



CSDs - Capital Markets Innovation Pillars

ecsda.eu

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Key points

- 1 CSDs are resilient and forward-looking, driving innovative initiatives as trusted market infrastructures;
 - They uniquely link traditional finance with innovative solutions while maintaining high standards of resilience and risk management.
- 2 The introduction of digital technologies represents an evolution continuum that does not alter FMIs' fundamental safety and resilience roles.
- 3 A level playing field in terms of risk management, prudential requirements, and investor protection must be maintained, regardless of technological advancements
 - Seamless alignment of the various regulatory initiatives within the broader framework is required to avoid regulatory overlaps and inconsistencies.
- 4 With a robust regulatory framework and the ability to leverage new technologies, CSDs are poised to lead the post-trading market transformation.
 - Having already embraced structural market projects such as T2S, ECMS and now T+1.
 - Redesigning processes thanks to DLT, AI, and Cloud technologies, internally or with external partners such as with the ECB for the CBDC trials and state-of-the-art fintechs.
- 5 The journey towards a fully digital financial ecosystem will require ongoing collaboration, innovation, and strategic planning.

In this paper we will address:

- The Commission's mandate
- The need for legal certainty when it comes to new technologies
- How CSDs embrace market projects and new technologies building on their unique strengths and regulatory framework i.e. showing how resilient market infrastructures continuously embrace innovation.



1. CSDs act to contribute to the SIU objectives



With the “[Competitive Compass](#)” framework announced early this year, the Commission set the tone of its new mandate: boosting European competitiveness with capital markets playing a key role.

Specifically linked to capital markets, the Commission issued its [SIU strategy](#), and with its recent SIU survey the Commission was looking for feedback on integration barriers with a particular focus on new technologies.

Central Securities Depositories (CSDs), as pivotal entities within the financial system, are eager to showcase how they are embracing cutting-edge innovation and undergoing a comprehensive digital transformation.

Their goal is to continuously provide their clients with highly innovative products and services, while steadfastly maintaining the highest standards of safety and resilience.

By embracing advanced technologies such as DLT, artificial intelligence, and cloud computing, CSDs are not only enhancing operational efficiency but also **paving the way of the future digital financial ecosystem and contributing to the Commission’s SIU objectives.**

2. The need for legal certainty

The digital transformation of the financial industry is no longer a distant prospect but a present reality — DLT, cloud computing, and AI — offer significant opportunities for innovation and efficiency. However, they also require a legal, risk, and regulatory framework that addresses these new developments appropriately while fostering competition.

In the field of innovation, more than in others, regulation should evolve in response to practical experience gained by market stakeholders. Not everything can be foreseen from the outset, and experimentation is an inherent part of the journey. **It is essential to maintain legal certainty and safeguard investors' rights through a robust framework that prevents further fragmentation, particularly in areas such as DLT.**

A recent Value Exchange¹ study indicates that for 80% of investors, legal uncertainty is the main barrier to holding digital assets. The same applies for DLT project leaders: we observe that DLT activities tend to concentrate in jurisdictions offering regulatory clarity, with Luxembourg, the UK, and Singapore attracting the majority.

In line with the recent European objectives on **regulatory simplification**, regulation concerning innovative technologies must avoid overlaps, and duplicate regulatory reporting obligations, and should not impose an excessive regulatory burden where existing sectoral regulations already achieve comparable outcomes.

Recent experiences — including the interactions between DORA and the Cyber Resilience Act, as well as the cloud certification scheme — have highlighted the challenges of achieving coherence. These examples illustrate the difficulties in **ensuring alignment across various regulatory initiatives within the broader framework.**

¹ [The Value Exchange – “DLT in the Real World 2024” – Survey Key Findings](#)

3. Resilient market infrastructures continuously embracing innovation

3.1. Framework and resilience

CSDs play a crucial role in the financial system through their three core functions. CSDR defines a CSD as entity which:

- operates a securities settlement service (settlement service)
- records newly issued securities in book-entry system (notary service)
- provides and maintains securities accounts at the top tier level (central maintenance service)

Although the Regulation only requires the performance of the settlement service, AND the notary OR central maintenance service to be authorised as CSD, in practice the vast majority of CSDs perform all three services, ensuring operational consistency of all processes. CSDs operate within a robust regulatory framework that includes the Central Securities Depositories Regulation (CSDR), the Settlement Finality Directive (SFD), the Financial Collateral Directive (FCD), and the Digital Operational Resilience Act (DORA). Additionally, they are subject to a prudential framework for CSDs with banking licenses and comply with Anti-Money Laundering Regulations (AMLR).

All of the above ensures the resilience of these key market infrastructures and has enabled CSDs to support capital markets in facing major crises, such as the 2008 financial crisis, the COVID-19 pandemic, and the Ukraine war, while maintaining the continuity of financial system operations.

CSDs have proven their ability to pair resilience with innovation when engaging in structural market projects such as T2S, ECMS, T+1 and the ECB's wholesale CBDC trials. When considering new technologies, let's focus on how CSDs embrace: **DLT, AI and Cloud computing**.

3.2. CSDs and new technologies

We welcome the opportunities offered by new technologies to enhance processes, offer settlement prediction, shorten deadlines, overcome lengthy reconciliation processes, continue offering better services to our clients as well as offering ways to further harmonize, and integrate the post trade landscape contributing to the SIU objectives.

3.2.1. DLT

CSDs have been testing and experimenting DLT for years, even before the adoption of the DLT Pilot regime, with the aim of identifying use cases, processes and asset classes that could benefit from the core features of DLT based solutions, also setting up collaborations and partnerships among them and with fintechs.

Bonds have emerged as the leading asset class for digital issuance and experimentation. ECSDA members are active in several projects supporting digital bond issuance and settlement — confirming that core capital market instruments are the natural starting point for scalable DLT adoption. Issuance of bonds and other instruments is being worked on, spanning over a full digital trade cycle with securities financing, trading and payments entering the space of DLT use cases.



Experiments & collaborations

ECB trials - CSDs participating

- Clearstream Banking AG
- Clearstream Banning S.A., Luxembourg
- LuxCSD S.A. Luxembourg
- Euroclear Bank
- Iberclear (BME/SIX Group)

DLT Implementations:



Bis Agora Project, DFMI



EURONEXT

First Banque de France digital bond issuance



Central Securities
Depository Prague

DLT Pilot Regime authorization

clearstream

DEUTSCHE BÖRSE
GROUP

Platform DZ

KDPW

The Central Securities
Depository of Poland

KDPW KNF Sandbox and Blockchain Platform for Capital
Markets, General Meetings and eVoting, new CSD on DLT
project



BOLAS Y MERCADOS ESPAÑÓLES

a SIX company

BME, BBVA and IDB issue the first regulated bond in Spain
registered with Blockchain | BME Bolsas y Mercados
Españoles



EURONEXT

Euronext POC in collaboration with Tokeny and
Liquidshare

The successful outcome of ECB trials for wholesale settlement in central bank money marks a significant step towards digital sovereignty and a digital Capital Markets Union. It creates strong momentum for continued exploration and support of DLT solutions, while avoiding additional fragmentation and liquidity splitting in view of establishing an integrated European digital asset market.

Interoperability — both between different DLT ecosystems and with traditional legacy systems — is key to ensure digital assets can move from experimentation to mainstream adoption. The experiments have shown that atomic settlement can be implemented under an interoperability model that leverages programmability.

ECSDA's member-CSDs have successfully participated in the [ECB trials](#). By connecting to all three central bank digital offerings — the Bundesbank, Banque de France, and Banca d'Italia — the trials demonstrated the ability to issue, settle, and redeem primary and secondary market transactions as delivery-versus-payment (DvP) transactions. A total of 64 partners from Germany, Luxembourg, the UK, the Netherlands, Spain, and Italy were involved, testing 40 use cases during the trial period. These included repos (including cleared and intra-day repos), securities, and commercial papers/Eurobonds.

ECSDA members remain key supporters of the cooperation between DLT operators and market participants. They welcome efforts to evolve the progress achieved into a 'transitory solution' as a necessary step toward delivering a European-based long-term solution.

In this context, ECSDA welcomes the recent [announcement of the ECB](#) commitment to distributed ledger technology plans through a dual-track strategy — a path in which the CSD community is eager to participate.

3.2.2. Collaboration with Fintechs

Promoting collaboration between traditional players and younger innovative businesses is essential to embrace innovation. This approach helps achieving the right balance between mature expertise, resilience, and innovation, while also creating opportunities for EU innovative companies to grow within the European Union.

Already in 2021, the [ESMA Report on the use of FinTech by CSDs](#) highlighted that CSDs do not work on the development and implementation of new technologies in isolation, as [10 CSDs out of 17 respondents declared having established partnerships](#) with start-ups and other third parties.



3.2.3. AI

AI capabilities are being tested by CSDs following a gradual and prudent approach, carefully evaluating potential consequences on data safety, risks stemming from biases and hallucinations, and decision-making transparency issues, which require specific governance.

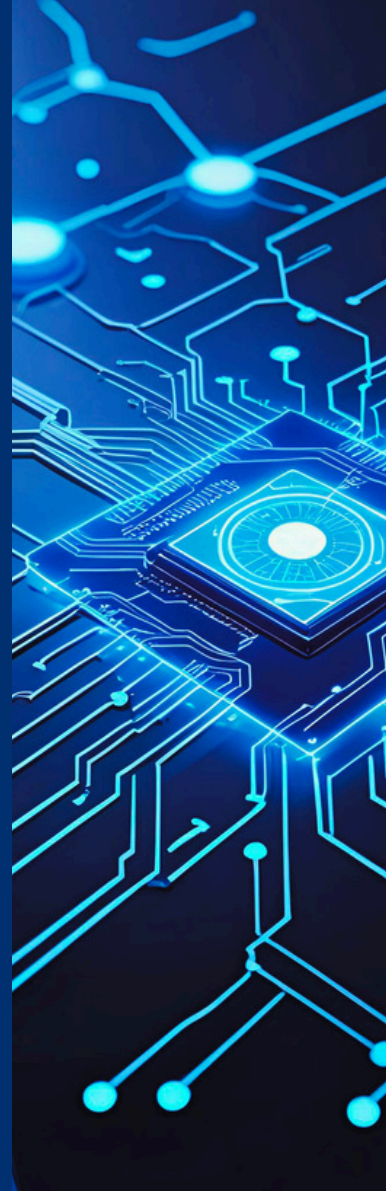
We see use cases emerging in the following areas (detailed table in annex):

- Risk and compliance
- Cybersecurity
- Operational efficiency
- Client services
- Internal corporate functions
- Technology infrastructure

As reliable and risk-averse financial market infrastructures, CSDs should only deploy AI when it clearly enhances reliability and does not introduce undue operational or reputational risk.

The EU AI Act is a comprehensive regulatory framework established to govern the use of artificial intelligence. It is crucial to avoid divergent national interpretations. We see no need to implement the AI Act into post-trade sectoral regulations, which already provide a technology-neutral set of rules on risk management.

Ensuring a level playing field across the EU and globally would be most conducive to the broader adoption of AI technology in the financial industry, especially in the face of intense international competition.



3.2.4. Cloud technology.

Leveraging cloud technology in the financial sector is a crucial prerequisite for fostering innovation. It enables FMIs and all market players to enhance their scalability - a key consideration in the SIU context, improve overall data and application accessibility, reduce their IT costs (as it lessens the need for physical hardware and maintenance), and further strengthen resilience through robust disaster recovery solutions.

As key cloud providers are not European, we observe that some CSDs are facing challenges in adopting cloud technology due to local data location requirements, which should be put into perspective.

CONCLUSIONS

Technology evolution represents a continuum in the evolution of CSDs services. CSDs rely on a strong regulatory and technology neutral framework, which remains adequate, as the purpose of CSDR was to create, at the EU level, a common definition and prudential framework for entities that meet the CSD definition, recognising their systemic market role and ensuring financial market stability.

A change in technology does not warrant alleviating the consistent regulatory framework to which CSDs are subject, nor allowing entrants to offer core CSD services on a different regulatory basis, nor to unbundle them. The principle of *same services, same rules* applies.

We identify the potential for bringing some clarifications to the existing framework to account for new ways of working such as for instance how to define the appropriate conflict of law principle, which should be determined by the place of the Relevant Operating Authority rather than the location of a DLT network node. These clarifications can be brought by second and third level regulations.

In collaboration with state-of-the-art fintechs, CSDs will continue enhancing their offering, reducing costs, and embracing the possibilities offered by the latest technologies. They are technologically neutral as they will leverage the technologies that offer the greatest benefits in terms of client service, cost and implementation time.

Overall, the European principle of technological neutrality ensures that laws and regulations do not favour or discriminate against any specific technology. This principle allows for flexibility and adaptability, ensuring that regulations remain relevant and effective even as technology evolves.



ANNEX

Table: AI Use cases emerging in the CSD Industry

Category	AI Use case	Details
Risk & Compliance	Red flag risk assessments	Automated AI risk checks aligned with the AI Act, promoting early detection & business unit accountability.
	Internal AI governance	AI-enabled controls to manage risks like bias, hallucinations, & opacity—supporting compliant & responsible AI use
	Sanctions, KYC, AML screening	Smart automation of the related processes abd data analysis improving the compliance & risk management
	Legal drafting & research	Generative AI assists with legal documents & research (non-core, internal use)
	Regulatory reporting	AI based drafting of regulatory reports streamlines compliance & reporting processes
	Due diligence in RFPs	AI based assessment of documents used inernally by procurement teams
Cybersecurity	Threat detection & incident response	LLMs used to help in real-time identification & response to cyber threats
Operational Efficiency	Automation of operational processes	Reduction of manual tasks in some operational processes replicating human-like cognitive tasks
	Settlement fail detection	Machine learning tools predict & detect settlement issues
	Liquidity gap prediction	Predictive analytics for better liquidity management
	Exception handling	AI used to assist in managing hight-volume post-trade exceptions
	Matching & settlement monitoring	AI improves data analysis for better oversight
	Collateral optimization	Enhances usage & management of collateral through predictive models
	Corporate actions processing	AI used for smarter automation of corporate action-related tasks
Client Services	Conversational AI	Widely used in client interactions & commercial support
Internal Corporate Functions	HR candidate selection	AI aids in selecting best candidates (internal support function)
	Productivity tools for HR, legal, procurement	Generative AI used for non-core process enhancement
	Finance operations	AI-Powered financial forecasting



+32 230 99 01
info@ecsda.eu
<http://ecsda.eu>

Rue du Congrès 1
1000 Brussels
Belgium