

DISTRIBUTED LEDGER TECHNOLOGY CHALLENGING ANTI-TRUST AND COMPETITION LAW

Stephan U. Breu

Doctor of Science, Professor and President
Johan Heinrich Pestalozzi Christian University, Miami, USA

Veljko Milutinović

Docotr of Science, Professor and Dean
Megatrend University, Belgrade, Serbia

Key words: regulation, distributed ledger technology, block chain, anti-trust competition law

Introduction. Since the appearance of Distributed Ledger Technology there is a new field of challenges to regulators and authorities opening up. Most attention in the public and media has been put on the Bitcoin-Blockchain based on the Open Distributed Ledger Technology. Blockchains are basically algorithm with decentralized data storage on a peer-to-peer network lacking a centralized administration. The software for most blockchain applications is open source and keeps the ledger of all transactions ever occurring on public files. If a blockchain is administrated, it is not an Open Distributed Ledger anymore.

The inherent decentralizing and anonymity aspects of DLT makes it difficult to define an appropriate jurisdiction. In traditional law, and in absence of any agreement stating otherwise, DLT disputes are normally settled by state courts. But state courts mostly do not have the authority and tools to act in this environment. Missing a clearly defined legislative umbrella for transaction with DLT the regulators have to concentrate on the gatekeepers between the Distributed Ledger and the real world. Here they can regulate through compliance regulations or through determining which ledger is recognised within the existing legal and regulatory system. International initiatives for developing international law for facing the new challenges will be necessary for the future.

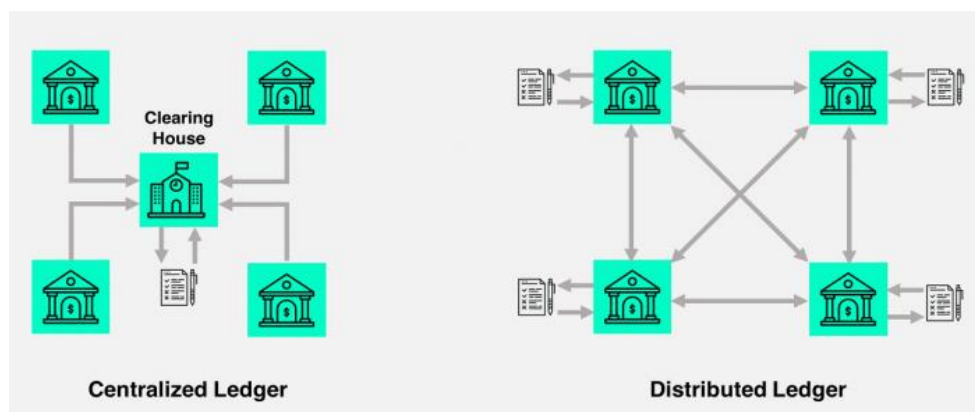
Methodology and literature review. Still, the fact that some researchers state that Bitcoin with its underlying block-chain has already started to create a supranational economy in which the classical idea of a legal person is obsolete, (Starodubcev, «Bitcoin created a supranational economy», 2016) this paper aims to start discussing the possible frictions between blockchain applications, their stakeholders and legislative and regulative authorities. The main challenge for regulators and society is an increasing asymmetry between the blockchain industry, its stakeholders and the legal system and consumer. Today's approach by various governments to implement more and more legal restrictions on the internet will not prove sustainable (UNESCO, 2017/2018, World Trends, 2017) DTL and Blockchain technology is definitely a challenge to legislative

and regulative authorities that is asking for massive capacity building and adjustments of existing legal frameworks to give an answer to the challenges of tomorrow.

Short introduction to Distributed Ledger Technology (DLT). Ledger Technology has been used for a long time even before the digital version of it existed. Maintaining ledgers is a fundamental tool for accounting since the beginning. The technologies to maintain the ledgers might have changed over time but one thing was always inherent- a third party was registering, validating and overlooking each transaction. This was a basic for the validation and trust the involved parties had into this accounting system.

Distributed Ledger Technology (DTL) is now the first form of ledger that is not relying on any third party for verifying and registering transactions. It delegates the maintenance of the ledger and the responsibility to validate into the hands of all user of the ledger. This creates a decentralized system of a data register that is transparent, reliable, fast and incorruptible.

Analysis. Through its dynamic form DLT has much more potential than static paper-based Ledgers. As we already know DLT data are not secured and verified at a centralized place which could become a Single Point of Failure. DLT is avoiding the inclusion of any central authority or intermediate to process, validate or authenticate data. Data will only be included in the DTL after consensus of all parties maintaining the system is reached.

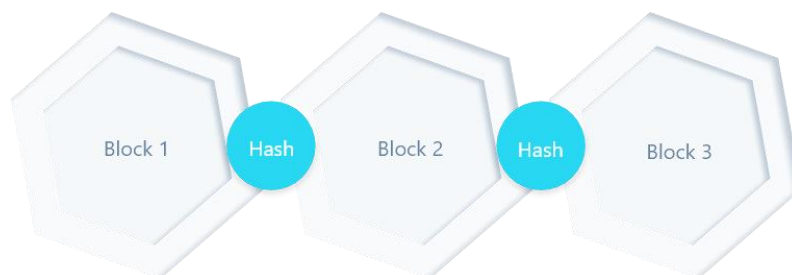


Copyright: [www.krypto-vergleich.de /distributed-ledger-technology/](http://www.krypto-vergleich.de/distributed-ledger-technology/) - Was ist Distributed Ledger Technology und wie funktioniert es; retrieved April 4, 4021

For inclusion into the DLT all new data will be stamped with the date and time and will be referenced with a unique cryptographic signature. All participants of the DLT can at all time access all data and therefore there is a verifiable and auditable history of all information in a dataset available.

A Distributed Ledger is decentralized through its technology. As soon as any administrator has the control over the network it is not decentralized anymore. So DTL is a first step towards Blockchain technology. But it is important to understand that DTL do not necessarily build up blockchains. It can also be used to build other networks that are maintaining decentralized datasets securely.

Still Blockchain is the most prominent application using Distributed Ledger with a very specific technological basis. In blockchains, groups of datasets with cryptographic signatures are linked to each other to build a chain of datasets. One of the best example for such an Open Distributed Ledger is Bitcoin as the leading Cryptocurrency.



Copyright: <https://tadeix.com/didtributed-ledger-technology/>; the Difference Between Blockchain and Distributed Ledger Technology; retrieved April 4, 2021

The conclusion is that Distributed Ledger Technology and Blockchains are not the same. Blockchain is in any case using DTL but DTL has not to be a blockchain in each case. The potential of DTL in the future is far greater than solely the use of blockchains, going into multiple areas of our business and private life.

Blockchains and it's most prominent application Bitcoin. We have seen that Blockchains are Distributed Ledger so basically an algorithm with decentralized data storage, lacking a central administrator, and where the participants know nothing on each other. Best known as the technology behind bitcoin as the leading cryptocurrency. Bitcoin and its underlying blockchain technology were first introduced by Satoshi Nakamoto in his paper “Bitcoin: A Peer-to-Peer Electronic Cash System” (Satoshi, 2008).

The whole software for cryptocurrencies is open source and keeps the ledger of all transactions ever occurring on public files. The records of all transactions are secured on the computers that build this ledger, but not the whole ledger on all but only small blocks with references to other blocks on all these computers worldwide, linked and secured using cryptography. This means, any alternation of any block cannot be done without alternation of all subsequent blocks which makes the system permanent, efficient, incorruptible and auditable. So, each transaction and its identification is validated by at least three parties involved in maintaining the whole system and “mining” new blocks of information containing data relating to the actual transaction.

By solving mathematical problems presented by the system these blocks are added to the existing blockchain, so all members of the system have access to the data. If a transaction is not verifiable with the existing blockchain the new blocks will not be integrated and so the integrity of the system is guaranteed. Blockchains have been described as potential secure and efficient solution for several applications^{4 5 6}. (Plant, 2017, Popper, 2017, Arthur, 2017) It is also widely expected that blockchains will track integrity and provenance of other special products like pharmaceuticals, diamonds or seafood in future. Blockchain will change the way of exchanging data and the ability to transact globally in various fields, including financial services. Beside the public blockchains, like the one used by bitcoin, there are new applications like consortium blockchains where the consensus process is limited to predefined nodes of the blockchain i.e. participants and members of the consortia. The access to the blockchain can be public or restricted or even hybrid. In a fully private blockchain the write permission is kept by one organisation but it might be possible to have public reading permission or even that could be restricted to certain stakeholders of the blockchain. In contrast to the public blockchains, consortium or private blockchains can easily change rules and entries in the ledger and even revert processes. But having a central entity controlling the blockchain and being capable of interfering with the algorithm, especially for the challenges discussed in this paper, might solve the problem to define a responsible legal entity and take legal actions against it. This makes a big difference to Open Distributed Ledger Technology where such a legal entity is difficult to define.

Legal Responsibility in an Open Distributed Ledger using Artificial Intelligence. Especially Open Distributed Ledger that have no administrator with any possibility to interact with the decentralized ledger are creating a new challenge to our law systems. The inherent decentralizing aspects make it difficult to define an appropriate jurisdiction. In traditional law, and in absence of any agreement stating otherwise, disputes regarding legal problems involving DLT are normally settled by state courts. But the inherent structure is creating nearly insoluble problems to such state courts. Transactions are conducted completely independently from the physical location of the involved legal entities. Stakeholders can act in various jurisdictions simultaneously in high anonymity with decentralised storage on large peer-to-peer computer networks. Bitcoin with its underlying blockchain has already started to create a supranational economy in which the classical idea of a legal person is obsolete (Starodubcev, 2016) whereas the supranational law is not really designed to address these new developments yet .

As the courts and states have enormous problems to tackle in these new scenarios there are some ideas how to come into a position to be able to regulate the markets beside self-regulation. One opinion on this jurisdictional issue is: “that at a simple level, every transaction potentially comes under the legislative umbrella of wherever the node

exists whether in respect of financial services or data protection.” (Brandman, 2016). Whereas the author also states that this means that blockchains would then need to be compliant with a potentially unwieldy number of legal and regulatory regimes. Given this, the locus of a relevant “act” could be unclear as the transactions may have occurred simultaneously in a few different places, which again makes it nearly impossible to determine the competent jurisdiction. The unsolved questions regarding competence of jurisdictions in these new challenges of the new digital economy will become more and more important in our business and private life.

Whether in a distributed ledger, a blockchain consortia or a private blockchain, a deep cooperation and interaction between stakeholders is necessary to take full advantage of the potential. Blockchains are unified platforms with unified processes to maintain its structures. Attention has to be paid to the fact that all information shared between the stakeholders are only used to help the consortia to achieve legitimate goals and not violate competition laws and regulations. In future artificial intelligence could open a completely new field as blockchains will start to operate independently to optimize prices and profits by using the data stored within the ledger and trigger decisions and actions automatically. For state legislation it is very difficult to implement regulations that have to be followed in a system that is outside its sphere of influence and action. An autonomous system maintained and managed by the users themselves over which no state organization has any influence and control might start a supranational economy in which the classical idea of a legal entity is obsolete.

Legislative and Regulative Approaches. Within this new digital economy there is no technical necessity for the stakeholders to be attached to any jurisdiction. The high degree of anonymity of stakeholders in an Open Distributed Ledger is a extreme challenge for legislation as - for example - will still do not know the real identity behind “Nakamoto Satoshi” who presented the first concept of bitcoin to the public back in 2008. Our existing legal frameworks are based on the state’s monopoly on violence. If any actor decides not to follow the regulator’s regulation he goes to court. But who we can bring to court in a Open DLT?

As first step for implementing regulations some states defined some rules for self-regulation like Switzerland through the Swiss Crypto Valley Association publishing the ICO Code of Conduct for Switzerland in January 2018. Despite the softness of such regulations it is very difficult to establish a harder regime comparable to traditional regulation of markets. Mainly because the concept of legal entities is nearly impossible to maintain with Open Distributed Ledger Technology. All legal entities that can be defined as such are gatekeepers of the underlying blockchain that exists virtually.

As mentioned before, the potential of Open Distributed Ledger Technology can only be presumed today. To quote Leanne Kemp, CEO of Everledger, from the IBM

Institute for Business Value report: “At its core, blockchain is a shared ledger that allows participants in a business network to transact assets where everyone has control but no one person is in control “ (IBM, 19th Edition). Validated supply chains will be available to the consumers, healthcare data will be managed in blockchain consortia models, and financial trading platforms will be managed through blockchains. Smart contracts will facilitate, execute and enforce agreements through blockchain technology and will guarantee proper fulfilment of the agreement and secure storage of data. This technology will make the use of intermediates and middleman more and more neglectable.

Further discussing the challenge to regulate Open Distributed Ledger through state authorities we have to answer some questions first. It seems appropriate to start discussion with the most prominent application based in an Open DLT, today still Bitcoin. On-ledger currencies such as Bitcoin are completely different to sovereign currencies, fiat or not. A Bitcoin can not be exchanged for any commodity as it is not backed by any trusted institution or government. The worth of a Bitcoin is purely a function of the demand in the markets which leads to a significant volatility. For that reason the Bitcoin is traded in the markets more like an asset than a currency.

We should remind that the main purpose of regulating a currency is to make a currency stable and predictable for international trade. Monetary interventions try to control inflation and to store the value to make a currency a fair medium of exchange. But do we have to ensure the stability of a cryptocurrency? As long as there are reliable market information for consumers we can surely delegate the risks of the volatility to the consumers. It is not a problem for regulators to solve (Deloitte, 2016). We should concentrate on the traditional monetary tasks of Governments and their agencies and remember that the fast majority of distributed ledgers operate inside established regulatory regimes.

Early in the history of the Bitcoin there was concern that the anonymity would enable money laundering and fraud easily. These concerns have been proven unfounded.

While the Open Distributed Ledger of Bitcoin itself exists outside of regulatory structures, it must be connected to the real world so for example the market value of a Bitcoin can be realized. These bridges or gatekeepers between the DLT and the real world are today subject to existing regulations and have to adhere to compliance requirements. Through regulation of these gatekeepers regulators have a powerful tool to indirectly manage the ledger itself. This is regardless the ledger’s content: be it assets, contracts or entitlements. To enable the transfer of ownership of a physical asset recorded with DLT, the ledger itself has to be recognized by the legal system. Regulation of Open Distributed Ledger can effectively be organized by determining which ledger is recognised by the existing legal and regulatory system.

The coming years will show an enormous development of blockchain technology impacting all aspects of life on a day to day basis. The main challenge for regulators and society is an increasing asymmetry between the blockchain industry, its stakeholders and the legal system and consumer. Today's approach by various governments to implement more and more legal restrictions on the internet will not prove sustainable (UNESCO, 2017/2018, World Trends, 2017). All regulations and restrictions should consider the specific aspects of Distributed Ledger Technologies and Blockchains and not diminish the potential positive effects of economic growth and innovation.

Conclusion. Distributed Ledger Technology is opening a challenging new field for legislative regulations and law enforcement. The decentralized and autonomous technology and structure of the peer-to-peer network and the complete impossibility of direct intervention by any state institutions poses unseen challenges. Blockchains based on DLT might prove to be agnostic to any jurisdictional rules based on traditional legislative understanding. Blockchain consortia using artificial intelligence will go beyond the market structure as we have it today. Artificial Intelligence combined with a blockchain might well trigger decisions and actions automatically and without interference of any blockchain stakeholders in the future.

By just implement more and more legal restrictions on the internet, state actors will not be successful in regulating the DLT and their blockchains. Such rough intervention will not prove sustainable.

Even if Blockchains based on DLT itself might give great concern to regulators we still have to remind that most DLT applications are operating within established regimes. The ones existing outside of regulatory structures can be strongly influenced indirectly through regulating the gatekeepers that connect the DLT with the real world. Then all content of the ledger has sooner or later to be transferred into the real world. At this stage regulations can be effective.

Still capacity building has to be emphasized to keep the asymmetry of information between regulators and industry as small as possible. Self-regulation by the market players will be necessary to support. International coordination of regulations and addressing the problem of missing legislative umbrellas for decentralized databases can only been addressed globally.

References:

- Nakamoto Satoshi, "A Peer-to-Peer Electronic Cash System", published in November 2008 <https://bitcoin.org/bitcoin.pdf>
- Gregory Brandman, Samuel Thampapillai, "Blockchain – Considering the Regulatory Horizon", July 2016 by University of Oxford, Faculty of Law, Business Law www.law.ox.ac.uk
- Dima Starodubcev, "Bitcoin created a supranational economy", March 17, 2016 by coinfox.info
- Sergii Shcherbak, "How Should Bitcoin Be Regulated?", published Spring/Summer 2014, Vol. 7, Issue 1, European Journal of Legal Studies, www.ejls.eu
- Ajinkya M. Tulpule, "Enforcement And Compliance In A Blockchain(ed) World" January 2017 CPI – Competition Policy International <https://www.competitionpolicyinternational.com>
- Gregory Brandman, Samuel Thampapillai, "Blockchain – Considering the Regulatory Horizon", July 2016 by University of Oxford, Faculty of Law, Business Law www.law.ox.ac.uk
- Crypto Valley Association, "Mission and Policy Framework/General Code of Conduct", published January 2018, <https://cryptovalley.swiss/codeofconduct/>
- Marco Iansiti, Karim R. Lakhani, "The Truth About Blockchain", published January/February 2017 Harvard Business Review, <https://hbr.org>
- UNESCO Global Report 2017/2018 "World Trends in Freedom of Expression and Media Development", published 2017 by UNESCO, www.unesco.de
- Deloitte. Centre for the Edge, "Bitcoin, Blockchain & Distributed Ledgers; Caught between promise and reality", 2016, www2.deloitte.com
- Krypto-Vergleich.de "Distributed Ledger Technology: Was ist DLT und wie funktioniert es"; published 2019 by [Kypto-vergleich.de](http://kypto-vergleich.de)
- Roger Wattenhofer, "Distributed Ledger Technology: The Science of the Blockchain», published March 2017 by CreateSpace Independent Publishing Platform;
- Robert M. Townsend, "Distributed Ledger: Design and Regulation of Financial Infrastructure and Payment Systems", published October 2020 by The MIT Press

Stephan U. BREU, Veljko MILUTINOVIĆ

Distributed ledger technology challenging anti-trust competition law

Key words: regulation, distributed ledger technology, block chain, anti-trust competition law

Distributed Ledger Technology (DLT) enables a way to secure decentralized datasets without involvement of third parties or intermediaries secure, auditable and incorruptible. The specific way of storing data on worldwide peer-to-peer networks makes any attempt to regulate such applications very difficult as they are not residing in a specific area of influence of any given regulation or jurisdiction. DLT might prove to be agnostic to any jurisdictional rules based on traditional legislative understanding. Also in future it might be possible that artificial intelligence could be put into position to trigger decisions automatically based on such applications which will become a major challenge for competition and anti-trust regulators. Based on the Bitcoin technology we will see that there are fair possibilities to regulate the ledgers indirectly through existing legal and regulatory systems. The ones existing outside of regulatory structures could be controlled indirectly through regulating the gatekeepers that connect the DLT with the existing regulated structures. Selfregulation might also play a part to make these technologies widely acceptable.