VOLUME III

Blockchain and Financial Industry

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Introduction

The period of **2008 - 2014** can be considered as the dawn of Blockchain as a root technology. During these years it gained a solid community of users and an increasing diversity of use cases, but very little commentary or regulatory guidance by governments.

2016 can be considered as the dawn of Blockchain as an industry, at which time it gained enough recognition, public prominence and global penetration as to warrant commentary by governmental bodies.

One of the first notable documents in this regards was a 2016 report issued by the UK Government Office for Science entitled "Distributed Ledger Technology: beyond Blockchain."

2018, then, can be considered as the inflection point in the growth of the Blockchain industry, and the phase at which it is beginning to transition to what can be considered as **Crypto Economy** in its early stage of development**.**

But what is Crypto Economy? Crypto Economy is a technological and financial phenomenon that encompasses all activities currently occurring in the areas of blockchain, cryptocurrency and digital assets.

It does not yet have a sharply defined definition; industry participants from the side of financial services view it as an advanced state of FinTech enabled by next-generation IT technologies, while industry participants from the side of IT view it as advanced IT technologies as applied to the financial sphere. Each side views it from their own niche perspective.

But the true nature of the the Crypto Economy can only be properly envisaged in terms of the convergence and and intersection of advanced IT technologies with financial services.

And it is this central hallmark - the convergence of these two spheres to yield results greater than the sum of its parts - that allows the evolution of this sphere moving forward to be clearly projected.

While the Crypto Economy can be considered as an emerging sector of companies that are executing traditional economic activities using advanced IT tools and frameworks, it is more than that. It is, in fact, an entirely new way of facilitating an economy - a fundamental and systemic **paradigm shift** in economics.

While a consensus has yet to be reached on the definition and fundamental makeup of the Crypto Economy, we can nevertheless predict what it may look like by the year 2022.

Emerging into the new sphere of the "**Augmented Economy**" or "**Digital Economy 2.0**", a state during which the integration of Blockchain with AI and other next generation IT-solutions, for use cases including legal technology (**LegalTech**), investment technology (**InvestTech**), regulation technology (**RegTech**) and e-governance technology (**GovTech**), will emerge in such a way as to create an entirely novel technological-financial ecosystem with penetration into the majority of societal activities, from finance and commerce, law, regulation and governance.

Ongoing advancements in crptographic, blockchain and advanced IT solutions will continue to **accelerate**, and will enable the increasing **integration** of the now separate industries of FinTech, RegTech, LegalTech and InvestTech. The main outcome of this ecosystemic evolution can be summed up in one word: **Digitization.**

This process of Digitization can be expected to enable several significant outcomes for each of these industries:

1. Greater **consistency**, **transparency**, **immutability** and **security** of assets and data;

2. Enhanced **Liquidity** and **Interoperability**; the digitization of assets in combination with IT platforms and frameworks for their execution and manipulation will enable real-time manipulation of data and assets in real time, and offer unparalleled levels of liquidity.

What is a crypto economy?

Dick Bryan and Akseli Virtanen shared on 14 May 2018 via the Medium platform their views about the crypto economy and its role. They mentioned that crypto companies are emerging as a growing sector of the traditional economy, generating employment and attracting mobile capital in search of high risk/high return investment possibilities. But the crypto economy is not just another tech sector. It represents a different way of structuring the economy.

The emergence of a crypto economy has been dependent most obviously on the innovation of bitcoin and distributed ledger technology, including the preceding and associated programming and computational innovations, starting from public key cryptography. But it is essential to see crypto economy within the context of economic and financial history. There have been developments in a number of other conventional knowledges, conventions and practices that, in combination, create the actual conditions for the emergence of a crypto economy now.

A crypto economy offers economic relations that are not directly mediated by the state, opening possibilities for economic organization that do not comply with the state's conception of economic order. In the absence of state control, the crypto economy needs to focus on its own internal modes of governance. There should be no notion that a crypto economy is intrinsically harmonious and in balance. Cryptocurrencies have challenged the historical proposition that only the state can provide a basis of trust in symbolic tokens-as-money. Beyond the issues of the detachment of money from state provision, the change in money has further implications. In examination of crypto tokens—recently especially in relation to bitcoin—there is also a focus on its role as a means of exchange.

The real potential is in cryptocurrencies as units of account: as modes of measuring economic activity that are conceived differently from those intrinsic to fiat money. Fiat money has become tied to conventional framings of profit and loss, income and expenditure, and a market-centred calculus. Non-fiat monies have the potential for developing new ways to calculate economic activity; ways that represent different social and economic values, and measure performance by criteria other than profit. The unit of account potentially signals the importance of the crypto economy developing ways of accounting and measuring the activities supported by each respective token, which may represent various stores and exchanges of value. The authors see this as central to giving tokens a material basis in the crypto economy; not just leaving them as speculative stores of value.

Source https://medium.com/econaut/what-is-a-crypto-economy-155bdbc4ab1d

What are the developments in economic conventions?

Below some of these breakdowns:

1. **Debt and equity.** A breakdown of the distinction between debt and equity (convertible bonds, preference shares, total return swaps) opens up new ways of thinking about funding investment. Token issuance provides funding that is neither debt nor equity, albeit having some elements of each.
2. **Money and other assets.** A new liquidity in asset markets that comes with derivatives on money (interest rate, exchange rate) and the rise of high frequency trading creates a liquidity (convertibility) that breaks down the distinction between money and other assets.
3. **Conversion to fiat money.** Following, for traders, fiat money appears as a necessary, but costly, conversion point: something they have to 'pass through' as they shift from one asset to another. Tokens enable trade to 'bypass' fiat money measurement.
4. **Nature of assets.** The rise of 'intangibles' as an asset class which is now the predominant asset of most of the world's largest companies creates a problem for corporate accounting, for these assets cannot readily be valued. Blockchain-based assets are, in this sense, no different from conventional 'intangible' assets.
5. **Corporate organization.** The rise of 'networks' as modes of corporate organization breaks down the conventional means that differentiate one corporation from another and challenges the principle of 'competition' as the driver of corporate rationale. These are both issues that feature prominently in decentralized applications.
6. **Rationale of production.** Concern for the social responsibility of corporations, especially around environmental and human rights concerns, is being met by new modes of monitoring, moderating corporate decisions but never challenging the ontological primacy of profit-making as the goal of corporations. Programmable organizations enable production to be organized in a way that makes social criteria the rationale for production; not a constraint on it.
7. **Distribution of risk.** Changes in the nature of work (precarization, casualization, subcontracting, the rise of the gig economy) see workers carrying greater risks and break down the attachment of work and living standards to employment. There is growing interest in alternative ways of organizing work.
8. **Trust in traditional financial instruments.** The Global Financial Crisis of 2007–2008 created an economic environment of mistrust in conventional banking. Further, Quantitative Easing leaves on-going uncertainty about the stability in value of treasury bonds. New modes of financial trust look more appealing in the aftermath of these developments.

Source: https://medium.com/econaut/what-is-a-crypto-economy-155bdbc4ab1d

What are the key features of the emerging crypto economy?

To develop new modes of governance that do not rely on the state

There is a potentially transformed economic role of the state. Some involved in blockchain talk of an economy run by protocols, without the need for a state. That is simplistic, for blockchain and coin issuance are contingent on many state capacitates which cannot be replicated in crypto-order at the moment; not least the enforcement of contracts and property ownership and macroeconomic management.

But clearly the idea that money and the state are enmeshed (that only the state can oversee a money system) is challenged profoundly. Implicitly, the idea that the state oversees social trust is also challenged.

Record keeping and clearing houses for transactions no longer require the hand of the state. A crypto economy offers economic relations that are not directly mediated by the state, opening possibilities for economic organization that do not comply with the state's conception of economic order. To the extent that the state is not conspicuous, the crypto economy needs to focus on its own modes of governance. There should be no notion that a crypto economy is intrinsically harmonious and in balance.

Changing nature of money

Cryptocurrencies have challenged the historical proposition that only the state can provide a basis of trust in symbolic tokens-as-money. Bitcoin provided an alternative basis of trust, challenging the historically-assumed inseparability of money and the state.

Beyond the issues of the detachment of money from provisioning by the states (and banks associated with fiat currency issuance), the change in money has further meaning. In discussion of Crypto Tokens—recently especially in relation to bitcoin—there is a focus on its role as a means of exchange.

Critics point out that its value is volatile (but who chooses the benchmark of 'stability'?). They also point out that bitcoin is not widely used as a means of exchange. Some even announce it as a doomed currency on this point alone. *But money is not simply means of exchange: its other critical functions are store of value and unit of account.*

Cryptotokens are not yet strong stores of value, in part because of volatility, but also because their connection to other modes of storing value are yet to develop. When, for example, crypto companies are accessed by investment banks and pension funds as a distinct asset class (via listing on the NASDAQ or by a broadening of the vision of, and legal constraints on, investment bankers as to what constitutes an 'alternative' asset class), the role of store of value will be differently framed.

Source https://medium.com/econaut/what-is-a-crypto-economy-155bdbc4ab1d

But the real potential is cryptocurrencies as units of account: as modes of measuring economic activity that are conceived differently from those intrinsic to fiat money.

Fiat money has become tied to conventional framings of profit and loss, income and expenditure, and a market-centred calculus. Non-fiat monies have the potential for developing new ways to calculate economic activity; ways that represent different social and economic values, and measure performance by criteria other than profit.

Think about it for a moment. The unit of account potential signals the importance of the crypto economy developing ways (not a singular way, but coin-specific ways) of accounting and measuring the activities supported by each token. We see this as central to giving tokens a material basis in the crypto economy; not just leaving them as speculative stores of value.

Patterns of economic association

Trade: Cryptographically enabled distributed information systems enable peer-to-peer trade which is seen to be fast, low cost, and open up processes of exchange between people/institutions who would not hitherto have seen themselves in economic association.

For some, especially followers of libertarian economics, the capacity to exchange (trade) is an intrinsic virtue: the ability of people/organizations to freely associate for mutual gain. Blockchain certainly complies with this political vision.

But exchange is often between parties of unequal power, so mutual gain cannot be presumed. An important issue of the crypto economy is how blockchain can and cannot countermand asymmetrical power in trade. We see blockchain not facilitating frictionless markets but rather frictionless capital: distributed capital.

Networks: Much is written in organizational studies about networked relations, the increasingly fluid boundaries between different organizations (firms) and changing relations of workers and firms.

It is clear that networks are breaking down conventional ideas of organizations and ownership (eg. of intellectual property) and of ‘employment’.

For some, this challenge leads back to the idea of our known organizations as synthetic amalgamations that overcome the inefficiencies of individual contracting. They contend that, via networks, we are seeing a resurgence of the efficiency of individual contracts. We see networking opening new possibilities of co-operation and possibilities for risking and speculating together.

Source https://medium.com/econaut/what-is-a-crypto-economy-155bdbc4ab1d

Production: from the potential of cryptocurrencies as units of account different from the state's fiat currency and the possible re-framing of networks as the emergent mode of organization comes the possibility of re-thinking what we understand by production:
what are the social units that produce; how production is measured as a social contribution, and how output is distributed/accessed/owned. Re-defining and re-measuring production provides the material basis of the crypto economy; a basis that gives crypto-tokens a long-term future as the currency of an alternative economic logic. A different way of doing the economy.

The economic space we need to discuss in relation to the crypto economy is nothing short of imaging and engineering an alternative, post capitalist mode of organizing and calculating that sits in parallel with the conventionally-conceived economy.
That's a big claim. It announces new economic possibilities that, while not entirely novel in their vision, are wildly new in the conception of their reach and mode of organization. The rise of joint stock company and stock markets in 1840s transformed capitalism. A whole new mode of production, capture and distribution of value was born.

> *We think we are now at a turning point of similar significance. The new network technologies will produce a radically different economy. How value is created, captured and distributed, what is money, how people relate to production, are changing as radically as the first generation internet changed the way we communicate and relate to the presence of others on the information level.*

Source: https://medium.com/econaut/what-is-a-crypto-economy-155bdbc4ab1d

Crypto Economy in UK

The Treasury Committee of the UK Parliament announced on 22nd February that is ready to launch an inquiry into virtual currencies and their effect on the economy. The main intention of the Treasury Committee is to understand the risks and benefits of digital money. The MPs will cover the role of digital currencies in the whole United Kingdom, on consumers and businesses. Cryptocurrencies are able to benefit United Kingdom's economy. It does not mean that regulations shouldn't take place, but the benefits of blockchain technology and cryptocurrencies are visible in the whole economy.

Fresh from the announcement that the UK government was setting up a "crypto task force" to look into the risks and benefits of cryptocurrency and all things blockchain, British minister John Glen MP has revealed to reporters that provided the government gets regulation right, they would welcome a "*flourishing*" cryptocurrency exchange in London. Governments everywhere are trying to balance the risks of cryptocurrency speculation with the growth opportunities which blockchain technologies provide. For Glen the issue is, "*how do we regulate or not, how do we enable or not, based on the blend of opportunities and risks that may exist in this new technology*".

Agreeing with Bank of England governor Mark Carney that the current size of the crypto-economy poses no risk to the broader financial system, Glen told journalists that the government was "*agnostic*" on cryptocurrencies and wanted to find "*the right level of regulation if that's appropriate*".

Glen acts as "City Minister" for the UK, the government official ultimately responsible for financial services in the country. Despite Britain's speciality in finance, thus far there are no major British-based cryptocurrency *exchanges. Glen believes that provided the UK gets the regulation right, there could be a "stable, flourishing cryptocurrency exchange in the City of London*".

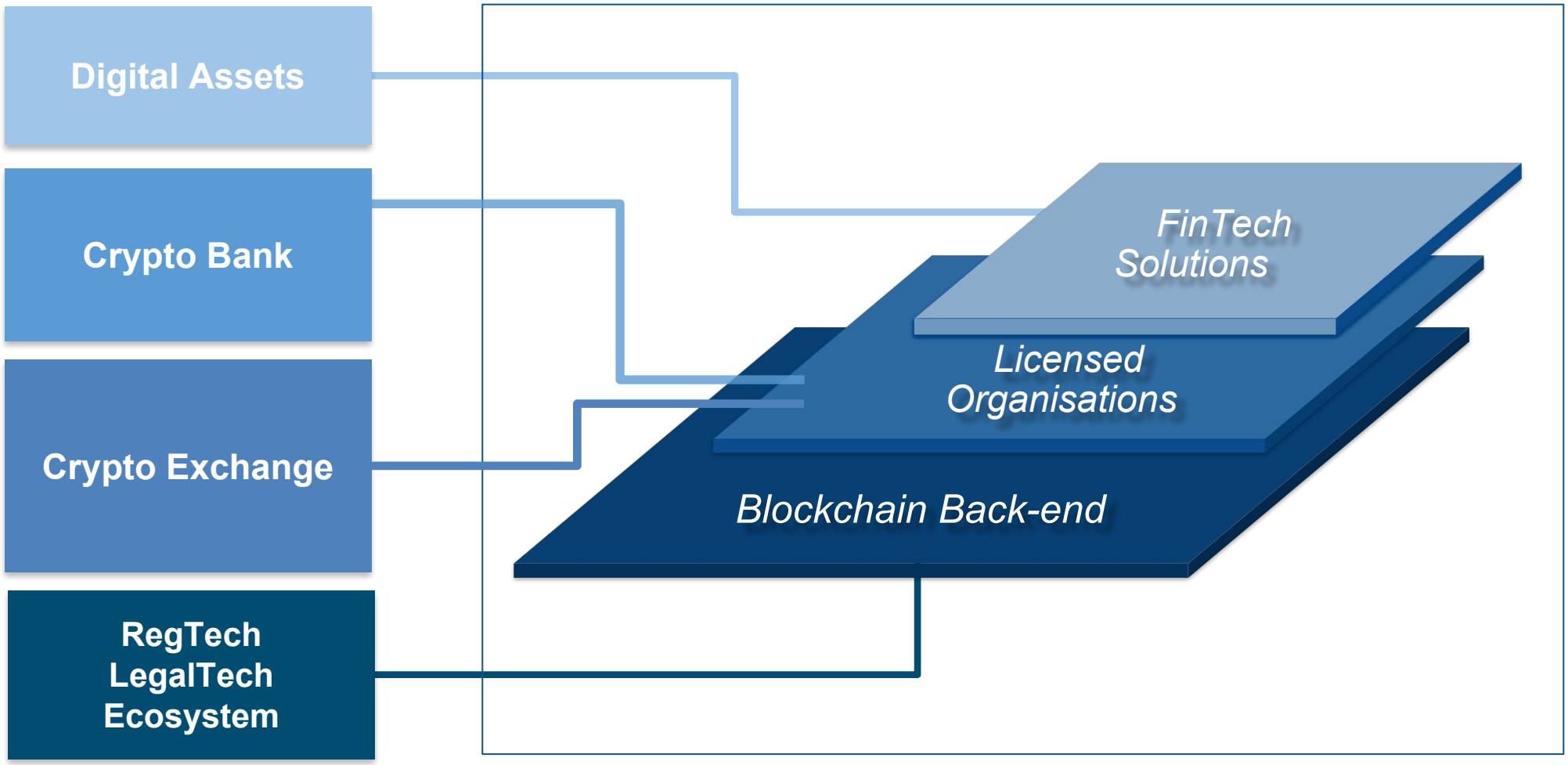
British Chancellor of the Exchequer Philip Hammond yesterday announced an investigatory taskforce so the government could "*manage the risks around Crypto assets, as well as harnessing the potential benefits of the underlying technology*". The taskforce will include representatives from all major financial institutions, including the Bank of England, the Treasury and the Financial Conduct Authority.

Source: https://www.coinstaker.com/united-kingdom-examine-cryptocurrency-effect-uk-businesses-investors/, https://cryptocoinspy.com/british-government-would-welcome-a-flourishing-london-crypto-exchange/

Crypto Economy
(Case Study - DAG Global)

Logical scheme of Crypto Economy architecture - case study provided by DAG Global

Crypto Economy Technological and Business Architecture



Crypto Economy
(Case Study - DAG Global)

CRYPTO BANK: BRIDGE FIAT WITH EMERGING DIGITAL ASSETS

- **OPPORTUNITY:** There is currently no credible, full-service digital bank for an emerging fintech and $500B crypto ecosystem which has experienced massive growth over the past 18 months and is expected to reach a $5 Trillion market cap over the next 3 years. This is a unique opportunity to participate in the revolution that is about to rewrite the rules of the world's entire financial system over the coming years, where DAG Global sees their bank serving an integral role in shaping the financial ecosystem as the "Tokenization of everything" unfolds.

- **VISION:** To become the premier global "crypto bank" – providing a robust digital banking platform using the most advanced suite of technologies, to facilitate transactions in and between traditional and digital currency and assets whilst adhering to an exacting standard of compliance and security, and with the ultimate aim to create a positive experience for clients.

- **MISSION:** To build a trusted brand and financial services ecosystem which truly delivers real products to Fintech, crypto and SME firms which have been isolated from mainstream financial services. What this means is to go straight to the heart of the current division in the market between the traditional methods of operating and create the bridge to the new technologies and interpret the regulatory framework into a future idiom.

Crypto Economy
(Case Study - DAG Global)

Cybersecurity is at the core of DAG technology. Aim is to achieve assurance against cyber risks by pursuing a layered security maturity model, enabling a base level of due diligence moving to a standard above the industry norms pushing towards due care

Liquidity in creating an integrated financial ecosystem spanning banking services to exchanges across multiple asset classes, DAG aims to deliver liquidity mechanisms for their clients and partners

RegTech / LegalTech - through the use of RegTech, DAG streamlines the KYC process to create a unique client digital identity, and to optimise legal delivery and maintenance including automation of AML/KYC verification of transactions.

Artificial Intelligence / InvestTech - to use leading expertise in the Artificial Intelligence space to select the best InvestTech solutions

R&D conduct own R&D and absorb new innovations to improve compliance and security, and deliver novel financial instruments

AI and DeepTech at their intersection with financial science.

DAG Global has strong capabilities to leverage the advantages of technological progress and to maintain thought leadership through their in-house analytics and industry partnerships.

Crypto Economy
(Case Study - DAG Global)

Logical scheme - “Building Integrated Infrastructure for the Digital Economy”

Crypto Economy In Emerging Markets
(Case Study - GMEX Group)

Financial inclusion is a critical enabler for poverty reduction and inclusive growth, and the key facilitator of financial inclusion is banking. People and firms with bank accounts can make financial transactions efficiently and safely, access funds (whether payments, credit, savings, or other) invest in the future, and cope with economic shocks. However in 2017 30% of adults did not have access to a transactional bank account.

The Global Findex database shows that 515 million adults worldwide opened an account at a financial institution or through a mobile money provider between 2014 and 2017. Most of this growth has been in sub-saharan Africa. As non-cash transactions continue to rise globally, ventures such as the GMEX-run FinComEco Limited and MINDEX ecosystem aim to deliver sustainable and responsible economic changes to locales where the current financial systems have failed.

High impact initiatives facilitate agricultural value chain efficiencies through provision of strategic value-added services including an electronic Warehouse Receipt System (eWRS), Exchanges, Trading Platforms, Commodities and Input Finance and Electronic Banking, training and capacity building including the establishment of a commodities exchange underpinned by Blockchain technology.

FinComEco initiatives will facilitate trust between investors, institutions and farmers in a form previously unseen for Sub-Saharan African agriculture ecosystems, resulting in high potential for creation of derivatives such as asset backed securities and trade finance.

Crypto Economy In Emerging Markets (Case Study - GMEX Group)

GMEX leads consortium to launch a Mauritius based International Commodities and Derivatives Exchange (MINDEX) ecosystem.

MINDEX (Mauritius-based International Derivatives and Commodities Exchange) enables sourcing, trading and financing of ethically sourced green gold from bonafide sources; including artisanal miners. A new level of trust is achieved by implementing a blockchain-based supply chain infrastructure to allow transparent activities by participants. Refined gold bars produced from this value chain are stored securely in a Mauritius-based sovereign vault. The MINDEX commodities and derivatives exchange then allows buying and selling of the digitised gold contained in the vault.

MINDEX provides the following:

- A track record of a digital asset without the need for a trusted third party.
- Reduced need for reconciliation - preventing errors, delays, risk and capital required.
- A ‘golden’ source of data which tackles multiple inefficiencies with the traditional infrastructure.
- Enables more flexible market structures, increases innovation and allows streamlined reporting.
- Data integrity assurance.

The MINDEX ecosystem is supported by the Economic Development Board of Mauritius and the UK Government and has been approved by regulators to set up a derivatives exchange and advanced real-time central counterparty (CCP) clearing house.

Chapter II:

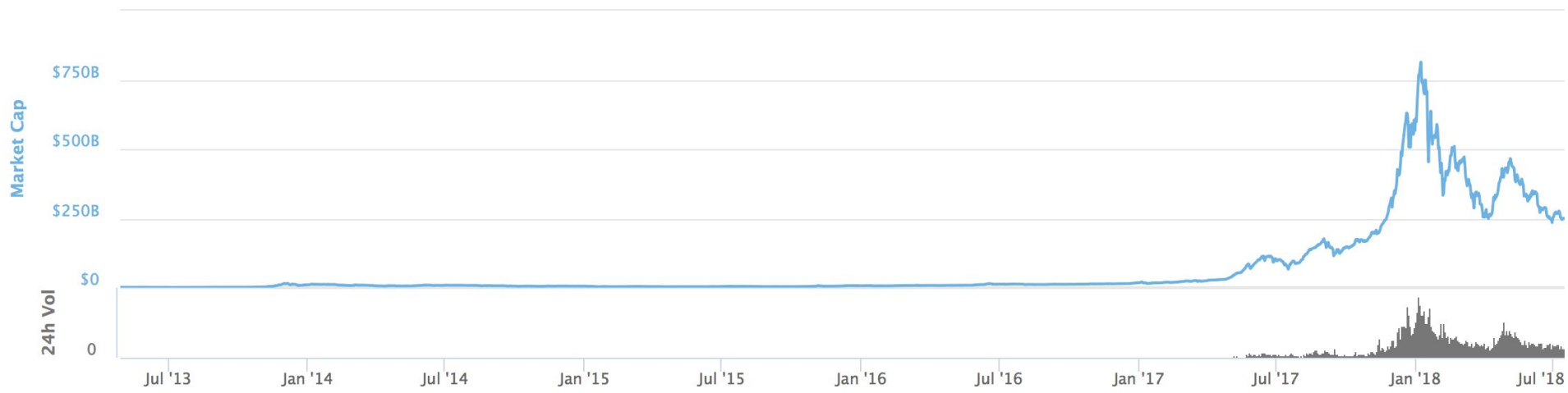
New Asset Class

Digital Assets as a New Asset Class - Rise in Valuations

This section of the report aims to examine if digital assets represent a new alternative asset class in themselves, or if they portend a future where all existing asset classes will become digitised (Tokenised).

While one could legitimately argue that the birth of “blockchain” as an asset class started shortly after the Bitcoin white paper was issued by Satoshi Nakamoto in 2009, the genuine rise of a new global digital asset class only really arrived in 2017 when inflows from largely institutional investors propelled the total market capitalisation of digital assets / cryptocurrencies based on the blockchain from $18 billion at the start of 2017 to well into the hundreds of billions at the end of the year and at one point crossed over $750 billion. The total market value of these instruments has since moderated in 2018 and at the time of publication of this report is around $250 billion. Daily liquidity has also increased considerably, with 24-hour trading volumes at the time of publication around $10 billion.

Total Digital Asset Market Capitalization - July 2013 to July 2018



Source: https://coinmarketcap.com/charts/

Digital Assets - Cryptocurrencies, ICOs, and Tokenization

The rapidly increasing valuations of global digital assets have largely been based on digital instruments known as “crypto” or “cryptocurrencies”, or digital assets which approximate the behaviour of traditional fiat currencies (e.g. pound sterling, dollar, yen, etc.) as means of exchange, albeit without the backing of Central Banks. The idea of cryptocurrency has captured the public imagination, with names such as Bitcoin entering the common parlance.

In addition, Initial Coin Offerings (ICOs) have raised several billion dollars in new growth capital for investment, typically in blockchain-related projects, with strong parallels to IPOs in the traditional equity capital markets. These have been known to a certain extent as utility tokens, although increasingly such ICO instruments are more regularly being classified as securities tokens as they generally denote a financial contract to participate in a business in some shape or form. Regulators are rapidly coming into the space to ensure appropriate consumer protections, with governments also issuing tax guidance to provide a context for this novel asset class.

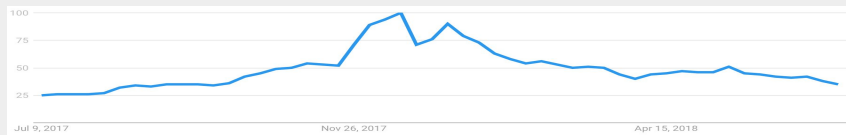
It is generally received wisdom within the crypto community that all existing assets will be “Tokenised”, whereby not just currencies and securities will be digitised onto the blockchain, but also increasingly the other major traditional asset classes including fixed income, commodities, real estate, etc. Already today, nearly all assets are digitised in some shape or form, if not yet transferred to the blockchain.

The transition to Tokenised digital assets, represented on the blockchain, is proceeding at a steady pace because of the corresponding benefits of increased efficiency, transparency and liquidity, and will yield interesting outcomes. The possibility to leverage the blockchain to deliver a tokenised future for relatively illiquid assets such as real estate, for example, could yield increased market efficiency with the establishment of financial instruments which have not been imagined previously.

The Rise (and Fall?) of Cryptocurrencies and the Stable Rise of Digital Assets and Tokenization

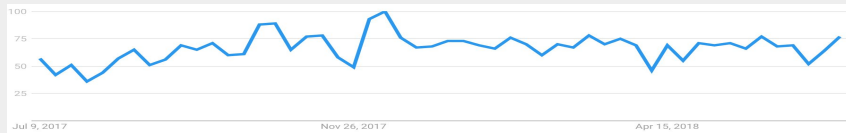
"CRYPTO"

"BLOCKCHAIN"

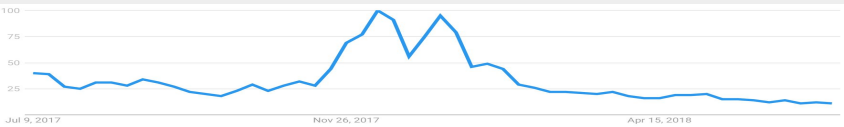


"BITCOIN"

"DIGITAL ASSET"



"ETHEREUM"



"TOKENIZATION"

The market euphoria at the end of 2017, as indicated by the dramatic rise in Google searches for "crypto" and e.g. "bitcoin" and "ethereum" in Q4 2017, and the subsequent decline in interest from Q1 2018, underlines a more stable and ongoing interest in "blockchain" and the concepts of "digital asset" and "tokenization".

Source: Google Search Trends

Definitions of Digital Asset and Two Principle Types

A **digital asset** is something which is expressed in a binary digital format and is associated with ownership. Data that does not have associated usage rights would thus not be considered an asset, and rather then just be considered purely information. On a high-level, digital assets may be split into two principle types essentially based on their auditability, i.e. 1) centralised by trusted actors or 2) tokenised on the blockchain for open access:

1. **Centralised** digital assets are controlled by one primary actor (e.g. a clearing Central Bank or company) and are occasionally audited by a secondary centralised firm or institutional actor. The concept of trust in these assets is established against the reputation of the actors along the process. A basic example of this type of digital asset would be a digital currency which is analogous to physical cash. Another example in practice would be assets that have been digitised by commodity exchanges, which have replaced physical records with electronic transactions; however, the infrastructure costs are typically high and the procedures require centralised actors on both sides of a trade and / or as intermediaries in order to confirm transaction validity.

2. **Tokenization**, represented by “tokens”, is the process of transferring the ownership rights of an asset into a digital token on a **blockchain**, which is a continuously growing list of records, or blocks, which are linked on a contiguous chain and secured using cryptography. In contrast to the above, typically the auditing of the asset is more transparent because numerous actors can review and audit the digital asset ownership and flow on a near- to real-time basis.

Digital assets of both types are relatively new, and particularly Tokenization of assets onto the blockchain is very much at the start of its trajectory. Given the relative youth of Tokenization, the following classifications should be taken in context and considered as a broad categorisation.

Three Types of Tokenized Digital Assets

1. **Crypto Tokens** are novel instruments based upon public blockchains that achieve liquidity without a centrally-mediating actor, with valuations largely based upon supply and demand (for example cryptocurrencies such as Bitcoin)

2. **Utility Tokens** are not based on real world assets, but are rather “crypto-only” assets which are used to use or purchase an ancillary or related service by spending or leveraging a token (an example of a utility token is Ethereum, a decentralized platform that runs smart contracts upon which other crypto instruments are established)

3. **Security Tokens** are blockchain-based tokens that denote traditional assets, and so in a way these tokens most closely resemble the real-world securities as traded today in the financial markets. The Tokenization of an asset is similar to securitisation, where traditional assets are fractionalised, however by structuring this process on the blockchain, to a certain extent issues with transparency are resolved. Some assets which could be formatted as security tokens include stocks and bonds, property, etc.

While the rapid increase in digital asset market valuations in 2017 were largely driven by the rise of crypto and utility tokens, it is the development of “security tokens” which seems to hold the most promise for growth in overall value. If security tokens can capture a fracture of the valuations of the other traditional asset classes, which number in the hundreds of trillions of USD, they will dwarf the combined value of crypto and utility tokens.

In addition, going back to the definition of a digital asset as something which is expressed digitally and is associated with ownership, there are numerous types of assets which could be transferred onto security tokens other than traditionally liquid asset classes which are generally considered from a purely financial services context. For example, while many firms and individuals speak publicly about valuing their data, such information is rarely if ever reflected as a value on their respective balance sheets. Having such information expressed in a security token on the blockchain could facilitate the valuation of such useful data, and also possibly afford a mechanism for individuals to be compensated for (and ideally also better control) their personal data.

The Promise of (Security) Tokenization

There is a significant and ongoing discussion to establish a common framework to transfer traditional assets onto the blockchain to gain the benefits of the new technology, while retaining the inherent qualities of the underlying asset.

Tokenization has the potential to increase market efficiency by:
1) lowering transaction costs,
2) increasing transparency in information between all parties
3) by promoting innovative mechanisms for ownership.

For one example of how a security token structure could deliver all of these three efficiencies, let us imagine an insurance contract cover for a cargo ship travelling through pirate-infested waters. In a traditional insurance cover, the underwriter will define a cost largely based upon an assessment of the likelihood of the highest cost risk event occuring along the journey of the ship (e.g. all goods being seized by pirates) balanced against a judgement of other risk events occuring based on previous experience (e.g. weather events, human error, etc.). If this insurance cover were to represented as a security token on a public blockchain, and were the valuation of the product to be linked to e.g. the GPS position of the ship with other relevant data noted in the public blockchain on a corresponding time series, the insurance product security token could be traded on the open markets in real-time with all interested investors having access to data to make informed investment decisions. This would mean that the cargo ship operators could likely achieve more efficient pricing on their insurance cover - and then potentially also be able to carry more goods.

The initial question posed then in this section, regarding if digital assets are best considered as their own (alternative) asset class or if they are rather a mechanism of representing other asset classes through Tokenization. The answer appears to be that digital assets are both a unique asset class in themselves (i.e. crypto and utility tokens) as well as a mechanism through Tokenization (security tokens) of valuing all other asset classes, including some not yet imagined.

The broad classification of digital assets

We already live in the era where most assets are digitized. Steadily, we're moving towards the digitization of, basically, any value. On top of it, tendencies set by blockchain technology imply that little by little, we will be foregoing intermediacy and move towards individual control and management of our assets. In order to understand how to work with them, we should know how they should be classified. The article will also be helpful for those who are interested in fintech.

What is what

Digital asset is a digitized right of ownership of any value. That's the most precise definition, though it doesn't say a lot, so let's delve deeper. Generally, digital assets can be categorized by the two basic groups:

1. Digital currencies with a limited audit (PayPal's digital USD or Central Bank digital currency). The fact that they are hardly auditable implies that you cannot assure yourself as to the authenticity of the processes but only trust those who manage them.
2. Tokens, the accounting of which is more transparent because some processes can be auditable.

A cryptographic token is an accounting unit used to represent digital balance in a certain value, whilst the ownership of a token is evidenced by the aid of certain cryptographic mechanisms, for example—digital signature.

What blockchain has to do with this?

On the back of the above information, you can come to quite an unexpected conclusion—digital assets are basically defined by the accounting system in which they 'exist'. Because it's the accounting system that has properties that determine the way you manage assets and the difference between them.

Blockchain is the technology that grants the accounting system with certain properties. Let's examine them.

Source: https://hackernoon.com/the-broad-classification-of-digital-assets-4d6ad6a6a067

Properties that blockchain may provide	**distributed permissionless environment**	**decentralized permissioned environment**	**centralized permissioned environment**
database integrity verification	yes	yes	yes
real-time sync and back-ups	yes	yes	yes
consensus among validators	available to anyone	requires permission	for owner only
real-time audit (transparency)	available to anyone	requires permission	for owner only
trust to accounting system	trustless	some trust to validators	completely trusted
light client (simple verification)	make sense	little sense	no sense
proof that accounting system was cheating	impossible (no sense)	possible (make sense)	possible (make sense)
timestamping (anchoring)	make sense for anyone	make sense for validators only	make little sense for owner only

As you can see, properties provided by the blockchain vary depending on the environment where it's being applied. Permissionless—universally accessible (no permission is required to interact within the accounting)

Permissioned—permission is essential in order to participate in the accounting.

Obviously, the supremely decentralized environment in combination with blockchain technology allows for the utmost of features that an accounting system can eventually achieve. It's especially in this case, you can almost certainly guarantee that collusion of validators (those who mutually participate in decision-making of the system) is impossible. Agreeably, you don't need to trust the validators.

Source: https://hackernoon.com/the-broad-classification-of-digital-assets-4d6ad6a6a067

Though, even in a centralized permissioned environment, where transactions are confirmed by a single party, blockchain still enables certain benefits:

- Regular users can get the proof of them being cheated, in case such situation occurs. Even the single holder of the database wouldn't be able to turn the situation to his favor.
- You can assure yourself as to the integrity of the data.
- Synchronize data among an unlimited number of servers in real-time (this excludes a single point of failure of the whole system and increases uptime).

Classification criteria of digital assets

In order to know the difference between various digital assets, one should understand how certain processes in their accounting systems are provided. This creates criteria by which assets can be classified. The combination of various states of these criteria distinguishes their accounting systems.

How digital assets are different?	**cryptocurrency**	**decentralized permissioned digital currency**	**centralized permissioned digital currency**	**decentralized permissioned token platform**	**centralized permissioned token platform**
issuance process	permissionless limited	permissioned limited	permissioned unlimited	permissioned limited	permissioned unlimited
transaction confirmation	permissionless decentralized	permissioned decentralized	private	permissionless decentralized	permissioned decentralized
transaction audit	available to anyone	available to anyone	permissioned	available to anyone	permissioned
upgrade management	by permissionless community	by private community	by private community	by permissionless community	by permissioned community
registration and restrictions	absent (not possible)	absent (possible)	present (necessarily)	absent (not possible)	present (necessarily)
transaction irreversibility	strong	doubtfully	absent	strong	doubtfully

Source: https://hackernoon.com/the-broad-classification-of-digital-assets-4d6ad6a6a067

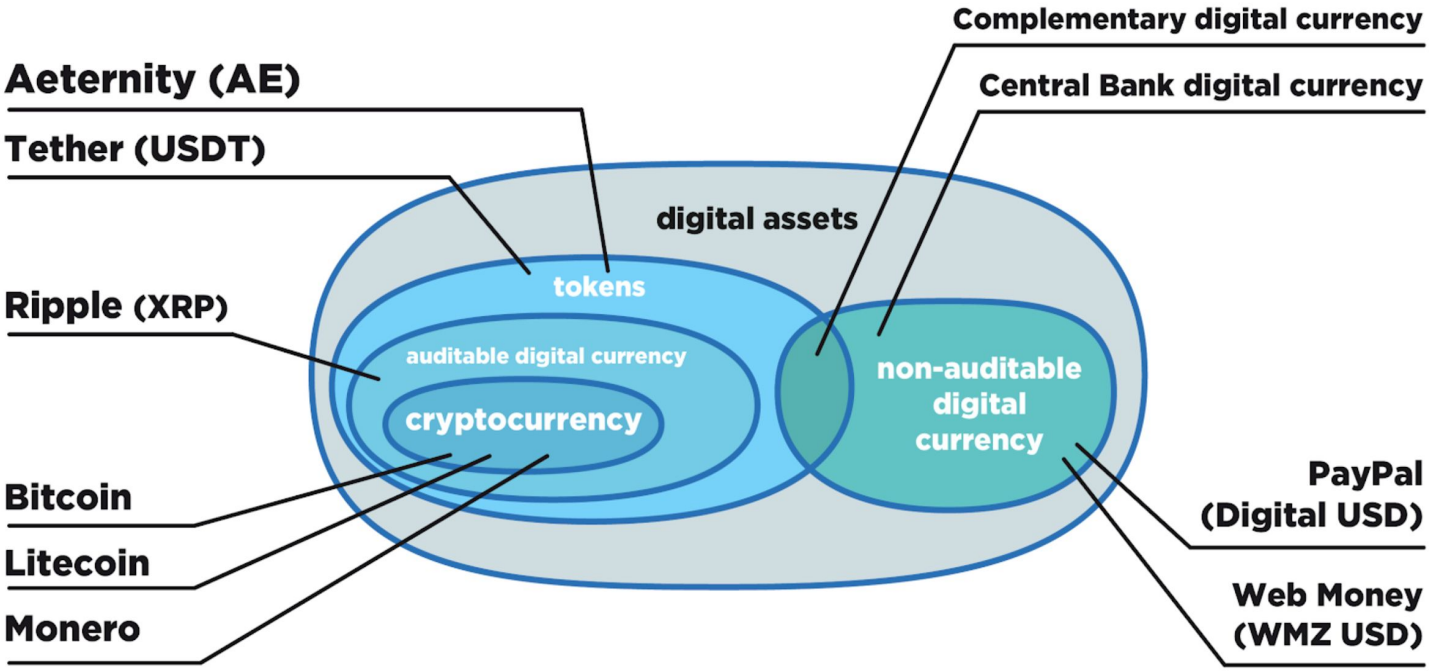
The chart is detailed and may seem laborious, but you'll get the main idea if compare just the two most distinctive assets:

· Cryptocurrency. The ultimate level of decentralization, where trust factor is ultimately eliminated. The management of the accounting system is done mutually.

· Centralized permissioned digital currency. All the processes are hinged on a private community, accordingly, users have no other choice rather than blindly trust the validators. The example is a Central Bank digital currency.

The classification

Now, basing on the criteria of the above chart, we'll consider the particular kinds of assets and put everything in place (Euler diagram).



So again, there are two major groups: tokens and digital currencies with a permissioned audit.

Source: https://hackernoon.com/the-broad-classification-of-digital-assets-4d6ad6a6a067

Non-auditable digital currencies

Along with Paypal's Digital USD, this group includes national digital currencies, where all the accounting processes are managed by Central Bank. Whereas, the price is always linked to that of the national currency.

Tokens

Token, in itself, is simply an internal unit in a certain digital accounting system. The interesting thing, though, is that depending on the situation, token can be attributed with various properties (be backed by):

- Stocks
- Digital obligations
- Certain currency
- Proprietary rights
- Right to any service

Tokens may be issued in both: centralized (under control of a certain organization) and decentralized (according to the pre-defined algorithm) manner. In this way, token is quite an abstract category of digital assets, that acquires specific features depending on the context.

Commodity-backed tokens

Evidently, these are tokens backed by any commodity :) The accounting (management, storing, issuance, etc) is accomplished on a centralized basis by the service provider or the organization that keeps the actual goods.
One token is backed by a fixed quantity of the commodity. It is to be guaranteed by a custodian. Referring to the chart (properties that blockchain may give), this can either be the case of a decentralized or centralized permissioned environment. It is principally impossible to make the accounting permissionless if tokens in it are backed by the commodity of a certain organization. It wouldn't be an organization elsewise.

Equity tokens

In this case, equity is a share in the business or any financial flow. The accounting is usually carried out by a centralized organ. One token represents a specific amount of shares or any percent of the money flow. The processing of such accountings can be done in both ways: centralized (by the depositary) or decentralized (by the community of independent validators). DAO is (or was :)) a good example of a decentralized accounting of the equity tokens.

Source: https://hackernoon.com/the-broad-classification-of-digital-assets-4d6ad6a6a067

Digital collectibles
A digital collector's item. Note: not digitized, but initially digital. So, it's not about the digitized proprietary right for a physical collector's item. It is something unique in the digital field. The main difference with other types of tokens is that these are never interchangeable. This kind of idea is realized in the CryptoKitties project.

Accounting tokens
This type of tokens is reasonable when you need to keep count of anything, at that, don't have a necessity to transfer it. For example, digital identity—it is unique and never transferred because belongs to each individual, such as identity or reputation. Most commonly, the processes in the accounting are centralized: managing, issuance, storing and audit.

Auditable digital currencies
These are also cryptographic tokens, but what distinguishes them from those that we've just reviewed is that they have attributes of currencies. On top of it, they can be audited easily. One of the representatives of this category is cryptocurrency.

Cryptocurrency
Cryptocurrency is an independent digital currency. Independence is the main point here and is achieved by virtue of decentralization of the following processes:

- Issuance. New coins in the system are to be issued according to the algorithm that's based on the determined upfront monetary policy.
- Transaction validation. Anyone can participate in the transaction validation process.
- Availability. The system is opened for use for all (it has no registrations or permissions).
- Data storing. Data is available for everyone, that said, everyone is able to store and verify it, which makes transactions irreversible. You cannot fool anyone when you're in the public eye.
- Audit. Everyone can synchronize with other nodes and verify the accuracy of the transaction history.
- Governance. No one holds the ultimate reigns of making decisions, rather, they are made mutually through discussions on forums.

Source: https://hackernoon.com/the-broad-classification-of-digital-assets-4d6ad6a6a067

Needless to say, that the initial code and specification of a cryptocurrency should be in the open source. Eventually, all the properties we have just considered can only be possible in case of a sufficiently big and open community.
Even if you copy the initial code of Bitcoin, which is kind of designed for a decentralized digital currency, and create a fork that only you control—it won't be a cryptocurrency.

Other auditable digital currencies
This is about digital currencies that's not yet cryptocurrency because some of the processes are not decentralized, though the database can be audited by any or some external parties (which significantly distinguishes it from non-auditable digital currency, where it's all based on trust and confidence). That's where many people get frequently confused because they think that it's a cryptocurrency, but it's actually not.
Ripple and Stellar are good examples. The issuance and distribution of coins are centralized, though everyone can audit the whole database and verify the accuracy of the transaction history.

Various accounting systems and their properties
Finally, we would like to share the comparative chart we've made. It demonstrates the properties that various accounting systems possess. It's quite massive actually and requires a separate article in order to review it to the full extent. On the other hand, it wouldn't be inappropriate here, because having it analyzed you will be able to have an objective opinion about specific accounting systems, basing on the actual properties they give.

Conclusion
Digital assets are at the very beginning of a long and advanced path. Yet, it's hard to make a universal classification of various kinds of them.

Source: https://hackernoon.com/the-broad-classification-of-digital-assets-4d6ad6a6a067

Chapter III:
FinTech

Notable Blockchain Companies in the UK Financial Industry

Circle

EQUI

GMEX Group

Globacap

BitFury

Humaniq

Cashaa

Lendingblock

Clearmatics

Populous World

Is Blockchain the Future of Financial Services?

Distributed Ledger Technology (Blockchain) and Blockchain will have a profound impact on the way that banks and financial institutions work in the future. Blockchain is the underlying foundation that can create shared digital databases of entries that are unchangeable. This technology can drastically reduce the manual intervention of supply chain in finance and employ smart contract or digitized procedures that rely heavily on paperwork, numerous intermediaries, high risk of illegal transactions, high cost and low efficiency.

Banks are trying to create systems that decrease the number of participants involved in transactions. Some have invested more heavily than others. Some banks are investing in Blockchain startups. Others are partnering with fintech companies that use Blockchain. Multiple global banks have published research on Blockchain technology through in-house efforts. Few banks to this point have constructed their own Blockchain-based systems or in-house technology without the aid of banking or fintech partners. Large global banks with the necessary resources to research and build large-scale projects have started to patent their own Blockchain-based systems or their underlying tech.

The most obvious application of Blockchain in finance in the future is through cryptocurrencies. Several banks have begun to focus their Blockchain efforts on projects that will be materially beneficial to their businesses. Therefore companies should streamline their approaches to their Blockchain projects in order to generate quicker results.

"*The Fintech 2.0 Paper: rebooting financial services*" (2016) by Santander InnoVentures, Oliver Wyman, Anthemis Group noted that international payments remain slow and expensive, and significant savings can be made by banks and end-users bypassing existing international payment networks, and suggests that distributed ledger technology could reduce banks' infrastructure costs attributable to cross-border payments, securities trading and regulatory compliance by between $15 billion and $20 billion per annum by 2022. As well, IBM predicted that in four years sixty-six percent of the banking industry will have commercialized the Blockchain at a scale.

The banks will try to improve their payment systems and overcome information communication resulting in a better customer experience hence the Blockchain will become the core technology of the financial sector in the future.

Sources: http://www.businessinsider.com/Blockchain-technology-banking-finance-2017-9
https://www.nasdaq.com/article/fintech-20-rebooting-financial-services-cm715877
https://moderndiplomacy.eu/2018/03/03/future-banking-industry-not-without-Blockchain/

The advantages of Blockchain in the Financial Industry

A research from July 2017 showed 52% of decision makers in financial services have implemented Blockchain because of its speed and cost benefits. Nearly a third are planning to invest in Blockchain in the future and 14% admit they should be considering investment despite having no plans for it at the moment. Organisations are seeking out financial services professionals with a deep understanding of the principles surrounding Blockchain systems listing technology trading (51%) and programming (47%) as the skills most in demand.

The implementation of the Blockchain influences a lot of stakeholders in the financial services which include customers, employees, shareholders, investors, suppliers, industry associates, education institutions, government and non-governmental organizations. Blockchain, as a ledger system, automates and records transactions which can be accessed by all the parties involved in the payment or lending processes. Eliminating the need for saving copies of invoices, bills and financial statements. Therefore 85% of financial services executives believe Blockchain will have made a genuine impact on the financial services industry by 2022. Those that have implemented Blockchain report already experiencing benefits including empowered users, increased transparency and faster transactions.

Furthermore, banks must deal with increasing economic instability. To that end, Blockchain-based solutions could generate cost savings of up to $20 billion per year, according to Santander. Fintechs are using Blockchain tech to offer services at reduced costs, with greater speed, and with more user-friendly interfaces than major banks. Banks can use Blockchain-based systems to circumvent central bodies or legacy infrastructure and it can potentially develop these systems to create brand new business models that disrupt the financial ecosystem.

Blockchain does not, by itself, eliminate the need for traders, market makers, exchanges or other components of the modern trading system. However, Blockchain when combined with ECNs and algorithmic trading, is likely to reduce the value of this service. Already, most brokerage firms funnel trades to electronic marketplaces.

Blockchain is so powerful it has the potential to impact every component of the financial services industry, not all will come to pass; and many of these changes will take years to develop.

Sources: http://www.growthbusiness.co.uk/the-rise-of-ledger-tech-why-half-of-uk-financial-services-leaders-bank-on-Blockchain-2551524/
http://t3technologyhub.com/Blockchain-and-the-future-of-financial-services/

From concept to reality: How Blockchain will reshape the financial services industry

"*From concept to reality: How Blockchain will reshape the financial services industry*" (2017) is a report from the UK's Department for International Trade. The report is based on extensive research and interviews with 14 representatives of financial institutions of all types and sizes, including banks, fund management groups, reinsurers and specialised start-ups.

The report presented the main features of the future use of Blockchain in the global financial services industry:

- **Closed systems:** Collaborative Blockchain networks will be closed to outsiders, to ensure that information does not land in the wrong hands and to prevent hackers from disrupting financial stability.
- **Back office first:** The first objective for introducing Blockchain technology will be to save costs. Blockchain will cut the cost of the daily checking and rechecking of ownership and transactions.
- **Regulatory overhaul:** Financial industry rules may need a worldwide update, along with reforms to broader data protection regulation. Regulators want to encourage innovation but without upsetting stability.
- **Emergency markets:** The first widespread changes to retail financial services involving Blockchain may take place in emerging markets, where banking, investment and insurance penetration rates are low.
- **Less reliance on cash:** Widespread use of Blockchain technology, together with updates to compliance regulations, will enable central banks to substitute their own regulated, Blockchain-based digital currencies for notes and coins. Some central banks, such as the Bank of England and the central bank of Norway, are already discussing discontinuing use of notes and coins entirely.
- **Smarter finances:** Within 10 to 20 years, embedded smart contracts could transform how bank accounts work and how insurance pays out.
- **SME boost:** Blockchain could help open up cheaper, non-bank financing to small and midsized firms, which provide two thirds of all jobs in Europe.

Sources: https://perspectives.eiu.com/sites/default/files/CCS150_CCS1117370718-1_Blockchain%20Brochure.pdf

From concept to reality: How Blockchain will reshape the financial services industry

The report concluded that:

> "*There will be no "big bang" heralding the arrival of Blockchain technology in the financial services industry. However, the revolution has already started. The first live implementations of financial applications of the technology are expected within two years. Mainstream adoption will take a decade or two.*"
>
> "*For widespread adoption of Blockchain technology in financial services to take place, two things need to happen. Financial institutions need to change how they interact. Today's centralised system encourages each player to assume others could be at fault. Blockchain will only work if companies learn to share and cooperate, and see themselves as part of a Blockchain network rather than solo actors. More importantly, the consensus approach will require a reworking of current financial regulation. If Blockchain is to truly deliver on its promise, then revision of rules that now require the use of various counterparties and clearinghouses will be needed. This reform process is a sensitive task: Regulators are keen to encourage innovation—but not at the cost of promoting instability in the financial system.*"

Sources: https://perspectives.eiu.com/sites/default/files/CCS150_CCS1117370718-1_Blockchain%20Brochure.pdf

Blockchain in UK Industry
FinTech Companies Overview

This report features approximately 40 blockchain companies focusing on financial services.

The blockchain for financial subsector in the UK shows a striking amount of diversity.

The majorative focus of these companies are providing services for FinTech companies, such as the integration of blockchain technologies focused on security and to streamline the efficiency of their internal operations. Some companies, focused on creating software with blockchain back-ends for financial organizations.

Blockchain-based investment platforms like HighCastle, EQUI and CREDIT-VISION aggregate and contextualize financial data for investors in corporate credit.

Other examples of companies in this space include the crypto banks 11:FS, DAG, Cashaa and ENtry Money LTD.

Others, like Humaniq, focus on the use of blockchain-based mobile applications to enable the banking of the unbanked and greater financial inclusion in developing countries.

In our analysis we grouped those companies that offer crypto trading platforms as a category in and of themselves, rather than grouping them in with the blockchain-based FinTech companies profiled in this report, due to the number and diversity of such companies. These companies are largely focused on offering services for buying and selling digital assets.

10 Notable FinTech Blockchain UK Companies

Company Name	Blockchain application	Type of Blockchain	Investments	Web site
Circle	Trading	N/A	$246M	https://www.circle.com/en-gb/
GMEX Group	Digital exchange trading technology, blockchain clearing system and secure wallet and settlement manager	GMEX Fusion	Self funded	www.gmex-group.com/
DAG Global	N/A	N/A	N/A	http://dag.global/
Cashaa	Cashaa wallet will move faster and easier than cryptocurrencies	Ethereum EIP-20	$19.3M	https://cashaa.com/
Clearmatics	to execute and validate economic and data processes all within one platform.	DVM	£830.3K	https://www.clearmatics.com/
EQUI	Security	EQUI Platform	$7M	https://www.equi.capital/
Globacap	to create two standardised Blockchain securities: Debt, Equity	N/A	$800K	http://www.globacap.com
Humaniq	Security	Ethereum	$5.2M	https://www.humaniq.com
Lendingblock	Security	Ethereum	$10M ICO in 2018	http://www.lendingblock.com
Populous	Blockchain is a part of business intelligence (BI) data analytics platform	Populous XBRL Platform	$10M	http://www.populous.co/

GMEX - successful example of a Blockchain FinTech company

GMEX Group was founded in 2012 by Hirander Misra. GMEX Group is a set of companies that offer sustainable and innovative solutions for a new era of global financial markets. Providing business expertise, the latest technology, connectivity & operational excellence delivered through an aligned partnership driven approach. We use our extensive market infrastructure experience and expertise to create an appropriate strategic master plan with exchanges, clearing houses, depositories, registries and warehouse receipt platforms.

Our key business solutions enable the creation and operation of cost effective electronic exchanges and post trade infrastructure in multiple asset classes including equities, debt, FX, derivatives, commodities, cryptocurrencies and digital assets. We operate in both developing and developed markets through the establishment of cohesive business and technology ecosystems. GMEX offers the added benefit of interconnection to multiple partner exchanges, to create global networks of liquidity.

GMEX - successful example of a Blockchain FinTech company

GMEX comprises

GMEX Group: ensures a cohesive strategic direction is maintained

GMEX Technologies: Provider of multi-asset exchange trading and post trade technology through a unique partnership driven approach

GMEX Innovation: R&D of technologically advanced new product solutions for exchange trading, clearing and settlement

GMEX Services: Strategic consultancy, implementing services & support for exchanges and post trade market infrastructure operators

GMEX Investments: Enables selective seed and early stage strategic investments into post trade market infrastructure and related FinTech companies.

Chapter IV:

Blockchain and UK Regulatory Framework

The period of **2008 - 2014** can be considered as the dawn of Blockchain as a technology. During these years it gained a solid community of users and an increasing diversity of use cases, but very little commentary or regulatory guidance by governments. **2016** can be viewed as the dawn of Blockchain and Crypto Economy as an industry, at which time it gained enough recognition, public prominence and global penetration to warrant commentary by governmental bodies. One of the first notable documents in this regard was a 2016 report issued by the UK Government Office for Science entitled "Distributed Ledger Technology: beyond Blockchain."

Today, while still somewhat skeptical, the UK government is warming to the notion of both a solid UK-based Blockchain industry, as well as the adoption of Blockchain solutions for governmental services. 2016 saw the UK government test the use of a Blockchain-based system to distribute welfare payments through the Department of Work and Pensions, explore the use of Blockchain as a service for each governmental department, available as of August 2016, and saw the Financial Conduct Authority (FCA) permit Blockchain startup Tramonex to issue its digital currency to UK citizens. The past several years also saw Innovate U.K., a government-led agency that supports companies utilizing emerging technologies that they feel can lead to national economic growth and allow the government to keep up with the accelerating pace of global innovation.

Malta, Gibraltar, Bermuda, Isle of Man, Singapore, Switzerland and several other jurisdictions will compete in terms of innovation within a regulatory framework as the optimum and most reliable environment for Crypto Economy and Digital Assets.

We predict that the UK will observe and analyse the experimental activities of these jurisdictions and implement the best solutions. As a result, within a 5 year time horizon, we envisage the UK as a leader in this race absorbing the best practices whilst at the same time, providing a premier technological and financial global Hub.

Fintech Sector Strategy

On 22 March 2018, at the government's second International Fintech Conference, Exchequer Chancellor Philip Hammond announced the launch of a Fintech Sector Strategy that looks to keep the U.K. on the forefront of the industry.

The primary component of this new strategy will be the introduction of a Crypto Assets Task Force composed of representatives from the Bank of England (BOE), HM Treasury and the Financial Conduct Authority (FCA). The purpose of this team will be twofold: promote the U.K.'s position as a leader in the emerging world of digital currency, while concurrently establishing the infrastructure needed to monitor the "potential risks" associated with the crypto space.

This development follows a recent shift in the British government's public attitude toward cryptocurrency. In January 2018, at the World Economic Forum, Prime Minister Theresa May voiced her apprehensions toward virtual currency and suggested that stronger regulations should be considered "very seriously" — a sentiment that was echoed by BOE governor Mark Carney who, in an interview with CNBC, decried the "speculative mania" that surrounds crypto assets.

On March 18, preceding the G20 summit, Carney released an official letter through the Financial Stability Board (FSB) that dramatically reasserted his position. It stated that at its current size "crypto assets do not pose risks to global financial stability" and that their underlying technologies "have the potential to improve the efficiency and inclusiveness of both the financial system and the economy." As digital currency becomes more integrated and interconnected with the economic system at large, emphasis should be placed on "support monitoring and timely identification of emerging financial stability risks."

It would seem that the announcement of the Crypto Assets Task Force represents an attempt by the British government to follow up on this recommendation. By combining three of its most preeminent financial institutions, the U.K. hopes to create a watchdog with the resources necessary to monitor the immediate risks and long-term benefits of this developing technology. Whether this move will be adequate to alleviate anxieties that have arisen in response to the recent volatility of the crypto marketplace is yet to be seen.

Source: https://www.gov.uk/government/news/fintech-sector-strategy-launched-at-international-fintech-conference

1.4 The government considers that while there are clear barriers to digital currencies achieving widespread use in their current form, the 'distributed ledger' technology that underpins digital currencies has significant future promise as an innovation in payments technology. The government wishes to foster a supportive environment for the development of legitimate businesses in the digital currency sector so that the UK can see some of the benefits of digital currencies, while also creating a hostile environment for illegal activity. At this early stage, the government's objectives for digital currency technology and the sector more widely are as follows: to provide clarity and certainty on the application of existing legislation and regulation for users, businesses and other parties dealing with digital currencies to limit any opportunities for criminals or terrorists to use digital currencies for illicit activities, and to support the effective identification and prosecution of illicit activity that does take place to create the right environment for legitimate digital currency entrepreneurs to flourish, including supporting the provision of banking and other financial and professional services to legitimate digital currency firms to support the research, development and application of new technology, to promote competition and innovation in payment systems, financial services and other relevant sectors to support monetary and financial stability in the UK, by monitoring the extent of usage of digital currencies in the UK and regularly assessing the risks posed

Conclusion and next steps

4.1 The government is committed to increasing banking competition in the interests of all customers. Encouraging greater innovation in payments, which provide the plumbing for the banking sector, is central to this. The government intends to create a world-leading environment for the development of innovative payments and financial technology. At Budget 2015, the government is announcing a package of measures to address key crime and consumer protection risks associated with digital currencies. These measures are intended create the right environment for legitimate actors to flourish, and to create a hostile environment for illicit users of digital currencies.

4.2 The government notes that the distinctive features of digital currencies can be attractive to illegal users as well as people and businesses who like to use digital currencies for legitimate purposes. In response, the government intends to apply anti-money laundering regulation to digital currency exchanges, to support innovation and prevent criminal use. The government is committing to a full consultation on the proposed regulatory approach early in the next Parliament. The consultation will seek views and evidence on key questions including how antimoney laundering regulation should be applied to the digital currencies sector, the scope of the regulatory perimeter and the identity of the regulator.

Source: https://www.gov.uk/government/news/fintech-sector-strategy-launched-at-international-fintech-conference

4.3 As part of the consultation on the proposed regulatory approach, the government will look at how to ensure that law enforcement bodies have effective skills, tools and legislation to identify and prosecute criminal activity relating to digital currencies, including the ability to seize and confiscate digital currency funds where transactions are for criminal purposes.

4.4 The Financial Action Task Force (FATF) has noted the legitimate uses of digital currencies, and identified characteristics of digital currencies that present potential anti-money laundering and counter-terrorist financing risks. The FATF has said that it wants to progress on its initial report for a decision at the June 2015 Plenary. The UK will continue to feed into the FATF process.

4.5 The government notes the nascent state of the technology and the surrounding industry, and recognises that users of digital currencies are potentially exposed to a number of risks. In response, the government considers that a framework for best practice standards for consumer protection is the right step to take at this stage, in order to address the risks identified but without imposing a disproportionate regulatory burden on the industry. The government intends to work with BSI (British Standards Institution) and the digital currency industry to develop pioneering voluntary standards for consumer protection.

4.6 The government considers that digital currencies, when used legitimately, offer an innovative, alternative payment option, which competes with existing payment models and has particularly clear short-term advantages for micro-payments, overseas remittances and crossborder trade. 4.7 The government recognises that the technology associated with digital currencies offers considerable promise, making it possible for users to transfer value (or other information) quickly, efficiently and securely, providing a permanent record of what has taken place, and without the need for a trusted third party to oversee the process. In response, the government is launching a new research initiative which will bring together the Research Councils, Alan Turing Institute and Digital Catapult with industry in order to address the research opportunities and challenges for digital currency technology, and will increase research funding in this area by £10 million to support this.

4.8 In addition, in February 2015, the Bank of England announced it will undertake research on central bank-issued digital currencies as part of its new research agenda. This work covers the potential costs and benefits of doing so as well as the economic impact, technological requirements and necessary regulations for a central bank-run system.

Source: https://www.gov.uk/government/news/fintech-sector-strategy-launched-at-international-fintech-conference

HM Treasury March 2015

Digital currencies: response to the call for information

Background to the call for information
1.1 In August 2014, the government announced a major programme of work looking into the benefits and risks associated with digital currencies and underlying technology, with a particular focus on the question of regulation. In November 2014, the government published a call for information to gather views and evidence on these questions. The call for information received over 120 responses. Submissions came from members of the public who use digital currencies, digital currency developers, businesses providing digital currency-related services, banks, payment scheme companies, academics, consultancies and other government departments and agencies.

1.3 As noted in the call for information, there are a number of diverging views on the benefits digital currencies can offer, and the risks they pose. Respondents to the call for information outlined a number of potential benefits that digital currencies could offer to consumers, businesses, charities and the wider economy as a method of payment. At the same time, respondents also noted that, as currently designed, digital currency systems have some inherent flaws which make them volatile and potentially unsuitable for mainstream usage. Other respondents focussed on the risk that digital currencies are an enabler of crime, a matter which is high on the government's agenda.

Source:https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/414040/digital_currencies_response_to_call_for_information_final_changes.pdf

Blockchain and the UK Regulatory Environment

The UK Government and the UK Financial regulatory authorities have taken an open approach to platforms based on new technologies such as Blockchain as it is recognised within the plethora of FinTech developments in the global markets that it will create revolutionary paths to reduce risks and introduce new products.

British Overseas Territories and the Crown Dependencies have also indicated their support although some of the indigenous banks have expressed concerns regarding opening the markets to new institutions. However, many of these small territories rely upon one or two business sectors and diversification and innovation are seen to be necessary to prevent them becoming marginalised within the global economy and the approaching Brexit event in 2019.

The Government launched a Financial Technology Sector Strategy review to look at Fin Tech disrupters and how technology can drive innovation. The FCA has created what is known as the 'Sandbox' to provide a place for new innovation proposals in the regulated markets to be reviewed and supported.

The majority of the firms within the Sandbox cover the following areas:

- Emoney and initiatives on payments technology
- Customer service and experience
- Insurance contracts
- IPO's and debt issues
- Authentication and identification

Those firms are required to prove real and direct benefits to customers within the UK to be admitted to the programme which is organised in cohorts to manage the degree of change and the regulators capacity to assess their impacts effectively.

Source: Claire Bright, DAG Global

Cohort 4 has just been announced which comprises of 29 firms of which 40% are using Blockchain.
Christopher Woolard who is the director responsible for strategy and competition at the FCA stated upon the announcement,

"I am pleased to say that this is the largest sandbox cohort to date with a record number of applicants meeting our eligibility criteria. Cohort 4 has seen a large increase in the number of firms testing wholesale propositions including firms that are aiming to increase the efficiency of the capital-raising process. Alongside these we can see significant use of distributed ledger technology (DLT), some experimentation with crypto assets which will help inform our policy work and propositions aimed at helping lower income consumers."

The FCA received 69 applications to cohort four of the regulatory sandbox, an increase on the number of applications to cohort three. 29 firms will proceed to test.
As with the previous cohorts, the FCA continues to see successful applications from a diverse range of sectors, locations and firm sizes. Areas covered include consumer credit, automated advice and travel insurance and issuance of financial products.
Eight firms (27%) are operating in the wholesale sector. This is a large increase on cohort 3 where we had three firms with wholesale propositions. Five large firm tests will be conducted in cohort 4; the largest number to date.
Over 40% of companies accepted to cohort four are using DLT. Of these, six are using DLT to automate the issuance of debt or equity. Two are using DLT to support the provision of insurance. Other technology applied includes geo-location technology, use of Application Programming Interfaces (APIs) and artificial intelligence.

We have accepted a small number of firms that will be testing propositions relating to cryptoassets. We are keen to explore whether, in a controlled environment, consumer benefits can be delivered while effectively managing the associated risks.

The current cohort consists of the firms listed below. One firm has asked not to be named at this point in time.
Tests will be conducted on a short-term and small-scale basis and the FCA has worked with the sandbox firms to agree testing parameters and build in robust consumer safeguards."
The list may be found on the FCA website.

Source: Claire Bright, DAG Global

This list is very telling as the products have come to the fore based on perceived needs and gaps in the current environment. This provides an insight into how the population feels about the relationship between their finances and what is available.

The British Business Bank was set up also to support new businesses in the UK which includes new technologies. However, it is not a bank itself, being unregulated, and cannot make investment decisions and is more of an advisory group bringing together potential borrowers and lenders to accelerate investment.
It remains a challenge to acquire the necessary investment for UK start ups and when founders find barriers they seek solutions elsewhere and thus there is a danger of polarisation and influence from those investors willing to provide the capital. Given the interest and active investment outside of the UK this development could become an area of concern.

The Internet Revolution
Internet banking and the use of the internet to re-engineer processes has been embraced by the UK financial markets for many years. Since the launch of Egg, the first profitable internet bank in the UK, nascent Fintech products and organisations have been vulnerable to cyber and data access attacks.
We have seen over the past two years significant IT outages and the collapse of service offers such as ATM network failures and personal data from some of the largest firms in the sector, and indeed some of those who are currently reluctant to support new entrants which wish to use blockchain to provide better security and new products to customers, the so called 'Disrupters'.

The point is that the new technology is theoretically safer than legacy platforms and the fact so many outages and data thefts have occurred in the UK indicates that the standard of controls, quality of code and the investment in IT of incumbent financial players is in need of review and focus and should not be taken as an indication of the future safety of the blockchain and the token technology.

There is evidence of new entrants being excluded from obtaining bank accounts due rejection by ultimate clearing providers, instructing their member banks to close or not onboard such firms. This is based on confusions between the use of cryptocurrencies and the use of the blockchain in improving financial infrastructure. This has created an attitude of activism within the Fin tech community to change the cartel of control by these institutions and democratise value flows as well as create access for those who cannot currently obtain operational financial freedom.

Source: Claire Bright, DAG Global

Past bank and major company failures have predominantly been possible due to the lack of or ability to manage data. In the 1990's the use of new database technology was adopted rapidly and this was quickly followed by the use of actuarial analysis based on data mining of patterns of behaviour and artificial intelligence.

Therefore, there is nothing new in the use of technology to innovate, what is different is the desire and drive to allow individuals to decide how they wish to manage their finances, in whichever location, using whatever currency or token, at any time. The legacy banks are increasingly losing ground to the new players who are prepared to provide cost effective services to smaller customers, allow degrees of bespoke features, reduce time to delivery and payments and thus risk, and appeal to popular interest in new ideas.

Voters vote with their feet and this is increasingly evident in the UK financial service market that customers will themselves will be activists and no respecters of hidebound and controlling service providers, including credit agencies whose output has built the foundation of decision making on individuals, rightly or wrongly. In the future lenders of any type will make decisions with or without agencies based on a wider range of data sources and inputs which may not result in the tick box points system currently prevailing.

The essence of the new regulatory horizon is therefore to ensure the proper working of an electronic money/token environment based on distributed ledgers, which can appropriately evidence information and risk to a national economy and manage those risks without constraining new entrants to the market. Innovation in global financial markets has mainly sprung from the UK and US markets and the UK Government has indicated how important this is for the future.

Additionally, a path which bridges 'old' and 'new' technologies will need to be brokered to enable the fair allocation of resources and clearing facilities currently in the hands of clearing banks, some of which were bailed out by UK taxpayers in 2007 and are preventing access to banking from some sectors.

Source: Claire Bright, DAG Global

Blockchain

The Barbarians are already in the gate and walking up the path to the central banks to demonstrate how the Blockchain and token technology can be used and how it will change or make authenticated data and processes core to national infrastructure.

The DLT environment is driving the reduction in timeframes for the settlement of transactions and therefore funds flows are faster and more secure in that time to fail is reduced or eliminated. This is due to changing processes which auto-match flows and information before they emanate from a firm, customers using crypto currencies can pre- check availability of funds, can check the credentials of the opposite party instantly and verify identity and authenticity.

Trust and reputation are the two most important risk criteria all technology based firms need to focus on and the use of the blockchain underpins trust and performance under contracts.

The reengineering of processes is also a significant use of blocks of authenticated data. Some firms refer to this disparagingly as 'blockwashing'. However, there is a place for the re platforming of current processes which are driven by fundamental legal contract requirements (such as the Land Registry) and also for firms to improve their speed of delivery while adopting and becoming more familiar with what process improvements may be possible.

New features which will change the risk types

There are new challenges in relation to the nature of the risks which are emerging.

Concept of value

Once the use of crypto currencies becomes more included in the issuance and trading of securities, the concept of value will need to be re evaluated. This is due to the fact that the value between fiat and crypto currencies and crypto to crypto transactions has not yet been stabilised, mixing national values in indigenous currencies with digital, non national, non interest rate bearing tokens.

Values in currencies are based on usage, utility, confidence and trust, the belief the currency will exist in the future, and the ability to have enough players to ensure liquidity. Over time these markets will bifurcate into digital currencies (evidenced by tokens) which are globally adopted much as reserve currencies, and Tokens which operate more as rights to functions or legal contracts.

Much like funds transfer pricing techniques were launched in the 1980's from the management accounting of commercial firms, the value of tokens will be driven in a similar manner. For the present, firms have no choice but to convert their digital balance sheets into their reporting currencies. Thus the underlying 'FX' risk will predominate the change in value of tokens and extracting the 'functional' spread will be necessary to track core values.

Source: Claire Bright, DAG Global

Accounting for ICO's and the nature of financial analysis

Accounting for ICO's appears to be a free market currently and the prudent approach is to account for them as senior financing which forces the issuers to represent them as liabilities and not just take the revenue as profits to the P and L line. Current evidence in the UK is that the implementation and understanding of IFRS 15 is not clearly set out for digital assets and will also affect how provisioning is calculated using IFRS9. Accounting standards will need to shift and in this instance it will be critical for the regulators to understand the quantum and direction of risk.
The changing concept of value will have a concomitant effect on how ICO's and their tokens will be valued and how financial analysis will be performed. Hopefully the technology which has driven the change will not yield space to a few credit agencies.

ICO's essentially encapsulate within their whitepapers both strategic imperatives akin to equity investor interests, and functional elements which ensure the stability and sustainability of a firm to deliver what is promised akin to debt investor interests (although not mutually exclusive).
Analysts will need to be experienced in both equity and debt risks to be able to properly assess the context of any ICO issue. This will entail the bridging of experience and the understanding and use of data to form modelling capability.

Speed of risk distribution
The speed with which markets will move and change direction will increase exponentially, giving users the data, platforms and traders a challenge in relation to tracking orders and execution of strategies.
Risks, patterns and reporting will inevitably speed up and reactions to those will require setting out.
Basic concepts of an 'end of day' and other stops will be needed to assure points of reference. Currently this sis set by the fiat clearing timeframes but increasingly those lines are becoming blurred.

The current volatility in the main crypto currencies is due to their immaturity and also the lack of signposts which can be used to assess pricing changes. Private ICO issues may be problematic if they drive insider knowledge of an increased demand for, as an example, Ethereum or Bitcoin. The size of an issue and what will move the market in pricing terms will be key for regulators to measure volatility of currency crossovers.

Source: Claire Bright, DAG Global

Data identification and management

The collection and management of data and the importance of artificial intelligence networks which will be openly available. This, in itself could skew markets artificially and the use of incorrect data or the imparting of information which cannot be controlled. The use of internal models, how the credit agencies operate and how the UK regulator will obtain and analyse information

Obsolescence

Product development will increase the rate of obsolescence as traditional products will be translated into digital platforms and standardised. This will give current traditional banks the challenge of running multiple systems where the new entrants won't have the legacy to manage. It will also require the regulator to have a framework to handle reporting and information.

Notifications to clients, withdrawals of products and customer compliance and risk warnings will all require

What should the Regulators be concerned with?

The greatest fear of national governments is the loss of control of their currencies or the breaking down of barriers to restricted countries using cryptocurrencies. For those individuals with significant sums to move around global markets those controls are not a problem now, let alone using crypto currencies, using non legal routes. Given all crypto trades start with a fiat currency and, allow the holder to use their value either in digital form or bring it back to a fiat form, using Blockchain will at least provide audit trails and authenticated routes. Therefore, the information will exist and it will be a necessary focus of the regulator to address its capability to handle this.

Source: Claire Bright, DAG Global

It is worth reviewing exactly what each of the UK regulatory authorities is striving to achieve using their own stated position:

The Bank of England
"The Bank of England is the UK's central bank. Our mission is to promote the good of the people by maintaining monetary and financial stability."

The PRA
"The Prudential Regulation Authority (PRA) is responsible for the prudential regulation of banks, building societies, credit unions, insurers and major investment firms. It aims through its supervision to develop a rounded, robust and comprehensive view of these firms, to judge whether they are being run in a safe and sound manner, and whether insurers are protecting policyholders appropriately. "

The FCA
"We are responsible for regulating a sector which plays a critical role in the lives of everyone in the UK and without which the modern economy could not function. From children's ISAs to pensions, direct debits to credit cards, loans to investments – how well financial markets work has a fundamental impact on us all.

Our strategic objective is to ensure that the relevant markets function well and our operational objectives are to:

- protect consumers – we secure an appropriate degree of protection for consumers
- protect financial markets – we protect and enhance the integrity of the UK financial system
- promote competition – we promote effective competition in the interests of consumers"

Thus stability, security, innovation and consumer protection are the main drivers of the regulators approach.

Thus, where are the areas of focus which encapsulate the core issues confronting the regulators?

Source: Claire Bright, DAG Global

The legal environment and recourse

The framework for the issuing and settling of transactions which digitally cross national borders will require legislation in each country. Blockchain nodes can be located anywhere and this means there is no real legal jurisdiction to support contracts. If a central bank is satisfied it can manage and control the digital exchanges which are in progress and approve new laws of contract which ratify only those contracts made under its national jurisdiction, irrespective of the final location of the trade, then this would start to bring into some form of legal acceptance of digital transactions.

It is likely that digital exchanges will need to set standards of contract as well as standards of information in ICO's and instrument prospectus as the London Stock exchange does now. This is due to the requirement to operate fair and transparent markets and the desire of customers to know their funds are safe and they are investing using the correct and valid information.

Recourse is also a fundamental are where the need to be able to obtain legal redress for non performance, fraud or other criminality in the case of failed transactions or failed firms, it is important to have a location, with the correct legal framework and representation to go to. This is a fundamental barrier to the adoption of the blockchain for financial transactions and also one for supportive regulators such as in the UK to consider.

Tokens V Crypto currencies

The use of token and Tokenization of assets and function compared to the use of crypto currencies as the means of exchange should be set out in terms which also allow the use of the blockchain as a trusted authentication of identity and evidence of a transaction. This would include the validity of digital documents such as loan agreements and bond issues (as examples). This would also cross over to international transactions.

Fiat activity and national economic protection

Currently the currency clearing framework is monitored and controlled by the Bank of England to ensure the safety and stability of our money supply and currency.

With crypto currencies this does not happen. This is both the joy of the freedom and also the anguish of national governments. The foreign exchange market flows predominantly freely with agreed reserve currencies. Gold is also additionally held to provide varying degrees of underpinning of the national currency. Additionally, in times of crisis capital controls and interest rate strategies can be employed to control outflows.

Source: Claire Bright, DAG Global

It is conceivable that central banks will have to agree which digital currencies they may hold as reserves or as reserve 'currencies' or even allow some form of digitisation of national currencies such as digidollars or digisterling to compete with non-domiciled crypto currencies.

Profit repatriation and taxation
This area is considered very contentious but is not driven by the use of blockchain but by the use of digital currencies and the ability to hide profits and cashflows from the authorities. However it is possible to do this using fiat currencies and thus national legislation.

Data protection
The Blockchain can enhance security and allow for more centralised information exchange in a more secure environments with controls as to who can access that data. The application of PSD2 (EU Payment Services Directive) will need to be applied to all firms digital or not. The regulatory challenge will be to ensure this is implemented fully and the digital firms can prove they are following the law.

Open access to banking facilities
Part of the drive and popularity of the fintech developments is the lack of open access to bank facilities and also lack of access to funding sources. The building societies in the UK are beginning to embrace those fundamental gaps in the funding markets and are much closer, with their branch network and personal service, to their client base and customer demand. They are also reviewing the use of new technology and are willing to cautiously embrace a new approach.

The financial divide between the North and South of England will increase unless the real powers of the North can access the life blood of all businesses-liquidity and capital. Those digital firms which can create that access easily and cheaply will triumph over the those who refuse to see that the UK financial infrastructure belongs to the whole population.

Source: Claire Bright, DAG Global

UK Regulation

The regulations in the financial market in the UK has been developed over many decades of events, crises, customer demand and history. The regulators work openly with their constituents to identify risks and work out solutions. Some work and some don't and eventually are revisited and amended.

The current thinking of the regulator is to investigate two main areas of the digital financial world.

The Crypto currency taskforce is set up to understand how they can be used and monitored. It will issue guidelines later this year.

Investigate the applications of DLT and the use of the blockchain.

This is a welcome and sensible way forward and will include professional bodies as well as market participants. It behoves all of us who embrace the potential for the future to be part of the change and work with them to forge the right path for the UK.

Source: Claire Bright, DAG Global

UK Digital Currencies Inquiry

Often the pseudonymity of public permissionless blockchains is described as a disadvantage for law enforcement and regulators. However, digital currencies present a more traceable alternative to paper currency as digital currency ledgers are immutable and transactions are transparent. By design, any computer ("node") on the public permissionless Ethereum network can see the value, sending address, receiving address, and time of the transaction. Additionally, KYC checks can be encoded into digital currencies and other tokenized digital assets, enhancing consumer protections and regulatory oversight of digital currency transactions. Chancellor **Philip Hammond**'s announcement at the second International FinTech Conference that the FCA and BoE are moving towards automating regulatory compliance was therefore especially opportune as the blockchain industry is currently exploring and implementing different compliance mechanisms into the design of tokens and token distribution events.

Chancellor Hammond cited automated regulatory compliance as cheaper and more efficient, allowing for more effective and efficient regulatory compliance in the financial services industry. Given the programmability of tokens and their native blockchain platforms, such regulatory compliance mechanisms can be implemented. For example, if the BoE implements a CBDC, regulators will be able to track currency flows— something that is exponentially more difficult to do with paper money. Regulators can even program the network to provide automatic alerts/notifications when identifiably suspicious transaction activity occurs. Thus, digital currencies can also facilitate greater oversight over the movement of money.

With 'Privacy Coins' Most public permissionless blockchains such as Bitcoin and Ethereum are pseudonymous but transparent by design. This transparency has allows technology vendors to create data analytics software to monitor, trace and prevent high risk activity. However, certain other implementations use encryption (ZCash) and obfuscation techniques (Monero) to make such detection very hard to implement. These implementations provide users privacy that is more akin to cash transactions today. Because these new assets can be very difficult to monitor but also could provide important privacy benefits, they should be looked at more in-depth.

Source: https://thebkp.com/crypto-asset-written-evidence

Mitigating Risks
It is within the industry's interest to encourage the responsible design and distribution of digital tokens to ensure consumers and businesses can capture the full potential of digital currencies and the products enabled by them. Several projects and initiatives within the blockchain community aim to develop best practices and standards for the design and distribution of digital tokens in order to encourage the incorporation of consumer protections and compliance with applicable regulatory frameworks. The BKP is an example of one such initiative.

UK Regulatory Response
Working with the Industry We support the UK's regulatory approach to date which has been pro-innovation and well informed. The FCA's Sandbox Program is a great example of the UK's industry-friendly approach. Additionally, the UK government has pledged to increase research funding of DLT and DLT-related projects by a total of £29 million. However, there are still challenges that need to be addressed by regulators. In particular, as noted by the FCA, it is still difficult for startups working on the technology to obtain bank accounts at high street banks.

Tax Policies HM Revenue and Customs (HMRC)
HMRC's 2014 position on the tax treatment of digital currencies is reflective of an approach in which governments apply analogous traditional tax frameworks to digital currency. This approach seeks to ensure that digital currencies are compliant and not used to evade taxes in this developmental phase. Future crypto-asset-specific tax frameworks should seek to further collaborate with the industry to develop more nuanced taxation policies for digital currencies once the industry gains a better overall understanding of crypto-assets by observing their increasing adoption and use.

Regulating Tokens by Function
Ideal regulatory frameworks should enable responsible and sustainable innovation while simultaneously accounting for consumer protections and compliance with existing legal frameworks. Well-informed regulatory frameworks recognise the distinctions between different categories of crypto-assets, or tokens, and regulate them accordingly. The Swiss Financial Market Supervisory Authority (FINMA)'s recent "ICO guidelines" are based on this approach.

Source: https://thebkp.com/crypto-asset-written-evidence

Anti-Money Laundering (AML)

HM Treasury has indicated that it intends to explore methods of applying AML protections to digital currencies in order to ensure consumer protection and prevent criminal activity from undermining legitimate uses of digital currencies. Drawing on existing AML frameworks, such as those provided by the EU's Anti-Money Laundering Directive and the Financial Action Task Force (FATF), could help design AML policies that are conducive to healthy and responsible innovation. The current paradigm for AML/CFT and general fraud risk management is based on a one-toone relationship between regulated entities and supervising authorities, and the liability of each entity is always individual. This means that each and every regulated institution needs to make investments to individually protect itself of abuse, thus expending resources in monitoring its internal systems. The problem, however, is that most criminal activity today is carried out in a collective fashion, across multiple institutions and jurisdictions, and though there is available technology (both DLT and non-DLT) to enable shared monitoring and interdiction, regulatory obligations do not yet allow for them to be deployed. This is a vulnerability that is well-known and often exploited by financial criminals—and one that is ripe for innovation. DLT and blockchain-enabled systems are inherently collaborative, so financial crime monitoring and oversight could be significantly improved. The implementation of identity systems or transactional value-transfer systems via blockchain technology would alter the siloed paradigm and turn it into a shared, cross-industry, cross-jurisdictional surveillance and information-sharing system, capable of improving financial crime monitoring and oversight.

Regulatory Consistency

Digital currencies transcend borders and connect communities worldwide. The global nature of digital currencies and their underlying blockchain technology necessitates relative consistency in regulations across various global jurisdictions. Thus, it is important to work with regulators, academics and industry leaders to inform guidelines and frameworks that would best service the industry and its consumers. The regulatory framework that UK regulators decide upon can have an influential impact on other governments and regulators, potentially informing future regulatory frameworks of other countries. Consistency in these frameworks would be conducive to innovation and development of blockchain technology as significant discrepancies in regulation can hinder the participation of certain consumers and businesses in digital currency platforms and the blockchain-based applications that they enable.

Source: https://thebkp.com/crypto-asset-written-evidence

Balancing Regulation and Innovation

The Chairman of the CFTC, J. Christopher Giancarlo, said in a written testimony that cryptocurrencies, “have brought ‘paradigm shift’ in how the world views payments and financial processes, and that ignoring such innovation, ‘will not make them go away, nor is it a responsible regulatory response.’” Chairman Giancarlo mentioned the “do no harm” principle that underpinned the United States’ regulatory approach to the Internet and argued that the same approach should be applied to regulation of DLT. The “do no harm” principle should underpin the UK’s approach to regulation of DLT and digital tokens, as promotion of the development and innovation of these new technologies should be prioritised alongside compliance with reasonable consumer protections and existing legal frameworks.

Source: https://thebkp.com/crypto-asset-written-evidence

Chapter V:

RegTech

Introduction

Regulatory technology, also known as a "RegTech" is a new field within the financial services industry that utilizes information technology to enhance regulatory processes. It puts a particular emphasis on regulatory monitoring, reporting and compliance and is thus benefiting the finance industry. The objective of RegTech is to enhance transparency as well as consistency and to standardize regulatory processes, to deliver sound interpretations of ambiguous regulations and thus to provide higher levels of quality at lower cost.

RegTech to date has been focused on the digitization of manual reporting and compliance processes, for example in the context of know your customer requirements. This offers significant cost savings to the financial services industry and regulators. However, a 2016 academic paper “FinTech, RegTech and the Reconceptualization of Financial Regulation” suggested that the potential of RegTech is far greater stating that "*it has the potential to enable a close to real-time and proportionate regulatory regime that identifies and addresses risk while also facilitating far more efficient regulatory compliance*".

The report goes on to suggest that RegTech transformative potential will only be fully captured by a new and different regulatory framework situated at the nexus of data and digital identity. The developments in FinTech, the tremendous changes in emerging markets, and the recent proactive stance of regulators may potentially combine to facilitate a transition from one regulatory model to another.

At a governmental level, the FCA was the first governmental body to establish and promote the term RegTech, defining this as: "*RegTech is a sub-set of FinTech that focuses on technologies that may facilitate the delivery of regulatory requirements more efficiently and effectively than existing capabilities".*

In March 2015, a report by the UK Government Chief Scientific Adviser, stated that "*FinTech has the potential to be applied to regulation and compliance to make financial regulation and reporting more transparent, efficient and effective – creating new mechanisms for regulatory technology, RegTech*".

Source: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2847806

Currently RegTech is considered still as a separate sub-industry, but in our forecasting it is quite obvious that in the near future RegTech will become an essential part of the integrated Digital Crypto economy, while the Blockchain technology will become a backend technology for RegTech.

In March 2016, BBVA made the following statement in its paper titled "Banking Outlook":

"*The term RegTech refers to a set of companies and solutions that marry innovative technology and regulation to address regulatory requirements across industries, including financial services. RegTech companies focus on the automation of manual processes and the links between steps in analytical/reporting processes, the improvement of data quality, the creation of a holistic view of data, the automated analysis of data with applications that are able to learn during the process, and the generation of meaningful reports that can be sent to regulators and used internally to improve key business decision making*."

FinTech growth has been led by startups (now increasingly partnering with, or being acquired by, banks and other traditional financial institutions), whilst RegTech developments to date are primarily a response to the huge costs of complying with new institutional demands by regulators and policy-makers.

For the financial services industry, the cost of regulatory obligations has dramatically increased, such that 87% of banking CEOs consider these costs as a source of disruption. This provides a strong economic incentive for more efficient reporting and compliance systems to better control risks and reduce compliance costs. Furthermore, the massive increases in the volume and types of data that have to be reported to regulatory authorities represent a major opportunity for the automation of compliance and monitoring processes.

Banco Bilbao Vizcaya Argentaria (BBVA), which hosted a RegTech innovation lab, quoted in 2016, "*Regtech solutions also allow banks to boost their responsiveness to regulatory changes, because they are, in theory, designed to adapt dynamically to new requirements in an almost immediate manner*".

Source: https://www.bbva.com/en/10-keys-understand-regtech/
https://www.bbvaresearch.com/wp-content/uploads/2016/03/Banking-Outlook-Q116_Cap6.pdf

Earlier, in November 2017, FinTech Global conducted a comprehensive review of the RegTech landscape globally, and selected the world most innovative 100 RegTech companies as RegTech 100 that every financial institutions should know about in 2018.

RegTech can have applications such as:

- Legislation/Regulation gap analysis tools
- Compliance universe tools
- Health Check tools
- Management Information tools
- Transaction reporting tools
- Regulatory reporting tools
- Activity monitoring tools
- Training tools
- Risk data warehouses
- Case management tools
- Horizon scanning
- Transaction monitoring

As soon as RegTech sub-set first appeared, a number of companies have been spawning in order to tackle various regulatory problems. Deloitte published a report on RegTech Universe in 2017 listing more than 150 RegTech startups globally. In January 2017, Citi has also published a report under Global Perspectives & Solutions where it identified 24 KYC FinTech startups in the RegTech space globally.

In 2017, FinTech Global released a list of the top 100 RegTech companies in the world.

Source: http://fintech.global/regtech100/
https://www2.deloitte.com/lu/en/pages/technology/articles/regtech-companies-compliance.html

Why is Regtech becoming the next big thing?

“Regtech is the new FinTech” by Deloitte explains that “RegTech” has rapidly risen to prominence in 2015, from total obscurity. At risk of sounding too simple, RegTech is pretty much what it says on the tin: the use of new technology to facilitate the delivery of regulatory requirements. Or, in slightly more words, RegTech is technology that seeks to provide “nimble, configurable, easy to integrate, reliable, secure and cost-effective” regulatory solutions.

Regtech is becoming more and more crucial as levels of regulation rise and focus on data and reporting increases. It also addresses a gap in a financial services market that is being disrupted at a speedy pace by FinTech. In a range of areas, dynamic FinTech has been driving a more efficient and more effective way of doing things. The extension of this disruption to regulatory practice is the next logical step.

This disruption can be expected to make regulation highly data acquisitive and to involve the use of real-time information, and the incorporation of algorithms and analytics. London is increasingly being seen as the home of RegTech with a range of leading global RegTechs based in the capital. The FCA recently engaged in its own crystal ball gazing, suggesting areas where RegTech might be about to effect substantial change.

It envisioned “new approaches” to “streamline AML checks” and the use of social media and biometrics to transform how customer due diligence is done, how anti-fraud measures work and how banks “filter the wheat from the chaff when deciding whether to make a suspicious activity report”.

The automation of due diligence, using data that can be tailored to a firm’s risk-based approach, is at the forefront of this RegTech revolution.

Source: https://complyadvantage.com/what-is-regtech/

RegTech in UK

On 22nd November 2017, the UK government reaffirmed its commitment to having a leading regulatory and technology environment in the UK. Within the Autumn Budget 2017 speech, the Rt Hon Philip Hammond announced a new £10bn Regulators' Pioneer Fund, established to "help regulators to develop innovative approaches aimed at getting new products and services to market".

UK regulators are already recognised as being at the cutting edge of financial and regulatory technology, thanks to initiatives such as the Financial Conduct Authority's Project Innovate and the Bank of England's FinTech Accelerator. The FCA, PRA and Bank of England are forward thinking, collaborative and increasingly open organizations, which alongside an active VC community and a good startup culture, makes the UK a great place for RegTech companies and solutions to flourish.

London has established itself as the world's leading city for RegTech innovation. The interaction between a well-developed tech sector, a supportive regulatory authority and active investors has facilitated the creation and growth of innovative companies that are incorporating the latest technologies, such as artificial intelligence and machine learning, into their products.

According to RegTech 100 list, amongst the UK's world-leading RegTech companies are the following:

1. Capnovum
2. CheckRecipient
3. ComplyAdvantage
4. CUBE
5. Digital Control Room
6. DueDil
7. Logical Construct
8. Onfido
9. TAINA Technologies
10. VoxSmart
11. Waymark Tech

Source: https://www.finextra.com/blogposting/14788/the-uk---the-best-place-to-be-a-regtech-company
http://www.londonlovesbusiness.com/business-news/tech/26-uk-fintech-companies-named-on-the-regtech-100-list-of-leading-regulatory-technology-providers/18566.article

REG TECH MARKET MAP

FINANCIAL SERVICES

ENTERPRISE RISK MANAGEMENT
Argos Risk, Cloud9, fenergo, FINOMIAL, QUMRAM

TAX MANAGEMENT
Avalara, canopy, taxometry, exactor, VATBOX

REPORTING
Confirmation.com, AQMETRICS, CERTENT, Global Debt Registry, intix, GOVERNANCE.io, PLIA

PORTFOLIO RISK MANAGEMENT
Credit Benchmark, kyriba, QuanTemplate, loanlogics, riskalyze, CreditPoint, Limina, ncino

AML/KYC
CONTEGO, ComplyAdvantage, trunomi, FORTRESS RISK MANAGEMENT

OPERATIONS RISK MANAGEMENT
CORLYTICS, R-sam, NetGuardians, ASCENT

TRADE MONITORING
OpenGamma, DROiT, ANCOA, ComplySci

QUANTITATIVE ANALYTICS
FINCAD, AYASDI

BLOCKCHAIN/BITCOIN
Skry, elliptic, CHAINALYSIS

GOVERNMENT / LEGISLATION
TrackBill, LOGICGATE, FiscalNote

ENVIRONMENT, HEALTH, SAFETY, & QUALITY
Assent, rizepoint, ICIX, INTELEX, effective SOFTWARE, OnRule

INFORMATION SECURITY / CYBERSECURITY
REDOWL, CloudPassage, CORE SECURITY, EIQ, HYTRUST, RISKIQ, onapsis, LogRhythm, datiphy, QUARRI, Lumeta, CLOUD RAXAK, druva, radar, cloudcover, skyhigh, EverCompliant

GENERAL COMPLIANCE MANAGEMENT
MEWE, AgeCheq, CONNXUS, Continuity, Oversight, Jewel Paymentech, convercent, Simpliance, zlien, ComplyGlobal, flexeye, SocialSafeGuard, GAN INTEGRITY

HEALTHCARE
greenlight.guru, InvisALERT SOLUTIONS, Quatrax COMPLIANCE SOFTWARE

VENDOR RISK MANAGEMENT
venminder, Enterprise Risk Control, CERTRAX, GBANC, PREVALENT

IDENTIFICATION / BACKGROUND CHECK
Trulioo, onfido, ThisIsMe, trooly, CLi, verato, now we comply, SOCURE, Checkr

CANNABIS
BioTrackTHC, MJ FREEWAY BUSINESS SOLUTIONS, Hypur, KIND, payQwick, HELIX TCS

CBINSIGHTS

Source: CB Insights

Chapter VI:

LegalTech

Legal technology, also known as **LegalTech**, refers to the use of technology and software to provide legal services. Legal Tech companies are generally startups founded with the purpose of disrupting the traditionally conservative legal market. According to TechCrunch, as of December 2014, "legal technology is booming, with companies attempting to disrupt the legal space at every level and from every angle" and Forbes noted in February 2015 that there were “hundreds of legal startups popping up all over the US and Europe”.

Legal technology traditionally referred to the application of technology and software to help law firms with practice management, document storage, billing, accounting and electronic discovery. Since 2011, Legal Tech has evolved to be associated more with technology startups disrupting the practice of law by giving people access to online software that reduces or in some cases eliminates the need to consult a lawyer, or by connecting people with lawyers more efficiently through online marketplaces and lawyer-matching websites.

The legal industry is widely seen to be conservative and traditional, with Law Technology Today noting that "in 50 years, the customer experience at most law firms has barely changed". Reasons for this include the fact law firms face weaker cost-cutting incentives than other professions (since they pass disbursements directly to their client) and are seen to be risk averse (as a minor technological error could have significant financial consequences for a client).

However, the growth of the hiring by businesses of in-house counsel and their increasing sophistication, together with the development of email, has led to clients placing increasing cost and time pressure on their lawyers. In addition, there are increasing incentives for lawyers to become technologically competent, with the American Bar Association voting in August 2012 to amend the Model Rules of Professional Conduct to require lawyers to keep abreast of "the benefits and risks associated with relevant technology", and the saturation of the market leading many lawyers to look for cutting-edge ways to compete. The exponential growth in the volume of documents (mostly email) that must be reviewed for litigation cases has greatly accelerated the adoption of technology used in eDiscovery, with elements of machine language and artificial intelligence being incorporated and cloud-based services being adopted by law firms.

Currently LegalTech is considered as a separate sub-industry, but in our assessment it is highly credible that in the near future LegalTech will become an essential part of the integrated Digital Crypto economy, with Blockchain technology becoming a backend technology for LegalTech.

British Legal Technology Forum 2019 https://britishlegalitforum.com/

The British Legal Technology Forum 2019 will welcome an estimated 1,200 visitors from the world of law, legal technology and IT security in London on 12th March 2019.

As Europe's largest legal technology conference and exhibition, The British Legal Technology Forum 2019 will bring together the most respected professionals from both the legal and commercial technology sectors to examine and explore the systems, strategies, processes and platforms that will drive law firms and legal businesses into the next decade and beyond.

With four presentation stages and over 2,500 square metres of exhibition space, The British Legal Technology Forum will deliver multi-stream conference sessions, keynote presentations, panel discussions, knowledge sessions, interviews, interactive demonstrations and exhibitions by over 90 of Europe's best known technology and IT security suppliers.

Movers and Shakers: UK Lawtech Startups, report, published in partnership by Thomson Reuters and Legal Geek details the current state (2017) of play for the many startups in the UK and Ireland that are using technology to disrupt what has been a historically conservative and traditional market. , gives insight into these lawtech companies – who they are, the solutions they offer, how much funding they've received and more.
From chatbots that help the consumer understand legal terminology to enterprise-wide solutions for the largest law firms there appears to be something for everyone. And albeit relatively small, and slow in emerging, the market is diverse and dynamic, and, crucially, starting to produce success stories.
The report also includes the latest UK Lawtech Startup Map – a one-of-its kind visual representation of the UK legal startup community, first created by Thomson Reuters and Legal Geek in 2016. Based on the iconic London Underground map it uses different "Tube" lines to indicate the various categories or market segments that start-ups are operating in, like Practice Management, Marketplace, Contracts, Risk and Compliance, Law for Good, and Analytics and Search.

Source: https://blogs.thomsonreuters.com/legal-uk/2017/07/05/uk-lawtech-start-ups-legal-geek/

Source: https://www.legalgeek.co/startup-map/

Barclays and the Law Society launch law-tech incubator to help the UK be a leader in the field

23 Apr 2018

- New Eagle Lab will help turbo-charge London's law-tech ecosystem
- Venture backed by major law firms, University College London (UCL) and The University of Liverpool
- Start-up community Legal Geek to provide community events
- Co-working, incubation, mentoring, introductions to major firms and other services will help law-tech firms start up and scale up

Barclays today launched a new law-tech incubator in partnership with the Law Society. The venture is backed by major law firms (see Notes to Editors), as well as leading universities UCL and The University of Liverpool.

Together, they aim to turbo-charge the UK's law-tech sector, helping companies start up and scale up, and become international leaders in their field – matching the UK's reputation as a leader in the legal services sector.

The law-tech Eagle Lab will open soon in Notting Hill, London, and create a centre of excellence. It will provide co-working space and support for up to 100 individuals, with events and meet-up space expected to be confirmed soon.

Barclays will meet potential law-tech Eagle Lab residents to discuss their aim and scale of ambition, relevance to law/regulation technology, their funding status and ongoing sustainability, how they will benefit from the initiative and their commitment to the law-tech ecosystem and wider community. Selecting businesses for residency will be mutually discussed by the partners, before Barclays makes the final decision on successful applicants.

Partners signed up to the initiative include Allen & Overy, Baker McKenzie, Brethertons, Capital Law, Clifford Chance, Clyde & Co, DWF LLP, Gowling WLG, Latham & Watkins, Legal Geek, Norton Rose Fulbright, PWC, Simmons & Simmons, SO Legal, the Law Society, The University of Liverpool, TLT LLP and University College London.

Source: https://newsroom.barclays.com/r/3587/barclays_and_the_law_society_launch_law-tech_incubator_to

What are the hottest legal tech startups in the UK?

Name	Description	website
Lexoo	Lexoo is a marketplace where businesses and in-house legal teams can easily compare and hire talented and forward-thinking lawyers around the wolrd, all pre-screened and vetted by Lexoo. The lawyers are incentivised to compete for your work and your can see hundreds of reviews from other businesses. Our team of ex-lawyers does the vetting for you so you will only receive quotes from lawyers that are right for your job. Our lawyers are typically former big firm lawyers who now work on a lower overhead basis.	https://www.lexoo.co.uk/
Crowdjustice	CrowdJustice allows communities to band together to access the courts to protect their communal assets – like their local hospital – or shared values – like human rights. Successive governments have made access to justice harder and more expensive but we are using the power of the crowd to try and stem the tide," explains Salasky.	https://www.crowdjustice.com/
DoNotPay	DoNotPay is an online robot lawyer that allows anyone to automatically claim asylum in the U.S, U.K, and Canada for free.	https://donotpay.com/
Linkilaw	Linkilaw is committed to stopping inefficiencies and helping legal work become accessible through our technology, in-house solutions and legal marketplace. By streamlining legal services, and working to understand your challenges, we provide legal work that is tailored to your business needs. Our lawyers turn work around fast, and deliver solutions that are easy to understand and will protect your business for years to come.	http://linkilaw.com

Source: https://www.quora.com/What-are-the-hottest-legal-tech-startups-in-the-UK

Chapter VII:

Compliance

(KYC, AML, KYT)

At present, the processes of KYC and AML occupy a significant portion of the financial and fintech industries day-to-day activities. The opinion that Crypto Economy technologies can help circumvent the financial services' monitoring constraints and limitations is quite common. Blockchain technology in fact allows us to significantly increase the level of monitoring and therefore create a fundamentally more sophisticated approach, applying KYC and AI technologies to execute precise monitoring and analysis of all transactions and their pathways. Therefore, in theory and in practice, as Crypto Economy technologies mature, the level of transparency of financial institutions operating within the framework of the Crypto Economy will be significantly more secure and transparent compared to the standards found within traditional financial institutions of which the majority are using outdated technologies in their financial control and monitoring systems.

KYC - Know Your Customer

Know your customer (alternatively **know your client** or 'KYC') is the process of a business verifying the identity of its clients and assessing potential risks of illegal intentions for the business relationship. The term is also used to refer to the bank regulations and anti-money laundering regulations which govern these activities. Know your customer processes are also employed by companies of all sizes for the purpose of ensuring their proposed agents, consultants, or distributors are anti-bribery compliant. Banks, insurers and export creditors are increasingly demanding that customers provide detailed anti-corruption due diligence information.

The objectives of KYC guidelines is to prevent banks from being used, intentionally or unintentionally, by criminal elements for money laundering activities. Related procedures also enable banks to better understand their customers and their financial dealings. This helps them manage their risks prudently. Today not only the banks but also different online businesses can implement KYC. They usually frame their KYC policies incorporating the following four key elements:

- Customer Acceptance Policy;
- Customer Identification Procedures;
- Monitoring of Transactions; and
- Risk management.

For the purposes of a KYC policy, a *Customer/user* may be defined as:

- a person or entity that maintains an account and/or has a business relationship with the bank;
- one on whose behalf the account is maintained (i.e. the beneficial owner);
- beneficiaries of transactions conducted by professional intermediaries such as stockbrokers, Chartered Accountants, or solicitors, as permitted under the law; or
- any person or entity connected with a financial transaction which can pose significant reputational or other risks to the bank, for example, a wire transfer or issue of a high-value demand draft as a single transaction

KYC controls typically include the following:

- Collection and analysis of basic identity information such as Identity documents (referred to in UK regulations and practice as a "Customer Identification Program" or CIP)
- Name matching against lists of known parties (such as "politically exposed person" or PEP)
- Determination of the customer's risk in terms of propensity to commit money laundering, terrorist finance, or identity theft
- Creation of an expectation of a customer's transactional behavior
- Monitoring of a customer's transactions against expected behavior and recorded profile as well as that of the customer's peers

Enhanced due diligence (EDD) is a more detailed standard required for larger customers and transactions. The USA PATRIOT Act dictates that institutions "shall establish appropriate, specific, and, where necessary, enhanced, due diligence policies, procedures, and controls that are reasonably designed to detect and report instances of money laundering through those accounts." US regulations require that EDD measures are applied to account types such as Private banking, Correspondent account, and Offshore banking institutions. Because regulatory definitions are neither globally consistent nor prescriptive, financial institutions are at risk of being held to differing standards dependent upon their jurisdiction and regulatory environment. An article published by Peter Warrack in the July 2006 edition of ACAMS Today (Association of Certified Anti-Money Laundering Specialists) suggests the following: "A rigorous and robust process of investigation over and above (KYC) procedures, that seeks with reasonable assurance to verify and validate the customer’s identity; understand and test the customer’s profile, business and account activity; identify relevant adverse information and risk; assess the potential for money laundering and / or terrorist financing to support actionable decisions to mitigate against financial, regulatory and reputational risk and ensure regulatory compliance."

AML - Anti Money Laundering

Anti money laundering (AML) refers to a set of procedures, laws, and regulations designed to stop the practice of generating income through illegal actions. Though anti money laundering laws cover a relatively limited number of transactions and criminal behaviors, their implications are far-reaching. For example, AML regulations require institutions issuing credit or allowing customers to open accounts to complete due-diligence procedures to ensure they are not aiding in money-laundering activities. The onus to perform these procedures is on the institutions, not on the criminals or the government.

Money laundering is the act of concealing the transformation of profits from illegal activities and corruption into ostensibly "legitimate" assets. The dilemma of illicit activities is accounting for the origin of the proceeds of such activities without raising the suspicion of law enforcement agencies. Accordingly, considerable time and effort is put into devising strategies which enable the safe use of those proceeds without raising unwanted suspicion. Implementing such strategies is generally called money laundering. After money has been suitably laundered or "cleaned", it can be used in the mainstream economy for accumulation of wealth, such as acquisitions of properties, or otherwise spent. Law enforcement agencies of many jurisdictions have set up sophisticated systems in an effort to detect suspicious transactions or activities, and many have set up international cooperative arrangements to assist each other in these endeavors. In a number of legal and regulatory systems, the term "money laundering" has become conflated with other forms of financial and business crime, and is sometimes used more generally to include misuse of the financial system (involving things such as securities, digital currencies, credit cards, and traditional currency), including terrorism financing and evasion of international sanctions. Most anti-money laundering laws openly conflate money laundering (which is concerned with *source* of funds) with terrorism financing (which is concerned with *destination* of funds) when regulating the financial system.[3]

Some countries treat obfuscation of sources of money as also constituting money laundering, whether it is intentional or by merely using financial systems or services that do not identify or track sources or destinations. Other countries define money laundering in such a way as to include money from activity that *would have been* a crime in that country, even if the activity was legal where the actual conduct occurred.[4]

Money laundering and terrorist funding legislation in the UK is governed by four Acts of primary legislation:

- Terrorism Act 2000
- Anti-terrorism, Crime and Security Act 2001
- Proceeds of Crime Act 2002
- Serious Organised Crime and Police Act 2005
- Money Laundering Regulations 2007
- Money Laundering Regulation, Terrorist Financing and Transfer of Funds (Information on the Payer) Regulations 2017
- Sanctions and Anti-Money Laundering Act 2018

Money Laundering Regulations are designed to protect the UK financial system, as well as preventing and detecting crime. If a business is covered by these regulations then controls are put in place to prevent it being used for money laundering.

23 January 2018 UK launches new anti-money laundering watchdog.

A new watchdog launches today to strengthen the UK's defences against money laundering and terrorist financing. The Office for Professional Body Anti-Money Laundering Supervision (OPBAS) is based within the FCA and will work with all the UK's Anti-Money Laundering (AML) supervisors to help improve standards, and with law enforcement to strengthen cooperation.

OPBAS will directly oversee the 22 accountancy and legal professional body AML supervisors in the UK. It will ensure these 22 organisations meet the high standards set out in the Money Laundering Regulations 2017, and has powers to investigate and penalise those that do not.

Launching OPBAS delivers on the government's commitment to reform the AML supervisory regime, a key part of the 2016 Action plan for anti-money laundering and counter-terrorist finance.

Source: **HM Treasury** and **John Glen MP**

One of the examples related to the KYC-AML technologies at the intersection of Blockchain and Crypto Economy is CoinFirm https://www.coinfirm.io/aml-ctf

AML Policies for entities acting at the intersection of blockchain and traditional financial system

Almost any kind of blockchain both public and private, including digital currency blockchains, blockchain based token networks and initial coin offering (ICO) related blockchains can be easily integrated with the Coinfirm platform. Coinfirm builds customized AML and financial risk models meeting the most restrictive regulatory and performance requirements, providing blockchain operators with the required assurance for their business continuity.

AML/CTF and Compliance

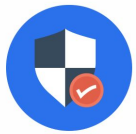
The Blockchain AML & Compliance Platform

Quick Search and Check

Search and check blockchain addresses to get initial AML and financial risk assessment results for free

In-Depth Reports

Generate comprehensive reports on AML and financial risk assessment of blockchain addresses and users.



AML Risk Management

Customized AML policies, procedures and risk matrixes for entities dealing with blockchain and cryptocurrencies.

Use Our API

Scale up and automate your compliance processes with commercial access to our blockchain analysis, data and reports

Actionable Data

Coinfirm's platform uses proprietary algorithms and big data analysis to provide actionable data on blockchain transactions and parties.

KYT - Know Your Transaction

KYC is not enough

Legacy technology, integration issues, a lack of secondary attributes in payment transactions, and a dearth of uniformity on how Know Your Customer (KYC) is handled are crucial issues for the financial services industry. We examine these problems and suggest how a financial institution can achieve greater clarity through expanding due diligence past KYC by introducing Know Your Transaction (KYT). KYT is about a financial institution having a callable, more complete and granular data-set specific to a transaction.

KYC requirements for financial institutions are stringent and adhere to a global set of guidelines agreed upon by a collective of jurisdictions. Even though there is a uniformity in what should be known about a customer, there is no specificity detailing these requirements as an internationally acceptable standard. Some jurisdictions have been prescriptive, while others have left it up to the market participants, to be able to fit to the letter and the spirit of the law.

Today, most KYC processes are manual and tend to be static in nature - once a KYC due diligence has been performed, there is little to no follow-up. Often times, once a client is on-boarded, the extent of the file upkeep on that person or company is ensuring it is present in paper form, for however long the law requires. The reality is that things in the world of business are constantly changing. This means that continuing due diligence becomes another issue for the banks. How are banks supposed to efficiently and effectively conduct continuing due diligence on its entire customer base?

As technology plays a heavier role in the financial services sector, the onus on financial institutions will continue to grow. Financial crime compliance will be an area of greater focus. Regulators will become more detail-oriented as innovation continues and they learn more about how markets and their participants can be increasingly transparent. Lawmakers are motivated to keep investors safe, markets fair and efficient, assist in countering the financing of terrorism and fighting money laundering. Knowing not just the customer but also each transaction is going to be an inevitable facet of future regulation.

Source: http://www.bobsguide.com/guide/news/2017/Feb/14/the-evolution-of-know-your-transaction-why-kyc-alone-is-not-enough/

New “Know-Your-Transaction” Tool Enables Enhanced Blockchain Investigation

Cryptocurrency investigation enterprise Chainalysis is releasing a product called Know Your Transaction (KYT) designed to help businesses track customers that may be involved in illicit cryptocurrency-related activity. Thecompany’s clientele includes the Federal Bureau of Investigation (FBI), the Drug Enforcement Administration (DEA) and Europol.

Per a recent blog post, Chainalysis stated that it holds a lot of faith in both cryptocurrencies and blockchain technology:

“Blockchains create new ways for people to build trust among themselves and transact using cryptocurrencies. Cryptocurrencies have, in turn, inspired people to reimagine the financial machinery that powers world commerce. People are collecting land in virtual realities, conducting real-time payments for computation services, and buying collectible cats on the internet. This is just the beginning of worldwide access to financial instruments.”

The venture’s primary goal is to get banks involved in the cryptocurrency scene and to create a world where financial institutions can offer their services to digital currency exchanges and ventures, but alleged fears of money-laundering make this somewhat tricky, which explains the reasoning behind the product’s release.

Chainalysis’ KYT provides “real-time feedback” on transactions and fuels relevant information into what the company calls exchanges’ “transaction processing engines,” so executives can raise alerts regarding risky customers and monitor suspicious activity. The product has been in a testing phase amongst a small group of select customers, who reported seeing a “20X improvement in the speed of account reviews.” KYT will now be released to global cryptocurrency exchanges and financial institutions.

Chainalysis is not alone in this space. London-based Elliptic, which also runs investigations relating to cryptocurrencies, has garnered over $7 million in funding from institutions like Banco Santander bank and Octopus Ventures to further expand its operations and product development team.

Source: https://bitcoinmagazine.com/articles/new-know-your-transaction-tool-enables-enhanced-blockchain-investigation/

One of the examples related to the further development KYT technology is Crystal created by BitFury

Comprehensive Blockchain Analytics

Investigative Analytics for Blockchain and Cryptocurrencies

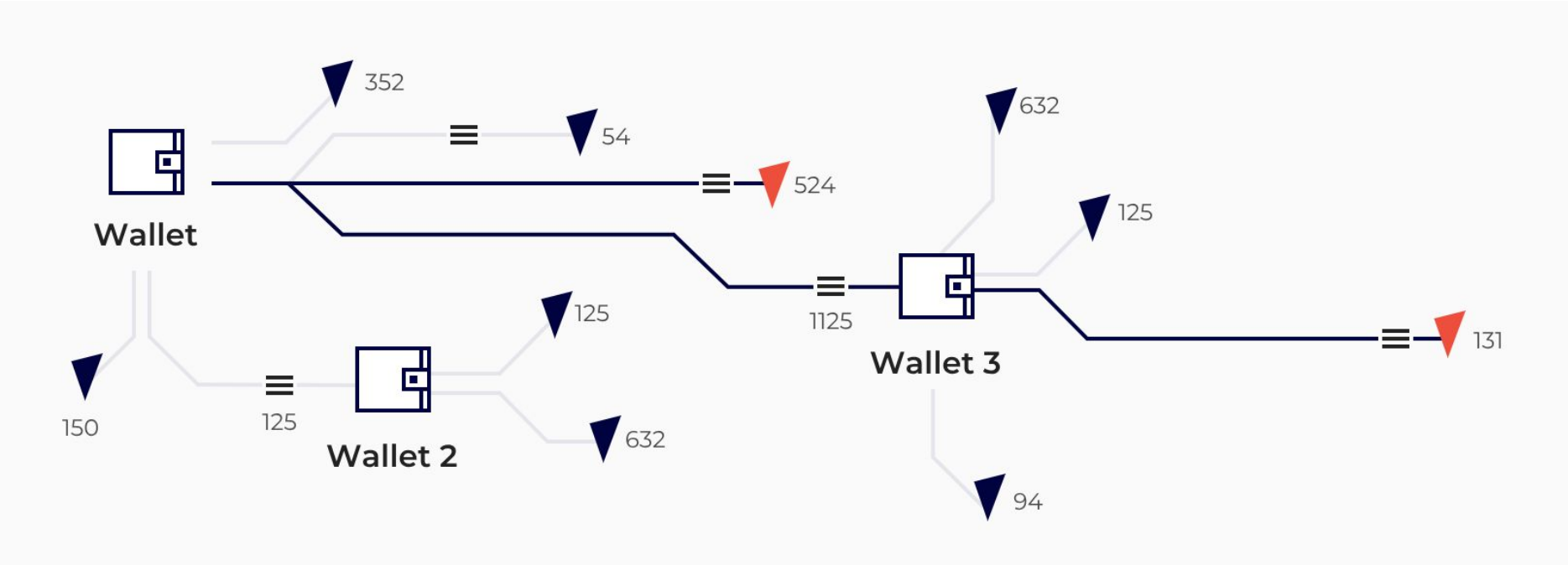
Crystal is the all-in-one blockchain investigative tool. Crystal provides a comprehensive view of the public blockchain ecosystem and uses advanced analytics and data scraping to map suspicious transactions and related entities.
Whether it is tracking a bitcoin transaction to a real-world entity, determining relationships between known criminal actors, or surveying suspicious behaviour, Crystal can help move your investigation forward. Engineered by the Bitfury Group.

Detailed Risk Scoring
Crystal helps investigators evaluate risks of transactions and compare them to each other. Armed with this “risk score,” law enforcement agents can trace the most suspicious transactions to a final address or withdrawal point.

Autonomous Tracking
You don’t have to spend days manually tracing suspicious transactions. Crystal does it for you — in a matter of hours. Crystal gives you a complete visualization of transactions and a final destination address, or an exchange address where funds were withdrawn as a fiat currency.
It can also inform you by email that a final address has been found, so you can work on other tasks while Crystal is working for you.

Secure Infrastructure
Crystal™ Pro can be used as an internal investigation tool, deployed on your in-house infrastructure in compliance with internal security policies. The data you enter into Crystal will never leave the secure perimeter of your network.
Interoperability

Crystal is the central data source of cryptocurrency analytics for your blockchain investigations. You can see analytical results in the Crystal interface, or you can integrate the results into your existing software tools.

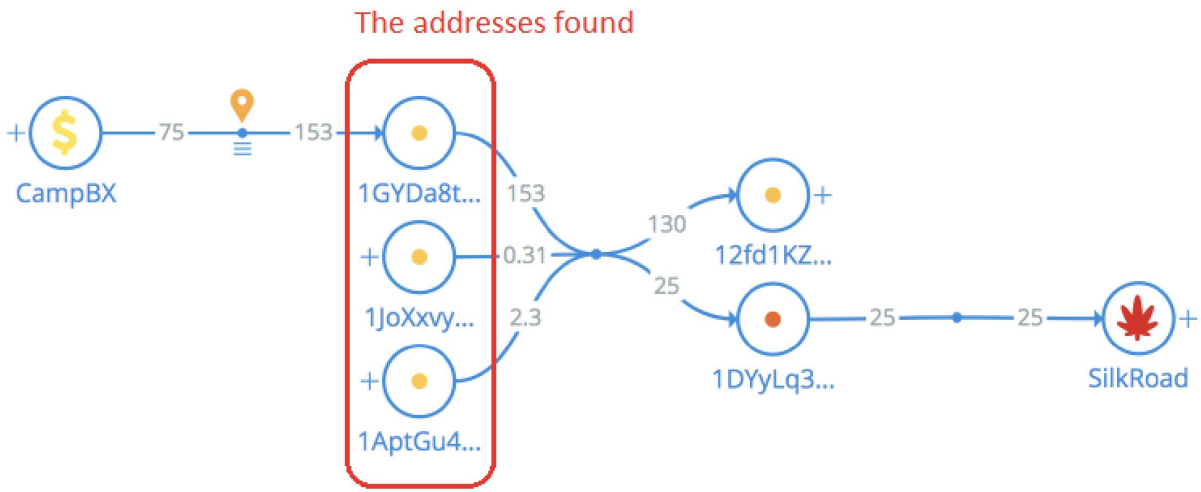


Wallet

Owner	**John Doe**
Transaction	**23**
Balance	**5.423 BTC**
Risk Score	**26%**

Clean Transactions

Risk Transactions



Chapter VIII:

OTC

(Over-The-Counter Trading)

OTC vs Exchange

In blockchain markets, as in traditional financial markets, the OTC (Over-The-Counter) market is that in which assets trade outside of exchange markets on a direct and bespoke counterparty-to-counterparty basis. These assets trade via decentralised dealer networks in which liquidity providers and market makers run dedicated OTC trading desks.

We illustrate some key differences between OTC markets and exchange markets below.

	Exchange	**OTC**
Typical Trade Size Range	$100 to $100k	$100k to $10m
Typical Minimum	$5	$100k
Typical Maximum	$1m	N/A
Transparency	High: Visible Order Book	Low: 'Dark pools'
Clientele	Retail, Algorithmic	Corporate, Institutional
Cryptocurrencies / price pairs	Can be in the hundreds	Typically only the most liquid handful
Main Trading Channels	Web UI, API	Messaging apps[1], API
Trader Behaviour	Frequent, fast, small, algorithmic	Slow, large, negotiable

[1] OTC crypto market flourishes, powered by Skype

https://uk.reuters.com/article/uk-crypto-currencies-otc/otc-crypto-market-flourishes-powered-by-skype-idUKKCN1H91P8

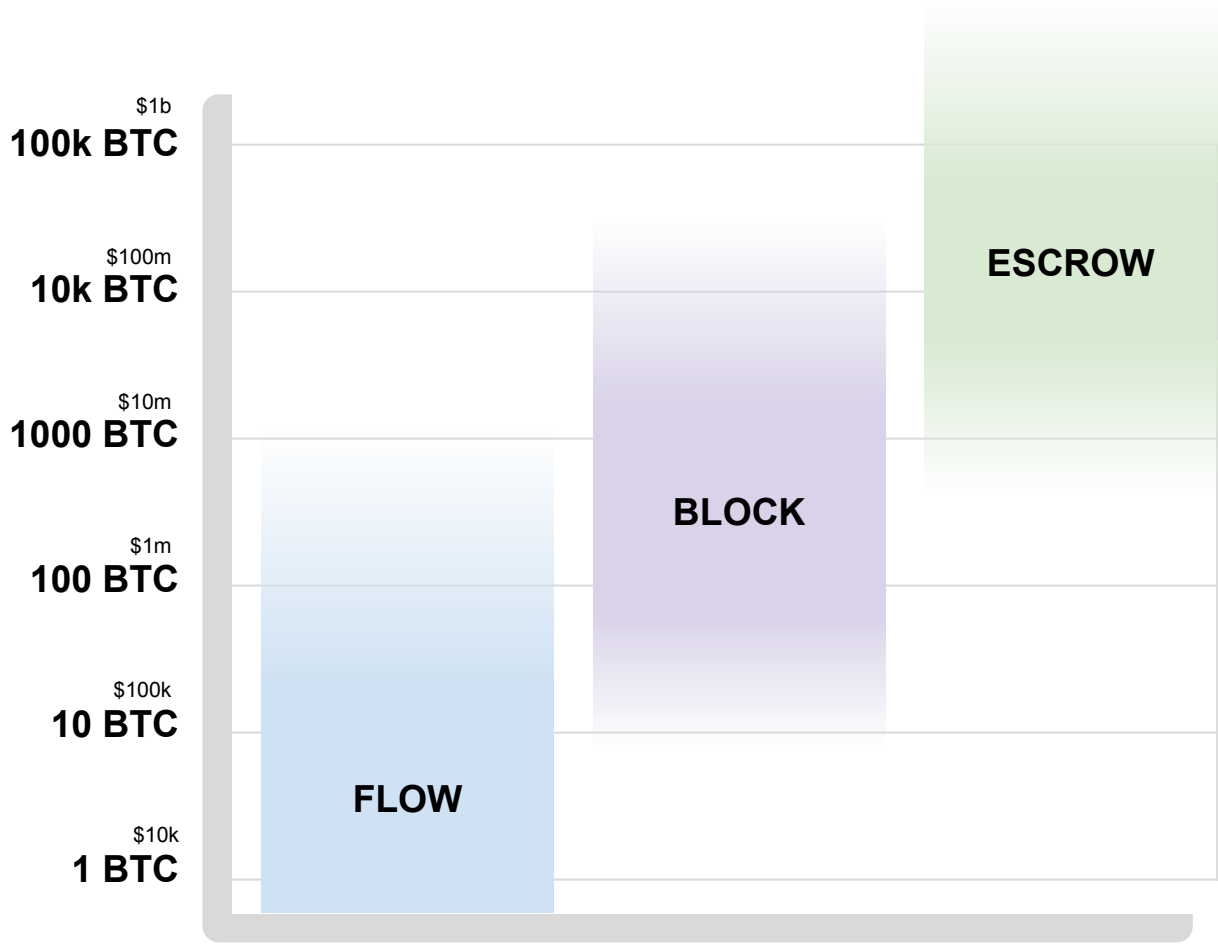
OTC Markets

The blockchain OTC market is dominated by cryptocurrencies Bitcoin and Ethereum, and can be segmented by size in three broad categories: Flow markets, block markets and escrow markets.

There are also OTC markets for protocol tokens, security tokens and alt-coins in general, but these tend to be much smaller and more illiquid than Bitcoin and Ethereum.

The flow OTC market constitutes typical daily liquidity serviced by dedicated OTC desks (some of whom identified later in this chapter), and predominantly used by institutional clients like hedge funds, wealth managers and family offices.

At around the $10m mark we see more bespoke 1-to-1 block trading. This market is mainly for OTC desks servicing their own liquidity requirements, often facing miners on the sell side or large funds on the buy side.



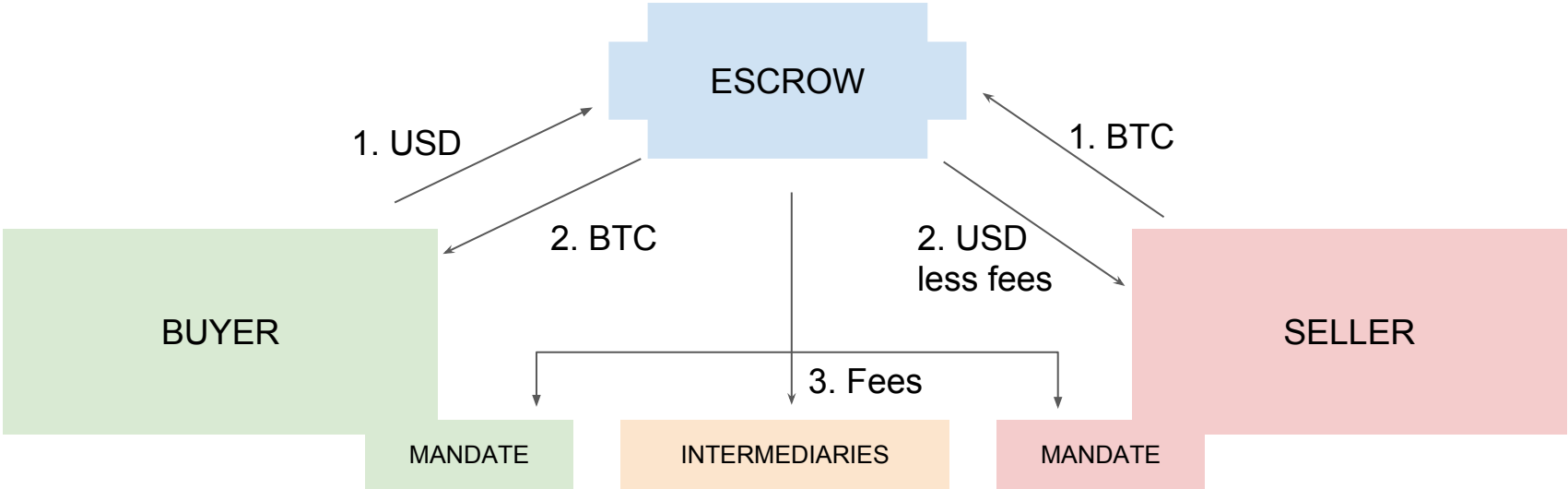
Source: BCB Group

From around 5000 BTC upwards (high tens of millions of dollars), counterparty risk becomes a major determinant in deal structure and the number of market participants reduces materially. A number of escrow services have emerged to address this specialist market segment – trusted 3rd parties with large enough balance sheets to mitigate this risk.

OTC Escrow Services

In the absence of central clearing counterparties typically found in traditional financial markets, one effective method for mitigating counterparty risk for large cryptocurrency trades is via escrow services. These trusted third parties take delivery of both the fiat cash and the cryptocurrency asset and disburse each in accordance with the pre-agreed terms.

Escrow agents can also act as paymasters whereby they settle any fees owed to the buyer or seller mandates, intermediaries, introducers or brokers, or lawyers.



Notable escrow agents for cryptocurrency OTC trading include:

- Noble Bank (https://www.noblebankint.com/)
- Kingdom Trust (https://www.kingdomtrust.com/)
- Vontobel (https://www.vontobel.com/)
- TMF (https://www.tmf-group.com/)

Market Participants

Liquidity Providers and Market Makers

Unlike exchanges, OTC trading desks rarely offer transparency of volume, so current estimates of global liquidity are not easily available. The largest and most liquid OTC providers and market makers, those trading over $1bn per month, are well known within trading communities and include:

- Circle (https://circle.com) with up to $4bn monthly traded volume[2]
- B2C2 (https://b2c2.com)
- Cumberland Mining (https://cumberlandmining.com/)
- Galaxy Digital (https://www.linkedin.com/company/galaxydigital/)
- Genesis Trading (https://genesistrading.com/) with $75-80m daily trade volume[2]

Clients

Buyers include hedge funds, crypto investment funds (see Chapter X), wealth funds, brokers, cryptocurrency exchanges, family offices and HNWI/UHNWI.

Sellers span all of the above but also notably include miners and token issuers.

[2] Over The Top Demand for OTC Market https://medium.com/@thedailybit.news/over-the-top-demand-for-otc-market-c4c4d87b1df9

OTC in UK

Large Cap

Mid Cap and Small Cap

Chapter IX:

Custodians

Crypto Custodies - Current State

The crypto market has historically been dominated by individual investors, but there is a rapidly rising demand for access to the crypto market from institutional investors like hedge funds, pension funds and retail brokerages as well.

As the influx of institutional investors into the crypto market surges, the need for trusted and qualified fund custodians increases proportionally.

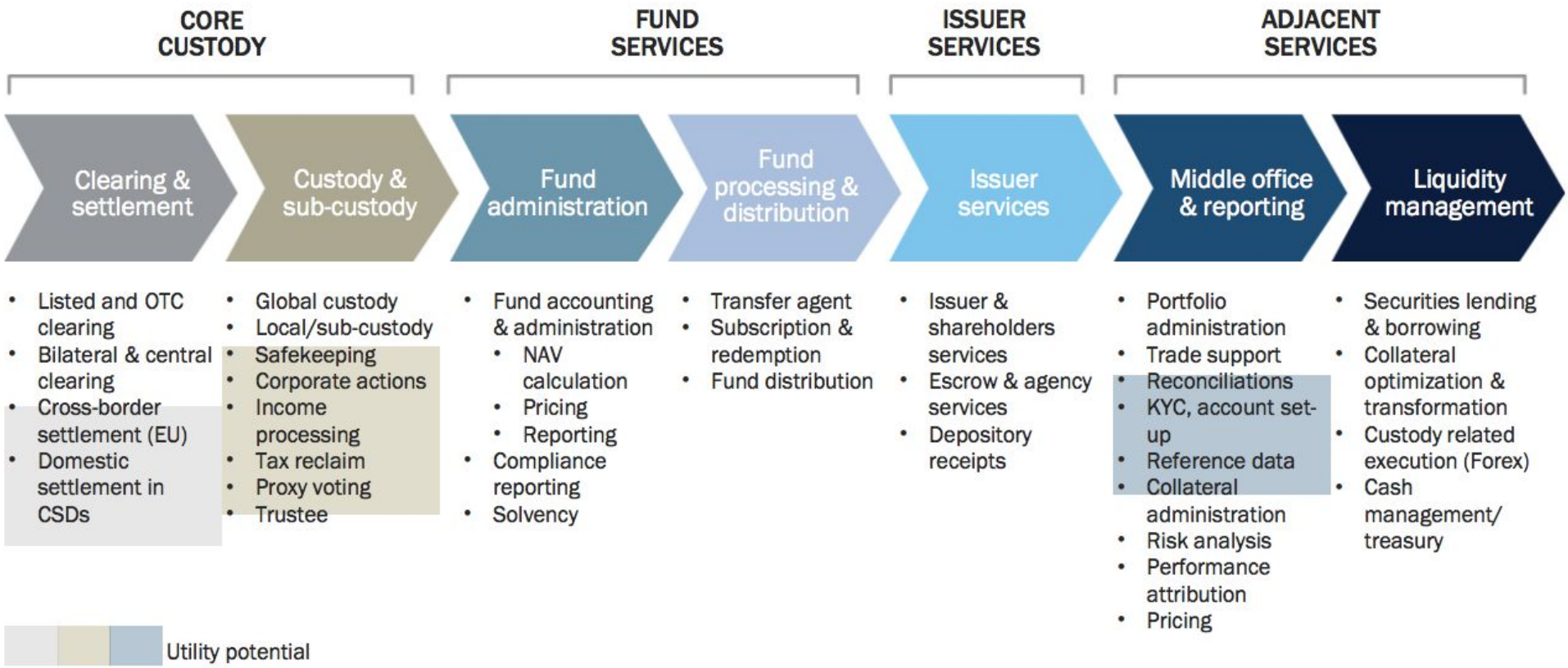
The problem of custodianship can be concisely summarized as the issue of how an investor's digital assets are stored and secured. While services to handle this issue in the traditional stocks and securities market have existed for almost as long as those markets have existed, this issue is just beginning to be explored in the cryptoasset space.

The central factor that will determine the winners and losers of the crypto custody race will be counterbalancing security and efficiency.

The major strategies currently being taken by the leading players of the crypto custodian space involve a diversified mix of hot and cold storage, along with multi signature wallets and monitored concentration limits so as to minimize risk.

Sources: https://www.finance-monthly.com/2018/06/what-is-the-solution-to-crypto-custody-for-institutional-investors/
https://techcrunch.com/2018/02/01/the-sad-state-of-crypto-custody/
https://www.finance-monthly.com/2018/06/what-is-the-solution-to-crypto-custody-for-institutional-investors/

Significant "utility potential" in core custody businesses



Source: Oliver Wyman

Source: https://hub.digitalasset.com/hubfs/Industry%20Reports/Blockchain%20White%20Paper%20v11.pdf?t=1513021211010

Crypto Custodies - Perspectives

"There are a lot of investors where custodianship was the final barrier. Over the next year, the market will come to recognize that custodianship is a solved problem. This will unlock a big wave of capital."

Hedge fund manager **Kyle Samani**

Many crypto funds now offer custody services and solutions such as insurance for third-party entities including institutional investors.

Furthermore, an increasing number of well-established crypto companies are developing internal custody schemes and acquiring other custody-focused companies.

BitGo, for instance, recently acquired the digital asset custodian Kingdom Trust (with more than $12B in held assets).

We can expect to see established crypto exchanges making similar acquisitions in the coming years.

We can also expect to see an increase in regulated crypto custody services in order to meet the increasing demand of institutional investors (e.g. hedge funds, pension funds and retail brokerages) for access to crypto markets.

Sam McIngvale from Coinbase has predicted that there exists some $20B waiting to enter into the custody services market once such services are available.

Furthermore, an increasing number of custodian startups are already interfacing with the SEC and Financial Industry Regulatory Authority to make this happen. BitGo is working with the SEC to establish itself as a qualified custodian and to get a state-chartered trust company approved in South Dakota.

Sources: https://www.bloomberg.com/news/articles/2018-06-18/regulated-crypto-custody-is-almost-here-it-s-a-game-changer
https://www.finance-monthly.com/2018/06/what-is-the-solution-to-crypto-custody-for-institutional-investors/

Crypto Custody - Landscape

In May 2018, the popular crypto exchange CoinBase announced the launch of crypto custody services targeted specifically toward large institutional clients. Clients using this service would need to pay a $100,000 set-up fee and keep a minimum of $10M in deposits, in addition to a minimum monthly fee based on the assets stored.

Coinbase also reported that they would be partnering with a U.S. Securities and Exchange Commission-regulated broker dealer so as to combine Coinbase's expertise in crypto security with the broker-dealer's experience in third-party auditing and financial reporting validation.

Coinbase also holds an e-money licence in the U.K., and has recently opened an account at Barclays PLC to enable easier deposit and withdrawal of client funds.

Coinbase Custody's key features include:

- Strict financial controls (multiple signers, audit trails, limits, etc)
- Dedicated account representatives and phone support
- SLAs on funds transfers
- A regulated digital currency custodian
- Multi-user accounts with separate permissions
- Support for a wide range of digital assets and currencies
- Insurance (in some cases)
- And high levels of cyber and physical security

Sources: https://www.coindesk.com/coinbase-rolls-out-crypto-custody-product-for-institutions/
https://www.bloomberg.com/news/articles/2018-03-14/coinbase-gets-a-u-k-money-license-and-reportedly-a-bank-account
https://medium.com/@barmstrong/announcing-coinbase-custody-a-digital-currency-custodian-for-institutions-907166d7af85

Crypto Custodians - Landscape

In May 2018, BitGo announced that they will be launching the first qualidied crypto custodial service explicitly designed with cryptocurrencies and digital assets in mind.

> *"BitGo Trust is ground-breaking for our industry because it will be the first qualified custodial solution designed specifically to hold digital assets for institutional investors independent of any exchange or trading activities."*
>
> **Robin Verderosa**, Product Marketing at BitGo

That same month, Nomura announced a collaboration that also aims to provide crypto custodian services that employs a novel kind of storage.

They will offer different storage options for different types of clients (e.g. institutional investors vs. individual investors), and aim to ensure that the storage solutions they offer are fully compliant with the regulations necessary to serve as fund custodians for institutional clients.

Sources: https://bitcoinexchangeguide.com/nomura-launches-komainu-crypto-asset-bank-with-ledger-coinshares/
https://bitcoinexchangeguide.com/regulated-crypto-custody-game-changing-investor-services-are-coming/

Crypto Custodians in UK

Both Coinbase and Circle - two prominent exchanges that we mentioned previously - are building custodian services with access to the UK market.

Besides these two international powerhouses, the number of companies offering crypto custodian services is rather small.

One such company is Vo1t, which invented a proprietary cold-storage vault.

Another is Online Blockchain, whose main focus is serving as an incubator for blockchain projects and startups, but who also offers custodial services.

Company name	Services	Investments	
Online Blockchain	R&D services	N/A	https://www.onlineBlockchain.io/
Vo1t	Crypto assets security		https://vo1t.io
Circle	No data		https://www.circle.com/md/legal/intl-user-agreement
Coinbase	No data		https://www.coinbase.com/

Chapter X:

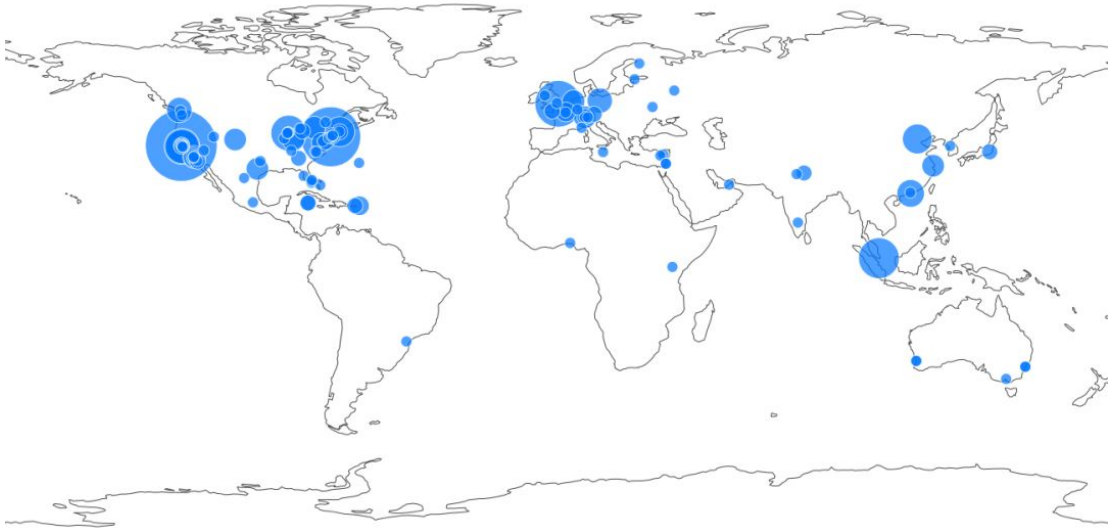
Crypto Investment Funds

Crypto Investments Funds

The crypto fund sector is rising rapidly, with more than 100 such funds launched in 2017 alone, which accounts for 14% of the total number of hedge fund launched generally that year, with 1% of the total assets held by hedge funds generally under management - a significant percentage given the market cap of cryptocurrencies versus traditional securities. Moreover, some of the top performing hedge funds globally in 2018 were crypto funds.

Current projects estimate another 150 to be launched in 2018.

Crypto Funds by City



Sources: https://cryptofundresearch.com/cryptocurrency-funds-overview-infographic/

Crypto Investments Funds

The cryptocurrency marketplace is evolving rapidly and in May 2018 a UK financial services startup announced the launch of a new fund aimed at providing an easy way into the cryptocurrency investment universe. Conceived by finance professional Andrew Pritchard, the 10x Growth Account allows investors to put money into a portfolio of cryptocurrencies, thus removing the complexity surrounding any decision over which particular digital coin to buy, while also making it less likely that the investor will fall victim to a sharp fall in values.

As Pritchard explains, 10x is open to 'experienced investors' – or to put it another way, people who have made at least one other investment. However, unlike some virtual currency funds, there is no requirement to be a "sophisticated" investor – usually a very high-income individual, with deep financial experience and even deeper pockets. To reach the widest possible group of investors, Pritchard says the aim was to get the regulatory ducks in a row.

There is, says Pritchard, the added advantage of tax relief under the Enterprise Investment Scheme. "40% of the investment will go into a social enterprise that qualifies for EIS relief," he says. And in addition to a portfolio of between 25 and 35 digital currencies, the fund will also include ICO tokens. Essentially these are digital tokens sold by businesses to raise capital.

The **10x Growth Account** is a UK based investment opportunity that enables you access to a portfolio of cryptocurrencies such as Bitcoin, Ethereum, Litecoin and Ripple through collaboration with the Gryphon Exchange and their secure platform, which launches in 2018. The 10x Growth Account removes the complexity surrounding access to cryptocurrency and takes the difficulty out of deciding which cryptocurrency to buy – all from a fully transparent and easy to use platform, with the highest levels of security.

10x
Growth Account

There are over 4000 cryptocurrencies for investors to choose from. Choice paralysis, choice adds cost, complexity and the need for guidance. The 10x Growth Account aims to change this with a portfolio that is re-balanced to mitigate risk, has broad market share and allows for diversification in cryptocurrency assets by opening a single account.

Source: https://www.cashlady.com/news/uk-startup-launches-cryptocurrency-investment-fund/
https://10xgrowthaccount.com/

Crypto Investments Funds

Some of crypto funds are actively managed, others are passively managed, still, others are a mix of classic real estate investing, others invest outside of the cryptoverse. The big risk with funds, which goes against the spirit of cryptocurrencies is that the investors do not hold the private keys. If stock market funds are an indicator to follow, passive index funds have shown better performance than actively managed ones. If Bitcoin will remain the predominant force in the cryptosphere, favouring funds which focus on altcoins that incorporate functionality that Bitcoin does not have or cannot incorporate, can be a profitable strategy.

SVK Crypto is a community-driven investment firm based in London focused on Blockchain Technologies and Digital Assets globally. SVK Crypto actively advise a multi-strategy portfolio that invests in the most promising early stage projects and liquid digital assets with a long-term view. SVK Crypto brings portfolio and risk management principles to an emerging digital asset class whilst recognising the power of the community. SVK Crypto in partnership with Block.one EOS VC have created a venture fund, Cryptogon EOS, dedicated to investing in projects that will utilize the EOS blockchain protocol. SVK Crypto joins a renowned global Block.one EOS VC venture syndicate deploying in excess of 1 billion USD. SVK Crypto hosts the largest monthly blockchain and cryptocurrency meetups in the City of London each and every month.

Andrew Pritchard, MD Blockchain for premier cryptocurrency account The 10x Growth Account, revealed six reasons on why we should take the plunge and invest in the world of cryptocurrency:

1. Improved Crypto regulations
2. Blockchain is here to stay
3. It has never been simpler to invest
4. Out with the old, in with the new?
5. Crypto's promising future
6. You will be a key part of technological innovation

Source: https://www.svkcrypto.com/
http://www.whatinvestment.co.uk/six-reasons-why-you-should-invest-in-cryptocurrency-2613994/

Crypto Investments Funds in UK

Funds	year	Types of funds	Web Site
Arbidex	2017	Crypto Hedge Fund	https://arbidex.uk.com/
CryptoSky	2017	Crypto Hedge Fund	https://www.cryptosky.club/
Distributed Alpha	2017	Crypto Hedge Fund	http://www.distributedalpha.com/
GABI	2017	Crypto Hedge Fund	https://coinshares.co.uk/
Outlier Ventures	2018	Crypto VC	https://www.blockventureproject.com/
Crypto Partners Invest	2014	Crypto VC	https://outlierventures.io/
Eterna Capital	2018	Crypto VC	https://www.eternacapital.com/
Prime Factor Capital	2018	Crypto Hedge Fund	https://www.primefactor.capital/
Fabric Ventures	2017	Crypto VC	https://www.fabric.vc/
Libertus Capital	2017	Crypto VC	http://www.libertuscapital.com/

Sources: https://cryptofundresearch.com/cryptocurrency-funds-overview-infographic/

Chapter XI:

Crypto Exchanges

Crypto Exchanges

Digital Currency Exchange (DCE) is a business that allow customers to trade cryptocurrencies or digital currencies for other assets, such as conventional fiat money, or different digital currencies. They can be market makers that typically take the bid/ask spreads as transaction commissions for their services or simply charge fees as a matching platform.

DCEs may be brick-and-mortar businesses, exchanging traditional payment methods and digital currencies, or strictly online businesses, exchanging electronically transferred money and digital currencies. A number of digital currency exchanges operate outside of Western countries, avoiding regulatory oversight and prosecution, but DCEs often handle Western fiat currencies, sometimes maintaining bank accounts in several countries to facilitate deposits in various national currencies. They may accept credit card payments, wire transfers or other forms of payment in exchange for digital currencies or cryptocurrencies. As of 2018, regulation of cryptocurrency and digital exchanges in many developed jurisdictions remains unclear, many regulators are still considering how to deal with these types of businesses and regulation regimes that do exist have often not been tested for validity.

They can send cryptocurrency to your personal cryptocurrency wallet. Some can convert digital currency balances into anonymous prepaid cards which can be used to withdraw funds from ATMs worldwide.

Some digital currencies are backed by real-world commodities such as gold.

Creators of digital currencies are often independent of the DCEs that trade the currency. In one type of system, Digital Currency Providers (DCP), are businesses that keep and administer accounts for their customers, but generally do not issue digital currency to those customers directly. Customers buy or sell digital currency from DCEs, who transfer the digital currency into or out of the customer's DCP account. Some DCEs are subsidiaries of DCP, but many are legally independent businesses. The denomination of funds kept in DCP accounts may be of a real or fictitious currency.

Crypto Exchanges

1. **"Traditional" Cryptocurrency Exchanges**: These are the exchanges that are like the traditional stock exchanges where buyers and sellers trade based on the current market price of cryptocurrencies (with the exchange playing the middle-man). These type of trading platforms generally charge a fee for each transaction. Some of these types of exchanges deal only in cryptocurrency, others allow users to trade fiat currencies like the U.S. dollar for cryptocurrencies like Bitcoin. Coinbase's GDAX is an example of this type of exchange, as is Kraken. Of exchanges, there are those run by third parties (they have a middle man who can do support and correct some problems) and decentralized exchanges and peer-to-peer exchanges (exchanges without a middle man). EtherDelta is an example of this type of peer-to-peer exchange.
2. **Cryptocurrency Brokers:** These are website-based exchanges that are like the currency exchange at an airport. They allow customers to buy and sell cryptocurrencies at a price set by the broker (generally at the market price plus a small premium). Coinbase is an example of this type of exchange. Shapeshift provides a similar service as well (it lets you swap on type of token for another). This is the simplest solution for new users, since it is simple and easy, you'll pay slightly higher prices than you do on the exchanges.
3. **Direct Trading Platforms**: These platforms offer direct peer-to-peer trading between buyers and sellers, but don't use an exchange platform like GDAX does. Direct trading platforms of this type don't use a fixed market price. Sellers set their own exchange rate and buyers either find sellers via the platform and preform an Over the Counter (OTC) Exchange, or they denote the rates they are willing to buy for and the platform matches buyers and sellers. This solution is hardly ever the best one, but it can be the only solution in some regions. In regions where trading is limited to direct trading, make sure to do some research and ensure you are using a trusted platform and dealing with highly rated users. Also, make sure to check market prices on Coinmarketcap, you aren't buying / selling at a fixed market price!
4. **Cryptocurrency Funds**: Funds are pools of professionally managed cryptocurrency assets which allows public buy and hold cryptocurrency via the fund. One such fund is GBTC. Using a fund you can invest in cryptocurrency without having to purchase or store it directly.

Sources: https://cryptocurrencyfacts.com/what-is-a-cryptocurrency-exchange/

Crypto Exchanges and Digital Asset Trading Platforms

Companies	Description	Funded in	Web Site
Billon Group	Billon disrupts technological fundaments behind the way money, documents and personal data is stored and moved between people and organizations.	2012	http://www.billongroup.com
Bitstamp	Bitstamp is a bitcoin exchange based in Luxembourg. It allows trading between USD currency and bitcoin cryptocurrency. It allows USD, EUR, bitcoin, litecoin, ethereum, ripple or bitcoin cash deposits and withdrawals.	2011	www.bitstamp.net
Luno	LUNO is a Bitcoin company headquartered in London with operations in Indonesia, Malaysia, Nigeria, South Africa, Singapore, the United Kingdom, and 35 other European countries.	2012	https://www.luno.com
UQUID	Uquid payment system is the easiest way for you to deposit, transfer or withdraw many e-currencies such as bitcoin, altcoins, btc-e, paysafecard and cashu.	2016	https://uquid.com
BlockEx	The BlockEx Digital Asset Exchange Platform manages the entire lifecycle of blockchain based digital assets, including origination, issuance, exchange.	2014	https://www.blockex.com/
CryptoFacilities	Crypto Facilities is a London-based financial services firm and provides risk management and trading solutions.	2014	https://www.cryptofacilities.com/

Chapter XII:

Blockchain and Financial Inclusion

Crypto Economy In Emerging Markets

Financial inclusion is a critical enabler for poverty reduction and inclusive growth, and the key facilitator of financial inclusion is banking. People and firms with bank accounts can make financial transactions efficiently and safely, access funds (whether payments, credit, savings, or other) invest in the future, and cope with economic shocks. However in 2017 30% of adults did not have access to a transactional bank account.

The Global Findex database shows that 515 million adults worldwide opened an account at a financial institution or through a mobile money provider between 2014 and 2017. Most of this growth has been in sub-saharan Africa. As non-cash transactions continue to rise globally, ventures such as the GMEX-run FinComEco Limited and MINDEX ecosystem aim to deliver sustainable and responsible economic changes to locales where the current financial systems have failed.

High impact initiatives facilitate agricultural value chain efficiencies through provision of strategic value-added services including an electronic Warehouse Receipt System (eWRS), Exchanges, Trading Platforms, Commodities and Input Finance and Electronic Banking, training and capacity building including the establishment of a commodities exchange underpinned by Blockchain technology.

GMEX - Crypto Economy Company applying blockchain technology in emerging markets

FinComEco initiatives will facilitate trust between investors, institutions and farmers in a form previously unseen for Sub-Saharan African agriculture ecosystems, resulting in high potential for creation of derivatives such as asset backed securities and trade finance.

MINDEX (Mauritius-based International Derivatives and Commodities Exchange) enables sourcing, trading and financing of ethically sourced green gold from bonafide sources; including artisanal miners. A new level of trust is achieved by implementing a blockchain-based supply chain infrastructure to allow transparent activities by participants. Refined gold bars produced from this value chain are stored securely in a Mauritius-based sovereign vault. The MINDEX commodities and derivatives exchange then allows buying and selling of the digitised gold contained in the vault.

MINDEX provides the following:

- A track record of a digital asset without the need for a trusted third party.
- Reduced need for reconciliation - preventing errors, delays, risk and capital required.
- A ‘golden’ source of data which tackles multiple inefficiencies with the traditional infrastructure.
- Enables more flexible market structures, increases innovation and allows streamlined reporting.
- Data integrity assurance.

The MINDEX ecosystem is supported by the Economic Development Board of Mauritius and the UK Government and has been approved by regulators to set up a derivatives exchange and advanced real-time central counterparty (CCP) clearing house.

Emerging FinTech apps and services now serve as the most optimal gateway for populations of the developing nations to gain access to basic financial services. Moreover, access to such services also serve as gateways to many other opportunities; it also means access to participation within the global economy, and through this, to further socioeconomic development.

In this report, we have identified a specific set of emerging technologies that can help to overcome the roadblocks in terms of facilitating greater financial inclusion. These include:

- Artificial Intelligence
- Bio-identification, which can be used as proof-of-identity mechanisms for clients who do not possess the necessary forms of government-issued ID that banks traditionally require when opening accounts;
- Blockchain-enabled infrastructures which allow transactions to occur in a secured and provable manner,
- Chatbots, which can serve to overcome the illiteracy barrier that makes many segments of rural populations unable to interact with banks via text-based interfaces and statements;
- Gamification (the use of game elements and game design techniques in a non-game context), which can be used as a tool for educating clients on the use of financial service interfaces, and ultimately serve as a tool for enhancing user experience, satisfaction and, above all else, user engagement.

The synergetic convergence of the above core technologies will enable increased financial inclusion in the developing regions and will take shape within the next 5 years, and prove to be the most disruptive factors changing the shape of the financial services industry in the developing regions.

More than this, it will prove to be among the most powerful forces for increasing the quality of life for rural populations of developing nations who current lack not just access to basic financial services, but also to basic human amenities and human rights.

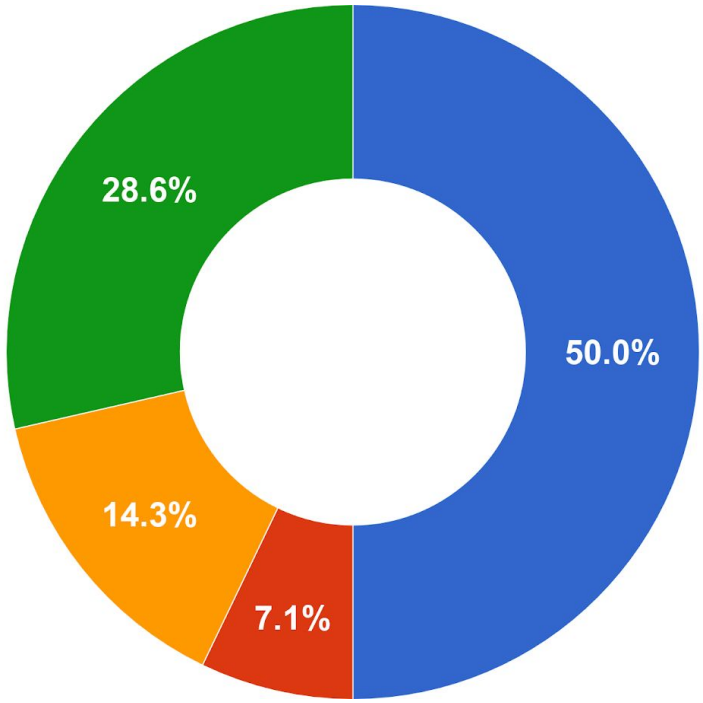
All these activities surrounding “FinTech for Social Good” and Financial Inclusion in developing regions represents more than just than just outstanding business opportunity; it represents a clear path toward humanitarian good, impact investment, ethical business and above all else, towards accelerating the socioeconomic development of emerging countries.

Blockchain & Crypto (Africa)

According to "The trouble with cryptocurrency in Africa – the truth behind the hype" by Saibu Baba:

> "*Though many governments like South Africa, Nigeria, Kenya, and Zimbabwe are making big strides towards finding out how to regulate the sector, a lot needs to be done on a continent-wide scale. Some start-ups are operating blindly without support or any regulation. Institutions find the cryptocurrency market to be too risky to invest. Some governments don't even know of anything called cryptocurrencies. Some religious-oriented people see cryptocurrencies to be the end of the world. That is Africa and cryptocurrencies.*"

- **Botswana, Tanzania, Rwanda,South Africa, Nigeria, Uganda**
- **Kenya, Zimbabwe**
- **Ethiopia,Sierra Leone**
- **Ghana, Egypt, Morocco, Morocco**



ALLOW CRYPTO TRANSACTIONS

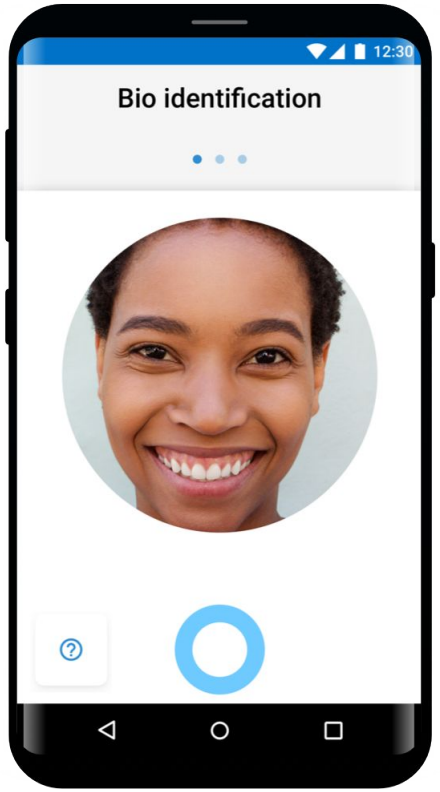
SOME BANKS ALLOW CRYPTO TRANSACTIONS

BAN CRYPTO TRANSACTIONS

EXPERIMENTING WITH BLOCKCHAIN

Source:https://www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/downloads/2017-global-cryptocurrency-benchmarking-study.pdf
https://www.coinstaker.com/trouble-cryptocurrency-africa-truth-behind-hypes/

Case Study: Humaniq



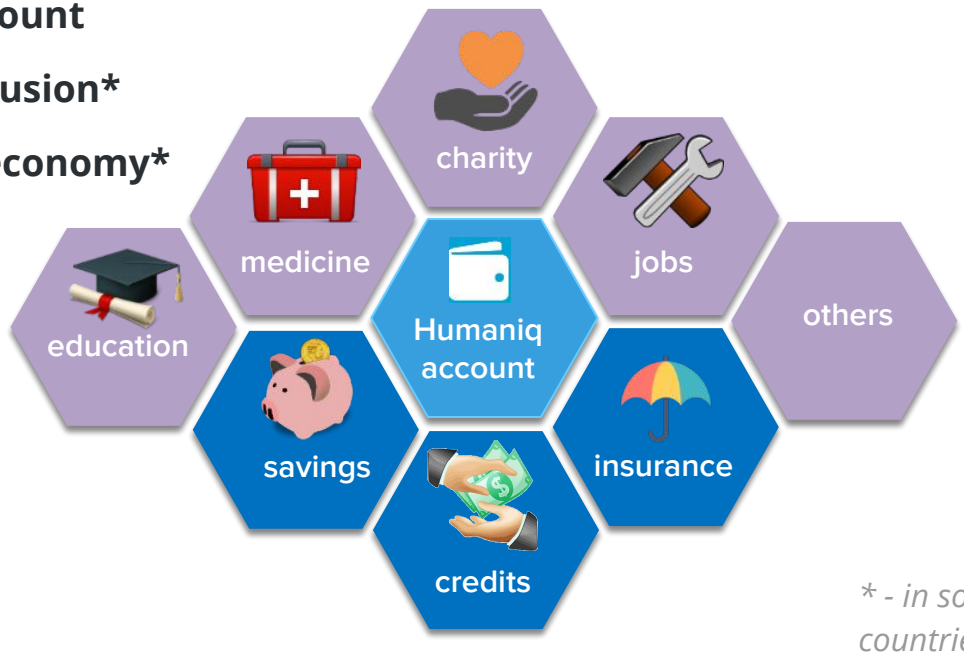
Humaniq is a **blockchain-for-good infrastructure platform** operating predominantly in Africa that combines **distributed ownership**, mobility, visual simplicity and **biometric ID** to connect the 2 billion unbanked people to the global economy.

The Humaniq team is building a next generation model for financial services which is based on Blockchain technology, mobile devices and biometric identification systems. Their aim is to empower a market of 2 billion people who currently don't have access to banking across the world. Almost half the world — over three billion people — live on less than $2.50 a day. At least 80% of humanity lives on less than $10 a day. More than 80 percent of the world's population lives in countries where income differentials are widening. They believe Humaniq can help reverse these trends and help bring people out of poverty by giving them banking tools that can provide liquidity for entrepreneurial ventures via loans, investment, online work and cryptofinancing as well as create new opportunities in the digital economy, locally, nationally and internationally. Humaniq can also help mitigate the refugee crises occurring in many countries in the West due to economic disparity and lack of opportunities in emerging economies. Their unique selling proposition (USP) in the digital banking market is their use of Blockchain technology combined with biometrics and a focus on mobile technology. Humaniq plans not only provide a software solution but also bring mobile hardware (phones) into the markets of Africa, Asia and South America.

Case Study: Humaniq

1 click
opens the door
to global economy

- Humaniq account
- Financial inclusion*
- Augmented economy*



** - in some countries*

Case Study: Humaniq

Given the ***size of the market*** and the ***lack of established entrants***, our market niche represents one of the most lucrative opportunities in financial services.

$4.2Tr
in new deposits

$2.1Tr
in New Credit

$3.6B
boost in GDP for developing countries

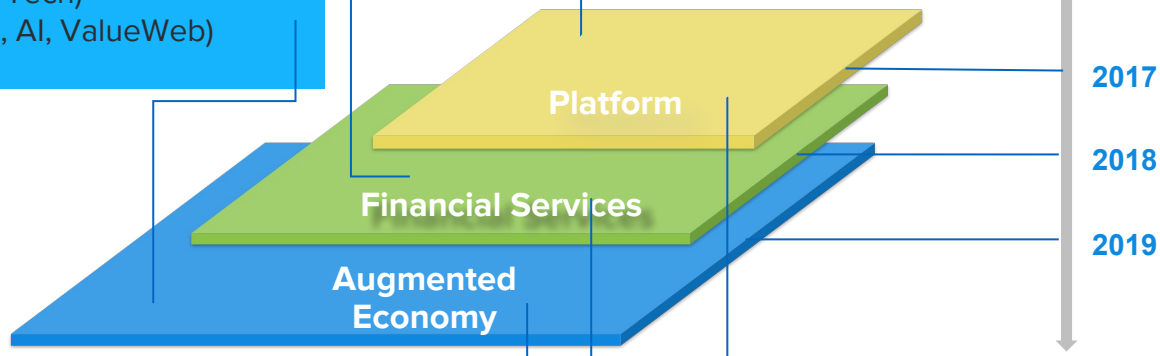
95M
new jobs could be created by banking

2B
unbanked people globally

Case Study: Humaniq

The main products of the Humaniq FinTech company

- Platform as a Service (end of 2017)
- Financial Services (LegalTech/MarTech/InsurTech)
- Augmented Economy Empowered by AI (IoT, AI, ValueWeb)



Profit Generation Sources

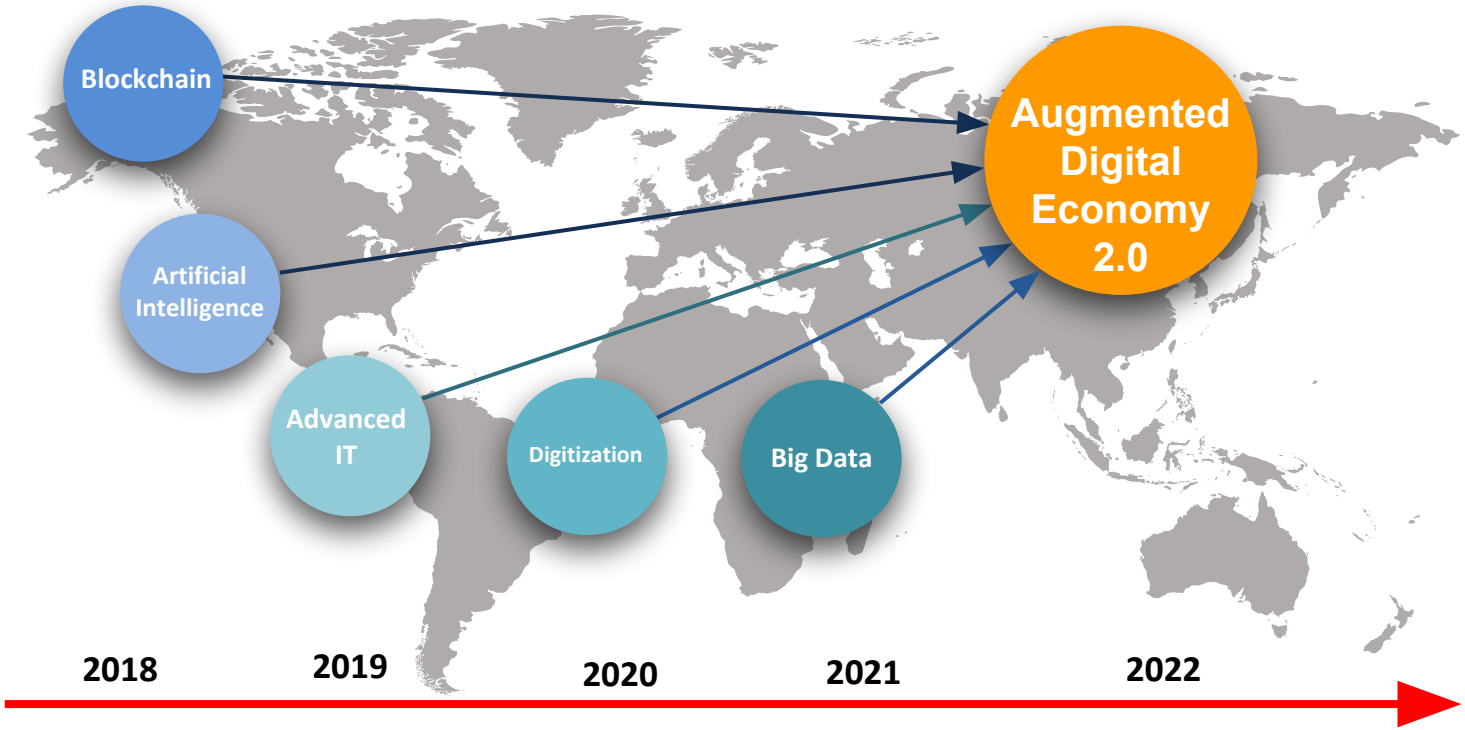
- Fees for access to the platform from the 3d parties (FinTech services and Financial organizations)
- % of shares of FinTech startups which will rise from the Humaniq platform and participation in their profits
- Creation of Augmented Economy elements for 3d parties in the Ecosystem and participation in the additionally added profits

Chapter XIII:

Augmented Digital Economy 2.0

In the period of 2014 - 2015, FinTech, Digital Technologies and Big Data were thought of as advanced, futuristic and progressive technologies on the leading edge of industrial development. Today, even traditional brick and mortar banks need to incorporate some element of FinTech in order to be considered modern and relevant. Big Data analytics has evolved over the past four years into an advanced AI-driven ecosystem. The UK is home to over 700 AI companies, and featured AI-focused committees in Parliament, Government and the office of the Mayor of London.

Core technologies and industries which today are considered as distinct from the Crypto Economy and Digital Economy, but which will become integral and necessary elements of the Crypto and Digital Economies in the next several years include not just FinTech and Blockchain, which are relatively obvious industry elements today, but also RegTech, LegalTech, InvestTech, InsurTech. The difference between Crypto Economy and Digital Economy will meld and merge by the year 2022, empowered by AI and other advanced IT technologies and solutions in order to evolve into what can be considered the Augmented Economy, or Digital Economy 2.0.



One can envision the natural end-state towards which the Digital Economy is moving; a state in which all restrictions, frictions and limitations (what can be considered as so-called "slow-down factors") will be eliminated by the fully optimized integration of financial services with legal, regulatory and investment frameworks.

This will be enabled via a **combined backend** involving the integration of **blockchain** with **AI** and other **advanced IT solutions**.

Such an end-state will enable all such currently seperate subsectors like RegTech, LegalTech, InvestTech and to combine via a what can be considered as plug-and-play, API-like frameworks.

This end-state will have two predominant positive hallmarks:

1. Cybersecurity.

Being enabled by a blockchain-based backend, these separate spheres will all gain enhanced cybersecurity resulting in optimum data **transparency**, **immutability** and **consistency**. We can expect that cybersecurity threats on both assets and data relating to these spheres will increase in proportion to their ongoing use, but also that solutions to these threats (as embodied in ongoing advancements in cryptographic and blockchain technologies) will evolve in tandem in a sort of evolutionary arms-race, and that the overall level of cybersecurity threats will remain roughly on par with the level today as a result of this, or alternatively decrease due to ongoing advancements in cryptographic and blockchain-based technologies.

2. Liquidity.

The fully digitization of traditionally-physical assets will enable them to achieve **real-time liquidity**, which can be bought and sold **24/7**, in real time, via **AI** systems. This not only optimizes market efficiency, but also allows individual and institutional investors and traders to become better equipped to hedge the risks inherent in operating within markets that can be perturbed at any time by events, but which can only be accessed and operated-within during specific sets of hours (e.g. in between the open and close of daily markets). Thus, market participants can gain the capacity to **react** to negative market events in **real-time,** rather than being limited to modifying their market positions only when the market re-opens.

The dynamic of technological development has now achieved such a rapid pace that the traditional business models of yesterday take on an air of absurdity, and must be reformulated from the ground up if they are to remain relevant in the face and pace of change we see today **- Dmitry Kaminskiy, Managing Partner, Deep Knowledge Ventures**

In the industry paradigm that will evolve from the Augmented Economy, next generation financial institutions will exist almost entirely in a virtual world, with a future firm interacting within its own component parts as well as its clients, shareholders and other entities in an entirely digital environment, executing its operations through unmanned agents.

We can see this transition already happening through algorithmic stock trading, and the trend will continue to envelop almost all operating procedures of financial institutions themselves.

We will see an age where entire enterprises can be created and liquidated on demand.

In the sphere of the Crypto Economy, such entities are referred to as Decentralized Autonomous Organizations (DAOs).

This will, however, grow to encompass almost all entities in the digital economy, who will necessarily adopt increasingly **digitized**, **automated** and **virtual** embodiments in order to keep up with the rest of the industry.

This drastic change will come to be known as the **Fifth (Financial) Industrial Revolution**, and will be marked by the full digitization of financial assets and eventually financial institutions themselves, transforming themselves into maximally automated, self-regulating systems empowered by AI, with minimal top-level human intervention.

This will mark an age with several distinct features, foremost among them being:

- the cost of economic transactions will significantly decrease until they approach zero;
- communication and the facilitation of financial transactions will occur almost instantaneously, and proceed as fast as data can be sent from one location to another
- the specific geographic location of transacting parties becomes irrelevant

The Augmented Economy can be provisionally defined as the state when the full-scope of synergetic benefits of the **Digital Economy 2.0** will be realized.

It is a state in which entirely novel outcomes and values not currently obvious or projectable by current standards will emerge as a natural byproduct of the evolution of the digital ecosystem. We can project this state to be achieved around **2026-2028**.

This transition, marked by the **digitalization** and **mathematization** enabled full **integration** and **unification** of FinTech, RegTech, LegalTech and InvestTech, housed by a blockchain backend, and advanced IT and AI technologies, throughout its evolution from the Crypto Economy of today, toward the Augmented Digital Economy 2.0 of the future, can together be considered as constituting the **Fifth (Financial) Industrial Revolution**.

The full realization of the possible end-state hallmarks of this financial and technological evolution, referred to as the Augmented Economy, will then establish the necessary preconditions for what can be considered as akin to a **Financial Singularity**, in which the pace of progress in the convergent evolution of FinTech, RegTech, LegalTech and InvestTech, driven and enabled by ongoing advancements in blockchain, cryptographic technologies, advanced IT-solutions and AI-technologies will be so swift and synergetic as to preclude any reasonable predictions and projections of what the **Techno-Financial** ecosystem will look like in years to come. While such topics regularly defy quantifiable projection, based off of the current pace of innovation, we can reasonably estimate this state to be achievable by the year 2030.