-based)*
  - World's first DLT network between a larger group of central banks
  - Hackathon with the EU central bank community conducted in April 2018 and November 2018 to explore possible use cases

# ECB test lab

Bank of Japan/ECB cooperation:

Project “Stella” launched in December 2016

Objective: deepen understanding of DLT

Not geared towards replacing existing central bank services with DLT-based solutions

09/2017 **Stella 1:** In-depth experiments on whether specific liquidity-saving mechanisms of RTGS could be run on DLT *(Hyperledger)*

03/2018 **Stella 2:** Conceptual analysis and experiments on how Delivery-versus-Payment could be conceptually designed and operated on DLT *(Hyperledger, Corda, elements)*

# Report 1 Payments

## Main findings

### performance

Current performance needs of RTGS system (ca. 10-70 transactions) can be processed without difficulty

Liquidity-saving mechanisms (smart contract) not a major factor for latency (adding 0.01-0.02 seconds)

DLT performance is affected by distance between nodes

### availability

DLT solutions were found to be resilient to the failure of individual network nodes

Validating nodes mostly recovered in less than 30 seconds

DLT solutions were found to be resilient to incorrectly formatted messages; latency remained between 0.5 and 1 second

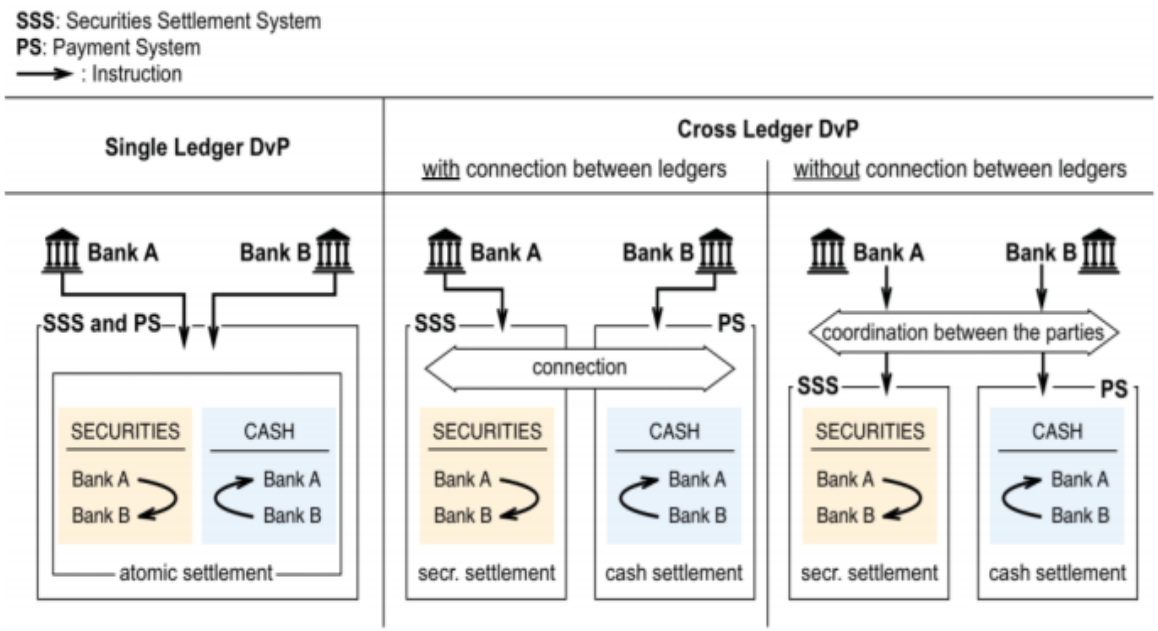
*https://www.ecb.europa.eu/pub/pdf/other/ecb.stella_project_report_september_2017.pdf*

# Report 2 Payments

## Main findings

DLT offers a new approach for achieving DvP between ledgers, which does not require any connection between ledgers (cross-chain atomic swaps)

This new interoperability approach however entails complexities (e.g. higher liquidity needs) and possibly also additional risks




https://www.ecb.europa.eu/pub/pdf/other/stella_project_report_march_2018.pdf

**Advisory Group on Market Infrastructures for Securities and Collateral** launched a work stream on harmonisation and technological innovation: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**The potential impact of DLTs on securities post-trading harmonisation and on the wider EU financial market integration**

Advisory Group on Market Infrastructures for Securities and Collateral

- DLT Task Force analysed potential impact of DLTs on existing and upcoming T2S harmonisation activities and on wider EU financial integration.

  An **educational report** with main findings of the analysis on DLT was published in September 2017

- Fintech Task Force is addressing feasibility and practical interest by market participants in developing **use cases**

*https://www.ecb.europa.eu/paym/intro/governance/shared/pdf/201709_dlt_impact_on_harmonisation_and_integration.pdf*