

EUROPEAN SMART REGULATION OF THE DISTRIBUTED LEDGER TECHNOLOGY IN THE FINANCIAL SECTOR

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Abstract: *The distributed ledger technology attracts increasing attention, especially in the financial industry. The contribution attempts to provide a brief overview of ongoing efforts to apply this technological phenomenon on various aspects of financial services and further investigates the role of regulation in regard to this technology with primary focus on the European concept of smart regulation.*

1. Introduction

As many traditional sectors undergo transformation through new technologies, the financial sector still runs mostly on time-proven frameworks, which seemed resistant to rapid technological innovation. These frameworks are, however, under growing pressure for cutting costs and simplifying their structure. An increasing attention is aimed towards the distributed ledger technology (DLT), which may be the key to making financial transactions, their settlement and many other aspects of financial services faster, safer, less complex and cheaper.

2. Distributed ledger technology

The original protocol, called blockchain, serves since 2009 as the framework for the distributed cryptocurrency Bitcoin.¹ Yet, it was soon recognized that the basic concept has much broader application. The technology represents a digital, cryptographic method of a decentralized, transparent ledger. This structure ensures trust in the records through mathematical means without the need for a third, trust-providing party such as central depository or clearing house. It further includes a high level of data security and allows for potentially almost instant record update and review.² The structural basis of this concept is the chain created by the encrypted data blocks holding the records, which is distributed on a multitude of storage devices within the network and kept up to date. The updates ensure that the chains of blocks within the network contain the same records and also that there was no manipulation of the already distributed records. Every update adding a subsequent block to the chain is verified by the network and accepted only if the preceding blocks correspond with the version distributed within the network.³ The blocks hold records which can range from simple, time-stamped transaction information to smart contracts.⁴ The specific features and structure of DLT projects vary based

¹ THE NEW YORK TIMES, An Abridged History of Bitcoin, Timeline. <http://www.nytimes.com/interactive/technology/bitcoin-timeline.html> (all Internet sources accessed on 7 December 2016), 19 November 2013.

² THE ECONOMIST, The great chain of being sure about things. <http://www.economist.com/news/briefing/21677228-technology-behind-bitcoin-lets-people-who-do-not-know-or-trust-each-other-build-dependable>, 31 October 2015.

³ TAPSCOTT/TAPSCOTT, Blockchain Revolution, Penguin Random House, 2016, p. 7.

⁴ Smart contracts are programs adapted to user needs, governing a transaction and executing it algorithmically. Cf. DELMOLINO/ARNETT/KOSBA/MILLER/SHI, Stepped by Step Towards Creating a Safe Smart Contract: Lessons and Insights from a Cryptocurrency

on their expected application. For the application in the financial industry, the ledgers do not feature free access and full transparency of the records like the original blockchain, but are mostly based on limited access available only to participating institutions, in a structure commonly referred to as permissioned distributed ledger. Furthermore, features like rules for creating the blocks, requirements for their validation by the network and network security are mostly solved differently to cryptocurrencies.⁵

3. Significance for the financial sector

The expectations about the impact of this technology on the financial industry are significant.⁶ In 2016, numerous international bodies⁷ and regulatory authorities⁸ released discussion papers and overview reports concerning DLT and its future role in the fintech⁹ industry. Most banks pursue some form of DLT implementation,¹⁰ either as an in-house project or in collaboration with other entities. The most prominent examples of the cooperative efforts are the Hyperledger project, a multi-industry project by the Linux Foundation,¹¹ R3, leading a consortium partnership with over 50 major financial institutions,¹² and the Post-trade Distributed Ledger Group, a group of nearly 40 financial institutions and market infrastructure players.¹³

There are a great number of fintech DLT projects under development, but more importantly, some projects focusing on issues ranging from global payment network,¹⁴ to insurance,¹⁵ to information sharing,¹⁶ to trade¹⁷ and to post-trade¹⁸ processing are already running a trial phase or have announced to do so in 2017.

Lab, in: Clark/Meiklejohn/Ryan/Wallach/Brenner/Rohloff (eds.), *Financial Cryptography and Data Security: FC 2016 International Workshops*, Springer Berlin Heidelberg, 2016, pp. 79–94.

- ⁵ E.g. KAKAVAND/KOST DE SEVRES, *The Blockchain Revolution: An Analysis of Regulation and Technology Related to Distributed Ledger Technologies*, <https://ssrn.com/abstract=2849251>, 6 October 2016.
- ⁶ PALMER, *Chain reaction*. *The Economist*, *The World in 2017*. <http://www.theworldin.com/article/12769/chain-reaction?fsrc=scn/fb/wi/bl/ed/>, 14 November 2016.
- ⁷ E.g. International Monetary Fund. Cf. HE/HABERMEIER/LECKOW/HAKSAR/ALMEIDA/KASHIMA/KYRIAKOS-SAAD/OURA/SAADI SEDIK/STETSENKO/VERDUGO-YEPES, *Virtual Currencies and Beyond: Initial Considerations*. IMF Staff Discussion Note, SDN/16/03. www.imf.org/external/pubs/ft/sdn/2016/sdn1603.pdf, 2016.
- ⁸ E.g. European Securities and Markets Authority or US Federal Reserve. Cf. ESMA, *Discussion Paper, The Distributed Ledger Technology Applied to Securities Markets*, ESMA/2016/773, https://www.esma.europa.eu/sites/default/files/library/2016-773_dp_dlt_0.pdf, 2 June 2016; MILLS/WANG/MALONE/RAVI/MARQUARDT/CHEN/BADEV/BREZINSKI/FAHY/LIAO/KARGENIAN/ELLITHORPE/NG/BAIRD, *Distributed ledger technology in payments, clearing, and settlement*, Finance and Economics Discussion Series 2016-095, Board of Governors of the Federal Reserve System. <https://doi.org/10.17016/FEDS.2016.095>, 5 December 2016.
- ⁹ Fintech stands for financial technology, i.e. approaches to financial services based on new technologies.
- ¹⁰ According to the World Economic Forum report 80% of banks are predicted to initiate DLT projects by 2017, as well as 90+ central banks are already engaged in DLT discussions worldwide. Cf. World Economic Forum, *The future of financial infrastructure, Future of Financial Services Series*, http://www3.weforum.org/docs/WEF_The_future_of_financial_infrastructure.pdf, August 2016, p. 14.
- ¹¹ About The Hyperledger Project, <https://www.hyperledger.org/about>.
- ¹² About R3, <https://r3cev.com/about/>.
- ¹³ PTDL Group. About us, <http://www.ptdlgroup.org/about-us.html>.
- ¹⁴ Visa should launch an initial pilot of such a service in early 2017. Cf. VISA, *Visa B2B Connect: New kid on the blockchain*, <http://visacorporate.tumblr.com/post/152112040533/visa-b2b-connect-new-kid-on-the-blockchain>, 21 October 2016.
- ¹⁵ E.g. ALLIANZ, *Blockchain technology successfully piloted by Allianz Risk Transfer and Nephila for catastrophe swap*, <http://www.ages.allianz.com/about-us/news/blockchain-technology-successfully-piloted-by-allianz-risk-transfer-and-nephila-for-catastrophe-swap/>, 15 June 2016.
- ¹⁶ E.g. NASDAQ, *Nasdaq Linq Enables First-Ever Private Securities Issuance Documented With Blockchain Technology*, <http://ir.nasdaq.com/releasedetail.cfm?releaseid=948326>, 30 December 2015.
- ¹⁷ Application tested by Commonwealth Bank of Australia and Wells Fargo with focus on the global cotton market. Cf. KAYE, *Major banks mark first-ever international trade using blockchain tech*, Reuters, <http://www.reuters.com/article/us-australia-tech-banks-idUSKCN1200DX>, 24 October 2016.
- ¹⁸ Activities like clearing and settlement which take place after the trade is complete. E.g. Axoni's project of a smart contract system for over-the-counter equity swaps is already running a trial. Cf. AXONI, *Axoni Completes Successful Nine-Firm Blockchain Implementation for Equity Swaps*, <https://axoni.com/updates/axoni-completes-successful-nine-firm-blockchain-implementation-for-equity-swaps>, 18 October 2016.

Despite this innovative surge, there are still significant obstacles to widespread adoption of DLT. Some technological hurdles relate to characteristic features of this technology, mainly the inherent immutable nature of the entered records. There are, however, signals that such issues are not insurmountable.¹⁹ Problematic is also the functionality aspect of the broad distribution, because the individual ledgers cannot be efficient without available interoperability protocols and standards. Dealing with this issue remains the main objective of the cooperative efforts, with one possible solution being the open source distribution of the core elements, like in the case of the platform R3 Corda.²⁰

4. Smart regulation in the European Union

The new technological dimension of financial services presented by DLT poses the question of appropriate regulatory response. From a general perspective, the element of newness²¹ for the financial processes presented by this technological solution creates a necessity for regulatory reconnection.²² The variable and relentless innovation of technology in general requires constant adaptation of the regulatory regimes in order to manage their obsolescence;²³ so does the broad adoption of DLT. The lack of a corresponding regulatory framework would inevitably lead to some form of «pacing problem».²⁴

The influence of the regulator on the technological design is more likely to be embraced during the early phase of the adoption.²⁵ Yet, at this stage, the regulating authority is provided only with limited information on the final form of the transformation regarding the regulated environment, which leads to difficulties in terms of forming a suitable regulatory framework.²⁶ The regulatory authority is thereby faced with an uncertainty paradox,²⁷ as reformulation of the regulatory regime is needed, but the changing technological landscape is providing a limited ground for specific rules.

This has been recognized on the European regulatory²⁸ as well as the legislative level. The European Parliament adopted on 26 May 2016 a resolution on virtual currencies,²⁹ which summarized opportunities and risks related to the DLT based innovations, going beyond the scope of virtual currencies and envisioning further potential uses in the area of financial services. In this resolution, the European Parliament formulated basic outlines of the smart regulation of DLT, which should be proportionate, avoiding stifling the innovation, but responsive to challenges created by the widespread use of DLT.

In order to approach the regulation of DLT in accordance with the concept foreseen in the resolution, an overall assessment is needed to determine how the new technology fits into the pre-existing legal and regulatory

¹⁹ ACCENTURE, Accenture Debuts Prototype of «Editable» Blockchain for Enterprise and Permissioned Systems, <https://newsroom.accenture.com/news/accenture-debuts-prototype-of-editable-blockchain-for-enterprise-and-permissioned-systems.htm>, 20 September 2016.

²⁰ KELLY, Blockchain platform developed by banks to be open-source, Reuters, <http://www.reuters.com/article/us-banks-blockchain-r3-exclusive-idUSKCN12K17E>, 20 October 2016.

²¹ PRICE, The Newness of New Technology, *Cardozo Law Review*, 22 (5–6), <https://pdfs.semanticscholar.org/7fb5/4c29be887051072d0bdb8a34698ebf018ce3.pdf>, 2001, p. 1885.

²² BROWNSWORD, *Rights, Regulation and the Technological Revolution*, Oxford University Press, 2008, pp. 160–185.

²³ BENNETT MOSES, *Recurring Dilemmas: The Law's Race to Keep Up with Technological Change*, UNSW Law Research Paper, No. 2007-21, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=979861, 11 April 2007.

²⁴ MARCHANT/ALLENBY/HERKERT (eds.), *The Growing Gap between Emerging Technologies and Legal-Ethical Oversight*, volume 7, International Library of Ethics, Springer, 2011.

²⁵ HUGHES, *Technological Momentum*, in: Marx/Roe Smith (eds.), *Does Technology Drive History? The Dilemma of Technological Determinism*, MIT Press, 1994.

²⁶ COLLINGRIDGE, *The Social Control of Technology*, Palgrave Macmillan, 1981.

²⁷ VAN ASSELT/VOS/FOX, *Regulating Technologies and the Uncertainty Paradox*, in: Goodwin/Koops/Leenes (eds.), *Dimensions of Technology Regulation*, Wolf, 2010, p. 259.

²⁸ MERSCH, *Speech: Distributed Ledger Technology: role and relevance of the ECB*, 22nd Handelsblatt Annual Conference Banken-Technologie, <https://www.ecb.europa.eu/press/key/date/2016/html/sp161206.en.html>, 6 December 2016.

²⁹ European Parliament Resolution of 26 May 2016 on Virtual Currencies, 2016/2007(INI), P8_TA(2016)0228, <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+TA+P8-TA-2016-0228+0+DOC+PDF+V0//EN>.

landscape of the more generally applicable rules.³⁰ The initial assessment of the situation was already included in the resolution. According to this the current European legislation for the financial sector could provide a basic regulatory framework for DLT based platforms, but additional tailor-made legislation might be needed. Beyond that, a more in-depth analysis is necessary and it is therefore suitable that the resolution also forms a basis for the creation of a horizontal Task Force on DLT under the European Commission. This should facilitate expert discussion across sectors, identify standards for best practice, but most importantly, assess the existing European regulation and suggest appropriate updates in response to widespread DLT adoption. Given the essential role of the assessment, which the task force is meant to provide, to the formulation of a smart regulation for DLT, the gradual process of formation of this task force is rather disconcerting. This is due to the increasing urgency of such analysis, bearing in mind that delayed regulatory response may be facing an established technology design, modifications of which may be increasingly difficult to implement.

At the same time, the amendment of the regulation should not be limited to a specific use of the technology. The increasing pace of technological innovation is likely to turn use-specific rules soon obsolete, intensifying the division between applicable rules and reality. There are also other arguments for a more technology and purpose neutral approach,³¹ or, at least, for regulatory framework, which is designed to flexibly adapt to changing technological possibilities. The resolution of the European Parliament mentioned above is primarily focused on the application of DLT to virtual currencies, where its use is currently most advanced. However, as I attempted to present in this contribution, the relevance of this technology is much broader and the alternative applications need to be taken into consideration during the formation of the smart regulation. Otherwise the regulatory framework for DLT could fall short of its target.

For the gap between technological and regulatory dimension to stop widening, a smart approach to smart regulation is needed, one that allows for rules that are applicable beyond the scope of the imminent technological horizon, as many potential forms of this and other new technologies will always remain unobservable from today's perspective.³²

5. Conclusion

This contribution was aimed at providing a short overview of the current potential of the distributed ledger technology in the financial sector and a limited discussion of the European smart regulation. Significant attention is being devoted to DLT by major commercial as well as institutional entities, with the first examples of later phase implementations already being introduced. Current measures taken towards smart regulation of DLT in the European Union signal progress in the right direction, yet further steps are needed before long, in order to create a regulatory environment that is reflecting the change about to be brought by this new technology in the financial sector.

³⁰ BENNETT MOSES, *How to Think about Law, Regulation and Technology: Problems with «Technology» as a Regulatory Target*. *Law, Innovation and Technology*, volume 5, issue 1, <http://www.tandfonline.com/doi/abs/10.5235/17579961.5.1.1>, 2013, p. 9.

³¹ BENNETT MOSES (note 30), p. 15–16.

³² GANASCIA, *Commentary on the Onlife Manifesto*, in: Floridi (ed.), *The Onlife Manifesto. Being Human in a Hyperconnected Era*, Springer Open, 2015, p. 25.