

EXPLORING DLT AND BLOCKCHAIN FOR ALTERNATIVE FINANCE

A COLLECTION OF CASE STUDIES

A publication of the **Exploring
Blockchain for Alternative Finance**
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Exploring DLT and Blockchain for Alternative Finance

A Collection of case studies, by Conny Weber

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ABOUT

The European Crowdfunding Network AISBL (ECN) is a professional network promoting adequate transparency, (self) regulation and governance while offering a combined voice in policy discussion and public opinion building. ECN was formally incorporated as an international not-for-profit organisation in Brussels, Belgium in 2013.

We execute initiatives aimed at innovating, representing, promoting and protecting the European crowdfunding industry as a key aspect of innovation within alternative finance and financial technology. We aim to increase the understanding of the key roles that crowdfunding can play in supporting entrepreneurship of all types and its role in funding the creation and protection jobs, the enrichment of European society, culture and economy, and the protection of our environment.

In that capacity we help developing professional standards, providing industry research, as well as, professional networking opportunities in order to facilitate interaction between our members and key industry participants. ECN maintains a dialogue with public institutions and stakeholders as well as the media at European, international and national levels.

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¹ <https://eurocrowd.org/work-groups/exploring-blockchain-alternative-finance/>

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METHODOLOGY

This report provides an overview of various case studies showcasing how distributed ledger technology (DLT) and blockchain (hereafter jointly referred to as BDLT) are currently used in the alternative finance sector.

The overall idea is to explore the state of the art by understanding challenges and opportunities and highlight common characteristics with the aim to leverage the potential of BDLT technologies in the alternative finance sector.

This will support different target groups of the sector, namely crowdfunding platforms, investors, startups, SMEs, and policymakers to better understand blockchain empowered use cases, with a special emphasis on the alternative finance sector.

This report shares our conclusions from desk research, interviews, two conferences² and a workshop³ organized on the topic. The interviews consisted of semi-guided, qualitative interviews with market and technology experts and SMEs, who have experience in BDLT-based products and services.

To understand the ways in which blockchain can most effectively be used for alternative finance we clustered our results into the following use cases:

- BDLT for online payment and identity services
- BDLT for peer-to-peer investing and investment services
- BDLT for financial democratization

For the sake of simplicity, we will interchangeably use the terms blockchain and DLT (BDLT) and refer to a well understandable explanation from the European Commission:

“Blockchain is the best-known distributed ledger technology. A ledger is a database which keeps a final and definitive record of transactions. Records, once stored, cannot be tampered without leaving behind a clear track. Blockchain enables a ledger to be held in a network across a series of nodes, which avoids one centralised location and the need for intermediaries’ services. This is particularly helpful for providing trust, traceability and security in systems that exchange data or assets. There is a lot of potential for blockchain to be used in many different areas such as financial services, supply chains or healthcare.”⁴

²4th ECN CrowdCamp, Exploring Blockchain for Alternative Finance, 13.06.2019, Berlin
<https://eurocrowd.org/4th-ecn-crowdcamp/>

³8th ECN CrowdCon, Scaling-up the industry, Blockchain Track on the 25.10.2019, Brussels
<https://eurocrowd.org/ecn-crowdcon-2019/>

⁴ Workshop supported by the European Commission, DG Grow: "SMEs in the Emerging European Token Economy: Opportunities, Education, Best Practices" as part of the 8th ECN Crowdfunding Convention

⁴ European Commission (2017), [Factsheet to learn how can Europe benefit from blockchain technologies](#)

EXECUTIVE SUMMARY

The intention of this report is to explore BDLT for alternative finance. The European Crowdfunding Network, as association representing the European crowdfunding industry strives at providing neutral and critical information to its members by observing and analysing innovative developments for the crowdfunding industry.

The crowdfunding and alternative finance industry is aware of the potential of BDLT-based applications. FinTech start-ups deploying BDLT to create innovative and disrupting services both for retail and institutional investors are happening as we speak. However, pioneering a new technology in complex regulatory frameworks leads to high costs and long time-to-market periods impeding the uptake.

Our focus with regard to BDLT will mainly relate to the alternative finance industry, and especially potential application areas for European crowdfunding platforms. To this end, we will continuously observe further developments and stay in dialogue with public institutions and stakeholders at European, international and national levels, taking into account and complementing their initiatives.

The examples used in this report range from cryptocurrencies and identity, to innovative SME financing ecosystems including tokenization of securities, and showcase motivations, challenges and lessons learnt. It is too early to provide concrete recommendations to policy and other stakeholders of the crowdfunding industry, but we highlight some lessons learnt and common characteristics to raise awareness for further observation. These insights may also provide a source of information for some initiatives announced in the FinTech action plan⁵ and beyond and can be summarized as follows:

- More incentives – Pioneering the blockchain sector is challenging
- Adapting regulatory frameworks – Integrate the token economy into European legal frameworks
- Creating BDLT communities – Education, knowledge and trust
- Blockchains used - Public vs. private

Overall, we can observe a very positive attitude of national and European policy makers to support and enable blockchain-based innovations. This covers supportive initiatives including progressive regulations or strategies for potential application fields, but also acceleration programmes, grants and further investments. Nevertheless, FinTech start-ups in Europe still face many hurdles stifling innovation.

⁵ European Commission (2018): FinTech Action plan: For a more competitive and innovative European financial sector. https://eur-lex.europa.eu/resource.html?uri=cellar:6793c578-22e6-11e8-ac73-01aa75ed71a1.0001.02/DOC_1&format=PDF,

INTRODUCTION

Not yet a decade ago, crowdfunding emerged as an alternative form for financing startups and SMEs, which due to the financial crisis in 2008 faced more and more difficulties in getting traditional finance. Today crowdfunding provides donation, reward, equity and lending based funding options ranging from small community projects, via market testing of innovative ideas, up to large international projects in different industries, including real estate, renewable energy, technology and health.

In 2012 we launched our activities to build a professional crowdfunding sector across Europe. Soon European member states introduced national regulatory frameworks, which hindered the development of a Single Market for crowdfunding services⁶. Today, at end of 2019 we are happy to see the European institutions make the European Crowdfunding Service Providers (ECSP) for Business Regulation a positive and broadly welcomed reality. "We believe it has the potential to make pan-European crowdfunding a reality, and that doing so will be of huge benefit to European start-ups and SMEs and to European investors."⁷

Crowdfunding helps to democratise investment processes and to establish a direct relationship between SMEs and investors. Anyone can contribute to any project, which allows innovative start-ups and SMEs to test the market, to create a community and to create products or services that otherwise could not be realized. Crowdfunding and BDLT share some essential characteristics and are complementary on other areas. We believe that deploying BDLT in the alternative finance sector will have positive impact for the industry.

"Blockchain and DLTs in general can drive change in the financial services by introducing transparency, simplification and efficiency. The key benefits of these new technologies are related to their ability to create trust in a distributed system, increase efficiency in real-time or near real-time reporting of transactions, and support high resilience."⁸

CRYPTOCURRENCIES, ICOS AND PAYMENTS

Cryptocurrencies are probably the best-known use case of blockchain. Although "DLT systems conceptually emerged in 1982, while the earliest occurrence of the 'blockchain'

⁶ European Commission (2018): FinTech Action plan: For a more competitive and innovative European financial sector. https://eur-lex.europa.eu/resource.html?uri=cellar:6793c578-22e6-11e8-ac73-01aa75ed71a1.0001.02/DOC_1&format=PDF, p. 5.

⁷ <https://eurocrowd.org/2019/10/02/trilogue-stage-position-paper-of-the-european-crowdfunding-network-on-the-proposed-regulation-on-european-crowdfunding-service-providers-escp-for-business/>

⁸ Nascimento S. (ed), Pólvara A. (ed), Anderberg A., Andonova E., Bellia M., Calès L., Inamorato dos Santos A., Kounelis I., Nai Fovino I., Petracco Giudici M., Papanagiotou E., Sobolewski M., Rossetti F., Spirito L., *Blockchain Now And Tomorrow: Assessing Multidimensional Impacts of Distributed Ledger Technologies*, EUR 29813 EN, Publications Office of the European Union, Luxembourg. https://publications.jrc.ec.europa.eu/repository/bitstream/JRC117255/blockchain_executive-summary_online.pdf

concept can be traced back to 1991⁹, it became popular through the Bitcoin White Paper published in 2008¹⁰. The underlying idea of Bitcoin is to provide a “solution to the double-spending problem using a peer-to-peer network”¹¹. The disruptive vision of cryptocurrencies consists therefore in a “purely peer-to-peer version of electronic cash (...) [allowing] online payments to be sent directly from one party to another without going through a financial institution”¹².

Cryptocurrencies were the first alternative finance related blockchain based application. Using an Initial Coin Offering (ICO) allows companies to receive capital from private citizens, similar to crowdfunding. Important is that ICO do not represent investments and funders will not acquire any assets or rights in the underlying company or organization, but receive a counter value, or reward, in the form of exchangeable tokens.

The ICO market had its peak in 2017, during a period of increased cryptocurrency trading, especially Bitcoin. They offered high speeds of transaction and low fees. However, the overall success of the majority of ICOs in the aftermath of the funding rounds remains sobering, with an amount of alleged fraud included, and the market has shrunk significantly. The identification of innovative ideas with a realistic opportunity to succeed in the market, needs more than fast and cheap processes.

Consequently, today the costs for raising funds with a regulatory compliant ICO are very high and lead to an exclusion of smaller projects. There are no clear figures, but costs for developing the technology behind the project, creating a strong communication, conducting third-party security audits and meeting other regulatory requirements may range between \$50.000 and \$500.000¹³. Listing a crypto token on an exchange requires between \$1-3 million¹⁴.

Nevertheless, ICOs showed that the underlying technology can help to significantly enhance workflow and management of finance services, contractual relationships and security. In general, cryptocurrencies continue to gain popularity, but remain subject of controversial discussions such as cyber risks, transaction delays due to scalability problems, or high volatility. To address the volatility problems so called stablecoins, i.e. a cryptocurrency that is backed by real assets with stable value, claim to provide a solution. The European Central Bank is investigating in stablecoins with a view to understanding their potential implications for monetary policy¹⁵. Early initiatives, e.g. Facebook’s Libra

⁹ Rauchs et al. (2018): Distributed Ledger Technology Systems. A Conceptual Framework. In Cambridge Centre for Alternative Finance Reports, Cambridge Judge Business School, University of Cambridge. P.15. https://www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/downloads/2018-10-26-conceptualising-dlt-systems.pdf

¹⁰ Nakamoto, S. (2008): Bitcoin: A Peer-to-Peer Electronic Cash System. <https://bitcoin.org/bitcoin.pdf>

¹¹ Ibid.

¹² Ibid.

¹³ E.g. OECD (2019), Initial Coin Offerings (ICOs) for SME Financing, www.oecd.org/finance/initial-coin-offerings-for-sme-financing.htm, p. 20

¹⁴ <https://next.autonomous.com/thoughts/crypto-exchange-listing-fees>

¹⁵ Bullmann D., Klemm J., Pinna, A. (2019): In search for stability in

are currently discussed critically especially considering the risk to financial stability in Europe, i.e. to ensure that stablecoins do not become an alternative to state currencies¹⁶.

IDENTITY – ACCESSING FINANCIAL SERVICES

The rapid pace of innovation in the FinTech industry requires dedicated regulations to address cyber-related risks and ensure data and investor protection. Examples for such regulations are the General Data Protection Regulation¹⁷ and the Anti-Money Laundering Directive¹⁸, which provide safeguards for market integrity.

Every financial service provider is therefore required to verify their customer's identity before offering their services. In a digital world, identity applications allow to authenticate the identity of customers.

"The digital identity application segment is expected to be the fastest-growing application in the Blockchain Market, as it eliminates the need for central authority and third party thereby making it easier for the individuals to manage and control over personal information and access."¹⁹

Identity services are relevant to retail investors before investing as SMEs must know their customers. Identity applications are therefore highly relevant in the alternative finance sector. Blockchain in combination with identity verification, creates a digital identity which can be used for multiple transactions. The vision is that users and customers then do not have to provide all their details to every platform because they can just sign up once and the identity management verifies their identity.

SECURITY TOKEN OFFERINGS

Unlike an ICO coin or token, a security token represents a security, i.e. a smart contract on the blockchain defines the underlying tangible asset of the token representing profit participation, shares, dividends or other interest rates. In principle any type of securities can be tokenized. Securities are tradeable financial instruments. Tokens represent ownership of small units that are connected to underlying assets of a company. From a

crypto-assets: are stablecoins the solution?. Occasional Paper Series.No 230 / August 2019.
<https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op230-d57946be3b.en.pdf>

¹⁶ c.f. BMWi, BMF (2019): Blockchain-Strategie der Bundesregierung. Wir stellen die Weichen für die Token-Ökonomie. P 8.

https://www.bmw.de/Redaktion/DE/Publikationen/Digitale-Welt/blockchain-strategie.pdf?__blob=publica

¹⁷ <https://eugdpr.org/>

¹⁸ https://ec.europa.eu/info/policies/justice-and-fundamental-rights/criminal-justice/anti-money-laundering-and-counter-terrorist-financing_en

¹⁹ <https://www.prnewswire.com/news-releases/blockchain-market-worth-23-3-billion-by-2023-exclusive-report-by-marketsandmarkets-tm--895305466.html>

regulatory perspective, security tokens may qualify as transferable securities under MiFID²⁰.

SECURITIES MARKET

Blockchain already started disrupting the financial sector and the near future will show how this will impact traditional financial markets and securities post trading services²¹ in Europe and beyond. Crucial aspects for STOs becoming successful may be the uptake of these securities by financial institutions to create liquidity, and most interesting if all this can happen in a decentralized way, without any governance institution.

The main advantages for using BDLT in the securities market and for post trading services are increased efficiency, by simplifying the process of issuing and reducing clearing and settlement time. This will lead to a reduction of costs for financial services, both for investors and issuers, and might not only influence clearing and settlement but also trading and exchanges themselves²². Some banks and exchanges²³ are already experimenting with blockchain technology and e.g. exploring how to “make digital central bank money available for the trading and settlement of tokenized assets between financial market participants.”²⁴

For now, the technology is not sufficiently stable and scalable to be broadly adopted. On top, regulatory challenges and compliance with securities law still need to evolve.

²⁰ ESMA (2019): Advice on Initial Coin Offerings and Crypto-Assets. Publication from January 9th 2019, ESMA50-157-1391. https://www.esma.europa.eu/sites/default/files/library/esma50-157-1391_crypto_advice.pdf, p.5 and p.39ff

²¹ Concrete use cases are discussed for example here: European Central Bank (2019): Potential use cases for innovative technologies in securities post-trading. Advisory Group on Market Infrastructures for Securities and Collateral. January 2019.

²² Cf. Nascimento S. (ed), Pólvara A. (ed), Anderberg A., Andonova E., Bellia M., Calès L., Inamorato dos Santos A., Kounelis I., Nai Fovino I., Petracco Giudici M., Papanagiotou E., Sobolewski M., Rossetti F., Spirito L., *Blockchain Now And Tomorrow: Assessing Multidimensional Impacts of Distributed Ledger Technologies*, EUR 29813 EN, Publications Office of the European Union, Luxembourg, 2019,p.62f

²³ SIX, Switzerland (<https://www.sdx.com/en/home.html>); Börse Stuttgart; Germany (<https://www.boerse-stuttgart.de/en/investing/get-started-with-cryptocurrencies/>)

²⁴ The SIX Digital Exchange: <https://www.sdx.com/en/home/news-events/20191008-six-snb-bis.html>

CASE STUDIES

The following cases studies aim to provide a better understanding about the practical implications of current BDLT developments in the field of alternative finance. We have clustered the cases studies into three dominating domains:

- **BDLT for online payment and identity services (Dash, Fractal and Blinking)**

Starting from cryptocurrencies (Dash) which are gaining increasing popularity for payments and money transfer, identity services represent crucial applications to manage and control access to financial online services (Fractal and Blinking).

- **BDLT for peer-to-peer investing and investment services (Conda, Realmarket, Stokr, Finexity)**

BDLT remove barriers for SMEs to improve the access to finance. Applications in this domain range from offering SMEs the choice between equity crowdfunding and security token offering (Conda), to creating the infrastructure for secondary markets (RealMarket) or to eliminate the intermediary by providing just an interface connecting SMEs and investors (Stokr). Following the trend towards real estate crowdfunding, also in this domain blockchain offers interesting advantages (Finexity), as the technology allows the fractionalization of property assets.

- **Case Studies: BDLT for Financial Democratization (Goteo, Blockbonds)**

Alternative finance has always had a social impact, as it raised bottom up, involving the crowd in the decision-making process of funding a project or not. Incentives for donation-based crowdfunding are to do something good, generating consciousness and commitment. Further, this commitment is often rewarded with a tax relief – but only if the platform is in the same country. BDLT allows to create European networks by issuing donor certificates across borders (Goteo). Finally, through BDLT evolve completely new possibilities to address financial inclusion and involve people in the financial system who were formerly excluded (Blockbonds).

DASH



<i>Country</i>	Global
<i>Regulatory compliant</i>	No legal entity
<i>Blockchain used</i>	Dash
<i>Type</i>	Cryptocurrency
<i>Lifecycle</i>	Advanced
<i>Activity</i>	Active since January 2014
<i>Relation to crowdfunding</i>	No direct relation
<i>Website</i>	https://www.dash.org

DASH IS A DIGITAL CURRENCY THAT ENABLES ANYONE, ANYWHERE IN THE WORLD TO MAKE QUICK, EASY AND CHEAP PAYMENTS AT ANY TIME WITHOUT GOING THROUGH A CENTRAL AUTHORITY. ²⁵

Overview

Dash is a cryptocurrency, similar to Bitcoin. Dash envisions a broad implementation as a means of payment at points of sale and in e-commerce. Main competitors to Dash are other cryptocurrencies such as Bitcoin, Litecoin or Monero, while utility tokens such as Ethereum do not represent competition. Dash is “down 96% from the all-time high established in December 2017. The market cap (...) stands at 636 million USD”²⁶ and ranks 18th behind Bitcoin with a market cap of 165 billion USD²⁷.

Crowdfunding platforms can integrate Dash as means of payment, through a built-in converter the project can receive the crypto investments also in euros. This allows integrating also people active in the “crypto scene” who have larger amounts of cryptocurrencies but do not want to deal with fiat currencies.

²⁵ <https://www.dash.org/faq/>

²⁶ <https://bravenewcoin.com/insights/dash-price-analysis-increasing-and-sustained-on-chain-activity>, 7. November 2019

²⁷ <https://www.cryptocompare.com/coins/list/USD/>

Innovation

Dash is not a company but a Decentral Autonomous Organisation (DAO), represented by all participants in the network. This means that regulation cannot apply directly, as there is no legal entity. For example, the Dash Embassy D-A-CH, supporting the German speaking community has created an entrepreneurial company with limited liability (in German: Unternehmergeellschaft (haftungsbeschränkt), but only for having a legal representation for running for example the website. Anyway, after their foundation, the Dash Embassy D-A-CH has been contacted by the German financial authority BaFin, but as this representation doesn't issue tokens itself no regulation affects.

Lessons learnt, challenges and success factors

A large number of customers include the Dash cryptocurrency as means of payment. This is enabled by its built-in incentive mechanism, allowing the organisation to create a fund for adoption projects. Dash is self-sustainable and independent of external funds.

Activities of the Dash DOA are financed by keeping 10% of the mining block rewards to finance community projects. For example, with Bitcoin, the miners that create new blocks receive 100% of the block rewards, i.e. they get new bitcoins by successfully mining a block. At Dash the miners get 45% of the block rewards, masternodes (servers that host services and governance) get also 45% and 10% remain in the DAO treasury. Depending on the Dash price the monthly budget varies, e.g. currently it is at 1 Million Euro per month.

FRACTAL



<i>Country</i>	Germany (Porto and Singapore)
<i>Regulatory compliant</i>	Yes
<i>Blockchain used</i>	None
<i>Type</i>	Identity solution
<i>Lifecycle</i>	Advanced
<i>Activity</i>	Founded in 2017
<i>Relation to crowdfunding</i>	KYC/AML
<i>Website</i>	https://www.trustfractal.com/

FRACTAL ID IS A USER-CENTRIC KYC/AML PLATFORM SPECIFICALLY BUILT FOR FINANCE 3.0 SERVICES. IT IS USED TO THE IDENTITY OF USERS, THEREBY HELPING ITS CUSTOMERS GET TO KNOW THEIR CUSTOMERS AND COMPLY WITH LAWS AND ANTI-MONEY LAUNDERING REGULATIONS.

Overview

Fractal provides Anti-money laundering (AML) and Know your customer (KYC) solutions for customers with a very international and widespread target group. Fractal was founded in 2017 in Berlin and holds additional offices in Porto and Singapore.²⁸

Digital identity solutions allow digital access to financial services. The "Identity Verification Market is expected to grow from USD 6.0 billion in 2019 to USD 12.8 billion by 2024"²⁹.

Customers include Liquidblocks³⁰ and the Ocean Protocol³¹. For example, the Ocean Protocol, aims at "creating an ecosystem of data marketplaces, data commons, and data

²⁸ <https://www.trustfractal.com/media/pages/about/3557335158-1571911508/for-immediate-release-fractal-signs-strategic-partnership-with-seedbox-to-drive-financial-inclusion-across-southeast-asia.pdf>

²⁹ <https://www.prnewswire.com/news-releases/identity-verification-market-worth--12-8-billion-by-2024--exclusive-report-by-marketsandmarkets-300849572.html>

³⁰ <https://crypto-bridge.org/>

³¹ <https://oceanprotocol.com/>

science tools operating against a public utility network for data services”³², and raised “just over \$1.8m from 350+ contributors on the Coinlist and Fractal launchpad platforms.”³³.

Competitors include IdentityMind, Sum&Substance or Onfido. Fractal is currently not blockchain based but designed to interact with blockchain based identities.

Innovation

For Fractal itself, regulatory impediments are not very high, but their customers need to carefully understand which requirements must be fulfilled and comprehensive and expensive legal advice is required. Fractal supports their customers in ensuring that all regulatory requirements are implemented. Especially KYC rules are important for their solution, for example U.S.-based investors often have to be excluded from ICO participation. In general, different countries have different KYC identity document policies, and, in some cases, an additional video ID might be required.

Recently, Fractal has initiated two strategic partnerships to drive financial inclusion. For example, in Philippines Fractal aims to provide financial access to the country’s underbanked population.³⁴

Lessons learnt, challenges and success factors

Within the roll out of Fractal the company learned quickly that usability and simplicity of the product was a key aspect for onboarding clients. The product, while technically sophisticated, needs to be useable by non-technical clients. Fractal underwent relevant design changes in its early adaptations.

The Identity market is very competitive and an advantage for quick market uptake was that the product was ready for commercialization when ICOs required global identity solutions. The right product and market fit were also recognized by investors, allowing to secure a position in this quickly growing market. Since 2017, Fractal has received US\$3 million in venture funding with participation from Coparion, a VC fund backed by the German government. They have also partnered with data sharing platforms, digital currency exchanges, digital asset platforms and derivatives exchanges across Hong Kong, Germany and Singapore.

³² <https://blog.oceanprotocol.com/ocean-protocol-technical-whitepaper-v2-o-is-here-fo78f3c8bo72>

³³ <https://blog.oceanprotocol.com/ocean-protocol-token-sale-g6do3f968e22>

³⁴ <https://www.trustfractal.com/media/pages/about/3557335158-1571911508/for-immediate-release-fractal-signs-strategic-partnership-with-seedbox-to-drive-financial-inclusion-across-southeast-asia.pdf> and <https://jumpstartmag.com/blockchain-startup-fractal-signs-deal-with-consensys-backed-gnosis-to-drive-global-financial-inclusion/>

BLINKING



<i>Country</i>	Serbia
<i>Regulatory compliant</i>	Yes
<i>Blockchain used</i>	IBM Blockchain Platform based on Hyperledger Fabric
<i>Type</i>	Digital Identity solution
<i>Lifecycle</i>	Advanced
<i>Activity</i>	Founded in 2017
<i>Relation to crowdfunding</i>	KYC/AML
<i>Website</i>	https://blinking.id/

BLINKING IS A DIGITAL IDENTITY MANAGEMENT PLATFORM THAT GIVES END-USERS COMPLETE CONTROL OVER THEIR PRIVATE DATA. IT IS AN OVERALL SOLUTION FOR AUTHENTICATION AND AUTHORIZATION OF USER IDENTITY AS WELL AS KYC PROCESS UTILITY AND SECURE AND SAFE STORAGE FOR PRIVATE USER DATA.

Overview

The added value of using blockchain for identifying a customer's identity consists in ensuring data immutability, transparency and encryption. Blinking uses the Hyperledger Fabric framework, a private permissioned blockchain.

The company was co-founded by two university professors with strong academic and scientific background in IT. Many of Blinking's engineers and developers are therefore former students. Further relevant networks are the Hyperledger foundation, or large corporations with active DLT development. In the alternative finance sector Blinking can be used by crowdfunding platforms, cryptocurrency exchanges, stock markets etc.

Innovation

The company has currently completed a pilot testing phase with two banks in Serbia. "At the two banks using the pilot version of the Blinking KYC solution, employees can save time by registering and identifying customers remotely rather than having to meet them in-branch. Consumers no longer have to find ID paperwork or fix appointments and can instead confirm web and mobile transactions immediately. The additional three banks

that have agreed to take part in the advanced pilot look forward to reaping similar benefits³⁵. A pilot with Telekom Serbia is in preparation.

Lessons learnt, challenges and success factors

One of the main barriers for the roll-out to customers is related to high integration cost, as it is necessary to make infrastructure adjustments for each client. The company is further developing the underlying solution in order to reduce technology cost and to achieve a sustainable roll-out. Additional concerns are legal requirements for storing and managing citizens' private data and customers trust in the capacity of the new technology. The ongoing pilots are aimed at developing adequate solutions to overcome relevant concerns and enable scalable market entry.

³⁵ <https://www.ibm.com/case-studies/blinkin-ibm-cloud-id-authentication>

CONDA



<i>Country</i>	Austria
<i>Regulatory compliant</i>	Yes, under the Austrian Financial Authority (FMA)
<i>Blockchain used</i>	Ethereum
<i>Type</i>	STO – tokenized equity offering
<i>Lifecycle</i>	Early-stage (CrowdNetwork)
<i>Activity</i>	Active since 2013
<i>Relation to crowdfunding</i>	Equity Crowdfunding Platform
<i>Website</i>	https://ico.conda.online/

CONDA IS AN AUSTRIAN CROWDFUNDING PLATFORM CONNECTING ENTREPRENEURS AND SMALL COMPANIES WITH POTENTIAL INVESTORS. WITH THE CRWD-NETWORK PLANNED IN 2019, CONDA WANTS TO SET NEW STANDARDS FOR THE PROCESSES AND PROCEDURES IN CROWDFUNDING. THESE SHOULD BE VALID ACROSS BORDERS AND THEREFORE SIMPLIFY THE POSSIBILITY OF INVESTING IN INTERNATIONAL COMPANIES.

Overview

On Condas equity crowdfunding platform around € 22 million have been raised to finance around 100 projects. By using BDLT it is envisioned that entrepreneurs can present their crowdfunding campaign across multiple platforms and across borders without much effort, multiplying the reach of potential investors. The first prototype of the CRWD Network was self-developed by one of the founders, and utilizes the Ethereum blockchain, as this framework seemed to ensure stable further developments having a large community behind.

In practice a CRWDToken represents the inherent utility token of the CRWD Network. It is an ERC20 standard token that is utilized by various services in the network and has fluctuating value based on market trading price. Once a company has launched its fundraising on the CRWD Network, it issues a tokenized equity. This token can refer to

any financial instrument like a share or a bond and represents the company's liability to its investors.³⁶

Innovation

The digitization of organizations and thus the creation of completely new networking possibilities within the CRWD Network are key value added. Via the blockchain, governance programs can be integrated into customers procedures, for example voting processes or employee participation models can be automated.

Lessons learnt, challenges and success factors

An important success factor consisted in choosing a stepwise approach in close collaboration with the financial regulator in order to ensure a positive attitude towards this new paradigm: First, Conda tokenized their own stocks and shareholders now hold equity tokens. The intention was to showcase feasibility for investors and regulators. Second, Conda conducted a (private placement) security token offering for a company where investors still were required to sign a physical paper before they could receive their tokens. This enabled the third step, to run a token sale for another company completely digital.

This approach also was useful to sensitize the investors. However, convincing investors to trust in new technologies is hard and requires creative solutions. In Austria for example, CONDA is collaborating with the Bitcoin-Wallet Coinfinity³⁷. Investors receive a physical card, similar to an identity card, that includes the private key, i.e. the information required to access the digital securities and that can be stored for example in a safe. This solution proved to be suitable to involve conservative investors who feel more comfortable receiving their tokens not only virtually.

³⁶Cf. For more technical details, Horak, D. & Pöltner, P. (2018): The CRWD Network. Whitepaper. <https://ico.conda.online/>

³⁷ <https://www.trendingtopics.at/card-wallet-coinfinity-staatsdruckerei-hodl/>

STOKR



<i>Country</i>	Luxembourg
<i>Regulatory compliant</i>	Yes, MiFID regulatory framework
<i>Blockchain used</i>	Ethereum
<i>Type</i>	STO – profit participation tokens
<i>Lifecycle</i>	Early-stage
<i>Activity</i>	Active since May 2019
<i>Relation to crowdfunding</i>	Crowdfunding without intermediate
<i>Website</i>	https://stokr.io

STOKR IS A PEER-TO-PEER INVESTMENT INTERFACE AIMING TO CONNECT RETAIL INVESTORS AND BUSINESS FOUNDERS TO FINANCE FORWARD-THINKING IDEAS AND TO SHARE FUTURE PROFITS. STOKR IS POWERED BY ETHEREUM BLOCKCHAIN TO CREATE INDEPENDENT ACCESS TO CAPITAL MARKETS. THROUGH EU-COMPLIANT SECURITY TOKEN OFFERINGS (STOS), EVERYDAY INVESTORS CAN DIRECTLY FUND INNOVATIVE START-UPS AND SMES IN RETURN FOR A SHARE OF THE VENTURE'S FUTURE PROFITS.

Overview

STOKR has been founded in 2018 in Luxembourg. STOKR is powered by Ethereum Blockchain and offers profit participation tokens based on smart contracts. Every token has a fixed share of the company.

The value proposition at STOKR for using blockchain is the idea of tokenization. Through the tokens, it is possible to transfer securities on a blockchain and to have an instant and always up to date overview of who holds the securities. This helps to create transparency within the STOKR Framework. To unlock the potential of tokens in security transactions, STOKR seeks to help create the right legal framework for secondary markets allowing to trade securities on blockchain.

First feedback gathered from its early customers confirms that there is demand for STOKR's tokenized security funding model, which, or now, is structured around profit sharing and not shareholding.

Innovation

Three smart contracts are core of the STOKR Framework³⁸: (1) To comply with KYC/AML regulations, verified investors are stored on a whitelist contract on the Ethereum blockchain (2) The initial offering of the token is managed by a special smart contract called the Crowdsale Contract. Investors can transfer Ether during the offering period to the Crowdsale Contract. These tokens represent a fixed portion of the distributable future profits of the venture. The Crowdsale Contract has a maximum and a minimum number of tokens to be issued during the offering period. If the minimum funding amount (Softcap) of an STO is not reached, all the investors will be refunded their investment amount and no tokens will be issued. (3) The Token Contract manages token balances and transfers. Transfer of tokens are restricted only to the addresses registered in the Whitelist Contract. The Token Contract includes the profit-sharing functionality. The venture's profits will be distributed to the investors, or subsequent token holders proportionally to their token holdings.

Lessons learnt, challenges and success factors

Anticipating regulatory challenges, STOKR chose Luxembourg as their regulatory framework, namely the dematerialized securities regime. STOKR believes, that at that point, their model could not have been realized in a similar way in other European jurisdictions.

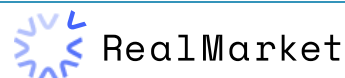
Key challenges so far consisted in creating the right product-market fit. Being faced with the typical double sourcing problem every crowdfunding platform has, onboarding investors and good quality, capital seeking SME at the same time, STOKR is reverting to non-digital workshops and publishes dedicated education modules on their website.

Main lessons learnt for STOKR are that regulatory and legal aspects combined with profound IT knowledge were key. One of the company's founders worked for more than 10 years as a lawyer and, as a self-taught programmer, understands the underlying IT. This has been helpful in reducing cost for external legal advice. The company also found, that in some cases it has proven to be better to hire motivated generalists rather than experts.

One of the key challenges going forward is to create liquidity. STOKR aims to achieve this via secondary markets. The tokens are peer-to-peer transferable and could be traded by investors that seek to exit one or more investments to another interested investor. However, currently there is no central marketplace for listing, trading or exchanging tokens available in Europe – and the regulatory framework for secondary markets is not including tokens.

³⁸ See here for details: <https://stokr.io/stoke-post/stokr-framework>

REALMARKET



<i>Country</i>	Serbia
<i>Regulatory compliant</i>	No
<i>Blockchain used</i>	Hyperledger Fabric
<i>Type</i>	Equity crowdfunding ecosystem
<i>Lifecycle</i>	Early-stage
<i>Activity</i>	Founded in 2018
<i>Relation to crowdfunding</i>	Crowdfunding Platform
<i>Website</i>	https://realmarket.io

FOUNDED IN JULY 2018 IN NOVI SAD, SERBIA. THE VISION IS TO BUILD SUPERIOR SOLUTIONS FOR BUSINESS PROBLEMS USING ENTERPRISE BLOCKCHAIN TECHNOLOGY AND MACHINE LEARNING. REALMARKET'S MAIN PRODUCT CONSISTS IN A CAPITAL MARKET ECOSYSTEM FOR PRIVATE COMPANIES.

Overview

RealMarket started as a research group focused on enterprise blockchain at the Faculty of Technical Sciences, University of Novi Sad, Serbia. The original idea was to create a platform for GameCredits, i.e. a platform where game developers could develop and sell their products. But then the company providing the use case went out of business.

RealMarket was still not founded, when in July 2018 in London they met the co-founder of a large UK equity crowdfunding platform. During the discussion about pain points in the crowdfunding industry, they developed the idea of creating an efficient solution for secondary markets that would tackle the liquidity problem, including a precise and accurate capitalization table tool, showing in real time all trades performed.

Based on this idea RealMarket has developed the product and next steps are to launch a blockchain based crowdfunding platform in Serbia and to start piloting the secondary market solution with a crowdfunding platform in UK.

RealMarket uses Hyperledger Fabric as underlying technology. A private permissioned blockchain is different from public blockchains. Reasons leading to this decision are, that at the moment it is difficult to meet regulatory compliance with a completely

decentralized network like public blockchains provide. In a private blockchain, regulators, crowdfunding platforms, banks etc. have some peers in the network to verify or follow the transactions in the network.

Innovation

Building on BDLT, RealMarket has now created an ecosystem of products for a not yet exploited niche in the SME financing sector. For emerging markets, the product includes an integrated crowdfunding solution lowering barriers to entry for the industry. For already established crowdfunding platforms, RealMarket provides a secondary market for private capital increasing the liquidity of investments. The system also integrates a cap table management solution ensuring that ownership information is always up-to-date and reliable. The reason for using blockchain as the underlying technology, was that it already includes relevant levels of trust and transparency, while offering security advantages of a decentralised system.

Lessons learnt, challenges and success factors

A main challenge for RealMarket remains that the regulation for its products is not yet fully in place to facilitate the underlying markets. In Serbia for example, the company believes that some adaptations in the tax regulation need to be introduced for making equity crowdfunding attractive. As for its secondary market product for EU member states, allowing to trade participations invested in via different crowdfunding platforms under existing regulation would impose high compliance cost to most of the small and medium sized enterprises making use of crowdfunding.

FINEXITY



<i>Country</i>	Germany
<i>Regulatory compliant</i>	Yes, Bafin approved
<i>Blockchain used</i>	Ethereum
<i>Type</i>	STO
<i>Lifecycle</i>	Early-stage
<i>Activity</i>	Active since 2018
<i>Relation to crowdfunding</i>	Tokenised real estate securities
<i>Website</i>	https://finexity.com

FINEXITY AG IS A FINTECH COMPANY BASED IN HAMBURG. FOUNDED IN 2018, IT IS ONE OF THE FIRST COMPANIES (...) TO OFFER TOKENISED REAL ESTATE INVESTMENT OPPORTUNITIES THEREBY REDUCING CAPITAL REQUIREMENTS FOR INVESTORS TO A MINIMUM WHILST GRANTING MAXIMUM FLEXIBILITY AND LIQUIDITY.³⁹

Overview

FINEXITY AG is a real estate focused crowdfunding platform on which investors can buy tokenised real estate shares with an owner-like participation. Instead of bundling several properties in an investment fund, investors select individual properties of which they get individual share certificates, to benefit from rental income, redemption profit and potential increase in the value of the property.

FINEXITY offers, depending on the transaction, returns of around 3.5% to 7%. Individual investors are bundled in a special purpose vehicle which is entered into the property registry. The blockchain is used as a digital registry for the interests in the special purpose vehicle in which all individual investors are kept.

Innovation

FINEXITY issues blockchain-based tokens that represent a small economic part of a particular property. Using blockchain allows to eliminate the emission costs, depository fees or fees for other intermediary agents. The token is represented by an Ethereum

³⁹ <https://finexity.com/about>

ERC20 smart contract that is developed inhouse. Once issued, the token can be traded at any time by verified customers using blockchain technology. The company is also testing whether individual investors are willing to resign from some of their returns in order to create affordable living space, especially within metropole regions.

Lessons learnt, challenges and success factors

Finexity early on initiated contact with BaFin, the German financial regulatory authority, in order to determine the regulatory classification of the tokens. To get the BaFin approval took the company nearly one year. Challenges to be solved, amongst others consisted in defining the security token. It needed to be clarified whether the token is a security (yes), if the security can be represented on the blockchain (yes) and to define all related details e.g. how the transfer tax (Grunderwerbssteuer) applies when a token is sold multiple times. According to German law a security token is a security⁴⁰ and therefore the business model falls under the securities trading act and not the German crowdfunding regulation.

The benefits of blockchain remain unclear to many potential clients and other stakeholders, as relevant background and technical knowledge of blockchain is not yet commonplace. For this purpose, Finexity is engaging in educational activities, for example, they have published a blockchain guide for interested parties. However, given that a broad knowledge of blockchain technology is not likely amongst its broader client base, the company is now working to design its service with a user experience in mind that removes technical obstacles.

⁴⁰BaFin – Bundesanstalt für Finanzdienstleistungsaufsicht (2019): Tokenisierung.
https://www.bafin.de/SharedDocs/Veroeffentlichungen/DE/Fachartikel/2019/fa_bj_1904_Tokenisierung.html

GOTEO



<i>Country</i>	Spain
<i>Regulatory compliant</i>	Yes, donation based crowdfunding platform
<i>Blockchain used</i>	Not yet defined
<i>Type</i>	N.A.
<i>Lifecycle</i>	Mature
<i>Activity</i>	Active since 2011
<i>Relation to crowdfunding</i>	Crowdfunding platform (Donations and matchfunding)
<i>Website</i>	https://en.goteo.org/

GOTEO FOUNDATION, IS A NON-PROFIT ORGANIZATION FUNDED IN 2011, TO PROVIDE CROWDFUNDING OR COLLECTIVE FINANCING (MONETARY CONTRIBUTIONS) AND DISTRIBUTED COLLABORATION (SERVICES, INFRASTRUCTURES, MICROTASKS) FOR PROJECTS WHICH, APART FROM GIVING INDIVIDUAL REWARDS, ALSO GENERATE A COLLECTIVE RETURN THROUGH FOMENTING THE COMMONS, OPEN CODE AND/OR FREE KNOWLEDGE.

Overview

Goteo was founded in 2011. The platform is today governed by the non-profit Goteo Foundation, which leads the development of Goteo and which is managing a public-private social investment fund that matches funding on the platform. Goteo Foundation is exploring the use of BDLT within a European foundation network to facilitate tax reliefs for any citizen in any country of the EU. The idea behind their work is a distributed application that allows payment automatization and certification between associated foundations.

Innovation

There is no legal framework for tax relief on a European level for donations between countries of the EU. Goteo seeks to replicate its existing certification model for users with a network of organisations with the capacity to generate donation certificates for donors within their country and under national regulation. The certification would be emitted

depending on the country where the donation originated, independently of the destination country of said donation.

Regardless of the destination country of a given donation, donors would always get a donation certificate from within their own country made available by a pertinent entity for tax relief purposes. The payment balance between entities, those that receive the donation and those that issue a donor certificate, will be satisfied through the invoices and payments between them, equivalent to the donations that they have received in name of a project they do not personally handle.

Lessons learnt, challenges and success factors

Goteo is currently evaluating the technical feasibility of its conceptual model, including the deployment of blockchain. By using distribute ledgers, it is hope that the system would be able to reflect the complex workflow in transparent registers with smart contracts managing the flow of funds. Foundations in this network would need a compensation mechanism that allow justification of the certificates done in name of another foundation. This mechanism must emit certificates and/or invoices for the associated entities with the annual summaries - or from another time period - as to balance out the payments within the network. The system will need to manage the particularities of different national fiscal models, determine which foundation will make the payments, will receive the donations and emit the implicated certificates.

BLOCKBONDS



<i>Country</i>	Norway
<i>Regulatory compliant</i>	Yes, donation based crowdfunding platform
<i>Blockchain used</i>	Not yet defined
<i>Type</i>	N.A.
<i>Lifecycle</i>	mature
<i>Activity</i>	Registered 25.08.2015
<i>Relation to crowdfunding</i>	Banking the unbanked
<i>Website</i>	https://blockbonds.io/

BLOCKBONDS IS A NORWEGIAN FINTECH COMPANY DEDICATED TO BANKING THE UNBANKED. THE PRODUCT SPENN IS A BLOCKCHAIN-BASED MOBILE BANKING APPLICATION, OFFERING A DIGITAL ACCESS TO BANK ACCOUNTS AND MONEY TRANSFERS.

Overview

Blockbonds aims at driving financial inclusion by empowering people through innovative technology. Currently Blockbonds is active in 3 countries, serving 177 million unbanked and installed on 54 million smartphones. In total \$8.7 million have been raised and it is planned to expand to 16 further markets tapping a market opportunity of \$380 billion.

SPENN is based on the private permissioned MultiChain. The added value of using blockchain is to ensure transparency and security towards partnering banks and central banks. The company's main costumers are banks, but Blockbonds also works directly towards the end users through its mobile application offering.

Innovation

Today 2 billion people are still unbanked and need access to basic financial services such as savings, credit and insurance. SPENN is a blockchain-based mobile banking app, which is "licensed to the banks, helps banks overcome their weak legacy systems, and cost-

efficiently bank the unbanked.”⁴¹ The free banking app allows users to send, receive and store money, and access other basic financial. At the same time, new revenues streams for the banks are created.

Lessons learnt, challenges and success factors

Main challenges remain legal and regulatory impediments or misinterpretations. These differ from market to market and include the use of cloud technology and BDLT. Working on a country by country basis involves repeated education of the relevant authorities of the underlying technologies, it is time consuming and costly.

In order to enable more end users to comfortably use the product, the underlying technology is being kept out of the end user experience. Customers therefore are presented with a user-friendly product that is adapted to their general needs and knowledge. The use of blockchain is kept in the background processes and managed by Blockbonds.

⁴¹ <https://blockbonds.io/>, Who we are

LESSONS LEARNT

Even at this early stage of BDLT adoption in the alternative finance sector we can already derive some lessons learnt and outline steps that are needed soon to better enable SMEs to fully grasp the opportunities created by the digital economy.

- **More incentives – Pioneering the blockchain sector is challenging**

Launching or implementing blockchain solutions was harder than anticipated for all companies presented here. Hurdles to overcome the identification of the right technology solution (in an immature market), to find people that are willing to learn, to have the patience and the financial resources to engage in the required learning process to make, amongst others, customers, lawyers and regulators understand new BDLT-based business models.

SMEs in particular will need incentives to experiment and deploy BDLT based business models, as cost associated with technical and legal risk are high. Positive initiatives that can be observed in this field are, for example, several piloting schemes for the uptake of DLTs by SMEs and co-financed by the European Commission, such as Blockchers⁴², Blockpool⁴³, BlockStart⁴⁴ or BlockIS⁴⁵. These initiatives are not limited to the (alternative) financial sector and allow SMEs from different sectors to pilot blockchain-based projects. Further, the European Commission, in collaboration with the European Investment Fund (EIF), is about to announce a “first dedicated EU equity investment fund for AI and blockchain technologies”⁴⁶ to bridge the investment gap required for European investments in highly innovative start-ups and tech companies.

- **Integration of the token economy into European legal frameworks**

A key hurdle for the uptake of BDLT remains widespread uncertainty regarding requirements to meet regulatory compliance. Consequently, SMEs launching BDLT-based business models currently have to count in another 6-12 months before becoming operational, for getting the approval of the regulator. To leverage BDLT uptake it is therefore crucial to support the dialogue between start-ups and regulators.

In order to incentivize and facilitate innovation and growth based on BDLT applications, hurdles to bringing a product or a service to the market need to be reduced, both with regards to time and investments. Innovative SMEs should have the possibility to test and pilot their business model. If it proves, further investments and legal considerations may be worked out. When looking to best practices, e.g. the UK Financial Conduct Authority

⁴² <https://blockchers.eu/>

⁴³ <https://blockpool.eu/>

⁴⁴ https://cordis.europa.eu/project/rcn/224778/factsheet/en?WT.mc_id=RSS-Feed&WT.rss_f=project&WT.rss_a=224778&WT.rss_ev=a

⁴⁵ <https://blockis.eu/>

⁴⁶ <https://ec.europa.eu/digital-single-market/en/blogposts/forging-new-frontiers-finance-digital-innovations>

(FCA)'s regulatory sandbox proved to be very effective for establishing the alternative finance industry in UK⁴⁷. Alternatively, the Monetary Authority of Singapore has early on enabled BDLT and crypto currencies by creating clarity on its regulatory viewpoint, which is largely rooted in existing legal frameworks.⁴⁸

There are relevant initiatives also in Europe under way, which are different in nature and may lead, if not aligned, to fragmentation in the BDLT sector across Europe. For example, France⁴⁹ and Switzerland⁵⁰ have created open-minded frameworks for initial coin offerings (ICO), Germany has published a general blockchain strategy⁵¹ and is together with Luxembourg⁵² currently at the forefront regarding security token offerings (STO). Austria⁵³ on the other hand is considering implementing a FinTech Sandbox approach. Gibraltar and Malta have also developed dedicated conditions for blockchain, but potentially most progressive blockchain law will come into force in Liechtenstein⁵⁴ in early 2020, enabling the token economy by allowing a straightforward tokenization of all kinds of assets and rights and their transfer on blockchain.

European governments can facilitate the uptake of BDLT by SMEs by providing clear interpretation of regulatory interpretations. Some jurisdictions⁵⁵ already recognize tokens as securities, as they argue they fulfil all relevant characteristics. The currently discussed regulatory framework for European Crowdfunding Services Providers (ECSP) represents a key policy success for the European institutions, having acted on a young innovative sector within very short period by developing jointly with the market a relevant, harmonised regulatory framework across the EU with a strong consumer protection in place. This creates a significant opportunity to improve access to finance for European SMEs and can, with adequate and careful interpretation also enable token transactions if these fall under admitted instruments within EU Member States.

- **Creating BDLT communities – Education, knowledge and trust**

⁴⁷ Cf. e.g. <https://www.fca.org.uk/publication/research/the-impact-and-effectiveness-of-innovate.pdf>

⁴⁸ <https://www.mas.gov.sg/development/fintech/technologies---blockchain-and-dlt>

⁴⁹ <https://www.gouvernement.fr/en/pacte-the-action-plan-for-business-growth-and-transformation>

⁵⁰ <https://www.finma.ch/en/documentation/dossier/dossier-fintech/entwicklungen-im-bereich-fintech/>

⁵¹ BMWi, BMF (2019): Blockchain-Strategie der Bundesregierung. Wir stellen die Weichen für die Token-Ökonomie https://www.bmw.de/Redaktion/DE/Publikationen/Digitale-Welt/blockchain-strategie.pdf?__blob=publicationFile&v=10

⁵² https://www.chd.lu/wps/portal/public/Accueil/Actualite/ut/p/z1/04_SjgCPykssyoxPLMnMzovMAfljo8ziXYxcwol8TYwM_F2DzQyMjAOMHYOCjQwMDEzowwkpAJKG-AAjgZA_VFYIDgaOAUZORkbGLj7G2FVgGJGOW6EOaajoiAzgGPSw!!/?1dmy&page=6_D2DVRl42oG7Q402JEL7USN38D6&urile=wcm%3Apath%3A%2Factualite.public.chd.lu%2Fst-www.chd.lu%2Fsa-actualites%2Fa27dec72-f1fa-4858-acfg-cf62ecbee781

⁵³ https://www.parlament.gv.at/PAKT/VHG/XXVI/ME/ME_00142/index.shtml

⁵⁴ Full report of the Liechtenstein TOKENS AND TT SERVICE PROVIDER ACT; TVTG https://www.naegele.law/downloads/2019-07-12_BuA_TV TG_en_full_report.pdf

⁵⁵ For example Germany, Luxembourg or Liechtenstein

For a broad market uptake of BDLT across industries awareness creation and education is necessary. Therefore, national and European initiatives and associations need to be visible and provide evidence and support, such as references to innovative start-ups, specialized lawyers, an overview of developers and other supporting experts or even grants supporting legal advice. These early ideas might be worth further investigation. European examples for such initiatives are for example the European Blockchain Observatory and Forum⁵⁶, or the International Association for Trusted Blockchain Applications (INATBA)⁵⁷. The topic of BDLT is, of course, also subject to discussions within existing industries, but an open exchange of knowledge and expertise needs to happen across verticals. Much of the onus in creating this knowledge exchange is with the industry itself and it is a welcomed and positive sign that the European Commission has taken the lead in enabling such exchanges by creating and supporting the above-mentioned bodies.

The general knowledge of BDLT, its opportunities and risks remain limited, among all stakeholders. But the demand for education has a broader impact, when analysing market predictions. As per market forecasts, the global blockchain market is set to grow from \$1.2 billion in 2018 to \$23.3 billion by 2023⁵⁸, but as highlighted by Elias Iosif of University of Nicosia⁵⁹, which provides a Master's degree in Digital Currency & Blockchain Technologies already since 2014, so far higher education institutions do not consider seriously enough the creation of dedicated BDLT degree programs.

- **Blockchains used - Public vs. private**

Both, public and private blockchains are peer to peer networks and offer a decentralized ecosystem. In both cases the transactions are verified through consensus mechanisms.

From an economic point of view, public blockchains have probably more innovation potential as they envision full decentralization. Examples such as Bitcoin and Ethereum have created completely open global ecosystems where anyone can participate. Further, these blockchains have in-built incentive mechanisms, ensuring the further development of the network by rewarding more active participants as part of a community.

Private blockchains or also so called "business blockchain technologies" like Hyperledger (also open source), allow restricting the access to people who have a "permission". Therefore, with private blockchains it is possible to take advantage of the innovative

⁵⁶ The European Union Blockchain Observatory and Forum aims to accelerate blockchain innovation and the development of the blockchain ecosystem within the EU, and so help cement Europe's position as a global leader in this transformative new technology. <https://www.eublockchainforum.eu/about>

⁵⁷ INATBA offers developers and users of DLT a global forum to interact with regulators and policy makers and bring blockchain technology to the next stage. <https://inatba.org/>

⁵⁸ MarketsandMarkets (2019): "Blockchain Market by Provider, Application (Payments, Exchanges, Smart Contracts, Documentation, Digital Identity, Supply Chain Management, and GRC Management), Organization Size, Industry Vertical, and Region - Global Forecast to 2023" <https://www.marketsandmarkets.com/Market-Reports/blockchain-technology-market-90100890.html>

⁵⁹ 8th ECN CRowdCon, Scaling up the industry, October 25th 2019; Insight I, University of Nicosia, Elias Iosif, Blockchain in Education: Current Landscape and Open Challenges

features but restricting the access of participants or involving regulating authorities. “Businesses and institutions can choose from a wide range of core protocol frameworks as the technological foundation of their networks. However, data suggests that only four protocol frameworks dominate the market: Hyperledger Fabric takes the lion’s share, supported by nearly half of live networks deployed in production, followed by R3’s Corda and coin Science’s MultiChain”⁶⁰ As both frameworks are open source, Ethereum is also already used for business purposes⁶¹ and hybrid frameworks are used.

⁶⁰ Rauchs, M., et al. (2019): 2ND GLOBAL ENTERPRISE BLOCKCHAIN BENCHMARKING STUDY. Cambridge Centre for Alternative Finance. https://www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/downloads/2019-ccaf-second-global-enterprise-blockchain-report.pdf, p. 37

⁶¹ E.g. <https://www.forbes.com/sites/michaeldelcastillo/2019/08/29/hyperledger-unanimously-approves-first-ethereum-codebase-for-enterprises/#1f0008c3794c>