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***A DLT financial market infrastructure under the EU DLT Pilot Regime;
a regulatory tug-of-war.***

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ABSTRACT

The EU legislator has only recently adopted Regulation 2022/858 of the European Parliament and of the Council (DLTR), which introduces a Pilot Regime for market infrastructure based on DLT, more specifically a DLT-MTF or CSD, or in their consolidated version, as a DLT Trading and Settlement System. The new Regulation is inscribed in the EU agenda of promoting and adopting digital innovation, albeit with a cautious approach due to related risks. Nevertheless, certain aspects of DLT that provide opportunities of significant market efficiencies, such as disintermediation and consolidation, can now be implemented, through specific exemptions from standing rules, provided by DLTR. This innovative approach of the EU legislator heavily resembles a ‘regulatory sandbox’, where participants, both supervisors and market actors, can experiment with innovation, for the benefit of the whole financial market. However, this move is, at the same time, ridden with internal restrictions, linked to the EU’s longstanding objective of preserving financial stability. Ultimately, however, this initiative constitutes a step in the right direction, towards a more innovation-friendly and flexible EU Financial Regulation.

Keywords: financial regulation, financial law, capital markets, financial market infrastructure (FMI), distributed ledger technology (DLT), blockchain, digital finance, fintech, DLT financial instruments, crypto-assets, European Union (EU), Digital Finance Strategy 2020 (DFS 2020), European Central Bank (ECB), European Securities and Markets Authority (ESMA), Regulation 2022/858/EU, DLTR, MiFID II, Pilot Regime, sandbox, regulatory, innovation, MTF, CSD, retail participation

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LIST OF ABBREVIATIONS

AML/CFT	Anti-Money Laundering / Counter-financing of Terrorism.
BIS	Bank for International Settlements
CPMI	Committee on Payments and Markets Infrastructures
CPSS	Committee on Payment and Settlement Systems
CSD	Central Security Depository
CSDR	Regulation (EU) No 909/2014 of the European Parliament and of the Council
DeFi	Decentralised Finance
DFS	Digital Finance Strategy
DLT	Distributed Ledger Technology
DLTR	Regulation 2022/858 of the European Parliament and of the Council
DvP	Delivery Versus Payment
EBA	European Banking Authority
ECB	European Central Bank
ESMA	European Securities and Market Authority
EU	European Union
FCA	Financial Conduct Authority (UK)
FMI	Financial Market Infrastructure
IOSCO	International Organisation of Securities Commissions
MiFID II	Directive 2014/65/EU of the European Parliament and of the Councils
MTF	Multilateral Trading Facility
OTF	Organised Trading Facility
P2P	Peer to Peer

PoS	Proof of Stake
PoW	Proof of Work
SSS	Securities Settlement System
TSS	Trading and Settlement System

Introduction

Fintech as a disruption to legacy systems

Financial Technology, or more commonly known by its abbreviation ‘FinTech’ has become synonymous with the term ‘disruption’ in the financial sector. Both market participants and regulators are being forced to take into account its potential in reshaping the structure of the financial system. As per the definition of fintech the FSB, but also the Basel Committee on Banking Supervision considers FinTech to be “technologically enabled financial innovation that could result in new business models, applications, processes, or products with an associated material effect on financial markets and institutions and the provision of financial services”¹. Besides, as noted by the European Commission, innovation is increasingly taking a digital form, which makes it easier for new and/or existing businesses to grow, accelerating in turn the innovation cycle².

Often, the introduction of a new technology necessitates a change in market structure. The regulatory treatment of crypto-assets and their underlying technology (‘DLT’) has thus troubled regulators, especially after the proliferation of the provision of such financial services in the two crypto-booms of 2018 and 2021. This however should not come as a surprise given the many legal ambiguities that this technology poses to a regulatory framework developed and adopted with legacy technology in mind³. Besides, one cannot overlook DLT’s ability to enhance the efficiency of financial markets and relevant infrastructure⁴.

The Commission signaled in 2018 via its ‘Fintech Action Plan’⁵ its determination to support the uptake of technological innovation in the financial sector, inter alia, through an EU blockchain initiative, although acknowledging that, at the time, Distributed Ledger Technology was at a [much more] nascent stage. Following on its promise, on 24 September 2020, the Commission came out with its ambitious Digital Finance Package, which included legislative

¹ BIS 2018.

² COM(2020) 591 final.

³ DLTR, Recital (4)

⁴ As will be discussed further below under 2.-.-)

⁵ COM/2018/0109 final

proposals on crypto-assets and a pilot regime for market infrastructures that wish to trade and settle transactions of financial instruments in crypto-asset form⁶. In a remarkable turn to up to then practice, the Commission opted to follow a regulatory sandbox approach in order for regulators and participants to gain experience on the use of distributed ledger technology in insulated though real market setting. After inter-institutional deliberations, the Parliament voted on the final agreement on 24 March 2022. On 30 May the final act was signed and on 2 June 2022 Regulation 2022/858 of the European Parliament and of the Council was published in the official journal. It shall apply from 23 March 2023⁷.

I. A necessary background on DLTR

1.1 DLTR objectives related to DFS 2020

The DFS 2020 had identified four priorities for the European Legislator to act upon. These are:

- i) Tackling fragmentation in the Digital Single Market:
- ii) Ensuring the EU regulatory framework facilitates digital innovation
- iii) Promoting data-driven innovation and data sharing, and
- iv) Addressing new challenges associated with the digital transformation.

The initiative for a Pilot Regime for the trading and settlement of securities on DLT was inscribed in the Commission's DFS 2020 second objective, out of all four. However, while promoting digital innovation⁸ is certainly the main drive for this legislation, it help to put (DLTR) into perspective with the rest of EU's regulatory objectives, as stipulated in the Communication. It is important to situate the recently adopted Regulation inside the regulatory matrix, in order to define a specific target state upon which ESMA's assessment of the pilot regime, under Art.14§1 DLTR, will be based. A more systematic reading of the adopted

⁶ DFS 2020, Press Release, accessible at: https://ec.europa.eu/commission/presscorner/detail/en/IP_20_1684

⁷ DLTR, Art.19.

⁸ *'Fit for the digital age'*; DLTR, Recital (1).

Regulation in conjunction with the Commission’s DFS 2020 objectives suggests that the new piece of legislation also addresses priority number one, as well as number four⁹.

The concern for fragmentation in the Single Market is two-fold. Firstly, it relates to the interoperability of technologies in the application of digital identities. This does in fact go beyond the objective of the DLT-Regulation, because of the embedded difficulties in the development of interoperable DLT arrangements. Such a shortcoming had been already identified by the ECB’s 2021 Advisory Group on Market Infrastructures for Securities and Collateral and its Advisory Group on Market Infrastructures for Payments¹⁰ and is indeed acknowledged by the European legislator in the recital of the Regulation¹¹.

The second fragmentation concern calls for facilitating the scaling up of digital financial services across the Single Market¹² and in particular enabling the provision of cross-border services. The way to achieve this is through the ‘EU passport’, which is based on the understanding that common rules apply throughout the Union and in each Member State. It also demands that the supervision of digital financial services be as uniform as possible. That could only be achieved through, on the one hand, a uniform set of rules on the European level and, on the other hand, the enhanced cooperation between the relevant authorities which in turn would also engage them in a learning process from which they would acquire the necessary skills to do so¹³; otherwise, it is not clear as to how national competent authorities will be able to cope with the complexities of digital finance¹⁴. As will be discussed further below, the Regulation does include such consideration, in one hand, by introducing Union-wide authorisation (permission) for the deployment of DLT-FMIs, and on the other hand by upgrading the role of ESMA. However, Directive 2014/65/EU of the European Parliament and of the Council (MIFID II) being a Directive, the definition of a financial instrument under it may vary across different implementing jurisdictions¹⁵.

Yet, the main new challenges associated with the digital transformation, when it comes to financial services, are without a doubt addressing concerns regarding the safeguarding of

⁹ Zetzsche et al., 2022, p.236.

¹⁰ ECB 2021, chapter 1.3.

¹¹ DLTR, Recital (5).

¹² COM (2020) 591 final.

¹³ Ibid, note 6.

¹⁴ Ringe et Ruolf 2020a, guided sandbox article

¹⁵ ECB 2020, p.4

financial stability and market integrity Furthermore, a level playing field should be ensured to both FinTech and legacy companies following the ‘same activity, same risks, same rules’ approach, which is derived by the technological neutrality principle guiding the Union’s actions. What is more, consumer (/investor) protection remains of paramount importance¹⁶. These considerations are indeed noted in the recital of DLTR¹⁷.

However, these principles are not weighted against each other. This could create friction when each Member State’s Competent Authority considers granting or refusing the specific permission to participate in the sandbox regime. Even so, it is reasonable that the legislator has opted for an open-ended wording, given its interconnectedness to the current regulatory framework and the restricted nature of the pilot Regime in terms of aggregate value and operational time.

Therefore, these are significant aspects that should be taken into account when reading through the provisions of the Regulation and, certainly, when specific exemptions would be requested by market participants and (potentially) awarded by the supervisors.

1.2 The sandbox approach

It is important to keep in mind that regulation of ‘FinTech’ services faces a double challenge, making it a real regulatory *enjeux*: on the one hand, the regulator must try to keep pace with innovation and facilitate new market entries while, on the other hand, understand and manage, possibly *ex ante*, the regulatory risks that are involved¹⁸. Preemptively regulating puts all market players, be it regulator, supervisor or participant, in a precarious position where rules may not address risks adequately; that is, overextending their reach, to hamper innovation, or having too little of that, allowing dangerous situation that could potentially threaten financial stability.

Besides, in the context of EU, legislature procedure is governed by bureaucracy, which, although put in place as a democratic safeguard, is notoriously slow to deliver a final product. However, in the context of DLTR, that procedure is already fruitful, as a result, this study will not address any shortcomings related to it.

¹⁶ COM(2020) 591 final, point 4.

¹⁷ DLTR, Recital (2), (10).

¹⁸ Ringe et Ruolf 2020a, p.604.

As such, a ‘sandbox’¹⁹, where participants can experiment in a – regulatory – safe space has been lauded as a means of best integration of FinTech into the heavily regulated financial system.

Regulatory ‘sandboxes’ provide financial institutions and non-financial firms with a controlled space in which they can test innovative FinTech solutions with the support of an authority for a limited period of time, allowing them to validate and test their business model in a safe environment²⁰

The objective is twofold: experimenting in close-to-real market conditions and engaging in a constructive dialogue between sandbox participants, i.e. supervisors and supervisee, identifying best practices, with the aim, especially in the case of FinTech, of reducing, or better yet eliminating, legal uncertainty²¹; and on the other hand, protecting consumers and the financial stability at large by limiting the exposure of consumers of these new services and technologies. The success of this approach is evidenced by the fact that this pioneering idea, first put into practise by the FCA²², has turned London into the FinTech capital of the world (at least pre-Brexit). The European legislator, although not as quick to react, has finally produced their idea of a sandbox, through DLTR.

This study, will continue by exploring current market structure with the aim to identify why and how DLT as a FMI will serve any benefits, if any, when taking into account the risks it involves. An in-depth analysis of DLTR will follow in the third section; finally, some comments will be made on the suitability of DLTR Pilot Regime as a regulatory sandbox, based on the (limited but) existing literature.

¹⁹ For the sake of clarity, the terms ‘sandbox’ and ‘pilot regime’ are used interchangeably in the current study, as the author doesn’t see any merit in the context of this study. However, some writers prefer to differentiate between them. For a brief overview of those differences, see McCarthy 2022, p.290.

²⁰ EBA Discussion Paper, 2017/02. p.7

²¹ Ringe and Ruof 2020, p.612.

²² Although the Financial Conduct Authority was the first to implement such a novel tool, other regulatory authorities have since followed suit, e.g. the Honk Cong Monetary Authority, or he e Australian Securities and Investments Commission. For information purposes, see FCA’s website <https://www.fca.org.uk/firms/regulatory-sandbox> accessed 31/10/2022.

II. DLT as Financial Market Infrastructure: a regulatory *enjeux*

Given that DLTR proposes a partial structural overhaul of the current legacy system, there is merit in looking at the financial market infrastructure landscape, in order to extract the necessary context, before diving in the specific provisions of the Regulation.

2.1 Legacy Market Infrastructures: the tiered market structure

The current market structure involves various actors, each one operating on different layers. This in turn means that the process of a financial transaction is two-fold. The first thing to happen is the matching of opposing interests resulting in a contract; after that²³, the security must be credited to the buyer in exchange for a payment to the seller.

The first layer, where multiple third-party buying and selling interests in financial instruments interact with each other, is the Trading Venue. The EU Markets in Financial Instruments Directive (MIFID II introduces three regulated types of facilities where such trading takes place. These are:

- i) a ‘Regulated Market’²⁴, which specifically is the multilateral system operated and/or managed by a market operator, which matches buying and selling interests in accordance with non-discretionary rules – in a way that results in a contract, e.g. a traditional stock exchange
- ii) a ‘Multilateral Trading Facility’²⁵, which in principle functions just like a Regulated Market, whose operator, however, can also be an investment firm.
- iii) an ‘Organised Trading Facility’²⁶, whose main differentiating trait are the discretionary rules applying in interest-matching. What is more, it can only admit non-equities.

This is where the first leg of a financial transaction is performed.

A financial transaction involving securities requires, beyond the confirmation of trade terms, the subsequent clearing²⁷ and settlement²⁸. These functions, which represent the post-trade

²³ In the case where the transaction involves a security.

²⁴ MiFID, Art.4§21.

²⁵ Ibid, §22.

²⁶ Ibid, §23.

²⁷ See: CPSS 2003 glossary, p.13: clearing is the process of transmitting, reconciling and, in some cases, confirming payment orders or security transfer instructions prior to settlement.

²⁸ Ibid, p.45: settlement is the completion of a transaction, wherein the seller transfers securities or financial instruments to the buyer and the buyer transfers money to the seller.

environment²⁹ are performed by the [Financial] Market Infrastructures. The definition given to a FMI according to the Bank for International Settlements, in its '*Principles for financial market infrastructures*' document, is of a multilateral system among participating institutions, including the operator of the system, used for the purposes of clearing, settling, or recording payments, securities, derivatives, or other financial transactions³⁰. They include payment systems, central counterparty clearing houses, central securities depositories (CSDs), securities settlement systems (SSSs), and trade repositories. In most cases, these post-trade functions are carried out through different financial intermediaries who operate these systems with aim of ensuring their smooth operation. Also, FMIs need to account for the risk arising from the undertaking of such activities³¹, by taking measures to mitigate it.

Put simply, in a legacy framework, the end-user, in this case the investor, be it a household or a business, orders the initiation of a transaction to their financial intermediary³², who then in turn interacts with other intermediaries and through FMIs, in order for the transaction to be completed; that is, cleared and settled, through a Securities Settlement System³³.

2.1.1 Role of a Central Security Depository:

Under the broad definition of the CPSS-IOSCO principles³⁴, a Central Securities Depository (CSD) is an entity that provides securities accounts, central safekeeping services, and plays a significant role in ensuring the integrity of securities issues. A CSD can hold securities either in physical form or in dematerialised – book-entry form (that is, they exist only as electronic records). The precise activities of a CSD vary based on jurisdiction and market practices. Indeed, a CSD under the current EU legislation³⁵ is a legal person that on top of either a notary or a central maintenance service, operates an SSS.

In practice, when a securities transaction takes place, clearing and settlement takes place through a clearing and settlement leg. The CSD first verifies that the seller is indeed the holder of that security, so that the name of the new owner (buyer) may now be registered in its ledger. After the

²⁹ As opposed to the trade environment, where the matching of orders occurs.

³⁰ BIS-IOSCO 2012, p.7.

³¹ Ibid, p.18.

³² Under MiFID II, only authorised entities can transact in regulated trading venues. See below 3.1.1

³³ Ibid supra note 27, p.46 : a [S]SS is a system used to facilitate the settlement of transfers of funds or financial instruments.

³⁴ BIS-IOSCO 2012, p.8.

³⁵ Regulation (EU) No 909/2014 of the European Parliament and of the Council (CSDR), Art.2§2.

clearing, the transaction price is deducted from the buyer's bank account and credited to that of the sellers. The procedure gets more complicated when either the buyer or seller don't hold accounts with the same institution, as the CSD involved. In that case, the transmission of funds must be reflected in multiple subordinate ledgers³⁶. This process can take up to 3 business days³⁷. In the meantime, the security or the payment can be held as collateral and may not be able for further transactions, although that is not always the case.

As the complexity of the financial system's structure and the transaction volume have increased, frictions have been identified in the form of cost inefficiencies, which bear both a higher cost and increased risk when transacting in these markets³⁸. Solutions to these inefficiencies have come with technological development, which in turn may necessitate, as mentioned above, a change in market structure. Distributed Ledger Technology has indeed been identified as a means to mitigate existing frictions in clearing and settlement, though it may very well require such structural change.

³⁶ See Figure 1 to illustrate.

³⁷ Morten Bech et al., 2020, p.6.

³⁸ David Mills et al. 2016, p.8

2.2 DLT Market Infrastructure: associated benefits and challenges.

In comparison to centralised ledgers, under which existing FMIs operate, a ‘distributed ledger’ is a type of database (or information repository), that is shared across nodes in a network, which may [or may not] be spread across multiple geographies and entities³⁹. Transactions are synchronised across all network nodes via predefined consensus mechanisms. That means that the rewriting of data can only be achieved if the majority of data-storage points (i.e., nodes) agree on such revision. The fact that the ledger can be accessed by each participating node results in each node being a witness (or even a validator) to every transaction⁴⁰. Also, given that authorisation and recording of new transactions on the common ledger is governed by a software-driven consensus mechanism, [together with sophisticated cryptography applications], trusting a third-party to validate transactions, is made redundant⁴¹. As a consequence, Peer to Peer (P2P) interactions, such as data management or messaging, are made possible in such network.

Distributed Ledger Technology⁴² (DLT) is in turn the technology behind the operation of such distributed ledgers. While ‘blockchain’ refers to the timing and distribution of transactions registered on the ledger by incorporating them into sequential blocks⁴³, DLT is only a consensus mechanism through a multi-party system in which participants agree on a set of shared data and its validity.⁴⁴

DLT networks have their own unique governance features, which are ‘hard-coded’ in the protocol and as a result are categorised, on a first layer, as either:

- public or private, a distinction reflecting the conditions under which an entity has access to the ledger, as well as their capacity to initiate a transaction on the network⁴⁵. An example of such configuration is the Bitcoin protocol.

and on a second layer, as either:

³⁹ This study will not delve on technicalities of the technology. For an accurate representation of DLT, see, P. De Filippi & A. Wright, *Blockchain and the law* 2018, at 13–57.

⁴⁰ Ibid.

⁴¹ It is argued supra note 39 that DLT offers in fact a new type of governance, challenging traditional structures.

⁴² Blockchain is a type of DLT; the umbrella term ‘DLT’ is used in this paper. Besides, the term is not even used once in DLTR.

⁴³ Ibid, supra 39

⁴⁴ M Rauchs et al, 2018 p.19.

⁴⁵ Benos et al 2019, p.124

- permissionless or permissioned, which refers to the restrictions of a DLT network in its membership and control procedures. An intrinsic configuration defines each participant's role in which members can add and/or validate information on the ledger, or approve admission of new members⁴⁶. An example of a permissioned protocol is Ripple.

Each configuration presents both opportunities and challenges. Going by each one would be lengthy and extend beyond the scope of this study. However, it suffices to state that proper governance of any market infrastructure is important to ensure its safety and efficiency⁴⁷. Also, GDPR concerns, as well as frictions regarding intellectual property and business secrets are evidently present in a public, permissionless setting. Consequently, only a private and permissioned DLT protocol is compatible with the market structure envisioned in DLTR and as such further analysis will only account for that configuration.

2.3 Opportunities of a FMI operated under DLT:

The conversation around a DLT FMIs is based on the broad array of supposed benefits that its employment may entail for market participants. This paper will briefly mention some of the most prominent ones with the aim of illustrating the value derived from the implementation of a DLT FMI, as envisioned by the EU legislator in DLTR.

Compared to legacy technology, a DLT setting presents significant potential arising from the speed of transaction (2.3.1), disintermediation (2.3.2), better risk management (2.3.3) and operational resilience (2.3.4).

2.3.1 Transaction time

One of the greatest benefits of using DLT is substantial efficiency gains within the settlement process. Assets are most commonly being settled under a 'free-delivery' system, where one party delivers (an asset) or pays (the corresponding amount) prior to the receipt of the payment or the asset. As this process can take even up to 3 business days, the clearing house, in the meantime, faces increased risks⁴⁸, more specifically credit and liquidity risk⁴⁹. The alternative is a 'Delivery versus Payment' (DvP) model, where the exchange is made simultaneously. In a DLT environment, securities could be settled on a DvP basis, thanks to DLT

⁴⁶ Kean Wu et al. 2019, p.4.

⁴⁷ ECB 2019 (review for page)

⁴⁸ Risks are referred to per the taxonomy of CPMI-IOSCO 2012 principles.

⁴⁹ BIS 2012, p.19

sophistication and automated consensus mechanisms⁵⁰. DvP settlement manages to almost eliminate liquidity risk, even though credit risk is only reduced⁵¹. Still, it is argued that for financial instruments other than derivatives where the contract execution is at a later stage, being able to require the availability of securities and cash would eliminate liquidity and credit risk from any trade executed for immediate delivery⁵². It is important to add, though, that most up-to-date legacy systems can offer DvP⁵³. Nevertheless, added value isn't guaranteed to be extracted because of traditional cumbersome back-office processes and siloed databases⁵⁴. Under the current framework, a transaction needs to be reflected on multiple ledgers, because of the multi-layered post-trade environment.

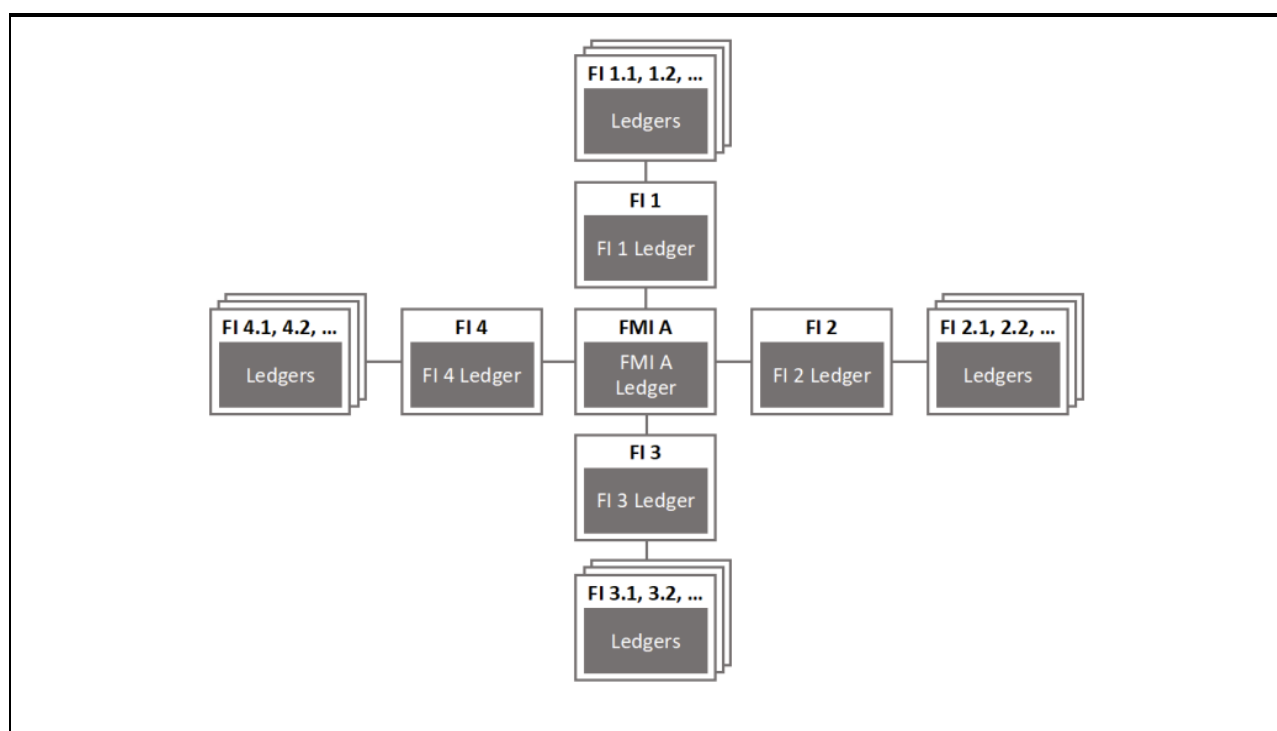


Figure 1⁵⁵:

Current FMI framework: each Financial Institution must update their ledger in accordance with the hierarchical master copy, to reflect a new financial transaction.
 In comparison, in a DLT arrangement a common ledger is shared across the network, *making multiple reconciliations redundant.*

⁵⁰ ECB, 2016

⁵¹ ECB 2021, p.27; only pre-funded transactions eliminate this risk.

⁵² Ibid supra note 50, p.26

⁵³ A notable example is 'Target2Securities' and the (privately owned) 'Euroclear' clearing house.

⁵⁴ Zetzsche et al. 2020, p.217 at footnote 23.

⁵⁵ Mills et al. p.7

Therefore, achieving high transaction-speeds is not limited to DTL configurations. However, DLT-based systems could be adopted with the aim of standardising and streamlining processes, leading to cost and time savings by reducing unnecessary duplication of activities⁵⁶, if the FMI operates under a common ledger. The prospect for DLT to make reconciliation on multiple ledgers redundant has the potential to bring an even speedier settlement finality to transactions processed by [DLT] FMIs.

2.3.2 Disintermediation

By reference to the previous point, many current back-office processes that are hosted in different intermediaries (e.g. Clearing members, Custodians, multiple CSDs which in turn hold accounts in multiple credit institutions) can be made redundant through the use of a common and commonly accessible, immutable database. DLT provides for such ledger, without relying on multiple third-parties⁵⁷. This could potentially decrease the cost associated with clearing and settlement borne by the end-user⁵⁸. However, it could only entail changes in the way costs are allocated among participants⁵⁹.

What is more, P2P transactions have made bringing both trade and post-trade environment on a DLT arrangement possible. The crediting and debiting of investors' securities accounts could be performed with the same cost and time efficiency as that with which internalised settlement is currently conducted in the accounts of custodian banks⁶⁰. To illustrate:

⁵⁶ See: Benos et al 2019, p.130.

⁵⁷ In permissioned DLT arrangements, some level of trust still exists, however, since the master operator could in fact forge new entries in the database.

⁵⁸ Euroclear Sweden charges of 2021 are not trivial (*as of 31/10/2022*).

⁵⁹ BIS 2017, at chapter 3.2.2 (*CPMI, Distributed ledger technology in payment, clearing and settlement, BIS 2017*).

⁶⁰ ECB 2016, p.30.

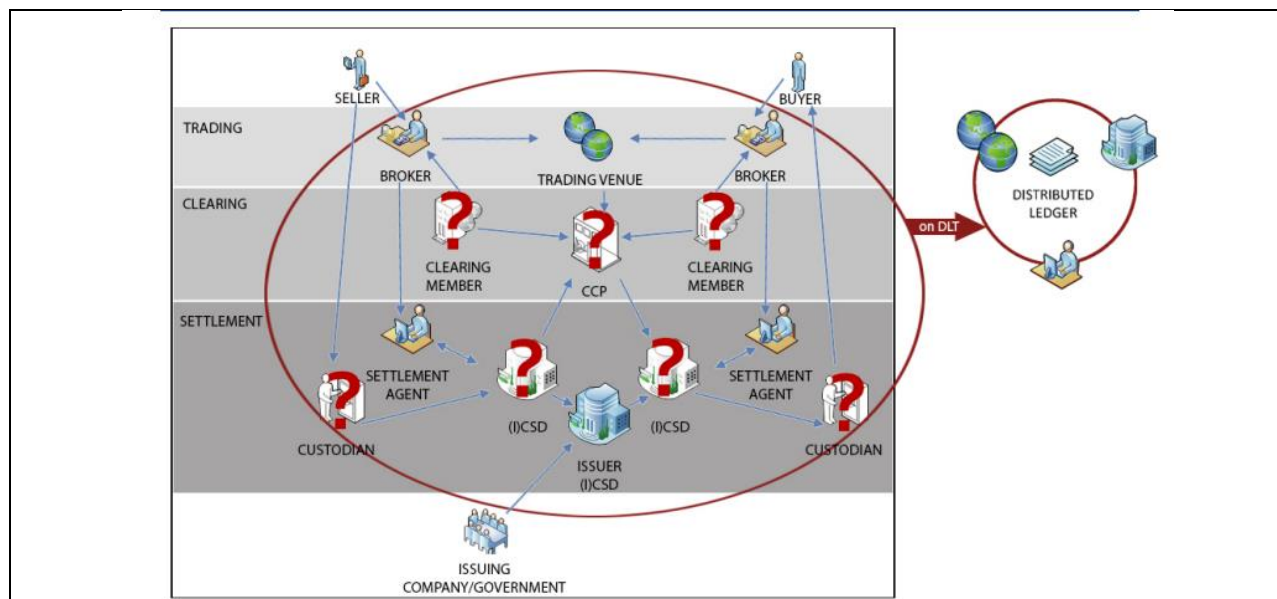


Figure 2⁶¹:

Trade and post-trade environment have migrated to DLT. This does not mean that financial intermediation services are precluded, but intermediation is expected to happen outside the DLT network that is used for [trading and] settlement.

This market structure has been made possible by DLTR via the introduction of a DLT Trading and Settlement System (DLT TSS)⁶².

2.3.3 Efficient risk-management

By performing centralised activities, traditional FMIs concentrate risks and create interdependencies between and among FMIs and participating institutions. DLT arrangements support better risk management and risk mitigation⁶³.

As already outlined above, a FMI operating on a DvP basis can better manage credit risk, while also freeing up liquidity for its participants, since assets needn't be held as collateral until the settlement.

Furthermore, DLT holds promising potential in alleviating and better managing systemic risk. The benefits should extend across securities markets by the alleviation of systemic risk,

⁶¹ Ibid, Diagram 2.

⁶² See below 3.5

⁶³ BIS-IOSCO 2012, p.8

depending on the degree of prior reliance on particular counterparties and CSDs⁶⁴. DLT may also present benefits in addressing interconnectedness relates systemic risk⁶⁵.

Another key area, where DLT holds great promise is security and reliability of the infrastructure in question⁶⁶. The distributed nature of its design, with the use of multiple synchronised ledgers and multiple processing nodes, has the potential to reduce the risk of a single point-of-failure⁶⁷. Also, even if a node experiences down-time, the ledger can be maintained by other operational nodes. Cryptography shields the ledger from unauthorised and malevolent actions⁶⁸, reducing costs related to operational risks from cyber-attacks. Distributed ledgers address these problems by raising the barrier for manipulation. The underlying technology requires the consensus of most (if all) data storage points ('nodes'). The effort necessary to manipulate all the linked servers will be to the multitude of connected nodes; in comparison a centralised database may only be manipulated through its single entry⁶⁹.

2.3.4 Efficiency gains

Certain features of DLT could allow for efficiency gains in a market settings. DLT can deliver concurrent communication of real-time information to multiple parties⁷⁰, be it order originators, market participants or market supervisors, thus solidifying trust in the capital markets via increased transparency. Furthermore, asset servicing instructions in securities could benefit from smart contract-driven execution. Nevertheless, the complexity of the code and potential bugs may mean that additional steps may be required before execution in a real-life scenario. Even so, DLTR contains provisions regulating liability from the use of smart contracts, implying that their employment in the sandbox is indeed possible.

⁶⁴ McCarthy 2022, p.302

⁶⁵ E Avgouleas and A Kiayias, 2019 at ch.2.

⁶⁶ BIS 2017, pp.14-19

⁶⁷ A single point of failure (SPOF) is a part of a system that, if it fails, will stop the entire system from working.

⁶⁸ At least at the current technological status quo. Quantum computing could new raise challenges to cyber-security.

⁶⁹ Zetzsche et al., 2022, p215.

⁷⁰ ECB 2021, p.24

2.4 Caveat

All the above benefits would reach their maximum potential should the model for a DLT FMI allows for settlement via cash-on-chain, a point iterated by all ECB reports⁷¹. The European Legislator in fact seems to have been aware of this issue. Since there isn't a compatible way for a DLT Settlement System (SS) to settle in central bank money⁷², at least for now, and although leaning favorably towards central bank money settlement, they [the legislator] have provisioned for settlement to also take place in commercial bank money and notably in tokenised form⁷³. This allows for a DLT FMI to be operational even before the entry into force of Markets in Crypto-Assets Regulation⁷⁴, that would provide the regulatory background for the use of 'e-money tokens' in settlement.

2.5 Risks arising from the use of DLT arrangements

DLT is still in its nascent form. Although policy makers have rushed to experiment or even adopt⁷⁵ legal frameworks making use of this promising technology, however the fact remains that DLT cannot remedy but some legacy technology shortcomings and mitigate only specific risks. What is more, adoption of DLT adds to the list of risks and challenges that regulators should be aware, especially when it is used as a FMI. Thanks to the wide and constant research output, the risk profile of DLT has been well documented; as far as FMI related risks are concerned, this paper identifies three major risk groups: technical (1), legal (2) and climate related (3).

2.5.1 Technical Issues:

Cyber-Attack:

Some technical issues relating to the nascent nature of DLT could become detrimental to policy makers' attempts to harvest its potential. In that vein, one cannot overlook the challenge

⁷¹ ECB 2016, 2017, 2019 and 2021.

⁷² DLTR, Recital (34)

⁷³ Ibid, Art.5§8

⁷⁴ Proposal for a Regulation of the European Parliament and of the Council on Markets in Crypto-assets, COM(2020) 593 final

⁷⁵ In the case of Lichtenstein and its 'Blockchain Law': '*Token and Trusted Technology Service Provider Act*', in force since 1 January 2020, introducing tokenisation to its legal framework.

faced by DLT protocols in regard to their ability to handle numerous transactions per second. Risks arise from the overloading of the network from within, as a result of, both, benevolent (e.g. high transaction volume) and malevolent actions⁷⁶ (e.g. Distributed Denial of Service attacks⁷⁷), meaning in fact cyber-attacks. The vulnerability to a cyber-attack is also directly related to bugs and flaws in the DLT protocol that could be exploited, if discovered. Also, 51% attacks⁷⁸ pose a significant risk to the tamper-free and immutable character of the distributed ledger and as a result to its credibility as sound alternative to disintermediation.

Irrevocability of transactions

Unrelated to attempts of malicious actors, is the risk that bugs, or false data provided by oracle applications, which may hamper smart-contract execution, should such arrangement be implemented in a DLT protocol. Given that in most running protocols smart-contracts⁷⁹ are designed to be immutable, that also poses a problem to the orderly function of a FMI, when these contracts exhibit bugs or are products of manipulation or even coercion. Following this previous point, there is a real need to address the rectification of transactions⁸⁰. Given the decentralised nature of DLT, where communication between nodes may not always be possible or fruitful, and the immutability and irrevocability of the ledger, addressing this risk should be a high priority for regulators. In practice, this could be ensured by maintaining sound governance arrangements within each DLT FMI.

Interoperability

Different approaches to DLT arrangements and proprietary protocols – not interoperable to one another, as is the current landscape – are to be expected in a unregulated environment with only marginal real use-cases. However, the eagerness with which policy makers have embraced DLT may fall short of its promise if this technological fragmentation insists. Standardisation and common rules on a broader set of features and technical aspects are needed for the different

⁷⁶ Although it should be expected that the admission of incumbent firms as market participants, in a permissioned protocol, would at least mitigate such a threat.

⁷⁷ This kind of attack aims to overwhelm a web server, to disrupt normal traffic and therefore impair its use by the user.

⁷⁸ This kind of attack aims to tamper the ledger via manipulating the consensus mechanism of a DLT protocol.

⁷⁹ For a critical view on smart-contracts see instead of many: Andres Guadamuz: *All watched over by machines of loving grace: A critical look at smart contracts*, Computer Law & Security Review Volume 35, Issue 6, November 2019)

⁸⁰ ECB 2021, at.3.2.3.3 p.25 & ECB 2019, p19.

systems to interact smoothly with each other, both in a DLT-legacy and a DLT₁-DLT₂ setting⁸¹. Most importantly, uniformity should apply in rules for smooth interactions⁸², e.g. for messaging.

Unlocking interoperability between systems will therefore influence the uptake of DLT-based solutions, by whether it is possible for them to interact with each other and with the existing environment⁸³. Otherwise, current lack of interoperability across DLT-based solutions developed in the post-trade area may give rise to market fragmentation, representing a challenge to harmonisation goals. What is more, considering the implementation of tokenisation of real-world assets may aggravate problems such as market liquidity fragmentation and double spending, as a result of lack of interoperable interfaces between DLT and legacy systems⁸⁴.

Overreliance on a limited set of technology providers

The development, operation and upkeep of DLT technology requires a level of sophistication and expertise which only a limited number of individuals or companies possess. DLT FMI technology providers, or DLT FMI entities themselves are likely to be concentrated among few competent companies which, without any regulation, could result in inefficient pricing, with service providers capturing much of the market surplus, as well as unintended consequences due to regulatory ignorance towards these technologies⁸⁵.

Overreliance in those entities raises issues ranging from insufficient market competition, such as monopoly pricing or price discrimination, to the technological dependency of EU markets to overseas actors, as is already alarmingly the case for retail digital payment systems⁸⁶

Technological illiteracy further exacerbates the matter⁸⁷.

2.5.2. Legal ambiguities

Governance Risks

⁸¹ ECB 2021, p.10.

⁸² Comparable to the ISO 9362 business codes operated by entities in the SWIFT network.

⁸³ Ibid, supra note 81.

⁸⁴ Ibid, p.12.

⁸⁵ Zetzsche et al. 2022, p.218, characterized as ‘knowledge risk’. The issue of over-centralisation of technological know-how has been already highlighted in their previous work (Zetzsche et al 2018).

For a concise analysis of the issue see: Benos et al. 2019, p.135 ff.

⁸⁶ Highlighted by Fabio Panetta in his introductory statement to the EU Parliament ECON, on 15 June 2022 (accessible at: <https://www.ecb.europa.eu/press/key/date/2022/html/ecb.sp220615~0b859eb8bc.en.html>).

⁸⁷ Ibid supra note 85

The intense legislative activity around crypto-assets and DLT in general, demonstrates that the current legal landscape was not made with DLT in mind. The matter is further complicated by the EU legislator's rule-based approach. There are key DLT features that could create friction with existing law. These originate from the multiple data-points required in a DLT protocol, which in turn create issues around data-privacy, outsourcing, jurisdiction and ultimately liability⁸⁸. These issues remain even in the case of a permissioned DLT arrangement. Even though it is worth keeping in mind that multiple nodes can be set up and operated by the same entity (which would ease concerns about the aforementioned areas), nevertheless, precluding any other business models from accessing the pilot market would go against the EU's innovation goal. Regulators should set and safeguard a minimum threshold of protection, leaving market actors to decide upon the finer details. Indeed, this has been the regulatory approach of the EU legislator with regard to DLTR, by allowing exemptions where the objective of the provision in respect of which an exemption is requested, are met. Therefore, all above concerns could be summed up as *governance risks*, which in turn can be addressed through [governance] arrangements pertaining to the business plan of a DLT FMI and are thus not legal concerns per se. All the above issues are key points that a governance model should address in advance⁸⁹.

2.5.3. Climate considerations

Aside from the notoriety as the first and biggest (in terms of market capitalisation) crypto-asset, Bitcoin also made headlines on a different front. The energy required to keep its network operational was, in 2022, at a whopping 127TWh⁹⁰. This has prompted sustainability concerns over the energy expenditure of DLT-related computational tasks. Energy consumption is directly related to the architecture of the network and does not necessarily reflect its scale. A distinction is drawn between energy hungry Proof of Work (PoW) protocols on the one hand, and on the other, the sustainable Proof of Stake (PoS) protocols⁹¹. The EU legislator explicitly encourages

⁸⁸ Zetzsche et al. 2022 p.217

⁸⁹ See chapter 3.2 where the governance model and specific arrangements are discussed.

⁹⁰ <https://www.forbes.com/advisor/investing/cryptocurrency/bitcoins-energy-usage-explained/>, accessed on 31/10/2022. The energy needs of the protocol outweigh those of Norway.

⁹¹ The distinction relates to each protocol's consensus mechanisms.

the development of, and investment in, low-emission or zero-emission DLT⁹², in a way precluding FMIs from operating under a PoW consensus mechanism.

2.6 Caveat

As new solutions may emerge in response to evolving market needs, an important consideration for investors, banks and FMI operators that may want to adopt DLT is how significant the expected cost improvements are compared with the investments required⁹³. There is ultimately very little that could be achieved by allowing a technology the opportunity to prove itself if the technology may not be believed in by market operators⁹⁴.

III. The EU legislator's vision of a DLT-FMI

As the above brief analysis has showed, any policy maker looking to harvest the promise a DLT-based FMI presents, is faced with major hurdles. It is a tough balancing act where, on the one hand stands the need for innovation, demanding at least a certain degree of deviation from current legal arrangements, while on the other hand are situated the safeguarding of financial stability, market integrity and investor protection⁹⁵. At their intersection (as has been defined by the European legislator) stands the recently adopted Regulation on a pilot regime for market infrastructures based on DLT.

In this third part of the study, the Regulation's scope and main provisions will be outlined and examined in depth. Understanding the regulatory matrix, which necessarily extends beyond the provisions of this Regulation, will be important in order to discuss aspects relating to its nature as a regulatory sandbox.

⁹² DLTR, Recital (61)

⁹³ ECB 2021, p.27

⁹⁴ McCarthy 2022, p.289.

⁹⁵ These are traditional financial regulation objectives.

3.1 Scope and definitions

The ambitious (or withheld, depending on the perspective) DLT Regulation meticulously defines the regulatory safe space. The framework envisaged through the proposal serves as an experiment in the complexities involved when determining the extent of a pilot regime and the allocation of supervisory responsibilities. It does so with the aim of achieving the EU set goals. In this regard, it has *two addressees*⁹⁶; the market participants, which are invited to join the pilot regime and the supervisory authorities – national competent authorities and ESMA – the latter of which, as will be discussed below, assumes a more commanding role.

3.1.1 Participants

The DLT Regulation does not introduce a new definition of FMIs or a new set of market participants. Instead, *it relies on existing FMI concepts*, only allowing, as a result, for a legacy MTF or an SSS to be operated under DLT arrangements⁹⁷. A DLT-MTF and a DLT-SSS, being in principle the same market structures defined in MiFID II⁹⁸ and CSDR⁹⁹ correspondingly, follow the same rules and limitations imposed on their legacy counterparts. As such, only incumbent firms, i.e. investment firms and [regulated] ‘market operators’¹⁰⁰ and CSDs¹⁰¹ can operate a DLT FMI. In addition to it, a specific permission is required, which means that financial institutions cannot operate a DLT FMI at their own discretion.

3.1.2 Distributed Ledger Technology

In the emerging field of DLT computer science, where different terms are used interchangeably and strict taxonomy hasn’t been established¹⁰², clarity is needed when it comes to legislative definitions. Marking a change from the original EU Commission proposal¹⁰³, which would have been too broad for legal clarity, ‘DLT’ now enjoys a tighter definition closer to its actual features: *a technology that enables the operation and use of distributed ledgers*¹⁰⁴. Even though, no specific DLT arrangement is preferred in its definition, it should be already clear that only permissioned protocols may assume the role of FMIs Unimportant as it may seem, on the

⁹⁶ DLTR, Art.1

⁹⁷ Ibid, Art.2 (13), (15).

⁹⁸ MiFID II, Art.4(22).

⁹⁹ CSDR, Art.2§1 point (1), (10), in conjunction to Annex, Section 1.

¹⁰⁰ MiFID Art.4§1 points (1) and (18) respectively.

¹⁰¹ Ibid note 99.

¹⁰² McCarthy 2022, p.294.

¹⁰³ COM/2020/594 final, Art.2(1).

¹⁰⁴ DLTR, Art2(1)

contrary, having a narrow enough but still futureproof¹⁰⁵ definition of DLT is paramount; the reason being that DLTR only allows for DLT financial instruments to be traded and settled by said FMIs.

3.1.3 DLT Financial Instruments

The base definition of a financial instrument remains in MiFID II¹⁰⁶. It is worth noting that the EU Parliament shifted from the Commission's original proposal to also include the notion of DLT-transferable securities¹⁰⁷. Even though only financial instruments under MiFID II are included in the scope of DLTR, however, FMIs authorised under it, can only admit to trading and/or settle DLT-only-financial instruments¹⁰⁸. As such, they are issued, recorded, transferred *and* stored using distributed ledger technology¹⁰⁹. As a result, MiFID II has been amended by the present Regulation¹¹⁰ to accommodate for the specific nature of DLT-financial instruments, aiming in certain extent to harmonize Member States' (MS') legislation.

Initially, this definition creates ambiguity as to DLT financial instruments' nature in relation to crypto-assets. The latter's definition¹¹¹ under proposed MiCAR doesn't differentiate much, in the sense that both financial products only exist on-chain through their whole life-cycle. As a result, the Commission specifically needed to preclude financial instruments under MiFID II as crypto-assets¹¹², in order for the whole financial regulatory matrix to also be applied on *MiFID II-DLT financial instruments*, under DLTR. To the writer's opinion, this division of instruments admitted serves a key role due to the specific goal of DLT-Regulation, i.e., to test and experiment the prospects of a DLT as a FMI, in a regulated market setting¹¹³. It also serves to facilitate the implementation and adoption of DLTR sandboxes in different jurisdictions; a new EU-wide definition of DLT-financial instruments, directly correlated to the crypto-assets would engender frictions, owing to the fact that each MS has, until now, different rules in force with regard to DLT issued OR recorded securities¹¹⁴.

¹⁰⁵ Ibid, note 102.

¹⁰⁶ MiFID II, Art.4.1(15)

¹⁰⁷ ECON 2021, 2020/0267(COD).

¹⁰⁸ DLTR, Art.2 (6),(7)

¹⁰⁹ Ibid, Art.2 (11)

¹¹⁰ DLTR, Art.18§1

¹¹¹ COM(2020) 593, Art3§1(2)

¹¹² Ibid, Art2§2(2)

¹¹³ For an overview of MiCAR objectives see Gortsos (2021)

¹¹⁴ ECB 2021, p.6

Conversely, the existing mismatch¹¹⁵ on the definition of a financial instrument under MiFID II, however trivial, will undoubtedly trouble market participants and regulators/supervisors when applying each regulatory framework, in light of the aforementioned EU passport.

Moreover, if the wording of the definition is to be read correctly, DLT financial products should spend their whole life-cycle on-chain. This marks a distinct move off of securities tokenisation in the way that it is currently envisioned; that is, a digital representation of a real-world asset¹¹⁶ (though not always on a 1:1 relationship), which is referenced in the digital world through a [unique] corresponding token. DLTR shifts away from this concept implementing, instead, securities that have their initial recording done on DLT.

This legislative choice has sound reasoning. Firstly, competing (EU) jurisdictions in the race to attract promising DLT businesses, have adopted different definitions of DLT credited securities. Secondly, securities that have no other representation outside DLT and are considered native digital assets, could be publicly traded even on conventional execution venues and comply with existing regulations¹¹⁷.

Thus, the adoption of DLTR only serves as a means to construct the necessary regulatory framework for the issuing, recording, trading and settling of these financial instruments, successfully avoiding novel legal definitions. Moreover, a system under which securities registered in legacy systems would exist in parallel with digital tokens¹¹⁸ could cause regulatory headaches. As already discussed¹¹⁹, interoperability of legacy and DLT systems, or more specifically the lack of it, creates difficulties and augments risks, such as securities overdrafts and double spending (in the case of tokenised securities), liquidity fragmentation and increased operational risk owing to IT complexities¹²⁰. In fact, the introduction, or rather, the regulation of native digital assets extracts maximum value and efficiency; limiting the legislative, regulatory, supervisory and legal compliance burden only serves to facilitate the adoption of the DLT-FMI proposition.

¹¹⁵ Ibid

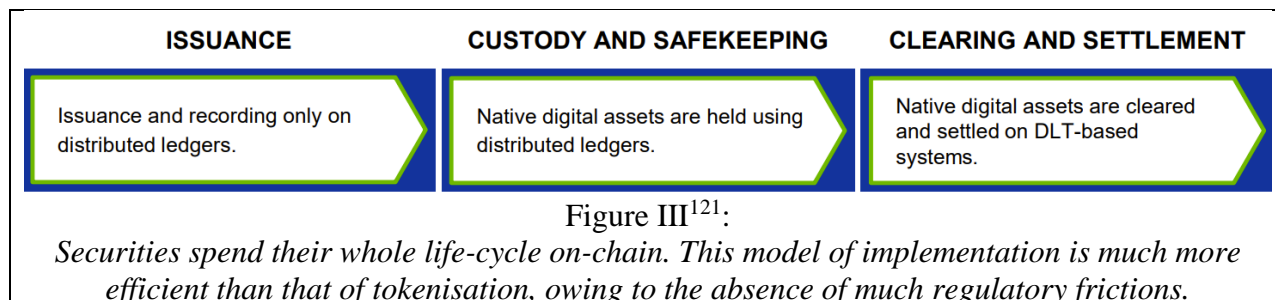
¹¹⁶ As defined in Roth et al 2021.

¹¹⁷ ECB 2021, p.12.

¹¹⁸ In a reference relationship; ‘asset-referenced tokens’ are expected to be regulated under MiCAR.

¹¹⁹ See chapter 2.5.1

¹²⁰ Ibid p.15



3.1.4 Admissibility of Financial Instruments

DLTR, following its tough balancing act, vigorously limits the range of financial instruments that can be admitted to a DLT-FMI, both by financial instrument type and by market capitalisation (market cap).

Already by the Commission's first proposal, the term DLT-transferable securities¹²², by reference to MiFID II¹²³, not only limited the admissibility of financial instruments to DLT FMIs, but also caused ambiguity as to whether collective investment schemes can indeed be admitted, if they are issued as shares or bonds¹²⁴. However, following the input by the EU Parliament, the scope of DLTR has been broadened from vanilla financial instruments and now includes¹²⁵:

- i) Shares, the issuer of which has a market capitalisation, or a tentative market capitalisation, of less than EUR 500 million.

According to our analysis under 3.1.3, these shares will in fact be native digital shares of DLT registered companies, unless of course they have engaged in dual listing. The threshold amount for admissibility has also been raised from EUR 200 to EUR 500 million, contrary to the ECB consultation paper¹²⁶.

- ii) Bonds, other forms of securitised debt, including depositary receipts¹²⁷ in respect of such securities, or money market instruments¹²⁸, with an issue size of less than EUR 1 billion;

¹²¹ Ibid, table 1

¹²² COM/2020/594 final

¹²³ MiFID II, Art4§1(44); derivative contracts and money-market instruments are not transferable securities.

¹²⁴ Zetzsche et al, 2022 p.218

¹²⁵ DLTR, Art3§1

¹²⁶ ECB, 2021/C 244/04 p.1

¹²⁷ A depositary receipt allows investors to hold shares in stocks of companies listed on exchanges in foreign countries. A depositary receipt avoids the need to trade directly with the stock exchange in the foreign market.

derivatives or contracts that incorporate a structure which makes it difficult for the client to understand the risk involved are explicitly excluded.

Corporate bonds issued by issuers whose market capitalisation did not exceed EUR 200 million at the time of their issuance shall be excluded from the calculation of the threshold.

It is noteworthy that the adopted text does not prohibit the admission of sovereign bonds¹²⁹. Both the ECB¹³⁰ and the European Parliament¹³¹ share the view that admitting them in a DLT-FMI setting would not pose significant risk to financial stability. In fact, the inclusion of sovereign bonds as eligible instrument could in particular be helpful for smaller MSs with less developed capital markets, to enable them to also gain experience with DLT-FMIs. Also, money-market instruments are now included.

As per the threshold wording, it seems that the EUR 1 billion threshold applies per issue and not per issuer. However, it would be more prudent if it were applied on a per issuer basis, considering that DLT-FMIs cannot admit to trading or record new instruments, when the total aggregate market value of all securities already registered exceed EUR 6 billion¹³². The exclusion of derivative contracts and structured financial instruments posing a risk to a client can be justified under the innovative legislative consideration to allow natural persons, as market participants dealing on own account¹³³.

- iii) Units in collective investment undertakings (UCITS) covered by Article 25(4), point (a)(iv), of Directive 2014/65/EU, the market value of the assets under management of which is less than EUR 500 million.

The explicit inclusion of UCITS dissipates any ambiguity as to whether collective investment schemes are included in the financial instruments allowed by the DLTR. Structured UCITS are considered complex financial instruments and as such, are not admissible in a DLT-FMI setting, as per the above analysis.

¹²⁸ Money market instruments are securities that provide businesses, banks, and the government with large amounts of low-cost capital for a short time.

¹²⁹ COM/2020/594 final , art.3§1(b), where sovereign bonds are excluded from the pilot regime.

¹³⁰ ECB, 2021/C 244/04 p.1 at 1.2.

¹³¹ 2020/0267(COD), Amendment 61

¹³² DLTR Art3§2, first sub-paragraph

¹³³ Ibid, Art4§2 & Art5§5; the inclusion of retailers will be further discussed in a following chapter.

The safeguarding of investor protection and market integrity imposed themselves on the legislator. Still, the choice to exclude certain financial instruments from admission in a DLT-FMI, while allowing others, has been systematic to the financial regulatory landscape¹³⁴. An instrument not posing risk to a client (or in the DLTR case: the retail investor) is that for which an assessment on the suitability and appropriateness (by the investment firm) of the client is not mandatory under MiFID II investor protection rules¹³⁵. Level 2¹³⁶ and level 3¹³⁷ legislation further specifies the criteria under which a financial instrument is deemed ‘not complex’¹³⁸. Using this framework as a compass, supervisors should check the admissibility of financial instruments according to DLTR, e.g. which debt instruments do in fact incorporate a structure¹³⁹ resulting in their exclusion from a regulated DLT-FMI, and adopt based decisions with sound legal reasoning.

3.1.5. Thresholds

Apart from excluding certain financial instruments, DLTR also introduces thresholds to the value of assets that can be admitted to trading and settled on a DLT FMI. For the legislator, in order for risks to financial stability to be avoided, the aggregate market value of DLT financial instruments admitted to trading or recorded on a DLT market infrastructure should be limited¹⁴⁰. The ECB, even though very much in favor of the threshold, opined for an even lower amount to be instated, citing fears of (un)even playing field between operators of legacy and DLT FMIs and disruption to financial stability¹⁴¹. The EU Parliament was also of the same view¹⁴². What is striking is that the original proposal set far lower thresholds¹⁴³ than the adopted text. However, under the Commissions’ proposal, [national] competent authorities couldn’t lower the threshold amounts, an option which is afforded by the DLTR. As a result, the concerns about having too

¹³⁴ DLTR recital 23

¹³⁵ MiFID II, Art.25§4 first sub-paragraph (a)

¹³⁶ Commission Delegated Regulation (EU) 2017/565, Art.57

¹³⁷ ESMA Guidelines on complex debt instruments and structured deposits (ESMA/2015/1787)

¹³⁸ For a detailed overview, see Gortsos 2018 pp 138 ff.

¹³⁹ Such determination will be made based on ESMA Guidelines, note 137.

¹⁴⁰ DLTR, Recital 23

¹⁴¹ Ibid supra note 130.

¹⁴² Ibid supra note supra note 131.

¹⁴³ Ibid supra note 129, Art.3§§1-3.

large of a limit can now be addressed¹⁴⁴, while at the same time, allowing room for the adoption of a well-developed and deep DLT capital market. However, even with a greater upper limit, supervisors need to ensure that it is upheld and under no case circumvented.

To sum up, these thresholds are:

- i) EUR 500 million for shares,
- ii) EUR 1 billion for bonds,
- iii) EUR 500 million for UCITS.

The aggregate market value of all securities admitted in a DLT-FMI should not exceed EUR 6 billion¹⁴⁵; or at any time exceed EUR 9 billion. Reaching that upper limit would force the operator of a DLT FMI to activate their transition strategy¹⁴⁶ (which will be discussed just below under). It is calculated on a monthly basis by the legislative formula¹⁴⁷:

$$\left. \begin{array}{l} \text{average of the daily closing price} \\ \text{of each traded or recorded DLT} \\ \text{financial instruments in that} \\ \text{DLT-FMI} \end{array} \right| \quad \times \quad \left| \begin{array}{l} \text{the number of DLT financial} \\ \text{instruments} \end{array} \right.$$

At any point, the supervisor may choose to lower the thresholds (or any particular one). However, such decision cannot be based on arbitrary considerations. Instead, the competent authority must take into account the market size and the average capitalisation of similar DLT financial instruments admitted to DLT FMIs across MSs. At the same time, the risk profile of the issuer(s) in relation to the DLT arrangement used and the activities offered shall also be accounted for¹⁴⁸. It is not clear, however, if a decision on lowering a threshold is limited on an individual basis or on a broad one, which would apply for all sandbox participants, present and future, or in fact both. By the wording, it seems that both are indeed possible. Besides, to the authors view, predefined aggregate values would needlessly perplex the already complicated role faced by competent authorities, of learning and supervising at the same time. Finally, since a ruling on this matter can only be made by a national competent authority, it follows that it could only be challenged before the national court.

¹⁴⁴ Expressed predominantly by the ECB in its opinion, supra note 130.

¹⁴⁵ DLTR, Art.3§2

¹⁴⁶ Ibid Art3§3.

¹⁴⁷ Ibid Art.3§4

¹⁴⁸ Ibid, Art.3§6

3.1.5.1 Transition Strategy

A transition strategy is envisioned in Art.7§7 of DLTR when the aforementioned thresholds are met. This document, which is a pre-requisite for authorization, must contain all relevant information regarding the transition from a DLT powered FMI to a legacy one, at the time where the foregone thresholds are met, or, even, the operator's authorisation to operate a DLT-FMI is revoked by the NCA.

3.2 Essential elements to a DLT-FMI

Marking the distinct difference of a DLT FMI compared to a legacy one, Article 7 of DLTR, specifies the essential requirements to be met by operators of such infrastructures. These come in addition to existing regulatory provisions of MiFID II, MiFIR and CSDR, as already discussed. The focus of the legislator has been to promote stable and transparent arrangements within a DLT FMI, that is, among its members and between them and FMI operator. Regulatory provisions to attain this objective are related to the operational resilience of a DLT FMI (3.2.1), the liability arrangement of the operator (3.2.2), the custodial arrangements (3.2.3) and finally the structure and content of the 'business plan' (3.2.4).

3.2.1 Operational Resilience

First of all, operators of DLT FMIs are subject to a set of requirements relating to the operational resilience of the DLT as a means to operate an FMI. Cyber-attacks, hacks and, maybe even more importantly, network outages have plagued DeFi¹⁴⁹ platforms since the beginning of the crypto-asset boom. The legislator has thus understandably been preoccupied with the integrity and safety of a DLT protocol used to operate an FMI.

It is important to note that the requirements are abstract in nature and as a result objective-oriented. As a result, ESMA, under its broad coordinating – quasi-supervisory – role, has been

¹⁴⁹ Decentralised Finance (DeFi) is the term used to describe a parallel, to the existing, financial system whereby the traditional intermediation in the provision of financial services is replaced by decentralisation and non-intermediation, enabled by DLT protocols: for an overview see Avgouleas E. and Kiayias A. (2020).

authorised to draft guidelines on the evaluation of adequacy of (among others) the operator's cyber arrangements, in the context of the authorisation process¹⁵⁰ (see below. 4.1,2)

In particular, the operator must put in place IT and cyber arrangements ensuring the continuity and continued transparency, availability, reliability and security of their services, and in particular the reliability of smart contracts (where used). The obligation also extends to the integrity, security, confidentiality and finally availability of any data stored by the market operator¹⁵¹. The necessity of robust IT systems is especially crucial in the context of DLT financial instruments or collateral held in custody of the operator (for the FMI's members), as well as the means of access to them¹⁵². Any such arrangements need to be proportionate to the scale and complexity of the activities the operator undertake¹⁵³. Finally, specific operational risk management procedures must be applied due to augmented risks posed from the novel use of (in fact nascent) DLT arrangements.

The assessment on the reliability of the operator's IT and cyber arrangements may require an audit, ordered by the competent authority via the appointment of an independent auditor. The cost of that audit will be borne by the market operator¹⁵⁴.

A major point of ambiguity is the systematic interaction of DLTR and the Digital Operational Resilience Act¹⁵⁵ (DORA). While the former requires for a base level of (digital) operational resilience, the latter goes in depth to achieve it. As a result, many DORA provisions would imply significant regulatory burden to financial entities operating a pilot DLT FMI with regards to that specific undertaking. Consequently, it begs the question whether relevant DORA provisions would apply in the context of the DLT pilot regime, that is inside the regulatory safe space, via a 'lex specialis' exemption¹⁵⁶; or is indeed the DLTR sandbox regime that specific/special exemption. Lacking any input on the matter from the (co-)legislator, even as the

¹⁵⁰ DLTR, Art.8,9, §8 point (a).

¹⁵¹ DLTR, Art.7§4, first sub-para.

¹⁵² Ibid, Art.7§5, final sub-para.

¹⁵³ Ibid, note -2.

¹⁵⁴ Ibid, Art.7§4 in finem.

¹⁵⁵ Proposal for a Regulation of the European Parliament and of the Council on digital operational resilience for the financial sector and amending Regulations (EC) No 1060/2009, (EU) No 648/2012, (EU) No 600/2014 and (EU) No 909/2014

¹⁵⁶ This will be the case regarding possible overlaps between DORA and the Network and Information Security Directive (EU/2016/1148), in : Council of the EU Press release, 11/05/2022, (<https://www.consilium.europa.eu/en/press/press-releases/2022/05/11/digital-finance-provisional-agreement-reached-on-dora/>) accessed on 31/10/2022.

inter-institutional dialogue on the proposed regulation (DORA) has ended in an agreement on May 10 2022¹⁵⁷, the author suggests that the proportionality principle included therein¹⁵⁸, be used to exempt, where necessary, operators of DLT FMIs from burdensome operational resilience requirements (naturally, only in their capacity as DLT FMI operators). If not, there is a risk that the innovation aims of DLTR, attainable through the cautious regulatory laxity, may be hampered.

3.2.2 Custodial Arrangements

A DLT FMI operator, just like any other legacy FMI, can accommodate for the safekeeping of participants' [DLT] financial instruments, funds, as well as collateral¹⁵⁹. In doing so, they must at a minimum guarantee the operational resilience of the network, as already discussed above. That also includes the maintenance of retrievable records of any funds registered on the ledger. In addition, in such a case, the custodian must put in place arrangements to prevent any unauthorised use of the assets in custody¹⁶⁰. What is more, by their design, particular DLT protocols could raise concerns regarding their use in a P2P context, both in terms of compliance, with current AML/CFT rules, and in terms of security¹⁶¹.

However, another important issue regarding the safekeeping of participants' assets stems from DLT's capacity to render custody and safekeeping of funds by a third party completely redundant, through the use of cryptographic wallets, unique to each user, and operated by cryptographic arrangements, called 'keys'. It is important to note that these 'wallets' do not actually hold any assets, as these assets are recorded on the network; rather, they provide the authentication needed to initiate a transaction ('signing a transaction') where funds or securities credited to that wallet address and registered on the distributed ledger, are used. As a result, from a technological perspective, no funds or financial instruments are ever in the custody of the operator but only the means of access to those assets. This in turn, raises the question of whether

¹⁵⁷ Ibid

¹⁵⁸ Ibid supra note 155, Art.3a§1.

¹⁵⁹ e.g., MiFID II, Annex I, Section B point (1) and CSDR, Art.38; though an exemption from the latter can be requested under DLTR, see below 3.3.2.1

¹⁶⁰ Ibid, Art.7§5, first sub-para.

¹⁶¹ ECB 2021, at 3.2.1, p.20.

having control of private keys on behalf of clients should be regarded as a safekeeping service¹⁶².
///technology neutrality?

Following that analysis, a distinction is made between ‘custodial wallets’, in which case, as the names suggests, a third party holds and manages the participant’s private key on their behalf; and ‘non-custodial wallets’, where only the owner (/holder) possesses and controls the private key¹⁶³. Nevertheless, the legislator refers also to safekeeping of assets, when our previous analysis showed that this is not in fact the case¹⁶⁴. As a result, a third custodial arrangement may be envisaged, that of a master-key, where the custodian does not hold a client’s private keys to the digital assets but holds in safekeeping its own private key that operates the client’s digital assets¹⁶⁵; in such an arrangement, additional measures should be taken to ensure asset segregation, since no unique ‘wallet’ is used to sign each transaction. An additional layer of reconciliation may be necessary, which in turn would eat away on DLT’s potential to settle on a single ledger.

Given EU’s technological neutrality principle, DLTR does not contain any preference to any specific arrangement, without prejudice to the fact that ‘custodial wallets’ arrangements should be regarded as the most efficient adaptation to the custodial and safekeeping regime already in place. In any case, DLTR provides for an exemption to be allowed from CSDR rules on client’s account, whereby the operator may not be required to cater for individual client account segregation, thus, not precluding any specific custodial arrangements.

3.2.3 Liability of market Operator

Establishing liability in a decentralised, anonymous, self-sufficient network is next to impossible. As a result, the road to final adoption of DLT solutions has been long. While, a DLT FMI, will not operate under anonymity, still it will retain its decentralised nature, owing to the specificities of the distributed ledger. Without explicit legal provisions, establishing liability is still ridden with ambiguities.

¹⁶² Ibid, p.21.

¹⁶³ A brief but comprehensive overview on the specificities of each arrangement is given in Binance Academy, at: (<https://academy.binance.com/en/articles/custodial-vs-non-custodial-wallets-what-s-the-difference>), accessed on.

¹⁶⁴ DLTR, Art.7§ first sentence. However, only private keys may be safekept; the assets ‘locked’ in a wallet are always registered on the common ledger.

¹⁶⁵ ECB 2021, p.21.

As a result, liability is instated by DLTR onto the DLT FMI operator(s), nevertheless, only for a limited set of cases, mainly relating to network failures which result in loss of funds¹⁶⁶, and only up to the market value of the assets lost. Although the operator is not responsible, where proven, for events outside their ‘reasonable control’, it is not clear whether a network outage due to cyber-attack, falls within that category. The author suggests that this should be ascertained on an ad hoc basis, based on the effort of the operator to prevent, or manage the operational malfunction. An important point, which has not be clarified by the legislator, revolves around who actually is the holder of the claim against a DLT FMI operator in the cases above: the participant in the market infrastructure, i.e. an investment firm, following the traditional intermediation doctrine, or directly their clients’. It seems that the client, and final owner of the assets lost, is indeed the claimholder. This is supported by the fact that DLTR recital (6) where, inter alia, liability is discussed, explicitly uses the word ‘client’. Procedures regarding client and investor compensation should be outlined by the operator in an adequate and transparent manner¹⁶⁷.

In addition to that, an operator is required to establish a mechanism to handle client’s complaints¹⁶⁸. This provision represents a novelty in the current regulatory landscape at EU level¹⁶⁹. A complaint mechanism is also envisioned under MiCAR¹⁷⁰; the Regulation on Crowdfunding¹⁷¹ also holds provisions regarding procedures for complaint handling. Even though those two legislative pieces, provide great detail regarding the implementation and function of such mechanisms, DLTR is silent on the specifics. This should not come as a surprise, as it is in line with the principle-based approach the European legislator has opted in the case of the pilot regime. In any event, sandbox participants may always draw inspiration from MiCAR or ECSPR provisions.

The scheme of strict liability of the Operator vis-à-vis the events described above may require that additional prudential safeguards be adopted by them, i.e. investement firms, market operators or CSDs., in order to properly cater the associated pecuniary risk. These additional

¹⁶⁶ DLTR, Art.7§6, first sub-para.

¹⁶⁷ Ibid, second sub-para.

¹⁶⁸ Ibid.

¹⁶⁹ Neither MiFID II nor MiFIR contain a similar provision. CSDR does require that complaints be handled in a transparent way (Art.32§2), however, not inside a [pre-established] mechanism.

¹⁷⁰ COM(2020) 593 final, Art.27

¹⁷¹ Regulation (EU) 2020/1503 of the European Parliament and of the Council

prudential requirements may be imposed by the Competent Authority (the Supervisor) on an ad hoc basis¹⁷²

3.2.4 Business Plan

Perhaps the greatest innovation of the Pilot Regime is the introduction of the Business Plan as the way for the participants to contractually structure their relationship inside the network. Aside from the operator's strict liability, as described above, all other matters of a DLT network, may be regulated by that Business Plan, which is drafted by the FMI operator and is a requirement for authorisation¹⁷³.

A BP, according to DLTR, is a publicly accessible (by electronic means) document, produced by the operator of the DLT FMI, describing services and activities offered by the envisioned market infrastructure, as well as the rules governing it. Owing to its great importance in the stable and proper functioning of a FMI, the European legislator requires that a BP includes at least these points:

- i) A clear description of the functions, services and activities of the operators¹⁷⁴,
- ii) Information on any deviations of that DLT FMI in comparison to legacy MTFs or CSDs¹⁷⁵,
- iii) A clear description of the [operator's] critical staff and the technical aspects of the DLT protocol¹⁷⁶.
- iv) Documentation providing the legal rules governing the functioning of a DLT FMI. In particular, DLTR requires the inclusion in the BP of the legal terms defining¹⁷⁷:
 - a. the rights,
 - b. obligations,
 - c. responsibilities and liabilities of operators of DLT market infrastructures, as well as those of the members, participants, issuers and clients using their DLT market infrastructure to be included in the BP.

Furthermore, these legal terms must specify:

¹⁷² DLTR, Art.7§6 third sub-para.

¹⁷³ DLTR, Art.8,9,10 §4(a).

¹⁷⁴ DLTR, Art.7§3

¹⁷⁵ Ibid. These potential exemptions will be thoroughly discussed below, under 3.3.

¹⁷⁶ DLTR, Art.7§1 first sub-para.

¹⁷⁷ Ibid, second sub-para

- d. the governing law,
 - e. any pre-litigation dispute settlement mechanisms,
 - f. any insolvency protection measures under Directive 98/26/EC¹⁷⁸,
 - g. the jurisdictions in which legal action may be brought.
- v) Rules regarding the access to the common ledger and the participation to it as a node¹⁷⁹
- vi) Rules and procedures regarding the conflict of interest and risk management and risk mitigation, the objective being to ensure investor protection, market integrity and financial stability.¹⁸⁰

In the author's view, the legislator demands these topics be addressed as a minimum requirement for authorisation and not in an exhaustive manner. As such, the operator may choose to include additional provisions, not related with those above. Besides, the competent authority may require any corrective measures with respect to the business plan of the operator of the DLT FMI, the rules of that market infrastructure and the legal terms in order to ensure investor protection, market integrity or financial stability. The operator of the DLT market infrastructure shall report on the implementation of any corrective measures required by the competent authority, every six months¹⁸¹.

Some comments must be made with respect to the BP.

Many questions arise with regards to the specific content of those topics necessary present in a BP, as well as the governance model. However, DLTR is silent on those topics; it seems that the industry is left to identify on its own (and rightly so,) the most efficient model and decide on the specifics of the BP legal arrangements.

Current market practice, identified by the legal theory, shows a preference towards specific governance models¹⁸², a *consortium*¹⁸³, a *joint venture*¹⁸⁴ and a *statutory organisation*¹⁸⁵, with

¹⁷⁸ These are the insolvency provisions of the law governing that (DLT FMI) system, following Art.8 of Directive 98/26/EC.

¹⁷⁹ DLTR, Art.7§2

¹⁸⁰ Ibid.

¹⁸¹ DLTR, Art.11§3.

¹⁸² ECB 2019, ch.2.2.

¹⁸³ A consortium is established by several industry players and or/Fintech companies that decide to join forces and form together a working group.

¹⁸⁴ A joint venture foresees the creation of a separate, autonomous entity established by two or more companies who share ownership, return, risk and governance.

regards to DLT used as market infrastructure. However, since the operator of a DLT FMI must be an incumbent financial institutions, according to DLTR, these practices cannot be considered in the context of the sandbox regime in question.

Nevertheless, a joint venture approach is still viable, due to the fact that a new legal entity may operate the DLT FMI, while the main issues relating to governance and liability are agreed on a higher consolidation level, between the participating members of that venture, while the BP, which in any case is required by law, only serves to reiterate those arrangements. While this concentrated design could in fact function well among the subsidiaries of a financial conglomerate, it is unsure whether independent financial institutions will be willing to give up control over their clients' data in this way¹⁸⁶.

As a result, it is expected that the contractual terms of a BP will most probably not be negotiable between the operator and constitute an accession agreement, as is indeed the current practise in the financial services sector.

Moving forward, regarding the specific content of the BP, this analysis highlights the legal nature of the BP and its provisions as a major point of ambiguity. The BP, a contractual document, does, in essence, regulate the participants relations in the context of the functioning of a financial market infrastructure, which is normally a domain upon which the normative legislator would act¹⁸⁷. Nevertheless, submitting a business plan, addressing at least the topics outlined above, is a requirement for authorisation to operate a DLT FMI, (probably and) mainly due to the fact that DLTR contains no other conduct rules¹⁸⁸ on the functioning of the network. An adequate to the eyes of the supervisor BP, assuming that all other requirements are met, would grant the applicant authorisation. It is, however, not specified if, these contractual arrangements could be enforced, not only among the signing parties, but in addition by the competent authority acting as supervisor, since those provisions would now also constitute public law, by virtue of the act of authorisation by that competent authority. To the author's view, and without prejudice to each MS's specific legislation, the overriding public good, in the

¹⁸⁵ A statutory organisation is an independent body whose funding and operations are controlled by a regulatory authority. Participating members will follow the SO's directives and contribute to common objectives

¹⁸⁶ Zetzsche et.al. 2018, p.1370.

¹⁸⁷ Zetzsche 2022 p.224

¹⁸⁸ It is important to note, that participants in the context of a distributed network, and especially nodes amongst them, act on an on par basis within the network, regardless of their underlying relation, outside the network, e.g. a Financial Institution and a natural person as participants of a DLT FMI.

form of investor protection and investor confidence to the integrity of the capital markets, demands that the BP is indeed considered enforceable, where relevant, also by the sandbox-market supervisor. Besides, the innovation goal of this legislative initiative is not hampered at all, since all arrangements are produced freely by the FMI Operator.

Another remark should be made with regard to the governing law. While that is included necessarily in the business plan, issues may arise in the context of Rome I regulation¹⁸⁹ on the conflict-of-law, with regards to the overriding mandatory provisions of a MS. More specifically, difficulties in interpretation may surface especially concerning rights in rem. As a DLT networks may incorporate nodes from different jurisdictions and as many jurisdictions consider their rules on property rights as mandatory provisions, a settement of a security registered on the common ledger could create disputes as to where (in terms of jurisdiction) was in fact the point of execution, or the place where that security is held in custody. As such, there is an internal conflict among DLTR, Rome I regulation and MS's national law, in a case similar to that described above. The provisioning of DLTR, that the BP will state the governing law should be seen as prevailing from both Rome I and national legislation respectively. Besides, this being, above all things, a pilot regime, the legislator will also be part of the learning process.

3.3 Exemptions and requirements regarding DLT-FMIs

The legislator has acknowledged that the current legislative framework was not adopted with DLT in mind. However, a systematic overhaul of the financial regulatory landscape would be neither attainable nor needed. Instead, a system of derogations has been envisaged by the legislator to cater for the DLT's specific features. Consequently, according to DLTR¹⁹⁰, the competent authority could exempt the DLT-FMI operator, i.e. an investment firm, a regulated market operator or a CSD¹⁹¹, from certain regulatory requirements, deemed unapplicable to a DLT setting. The granting of an exemption is always preceded by a request made by the market

¹⁸⁹ Regulation (EC) No 593/2008 of the European Parliament and of the Council.

¹⁹⁰ DLTR, Art.4,5,6

¹⁹¹ See above: 3.1.1

operator. The set of exemptions is relative to the type of infrastructure operated. As such, there are requirements and exemptions specific to a DLT MTF¹⁹², a DLT SS¹⁹³, or a DLT TSS¹⁹⁴

3.3.1 DLT MTF-specific exemptions and requirements

3.3.1.1 Retail Participation

AN MTF operated in a DLT setting is still an MTF. It is thus subject¹⁹⁵ to the requirements that apply to its legacy counterpart under MiFID II and MIFIR¹⁹⁶; at least in principle. Analysing an MTF's function goes far beyond the aim of this study, as a result, no such **explanations** will be interposed in the subsequent analysis.

A major point of difference to the existing framework is the admissibility of natural persons (and legal persons dealing on own account) as members or participants¹⁹⁷ to the facility¹⁹⁸. Up until now, MiFID II allowed only for authorised entities, such as investment firms and credit institutions to access regulated markets¹⁹⁹. Any ambiguity owing to the wording of Article 53§3 was dissipated by an ESMA Q&A²⁰⁰, where it was made clear that natural (or legal) persons dealing on own account, other than commodity derivatives or emission allowances²⁰¹, cannot be a member of an MTF (or a 'Regulated Market'). Given the benefits from disintermediation²⁰², but also the fact that the obligation of intermediation under MiFID II was identified as a potential hindrance to a DLT – MTF²⁰³, the legislator has allowed for a temporary exemption from intermediation to be granted at the request of the operator.

It is however conditional; DLTR introduces seven criteria to be met cumulatively by the persons envisioned to be admitted. These requirements relate to the quality of the persons

¹⁹² DLTR, Art.4

¹⁹³ Ibid, Art.5

¹⁹⁴ Ibid, Art.6

¹⁹⁵ Ibid, Art.4§1

¹⁹⁶ Regulation (EU) No 600/2014 of the European Parliament and of the Council.

¹⁹⁷ As in MiFID II, Recital (16); both terms may be used interchangeably.

¹⁹⁸ DLTR, Art.4§2

¹⁹⁹ MiFID II, Art.53

²⁰⁰ ESMA:70-872942901-38, at chapter 5, Question 4

²⁰¹ Weirdly enough, emission allowances are considered financial instruments.

²⁰² See above: 2.2.2

²⁰³ DLTR, recital 26

admitted (3) and their function as a member of the MTF (4). As far as the latter is concerned, the operator may never admit persons who²⁰⁴:

- i) Are market makers on the DLT MTF;
- ii) Use a high-frequency algorithmic trading technique;
- iii) Provide other persons with direct electronic access to the DLT MTF;
- iv) Deal on their own account when executing client orders on the market.

Each above activity is extensively regulated under MiFID II (where?) and as such, only reserved for authorised entities. If DLTR was silent, these rules could be easily circumvented to the detriment of investor protection, market integrity and financial stability.

The rest of the requirements relate to the quality of potential members admitted. In this case, the operator may admit to the DLT-MTF persons who²⁰⁵:

- i) Are of sufficient good repute;
- ii) Have a sufficient level of trading ability, competence and experience, including knowledge of the functioning of DLT;
- iii) Have given informed consent to trading on the DLT MTF as members or participants and have been informed by the DLT MTF of the potential risks of using its systems to trade DLT financial instruments.

Questions arise as to what constitutes a ‘good repute’ or a ‘sufficient level’ of trading ability, experience etc. The notions of ‘good repute’ and ‘sufficient knowledge’ are present in MiFID II²⁰⁶, which in turn refers to CRD IV²⁰⁷, as sine qua non qualities to be found in every member of the management body member of an investment firm, should the latter be eligible for authorisation. Joint EBA and ESMA Guidelines²⁰⁸ on CRD IV and MiFID II have specified these legal notions to a great extent, albeit without legal binding effect²⁰⁹. However, these were not drawn having retail investors in mind; as such, these guidelines may set unrealistically high thresholds, since they are addressed to professionals with a high degree of flexibility in their decisions, while in a complex setting.

²⁰⁴ Ibid, Art.4§2 (c),(d),(e),(f)

²⁰⁵ Ibid, (a),(b),(g)

²⁰⁶ MiFID II, Art.9§4

²⁰⁷ Directive 2013/36/EU of the European Parliament and of the Council Art.91§1

²⁰⁸ EBA/GL/2017/12

²⁰⁹ With legal significance, nonetheless

Even so, the market operator and supervisor should use the Guidelines as a starting point, when applying the notion of ‘good repute’. In brief, a person is of good repute if there are no objective and demonstrable grounds to suggest otherwise²¹⁰. Such grounds would mainly constitute any convictions or ongoing prosecutions for a criminal offence (specifically a financial crime), administrative penalties following violations and/or their past and present financial soundness. To the author’s view, there is no reason for retail investors to be treated differently than professionals, in this regard.

The application of the Joint Guidelines could be extended to gauge the level of proficiency in trading and past experience of potential members²¹¹. Nonetheless, to the author’s view, the same result can be achieved through the rules regarding the assessment of suitability and appropriateness under MiFID II²¹². This would be more in line with the systematic interpretation of DLTR and MiFID. A natural (or legal) person dealing on own account under DLTR would be a [retail] client under MiFID II. This is corroborated by the fact that the admissible DLT financial instruments are in fact ‘not complex’, and as such investors fall in the scope of the execution-only provision of MiFID II²¹³. As a result, the ‘sufficient level of trading ability etc.’ should be deducted from an a priori assessment made in line with MiFID II²¹⁴. Yet, is not clear if, and how record-keeping obligations would apply.

What is more, based on the above, a base knowledge should suffice. High entry requirements could in fact render the disintermediation objective of the pilot regime [under DLTR] unapplicable in practice.

As for the entity making the assessment, this is the market operator, since they are the sole competent for admitting new members to the MTF.

As an extra safeguard, the competent authority may require additional measures for the protection of natural persons. Such measures shall be proportionate to the risk profile of those members.

²¹⁰ Ibid, supra note 19 (eba/esma), at 8.

²¹¹ Ibid, at 6.

²¹² MiFID, Art.25§2

²¹³ Ibid

²¹⁴ In this case, the Commission Delegated Regulation (EU) 2017/565, Section 3 (esp. Art.54 & 55) is most relevant and should serve as a reference point.

3.3.1.2 MiFIR reporting requirements

Some potential gaps have been identified in existing Union financial services legislation as regards its application to DLT financial instruments. In particular, the regulatory technical standards under MiFIR relating to certain data reporting requirements and pre- and post-trade transparency requirements are adapted to financial instruments issued under legacy technology. At the request of an operator of a DLT MTF, the competent authorities are allowed to grant an exemption to that operator or its members from the transaction reporting requirements under MiFIR, provided that the DLT MTF fulfils certain conditions²¹⁵. In fact, all transactions through a DLT-MTF must still be recorded through its systems. However, these records needn't contain the data MiFIR requires for legacy transactions²¹⁶, but only those that are relevant to each transaction and, in addition to this, tailored to what each DLT setting can produce.

The operator of a DLT-MTF must provide the competent authority with direct and immediate access to that information. Bearing in mind the specificities of a permissioned DLT arrangement, the legislator has acted accordingly, instituting such competent authority as a 'regulatory observer'. By that status, the competent authority is admitted as a member to the DLT-MTF, with real-time access (depending on the DLT arrangement) to the relevant transaction data.

It is not clear, however, whether the exemption refers only to the reporting requirements, or it extends to the responsibility for accurate and timely submission of data, or the operator's responsibility for sound security mechanisms. In truth, both can in fact be provided, in an automated manner, by the DLT protocol in place; besides the competent authority is a member of the MTF. As a result the exemption should be seen as referring to the whole article, even though [in DLTR recital 27], only the reporting requirements are envisioned to be included in the exemption.

3.3.2 DLT SS-specific exemptions and requirements provisions

Following the same logic as in a DLT-MTF, a DLT-SS operator (CSD) is subject to the same requirements that apply to a CSD operating a legacy SS, under CSDR. Besides, As evidenced by

²¹⁵ DLTR, Art.4§3

²¹⁶ MiFIR Art.26§3

the majority of replies to ESMA Call for Evidence on the DLT Pilot Program, the industry does not believe that CSDR cannot in principle accommodate for these technological novelties.

However, certain exemptions have been also envisioned by the legislator, mainly due to incompatibility with DLT, however all coming with conditions to be met. The main areas where a derogation from CSDR provisions is possible, relate to securities form and accounts (3.2.2.1), securities settlement (3.2.2.2), outsourcing (3.2.2.3), and access to CSD/DLT-SS (3.2.2.4). It is reminded that these exemptions are only awarded after a decision by the [national] competent authority, following a specific application by the operator.

3.3.2.1 Securities accounts in a DLT-SS

No matter how technology neutral CSDR may be, DLT systems can't easily comply with legislative notions that were created having legacy arrangement in mind. The legislator has indeed identified²¹⁷ that and has allowed for an exemption to be given to DLT-SS operators from conforming with the current definitions of dematerialised form of securities²¹⁸, transfer order²¹⁹ and securities accounts²²⁰.

Book entry form

Given the differences of DLT databases and legacy securities settlement systems that operate by crediting and debiting the securities accounts of their participants, double-entry or multiple-entry book-keeping securities accounts might not always be feasible in a DLT SS, where DLT financial instruments are (only) registered and traded on that (DLT) arrangement. As such, the operator can obtain an exemption from book-entry form and the relevant provision of CSDR²²¹, provided they demonstrate that the aforementioned regulatory obligations are incompatible with the use of DLT²²².

Securities Accounts: Integrity of issue

²¹⁷ DLTR, Rec.30

²¹⁸ CSDR, Art.2§1(4)

²¹⁹ SFD, Art.2(i)

²²⁰ CSDR, Art.2§1(28)

²²¹ Ibid, Art.3

²²² DLTR, Art.5§2(a)

DLTR also envisions exemptions from provisions relating to the integrity of securities' issues and the protection of clients' accounts²²³. Again, the derogation will only be applicable to the extent that the DLT-SS operator ensures, albeit at a minimum, that the objectives of the provisions from which an exemption is requested, will be met.

The integrity of the issue must always be upheld. This means that the operator is responsible to²²⁴:

- i) verify that the number of DLT financial instruments in an issue or in part of an issue recorded by the CSD operating the DLT SS is equal to the total number of DLT financial instruments making up such issue or part of an issue that are recorded on the distributed ledger at any given time
- ii) demonstrates it does not allow securities overdrafts, debit balances or the improper creation or deletion of securities.

Adhering to these practices is essential for the orderly function of any securities system and DLT based systems should not be differentiated in this regard. However, exchange of information across securities accounts (databases) is made redundant by the fact that DLT financial instruments can only be issued on DLT²²⁵, and as such, an exemption from this procedure may be afforded to a DLT-SS.

Securities Accounts: protection of participant's accounts

A major point of flexibility relates to the protection of participants' and clients' securities²²⁶. It is clear that the operator needs to keep records that enable them (the CSD operating the DLT SS) at any given time to segregate the DLT financial instruments of a member, participant, issuer or client from those of any other member, participant, issuer or client without delay²²⁷.

However, where an exemption is indeed granted, there appear to be no requirements for the CSD to enable individual client accounts or operate any legacy type of securities accounts for that matter. As such, no reference is made to the clients of a participant or member of a DLT-SS. The

²²³ CSDR, Art.37 and Art.38 respectively

²²⁴ DLTR, Art.5§2(b), points (ii),(iv)

²²⁵ DLTR explicitly requires that a CSD operating a DLT-SS ensures that DLT-financial instruments are recorded on the distributed ledger; an unneeded provision in light of the fact that, in the first place, a DLT financial instrument can *only* be issued on such ledger (see above: 3.1.3).

²²⁶ CSDR, Art.38

²²⁷ DLTR, Art.5§2(b), point (iii)

author argues that this specific omission serves to promote disintermediation and flexibility for innovative custodial arrangements, by not catering to legacy FMI doctrines.

The prohibition to a CSD of using any securities that don't belong to it, without the prior consent of the client²²⁸ may still be applicable depending on the custodial arrangement between the parties. It seems though that a custodian-wallet agreement may constitute in itself such consent.

Consequently, Commission regulatory technical standards²²⁹ should not be applicable regarding article 37 (CSDR) reconciliation measures under the envisioned exemption. However, technical standards requiring a CSD to demonstrate rules and procedures to mitigate risks associated with the safekeeping of securities²³⁰, should still be applicable.

3.3.2.2 Securities Settlement

Preventing settlement fails

DLTR also provides an exemption from the rules governing settlement fails; preventing them²³¹ and addressing them²³². That is not to say, however, that the operator needn't worry about the orderly execution of securities transaction. Instead, they must at least ensure clear, accurate and timely confirmation of transaction details in DLT financial instruments, same as any other traditional FMI.

Nonetheless, given that all settlement information can be maintained on-chain, allocation of securities could automatically be carried out by updating the common ledger and needs no further actions. As such, communication between investment firms and [professional] clients is not necessary for the allocation of securities and the subsequent settlement of a transaction. Provisions regarding the allocation of securities and communication²³³ between parties may not be relevant under a DLT technological arrangements. Consequently, an exemption from Article 6§§1,2 CSDR has been envisioned by DLTR.

²²⁸ CSDR, Art.38§7

²²⁹ Commission Delegated Regulation (EU) 2017/392

²³⁰ Ibid, art.26, (a)

²³¹ CSDR, Art.6

²³² Ibid, Art.7

²³³ Ibid, Art.6§§1,2; ESMA Guidelines (ESMA70-151-2906 ESMA70-151-2906) on this topic should also be deemed irrelevant, where such a procedure has been made redundant by DLT-specific technological arrangements.

Notwithstanding the previous requirements, a CSD operating a DLT-SS must also adopt appropriate measures to prevent settlement fails. According to Article 6§3 (CSDR), mitigating exposure to counterparty and liquidity risk by timely execution on the intended settlement date is paramount to preventing settlement failures. However, there is no explicit requirement for a DLT-SS operator to take any specific measures regarding thereof. Accordingly, the operator is free to propose any objective-oriented solutions, without regulatory obligations. The competent authority will decide if the proposal is sufficient to prevent settlement fails.

Addressing settlement fails

The same goes for addressing settlement fails. Under current legislation²³⁴, a CSD is obliged to employ an array of measures aimed at addressing them. These are;

- i) recording of settlement fails;
- ii) a penalty mechanism, involving cash penalties;
- iii) an extension period to the intended settlement date;
- iv) a buy-in mechanism and
- v) suspension of participants that fail consistently and systematically to deliver the financial instruments on the intended settlement date.

Where an exemption has been given, the operator shall be free to propose their own measures aimed at addressing settlement fails. However, in regard to the suspension of frequently failing participants, it is not clear if the procedure itself will be carried out according to current regulatory requirements²³⁵, or be governed by an ad hoc procedure outlined in the [DLT-FMI] business plan, accompanying the request for an exemption, in this case, from Article 7 CSDR.

Settlement finality and designation of an SS, under Directive 98/26/EC of the European Parliament and of the Council (SFD)

DLTR also provides to DLT-SS operators exemptions from Article 39 CSDR on settlement finality. Owing to the nature of the consensus mechanism, where the finality of a transaction, i.e. the moment past which a transaction is irrevocable, can only be probabilistic in nature, the legislator decided to allow the derogation thereof. However, the operator must still define a priori

²³⁴ Ibid, Art.7

²³⁵ e.g., the consultation of the competent authority on the intended suspension.

the moment of irrevocability. In essence, a DLT-SS shall publicly disclose the rules governing such system²³⁶.

Furthermore, a DLT-SS must settle transactions in DLT financial instruments at close to real time or intraday and in any case no later than on the second business day after the conclusion of the trade²³⁷; this provision is in fact identical to the original CSDR provision²³⁸. Even so, it is expected that the majority (if not all) DLT arrangements operating a DLT-SS will achieve [close to] real-time settlement²³⁹.

By way of derogation from the SFD, a CSD operating a DLT-SS may not be designated by the MS to ESMA as a securities settlement system under said Directive²⁴⁰. Nevertheless, a designation can still take place. As per the wording of the exemption, a designation on a systemic risk basis is still not required. However, the thresholds discussed above²⁴¹ aim to nullify such risks. Even so, a non-designated CSD operating that DLT-SS shall propose compensatory measures to mitigate risks arising from insolvency of a participant and more specifically, with regards to²⁴²:

- i) notification of their insolvency to other MSs;
- ii) the (retroactive) effect of the insolvency;
- iii) determining which insolvency law is applicable to the rights and obligations of that participant in connection with their participation in the SS, and
- iv) the fate of any collateral at the time of insolvency.

Cash Settlement

DLTR allows for a derogation from Article 40 CSDR on cash settlement. However, only DLT SSs that provide a DvP settlement arrangement are eligible for this exemption.

The rule

²³⁶ DLTR, Art.5§7 first sub-paragraph, point (b)

²³⁷ Ibid , see previous note, at point (a)

²³⁸ CSDR, Art.39§5

²³⁹ Most existing protocols can achieve real or at least close to real-time settlement. This, however, depends on network congestion.

²⁴⁰ SFD, Art.2(i)

²⁴¹ See chapter 3.1.5

²⁴² SFD, Recital (15)-(18)

As already discussed (see chapter 2.4), the legislator strongly supports the settlement of the cash leg of a securities transaction in Central Bank Money, however, they acknowledge the fact that this arrangement isn't possible at this stage, since there are no facilities to date that register central bank money in DLT. Nevertheless, DLTR upholds central bank money settlement, even in tokenised form, as the rule²⁴³, in anticipation of future developments²⁴⁴.

Until then, or where it is not practical, settlement can take place through the CSD's own accounts in accordance with CSDR or through commercial bank money, i.e. accounts opened with a credit institution. However, given the difficulty and lack of interoperability between legacy and DLT systems (or even DLT to DLT systems), which would hinder the application of a DvP arrangement in DLT financial instruments, Article CSDR 40 may not apply for those DLT operators. While, settlement can still take place through those traditional channels, cash settlement can in addition be implemented through tokenised commercial bank money or even e-money tokens²⁴⁵. It is important to note that a CSD requires a separate authorisation²⁴⁶, as a credit institution under CRR to hold and manage its clients' cash in own accounts. Settlement via commercial bank money provided by a designated (authorised) credit institution entails increased prudential requirements and supervisory scrutiny to that credit institution²⁴⁷.

In its proposal of DLTR, the Commission envisioned a total exemption from the cash settlement provisions of CSDR²⁴⁸, as outlined above, most probably in accordance with the goal of innovation and experimentation on the use of DLT, which in truth can be hindered by the inclusion of cumbersome actors, such as credit institutions, notably operating outside the sandbox regulatory safe space. In fact, the motive behind this proposal was to allow the introduction and experimentation with settlement (e-)coins, without, however, coming into detail in regard to their origination, distribution and management.

Unsurprisingly, this proposal was met with heavy criticism by the ECB through its opinion. Among concerns on financial stability and reduced capacity to manage credit and liquidity risk

²⁴³ DLTR, Art.5§8, second sub para first sentence.

²⁴⁴ The introduction of the DLT based Digital Euro is what comes to mind, although no reference is made to that project in DLTR Recital.

²⁴⁵ DLTR, Art.5§8, second sub-para in finem.

²⁴⁶ CSDR, Title IV, in particular Art.54.

²⁴⁷ Ibid, Art. 59 & 60 respectively.

²⁴⁸ COM (2020) 594 final, Art.5§5.

related to a FMI²⁴⁹, the ECB argues that under CRD, persons or undertakings that are not credit institutions are prohibited from carrying out the business of taking deposits or other repayable funds from the public. This prohibition does not apply to ‘cases expressly covered by national or Union law²⁵⁰’. Explicitly allowing CSDs operating a DLT SS to settle the cash leg of securities through their own accounts of either, traditional cash, or settlement coins of their own issue, albeit without an authorisation to operate as a credit institution, would come in stark contrast to the approach adopted concerning the issuance of e-money tokens²⁵¹. Under the proposed MiCAR, only entities authorised as credit institutions, or e-money institutions can issue e-money tokens²⁵².

What is more, the inclusion of natural persons in the settlement process²⁵³ (as network nodes), which may mean that transactions are recorded on the books of a natural person, or, in any case, of a non-authorised entity to take deposits, could in fact exclude the depositors from the protection²⁵⁴ of Deposit Guarantee Schemes and Depositor Preference concerning the ‘bail-out’ mechanism envisioned in BRRD²⁵⁵. Faced with that volume of scrutiny, in the end, the legislator didn’t derogate from the rules of the traditional framework²⁵⁶.

Derogation from the rule

Even so, a compromise has been struck regarding the settlement in commercial bank money (tokenised form should be included as well). The enhanced prudential requirements and heightened supervision of a credit institution providing the settlement of payments, i.e. Title IV CSDR²⁵⁷, with the aim of mitigating and addressing credit and liquidity risk, do not apply in the case of settlement of DLT financial instruments with an aggregate value not higher than EUR 6 billion, following the calculation method described above²⁵⁸. In fact, given the threshold the legislator sets on the aggregate value of DLT financial instruments admitted in a DLT FMI, the

²⁴⁹ ECB Opinion, 28 April 2021 (CON/2021/15), para 3.3.8 & 3.3.10 respectively.

²⁵⁰ CRD, Art.9.

²⁵¹ ECB Opinion, 28 April 2021 (CON/2021/15), para 3.3.7.

²⁵² COM(2020) 593 final, Art.43§1.

²⁵³ DLTR Art.5§5.

²⁵⁴ Ibid, supra note 251, para 3.3.9.

²⁵⁵ Directive 2014/59/EU of the European Parliament and of the Council

²⁵⁶ DLTR, Art.5§8 second sub-para.

²⁵⁷ And especially, Art.59 & 60 thereof.

²⁵⁸ Ibid, third sup-para

entirety of those instruments could be settled through accounts in a designated²⁵⁹ credit institution.

However, this paper identifies two potential gaps in the current framework.

- i) It is not clear how the designated credit institution will approach the handling of risks relating to settlement of the cash leg of DLT securities, and especially that of collateral held, since the current prudential framework is dissapplied;

To begin with, it is worth reminding that DvP is no panacea (see above 2.3.1,3). Furthermore, a DLT SS shall be responsible to identify, manage and mitigate any risks that may arise from the use of commercial bank money, where Title IV CSDR doesn't apply²⁶⁰. Nevertheless, those risks may have been better addressed at the level intended in the first place, i.e. the entity authorised as a credit institution to handle the cash settlement; or more importantly, there isn't any insight on how they are better addressed on the DLT SS level.

The same risk identification and mitigation responsibility applies in the case where settlement is carried out through e-money tokens.

- ii) The reasoning behind exempting only designated credit institutions that provide settlement in commercial bank money from Title IV, but not CSDs authorised as credit institution to hold own accounts, is not understood by the author. Ensuring a level playing field requires the 'same activity, same risks, same rules' principle to be upheld at any time. As a result, this exemption should be interpreted to include in addition CSDs authorised as credit institution for the provision of ancillary banking services.

In the case of provisions of cash credit and/or payment services via e-money tokens by a CSD operating a DLT SS or a credit institution, there is no exemption envisioned from Title IV CSDR²⁶¹.

Finally, it should be noted that these exemptions only apply within the regulatory safe space. Market participants should make arrangements on how they intend to comply with Title IV CSDR in the event that they eventually exit the pilot regime²⁶².

²⁵⁹ The term is not used in a legal context. Title IV CSDR does not apply.

²⁶⁰ DLTR, Art.5§8 fourth sub-para.

²⁶¹ Ibid, Art.5§8, fifth sub-para.

²⁶² DLTR, Recital (35).

3.3.2.3 Outsourcing of core services

The legislator has allowed for an exemption from the CSDR rules²⁶³ on outsourcing to be requested by the market operator, should these rules be incompatible with the use of a DLT as a securities settlement system²⁶⁴. Due to the distributed nature of the ledger, non-authorised entities may perform CSD-only core services²⁶⁵. As a result, the exemption only extends to the outsourcing of core services.

In a way, this allows market operators to freely distribute liability (where it is not instated by DLTR) within the network²⁶⁶, where, otherwise, they would have been responsible. It is important to note, however, that the delegation of tasks related to the functioning of the distributed ledger should not be considered outsourcing within the meaning of CSDR²⁶⁷. The exemption is granted by the competent authority. Given the ratio of this provision, it appears that this is a one-time exemption, meaning the operator doesn't need to obtain separate exemptions for each core service outsourced.

No similar exemption exists in the case of a DLT-MTF. The legislator must have concluded that MiFID II rules on outsourcing²⁶⁸ don't cover any settlement activities (on the distributed ledger) and as such, there is no need to exempt MTF operators from those provisions.

3.3.2.4 Access to a DLT-SS

Innovation-driven regulatory laxity as well as interoperability concerns have led the legislator to provide CSDs operating a DLT SS with potential exemptions from the rules governing access to that DLT SS.

Admission of natural persons²⁶⁹

²⁶³ CSDR Art. 19 and by extension, Art.30.

²⁶⁴ Ibid, Art.5§4.

²⁶⁵ For the core services, refer to note 30.

²⁶⁶ Zetzsche et al. 2022, supra footnote 187.

²⁶⁷ DLTR, Recital (31) in fine.

²⁶⁸ MiFID II, Art.16§5 and Commission Delegated Regulation (EU) 2017/565, Art.30,31.

²⁶⁹ DLTR, Art.5§5

Contrary to the ECB opinion²⁷⁰, which cites CPMI-IOSCO Principle 18 for FMIs²⁷¹, the legislator has decided to allow the admission of natural persons in a DLT SS. For further analysis on retail participation, see above (3.3.1.1).

Rules on open participation and transparency²⁷²

An exemption has been envisioned from CSDR provisions related to the requirements of participation, price and fees transparency and communication procedures²⁷³. This exemption mainly relates to the additional regulatory burden these provisions pose on DLT SS operators, and as a consequence could be detrimental (and opposite in goal) to the sandbox regime envisioned. As per usual, the objectives of those [exempted] articles must still be met, and in particular,

- i) The public disclosure of criteria for participation, which are transparent, objective and non-discriminatory and allow fair and open access to all persons interested to become participants;
- ii) The public disclosure of the price and fees associated to the settlement service provisioned.

Consequently, the legislator aimed to relieve DLT SS operators from the procedural requirements therein, such as the complaint to the competent authority in case of refusal of access, or even the risk assessment prior to entry²⁷⁴. Even so, it is not clear if these procedures are indeed considered to be a necessary objective, in which case they also must be met. According to the author, a total exemption would be the right direction, the goal of this legislation taken into proper account. Further specifications can always and should be made through ESMA's guidelines on the compensatory measures applying to each exemption (see just below 3.3).

²⁷⁰ Ibid note 251, at 3.2

²⁷¹ BIS-IOSCO 2012, at chapter 3.18.5., where the operational, financial, legal and risk-management requirements for participation that should be taken into account by an FMI, are detailed; non-regulated entities pose additional risks that need to be taken into account.

²⁷² CSDR, Art. 33,34,35.

²⁷³ DLTR, Art.5§6.

²⁷⁴ CSDR, Art.33§3.

It is important to note that, the requirement of CSDs (or the operator of a DLT SS) to utilize international open communication procedures²⁷⁵ can be rendered inactive, should an exemption be granted by the competent authority. This is unfortunate as it could further exacerbate interoperability issues raised by the current analysis²⁷⁶, which in turn could result in fragmentation of financial markets.

Access between CSDs²⁷⁷

Requirement for access between CSDs²⁷⁸ can be exempted following a request by the DLT SS operator, owing to lack of interoperability between DLT and legacy systems. Nevertheless, access can be still granted to other DLT SSSs, unless the competent authority prohibits such access to the extent that such access would be detrimental to the stability of the Union financial system, or the financial system of the Member State concerned.

3.3.3 DLT TSS-specific exemptions and requirements provisions

DLT's potential to restructure the financial markets lies with its capacity to realistically merge the trading and post-trade environments into one²⁷⁹. DLTR provides for such merging by allowing investment firms or market operators operating DLT MTF to also operate a DLT SS and vice versa, a CSD operating a DLT SS to also operate a DLT MTF²⁸⁰. The new FMI has been called a [DLT] Trading and Settlement System (DLT TSS).

The fact that the current regulatory framework is built upon the tiered market structure, is bound to cause frictions in the event of an unregulated merging. The main cause of such friction are rules on specific authorisation for an entity to acquire, before undertaking that regulated activity, in this case operating an MTF or an SSS. Another key concern is safeguarding a level playing field between entities with different authorisation status but same activity.

²⁷⁵ Ibid, Art.35.

²⁷⁶ See above: chapter 2.5.1

²⁷⁷ DLTR, Art.5§9

²⁷⁸ CSDR, Art.50,51,53

²⁷⁹ For brevity, see Figure II.

²⁸⁰ DLTR, Art.6.

As a result, DLTR contains provisions addressing these concerns by exempting entities wishing to operate a DLT TSS from certain regulatory requirements. However, as a general rule, both MiFID II/MiFIR and CSDR apply in the case of a DLT SS.

An investment firm operating a DLT TSS is subject to MiFID II and MiFIR rules regarding the functioning of an MTF; also, the rules applying to CSDs, under CSDR, when an investment firm (or market operator) operates a DLT SS as part of a DLT TSS²⁸¹. However, it is not subject to provisions regarding authorisation as well as organisational and prudential requirements to which a CSD would normally be subject. Neither do rules on settlement internalisers apply.

A CSD operating a DLT TSS is, similarly, subject to the same regulatory requirements, with the exception of certain MiFID II provisions related to the authorisation to provide investment activities, as well as organisational requirements and acquisition notifications that normally apply on investment firms. Since operating an MTF is an investment activity²⁸², extending the derogation from MiFID II/MiFIR any further would not be justifiable by the ‘same activity, same risks, same rules’ approach.

Other than that, the operator of a DLT TSS may request to be granted an exemption specific to either a DLT MTF or a DLT SS, under the conditions discussed above (3.3.1,2), in which case they don’t need to comply with those exempted provisions.

3.4 Additional safeguards

Compensatory Measures

The provisions of DLTR, under which an exemption to the current framework may be granted, should be considered of minimum harmonisation. While they require for a base minimum to be met at all times²⁸³, they allow for competent authorities to demand additional measures to be taken by the DLT FMI operator, in order to ensure the Union objectives of financial regulation²⁸⁴. What is most welcoming in the context of a sandbox, is the involvement of ESMA in preparing guidelines for those compensatory measure. Even though, as Guidelines,

²⁸¹ DLTR, Art.6§1.

²⁸² MiFID II, Annex I, Section A, (9).

²⁸³ As discussed, the objectives of the exempted provisions must, at minimum, be met.

²⁸⁴ DLTR, Art§1, second sub-para, (c) & Art.5§1, second sub-para, (c).

they will constitute level 3 legislation, however, they will retain their legal significance and, to the author's view, will serve as a major point of reference for any ad hoc compensatory measures requested by competent authorities.

Proportionality Clause

An additional safety valve has been introduced by the legislator, based on the notion of proportionality²⁸⁵. It applies both to DLT MTF²⁸⁶ and DLT SS²⁸⁷ operators alike. Any exemptions requested must be proportionate to the specific function of that DLT arrangement, as well as justified by its use. Furthermore, they must be limited to that DLT FMI for which the exemption has been given and cannot be extended to any other FMIs operated by the same entity. It is only right that benefits owing to the implementation of a regulatory sandbox don't extend outside the regulatory safe space. It is important to note that ESMA is not directly involved with defining the notion of proportionality per each individual case or as a whole, this competence residing with the [designated] competent authorities.

3.5 Caveat

The success of the exemption regime heavily relies on the expertise of national competent authorities to evaluate the conditions of each application for exemption, in relation to each specific DLT protocol. Nevertheless, it is not safe to say that they indeed possess that necessary knowledge. As such, ESMA has been awarded an important coordinating role among national competent authorities, which will be discussed further below, under chapter 4.

IV. The European Sandbox element

4.1 ESMA's Role in the Pilot Regime

Although a European *Supervisory* Authority in name, ESMA, to the exception of Credit Rating Agencies, Trade Repositories and just recently Data Repositories, has acted mainly as a regulatory authority, with a mandate, inter alia, to draft Level 2 legislation, which in turn would be adopted by the Commission, and publish the soft-law Regulatory Guidelines (Level 3

²⁸⁵ TFEU, Art. 5

²⁸⁶ DLTR, Art.4§4

²⁸⁷ Ibid, Art.5§10

legislation)²⁸⁸. The Authority also retains as an objective from its founding Regulation the enhancement of supervisory convergence across the internal market. It does not, however, hold any true supervisory powers, i.e. directly against supervised entities, rather it contributes, through the means awarded to it by the European legislator, to promote a common supervisory culture.

Nevertheless, whenever breach of EU law is diagnosed²⁸⁹, an action in emergency situations is needed or in the case of settlement of disagreements, acting as mediator between national competent authorities in cross-border situations²⁹⁰, the ESMA has indeed the right to substitute the national competent authorities if the latter fail to comply with the European Commission's formal opinions or ESMA's decisions. As a result, ESMA may assume some supervisory tasks, yet again indirectly²⁹¹ vis-à-vis the supervised entities.

Similarly, DLTR does not, *expressis verbis*, award ESMA with any direct supervisory tasks in relation to sandbox participants. However, its role as a shadow supervisor is upgraded to the point where ESMA may be seen as the main regulatory and supervisory entity of the new sandbox regime, without any provision stating thereto.

And to this end, the European legislator has introduced another great novelty. One may assume, that the limited scope and application of DLTR have served to curb the resistance of MSs reluctant to delegate power to the European Supervisor. However, it is worth reminding that ESMA has no direct or hard-law powers through DLTR.

On the other hand, ESMA should in fact take a more active role in the supervision of the pilot regime, as the uniform application of DLTR may otherwise, be seriously hampered. National competent authorities may in fact have minimum to no exposure to DLT as a market infrastructure. As a result, one can reasonably expect that a harmonised application, which is always the objective when a Regulation and not a Directive is the chosen legislative vehicle, would be destined to fail, when considering the complexities of the topic in question.

The present study will outline all (relevant to supervision) tasks and powers ESMA is awarded via DLTR. The author believes that having a concentrated and systematic view of ESMA's

²⁸⁸ Regulation (EU) No 1095/2010 of the European Parliament and of the Council (ESMA Regulation), Art.8§1

²⁸⁹ To the author's best knowledge, this procedure has never been activated.

²⁹⁰ These cases are laid down in Articles 17-19 of ESMA Regulation.

²⁹¹ Gortsos 2022.

powers serves to highlight its updated mandate and its role as a shadow supervisor in the case of DLT-FMIs. We can classify them by their nature, as regulatory or supervisory powers.

4.1.1 ESMA's Regulatory powers.

ESMA is charged with preparing and publishing a wide array of guidelines. Although this, in itself, doesn't constitute an innovation in itself, nevertheless these guidelines touch upon areas of great importance to the functioning of the sandbox regime, in its European perspective. As such:

- i. ESMA shall prepare guidelines on the compensatory measures²⁹² a DLT FMI operator must undertake in order to be awarded an exemption from the current regulatory matrix, in accordance with DLTR.

Put simply, these are the compensatory measures that the competent authority deems appropriate in order for the FMI operator to meet the objectives of the provisions in respect of which an exemption has been requested, or in order to ensure investor protection, market integrity or financial stability. National competent authorities will, of course, be able to deviate, but not without providing a fare explanation as for the reason of that derogation²⁹³.

- ii. ESMA may provide national competent authorities with non-binding opinions, in the authorisation procedure²⁹⁴. Note that such a non-binding opinion should not be deemed to be an opinion within the meaning of ESMA Regulation.

Before granting a specific permission to a DLT market infrastructure, the competent authority should provide ESMA with all relevant information. Where necessary to promote the consistency and proportionality of exemptions, or where necessary to ensure investor protection, market integrity and financial stability, shall provide the competent authority with a non-binding opinion on the exemptions requested or on the adequacy of the type of distributed ledger technology used as a FMI, after an application. Importantly, before issuing that opinion, ESMA shall consult the competent authorities of the other MSs and shall take the utmost account of their views when issuing its opinion.

²⁹² DLTR, Art. 4§6, 5§12.

²⁹³ ESMA Regulation, Art.16§3

²⁹⁴ DLTR, Art.8,9 §7, Art.10§8.

Where ESMA issues a non-binding opinion, the competent authority shall give that opinion due consideration and shall provide ESMA with a statement regarding any significant deviations from that opinion if ESMA so requests. ESMA's opinion and the competent authority's statement shall not be made public. Transparency issues, relating to opaque practises could be raised in response²⁹⁵.

In that vein, the criteria under which ESMA will decide whether that non-binding opinion is indeed necessary are not a priori known. As such, the European Agency enjoys a great amount of discretion when assessing those applications and the awarded exemptions therein. It is reasonable to believe that ESMA will in fact guarantee the uniform application of the exemptions throughout the EU, without however being able to recognize the concessions ESMA is prepared to make in terms of investor protection or market integrity. And although that opinion is a non-binding one, it is difficult to imagine a national competent authority deviating significantly from it.

- iii. ESMA shall develop guidelines to promote the consistency and proportionality of exemptions granted to operators of DLT FMIs throughout the Union²⁹⁶.

These assessments will, inter alia, include the evaluation of the adequacy of different types of distributed ledger technology used by operators of DLT FMIs and, also, the exercise of the option to lower the ceiling on the value of DLT financial instruments traded and recorded in a DLT FMI.

It is important to note that the European legislator has indicated 'Guidelines' as their vehicle of choice for increased harmonisation, and not any Delegated Regulations adopted (although most certainly drafted by ESMA). As such, not only does the regulatory landscape become less rigid, by way of soft-law and each MS's ability to derogate thereof, resulting in an end product (the sandbox) which caters to market needs; but also, removes the Commission out of the decision making, leaving ESMA as the sole – soft – regulator, recognising that its technocratic background and high expertise will be more relevant in the balancing act of the envisioned pilot regime, that pits the objective of innovation against that of investor protection and market integrity.

²⁹⁵ Ringe 2020, p.619.

²⁹⁶ DLTR, Art.8,9 §8.

4.1.2 ESMA's quasi-Supervisory powers

Although not direct, ESMA is vested with significant supervisory powers in a way that it may resemble as a true European supervisory agency.

- iv. ESMA is to be notified at all times as soon as the competent authority considers an application to grant a specific permission to operate a DLT FMI, to be complete²⁹⁷.

ESMA will decide based on that application to address a non-binding opinion (see above) to the national competent authority handling the application. Seen as how that opinion carries great legal importance, especially when taking into account the 'Expert' status of the authority, ESMA indirectly becomes responsible for authorizing the sandbox's participants around EU. ESMA will also be informed by the competent authority on the outcome of the authorisation procedure²⁹⁸

- v. ESMA shall receive all information and reports that national competent authorities have received from operators of DLT FMIs²⁹⁹ in a timely manner, and shall inform ESMA of any any corrective measures taken in respect to the applicant's business plan³⁰⁰.

That is in line with the coordination role awarded to ESMA, only this provision serves to reiterate it explicitly.

- vi. ESMA shall monitor the application of specific permissions, and any related exemptions and conditions attached to those exemptions, as well as any compensatory or corrective measures required by competent authorities with the goal of submitting an annual report

²⁹⁷ DLTR, Art.8,9§6, Art.10§7.

²⁹⁸ Ibid, §11.

²⁹⁹ This information may include, as per Art.11§1, second sub para:

- (a) any proposed material change to their business plan, including changes in relation to critical staff, the rules of the DLT market infrastructure and the legal terms;
- (b) any evidence of unauthorised access, material malfunctioning, loss, cyber-attacks or other cyber-threats, fraud, theft or other serious malpractice suffered by the operator of the DLT market infrastructure;
- (c) any material change to the information provided to the competent authority;
- (d) any technical or operational difficulties in performing the activities or providing the services that are subject to the specific permission, including difficulties related to the development or use of the distributed ledger technology and DLT financial instruments; or
- (e) any risks affecting investor protection, market integrity or financial stability that have arisen and that were not anticipated in the application requesting the specific permission or that were not anticipated at the time when the specific permission was granted.

³⁰⁰ DLTR, Art.8,9§6, Art.10§7.

to the Commission on how such specific permissions, exemptions, conditions and compensatory or corrective measures are applied in practice³⁰¹.

However, ESMA lacks in this regard the power to act, without prejudice to its usual powers from the statutory regulation. Even so, having complete overview of the market/pilot regime will necessarily influence the exercise of the aforementioned powers already conferred to it by DLTR. Ultimately,

- vii. ESMA shall fulfil a coordination role with respect to competent authorities with a view to building a common understanding of DLT and DLT FMIs, to establishing a common supervisory culture and the convergence of supervisory practices, and to ensuring consistent approaches and convergence in supervisory outcomes³⁰².

ESMA plays a significant role in the learning process by mere coordination of all competent authorities. Although this will in time serve great benefits to each national authority, it puts forward a bureaucratic process, which could slow things down³⁰³.

The final assessment report³⁰⁴ of the Pilot Regime will be carried out by ESMA and presented to the Commission, which will in turn present their findings to the European co-Legislator, the EU Parliament and the Council.

Given the extent of the power attributed to ESMA by DLTR, it may be fair to say that this updated role could serve as a *prova generale* for the Agency acting as an EU-wide supervisor of financial markets, with quasi hard power.

4.2 The sandbox objective – a regulatory tug-of-war

4.2.1 Suitability to sandbox characteristics.

In trying to define the objective of a regulatory sandbox, the author agrees with Ringe and Ruof in that the real challenge is to design a regulatory environment that is flexible enough to accommodate new fundamental changes to markets and, at the same time, is able to create

³⁰¹ DLTR, Art.11§6.

³⁰² DLTR, Art.11§5.

³⁰³ Zetzsche 2022, p.234.

³⁰⁴ DLTR, Art.14.

regulatory certainty for all market participants³⁰⁵, what is referred in the current study as a *regulatory tug-of-war*. Conceptually, a regulatory sandbox has certain common characteristics³⁰⁶:

i. Entry Conditions,

Under current practice, sandbox participants are generally not only incumbent financial institutions, or at least, are in the process of authorisation. In certain instances, no regulated entities are allowed³⁰⁷, however that would go against the principle of the a level playing field. Nevertheless, the fact that only incumbent firms may join the Pilot Regime seems like a step-back³⁰⁸, even though firms may request a specific permission to operate a DLT FMI, without having to conform to any provisions against which an exemption is also requested³⁰⁹.

ii. Investor (consumer) safeguards;

EU traditionally holds investor protection, especially that of the retail investor as a core objective of financial regulation. As such, one should expect that in the application of the current sandbox, that practice will still be upheld.

iii. Restricted Timeframe;

Interestingly, the timeframe of DLTR is actually quite lengthy. The initial run-down of the regime will be 3 years, with the possibility for an extension for another 3 years³¹⁰. There are no other provisions restricting participants to an *y* or *z* time until being forced to exit, unless ‘kicked’, or even restricting the number of participants in the first place. This goes against current practice, as most sandboxes have a duration of no more than a year³¹¹, which in turn may put great pressure on the competent authorities regarding their supervision and enforcement on participant’s exit strategies, given that the amount of market value and interconnectedness those sandbox participants will have accrued over the course of 3 or even 6 years may be considerable.

³⁰⁵ Ringe 2020, p.606.

³⁰⁶ For a comprehensive overview of the ‘sandbox’ phenomenon, see Zetzsche D. et al. (2017) *Regulating a Revolution: From Regulatory Sandboxes to Smart Regulation*, 23 *FORDHAM J. CORP. & FIN. L.* 31.

³⁰⁷ Ringe et Ruof 2020, p.608.

³⁰⁸ This idea is prevalent in the (limited) legal theory around DLTR.

³⁰⁹ DLTR, Art.8,9,10 §2.

³¹⁰ DLTR, Art.14 and Art.19.

³¹¹ *Ibid supra* note 307.

iv. Relaxation of the regulatory burden;

The study has already discussed this topic in depth. Naturally, a lot of ambiguity remains in anticipation of the competent authorities and ESMA to actually shape the scope and breadth of the exemptions. Given that only incumbent firms are able to join, it seems that relaxing the regulatory burden was not a prerequisite of the Pilot Regime in order for a fruitful learning process, rather a concession to make experimentation with DLT as a FMI, potentially more attractive³¹², to promote its uptake. Relaxing the regulatory burden serves, to the author's opinion, as a mere confirmation by the European legislator, that the current framework was simply not technology neutral, thus unable to accommodate DLT as a market infrastructure; this is corroborated by DLTR Recital (30). Even though the EU principle of technological neutrality should in principle be upheld to ensure, inter alia, a level playing field, it is also fitting to note that the reason a sandbox is established in the first place, is exactly because the 'one size fits all' approach isn't always the best one when it comes to testing new technologies. As a result, the European legislator could have gone a lot further, by, perhaps, tighter time-frames, or by introducing participation in cohorts as is FCA's practice.

v. A predefined exit strategy.

The importance of a solid exit strategy, especially in light of the extended time frame has been already addressed just above. DLTR does indeed require that such strategy be known to the competent authority, as a *sine-qua-non* for authorisation.

4.2.2 Suitability to achieve the benefits of a sandbox

Any shortfall, as well as the success of the Pilot Regime will in fact be judged after its implementation. There is no telling what the co-legislator will deem as a success or a failure, since no benchmarks have been announced or target status set. Even so, in a first step, a consideration can be made on how the EU Pilot Regime fares against the objectives of a sandbox³¹³. Moreover, legal theory³¹⁴ identifies certain aspects of a sandbox, which contribute to meeting that objective.

³¹² For example, retail participation.

³¹³ See above, chapter 1.2.

The market can seriously benefit from a sandbox application mainly because it can directly address regulatory uncertainty³¹⁵. That uncertainty can act as a market barrier, which even large financial institutions may find difficult to overcome. By having the rules of the game defined to the extent necessary to allow for real-world application, participants may actually engage with technologies situated in previously uncharted waters. Having those rules uniformly applied further strengthens the confidence of participants in that (sandbox) initiative. In that vein, an openness to innovation, through a smooth(er) authorisation process and closer, therefore more efficient supervision can not only reduce the time-to-market cycle that the EU desperately needs in relation to FinTech products, but also help communicate a signaling effect to the market of open mindedness, in a bid to attract new start-ups or even major financial institutions experimenting with Financial Technology. Consumers can also benefit directly, through innovative more efficient products, delivered in a much shorter time since their inception; as well as indirectly, as these products will have been exposed to the supervisor already, a crucial detail which renders them more user friendly. Ideally, potential risks will have been made clearer and as such mitigated. Following previous point, the regulator(s) themselves is exposed to the learning process. They can collect huge volumes of data. That data may be used to enhance the supervisory outcome, or even, be applied directly into developing their own side of FinTech, ‘RegTech’ and ‘SupTech’. In the end, the combination of the above may further foster innovation through competition within the unfortunately heavily concentrated financial markets, by lowering the entry barriers thus allowing smaller entities with highly innovative financial products to enter the markets.

In truth, there can be no certainty whether DLTR will indeed be able to attain all, or any, of the desired outcomes. In fact, the European legislator’s refusal to relax the entry barriers inside the financial markets, through the sandbox, remains a thorn in the side of the Pilot Regime³¹⁶. Nevertheless, the legal certainty, which in any case presented the greatest hindrance for any meaningful engagement with DLT up until now, has been tactfully addressed. And that, in fact, not through detailed provisions being addressed to national authorities, but through the

³¹⁴ Ringe and Ruolf 2020 and Zetzsche et al. 2017,2022. The following analysis heavily relies on the former, pp.613 ff..

³¹⁵ This has been identified by EBA ever since 2017 in EBA DP/2017/02, p.45 and is reiterated by Ringe et Ruolf (2020a).

³¹⁶ Ringe et Ruolf 2020b. With their follow up article, Ringe and Ruolf present their thoughts on the Proposal for a DLT FMI sandbox; their critique, but also praise, coincides with the current analysis.

nomination of ESMA as the surveyor of DLTR's uniform application throughout the Union. Significant attention has been given to the learning process as well. What is more, in the context of the EU, competent authorities of MSs without deep capital markets are now able to equally engage in that process, in turn reducing the incentives to attract financial institution through a race-to-the-bottom type of regulatory arbitrage.

In the end, by having ESMA as the main regulatory and supervisory actor, although not with direct powers, owing to the Meroni doctrine³¹⁷, DLTR introduces a true Union wide sandbox, far surpassing what Ringe et Ruolf anticipated in their article³¹⁸. However, they were right to highlight the notoriously slow-moving European legislature procedure as a faltering point for financial innovation. And indeed, it will take 3 years since the announcement of DFS 2020 to a working DLT as FMI sandbox. Ultimately, the greatest shortcoming of DLTR is that it is only limited to DLT market infrastructure, instead of setting the scene (obviously through a different scope) for the creation of ad hoc Union sandboxes, where the need arises. We have to be grateful, however, for this Regulation constitutes a step in the right direction.

Concluding Remarks

DLT first appeared in the distant 2008 as means of payment without intermediaries. As a cryptographic and privacy-oriented application, its use remained limited to decentralised financial eco-systems as technology persistently linked with the unregulated crypto-assets.

However, DLT offers significant efficiency gains when used as a financial market infrastructure technology. Its benefit isn't limited to fast transaction time, as that can already be achieved by legacy systems. In fact, DLT offers efficient risk management and efficiency gains linked with its disintermediation capacity, rendering multiple consolidation redundant. As a result interest in DLT has undeniably grown, with various financial entities, and as a result various jurisdictions, anxious to capitalize on its promise.

Even so, risks arising from the use of DLT are undeniable. As a nascent technology, it is plagued with technical shortcoming that may pose serious risks in the context of the functioning of a FMI, as in the case of a code exploit by an (cyber-)attacker. Perhaps the biggest obstacle,

³¹⁷ As a quick reminder, the Meroni doctrine, which arose from Cases C-9/56 and C-10/56 of the CJUE, precludes any discretionary actions from a Union Agency, which is not provided for in the Founding EU Treaties.

³¹⁸ In relation to the sandbox's internal mechanisms and balance of competences, even if ESMA has 'soft powers'.

however, was the legal ambiguity regarding its use, as the financial regulation landscape was not technology neutral in its entirety.

The European legislator, having in mind both the opportunity posed by DLT, as well as its risks, acted by enstating a Union-wide Pilot Regime to experiment with its adoption as a financial market infrastructure, i.e. a DLT MTF, a DLT CSD, as well as their consolidated version, which allows for trading and settlement of securities by the same entity, the DLT Trading and Settlement System.

That Pilot Regime, heavily resembling that of a ‘regulatory sandbox’ not only defines the scope of action of market participants, drastically reducing regulatory uncertainty, but also relaxes in certain aspects the regulatory burden posed on participants, where the legislator has explicitly allowed so. The new principle-based approach is supported by the updated role of ESMA in the uniform implementation of that Regime in the EU, making it a true quasi-supervisor.

Although truly innovative, the EU DLT regulatory sandbox has not been as open-minded as some, including this author, would have hoped. It constitutes, however, a step in the right direction, not only because of the U-turn on the rules-based approach usually attributed to the EU legislator, but also thanks to their forward thinking, which began from the inception in 2020 of the Pilot Regime and led to its adoption 2 years later.

There is much anticipation and legal interest surrounding this new initiative. However, the sole indicator of its success will be the industry’s level of adoption.

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