

Dr Tomasz Tomczak, LL.M.

University of Opole

ORCID: 0000-0002-8499-4553

e-mail: tomasz.tomczak@uni.opole.pl

'Advantages' of distributed ledger technology and the DLT Pilot Regime¹

„Zalety” technologii rozproszonych rejestrów a rozporządzenie pilotażowe DLT

Abstract

The aim of the DLT Pilot Regime is to allow for the development of crypto-assets that qualify as financial instruments and for the development of distributed ledger technology. This development is sought, among other things, by allowing some DLT market infrastructures to be temporarily exempted, under certain conditions, from some of the specific requirements of Union financial services legislation that could otherwise prevent operators from developing solutions for the trading and settlement of transactions in crypto-assets that qualify as financial instruments. Distributed ledger technology is often presented as revolutionary technology that will change the future. This paper will examine to what extent each of the indicated in this article 'advantages' of DLT is implemented by the DLT Pilot Regime. Such analysis allows us to assess how DLT-friendly this Regulation is.

Keywords: DLT, blockchain, capital markets, capital market, DLT Pilot Regime

JEL: K22, K23, K29, K33, O00, O30, O31

Streszczenie

Celem rozporządzenia pilotażowego DLT jest zezwolenie na rozwój kryptoaktywów, które kwalifikują się jako instrumenty finansowe, i rozwój technologii rozproszonych rejestrów. Rozwój ten ma być umożliwiony między innymi dzięki tymczasowemu zwolnieniu, pod pewnymi warunkami, pewnych infrastruktur rynkowych opartych na DLT z niektórych szczególnych wymogów unijnych przepisów dotyczących usług finansowych, które mogłyby w przeciwnym razie uniemożliwić operatorom opracowywanie rozwiązań w zakresie obrotu kryptoaktywami kwalifikującymi się jako instrumenty finansowe i rozrachunku transakcji związanych z takimi kryptoaktywami. Technologia rozproszonych rejestrów jest często prezentowana jako rewolucyjna technologia, która zmieni przyszłość. W niniejszym artykule przeanalizowano, w jakim stopniu każda ze wskazanych w tym artykule „zalet” DLT jest wdrożona w ramach rozporządzenia pilotażowego DLT. Taka analiza pozwoli ocenić, do jakiego stopnia to rozporządzenie jest przyjazne tej technologii.

Słowa kluczowe: DLT, blockchain, rynki kapitałowe, rynek kapitałowy, rozporządzenie pilotażowe DLT

Introduction

Regulation (EU) 2022/858 of the European Parliament and of the Council of 20 May 2022 on a pilot regime for market infrastructures based on distributed ledger technology (hereinafter: DLT) and amending Regulations (EU) No 600/2014 and (EU) No 909/2014 and Directive 2014/65/EU (hereinafter: DLT Pilot Regime) entered into force on 22 June 2022 and became applicable from 23 March 2023 (more precisely see Art. 19(2) of the DLT Pilot Regime). This Regulation is only a test regime (so-called 'sandbox' approach – Zetzsche et al., 2021, p. 205). It will hopefully provide the European Securities and Markets Authority (ESMA) and national competent authorities with

appropriate experience² on the basis of which the fate of DLT on capital markets in the EU will be decided.³

The aim of the DLT Pilot Regime is to allow for the development of crypto-assets that qualify as financial instruments and for the development of distributed ledger technology.⁴ This development is sought, among other things, by allowing some DLT market infrastructures to be temporarily exempted, under certain conditions, from some of the specific requirements of Union financial services legislation that could otherwise prevent operators from developing solutions for the trading and settlement of transactions in crypto-assets that qualify as financial instruments (Recital 6 of the DLT Pilot Regime and Zetzsche et al., 2021, p. 206). Permitted exemptions may contribute to

the development of a secondary market for DLT financial instruments, which could bring multiple benefits.⁵

The DLT Pilot Regime does not refer to all DLT financial instruments⁶ but, simplifying, it applies only to the following:

- a) shares,
- b) bonds or other forms of securitised debt (excluding those that embed a derivative or incorporate a structure which makes it difficult for the client to understand the risk involved); and
- c) units in collective investment undertakings covered by Article 25(4), point (a)(iv) of Directive 2014/65/EU (the so-called MIFID2 Directive).

Furthermore, in reference to each of these types of financial instruments, there are market caps (Article 3 of the DLT Pilot Regime). Therefore, we may have crypto-assets that qualify as DLT financial instruments and which are outside the DLT Pilot Regime. In such case, to issuers of such crypto-assets and to firms conducting activities related to such crypto-assets, a full set of European Union financial service legislation applies (Figure 1). Thus the EU does not treat all crypto-assets as a separate class of assets which does not fall under existing EU laws (Busch, 2021, p. 21).

Those crypto-assets that fall outside the scope of Union financial service legislation and can be currently seen as the unregulated part of crypto-assets markets will be covered by the so-called MiCA Regulation (Tomczak, 2022, p. 365; Tomczak, 2023a; Tomczak 2023b; Zetzsche et al., 2021, 204).⁷

much more modest. Distributed ledger technology is often presented as revolutionary technology that will change the future. The question may be asked as to why this technology has become so popular and continues to attract even more and more attention. The answer to that question is not an easy one. Undoubtedly, crypto-assets are currently one of the main applications of this technology (Recital 1 of the DLT Pilot Regime). In reference to crypto-assets, the following 'advantages' can be found in the literature:

- 1) their existence outside the current system;
- 2) decentralisation (lack of intermediaries);
- 3) anonymity, often called pseudonymity;
- 4) technology security;
- 5) irreversibility of transactions;
- 6) immediacy of transactions;
- 7) lower/lack of transactions costs.⁸

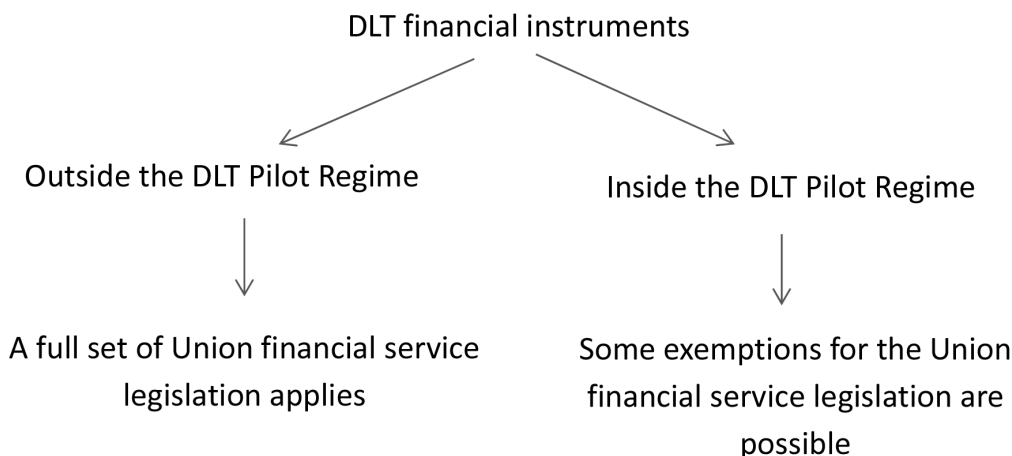
The word 'advantages' was not accidentally put in quotation marks. Firstly, it may be contested whether the above features really constitute advantages. Whether something constitutes an advantage or not often depends on whose perspective we are looking at it from. For example, it is highly doubtful that for supervisory authorities full decentralisation can be seen as an advantage.⁹ Secondly, it may be debatable whether these advantages actually exist. For example, IMF questions whether the costs are really lowered (IMF 2023, 9–10). Thirdly, there are other perceived 'advantages' of DLT that contribute to the substantial attention this technology receives.¹⁰ Lastly, it may be disputed which of these features have been decisive or have had the greatest impact on the development of DLT.

However, the aim of this article is not to critically fully consider those 'advantages'. These features were mentioned only to provide a research perspective – an analysis angle that would make it possible to assess the DLT Pilot Regime.

Aim of this article

The aim of this article is not to conduct complex research on the DLT Pilot Regime, where all the problems and doubts regarding this Regulation will be solved. The goal is

Figure 1
DLT financial instruments and DLT Pilot Regime



Source: own work.

In other words, this paper will examine to what extent each of these 'advantages' is implemented by the DLT Pilot Regime.

Existence outside the current system

Bitcoin is often presented as an answer to the 2007–2008 financial/banking crisis and an alternative to the 'corrupted' financial system (IMF, 2023, p. 5).¹¹ In light of the above, one could ask whether the DLT Pilot Regime provides a basis for creating something that is outside of the current capital markets. On the one hand, this Regulation refers to DLT market infrastructures, i.e. a DLT multilateral trading facility, a DLT settlement system or a DLT trading and settlement system.¹² On such infrastructures only DLT financial instruments¹³ can be traded and settled (ESMA, 2022b, p. 12). An entity that has obtained specific permission to operate DLT market infrastructure¹⁴ will not be allowed to trade and/or settle 'traditional' (account-based) financial instruments on DLT infrastructures. From this perspective, we can say that we have something, at least to some extent, 'separated' from traditional capital markets.¹⁵

However, on the other hand, we must consider whether we have something 'separated' from the current regulatory and supervisory system. According to Recital 3 of the DLT Pilot Regime, the so-called 'tokenisation' of financial instruments means the digital representation of financial instruments on distributed ledgers or the issuance of traditional asset classes in tokenised form to enable them to be issued, stored and transferred on a distributed ledger. As already mentioned, the fact that we will 'tokenise' a financial instrument does not mean that we will evade current financial service legislation. Therefore, we are not speaking about a class of assets that is detached from the current regulatory system. The DLT Pilot Regime only allows certain exemptions from current regulatory requirements.¹⁶ Such exemptions will not be provided 'for free', but a market infrastructure will have to follow the conditions attached to granted exemptions and provide certain compensatory measures.¹⁷

Looking from the supervisory perspective, it may be said that the supervision will not only have a 'traditional' scope, but it will be even more far reaching. The DLT Pilot Regime imposes additional duties regarding cooperation with the competent authorities (Article 11 of the Regulation). In conclusion, the DLT Pilot Regime does not allow the creation of infrastructures which are detached from the current regulatory or supervisory system. This Regulation is not a solution for persons who are against the current financial system.

Decentralisation

Decentralisation or disintermediation (Bains, 2022, pp. 1 and 8) is often highlighted as a significant advantage of

DLT. A characteristic feature of capital markets is the presence of a relatively large number of intermediaries (Bech et al., 2020, pp. 67–71). Trade and settlement of securities usually rely on trusted third parties.¹⁸

For sure, the DLT Pilot Regime does not allow the full decentralisation of DLT capital markets. However, under certain conditions, it allows some disintermediation. Firstly, the DLT Pilot Regime envisages a new type of a market infrastructure, i.e. the DLT trading and settlement system (DLT TSS).¹⁹ As the name of this infrastructure suggests, the DLT TSS combines trading and post-trading activities within a single entity. In reference to traditional securities under existing rules, there is no such possibility (recital 14 of the DLT Pilot Regime). It goes without saying that disintermediation would reduce the number of intermediaries from two to one. Such a reduction could potentially shorten settlement cycles (Bech et al., 2020, p. 75).

Secondly, the DLT Pilot Regime opens the possibility of giving retail investors direct access to trading venues, i.e. without the need of financial intermediaries.²⁰ As is aptly noted in this Regulation, platforms for trading crypto-assets usually provide direct access to retail investors (Recital 5 and 26). It seems that the EU did not want to lag behind in reference to this 'innovation' and decided to at least provide a possibility to test such a solution.²¹ However, this disintermediation is not automatic for DLT infrastructures (DLT MTFs and DLT TSS). An entity has to apply for appropriate temporary permission and a person to deal on his own account as members or participants have to follow certain requirements.²² Furthermore, where the competent authority grants such an exemption it may require additional measures for the protection of natural persons admitted to the DLT market infrastructure (Article 4(2) of DLT Pilot Regime). Such direct access will be given provided that adequate safeguards regarding investor protection will be in place (Recital 26 of the DLT Pilot Regime).

In conclusion, we can say that even if the DLT Pilot Regime does not allow full decentralisation, it allows some level of disintermediation, thanks to:

- 1) the potential combination of trading and settlement, and
- 2) the potential direct access of retail investors.

Thus, the possibility to eliminate at least two intermediaries which exist at traditional capital markets has been temporarily opened. In other words, the DLT Pilot Regime provides a possibility to create a more direct and probably simpler holding system (Bech et al., 2020, p. 79).

Pseudonymity

It is often highlighted in the literature that an inherent feature of crypto-assets markets is a lack of transparency, including the possible anonymity of investors (Tucker, 2009, p. 622). In some recent literature, instead of anonymity, we read about pseudonymity, and this term refers to "the string

of letters and numbers that constitute the 'public keys' of self-custody wallets that often do not require any know your customer procedures to be created" (ESMA, 2022a, p. 6). ESMA recognises that pseudonymity prevails in crypto-asset markets (ESMA, 2022a, p. 6). Anonymity or pseudonymity are features that are especially tempting for criminals and fraudulent individuals (Houben & Snyers, 2018). This problem has been acknowledged by the EU and constituted reasons for the amendment to Directive 2015/849 on the prevention of the use of the financial system for the purposes of money laundering or terrorist financing.²³

In the context of the above, the question may be asked as to whether the DLT Pilot Regime permits anonymous or pseudonymous trade and settlement of DLT financial instruments. Firstly, it should be recalled that this Regulation does not fully eliminate intermediaries, and according to it, intermediaries in trade and settlement will still exist. Thus, there will still be entities that will be obliged to carry out the Know Your Customer (KYC) or anti-money laundering (AML) compliance processes in accordance with the EU and national legislations. Secondly, the DLT Pilot Regime neither provides any exclusions from KYC or AML provisions nor allows for the possibility to apply for exemptions in relation to them.

Based on the above, it may be stated that the DLT Pilot Regime does not change anything regarding the analysed feature. However, it is worth noting that DLT can provide "a single source of truth as to who owns what" (Bech et al., 2020, 74), and this can be useful for compliance processes. This potential benefit is indirectly recognised in the DLT Pilot Regime. The report which will be presented by ESMA to the EU Commission should indicate, *inter alia*, any benefits resulting from the use of distributed ledger technology in terms of potentially enhanced compliance with KYC and AML processes.²⁴ Thus, the technology may turn out to be useful on the capital markets to provide greater transparency.

Technology security

It is often stated that DLT is a better technology than 'traditional' ones. This statement is based, *i.a.*, on the assumption that it is a more secure one, *i.e.* more resilient and reliable (Bech et al., 2020, p. 79). This security results from cryptography and decentralisation of information. The former, simplifying a lot, allows information to be stored and transmitted in such a way that unwanted third parties cannot read the information stored or transmitted (Katz & Yehuda, 2020). The latter makes record keeping safer thanks to the avoidance of a 'centralised points of risk' (Bains, 2022, p. 8). However, what is currently quite rarely noted in the literature is the fact that different DLTs may be underpinned by different consensus mechanisms (Bains, 2022, p. 4). Those different solutions may present different levels of decentralisation and some of the consensus

mechanisms are centralised ones.²⁵ Detailed research on consensus mechanisms show that each of them has not only advantages but also some disadvantages or is linked to certain risks (Bains, 2022, 8–18). The DLT Pilot Regime states that it is technology neutral (Recital 10); however, we will see that some regulatory requirements (*e.g.* regarding settlement finality) may result in some consensus mechanisms being hard to use in practice. Many risks arise not from DLT technology itself but from interoperability issues (ESMA, 2022b, p. 8), and in the literature it is highlighted that "the ability of tokenised systems to interoperate with account-based systems will be key to their success" (Bech et al., 2020, p. 79).

It seems that ESMA is seeing these problems and is not entirely convinced that DLT provides greater technological security. ESMA notes that crypto-assets are connected with some traditional risks but also with some new ones, which are linked to, *i.a.*, the underlying technology (ESMA, 2022a, p. 3).

Probably because of the above, a prudential approach was adopted by the DLT Pilot Regime. Such statement is not difficult to justify since, as was already mentioned, we are dealing only with the test regime (a sandbox). Furthermore, a statement about the prudential approach in reference to DLT can also be derived from certain provisions of this Regulation. An entity applying for specific permission has to provide a description of the functioning of the distributed ledger technology used.²⁶ Furthermore, DLT market infrastructures shall notify, without delay, their competent authorities upon becoming aware of, *i.a.*, 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.²⁷ Finally, the competent authority will withdraw a granted specific permission or any related exemptions where a flaw has been discovered in the functioning of the distributed ledger technology used that poses a risk to investor protection, market integrity or financial stability, and the risk outweighs the benefits of the services and activities under experimentation.²⁸

On the basis of the above-mentioned provisions we can clearly see that the DLT Pilot Regime is 'test and learn' approach whose aim is to assess the effectiveness and efficiency of the technology, *i.a.*, its security. This approach would also allow the national competent authorities and the ESMA to draw lessons from the pilot regime and to gain experience of the opportunities and specific risks relating to crypto-assets that qualify as financial instruments and to their underlying technologies (Recital 6 of the DLT Pilot Regime).

Irreversibility of transactions

Transactions on DLT are often presented as irreversible ones (Nakamoto, 2008, p. 1). This statement is not entirely correct since transactions can be reversed if "actors gain

control over 51 percent of nodes in a network".²⁹ A DLT market infrastructure which will be susceptible to 51 percent attacks should not be granted a specific permission since it will not fulfil the legal requirement of settlement finality. Such a requirement exists on the basis of EU legislation.³⁰

Furthermore, for some DLTs it may be difficult to meet this requirement for other reasons. Some consensus mechanisms provide only settlement probability (not finality) (Bains, 2022, pp. 9 and 17). If that will be the case, the competent authority may refuse to grant a specific permission to operate a DLT SS or DLT TSS since the CSD or DLT TSS is not able to comply with applicable provisions of Union law. Worthy of note is that the EU legislator has acknowledged this problem and allows DLT SS and DLT TSS to apply for an exemption from the settlement finality requirement (Art. 5(7) of the DLT Pilot Regime). However, in such a case, compensatory measures that will meet the objectives of Article 39 of Regulation (EU) No 909/2014 (so-called CSDR) must be proposed.³¹

In addition, DLT SS or DLT TSS must ensure at a minimum, by means of robust procedures and arrangements, that:

a) the DLT SS settles 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 trade;

b) the DLT SS publicly discloses the rules governing the settlement system; and

c) the DLT SS mitigates any risk arising from the non-designation of the DLT SS as a system for the purposes of Directive 98/26/EC, in particular with regard to insolvency proceedings.³²

Currently, it is really difficult to predict what exact remedies will be sufficient for certain competent authorities. It cannot be excluded that this requirement for compensatory measures may render many consensus mechanisms that provide settlement probability inefficient. Whether this will actually be the case, we will probably find out when the ESMA issues appropriate guidance.³³ In conclusion, it may be stated that the irreversibility of DLT transactions does not constitute a problem. On the contrary, the settlement probability of some consensus mechanisms could render them inefficient or even impossible to use in capital markets.

Immediacy of transactions

Another feature which has been put forward to justify the superiority of DLT over 'traditional' technologies is 'immediacy of transactions' (Tomczak, 2020, 96) or their 'higher speed' (IMF, 2023, 9). An instant transfer of assets is possible thanks to a process called atomic settlement (Bech et al., 2020, p. 79). However, to have an atomic settlement, at least so far, both the security and cash have to be on one ledger (Bech et al., 2020, pp. 81–82). In such case,

both the delivery and the payment will be tokenised and that would mean an "entirely new arrangement for achieving DvP" (Bech et al., 2020, p. 78). The above does not refer to all DLT transactions since some consensus mechanisms may be slow, especially "during times of high network traffic" (Bains, 2022, p. 1). In such case, the aforementioned immediacy is not provided (Tomczak, 2020, p. 96).

This potential advantage was noted by the DLT Pilot Regime. Recital 14 of this Regulation states that the use of DLT can expedite and combine trading and settlement in near real-time and could enable the combination of trading and post-trading services and activities.³⁴ Quite clearly, such an advantage can be attained by DLT TSS, which combines trade and settlement. This can be seen as an advantage since currently, as a rule, the settlement cycles in reference to securities worldwide range from two to four days (Bech et al., 2020, p. 68).³⁵

Interestingly and as is aptly indicated in the literature "market participants might not want to move to shorter settlement cycles, as this could increase liquidity requirements and give market-makers less time to source the cash or securities needed for settlement" (Bech et al., 2020, p. 75).³⁶ However, some market participants in the case of certain transactions may be interested in such atomic settlements, and there is no reason why such a possibility should not be provided for them.

However, to have atomic settlements, as mentioned above, we need cash on DLT. Regulation (EU) No 909/2014 (CSDR) encourages the settlement of transactions in central bank money, but so far in the EU we do not have CBDC.³⁷ Where the settlement of cash payments in central bank money is not practical and available,³⁸ it should be possible for settlement to take place through the CSD's own accounts in accordance with the CSDR or through accounts opened with a credit institution (so-called 'commercial bank money').³⁹ As is noted in the introduction to the DLT Pilot Regime, the above-mentioned rule can be difficult to apply for a CSD operating a DLT SS because the CSD would have to effect movements in cash accounts at the same time as the delivery of securities recorded on the distributed ledger. Therefore, a temporary exemption is allowed for CSDs operating a DLT SS from the provision of the CSDR on cash settlement in order to develop innovative solutions under the pilot regime by facilitating access to commercial bank money, or the use of 'e-money tokens'.⁴⁰

We can again see that the DLT Pilot Regime is a test approach. It wants to verify whether instant transactions are really possible and needed on capital markets. Furthermore, it is hoped that maybe some innovative solutions regarding settlement will be invented.

Lower/lack of transactions costs

Broadridge estimated in 2015 that 17–24 billion per year is spent by the industry on trade processing (Broadridge,

2015, p. 2). Tokenisation of securities is seen as a way to lower these costs (Bech et al., 2020, p. 67; Bains, 2022, p. 1).⁴¹

A potential to reduce them exists thanks to, i.e., the possibility to eliminate certain intermediaries (IMF, 2023, 9). Quite obviously, intermediaries are not charity institutions operating free of charge. If we eliminate them, we eliminate their fees.⁴² However, this cost efficiency is not as obvious as it may seem. Firstly, we have to bear in mind that DLT may turn out to be expensive in application on capital markets. Thus, any such reduction of costs may appear to be illusory.

Secondly, we have to bear in mind that the DLT Pilot Regime imposes certain additional requirements in reference to DLT market infrastructures, which may be costly (Article 7 of the DLT Pilot Regime). Thus, costs may be artificially inflated in comparison to traditional infrastructures, or at least it may be more difficult to properly estimate them.

Lastly, market infrastructures which combine trade and settlement (DLT TSS) are only temporarily allowed and are not permitted by existing rules in reference to traditional infrastructures (Recital 14 of the DLT Pilot Regime).⁴³ The EU may abandon in the future the possibility of such disintermediation and subsequent potential cost reduction if clear benefits are not observed or high risks appear.

Conclusions

So far, the EU has not taken an approach to outright ban crypto-currencies, including those which qualify as financial instruments.⁴⁴ It has adopted a test-and-learn position in order to, at least temporarily, allow for the development of crypto-assets that qualify as financial instruments and for the development of distributed ledger technology (Recital 6 of the DLT Pilot Regime). As this article has hopefully shown, that may potentially lead to reducing the complexity in securities settlement, greater transparency of capital markets, increased technology security, acceleration of trading and post-trading processes and the lowering of

transactions costs. Maybe even some other benefits which were not discussed in this article can be achieved.⁴⁵

Whether these benefits are really attainable without accompanying significant risks⁴⁶ will only be seen in the future, when the pilot regime is assessed (Article 14 of the DLT Pilot Regime). National competent authorities and the ESMA, on the basis of the DLT Pilot Regime, wish to gain experience to better understand potential advantages and disadvantages (Recital 6 of the DLT Pilot Regime). The acquired knowledge should help to make targeted adjustments to Union law as regards the issuance, safekeeping and asset servicing, trading and settlement of DLT financial instruments (Recital 6 of the DLT Pilot Regime).

The question, however, arises as to whether the data obtained and the assessment made on its basis will be accurate. The DLT Pilot Regime does not propose a 'legal wild-west' regarding the development of DLT financial instruments and DLT. It maintains a high emphasis on investor protection, market integrity, financial stability and transparency (Recital 6 of the DLT Pilot Regime) and allows only for certain temporary exemptions from current Union financial services legislation. Certain actors may be discouraged to invest heavily in DLT capital market solutions if there is a possibility that a future political decision may wipe out their efforts. In other words, they may think that the EU is trying to take advantage of them by saying: "invest significant resources in technology, provide us with data and go away". It cannot be ruled out that we will encounter such a situation in the future. However, the EU approach seems to be as follows. Current market infrastructures work quite well. Therefore, show us that DLT really brings all the many advantages you often espouse. If this is really the case, the technology will defend itself, and we will integrate it into existing Union financial service legislation.

To sum up, it remains to be seen whether tokens are the future of capital markets. Currently, it cannot be excluded that the securities trade and settlement landscape will change thanks to DLT (Bech et al., 2020, p. 67). The DLT Pilot Regime is a step in the direction of this new landscape. However, it is a step that could be retraced.

Notes/Przypisy

¹ This article is a revised and supplemented paper presented during the conference III Ogólnopolska Konferencja Naukowa "Finanse i Nowe Technologie – aspekty prawne", Opole 19.05.2023.

² See Recital 5 of the DLT Pilot Regime.

³ The first assessment will take place three years from the applicability of the Regulation. For more details, see Article 14 of the DLT Pilot Regime.

⁴ See Recital 6 of the DLT Pilot Regime. This Recital explicitly states that when we try to achieve these goals, we should not forget about preserving a high level of investor protection, market integrity, financial stability and transparency, avoiding regulatory arbitrage and loopholes. In Article 2(1) of the DLT Pilot Regime, distributed ledger technology was defined as 'a technology that enables the operation and use of distributed ledgers'. This definition is followed by the definition of distributed ledger: 'an information repository that keeps records of transactions and that is shared across, and synchronised between, a set of DLT network nodes using a consensus mechanism' (Article 2(2) of the DLT Pilot Regime). The IMF defines DLT as 'a set of technological solutions that enables a single, sequenced, standardised and cryptographically secured record of activity to be distributed and maintained by a network of participants.' (IMF, 2023, p. 6).

⁵ See Recital 4 of the DLT Pilot Regime. In this Recital there is mention of benefits, such as enhanced efficiency, transparency and competition in relation to trading and settlement activities.

⁶ A DLT financial instrument is defined as 'a financial instrument that is issued, recorded, transferred and stored using distributed ledger technology' (Article 2(12) of the DLT Pilot Regime). The ESMA notes that a financial instrument can begin its lifecycle by being issued directly on DLT market infrastructure or, somewhat contrary to the definition ('issued'), where an existing non-DLT financial instrument 'transforms' into a DLT financial instrument (ESMA, 2022b, pp. 17–18). A financial instrument was defined in this regulation as 'a financial instrument as defined in Article 4(1), point (15), of Directive 2014/65/EU' (the so-called MIFID II directive). Currently, one of the most difficult problems is to make a clear demarcation line between crypto-assets that qualify as financial instruments and other crypto-assets. This problem was indicated in: Tomczak, 2022, pp. 370–371. The IMF defines security tokens as 'crypto assets that are usually centrally issued, transferable, and meet the definition of security within the respective definition' (IMF, 2023, pp. 7–8).

⁷ Proposals for the DLT Pilot Regime and MiCA Regulation constituted part of the Digital Finance Package adopted by the European Commission on 24 September 2020.

⁸ Except for the first, these 'advantages' along with their critical analysis can be found in: Tomczak, 2020, pp. 94–99 and to some level in IMF, 2023, p. 9.

⁹ As is noted in the literature "Furthermore, it can be more difficult to supervise participants on a public blockchain because they can be global or unknown, and this challenge can pose risks such as financial crime, or there may be a lack of recourse to end users or no way to fix market errors should any failure or fraud occur." (Bains, 2022, p. 8).

¹⁰ For example, N. Acheson, in the context of Bitcoin, indicates, inter alia, seizure resistance (Acheson, 2021) and IMF indicates also 'financial inclusion' (IMF, 2023, p. 9).

¹¹ Bitcoin should not be classified as a DLT financial instrument, and it was only invoked to show more clearly what this part of the article will be about.

¹² See Article 1 (Subject matter and scope) and Article 2 (Definitions) of the DLT Pilot Regime. The latter provides definitions of, i.a., DLT market infrastructure (Article 2(5)), DLT multilateral trading facility (Article 2(6)), DLT settlement system (Article 2(7)) and DLT trading and settlement system (Article 2(8)).

¹³ Article 2(11) of the DLT Pilot Regime defines a 'DLT financial instrument' as a financial instrument that is issued, recorded, transferred and stored using distributed ledger technology.

¹⁴ In reference to specific permissions to operate DLT market infrastructures see Article 8, 9 and 10 of the DLT Pilot Regime, which refer to specific permission to operate, in turn, DLT MTF, DLT SS and DLT TSS.

¹⁵ In the literature it is properly highlighted that: "The ability of tokenised systems to interoperate with account-based systems will be key to their success." (Bech et al., 2020, p. 79).

¹⁶ See Article 4(2–3) of the DLT Pilot Regime in reference to DLT MTFs, Article 5(2–9) in reference to DLT SSs and Article 6(1) in reference to DLT TSSs.

¹⁷ In reference to compensatory measures see, for example, Article 4 paragraph 1, second subparagraph, point (c) of the DLT Pilot Regime.

¹⁸ For example trading venues, central securities depositories and central counterparties (see Recital 7 of the DLT Pilot Regime).

¹⁹ See e.g. Article 2(10), Article 6 and Article 10 of the DLT Pilot Regime.

²⁰ The obligation of intermediation results from the MIFID2 Directive. At present, traditional multilateral trading facilities are allowed to admit as members or participants only investment firms, credit institutions and other persons who have a sufficient level of trading ability and competence and who maintain adequate organisational arrangements and resources (see Recital 26 of the DLT Pilot Regime).

²¹ Liquidate this 'potential regulatory obstacle' (Recital 26 of the DLT Pilot Regime).

²² See Article 4(2) and Article 6(1) of the DLT Pilot Regime. How requirements for direct access to DLT market infrastructure can be met was, to some level, clarified in: ESMA, 2022b, pp. 12–14.

²³ See, for example, Directive (EU) 2018/843 of the European Parliament and of the Council of 30 May 2018 amending Directive (EU) 2015/849 on the prevention of the use of the financial system for the purposes of money laundering or terrorist financing, and amending Directives 2009/138/EC and 2013/36/EU OJ L 156, 19/6/2018, which introduced to the Directive (EU) 2015/849, i.a., the definition of 'virtual currencies'.

²⁴ See Article 14(1)(k) of the DLT Pilot Regime.

²⁵ Usually private DLTs are more centralised than the public ones (Bains, 2022, p. 8). However, the DLT Pilot Regime does not distinguish between private and public DLTs. The ESMA clarifies that such distinction, as well as the distinction between permissionless DLT and permissioned DLT, were not introduced since the terminology regarding DLT is still evolving (ESMA, 2022b, p. 13).

²⁶ See Article 8(4)(b) in reference to DLT MTF, Article 9(4)(b) in reference to DLT SS and Article 10(4)(b) in reference to DLT TSS, and each of these articles refers to 7(2) of the DLT Pilot Regime, which specifies the mentioned description.

²⁷ See Article 11(1)(d) of the DLT Pilot Regime.

²⁸ See Article 8(12)(a) in reference to DLT MTF, Article 9(12)(a) in reference to DLT SS and Art. 10(12)(a) in reference to DLT TSS of the DLT Pilot Regime.

²⁹ Irreversibility may also depend on the consensus mechanism used. For more details, see: Bains, 2022, pp. 4, 6 and 10–11.

³⁰ See Article 39 of Regulation (EU) No 909/2014 on improving securities settlement in the European Union and on central securities depositories (CSDR).

³¹ See Article 5(7) of the DLT Pilot Regime, which applies to DLT TSS on the basis of Article 6(1) of the DLT Pilot Regime.

³² *Ibidem*.

³³ Article 5(12) of the DLT Pilot Regime states that the ESMA shall prepare guidelines on the compensatory measures referred to in this Article.

³⁴ But see the whole Recital 14 of the DLT Pilot Regime. Also, in the literature it is noted that "DLTs may shorten settlement cycles by streamlining reconciliation processes and reducing the number of intermediaries" (Bains, 2022, p. 15).

³⁵ The authors specify that "the settlement cycle is the period between execution of a trade and final settlement" (Bech et al., 2020, p. 68). See also Article 39(5–6) of the Regulation (EU) No 909/2014 (CSDR).

³⁶ It is also mentioned that in decentralised environments, netting is getting more complex (Chapman et al., 2017, pp. 5–6).

³⁷ See Recital 34 of the DLT Pilot Regime.

³⁸ Recital 34 of the DLT Pilot Regime notes that "Settlement in central bank money could be considered as not practical and available if settlement in central bank money on a distributed ledger is not available."

³⁹ Recital 34 of the DLT Pilot Regime.

⁴⁰ See Recital 34 of the DLT Pilot Regime and Article 5(8) of the DLT Pilot Regime. E-money tokens are a legal category of crypto-assets introduced by the MiCA Regulation. For more on e-money tokens, see for example: Tomczak, 2022, pp. 374–377 or Tomczak, 2023a, p. 41.

⁴¹ Lower transactions costs regarding crypto-assets are usually presented in the context of cross-border payments, not necessarily in the context of securities trade and settlements (IMF, 2023, pp. 1, 9–10).

⁴² However, DLT may involve different types of intermediaries, i.e. validators. As is aptly addressed in the literature, they may also contribute to transactions costs (IMF, 2023, p. 9).

⁴³ In the indicated Recital, it is suggested that the prohibition against such combination stems from policy choices related to risk specialisation and unbundling for the purposes of encouraging competition.

⁴⁴ An outright ban of crypto-assets was proposed by some directors of the IMF (IMF, 2023, p. 2).

⁴⁵ M. Bech and others espouse "increased automation through the use of smart contracts" (Bech et al., 2020, p. 79). In this respect see also: IMF, 2023, p. 10.

⁴⁶ M. Bech and others aptly assert that "Risks rarely disappear, but new technologies may transform them and the way they are managed" (Bech et al., 2020, p. 75).

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Dr Tomasz Tomczak, LL.M.

Associate Professor at the Department of Commercial and Financial Law of the University of Opole (Faculty of Law and Administration). He is an expert in the field of secured transactions, company law and capital markets (including issues related to new technologies). His PhD dissertation entitled *Zabezpieczenia akcesoryjne w kredytowaniu konsorcyjnym – problem separacji podmiotowej* was found outstanding (*cum laude*). A graduate of the University of Wrocław, Radboud University in the Netherlands (LL.M.) and the University of Ottawa (LL.M.). Author of publications in renowned Polish and foreign scientific journals. Attorney-at-law cooperating as of counsel with Wrocław law firms.

Dr Tomasz Tomczak, LL.M.

Pracownik Katedry Prawa Gospodarczego i Finansowego Wydziału Prawa i Administracji Uniwersytetu Opolskiego. Specjalizuje się w prawie zabezpieczenia wierzytelności, spółek kapitałowych oraz rynków kapitałowych (z uwzględnieniem aspektów związanych z nowymi technologiami). Jego rozprawa doktorska pt. *Zabezpieczenia akcesoryjne w kredytowaniu konsorcyjnym – problem separacji podmiotowej* została wyróżniona. Absolwent Uniwersytetu Wrocławskiego, Uniwersytetu Radboud w Holandii (LL.M.) oraz Uniwersytetu w Ottawie (LL.M.). Autor publikacji w renomowanych polskich i zagranicznych czasopismach naukowych. Radca prawny współpracujący jako of counsel z wrocławskimi kancelariami prawnymi.

Przegląd Ustawodawstwa Gospodarczego

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tel. 795 155 583

00-252 Warszawa, ul. Podwale 17