



Global Challenges: Blockchain Solutions The GBBC 2018 Annual Report

in collaboration with Coin Center and Covington

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Global Challenges: Blockchain Solutions

The GBBC 2018 Annual Report

GBBC Global Blockchain
Business Council



Foreword

***The Hon. Carl Bildt | Technology Expert, Politician and Diplomat;
Prime Minister of Sweden from 1991-1994***

This time last year — January 2017 — we launched the Global Blockchain Business Council during the World Economic Forum Meeting in Davos. That was a pivotal point for the global blockchain community.

Blockchain technology exploded in 2017 — driven both by the meteoric rise in the value of cryptocurrencies and the incremental adoption of the technology for applications across sectors. No longer is blockchain technology reserved for a small circle of tech specialists — it is now a capable tool recognized and largely embraced by the global community.

The GBBC brings together some of the world's leading providers of blockchain solutions from around the globe. In this first annual report, the GBBC and its partners showcase how and why blockchain technology is a groundbreaking tool that responds to so many global challenges.

We are still in the early days. The practical applications of this technology will continue to develop and mature over the coming years; but some day in the not too distant future we will take the technology for granted, as we do the internet, the television, or the printing press.

I hope you enjoy reading the report as much as I have. The fascinating journey to the new future of technology has already begun. We hope you join us for the ride.

Best,
Carl Bildt



Foreword

Tomicah Tillemann | Chairman of the GBBC

The historian Yuval Harari has observed that the chronicle of human progress is a story of cooperation. In almost every case, progress requires trust. Before societies can solve tough challenges, individuals must achieve consensus around basic facts — identity, property ownership, and the validity of transactions. Governments and financial institutions have historically served as custodians of the information comprising this base layer of reality. However, the public's trust in institutions is collapsing. This erosion of confidence is undermining the bedrock of common understanding that supports collaboration in every sector of society.

Blockchain provides a response to this crisis. The technology is creating a new generation of solutions that are designed from the ground up to build trust. Blockchain has the potential to transform the way institutions, financial markets, and organizations deliver results for their stakeholders. Just as mobile phones enabled some countries to skip over copper wires when providing telephone access a generation ago, blockchain-based e-governance platforms, asset tracking systems, smart contracts, and supply chains will help societies leapfrog legacy systems that are failing to deliver results for people and the planet.

This tool is the rare discovery that could dramatically improve efficiency, security, and accountability across a broad range of industries and institutions. By providing a new mechanism to codify trust, it can help expand investment in frontier markets, and address issues as diverse as corruption and climate change.

As with any new technology, there is no guarantee that blockchain's impact will be evenly distributed or universally positive. The results will depend on whether actors in the private sector, public sector, and civil society develop blockchain strategies that unlock further innovation and promote responsible solutions for society.

This report represents a groundbreaking effort by the GBBC and its members to advance that goal. In providing a global survey of blockchain projects and regulation, the GBBC is establishing a baseline to evaluate future policy actions, and a framework for assessing progress in what will be a generational effort to deploy blockchain solutions. We look forward to working with you and our partners around the world to share the benefits of this powerful new technology and to replenish the reservoir of trust that irrigates our collective endeavors.

Warm regards,
Tomicah Tillemann



Introduction

Jamie Smith | CEO of the GBBC

In June 2016, a group of highly skilled, extremely thoughtful and remarkably bold change-makers gathered for The Bitfury Group's Blockchain Summit on Sir Richard Branson's Necker Island. Participants discussed the future of blockchain technology, and how it could potentially improve the systems and services delivered by various sectors of the economy and society.

One topic embraced by all was the dearth of thoughtful, accurate and accessible information about blockchain technology for business leaders, regulators and other key decision makers throughout the world. Against this backdrop, the GBBC was conceived.

The GBBC brings together founding members from more than 30 countries to advance global understanding of blockchain technology. We are a Geneva-based non-profit dedicated to furthering adoption of blockchain technology through engaging and educating business leaders, regulators, and global change-makers on how to harness this groundbreaking tool to create more secure and functional societies.

We launched this global initiative during the 2017 Annual World Economic Forum (WEF) Meeting, in Davos, Switzerland. What a difference a year makes. Since then, we have partnered with some of the largest corporations and many of the best and brightest minds in blockchain, governance, and innovation. From Beijing to Omaha — and the European Parliament to the World Bank — we are expanding our impact and fostering a crucial conversation about creating a better world for everyone.

And this is just the beginning. We are in the early days of blockchain technology. Successful global expansion and adoption requires insights and support from thoughtful, engaged, forward-thinking individuals and companies. We look forward to welcoming more and more members as we advance our mission and advance this paradigm-shifting technology. Together.

With great appreciation and all my best,
Jamie Smith

Global Update

Blockchain technology could be the most transformative technology since the internet. The World Wide Web revolutionized commerce, communication, and media, but so many assets of value — currency, passports, votes and land titles — have yet to be digitized. The delay in progress has been tied, in large part, to the lack of security offered by legacy platforms. Blockchain technology provides an elegant solution to that — and many other flaws in existing systems.

At its core, blockchain is a distributed ledger technology (DLT) that empowers anyone with an internet connection to transfer anything of value — anywhere, anytime, with unmatched security and integrity. The first blockchain (known as the Bitcoin Blockchain) was conceived in 2008, in the wake of the global financial crisis. Presented by a person or group known as Satoshi Nakamoto, the Bitcoin Blockchain has matured rapidly — adding security to the internet and changing the way governments, organizations, businesses and individuals operate in our increasingly digital world. In the last year, the price of bitcoin has skyrocketed.

Because information stored on a public blockchain is copied across a global network of computers, there is no central point of attack or failure. A paradigm-shifting approach to security, decentralization creates resilience when natural disasters, global unrest, hackers or other adversaries might threaten it. The internet has facilitated the frictionless peer-to-peer exchange of information; now blockchain has the potential to usher in the frictionless exchange of assets.

The most obvious applications for blockchain technology are in financial services. Reducing costs and complexity associated with financial transactions could open the global economy to billions of unbanked individuals. But blockchain technology goes beyond finance — from agriculture to supply chain, foreign aid delivery to identity management, insurance to governance, medicine to media, education to property rights and everything in between. It provides a secure, efficient solution whenever individuals or organizations need to store or transfer assets or information. As it is adopted across sectors and geographies, blockchain technology will reshape many of the systems powering contemporary life.

A note on vocabulary: In this report, we often interchange the words “blockchain,” “blockchain technology,” and “distributed ledger technology” (DLT). In the interest of not excluding any part of the ecosystem (including other cryptocurrencies, tokens and projects), we use these words to describe the entirety of the blockchain and cryptocurrency ecosystem.

Part One

The world of blockchain technology is fast-paced and ever-evolving.

The following sections outline recent developments and regulatory highlights from around the globe. They are not meant to be comprehensive, but rather to provide a high-level overview of the global regulatory landscape as it relates to blockchain technology.

Regulation | Key Trends

- Initiatives are nascent, yet many governments and relevant agencies worldwide are exploring applications, opportunities and risks. In general, lawmakers have tried to avoid early regulation that could stifle or limit the development and potential of blockchain technology.
- Many sectoral regulatory schemes apply to blockchain-based products or services in those sectors. Cryptocurrencies often fall under existing regulations, such as consumer protection, anti-money laundering, anti-terrorist financing, etc. But few countries have fully embraced cryptocurrencies, granting them legal tender status and providing licenses for cryptocurrency exchanges. Some countries, including China or Iceland, have restricted their use. Others have not decided how and when to act.
- Similar regulatory trends apply to Initial Coin Offerings (ICOs), which are a means to raise funds through a type of crowdfunding in connection with businesses and applications that relate to, or are based on, blockchain technology. Several countries have regulated, or issued guidance and recommendations, on ICOs. Consumer protection and financial stability are the key factors driving such action.

United States

Regulation of Blockchain

- The United States does not currently have any law or regulation that comprehensively governs the use of blockchain and other DLTs. Sectoral laws and regulations that govern products, services, and transactions related to blockchain technology have emerged. These include rules for payment transactions and data analytics. Such rules apply to the product, service, or transaction at issue, whether or not it makes use of blockchain technology. Companies considering the use of blockchain technology must consider any laws or regulations that govern the underlying product, service, or transaction.ⁱ In addition, legislation that enables the use of blockchain technology in certain contexts, or regulates certain aspects thereof, has been considered in a handful of states.ⁱⁱ
- Federal and state agencies are actively exploring blockchain technology and its opportunities and risks. They are evaluating blockchain technology solutions with the goal of understanding how the technology works and whether new regulations should be implemented, or existing regulations should be modified.
- The U.S. Commodity Futures Trading Commission (CFTC) considers bitcoin and other virtual currencies to be commodities under the U.S. Commodities Exchange Act, although the CFTC puts these virtual currencies into a separate category called exempt commodities. This means the CFTC can exercise anti-fraud and anti-manipulation authority over virtual currency transactions.

The CFTC has limited regulatory authority over spot and cash transactions in virtual currencies. But with respect to cryptocurren-

cies, futures and options contracts and swap transactions are subject to comprehensive regulatory oversight by the CFTC.

Regulation of Cryptocurrencies

- Companies that work with cryptocurrencies may be required to register with a bureau of the U.S. Department of the Treasury called the Financial Crimes Enforcement Network (FinCEN). Companies that administer or exchange cryptocurrencies are subject to anti-money laundering (AML) requirements under the U.S. Bank Secrecy Act that apply to money transmitters, including a requirement to register with FinCEN.ⁱⁱⁱ
- Such companies may also be required to apply for and obtain a money transmitter

license (or the equivalent license) from regulators in the various states in which the company does business. For example, the New York State Department of Financial Services recently started offering a “BitLicense” for companies that store, hold, or control virtual currency for others, buy and sell virtual currency, act as an exchange, or control or issue a virtual currency.^{iv}

- The CFTC and SEC have also issued guidance regarding certain applications of bitcoin, such as ICOs and bitcoin exchanges.^v

European Union

Regulation of Blockchain

- The European Commission (EC) has expressed support for blockchain technology and DLT. The EC has stated that the almost limitless list of potential use cases of DLTs makes it both very promising and challenging.^{vi} They acknowledge that the technology is at an early stage in its development, and that it is therefore too early to regulate it. Accepting that early regulation could limit its further development and potential, the EU’s principal regulatory agenda for blockchain and DLTs currently focuses on transparency and cybersecurity.
- The EU is running a few projects to explore opportunities to apply blockchain — includ-

ing the Observatory,^{vii} and the EU Policy Lab’s Blockchain4EU Project.^{viii}

- In March 2017, the EC set up an internal FinTech task force.^{ix} The taskforce is charged with assessing Member States’ regulatory frameworks for the sector and talking to stakeholders to test the case for a coordinated European response to developments such as DLTs and virtual currencies.
- The European Central Bank has also acknowledged potential advantages of DLT. Recently it created a special DLT task force of financial innovation and cybersecurity experts.^x

Regulation of Cryptocurrencies

- Central banks of the EU Member States do not consider virtual currencies as equivalent to money, and they are not treated as legal tender.^{xi} This may create problems for users

in the EU.^{xii} In cases of loss or fraud, there is no compensation mechanism or redemption mechanism.^{xiii} In many Member States, there is also no specific virtual currency regulation,

and in many cases only a series of opinions and warnings has been issued by central banks or regulators.^{xiv} Germany has the most elaborate rules and considers virtual currencies as units of account without the status of legal tender.^{xv}

- Further, in December 2017, the EU agreed to amend the 4th Anti-Money Laundry Directive

(4AMLD)^{xvi} to bring custodian wallet providers (CWPs) and virtual currency exchange platforms (VCEPs) into scope. They will have to put in place policies and procedures to detect, prevent and report money laundering and terrorist financing.

- There has been no EU-level regulatory guidance on ICOs and tokens.

Iceland

- Iceland holds the somewhat unique position of being home to some of the world's largest bitcoin mining facilities, while prohibiting foreign trade of bitcoin.
- In 2013, the Icelandic government issued a statement prohibiting foreign exchange

trading with bitcoin. The decision does not prohibit their citizens from owning or using bitcoin within Iceland — or from mining the currency. Instead it seems designed to stop the movement of funds out of the country; bitcoin is not treated as a currency in the country.

China

Regulation of Blockchain

- Similar to Iceland, China is home to some of the largest bitcoin mining facilities in the world, but regulators there have prohibited the use of bitcoin as legal tender.
- The People's Bank of China (PBOC) has been active in research on digital currency and blockchain technology since 2014,^{xvii} In

January of 2017, it established a Digital Currency Research Institution.

- In July 2016, PBOC launched a project to test blockchain technology, the Digital Commercial Paper Trading Platform. In January 2017, it issued a legal digital currency on this platform for a trial period.^{xviii}

Regulation of Cryptocurrencies

- Chinese regulators officially granted bitcoin legal status in 2013 as a type of special virtual commodity, rather than legal tender. However, in the same notice they banned financial and payment institutions from undertaking business related to bitcoin.
- There has since been a clamp-down on

virtual currencies. On September 4, 2017, China banned Initial Coin Offerings (ICOs) and virtual currency exchanges, and prohibited financial or non-bank payment institutions from carrying out any activities related to ICOs. However, it is not thought that the government will give up cryptocurrencies in the long term.

Japan

- In 2017, Japan became the first country in the world to recognize bitcoin as legal tender. Such regulatory changes and China's ban on ICOs and bitcoin exchanges made Japan a central hub for Asia's crypto-economy.
- In Japan, the Financial Services Agency (FSA) is charged with enforcing bitcoin regulations. Japan's bitcoin regulations also cover the exchanges that offer virtual currencies. In October 2017, the FSA granted its first regulatory approval to 11 domestic virtual currency exchanges.^{xix}
- Japan's regulatory action has raised the value of bitcoin and increased investor confidence in cryptocurrencies. Japan now stands to influence similar legislative initiatives across the globe.
- In 2017, Japan's central bank also backed a plan by a consortium of banks (led by Mizuho Financial Group and Japan Post Bank) to launch the J Coin.^{xx} This scheme could help Japan, which is a highly cash-dependent country, to move towards a digital currency built on blockchain technology.^{xxi}

Singapore

- Singapore's Central Bank recently rejected cryptocurrency as legal tender. It does not plan to regulate cryptocurrencies such as bitcoin. The Monetary Authority of Singapore (MAS) welcomes cryptocurrencies as an innovation that can reduce the cost of financial transactions. The MAS will only regulate the activities that surround virtual currencies if these activities pose specific risks.
- On August 10, 2017, the MAS published the Consumer Advisory on Investment Schemes Involving Digital Tokens (Including Virtual Currencies). In the publication, the MAS advises consumers to be mindful of potential risks of digital token and virtual currency-related investment schemes.
- While virtual currencies per se are not regulated in Singapore, MAS does regulate intermediaries in virtual currency transactions for money laundering and terrorist financing risks. In October 2017, the MAS revealed it is working on a new payment services regulatory framework that will address these risks.

MENA

United Arab Emirates

- The United Arab Emirates (UAE) stands at the forefront of bitcoin and blockchain developments in the MENA region. The Emirate of Dubai in particular appears intent on becoming a regional and global leader in the space.
- Banking, currency, and payment and settlement systems are regulated in the UAE by the UAE Central Bank. The provision of cryptocurrency-related services falls within its remit. The UAE government and Central Bank have been working to develop laws

and regulations in relation to bitcoin and blockchain.

- On January 1, 2017, the UAE Central Bank published the “Regulatory Framework for Stored Values and Electronic Payment Systems,” focusing on how “to facilitate robust adoption of digital payments across the UAE in a secure manner.” This regulatory framework was initially interpreted as a ban on bitcoin and blockchain, as it stated that “all

virtual currencies [and transactions thereof] are prohibited.” However, the governor of the Central Bank subsequently issued a statement saying that “these regulations do not apply to bitcoin or other crypto-currencies, currency exchanges, or underlying technology such as Blockchain.” While this statement offered some comfort to the market, most observers believe more regulatory certainty is needed.

Oman

- In November 2017, Oman was host to one of the region’s largest blockchain symposiums, with nearly the entire cabinet in attendance for the opening session.^{xxiii} The event was backed by multiple government agencies,

including the Office of Science, Knowledge, and Technology Transfer at the Ministry of Foreign Affairs, the Ministry of Commerce and Trade, Central Bank of Oman, the Capital Markets Authority.^{xxiv}

Bahrain

- The government of Bahrain is showing enthusiasm about bitcoin and cryptocurrency, and appears intent in placing the country on the cutting edge of FinTech innovations.
- It reportedly held talks with Singapore’s central bank on the country’s plans to adopt

blockchain technology.

- The Central Bank of Bahrain recently issued a Regulatory Sandbox Framework Directive, providing a “virtual space” for FinTech start-ups and firms to test and experiment their banking ideas and solutions.

Saudi Arabia

- Banking, currency and payment and settlement systems are regulated by the Saudi Arabian Monetary Authority (SAMA). The provision of cryptocurrency-related services

falls within SAMA’s remit. SAMA is said to be looking to regulate bitcoin and blockchain, but has yet to issue any guidance or regulations.

Morocco

- In 2015, Morocco’s central bank passed a new banking law, aiming to modernize the financial sector and promote electronic payments.
- One key measure is the recognition of digital currencies such as bitcoin and the use of

normal currencies used digitally, such as in digital wallets like PayPal.

- The law also defines the way currencies can be used digitally via transactions, payments, and transfers, opening the door to legal use of cryptocurrencies.

Australia

- Cryptocurrencies are not considered legal tender in Australia.^{xxv}
- In December 2017, the Australian government updated its anti-money laundering laws to cover bitcoin and digital currency exchanges. As part of the new rules introduced by the Anti-Money Laundering and

Counter-Terrorism Financing Amendment Bill 2017, the Australian Transaction Reports and Analysis Centre (AUSTRAC) will be responsible for monitoring cryptocurrency exchanges.^{xxvi} Moreover, digital currency exchange providers will be obliged to register with AUSTRAC and the Digital Currency Exchange Register.

India

Regulation of Blockchain

- Indian policy toward blockchain and digital currencies is nascent and evolving, and the government has examined applications of blockchain technology in the country's financial sector and more generally.
- In December 2017, the State Bank of India (SBI) began to beta-test blockchain-based smart contracts, which will be followed by blockchain-based KYC infrastructure.

- The government of the Indian state of Andhra Pradesh is also developing a blockchain-based land registry system to combat fraud and corruption in the real estate sector.^{xxvii}
- The regional government of Telangana is developing a similar system, as well as a blockchain solution for its state revenue department.^{xxviii}

Regulation of Cryptocurrencies

- The Reserve Bank of India recently issued a warning about the potential risks of using cryptocurrencies, including bitcoin.^{xxix}
- In April 2017, the Government of India established an Inter-Disciplinary Committee to “examine the existing framework with regard to Virtual Currencies,”^{xxx} which asked for public feedback on policy for the use of such currencies.^{xxxi} Although the committee's report has not been made public,^{xxxii} it is understood that the committee's report recommends strict regulations for the use of virtual currency.^{xxxiii}
- In November 2017, the Indian Supreme Court asked the government to respond to a

petition for the regulation of bitcoin.^{xxxiv} How the government responds to the Supreme Court's request, and the broader evolution of the Indian policy framework for digital currencies, will have a major impact on the direction of digital currency development and adoption in the country.

- Regardless of how bitcoin and other non-fiat cryptocurrencies are ultimately treated,

Indian officials appear interested in blockchain technology more broadly. Indeed, there are reports that the central government may introduce a fiat cryptocurrency, said to be called “Lakshmi.”^{xxxv}

Africa

- Digital currency advocates argue that blockchain technologies and cryptocurrencies could spark a “financial revolution” in Africa^{xxxvi}. However, the response to blockchain and cryptocurrency technologies by African regulators is as varied as the continent’s 54 nations. Many have expressed extreme caution and even skepticism of cryptocurrencies (bitcoin, in particular). Others have embraced the technology that makes cryptocurrencies feasible.
- For example, in December 2015, Tunisia became the first nation to put its national currency on the blockchain.^{xxxvii}
- Similarly, in November 2016, eCurrency Mint Limited partnered with Banque Régionale de Marchés (BRM) to provide a digital currency in the West African Economic Monetary Union (WAEMU).^{xxxviii} BRM issued digital tender, eCFA, in compliance with e-money regulations of Banque Centrale des Etats de l’Afrique de l’Ouest (BCEAO), the Central Bank of WAEMU.^{xxxix} Senegal was the first West African nation to announce it will issue eCFA as a national digital currency based on blockchain technology, giving it legal tender status alongside the West African CFA franc paper money.^{xi}
- Other African nations are not as keen to embrace cryptocurrencies. For example, in 2015, the Central Bank of Kenya (CBK) issued a warning that “bitcoin and similar products are not legal tender.” The Bank ordered the investing public to “desist from transacting in bitcoin and similar products.”^{xli}
- The South African Reserve Bank (SARB) struck a similar tone in its 2014 Position Paper on Virtual Currencies.^{xlii} However, SARB recently softened its position, announcing in July 2017 that it would begin testing a number of regulations related to bitcoin and other cryptocurrencies.^{xliii}
- Recently the Central Bank of Nigeria (CBN) acknowledged the need to study cryptocurrencies further.^{xliv}

Initial Coin Offerings: Global Regulatory Landscape

United States

- Most global regulators have preferred to take a cautious approach to ICOs, not wishing to jeopardize the benefits that blockchain technology can bring. Yet in many cases, participants purchase tokens primarily for speculation and capital gains making it difficult for global securities regulators to remain on the sidelines.
- The year 2017 ended with little international agreement as to regulation of ICOs. Much of the market spent 2017 waiting to see if the SEC would shut down ICOs in the United States. After investigating Slock.it, a decentralized autonomous organization (DAO) organized under German law, the SEC issued a Report of Investigation in which they

concluded that Slock.it violated U.S. federal securities laws in issuing its tokens. In their view, the Slock.it tokens were securities under U.S. securities laws and were sold without being registered with the SEC or pursuant to an effective exemption from registration. The SEC wrote that “whether or not a particular transaction involves the offer and sale of a security — regardless of the terminology used — will depend on the facts and circumstances, including the economic realities of the transaction.”

- The Slock.it report did not close the door to token sales in the U.S. or to U.S. persons. The SEC did, however, issue an important reminder — one that many in the token sale market either forgot or simply ignored: “U.S. federal securities laws may apply to various activities, including distributed ledger technology, depending on the particular facts and circumstances, without regard to the form of the organization or technology used to effectuate a particular offer or sale.”
- The takeaway from the Slock.it report is that if a token looks like and acts like a security, it probably is a security, at least in the eyes of the SEC. The SEC report reiterated that principles of U.S. securities laws can apply “to a new paradigm — virtual organizations or capital raising entities that use distributed ledger or blockchain technology to facilitate capital raising and/or investment and the related offer and sale of securities. The automation of certain functions through this technology, ‘smart contracts,’ or computer code, does not remove conduct from the purview of the U.S. federal securities laws.”
- The second takeaway from the Slock.it report is that if a token is a security under U.S. federal securities laws, simply excluding U.S. persons from an ICO is not sufficient. Secondary trading should also preclude

U.S. persons from purchasing tokens. Other jurisdictions also stepped up their oversight of ICOs in 2017.

- In December 2017, the SEC instituted Cease and Desist Proceedings against Munciee Inc., in connection with its sale of digital tokens to raise capital for its blockchain-based food review platform. The SEC found that Munciee’s token sale constituted a securities offering and that, because Munciee neither filed a registration statement nor qualified for an exemption from registration, Munciee was in violation of U.S. securities laws.
- In the Munciee Proceedings, the SEC reiterated what it had said earlier in the year in Slock.it. The SEC also noted that “Munciee primed purchasers’ reasonable expectations of profit through statements on blogs, podcasts, and Facebook that talked about profits.”
- A key lesson from Munciee is that the state of the business or platform at the time of the token sale may be a significant factor. The Munciee platform was not yet operational. Buyers of Munciee tokens could either hold the tokens and wait for the platform to become operational or sell them to third parties.
- The SEC was particularly troubled by that fact that purchasers would reasonably believe they could profit by holding or trading Munciee’s tokens, whether or not they ever used the Munciee app or otherwise participated in the Munciee platform. Had Munciee not marketed and promoted its tokens in a manner that so explicitly focused on the future profit and investment potential of the tokens, and instead had focused on how the tokens could be used in Munciee’s ecosystem and why the tokens were a critical component to using and accessing the ecosystem, the outcome might have been different.

Germany

- The German Federal Financial Supervisory Authority (BaFin) published a guidance note on virtual currencies generally treating them as financial instruments under the German

Banking Act. Tokens would likely be treated as virtual currencies and, if so, the sale of tokens would be a regulated activity, subject to certain exemptions.

Hong Kong

- Hong Kong regulators adopted a technology-neutral regulatory approach while seeking to develop a regulatory framework based on the transactions and related activities relating to tokens. However, the Hong Kong Monetary Authority (HKMA) and the Securities and

Futures Commission did not issue any formal publication on their views regarding the regulatory treatment of ICOs. Like the CFTC, the HKMA considers bitcoin a virtual commodity.

Japan

- Japan defines cryptocurrencies as virtual currencies. As a result, they are regulated and must be registered with the Financial

Services Agency of Japan. However, no specific regulations for ICOs were issued in 2017.

Singapore

- In August 2017, the Monetary Authority of Singapore issued a notice that offers of digital tokens would be regulated if they constitute products regulated under the Securities and Futures Act of Singapore (SFA). Accordingly, where digital tokens represent ownership or a security interest over an issuer's assets or property, such tokens could

be considered an offer of shares or units in a collective investment scheme under the SFA. On November 15, 2017, the MAS released a Guide to Digital Token Offerings, which provides general guidance on the application of the securities laws administered by the MAS in relation to offers or issues of digital tokens in Singapore.

Australia

- The chairman of the Australian Securities and Investments Commission (ASIC) noted in June 2017 that ICOs that meet the traditional concept of a security under Australian law

would be treated the same as any other financial instrument with a particular emphasis on disclosure. However, the ASIC expressed concern about premature regulation.

- On September 28, 2017, the Australian Securities and Investments Commission (ASIC) issued guidance to help issuers of initial coin offerings (ICOs) consider their legal obligations when offering coins or tokens.

^{xlv} ASIC's MoneySmart website has also published guidance for investors on the risks

of investing in initial coin offerings.^{xlvi}

- According to ASIC, in Australia the legal status of an ICO is dependent on the circumstances of the ICO, such as how it is structured and operated, and the rights attached to the coin (or token) offered through that ICO.^{xlvii | xlviii}

Other

- A number of the ICOs in 2017 originated from Switzerland, Gibraltar, Liechtenstein, Singapore, the Cayman Islands and the U.S. While there are many factors driving the choice of jurisdiction, the actions of the SEC and efforts by China and South Korea to restrict ICOs caused the market to realize that

the jurisdictions of token purchasers were ultimately more important than the location of the token issuer. In theory, this means that a token issuer must ask whether distributing tokens is a regulated or prohibited activity in every jurisdiction in which potential token purchasers are located.

Key Insights and Recommendations for Regulating Blockchain Technology

All over the world, entrepreneurs and technologists are developing novel uses for cryptocurrencies and blockchain technologies. Depending on how those developers apply these technologies they may find themselves caught between various laws and regulatory regimes. Savvy governments are responding to the problem by beginning to formulate their approaches to cryptocurrencies like bitcoin.

It is the responsibility of government to strike the right balance between achieving regulatory objectives, such as consumer protection, while maintaining a fertile environment for new technologies to grow. Inadvertently stifling cryptocurrencies and blockchains puts a nation at risk of taking a back seat during a wave of financial innovation. But these technologies are complicated and at times arcane. So how can a government approach them with a "do no harm" mindset?

The following principles have been at the heart of successful approaches to government regulation or self-regulation by the industry:

- **Understanding who and what can be the subject of regulation.** It may be possible to regulate individual parties who use the network customer-facing business that

preserves bitcoin and other cryptocurrencies for their users), but the network as a whole is a decentralized network not amenable to easy regulation.

- **Clearly articulating the goals of a cryptocurrency regulatory policy.** Cryptocurrency regulatory policy should have clearly defined goals. In general, there are two primary goals: consumer protection and discouraging money laundering.
- **Only regulating persons with “control” over consumers’ cryptocurrency.** In the cryptocurrency space, it can be difficult to determine which actors actually hold, and therefore can lose, customer funds. The Uniform Law Commission has developed a clear definition for what constitutes control: “the power to execute unilaterally or prevent indefinitely a [cryptocurrency] transaction.”
- **Cooperating with businesses to preserve visibility.** When it comes to anti-money-laundering policy, it is important to work with companies in the space rather than against them. Companies can provide expertise and visibility into cryptocurrency networks. If there is no reasonable path toward regulatory compliance, then capable allies for law enforcement are forced out, leaving only bad actors.
- **Treating all cryptocurrencies equally.** An attempt to limit a regulated exchange’s activities to one or another cryptocurrency would likely backfire. Users may prefer another and simply find access to exchanges based elsewhere that are willing to deal in the cryptocurrency of their choice. Additionally, the proliferation of competing cryptocurrencies is indicative of a highly innovative market.
- **Ensuring that regulatory requirements are reasonable.** When applying any particular regulatory framework to users of these technologies, it is important to be conscientious of what is, and what is not, possible or feasible to require from regulated firms.

Part Two

Blockchain Solutions

Global Challenges | Blockchain Solutions

Here are some of the global challenges that blockchain technology may help solve — along with the organizations working on solutions.

Digital Identity: Foundation of A Sustainable Digital Ecology

Alex Pentland | Professor of Media Arts and Sciences at MIT; Toshiba Professor; MIT Media Lab Entrepreneurship Program Director



Your digital identity is comprised of all the trusted relationships you have online, including your bank and telephone accounts, your government tax, license, and criminal records and obligations, and your search, purchase, and communication data. Credentials based on these digital relationships let you operate online, chatting with other people, dealing with government regulations, searching for information and buying things.

But you don't own your digital identity. In fact, you don't even know what information is in your identity records, where it is stored or how it is vetted. Instead, it is scattered across myriad organizations and stored on countless unreachable computers. Consequently, important decisions are made about you based on secret and sometimes incorrect data. Moreover, the identity credentials you have — credit card numbers, government IDs, etc. —

are based on just a thin slice of your full digital identity, making it easy to steal your identity.

It used to be like this in the physical world. Few of your relationships were documented, and those that were written down were controlled by unidentified government employees. We are just beginning the fight to get fair, open processes online — that is, to get rights to see and control our digital identity.

Blockchain technology is a key element in this fight. If all your important digital interactions are logged onto an incorruptible digital ledger, then you can prove your relationships, and that you paid your taxes or had your licenses approved. Also, importantly, you can prove what you did not do. You would likely have fewer arguments with the tax collector, identity theft would be extremely difficult, and you could easily obtain a global perspective on your whole online profile.

Digital Currencies, Tokens and ICOs

Joel Telpner | Partner at Sullivan & Worcester



Token or coin sale. Distribution, or offering, or initial coin offering or ICO. The exact term is less important than the reality: This new method of financing blockchain innovation is dominating conversation about the future of venture funding and transforming the way companies raise capital. Given its popularity, we will use the term “ICO” without intent to create any normative meaning as to the treatment of tokens or coins themselves. Equally, for ease of description, we will use the term “token” to refer to both coins and tokens. No matter what term we use, by the end of 2017 more than \$4 billion had been raised from ICOs. So what exactly are ICOs and what are the regulatory concerns and challenges?

Like many aspects of blockchain technology, ICOs are constantly evolving. But fundamentally, ICOs are a means to raise funds through a type of crowdfunding in connection with businesses and applications that relate to, or are based on,

Understanding the Difference between ICOs and Other Fundraising

The purpose of conducting token sales varies, but typically the goal is to raise money to pay the developers, distribute the token to a fairly large group and encourage early adopters by offering the new token at a perceived discount well below its potential future value. The capital raised from the token sale is often used to fund projects or ongoing development associated with the new token. As a result, these token sales often share many similarities with traditional securities offerings, where investors purchase stock as a bet on the future success of a company.

Often, token purchasers use bitcoin or ETH to pay for the tokens. To participate in an ICO and

blockchain or distributed ledger technology. But while many people are inclined to compare ICOs to IPOs (initial public offerings), they are in theory very different means of raising funds. In contrast to the sale by an issuer of its equities in an IPO, the thing sold in the ICO is a cryptographic digital token that is created by a “smart contract,” or computer code.

These tokens are not issued by a corporate entity in the sense that securities are issued. They may be created by a corporate entity, but it is possible for tokens to come into existence without the backing of any organized legal body. A group of software developers, or even a single individual, can create a smart contract that generates a token. The sponsors of the ICO may say they are building a company, for example, but that does not mean there is an actual legal entity with employees, assets or meaningful contracts in place that is issuing the token.

hold tokens, you need specialized software and knowledge. Token ownership is reflected by holding a digital access key that allows the transfer or use of the token. The project being funded by ICO and the token issuer can be located in a particular jurisdiction, but the digital wallets used by purchasers to hold tokens enable token purchasers to be located anywhere. Governments like China tried to restrict or outlaw ICOs entirely in 2017, but smart contracts, combined with distributed technology, make it difficult for regulators to keep these digital tokens based on a borderless technology out of their markets.

IPO or Venture Capital Fundraising

In an IPO or venture capital fundraising round, a company is selling its ownership shares or equity percentage in exchange for additional capital from investors. The capital is used to continue the company operations and growth, and the stockholders' equity increase is reflected on the balance sheet. Investors in the company gain cash value from the shares as the company grows, receive dividends or the ownership stake reaps benefits as revenue and profits increase.

Traditionally, early-stage startups have secured funding to initiate operations from angel investors or venture capital firms. Successful startups typically receive multiple rounds of funding until the company can operate profitably on its own or gain enough traction for an IPO. However, both startups and venture capital firms are now taking a keen interest in the recent phenomena of token sales due to the returns and liquidity seen in the market.

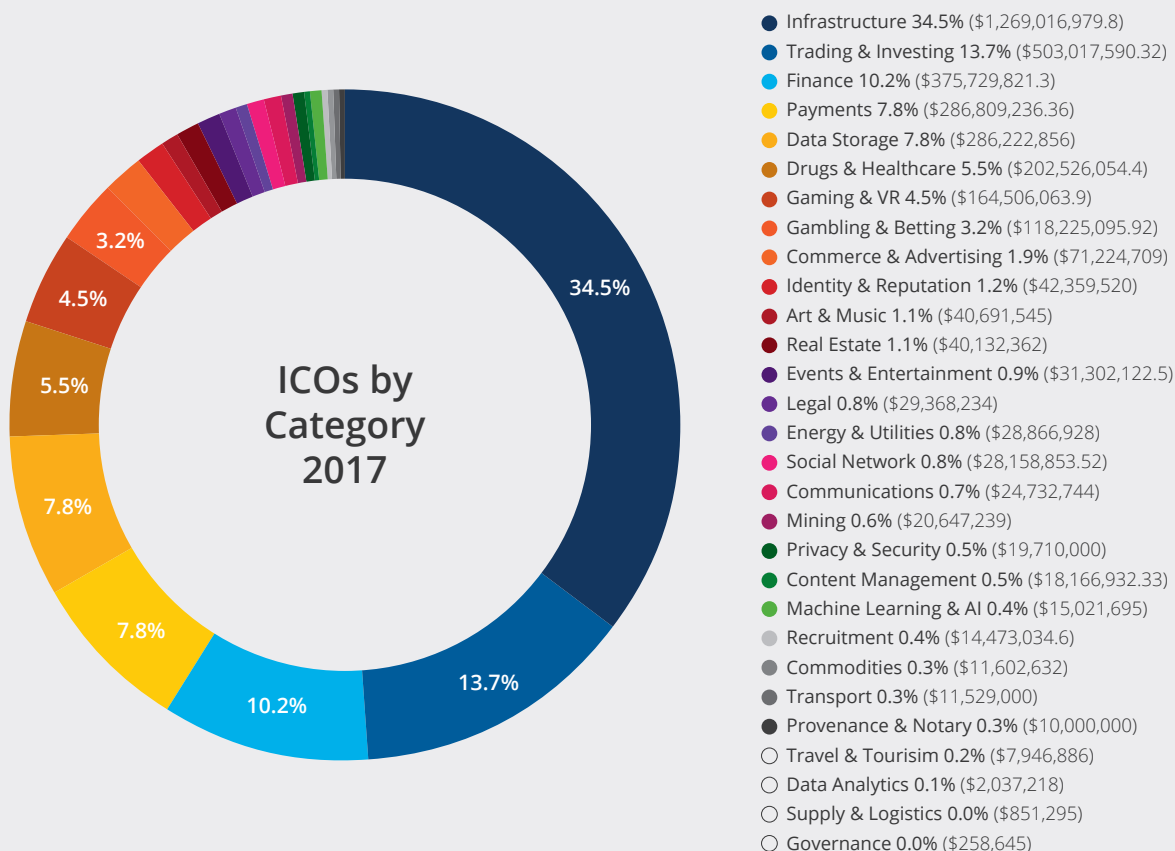
Deloitte, 2017

vs.

Token sale

In a token sale, the company has a unique technology and business value proposition that relies on the token as a core part of its future operating model. Most companies have developed a Dapp where the custom token provides a unique utility in using the company's product. The company sells tokens to gain stakeholders use the tokens to interact with the product.

The key difference here is that the token provides utility to any purchaser in the token sale. The token is sold as a way to incentivize new product users, participate with the ecosystem and augment the utility of their technology — not as an ownership interest in the ongoing enterprise. When a token is sold, the company gains working capital from the sale of tokens. The purchaser, on the other hand, gains product value — not necessarily cash value — by being able to “spend” their purchase token. Other than those subject to a “lock up,” tokens are exchanged freely using the Ethereum protocol so users also have the ability to trade them in for other cryptocurrencies or fiat if they choose.



Smart Contracts

Stuart Levi | Partner, Intellectual Property and Technology; Outsourcing; Cybersecurity and Privacy; Media and Entertainment



Smart contracts are a key component of most blockchain-enabled platforms and applications. Understanding how they function, and the challenges they present, is essential to appreciating how blockchain technology can revolutionize everything from large-scale global transactions to single-person endeavors in the developing world.

The term “smart contract” refers to computer software that automatically executes certain contractual terms on a blockchain. For example, assume the parties have agreed that the seller is entitled to a five percent premium if goods are delivered early. Traditionally, the seller would need to prove that the goods were delivered early, allocate resources to process the premium, and engage in a time-consuming dispute resolution process if the premium is not paid. In a blockchain supply system, a smart contract might be programmed to automatically compare the actual delivery date to the scheduled date and extract the premium from the buyer’s account and move it to the supplier’s account.

By automatically executing certain contract provisions, smart contracts raise the possibility of streamlining the transactional component of many contractual relationships, and eliminating middlemen in a variety of industries.

In the developing world, for example, smart contracts can provide instantaneous crop insurance payouts to rural farmers after a certain number of days without rain; combat corruption and misappropriation by providing a transparent mechanism for tracking funds from non-governmental organizations and other nonprofit entities; and even provide improved platforms for individuals to identify themselves for civic functions such as voting. The quick, cost-efficient and automatic execution of contractual transactions can benefit any business, and for small and medium-sized enterprises, it can mean the difference between failure and profitability. Equally important, a smart contract stored on a blockchain enjoys the heightened level of cybersecurity that is a hallmark of blockchain technology.

It is important to note that smart contracts will most likely augment, and not replace, standard contractual relationships. Indeed, despite their name, smart contracts are not “smart” in that they do not use artificial intelligence to parse complex or subjective contractual terms. Nor, is the code itself likely to be seen as a “contract” per se. Parties that rely on smart contracts, and the courts or arbitrators that adjudicate them, will also need to wrestle with a number of issues of first-impression.

Blockchain, Property Rights and The Bitfury Group

Blockchain solutions are just starting to test the limits of our imaginations, but some of the most promising and impactful pilot projects so far relate to property rights.

Formally documented property ownership plays an integral role in every prosperous society. The challenge of securely registering property has far-reaching economic and social implications.

Nearly 70 percent of the world's population lives in property to which they have no formal claim. This so-called "dead capital" is valued at \$10 trillion USD.

Renowned economist Hernando de Soto studies how dead capital harms disenfranchised people and believes that problems related to undocumented ownership are manifold.

To start, lack of legally backed documentation inhibits mobility. In the developing world, people with no legal claim to property must physically protect their home and property, limiting the geographic region in which they can seek employment, along with their freedom of movement generally. Additionally, the lack of legal documentation complicates or precludes people's ability to sell their property. Finally, without legal documentation of ownership, assets cannot be used as collateral to obtain or build credit. The implications are significant for individuals, businesses and corporations.

In 2010, after the earthquake in Haiti, the need for secure property records was reiterated. Buildings across the country crumbled — including those housing government-issued land titles. There were no redundant systems — even for people who had records or titles, the task of authenticating land ownership became an impossible battle.

The value of an immutable, decentralized and secure system is clear, but no technology, no matter how promising or secure, can be a solution if records are inaccurate in the first place.

The Republic of Georgia boasts one of the world's most accurate land registries — their

registry is ranked third worldwide by The World Bank. This, coupled with a vested interest in protecting records from potential adversaries, made the country an ideal place to pilot a blockchain-based land registry. Georgia's property pilot began in early 2017. Now, on their new blockchain-based land registry, data is secure and decentralized, real-time auditing is a reality, and frictions and costs are reduced. A process that used to take days can now be completed in minutes.

Ukraine recently announced an even more ambitious blockchain project — the largest, and potentially most important to date. With the help of their technical partner, the Bitfury Group, the leading full-service blockchain company, the project will build out an e-Governance platform on the blockchain — including a land registry. This system will serve the country's 45 million citizens. If successful, the project could be life-altering for the country's citizens.

Georgia and Ukraine are only two of many countries exploring blockchain solutions, including governments in Sweden, the United Arab Emirates, Australia, Denmark, Japan and Estonia.

Around the world, the challenge to restore confidence and, increase economic empowerment and inclusion is very real. Trust in governments, business leaders, banks and other institutions is eroding, sparking widespread instability and unrest. Through blockchain technology, we see a new mechanism for responsible, forward-looking governments, leaders and institutions to respond to emerging crises of trust by creating more responsive and transparent systems.

Global Challenge #3: Solutions for Society and Sustainability

How Blockchain Is Transforming the Energy Sector

Jemma Green | Co-Founder and Chair of Power Ledger



There's a transformation taking place in the energy industry. As solar panels become more widespread, households are becoming energy self-sufficient, defecting from the grid and bidding goodbye to expensive bills on their way out. It is imperative that network operators implement strategies to halt grid defection and that retailers connect with their customers.

Power Ledger fuses the blockchain with energy markets, facilitating peer-to-peer decentralized energy trading — a new concept where renewable energy can be sold without an intermediary. Historically, customers were supplied via centralized power stations, a long distance from where that energy was consumed. Consumers got what they were given. While customers with solar panels could sell excess energy to utilities, the utility would sell it to consumers at a profit. In this model power returns to the grid, travels a long distance before reaching the end user, ultimately leaving the seller with less profit and utilities with wasted energy.

The Power Ledger Platform uses blockchain technology to settle transactions. As the platform manages financial transactions, the security of the database is paramount. On top of being secure, the blockchain has the added benefit

of being more cost-effective and efficient to run than traditional databases, an important point considering the vast number of energy transactions.

Power Ledger token-holders also can invest in wind, solar and battery farm development projects via Asset Germination Events, launching later this year. There are also plans to deploy the platform in electric vehicle charging stations across Australia, with a development in White Gum Valley already underway. Power Ledger has completed successful trials of the platform with Origin Energy in Australia, Vector in New Zealand and has signed agreements with BCPG in Thailand, Tech Mahindra in India, the Liechtenstein Institute for Strategic Development in Europe as well as multiple projects in its origin city of Perth, Australia.

Power Ledger partners with utilities, such as the ones mentioned above, allowing them to onboard customers to the Platform. It enables utilities to offer cheaper energy, while keeping customers on the grid.

It's an innovative business model capable of disrupting utility companies. In some ways it's cannibalizing their incumbent market, but if they don't participate, their competitors will.

Veridium

Most of the world's largest corporations are heavily exposed to the risk of environmental liabilities. These amount to trillions of dollars in potential write-downs and losses in stock value. But they have few mitigation tools.

Access to environmental offset credits is restricted and the most effective ones are only traded OTC, making them illiquid and therefore difficult for corporations to use as long-term hedges. Monopolization and illiquidity have led to them being significantly underutilized and undervalued.

Together, these two markets represent trillions of dollars in value at risk — and trillions in unrealized value.

Veridium provides a platform and a set of protocols on which to onboard environmental assets to the Ethereum Blockchain, giving them a transparent pricing mechanism and liquidity. This additional utility, and the further development of the application layer, makes these assets the most efficient tool for mitigating the environmental impacts embedded in corporate supply-chains that ultimately pose an existential threat to shareholder value.



Environmental Assets
(Offset Credits)



Ethereum
Blockchain



Tokenized Environmental
Offset Credits



Environmental
Liabilities



Tokenized Environmental
Offset Credits



Sustainable Supply Chain
Solutions, Higher ESG
Ratings & Mitigated
Stranded Assets Risk

BitLumens

Veronica Garcia | CEO



BitLumens is a user-friendly, eco-friendly, and smart internet of things (IoT) device that brings electricity to the unbanked in places without a power grid.

More than 1 billion women remain locked out of the banking system because they lack legal identification. According to the World Energy Outlook, 1.2 billion people don't have access to electricity, while 2.7 billion can't access clean cooking solutions.

BitLumens could provide access to a digital identity, microcredit and clean energy for these populations.

More than 31 million people living in rural areas in Latin America depend on inefficient and hazardous fuels such as wood, kerosene, plastic, battery torches and candles. A single kerosene lamp emits over 100 kg of CO₂ per year when used four hours a day.

BitLumens is an unconventional renewable energy solution that uses wind and solar to address power reliability and energy security in Latin America. It will provide access to micro-lending to women who do not have bank accounts. It will be available in the region with a "pay as you go system." It will provide ownership of the technology once all installments have been paid, with the option to get a new system after the final payment has been made.

A long-standing blind spot for financial decision-makers has been the inability to see the returns of environmental, social and governance factors, to price capital accordingly. BitLumens adds impact investments into the crypto and blockchain sectors and provides a new, environmentally friendly asset class.

The company offers a Software as a Service (SaaS) through a peer-to-peer network using blockchain technology. In addition to transparency on transactions, they provide customer due diligence (know your customer or KYC), digital IDs, as well as data on indoor air quality and the load profile of each user. These will display power generation and consumption information for each household, providing a summary of how funds coming from micro-lenders are deployed.

Investors can use the BitLumens platform to see the location of hardware, the amount of power produced, and the credit score of the borrower. BitLumens aims to advance the UN Sustainable Development Goals, especially providing access to Affordable and Clean Energy, building Sustainable Cities and Communities, promoting Good Health and Well-Being, and supporting Gender Equality and Climate Action.

UWINCorp

Sandra Ro | Managing Partner and COO of UWINCorp



Unleashing Wealth in Nations (UWIN) is a for-profit, fintech company that delivers next-generation market infrastructure products and services to those most vulnerable and excluded from formal physical commodities markets — the commodity producer, particularly small and medium size shareholder farmers. It uses the latest technologies to reduce costs, increase efficiencies, and promote price discovery and transparency.

These technologies include simple, front-end mobile/tablet user interaction, cloud storage, blockchain back-end technology enabling unprecedented transparency, coupled with a federated, distributed systems architecture as well as IoT (for physical commodities), big data/machine learning analytics to provide valuable insights into the market data and registered

assets garnered. Such detailed, source market data does not exist today in 'easy to consume' recorded form.

The initial set of services aims to focus on some of the biggest problems for farmers — financing and collateral recognition/asset ownership valuation. Services include 1) identity registration 2) asset and land registry 3) collateral verification and reputation index services 4) price feeds — local and international 5) digital trading marketplace(s) 6) confirmation, settlement, delivery, and payment services and 7) credit and insurance services. UWIN works with partners across different technologies and solutions to offer these services and will expand offerings as appropriate for each unique market.

Bitpesa: Transforming payments in the developing world

Elizabeth Rosiello | CEO of Bitpesa



For the most part, the existing payments system in Africa is inefficient and challenging to anyone doing business there. This is especially true when cross-border transactions form an integral part of a company's operations. These transactions can be very expensive, slow and heavily reliant on the US dollar as a middle currency. Transfers can take weeks, tying up needed cash flow for growing businesses across the continent. Banks often cancel transactions, request layers of paper documents and stamps, and require in-person appearances for clearance.

BitPesa cuts both the cost and time of doing business in Africa by offering instant foreign exchange and treasury settlement. BitPesa

exchanges local currencies into global currencies and vice versa. With more than 15 different emerging market and global currencies on offer, the company offers direct currency pairs otherwise unavailable or prohibitively slow and expensive. BitPesa settles directly into bank and mobile money accounts using their own liquidity in local currencies, or using bitcoin as a means of gaining local liquidity. BitPesa customers have the choice of whether to use bitcoin directly — or to never touch bitcoin, but still benefit from its speed and efficiency behind the scenes. With BitPesa, paying a supplier in Europe from Nigeria is now possible in a few hours for as little as 1%, with minimal currency exchange risk.

BitPesa currently serves large corporates that do business across Africa, but also works with smaller businesses looking to trade from Africa with the world. From humble beginnings in 2013, enabling users to buy Kenyan Shillings with bitcoin and have it delivered to mobile wallets instantly, BitPesa has grown to handle

million-dollar transactions that make payments to hundreds of thousands of users. Bitcoin has made it possible for BitPesa to create a robust product and a globally-compliant company that can scale efficiently across markets where existing infrastructure is not enough.

Implementation: Central banks and Digital Currencies

Daniel Heller | Peterson Institute for International Economics and Centre of Blockchain Technology University College London



In less than 10 years, digital and cryptocurrencies like bitcoin and ether have achieved a valuation of more than \$600 billion, quickly approaching the market capitalization of global companies such as Apple. Against this background, it is not surprising that several central banks (e.g. the Bank of Canada, the European Central Bank, the Bank of Japan, the Swedish Riksbank and the Banco de Brazil) have started to study whether they should issue their own currency through digital tokens based on distributed ledger (DLT) or blockchain technology. This note provides an overview of the issues and findings.

Policy Issues

Typically, central banks offer access to central bank money to four groups: deposit accounts to commercial banks, financial market infrastructures and the government and banknotes (cash) to the public. The deposit accounts are used for the implementation of monetary policy with the accounts being linked to a central bank operated large-value payment system. Cash is distributed to the public through the banking system. This access policy could easily be applied to central bank issued digital currency (CBDC). Interbank payments could in principle be made in CBDC. Similarly, banknotes could be replaced with blockchain-based digital coins (see below).

One relevant policy aspect is related to competitive considerations of central bank operations, namely whether the central bank should provide a service which could potentially also be provided by the private sector. By law, many central banks are not permitted to engage in the provision of services that are provided by the private sector. The fact that central banks have been the operators of wholesale or large value payment systems is typically justified by systemic risk consideration. The provision of the central bank money as a settlement asset coupled with the central bank being the operator of the payment system are seen as providing minimal risk thereby justifying a monopoly. This argument would also apply, if CBDC were to be used for interbank payments.

However, this is likely to be different for retail payments. By now, most countries have very efficient and inexpensive private sector retail payment systems. The argument of market failure in this space is considerably less strong.

CBDC for Retail Transactions

Transactions in DLT based digital currencies allow for a peer to peer exchange of value. Thus, digital currencies share many of the features of banknotes. Leaving competitive consideration aside, central banks could provide CBDC to the

public as a substitute for banknotes. In doing so, central banks would have to work very closely with private sector vendors and service providers, pretty much in the same way as in the production and distribution of banknotes. E.g. commercial banks could issue the tokens on behalf of the central bank making sure that every token holder is properly identified in line with Know Your Customer (KYC) and Anti Money Laundering (AML) provisions. Also, network and software development would have to be outsourced to the private sector. It should be noted, however, that DLT is currently not powerful enough to process the high number of transactions that are taking place with banknotes.

An oft-mentioned argument against CBDC for the public is that this could trigger a sudden bank run, causing massive outflows from deposits in the banking systems into CBDC in times of stress. However, this risk could be eliminated by a credible deposit insurance and a cap on the holdings of CBDC.

CBDC could also become a substitute for existing non-cash retail payment, e.g. credit card or ACH (automated clearing house) payments. In addition to the above-mentioned capacity constraints, it should be kept in mind that conventional centralized retail payment systems have substantially improved their settlement speed. In Europe (e.g. the TARGET Instant Payment Settlement Service), the United States, Australia and several emerging economies retail payment systems are about to be implemented that will settle payments instantaneously on a 24x7 basis. In other words, DLT based systems will not have a competitive edge in terms of settlement speed over state of the art centralized systems.

CBDC for Wholesale/Large Value Transactions

Today's wholesale or interbank payments provide immediate finality (so called Real-Time Gross Settlement (RTGS) systems).

This unconditional and irrevocable real-time settlement greatly reduces systemic risk in interbank market. To guarantee uninterrupted settlement of payments, RTGS systems typically rely on two highly sophisticated data centers which contain exactly the same transaction data. In principle, using DLT (and thus more than two data centers) would potentially increase the resilience and security of the system.

A way in which a DLT-based central bank operated large value payment system could function is that central bank balances of commercial banks are converted into digital tokens at the beginning of the processing day. Payments between banks are then settled bilaterally using these tokens. At the end of the processing day, the tokens held by each commercial bank will be converted into central bank deposits and then be destroyed.

Despite potentially superior characteristics in the area of security and resilience, DLT still has two important shortcomings. First, the processing capacity of DLT systems is still too low. For instance, the current RTGS system in Switzerland processes around 70 payments per second on a peak today (5 million payments per day). This cannot be achieved by DLT at the current juncture. Second, current RTGS systems settle payments immediately within fractions of a second. The latency of DLT systems is orders of magnitudes higher, in the range of several seconds to several minutes. From a systemic risk perspective this would be unacceptable. It can be expected, however, that in a few years, DLT will have evolved enough to overcome these weaknesses.

Implications for monetary policy

The implications of a partial or complete tokenization of money for the implementation of monetary policy are surprisingly limited. It is the unique ability of a central bank to influence market interest rates by setting the interest rates on its deposits (overnight balances at the central

bank) and its refinancing operations (typically through repos). In other words, the central bank can set a corridor or a band in which short-term interest rates fluctuate. Even if demand for central bank money were zero, the central bank

would still be able to keep the market rates in the corridor. The mere option that the central bank stands ready to provide liquidity and deposits will be enough to keep the short-term market rates within the band.

Conclusion

These are still the early days of blockchain technology, and that is one of many reasons to be excited. The breadth of the activity chronicled in this report, the spectacular rise in cryptocurrency valuations, and the proliferation of new blockchain technology use cases all point toward the possibilities that will open up as the technology comes into broader use. **Just as the internet enabled the frictionless peer-to-peer exchange of information, blockchain has the potential to usher in the frictionless exchange of assets.** This promise, coupled with blockchain technology's potential to shore up confidence in faltering institutions worldwide, could have a profound impact on the future of the global economy and society. Next year we can only imagine the advances we'll be able to chronicle in our report. The Global Blockchain Business Council is grateful for the extraordinary partners that have contributed to this report. We extend special thanks to:

Jerry Brito and Neeraj Agrawal, Coin Center

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John Mercurio, The Bitfury Group

Sebastian Vos and Atli Stannard, Covington

We look forward to working with these partners — and you — to chronicle the next chapter in the extraordinary story of this revolutionary new technology.

- i | For example, the Electronic Fund Transfer Act, 15 U.S.C. §§ 1693 et seq., and Regulation E, 12 C.F.R. Part 1005, prescribe requirements for electronic fund transfers, such as the use of ATM cards and other electronic access devices. These requirements would likewise apply to an electronic fund transfer process that leveraged the use of blockchain or another DLT.
- ii | In 2017 alone, Arizona, Delaware, Illinois, Nevada and Vermont enacted or adopted blockchain legislation.
- iii | See FinCEN, FIN-2013-G001, Application of FinCEN's Regulations to Persons Administering, Exchanging, or Using Virtual Currencies (Mar. 18, 2013).
- iv | New York is the only state with a license available specifically for cryptocurrency providers.
- v | See SEC Investigative Report, The DAO (concluding that ICO coins may be treated as "securities" for purposes of federal securities laws); CFTC Press Release, CFTC Grants DCO Registration to LedgerX LLC (July 24, 2017) (announcing that LedgerX is authorized to serve as a derivatives clearing organization).
- vi | See <http://www.europarl.europa.eu/sides/getAllAnswers.do?reference=E-2016-009012&language=EN>
- vii | In July 2017, the European Commission opened a €500,000 call for proposals to set-up a European Expertise Hub on Blockchain and Distributed Ledger Technologies. See <https://ec.europa.eu/digital-single-market/en/news/eu-blockchain-observatory-and-forum>. At the time of writing of this Annual Report, the European Commission has not yet started its work on the Blockchain Observatory, since the call for proposals only closed on September 25, 2017.
- viii | The project is a forward looking exploration of existing, emerging and potential applications based on Blockchain and other Distributed Ledger Technologies (DLTs) for non-financial industry sectors. See <http://blogs.ec.europa.eu/eupolicylab/portfolios/blockchain4eu/>
- ix | See http://ec.europa.eu/newsroom/fisma/item-detail.cfm?item_id=56443&utm_source=fisma_newsroom&utm_medium=Website&utm_campaign=fisma&utm_content=Task%20Force%20on%20Financial%20Technology&lang=en
- x | See https://www.ecb.europa.eu/paym/initiatives/shared/docs/dlt_task_force_mandate.pdf
- xi | See [http://www.europarl.europa.eu/RegData/etudes/BRIE/2016/579110/EPRS_BRI\(2016\)579110_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/BRIE/2016/579110/EPRS_BRI(2016)579110_EN.pdf). The European Central Bank typifies virtual currency as a digital representation of value, not issued by a central bank, credit institution or e-money institution, which in some circumstances can be used as an alternative to money.
- xii | See [http://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_BRI\(2016\)579110](http://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_BRI(2016)579110)
- xiii | See [http://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_BRI\(2016\)579110](http://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_BRI(2016)579110)
- xiv | See [http://www.europarl.europa.eu/RegData/etudes/BRIE/2016/579110/EPRS_BRI\(2016\)579110_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/BRIE/2016/579110/EPRS_BRI(2016)579110_EN.pdf)
- xv | *Ibid.*
- xvi | See http://ec.europa.eu/newsroom/just/item-detail.cfm?item_id=610991&utm_source=POLITICO.EU&utm_campaign=314d-94f97e-EMAIL_CAMPAIGN_2017_12_15&utm_medium=email&utm_term=0_10959edeb5-314d94f97e-190085057
- xvii | See <http://www.pbc.gov.cn/goutongjiaoliu/113456/113469/3008070/index.html>.
- xviii | See <http://www.europarl.europa.eu/sides/getAllAnswers.do?reference=E-2016-009012&language=EN>
- xix | The FSA approved cryptocurrency exchanges must follow increased security guidelines such as: requirements for segregation of funds, anti-money laundering and know your customer rules, requirements to have strong systems and policies in place against cyber-attacks, etc.
- xx | This is an electronic currency to pay for goods and transfer money using smartphones. It is planned that J Coin would exchange at a one-to-one rate with the Japanese yen, and would be offered as a free service.
- xxi | See <https://www.technologyreview.com/the-download/608963/japanese-banks-are-planning-to-launch-j-coin-a-digital-currency-meant-to-kill/>
- xxii | See <http://www.europarl.europa.eu/sides/getAllAnswers.do?reference=E-2016-009012&language=EN>
- xxii | See <http://www.mas.gov.sg/News-and-Publications/Media-Releases/2017/Consumer-Advisory-on-Investment-Schemes-Involving-Digital-Tokens.aspx>
- xxii | See <https://cointelegraph.com/news/oman-blockchain-symposium-indicates-adoption-growth>
- xxiv | See <http://www.thenextsiliconvalley.com/2017/11/06/8409-oman-aims-to-be-investment-destination-for-blockchain/>
- xxv | See <https://www.moneysmart.gov.au/investing/investment-warnings/virtual-currencies>
- xxvi | See https://www.aph.gov.au/Parliamentary_Business/Bills_Legislation/Bills_Search_Results/Result?bid=r5952
- xxvii | See <https://www.cnn.com/2017/10/10/this-indian-state-wants-to-use-blockchain-to-fight-land-ownership-fraud.html>
- xxviii | See <https://economictimes.indiatimes.com/small-biz/security-tech/technology/blockchain-tech-is-joining-e-gov-dots-in-ap-telangana/articleshow/59330625.cms>
- xxix | See https://www.rbi.org.in/Scripts/BS_PressReleaseDisplay.aspx?prid=42462; see also <https://timesofindia.indiatimes.com/business/india-business/rbi-rings-alarm-bells-on-bitcoins-cautions-investors/articleshow/61938316.cms>
- xxx | See <http://pib.nic.in/newsite/PrintRelease.aspx?relid=160923>
- xxxi | See <https://www.mygov.in/group-issue/commentssuggestions-invited-existing-virtual-currencies-framework/>
- xxxii | See <http://www.thehindubusinessline.com/economy/policy/panel-on-cryptocurrency-submits-report-to-jaitley/article9805978.ece>
- xxxiii | See <http://www.thehindubusinessline.com/money-and-banking/panel-not-in-favour-of-legalising-virtual-currencies/article9820210.ece>; <http://www.financialexpress.com/economy/why-finance-ministry-panel-said-no-to-bitcoin-and-other-virtual-currencies/790455/>
- xxxiv | See http://supremecourtindia.nic.in/supreme-court/2017/35252/35252_2017_Order_13-Nov-2017.pdf; see also <https://www.coindesk.com/indias-central-bank-sounds-alarm-bitcoin/>
- xxxv | See http://www.business-standard.com/article/economy-policy/govt-considering-its-own-cryptocurrency-117091600051_1.html
- xxxvi | See, e.g., Helen Goussard, *Digital currency could spark financial revolution*, How We Made It In Africa (Aug. 4, 2017), <https://www.howwemadeitinafrica.com/digital-currency-spark-african-financial-revolution/>; Rainer Preiss, *Cryptocurrency is the great African opportunity*, How We Made It In Africa (Aug. 8, 2017), <https://www.howwemadeitinafrica.com/cryptocurrency-great-african-opportunity/>.
- xxxvii | Evander Smart, *Tunisia Becomes First Nation To Put Nation's Currency on a Blockchain*, DCE Brief (Dec. 28, 2015), <https://dcebrief.com/tunisia-becomes-first-nation-to-put-nations-currency-on-a-blockchain/>.

- xxxviii | Ranjo Denbow, *eCurrency Mint Limited and Banque Régionale De Marchés Launch New Digital Currency in Senegal*, BusinessWire (Nov. 4, 2016, 12:00 AM), <http://www.businesswire.com/news/home/20161103006949/en>.
- xxxix | *Id.*
- xl | Jelor Gallego, *Another Nation Has Developed a National Currency That's Entirely Digital*, Futurism (Nov. 28, 2016), <https://futurism.com/another-nation-has-developed-a-national-currency-thats-entirely-digital/>.
- xli | David Herbling, *Bitcoin firms investors stuck with shares after CBK warning*, Business Daily (Sept. 28, 2016, 8:56 PM), <http://www.businessdailyafrica.com/Corporate-News/Bitcoin-firms-investors-stuck-with-shares-after-CBK-ban/539550-3398320-704oni/index.html>.
- xlii | *Position Paper on Virtual Currencies*, South African Reserve Bank (Dec. 3, 2014), [https://www.resbank.co.za/RegulationAndSupervision/NationalPaymentSystem\(NPS\)/Legal/Documents/Position%20Paper/Virtual%20Currencies%20Position%20Paper%20%20Final_02of2014.pdf](https://www.resbank.co.za/RegulationAndSupervision/NationalPaymentSystem(NPS)/Legal/Documents/Position%20Paper/Virtual%20Currencies%20Position%20Paper%20%20Final_02of2014.pdf).
- xliii | *Reserve Bank to begin testing Bitcoin and cryptocurrency regulations*, BusinessTech (Jul. 19, 2017), <https://businesstech.co.za/news/finance/186533/sa-reserve-bank-to-begin-testing-bitcoin-and-cryptocurrency-regulations/>.
- xliv | *Id.*
- xliv | See <http://asic.gov.au/about-asic/media-centre/find-a-media-release/2017-releases/17-325mr-asic-provides-guidance-for-initial-coin-offerings/>
- xlvi | See <https://www.moneysmart.gov.au/investing/investment-warnings/initial-coin-offerings-icos>
- xlvi | See <http://asic.gov.au/regulatory-resources/digital-transformation/initial-coin-offerings/#legal>
- xlvi | In some cases, the ICO will only be subject to the general law and Australian consumer laws regarding the offer of services or products. In other cases, the ICO may be subject to the Corporations Act. ASIC and the Australian Competition and Consumer Commission (ACCC) also jointly warned people of the potential risks of investing in ICOs.



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