DLT and crypto-assets

Joachim Wuermeling

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Blockchain technology: hype or hope?

Judging by businesses' media activity in 2018, one could be forgiven for thinking that almost everyone is involved in one distributed ledger technology (DLT) project or another. There are at least two reasons why activity has been so brisk. First, Blockchain and DLT are indeed ingenious technologies. Second, they have made it to the top floor of banks and have become a vehicle for showcasing credit institutions' innovative prowess.

But compared with the years before, the excitement has worn off a little. The most famous DLT prototype, the bitcoin network, which was incidentally mistaken for a new era of finance, not only fell out of favour as bitcoin lost value. It also laid bare some of the technical constraints and trade-offs involved in open Blockchain applications. At around 350,000 payment transactions per day, it only proved capable of processing a tiny fraction of the usual daily transaction numbers (the German payment sector alone registers 75 million daily transactions). So scalability has become a concern for DLT applications. Also, the huge amounts of electricity consumed by the bitcoin network signposted the potential inefficiencies of DLT. Not just that – it also raised a fundamental question about Blockchain technology: when exactly is it certain that a transaction is final? In the bitcoin network, finality is merely a matter of probabilities.

> *"DLT is a matter for forging solutions that can also be deployed in the real world."*
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> - JOACHIM WUERMELING

Many of these issues have been mitigated as DLT applications have evolved. Overcoming the decentralisation paradigm has been important in this regard. Taken to extremes, a decentralised approach – like the one used by the bitcoin network – does not meet a core principle of financial regulation, which requires a specific entity to assume accountability for risks involved in financial services. In a fully decentralised network of miners, where anyone can come and go as they please, no individual node is responsible for the network to work properly, and there is no accountability in the event of theft or manipulation. The financial industry has acted accordingly, dismissing complete decentralisation as an objective. Ledger solutions are usually designed as "closed" and "permissioned" networks, meaning that the network is composed of a small number of authorised entities only. This might have taken away at least some of the original spirit, but it is a sign that Blockchain is growing up and overcoming technical constraints.

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>>> Institutions are pushing ahead with DLT-based applications for good reason. Leaving aside any ideological intentions, there is still a chance that DLT and Blockchain can deliver results which outperform traditional architectures. Improvements could take the shape of better transparency for all contractual parties, simplified reconciliation, traceable and manipulation-proof data, superior operational resilience, and the possibility of using smart contracts to execute processes automatically.

In the end, this could all help save money, time and resources in a variety of business areas, from settling cross-border transactions to setting up Blockchain-based markets and assets. But success will only come if technical, economic and governance issues have been properly addressed. So it can be said that DLT and Blockchain research is no longer a matter of conquering the entire financial sector, but of forging solutions that not only boost process efficiency, but can also be deployed in the real world.

However, the future of DLT and Blockchain in the financial sector also depends on politics. For example, some DLT projects are being held back by legal concerns. That's because widespread acceptance of DLT-based processes is contingent on creating legal certainty in what is, in some cases, still uncharted territory, and this has also led to a patchwork of regulatory requirements across jurisdictions. With that in mind, DLT's fortunes will depend on political will as well. This is no reason for European politicians to blindly give their wholesale backing. But as the concrete value added offered by specific solutions becomes visible, regulators should not hold back on implementation.

Whatever the future holds, financial supervision will remain technology-neutral and will neither hinder nor advocate innovation. But if DLT boosts efficiency and safety in the financial sector, that would surely be a welcome step in the right direction. ●

Klaus Löber

Head of Oversight, European Central Bank (ECB)

DLT, crypto-assets and digital coins – raising to the challenge

Crypto-assets market capitalisation reached its peak in December 2017 before the speculative bubble did inevitably burst. The price of crypto-assets has not recovered since then and, although Bitcoin and the like will continue to exist for some time, the idea that they could replace or compete with sovereign currencies has been largely discredited. However, crypto-assets continue to be supported by a dynamic ecosystem of innovators, entrepreneurs and investors that try to bring about newer generations of crypto-assets such as so-called stable coins or secured token offerings. Attention is also given to ways to represent cash in digital tokenised form, to provide substitutes for traditional account-based settlement. For central banks and other public authorities, it is important to closely follow developments regarding tokenised assets and their underlying technology.

Crypto-assets bear various risks that need to be considered and addressed by relevant authorities. Given their often-pseudonymous nature and the absence of regulated intermediaries, crypto-can serve criminal activities. In that regard, the work of FATF and the forthcoming entry into force of the 5th Anti-Money Laundering Directive that will hold crypto-currency exchanges and wallets accountable is welcome. In addition, the use of crypto-assets may pose consumer and investor protection issues. Central banks along with other public authorities have repeatedly issued warnings that investing in crypto-assets is at the users own risk. Increasingly countries take initiatives to regulate crypto-assets. >>>

>>> The objective to create a safer environment is well intentioned but regulation should avoid incentivising inherently risky crypto-assets activities. Although crypto-assets currently do not represent an immediate threat to financial stability, it is important to make sure that the financial sector remains shielded from potential contagion, for instance by applying a conservative prudential treatment to crypto-asset holdings.

While crypto-assets have so far not proven their economic and social value proposition, the underlying technology known as distributed ledger technology and the tokenisation of assets and cash may have potential applications besides crypto-assets warranting separate analysis. Many financial institutions and central banks, including the ECB, are exploring their potential and the limitations. At the international level, standard setting bodies such as the Committee on Payments and Market Infrastructures develop analytical tools and steer the reflection on risk and opportunities of new technologies and of new variants of assets and cash in tokenised form both for financial activities and regulatory compliance.

The key feature of DLT lies in the possibility for systems involving multiple participants to propose, validate, and record state changes consistently without relying on a central trusted third party. By replacing central account keepers with a distributed consensus mechanism, DLT also enables "tokenisation" of assets. Efforts to create digital settlement assets, often called digital coins, in particular in the wholesale sector, come with promises to enhance settlement efficiency. Often, these initiatives are presented as alternatives to traditional settlement in central bank and commercial bank money. Decentralisation and tokenisation represent potentials to explore as well as challenges that need to be addressed. From a technical point of view, experiments show that, to date, use cases in finance and banking can be conceptually and technically designed in a DLT environment, but that, at the current stage of development, DLT is not mature enough to meet the financial industry's requirements in terms of safety and efficiency. From a legal and regulatory point of view, DLT and tokens raise a series of questions related to legal qualification, governance, finality, interoperability or operational risk management, to cite just a few.

With its Fintech action plan, the European Commission has initiated the reflection on the implementation of regulatory measures that support technological innovation without compromising the financial sector's security and integrity. In particular, it has set up an expert group to assess whether there are unjustified regulatory obstacles to financial innovation in the financial services regulatory framework. ●

Leonardo Badea

President, Romanian Financial Supervisory Authority

Distributed Ledger Technology – the kid is growing up!

We have a saying in Romania "he grows in a year as much as others do in seven"! This is exactly what it comes to my mind when I look at how Distributed Ledger Technology (also known as DLT) has developed over the past years.

Looking at the financial sector, we have to keep in mind as a general matter of fact that it is a highly regulated sector. Indeed, DLT can bring a lot of benefits to the financial sector, but we have to be aware that any new technology that is implemented has to pass a lot of "hoops" before it is adopted on a large scale. Most regulators point out that any distributed ledger technology has to comply with the current regulatory framework. And this is the challenge at the end of the day.

"There is a lot of potential for implementing DLT in Central and Eastern Europe."

- LEONARDO BADEA

If we take a look at the stock exchanges, we can spot many areas where DLT can bring improvements. Of course, DLT can be used for clearing and settlement processes, in post-trade, it can be used to streamline the document flow and even to reduce the involvement of intermediaries with the use of smart. >>>

>>> There is a bright future for DLT in the insurance business, as well. DLT can be used to reduce the costs and increase the effectiveness of regulations for insurers, such as KYC and AML. Another area where DLT can be used is the prevention of risks and fraud detection.

But we have to keep in mind that although DLT can bring a lot of advantages, it will raise a few questions on its own. Of course, the lack of a central database might raise questions about what could happen in case of a failed or erroneous transactions. Cyber threats pose a concern to DLT since it is a decentralized network while another major concern regarding DLT is represented by the legal challenges, quite substantial in the case of cross border transactions.

In CEE region, an example of how a country is quick to adopt and to implement DLT is Poland. The Central Securities Depository of Poland implemented an e-voting solution which ensures a greater transparency regarding the history of their Annual General Meetings and the voting results. Another example in Poland is the bank PKO Bank Polski, which is using DLT to ensure compliance with EU law by organizing the bank's communications with its clients (documents, communications) in a repository based on DLT.

We should not forget Estonia neither, one of the most developed and active countries when it comes to implement new IT technologies in the benefit of its population. It has implemented a digitalization project at country level which reached its climax in 2014, with the introduction of the e-residency program.

So, clearly, there is a lot of potential for implementing DLT in Central and Eastern Europe, with countries from this region being in the center of the new technological revolution. Without any doubt, CEE is quite renowned for its highly skilled and trained workforce. Even more, it is visible that the region is surpassing the stage of being only an outsourcing region and is adopting a more complex role of working together on solutions with their partners, being a potential strategic player in the business. ●

Alan Marquard

Chief Strategy & Development Officer, CLS Group

The optimal model for the application of Distributed Ledger Technology

Successful application of Distributed Ledger Technology (DLT) occurs, if and only if, there is a clear understanding of a business problem. While there has been no shortage of PoCs, not all have been successful in improving existing ways of working – often because the application of DLT was a solution looking for a problem. When it comes to DLT applications in the financial market infrastructure space, safety and resiliency should be the priority rather than speed to market. If a PoC does not move to production, this is not a failure of DLT but an acknowledgement that DLT's application does not benefit a particular process.

Further, in certain cases, DLT may be used to improve an existing process that is run on a mature technology stack. A significant amount of integration may need to take place between the new technology and the legacy infrastructure, equating to a significant investment in infrastructure build and resources. Firms will need to proceed with caution as they consider the best way to enable interoperability. Without interoperability there will be duplication of effort and unnecessary cost, as well as a delay in time to market.

Defining rules and technical standards is another must. Clear technical standards are required if interoperability is to deliver maximum benefit to the industry. A digital ledger network of thousands of firms requires well-understood rules and technical standards for the ledger's operations and integration with any legacy technology or systems. Without clear rules and technical standards, there is a risk that participants establish multiple parallel business networks that do not communicate with each other; preventing scalability and wide-spread adoption, while creating silos and duplication.

Technology maturation also takes time and typically undergoes at least two stages before it reaches maturity: 1) the research and development (R&D) phase, where investment is made and the prospects of failure are typically high; and 2) the ascent phase, where costs have been recovered and the technology begins to gather strength. The maturity phase marks the point at which the technology is delivering a high and stable income. DLT is only now moving to the ascent phase, and it has a long way to go before it can be considered mature. Further, when it comes to systemically important financial market infrastructures like CLS that have adopted DLT for activities such as netting, the journey from R&D to ascent has probably taken even longer due to a strict testing programme designed to ensure its resiliency, reliability and safety to the market.

"...in the financial market infrastructure space, safety and resiliency should be the priority..."

- ALAN MARQUARD

The reach and power of a network makes the DLT proposition attractive to users. Once that network is formed, immediate questions arise: who is going to run, operate, and integrate the network? In financial markets, these questions can only be answered via the formation of a partnership between a market infrastructure and a technology company. The market infrastructure understands the business problem to be addressed and has experience in managing operations at scale, while the technology provider has the experience of running technology and operations.

The absence of any one of these components will prevent the financial industry and regulatory community from realising the benefits that new technologies such as DLT can deliver. ●

Guillaume Eliet

Head of Regulatory, Compliance & Public Affairs, Euroclear

DLT integration in the securities financial market – What lies ahead

DLT technology has been widely praised for its potential to fundamentally change the way in which companies, including market infrastructures, perform their business and interact with their clients. This change will have a number of positive impacts for society, including increased competition, improved efficiency and wider access to financial services. Blockchain is aligned to our group innovation strategy in terms of exploring new applications and finding new business models to invest in and expand. The areas of opportunity for DLT – or any new innovation – are found at an intersection where technology opportunities meet the rethinking of business models, within the boundaries of regulatory constraints.

Although opportunities are big, there are inevitable challenges that need to be addressed.

First, there is the question of how new technologies such as DLT and crypto-assets should be regulated. As FinTech start-ups generally do not operate like financial services companies, they tend not to be subject to the same regulations that govern the traditional players in the financial system.

As a regulatory level playing field between crypto and fiat securities is crucial for investor protection, market integrity and financial stability reasons, existing national or EU laws and regulations might need clarification or adaptation. This will be a crucial task for EU and Global authorities as having a regulatory framework providing legal certainty to the market participants is essential to foster new technology that provides efficiency and safety to the market. The recently published ESMA and EBA reports on crypto-assets and ICO form are an excellent contribution to the debate in the frame of the EU FinTech Action Plan. As regulation can act as a brake to innovation, authorities will have the difficult responsibility of striking the right balance between innovation and financial stability.

Second, even when these regulatory questions are addressed, there are the operational and technological challenges related to migrating a system that has matured over dozens of years into a new environment. For example, how can a DLT platform offer level 1 DvP settlement in central bank money? How a can a DLT platform ensure settlement finality? These are, among others, key questions that are to be answered before embarking in wide-spread transition to such technology.

"Providing legal certainty to the market participants is essential to foster new technology."

- GUILLAUME ELIET

As a financial market infrastructure aiming to ensure financial stability throughout the cycles, Euroclear takes an active role in the development of this new technology while making sure it is developed and governed with a long-term financial stability concept in mind. Euroclear is for example one of the shareholders in a start-up called LiquidShare, which designed to develop a post-trading DLT infrastructure for the Small and Medium Enterprise (SME) market in France. LiquidShare is entering into a pilot phase on Euronext's markets. More than 15 participants representing all the parties involved in the life cycle of an SME security are now ready to use its pilot platform. The aim is to improve SMEs' access to capital markets, improving the transparency and security of post-trading operations. ●

Morten Bech

Head of Secretariat, CPMI, Bank for International Settlements (BIS)

Crypto Winter

When Eurofi met in Tallinn in September 2017, it was springtime for cryptos. Distributed ledger technology (DLT) was all the rage. DLT was going to revolutionise the financial system overnight, and the price of bitcoin was growing exponentially. How quickly things can change. The Bitcoin hype is over, and winter is sweeping across crypto land. The ice cold winds blowing are wiping out investors and entrepreneurs without deep pockets. Initial coin offerings (ICOs) are down, and industry icons are jumping ship. Crypto exchanges have become targets of cyber-criminals, and confidence across crypto land is plummeting. Nobody knows how long the winter will last or whether it will ever end.

"The Bitcoin hype is over, and winter is sweeping across crypto land."

- MORTEN BECH

Many central banks around the world are experimenting with DLT[1] as the basis for the next generation of interbank payment and settlement systems. Coldly,

the results so far uniformly show that the new technology – at this stage – does not improve on the current state of the >>>

>>> art. In fact, central banks whose systems are at the end of their technology cycle are going "conventional" rather than venturing into uncharted territory. Using high-powered game theory, Hyun Song Shin of the Bank for International Settlements (BIS) has argued that DLT is not suited for large-value payments.

Yet, in a few places on the border between crypto land and the traditional financial sector, "the cold never bothered me anyway" echoes. The World Bank has issued a bond using DLT. The Australian Securities Exchange is moving closer to using DLT for post-trade processing. JPMorgan recently announced the introduction of JPM Coin. But all these projects are baby steps relative to the grand visions from years past.

To the optimists, the journey of DLT is similar to that of the internet. It will take a long time for the "killer applications" to break through the clouds and shine. Perhaps completely decentralised cryptocurrencies were simply a bridge too far for a nascent technology and the underlying economics was not completely understood. Nevertheless, as happened with the internet, lessons are being learnt, and there are probably a multitude of other problems where the technology can be useful.

As with any new technology, the Committee on Payment and Market Infrastructures (CPMI) has tried to see through the hype and will continue to focus on the merits of DLT and its implications for the efficiency and safety of financial market infrastructures. The Committee first published on cryptocurrencies (or digital currencies, as they were known back then) in 2015. Since then, we have, together with our friends at the International Organization of Securities Commissions (IOSCO), published an analytical framework looking at DLT in payments, clearing and settlement[2]. Clearly, financial market infrastructures based on DLT do not come without risks, and careful consideration should be given to their design. For example, it is important to ensure interoperability to avoid market fragmentation and other inefficiencies. The CPMI-IOSCO Principles for Financial Market Infrastructures (PFMI), however, remain the relevant international standards regardless of technology. ●

1. See H S Shin, "Distributed ledger technology and large value payments: a global game approach", lecture at the University of Cambridge, 22 January 2019.
2. See CPMI-IOSCO, Distributed ledger technology in payment, clearing and settlement – an analytical framework, February 2017.

Yuko Kawai

General Manager for Europe, Bank of Japan

Does Blockchain/DLT have a future?

In Japan, applications of blockchains/DLT and its technological developments are not greatly different from elsewhere, which is not a surprise given the technology's cross border nature.

Let me start with the Crypto assets/tokenization. This application by far has been most successful in terms of the economic value creation, while the hype stage seems to have passed and many tokens lost their values off from historical highs. In Japan, the regulator, Japanese FSA has established a regulation to have the crypto asset exchanges registered with and monitored by them. The exchanges are required to have the high standard of risk management and to comply with AML and consumer protection rules in order to be authorized to trade crypto assets. This framework made the image of the crypto-friendly-country and Japan has attracted massive trading flows and also criminal thieves, from which we have learned and still learning a lot. One of the learnings is that the basic principles of blockchain could become hurdles when things go wrong. We may need to agree on the legal nature of crypto assets/tokens in order for the stolen assets to be claimed back under the current legal regime, but such may not be enough. When the illicit theft is written in the blockchain which is irrevocable, how can the original owner claim the bona fide ownership?

Aside from crypto assets, while many parties are working on the researches (e.g., Bank of Japan-ECB joint researches on DLT), PoCs and practical applications, I am not yet aware of any specific examples successfully put into production in the meaningful scale in Japan.

While the features of blockchain/DLT technology are dreamed to improve the incumbent inefficiencies, the original package of technologies has deficiencies, such as the lack of finality or the issue of scalability. While there has been so much effort and some innovations seem to bear hopes, still the development is under way.

The evolvement of permissioned chains (a.k.a. private chains) intends to bring in the features required for specific applications. Permissioned chains can be loosely defined as the blockchains/DLT supported by the limited and known members, who are permissioned by the designated authority.

A naive question would be, what is the merit of using blockchains/DLT in the permissioned environment with a central node, which sounds almost like a bank payment system with a central authority such as a central bank. Some of the chains are said not to have the "block" nor "chain" structures, which may simply sound like the shared ledger, or the common database.

"You may say I am a dreamer but someday the technology may unite the related parties more tightly."

- YUKO KAWAI

Having said all the above, I personally believe that there has been and will be a significant meaning in discussing and developing the blockchain/DLT technologies. The process has made the incumbents, including the central banks, to think and rethink about the inefficiencies of the existing framework. Also, the new ecosystem has emerged to bridge the finance industry with the techs, and the shared-ledger-feature of the technology invites nonfinancial parties to the same table. You may say I am a dreamer but someday the technology may unite the related parties more tightly to make the financial transactions and other social contracts more efficient with better information sharing. ●