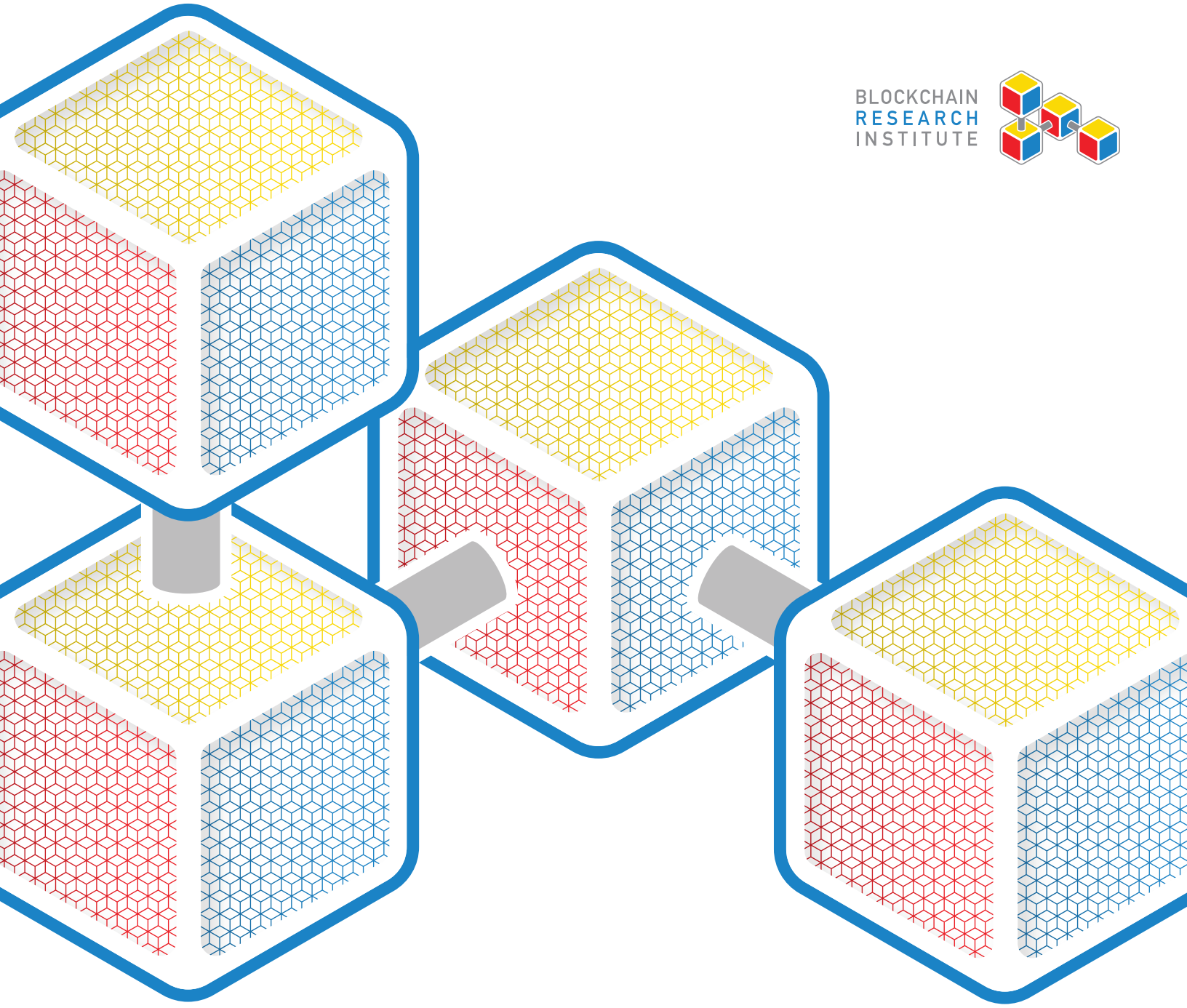
BLOCKCHAIN
RESEARCH
INSTITUTE



2018 BLOCKCHAIN REGULATION ROUNDTABLE

Addressing the Regulatory Challenges of Disruptive Innovation

Don Tapscott

August 2018

A BLOCKCHAIN RESEARCH INSTITUTE SUMMARY OF PROCEEDINGS

Realizing the new promise of the digital economy

In 1994, Don Tapscott coined the phrase, "the digital economy," with his book of that title. It discussed how the Web and the Internet of information would bring important changes in business and society. Today the Internet of value creates profound new possibilities.

In 2017, Don and Alex Tapscott launched the Blockchain Research Institute to help realize the new promise of the digital economy. We research the strategic implications of blockchain technology and produce practical insights to contribute global blockchain knowledge and help our members navigate this revolution.

Our findings, conclusions, and recommendations are initially proprietary to our members and ultimately released to the public in support of our mission. To find out more, please visit www.blockchainresearchinstitute.org.

The 2018 Blockchain Regulation Roundtable is an initiative of the Blockchain Research Institute in collaboration with Communitech, Gowling WLG, KPMG Canada, and the Open Data Exchange. This material is for informational purposes only; it is not investment guidance, legal advice, or managerial consulting. Use of this material does not create or constitute any kind of business relationship with the Blockchain Research Institute or its collaborators, and neither the Blockchain Research Institute nor any of its collaborators is liable for the actions of persons or organizations relying on this material.

Acknowledgments

Special thanks to Blockchain Research Institute Co-Founder Alex Tapscott for his careful review of this report.

Thanks, too, to the Blockchain Research Institute's partners in the roundtable—Canada's Open Data Exchange, Gowling WLG, and KPMG—and to the event sponsor, Communitech.

Many thanks to our facilitators—Jeff Bandman, principal at Bandman Advisors and former lead of fintech at the US Commodity Futures Trading Commission; Usman Sheikh, partner at Gowling WLG; and Joel Telpner, partner at Sullivan and Worcester LLP—for catalyzing the discussions and providing feedback on an earlier draft of this report.

Finally, my thanks to Blockchain Research Institute Editor-in-Chief Kirsten Sandberg, Production Manager Mary-Jane Pilgrim, and Editor Bill Gillies for their work in creating and assembling the material in this report. It was truly a team effort.

As author of this report, I take full responsibility for its contents.

DON TAPSCOTT
Co-Founder and Executive Chairman
Blockchain Research Institute

Contents

Preface

Blockchain technology is as disruptive an innovation to money as the Internet was to ideas, both currencies that governments care a lot about. Authoritarian regimes moved quickly to lock down the Internet with stringent laws and regulations, using the technology itself to promote the party line, censor free speech, and keep an eye on dissidents.

Democratic regimes went the opposite direction. In the interest of free markets, they loosened the ownership rules for broadcasting, print press, and the digital media to such an extent that power over communications channels has consolidated under a handful of oligarchs who now control the Western narrative and exert increasing influence over policymaking.

What we do now with the blockchain—what we do next, in terms of writing regulations with respect to human rights—may right many of the unintended wrongs of our Internet regulations.

The constant pull of such extremes has had a devastating effect on privacy and the truth. Citizens no longer trust governments, consumers no longer trust corporations, politicians raise doubt about scientific evidence, and their constituents are ill-equipped or ill-prepared to distinguish fact from fiction for themselves.

To this stack of communications protocols, blockchain adds a transaction layer of value. It is already disrupting capital markets and banking applications. We cannot afford to do with blockchain what we did to the Internet, which was to effect the exact opposite of what its founding innovators had in mind. This is important: what we do now with the blockchain—that is, what we do next, in terms of writing regulations with respect to human rights—may right many of the unintended wrongs of our Internet regulations.

As global as the atmosphere, blockchain recognizes no jurisdictional boundaries. After half a dozen years of technological gestation among computer scientists, cryptographers, and software developers, blockchain attracted the attention of four groups: venture capitalists who recognized its genius, law enforcement that used it to track down crime on the Dark Web, financial intermediaries who took its disruptiveness seriously, and regulators who looked to prevent investment fraud (e.g., Ponzi schemes, initial coin offerors who disappeared with the funds).[1] The regulatory response has ranged from draconian—such as China's ban on initial coin offerings—to laissez-faire as in South Korea.[2]

Its libertarian proponents still pooh-pooh any notion that blockchain's distributed applications can be sequestered within or barred from any

individual country's borders. But, as Blockchain Research Institute fellow Joel Telpner has said, anyone who thinks that blockchain is beyond regulatory reach should think again, as should those who believe self-regulation is the only road forward. We must find middle ground. The reality is that some aspects of the blockchain and its applications should be regulated, and some aspects shouldn't be.[3]

Innovation has almost always outpaced applicable regulations. Blockchain development and implementation are happening at a pace well beyond the capacity of regulators to respond, in many ways mirroring our experience with the Internet, but with two critical differences:

- *Pace of rollout.* The Internet developed and advanced at the speed of sound. By comparison, blockchain technology is evolving at nearly the speed of light.
- *Potential impact.* The Internet changed how we manage information. Blockchain changes how we create and manage value—the value of everything we value, from money, stock, and bonds to art, music, votes, and even our identities. It may fundamentally transform our institutions and the economy.

The dominant feature of the blockchain is its unpredictability in both its developmental path and its technological progeny. Oblivious to jurisdictional boundaries, the blockchain already spans every latitude and longitude of the planet, with potential to penetrate every aspect of our life, both obviously and imperceptibly. Regulating under such uncertainty is a serious challenge.

Of this, I am sure: the Internet is entering its second era based on this nascent technology. There is no reverse gear. The *irresistible force* of blockchain in driving entrepreneurship, fueling an innovation economy, and generating prosperity for all is meeting the too often *immovable object* of the law and its agents in protecting investors, stabilizing capital markets, and preserving human rights. The upshot is that there has probably never been a more important or challenging time to be a regulator.

This roundtable was the Blockchain Research Institute's first effort—in collaboration with Communitech, Gowling WLG, KPMG Canada, and the Open Data Exchange—to convene and engage the best minds in the regulatory challenges of disruptive innovation. It was a remarkable afternoon, unprecedented in its assemblage of talent and authority and in the candor of its participants. I was honored to host it and am thrilled to report and comment on its proceedings.

There has probably never been a more important or challenging time to be a regulator.

DON TAPSCOTT
Co-Founder and Executive Chairman
Blockchain Research Institute

Executive summary

Process

In Toronto on 10 May 2018, the Blockchain Research Institute brought together a unique international group of stakeholders to discuss the regulatory issues around blockchain, cryptoassets, and new blockchain-based methods of raising capital.

Participants had to hold one of these roles. We wanted a diverse portfolio of responsibilities in the room. To participate, contributors had to be playing one of these five roles in the blockchain ecosystem:

- Executives from blockchain start-ups in a wide range of industries and exchanges
- Senior representatives of various global banking and securities regulators
- Senior non-regulatory government officials
- Business leaders from various established industries that are experimenting with blockchain in their business models and practices
- Lawyers, accountants, investment bankers, and other key industry professionals

Participants represented diverse functions, industries, and interests. The blockchain companies that participated in the roundtable are involved in a wide array of projects: clearing and settlements, trade finance, syndicated loans, supply chain management with agriculture and food safety, and the pharmaceutical industry. Others are developing digital banks, insurance solutions, loyalty point programs, digital identity systems or focusing on new types of capital formation.

Participants received a brief orientation to the lay of the land. Usman Sheikh, partner at Gowling WLG, Joel Telpner, corporate and finance partner at Sullivan and Worcester LLP, and Don Tapscott each gave a brief presentation to map out the landscape of blockchain innovation and regulatory response and to suggest paths to progress that would satisfy the different needs of stakeholders at the table.

Three working groups did the heavy lifting and each group explored three key questions.

Three working groups did the heavy lifting. After opening remarks, participants broke into three working groups:

- Regulators were facilitated by Jeff Bandman, former fintech lead at the US Commodity Futures Trading Commission, and founder of Bandman Advisors
- Enterprise representatives were facilitated by Usman Sheikh
- Innovators and entrepreneurs were facilitated by Joel Telpner

Each group explored three key questions. Jeff, Joel, and Usman facilitated their respective group's exploration of these questions:

- What are the opportunities for business and the economy created by *initial coin offerings* (ICOs), blockchain, and cryptocurrencies?
- What are the impediments to realizing these opportunities?
- What breakthrough ideas or solutions could overcome these impediments and help us to achieve an innovation economy?

Although the roundtable discussed global issues, a majority of participants came from Canada—hence, the Canadian slant of this report.

The facilitators managed the flow of ideas and recorded notes of the discussions. Jeff, Joel, and Usman each reported the consensus views and recommendations of their working group to the whole roundtable. The full group then discussed what they heard.

Please read with three caveats in mind. Participants did not vote on or otherwise rank the issues or the possible actions, and so the Blockchain Research Institute takes full responsibility for gauging the sense of urgency in the room around each topic. Also, we conducted the proceedings under Chatham House Rule, whereby "participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed" without that participant's express permission.[4] Finally, although the roundtable discussed global issues, a majority of participants came from Canada—hence, the Canadian slant of this report.

Findings

We need a multistakeholder approach. Nearly everyone agreed that regulators in all the financial hubs, leaders from the private sector, and industry groups—be they in capitalist, socialist, or communist countries—must all claim their seat at the table and collaborate to reach an appropriate compromise between encouraging innovation and, where necessary, protecting consumers and markets.

Disruption is underway in banking and the capital markets. Innovators are introducing distributed ledger technologies into payment systems, identity management, and land registries for deeds and real estate transactions. Participants also discussed applications in clearing and settlement, corporate voting, global asset exchanges, and raising capital.

The roundtable identified four core issues to address. Two call for reform of the law, and two call for better mechanisms of communication.

Regulators have not responded uniformly across jurisdictions. Regulatory response has ranged from analysis, guidance, and warnings to enforcement of existing laws and revisions. Some have been quite forward-thinking, conducting or commissioning studies or setting up regulatory sandboxes in which start-ups can experiment and both the regulator and the regulated can learn from and talk about the experience.

The roundtable identified four core issues to address. Two of the following call for reform of the law, and two call for better mechanisms of communication:

- The lack of regulatory clarity
- The obsolescence of statutes and regulations
- The lack of a mechanism for meaningful dialogue between regulators and other stakeholders
- The lack of dialogue between financial service providers and blockchain entrepreneurs, such that start-ups are rejected sight unseen.

The roundtable made six recommendations.

The roundtable made six recommendations. There were many suggestions of substance and merit. We found these to be the most urgent and actionable for all participants:

- Form a multistakeholder action committee to move these issues forward.
- Prepare all stakeholders and the public for self-sovereign identities and pass legislation to recognize digital identities as valid.
- Institute a national regulator with oversight of the nascent industry rather than allow individual agencies to create their own regulations piecemeal.
- Agree on distinctions among cryptoassets and regulate accordingly.
- Discourage discrimination against blockchain entrepreneurs and support start-ups in the space.
- Encourage the formation of special interest groups to move governance issues forward across applications and domains.

King of Hares by Paul K, 2008, used under CC BY-SA 2.0.

Regulating the Internet of value

The importance of an ideal regulatory environment

All the stakeholder groups recognized the importance of creating and sustaining an innovation economy and shared an interest in stewarding blockchain technology.

All the stakeholder groups attending the May roundtable recognized the importance of creating and sustaining an innovation economy. They also recognized blockchain technology as a critical component of such an economy—or what I call the bedrock of the second era of the Internet: the Internet of value. Nearly everyone agreed that blockchain-based innovations offer new ways of creating wealth and achieving society's goals. The financial services industry is just one of many aspects of the economy that will be transformed.

Unlike the Internet's first era—the Internet of information—today's Internet of value deals with assets such as money, land, and other financial instruments, the identities of people and things, intellectual property, cultural artifacts like art, music, and literature, and even scientific findings. The Internet of value enables different types of assets to be stored, managed, and transacted securely. As a result, society has an enormous interest in ensuring that governments develop proper policies, laws, and enforcement mechanisms.

Blockchain challenges traditional mindsets. Being a regulator has never been more difficult—or more important. Most roundtable participants understood this predicament and shared an interest in becoming stewards of blockchain technology so that legislators and regulators need not bear the burden alone. They want to create a regulatory environment that simultaneously protects investors and consumers, sustains innovation, grows the economy, and cultivates a new kind of society. In the Blockchain Research Institute's study of blockchain hotbeds, a key variable to becoming an innovation hub was the government's ability to balance the needs of consumers and investors with those of entrepreneurs and others looking to innovate within its jurisdiction.[5]

ICOs and other token-creating events were a focus of the discussions. In 2017, blockchain ventures raised approximately $6 billion through ICOs, which raise funds in the form of cryptocurrencies. The ICO is a new spin on the IPO (initial public offering). The ICO market has grown in 2018. In *Blockchain Revolution,* Alex Tapscott and I first predicted that venture capital would be unrecognizable in five years; it is already unrecognizable. Not just venture capital, but investment banking, private equity, mutual funds, hedge funds, and capital markets overall will see profound shifts. There are both big opportunities and big dangers.

Both brand and brain drains were roadblocks to entrepreneurship and building an innovation economy in Canada.

For a country like Canada, the upside is good. Venture capital and angel investing have traditionally been underdeveloped and undersized compared to the United States, even on a per capita basis. Consequently, Canada has struggled to keep some leading companies and entrepreneurs in the country. Both brand and brain drains were roadblocks to entrepreneurship and building an innovation economy in Canada.

However, because of blockchain technology, the costs of building a business, raising funds, finding assets, and mobilizing people are dropping. The deep structure and architecture of the firm are changing. We have seen such change before, during the dot-com boom of the 1990s. As did many a dot-com, many of today's blockchain companies—block-coms—are sure to fail. Some have been scams, while others have been targets of hackers and thieves.[6]

The stakes are high for every economy, not just because this technology is central to forging an innovation economy and a robust financial services sector.

The stakes are high for every economy, not just because this technology is central to forging an innovation economy and a robust financial services sector. The Internet's first era originated in the United States and gravitated to Silicon Valley. The jury is out where the second era will be centered—though it will likely not be Silicon Valley, at least not exclusively. Leaders of old paradigms have difficulty embracing the new—and the new paradigm is *decentralized*.

The challenge of regulation

During the Internet's early growth, many said that government should just leave the technology alone and implement no regulations to shape or control it. However, in democratic countries, government bodies became involved to implement policies around privacy, intellectual property, and other social concerns. In totalitarian

Queen of Roses by Paul K, 2008, used under CC BY-SA 2.0.

countries, governments censored the Internet and used it to spy on citizens and otherwise control society.

With the second era based on blockchain, we can make an even stronger case for positive government involvement. This new platform enables storing, management, and transaction of assets—objects of value for which the public has a legitimate interest. The disruptions will be bigger this time around as well, including disruptions to the industries and markets that manage many key assets—specifically financial services and capital markets. Good regulation is critical.

With the second era based on blockchain, we can make an even stronger case for positive government involvement.

However, as the blockchain revolution unfolds, regulators would be wise to avoid the chainsaw when microsurgery could do. To be sure, we do not want the Wild West. In the wave of excitement, lawlessness is a real risk, and many investors and consumers may get hurt. However, the path forward must balance the priorities of regulators to uphold the law, preserve the integrity of capital markets, and allow innovation to flourish. To do so, the industry must shift its perspective from narrowly defined regulation to a broader concept of governance.

Many people in the blockchain world recoil at the notion of governance beyond what they have written in code. Governance can be delivered, in part, by governments. Overall, however, roundtable participants shared a view that stewardship of the Internet's second era and its impact on capital markets will be effective when all stakeholders come together and develop a clear understanding of their common interests. This is not an insurmountable task. As Pindar Wong, one of the Blockchain Research Institute's collaborators, said, "Just because you're decentralized doesn't mean you need to be disorganized."[7]

So, although we focused on the issues of regulation, we did not talk solely about the role of government. We discussed the broader issue, how to govern a transformative global resource like blockchain technology. The Internet of information was not and is not governed by the United Nations, the International Telecommunication Union, or other huge institution. Instead, it is governed by seven multistakeholder networks, each involving the private sector, civil society, government, academia, and others.

When it comes to blockchain and its Wild West nature, we need to think hard about governance. We have many reasons to get the right regulation balance. For one, a clear, stable, and open regulatory environment will attract entrepreneurship and capital. In turn, it will enable economic growth, stimulate innovation, and create jobs throughout a national economy.

When it comes to blockchain and its Wild West nature, we need to think hard about governance.

> *The Blockchain Research Institute has 80 projects examining blockchain's strategic implications. We are looking at how it transforms ten industries, not just financial services. How does it change the way we manage companies? What do smart contracts mean for the chief legal officer? What does triple-entry accounting mean for the CFO or for KPMG? In ten years, the annual audit will no longer be a sampling of batches of transactions because triple-entry accounting on distributed ledgers will give a real-time snapshot of accounts.*

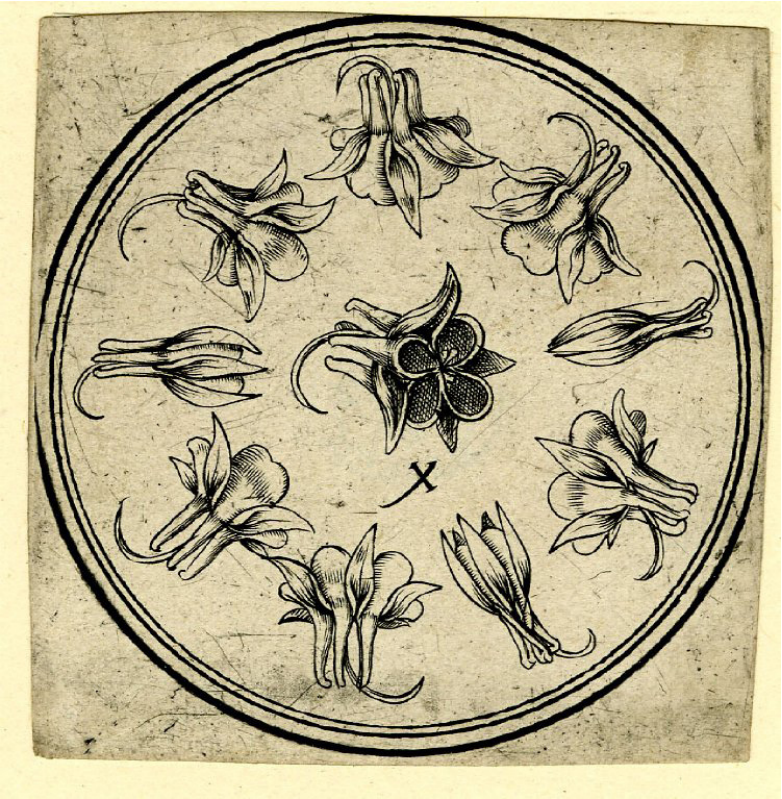
Blockchain: Disrupting regulated industries

Capital markets

With blockchain, we can trade assets peer to peer without the costly and complex legacy infrastructure.

Clearing and settlement

Historically, securities have different clearing and settlement times. Whereas two parties may agree to make a trade and to clear that trade instantly, the settlement times can take much longer; they range from "T+3" for most equity markets—that is, trade plus three days to settle—to even longer in other asset classes, as trades work their way through a complex multi-layer process, including pre-trade, trade, post-trade, custody, and so on. Exchanges, which we cover separately below, are but one of many players in this labyrinth. With blockchain, we can trade assets peer to peer without this costly and complex legacy infrastructure. Blockchain-based cryptoassets trade and settle almost instantly. This capability will eliminate many intermediaries and slash costs for many market participants, thereby improving the metabolism and efficiency of capital markets.



Ten of Columbines by Paul K, 2008, used under CC BY-SA 2.0.

Corporate voting

Blockchain promises to transform corporate shareholder voting, a problematic area in capital markets.

Blockchain promises to transform corporate shareholder voting, a problematic area in capital markets.[8] Voting goes to the heart of shareholder democracy, with many shareholders calling for greater transparency and ability to exert their authority.[9] Traditionally, large institutions such as pension funds held shares for extended periods. They often assigned their proxies to management. However, many of these large investors now want to be more active in guiding corporate behavior. Why is blockchain a better solution? Quite simply, a "vote" is much like a transaction: when a shareholder votes, her vote should be counted and verifiable, and she should not be able to vote again, that is, not to double spend her vote. By lowering barriers to voting on important corporate actions, we can improve stakeholder engagement in the market.

Exchanges

Traditional securities and commodities exchanges have embraced blockchain to various degrees. Bitcoin futures are now on the Chicago Mercantile Exchange. NASDAQ joined with Reality Shares to announce the creation of the Reality Shares NASDAQ Blockchain Economy. They have also filed for a related exchange-traded fund to track that index. Nuco, a Canadian blockchain company that participated in the roundtable, has collaborated with the Toronto Stock Exchange on a platform that would radically simplify the trading of natural gas, reducing settlement times from many weeks to a few hours.

Cryptocurrency exchanges have grown massively in the past few years. Prominent players in local markets such as Coinbase (USA) and Coinsquare (Canada) have become household names.

Capital raising

The explosion of value in cryptoassets has captured the imagination of developers and the attention of the media, governments, central banks, investing public, and regulators.

Two years ago, the entire cryptoasset market had a value of $9 billion. Had it been a public company, it would barely have cracked the S&P 500 Index.[10] Fewer than two years later, the cryptoasset market is $250 billion in size, surpassing the combined market capitalizations of both Goldman Sachs and Morgan Stanley.

The explosion (and recent pullback) of value in cryptoassets like bitcoin and ether has captured the imagination of developers and the attention of the media, governments, central banks, investing public, and regulators. It has made enthusiasts euphoric, Nobel laureates skeptical, and old school billionaires dyspeptic.[11] Charlie Munger of Berkshire Hathaway went so far as to call bitcoin "noxious poison."[12] Is there any other kind of poison?

To be sure, there is much hype in this market, and the industry must confront such implementation challenges as scale and regulatory uncertainty. However, beyond the hype and mania, something profound is happening—the creation of an entirely new *digital* asset class.

In discussions of ICOs, the taxonomy is not yet clear and widely accepted. Regardless, initiatives to generate digital tokens have many names—initial token offering, token generating event, and so on. Often, but not certainly, a start-up will issue tokens to fund the development of the project before development begins. While these tokens may eventually have utility in the application ecosystem of the project—as, for example, a discount token (coupon)—at least at the outset the main goal is to raise funds.

Initially, banks wanted nothing to do with blockchain. They equated blockchain with bitcoin and bitcoin with fraud.

The process raises many regulatory issues, as funds are raised and a token is delivered at a future date, sometimes unspecified and often several weeks after the fundraising event has taken place. According to *CoinDesk*, about $300 million was raised in 2016, more than $5 billion in 2017 and about $6.8 billion so far by May 2018.[13] The amounts raised are extraordinary. EOS, a new blockchain protocol, raised $4 billion in 2017.[14] In 2018, Telegram raised $1.7 billion from private sale investors alone.[15]

Applications in banking

Initially, banks wanted nothing to do with blockchain. They equated (wrongly, in our view) blockchain with bitcoin and bitcoin with fraud. Today banks are taking a different approach to cryptocurrencies and blockchain, as more banks announce initiatives in this space. We have witnessed the emergence of banking consortia and the launch of individual pilot projects, and the Blockchain Research Institute has covered many of these in its case studies and white papers.

Payments

In the financial services sector, the global payments system is the lifeblood of commerce. Even so, the system is bloated, slow, and costly. For example, checks drawn on a financial institution in one country and deposited to a different financial institution in another country can take weeks to clear or to be rejected.

At the heart of this global payments system is the Society for Worldwide Interbank Financial Telecommunication (SWIFT) network. It is a member-owned global cooperative: its customers are its owners. It is the world's leading provider of secure financial messaging services and, until blockchain came along, the world's most trusted network. However, SWIFT does not move money; it processes highly secure text messages about money (Figure 1, next page).

In the financial services sector, the global payments system is the lifeblood of commerce.

In 2017, SWIFT stated, "DLTs [distributed ledger technologies] are currently not mature enough for broad use on cross-border payments. [But] this technology may provide solutions for the associated account reconciliation."[16] It announced a blockchain pilot project in which it would leverage such assets as its strong governance, its expertise in liquidity standards, bank identifier code identity framework, and public key infrastructure security scheme, referring to the "roles, policies, and procedures that SWIFT creates, manages, distributes, uses, and stores" to ensure security.[17] It sought "to bring [DLT] in line with the financial industry's requirements [and] to deliver a distinctive DLT proof-of-concept

(POC) platform for the benefit of its community."[18]

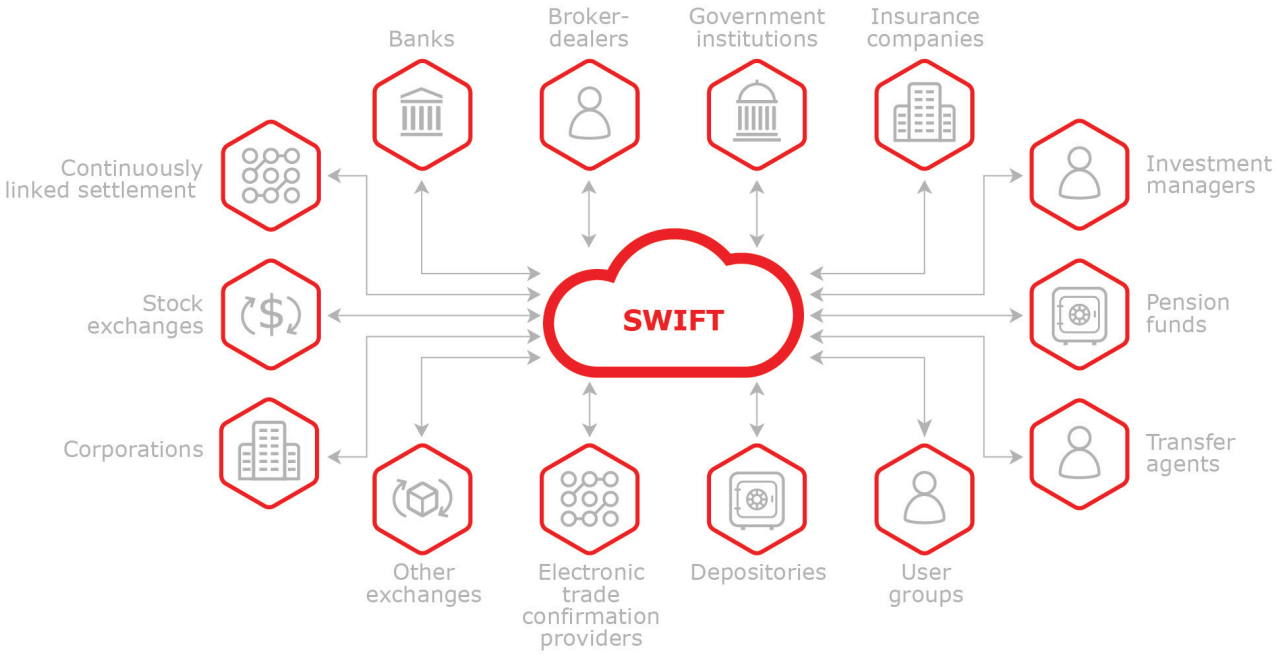
In his research on payments, Bob Tapscott discovered several other initiatives.[19] SWIFT is taking part in the new major International Organization for Standardization (ISO) technical committees that meet on standards critical to open blockchain-based payments, including reference architecture, taxonomy, and ontology; use cases; security and privacy; identity; and smart contracts.[20]

SWIFT is further working with the central securities depositories on standards for DLT management of securities.

Concurrently, SWIFT is demonstrating the benefits of DLT by building a standard settlement instruction database for over-the-counter derivatives markets in a reference data context in which there are no data confidentiality concerns. The POC may illuminate interoperability and backward compatibility with existing systems.

SWIFT is further working with the *central securities depositories* on standards for DLT management of securities. Participants include consulting firm Ernst & Young, the Canadian Depository for Securities Limited, the Moscow Exchange Group, South Africa's Strate, the Russian National Settlement Depository, Switzerland's SIX Securities Services, Nasdaq Nordic, and Chile's Depósito Central de Valores. SWIFT also has a project for a bond life cycle POC. This is a sensible market because of its large size and the relative simplicity of issuance and maturity.

Figure 1: SWIFT network



Source of information: SWIFT, "About us," n.d. www.swift.com/about-us, accessed 5 Jan. 2018.

Finally, SWIFT, as part of its *global payments innovation* roadmap, launched a POC in 2017 to see whether DLT could assist in the reconciliation of *nostro* ("ours with you") accounts more efficiently. For banks, getting the funds out of the customers' accounts in the original ten countries and then clearing the payments (i.e., making these funds available) in the eleventh is slow, risky, and difficult.[21] SWIFT has picked this high-risk problem but a low-risk area for its pilot. It is not about moving money; it is the reconciliation of money already moved.

Blockchain can speed transfers and lower costs of global payments. It can also obviate the need for layers of complex systems that manage risk and add service fees.

Many banks are examining how blockchain can provide many of SWIFT's services more efficiently. Blockchain can speed transfers and lower costs of global payments. It can also obviate the need for layers of complex systems that manage risk and add service fees. The expectation is funds transfers between countries with little delay. Blockchain can help stakeholders—including SWIFT and central banks—to consider opportunities for reinvention in the face of next-generation systems. The global financial system must start thinking "outside the bank," imagining a new role for governments in the financial system, and exploring the role of cryptocurrencies.

Identity

Self-sovereign identity secured by the blockchain is among the technology's killer applications. The transformation will empower citizens the world over to control their identities, retain their privacy, and access citizen services. Today, individual identity and personal data are highly fragmented and owned by third parties like banks, governments, and companies like Facebook and Google. This is problematic: individuals cannot monetize their own data, and thieves can hack their identity markers and attestations.

Blockchain promises a new model, where individuals have a digital avatar with full sovereignty over their data. Identities can be verified by trusted parties with whom individuals already have an established relationship, allowing a third party, such as a rental company, to ping our identity to verify a needed detail, such as age. Both incumbents and others see tremendous savings. The notion of a portable, citizen identity in a black box, owned by each of us, is one of the most foundational concepts of our time. It could enable each of us to keep our data and repatriate our identities so that we can manage them effectively and responsibly, use the data to better manage our lives (and even monetize it), and protect our privacy.

The notion of a portable citizen identity in a digital black box, owned by each of us, is one of the most foundational concepts of our time.

Land title/real estate

Land is a foundation of wealth in our economy, and a working land title system is a precondition for prosperity in any country. Blockchain-based land title registries that transparently and efficiently record the purchase and sale and ownership of land, buildings, and other capital assets, would be a vast improvement on how many systems work today, particularly in the developing world where land title registries are spotty at best.

King of Parrots by Paul K, 2008, used under CC BY-SA 2.0.

Sweden is moving to the testing phase, looking to replace its land registry system. Bitfury and the government of Georgia are developing a blockchain-based land title project. Indian states are actively testing a land registry application with BlockScale Solutions. The innovators' working group concluded:

> *Title registry is a great example of what people are doing with blockchain in other parts of the world. People are taking advantage of blockchain technology to improve lives, to empower citizens, to democratize different ways of getting things done, and to bring people into the financial system. When we talk about the opportunities of blockchain, we have positive examples.*[22]

Banks are exploring other areas such as trade finance, syndicated loans, reward programs, asset management, and taxation.

However, they are happening on one side of the world, and we have regulatory challenges on the other side. We are losing sight of this social good element and the efficiency improvements coming from blockchain. This is a challenge, and we need to bridge those two or respond to both parts of the world.

Banks are exploring other areas such as trade finance, syndicated loans, loyalty points/reward programs, asset management, and taxation.

Regulatory response

Roundtable members have seen four types of regulatory response. First, regulators have issued warnings, cautions, and guides. Second, they have created regulatory sandboxes for experimentation and learning. Third, regulators have commissioned regulatory studies. Fourth, they have initiated enforcement of regulations.

Regulatory warnings/guidance

The Canadian Securities Administrators (CSA), the Ontario Securities Commission (OSC), and the Investment Industry Regulatory Organization of Canada (IIROC) have put out some guidance pieces and warnings on ICOs in response to their booming growth. In March 2017, the OSC advised businesses using DLT that their projects might fall under Ontario securities laws.[23] In August 2017, the OSC issued a staff notice, "Cryptocurrency Offerings."[24] IIROC has issued some guidance as well.[25]

Regulators assess the circumstances in which an individual is giving over money, whether the individual expects gain, and whether the gain comes from the efforts of that individual or another person.

Regulators see instances of tokens that would potentially be securities under Canadian law. Regulators put the investment contract to a three- or four-part test (depending on people's interpretation of the contract elements). Essentially, they assess the circumstances in which an individual is giving over money, whether that individual has an expectation of gain, and whether that gain comes from the efforts of that individual or another person. In some cases, the individual (investor) is not doing anything to create that gain; rather, somebody else is working and managing to generate that gain. In that case, Canadian regulators would deem the token a security and require its issuer to comply with securities laws, either issuing a prospectus or seeking an exemption from that requirement. Next, securities dealers must be registered if they are in the business of trading; they must make appropriate disclosures, including risk acknowledgment forms.

Concerning cryptocurrency exchanges and their notices, regulators have said that those offering cryptocurrencies that are securities must determine whether they are a marketplace. If yes, then they must comply with the rules governing exchanges or alternative trading systems. They may face additional requirements to verify identities and prevent money laundering.

On AML/KYC (know your customer) obligations, the Financial Crimes Enforcement Network (FinCEN), a bureau of the US Department of Treasury, and the Financial Transactions and Reports Analysis Centre of Canada (FINTRAC) have both issued guidance.[26] Of particular concern to blockchain entrepreneurs, banks are not prepared to provide banking services to companies dealing with cryptocurrencies.

In March, many banks (including some at the roundtable) started prohibiting individuals from purchasing cryptocurrencies using their credit cards. To bankers, this area is highly unregulated, excessively volatile, and the credit risk is substantial. If people use their credit cards to purchase cryptos at $20,000, and the crypto value subsequently plummets to $8,000, these customers could be less able to pay their bills and could default.[27] Yet many banks that ban

Queen of Columbines by Paul K, 2008, used under CC BY-SA 2.0.

cryptocurrency purchases still allow their customers to use credit cards to gamble in casinos, buy lottery tickets, and purchase stock on margin.[28]

The Canadian regulators also expressed concern about their inability to discharge their AML/KYC obligations. What if, for example, they are unwittingly supporting an organization like Silk Road, the illicit online marketplace, or a company servicing such an organization?

Regulatory sandboxes

Regulators are serving up more than warnings. They are actively engaging with the start-up community by establishing regulatory sandboxes.

Regulators are serving up more than warnings. They are actively engaging with the start-up community by establishing regulatory sandboxes. While each sandbox is different, the goal is generally to encourage compliance and, if possible, spur innovation by simplifying the regulatory burden on start-ups. The OSC established its LaunchPad in October 2016.[29] It has had some early success: it granted approval for two token offerings: one for IMPAK and the other for TokenFunder.[30] For the CSA regulatory sandbox, the CSA authorized a handful of cryptocurrency investment fund managers: First Block Capital, Ross Smith Asset Management, 3iQ, and Majestic Asset Management.[31] Others will surely follow.

Regulatory studies

To stimulate discussion and help refine possible regulatory approaches, authorities have launched or commissioned research and published the results. For example, in April 2017, the UK Financial Conduct Authority (FCA) released a paper on DLT to explore "evidence-based rule making." The paper noted, "New technology plays a fundamental and increasingly pivotal role in delivering innovative products and services."[32] However, not all new financial services will benefit everyone. "Our objectives as a regulator mean that we need to strike a balance between supporting innovation and ensuring consumers are adequately protected."[33]

To stimulate discussion and help refine possible regulatory approaches, authorities have launched or commissioned research and published the results.

The European Central Bank released a discussion paper, "Distributed Ledger Technologies in Securities Post-trading: Revolution or Evolution?"[34] It noted that DLTs could "be the source of an imminent revolution." Its authors argued that DLTs could "stimulate a reorganization of financial markets, which could in turn: (1) reduce reconciliation costs, (2) streamline the post-trade value chain, and (3) allow more efficient use to be made of collateral and regulatory capital."[35]

Other studies include the European Securities and Markets Authority's 2016 report, "The Distributed Ledger Technology Applied to Securities Markets."[36] In 2017, the Financial Industry Regulatory Authority released "Distributed Ledger Technology: Implications of Blockchain for the Securities Industry."[37] The Blockchain Research Institute has conducted half a dozen projects on blockchain, cryptoassets, and capital markets (see Appendix B).

Enforcement activity

There is also enforcement activity. In Quebec, the first case was PlexCoin, trying to shut down an ICO that was allegedly promising returns of more than 1,350 percent in less than a month.[38] The Securities and Exchange Commission (SEC) filed parallel actions. There has also been much activity by securities regulators, particularly the SEC and the Commodity Futures Trading Commission (CFTC), and criminal authorities.

If people are using cryptocurrencies to run a pyramid scheme, launder money, or finance terrorism, then someone should stop them.

There has been much activity on the criminal side. Silk Road was the largest underground operation that allowed for the funding of murder for hire, for example, and the underlying payment system was Bitcoin blockchain. We have seen cases brought for AML and Bank Secrecy Act violations.

Everyone agrees that we should vigorously prosecute criminal activity. If people are using cryptocurrencies to run a pyramid scheme, launder money, or finance terrorism, then someone should stop them. We can and should apply the existing laws to this new industry, just as we would hope law enforcement would stop someone doing the same with fiat currencies or in traditional capital markets. However, running a con is quite different from funding a start-up through a token sale.

A major issue is the lack of clarity in many areas. While the consensus today is that bitcoin is not a security, the jury is still out on almost all other cryptoassets. In June 2018, the SEC provided some clarity on Ethereum when Bill Hinman, director of the SEC's division of corporation finance, gave at talk at Yahoo Finance All Markets Summit. He said,

While the consensus today is that bitcoin is not a security, the jury is still out on almost all other cryptoassets.

> *Putting aside the fundraising that accompanied the creation of ether, based on my understanding of the present state of ether, the Ethereum network, and its decentralized structure, current offers and sales of ether are not securities transactions. As with bitcoin, applying the disclosure regime of the federal securities laws to current transactions in ether would seem to add little value.*[39]

After bitcoin, ether is the second most valuable cryptocurrency in the markets today and is referred to as the "gas" that powers Ethereum's blockchain.

When is a token a security? Can a token change its form, which was from a security to a token, because management has expended its effort and there is no further effort on its part? Therefore, does the investment contract have to fail on the third prong—the expectation of profit from management's efforts—which is a view put forward by some regulators in the United States? What about the use of the *simple agreement for future tokens* (SAFT)? How can a bank discharge its AML/KYC obligation when opening up a bank account?

One problem the roundtable identified was the lack of a sensible tax taxonomy to categorize and understand digital assets. We concluded that, without a more granular analysis, digital assets are at risk of falling under securities legislation regardless of their function.

One problem we identified was the lack of a sensible tax taxonomy to categorize and understand digital assets.

No-action letters are common in the United States. According to the SEC, an individual or entity may ask SEC staff "whether a particular product, service, or action would constitute a violation of the federal securities law." The staff analyzes the facts and circumstances involved, discusses applicable laws and rules, and decides whether to grant a "request for no action," meaning that the "SEC staff would not recommend that the Commission take enforcement action against the requester based on the facts and representations described in the individual's or entity's request."[40] Canada should explore the same process.

Issues to address

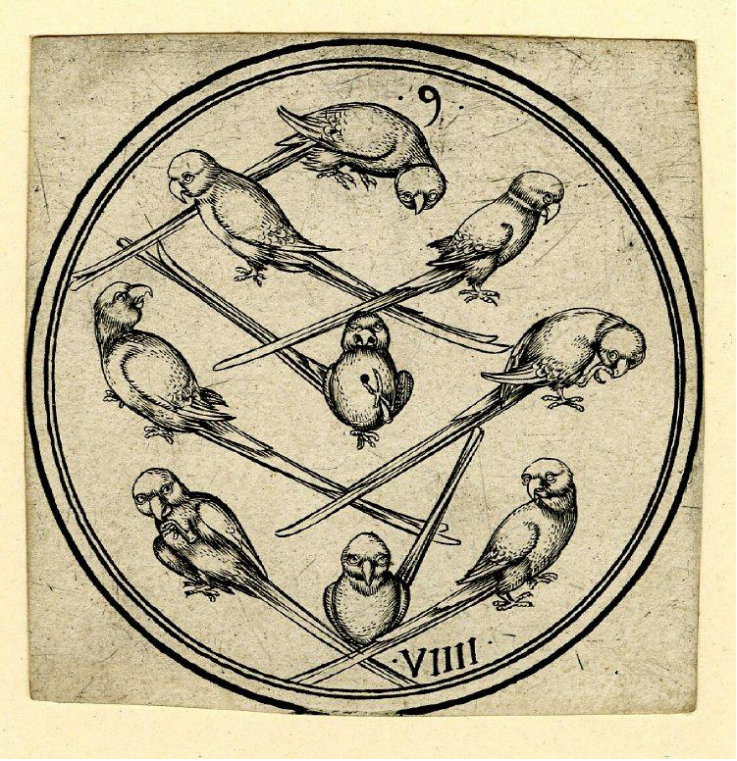
Lack of regulatory clarity

Groups like the Blockchain Research Institute and events such as this roundtable could foster shared understanding that is healthy and necessary.

Reporting on their discussions, the regulators said that they had a healthy debate about what should be the roles of regulators, professionals, and the industry. They discussed who should be driving the standards, enhancements, and initiatives to create greater efficiencies. For example, groups like the Blockchain Research Institute and events such as this roundtable could foster shared understanding that is healthy and necessary.

Some felt that there are limits to what a regulator—or especially a market supervisor—can do. Much should be driven by the community through self-regulation. Sometimes innovators are not familiar with the regulators' vocabulary or framework. As a result, an innovator effectively says none of the rules should apply and they should be able to do whatever they want. This is not sustainable for markets and not an advisable position for new entrants.

Both sides need help with vocabulary and cultural gaps. Initiatives such as the OSC LaunchPad, the AMF (Autorité des marchés financiers) Fintech Lab, and LabCFTC help with that.[41] They discussed the type of global sandbox that the UK FCA has proposed. This kind of mechanism will be helpful.



Nine of Parrots by Paul K, 2008, used under CC BY-SA 2.0.

The group felt that making efforts to identify gaps is important, whether it is a gap between securities laws, privacy laws, banking laws, money transmitter laws, and so on. We need to identify these gaps but also have realistic expectations.

The group also appreciated the tremendous opportunities blockchain offers for financial democratization. Blockchain enables new means of obtaining financing and capital investment for people traditionally excluded from the process. In many countries, citizens will be able to establish digital identities, participate in wealth creation, and experience reduced social disillusionment. Blockchain and crypto-economics can create opportunities and promote innovation. People can build business plans for which no sane person would have been able to get traditional venture capital funding.

Blockchain enables new means of obtaining financing and capital investment for people traditionally excluded from the process.

In reporting on its discussion, the innovators' working group said that, if we looked at blockchain in its simplest forms, it involves the clear concepts of *hash functions* (functions that compress large inputs into short outputs), *public keys* (the half of an encryption code or key pair used only to encode messages), and basic digital *automation* (operations execute in physical or virtual computers without human intervention).[42] The world should view blockchain in these terms. We must do more to raise public awareness of DLT and the innovation it enables.

The group also felt that the regulators understand quite well the processes involved. The innovators thought it was less a gap in understanding than in keeping up. No one said, "They don't understand what we're doing. You know, if only they could figure this out." That was not the concern.

During the roundtable, some innovators asked the regulators to "bring us the regulatory principles and let us implement them using blockchain technology to show you how we can achieve the solutions." In other words, regulators ought not regulate by mandate as their predecessors did. Instead, they should identify the principles that they want innovators to operate by, so that innovators could work out the blockchain solutions that would operate according to those principles. Entrepreneurs could probably implement some of these principles in ways that regulators have never considered. They said they could do it more efficiently and effectively, perhaps putting all parties on the same page and making their respective jobs easier. Regulators would no longer race to keep up with the constant evolution of technology, only to impose regulations inconsistent with blockchain's trajectory. That, the innovators said, is how regulation becomes an impediment.

Regulators should identify the principles that they want innovators to operate by, so that innovators could work out the blockchain solutions that would operate according to those principles.

Another issue raised by innovators was the lack of regulatory clarity and guidance. For example, many shared a view that any transaction involving cryptocurrencies would trigger a capital gain or a loss that had to be reported. Innovators want creative solutions from regulators such as adopting a *de minimis* threshold provision that regulators in other jurisdictions have adopted or simply giving guidance on the thorny issues that come up repeatedly in the blockchain community.

Few mechanisms for dialogue with regulators

Almost every innovator expressed a need for a fintech policy leader in Canada.

Almost every innovator expressed a need for a fintech policy leader in Canada. Many blockchain projects not only impact securities laws but also other laws, such as banking and insurance. It is uneconomic for them to be dialoguing and to get views from multiple regulators.

Similarly, there needs to be a multi-organization regulatory sandbox that addresses provincial and federal bodies where parties can dialogue with that one body and push their matter forward.

The regulators thought that harmonization could achieve a lot. Existing channels could use skilled people (such as those attending this conference) to help translate among channels. We need cross-functional teams and interdisciplinary effort.

The enterprise group participants also discussed the lack of a unified regulator in Canada. Without such a body, innovators must go to multiple regulators or government agencies. Because of the decentralized nature of the technology, a project often involves many regulators from other countries.

The regulators weighed the benefits and the detriments of a national regulator in Canada. Some regulators saw the value of a degree of unified regulation around crypto specifically. But the diversity of innovation cut across different lines—not just securities or even

Table 1: Achieving greater regulatory clarity

We provided this information to attendees for their working groups.

Issue/Question	Possible Solutions	Examples/Comments
Provide further regulatory clarity (proactive and collaborative guidance) Are cryptocurrencies securities? When is a token a security? Use of SAFTs? Solution to resale restrictions? Can a token change its form? How to discharge AML/KYC obligation when opening a bank account?	Request for comments Consultation papers	British Columbia Securities Commission (BCSC) Notice and Request for Comments: Consulting on the Securities Law Framework for Fintech Regulation
	Sandbox discussions (with immunity) United Kingdom, Singapore, Australia	Experiment and grow within boundaries without excessive regulation to reduce regulatory uncertainty and costs, and with limits on use of information
	No-action letters (published)	SEC No-Action Letters
	Exemptive relief orders	Only a handful issued to date
	Policy hearings	Policy Hearing on OSC Staff Notice 15-704, proposed enforcement initiatives
	Rule-making (evidence-based)	High frequency trading study

Source: Adapted from Usman Sheikh's opening remarks, 10 May 2018.

financial services but also privacy and consumer law. Because of the variety, participants see no clear lanes or even a clear vocabulary. Those involved often lack awareness of the terms used or a shared understanding of the meanings attached to them.

Because blockchain is a general-purpose technology, it will affect highly regulated areas well beyond financial services.

The regulator group was not monolithic. In fact, oversight of financial markets is highly fragmented in many countries: conduct regulators, market regulators, central bankers, and policymakers each have a role to play. Moreover, because blockchain is a general-purpose technology, it will affect highly regulated areas well beyond financial services—such as healthcare and pharmaceuticals—and unforeseen regulatory, policy, and governance questions will arise. We need a better understanding of the different roles and limitations on the authority of each stakeholder.

The regulator group pointed to existing standard-setting bodies. Some standards work is already underway at the ISO, the International Organization of Securities Commissions (IOSC), and other groups. They have functioned effectively in the past. We should determine whether we could leverage the existing processes and expertise in standard setting in the blockchain domain.

Inaccessibility of banking services

Lack of accessibility to traditional financial service is an obstacle for many blockchain businesses. Specifically, both the regulators' group and the entrepreneurs' group reported that one of the big

Valet of Parrots by Paul K, 2008, used under CC BY-SA 2.0.

impediments to blockchain innovation is the inability for new projects to set up bank accounts. Banks are worried about the reputation risk associated with blockchain projects, including the credit card risk, the fraud risk, and the lack of regulatory guidance.

A solution the regulatory group discussed was Chainalysis, which is effectively like a credit score. Chainalysis scrapes the web to try to determine if a crypto originates from organized crime.

A solution the regulatory group discussed was Chainalysis, which is effectively like a credit score. Chainalysis scrapes the web to try to determine if a crypto originates from organized crime.

Securitized token offerings (STOs) could be a solution. New regulations that apply to the ICO market could also help. If blockchain products or projects were willing to incorporate some dimension of customer protection, then that would assist banks.

One entrepreneur said the cannabis industry is instructive. Five years ago, everyone painted the cannabis industry unfairly with the same brush: as a bunch of pot-heads who couldn't get a bank account. Bank lending was effectively closed to the industry, and for a while only independent investment banks underwrote new offerings in the industry, opting to list companies via reverse takeover on Canada's smaller Canadian Securities Exchange (CSE) rather than risk a prospectus offering on the better-known Toronto Stock Exchange (TSX). Fast forward a few years and the cannabis industry has created $35 billion in market capitalization and become one of Canada's most important growth industries.

Commercial cannabis received funding because capital formed around it and people believed in it. If you believe in the blockchain, the opportunity is stark. ICOs are simply capital voting that they believe in the blockchain, which is going to evolve into STOs so that we can solve the AML and KYC issues. *Reverse takeovers* (RTOs) built the oil, gas, mining, and most recently cannabis industries, and—along with ICOs and STOs—RTOs may help to fund blockchain start-ups.

Table 2: Facilitating dialogue with regulators

Issue/Question	Possible Solutions	Examples/Comments
Suboptimal mechanisms to facilitate dialogue with regulators Uneconomic, time-consuming, and redundant dialogues with multiple regulators	Identify fintech policy lead for Canada	Delaware Blockchain Ombudsperson
Not enough regulatory collaboration and unified approach Challenges of a federalist system	Create multistakeholder regulatory sandbox with federal/provincial bodies with international collaboration ("bridges" or "landing pads," and global guidelines)	UK's Project Innovate, Singapore's Smart Financial Centre, and Australia have a unified financial sector regulatory framework and take national, unified approach to encourage fintech development

Source: Adapted from Usman Sheikh's opening remarks, 10 May 2018.

The entrepreneur said that capital formation would determine which jurisdictions succeed, just as it ensured Silicon Valley succeeded. Ontario could be a global center for capital markets for blockchain.

Outdated statutes and regulations

None of the innovators would say that we should ignore the laws or that they don't apply. But what worked in the 1980s or even 1990s does not work now.

The innovators' working group reported on the urgent need to reform security laws and AML. None of the innovators would say that we should ignore the laws or that they don't apply. But what worked in the 1980s or even 1990s does not work now.

We were reminded of something Blythe Masters, CEO of Digital Asset, told us in 2015. Masters, the consummate Wall Street insider turned blockchain pioneer, said,

> *Newcomers are simply able to do things that regulated institutions are not able to do, but one needs to think very carefully about why those regulations exist, and what purpose they serve, before one can conclude that exposing consumers to unregulated financial activities is a good thing.*[43]

Ultimately, the debate is not about the kind of society we want or the principles we want to apply; it is about the opportunities for regulators to steward this important global resource.

Ace of Roses by Paul K, 2008, used under CC BY-SA 2.0.

Regulators should be model users of the technology so that they understand intimately how they might apply some of the regulatory requirements in a new and more creative way.

The innovators agreed with the other working groups that a large educational gap exists. The public still equates blockchain with bitcoin or crypto. Innovators expressed some responsibility for dispelling this confusion. They suggested reframing the conversation and helping the public to distinguish a cryptocurrency from the many amazing goals that people are achieving with blockchain.

Regulators should be model users of the technology so that they understand intimately how they might apply some of the regulatory requirements in a new and more creative way.

Recommendations: Moving forward

Form an action commission

How do the citizens of Canada and other countries benefit from the views expressed at today's roundtable discussion? We need a more structured process in our countries. I can speak to Canada with my Canadian hat on. I won't use the phrase, "Royal Commission," because that sounds pretty old school and yields recommendations without results. We need an *action commission* to get the ball rolling and to move it forward. This would bring together a multistakeholder partnership that has funding and is authorized by the federal government. It would involve the provinces and cities because they care about this issue. We could get the big financial institutions and other players involved to drive this to a deeper level.

Table 3: Prioritizing and initiating statutory and regulatory reform

Issue	Possible Solutions	Examples/Comments
Statutory/regulatory reform Technologically-neutral and device-agnostic regulation Principle-based regulation Efforts to harmonize across jurisdictions	Address existing amendments that are not in force	Proceeds of Crime (Money Laundering) and Terrorist Financing Act for dealing in virtual currencies
	Update/neutralize legislation to address blockchain, smart contracts, etc.	Delaware corporate law amendments can now use DLT to maintain stock ledgers, communicate with stockholders, issue/ maintain shares on the ledger Arizona and Tennessee have smart contract legislation
	Develop specialized frameworks or licensing regimes for blockchain, where required	Need to be flexible and proportional to the risk

Source: Adapted from Usman Sheikh's opening remarks, 10 May 2018.

Enable self-sovereign identities

The new oil of the digital age is data. We create it, these intermediaries capture it, and it is a core catalyst of the bifurcation of wealth. We have growing economies and stagnating prosperity. We have enormous wealth creation and yet the middle class is shrinking in most Organization for Economic Cooperation and Development (OECD) countries. I've called it *digital feudalism:* under the feudal system, we vassals worked the land, but the lord owned the land, and so we had to give him the fruits of our labor. Sure, maybe he let us keep a few cabbages. The same applies to data in the digital age. What we need is a wholesale shift in how we think about data and identity sovereignty.

We need to help educate the public to distinguish a cryptocurrency from the many amazing results that people are achieving with blockchain.

Prerequisite to such a shift is a greater level of blockchain awareness among stakeholders and the public. The responsibility to dispel the confusion is on the market and the innovators. We need to reframe the conversation. We need to help educate the public to distinguish a cryptocurrency from the many amazing results that people are achieving with blockchain, and what they might do with a self-sovereign identity secured on a distributed ledger.

Establish a national regulator in Canada

As we alluded to earlier, the rise of blockchain and cryptoassets provides yet another reason most countries need a national securities regulator to oversee capital markets and protect investors. Today many countries have a hodgepodge collection of regulators separated by geographical or jurisdictional boundaries. Even in the United States where the SEC is a strong national regulator, there are other bodies dealing with certain asset types like commodities; fifty states have a role in governing cryptoassets as if they were currencies under their existing money transfer licensing regimes.

Canada may be the worst example—the only developed federal democracy that does not have a securities regulatory authority at the federal government level. Ten provinces, three territories, and the federal government all juggle responsibility for ensuring capital market functions efficiently and honestly—attempting to keep a watchful eye on issuers, investors, investment dealers, and other market players.

The rise of blockchain and cryptoassets provides yet another reason most countries need a national securities regulator to oversee capital markets and protect investors.

This model was set up to oversee a much simpler world where there were actual traders on stock exchange floors, and where the pace of innovation in capital markets was glacial and regionally confined. There was no global electronic trading, no derivatives, no program trading, or shadow banking system, and clearly no cryptoassets.

As recently as 2011, the Canadian Supreme Court ruled "that the day-to-day regulation of securities … essentially remains a matter of property and civil rights," which falls under exclusive provincial jurisdiction. The court argued for a cooperative approach between provinces where they could opt in to a national regulator. Progress has been limited.

Others have tried to institute a federal securities regulator who would provide national oversight of markets that were national and

increasingly international in character. Such a regulator would help to manage banks that operate nationally and beyond; manage risk in banking and capital markets; align policies across provinces; have better resources and tools to fight securities-related crime; ensure national capital market stability; respond more quickly to capital market innovation; and represent Canada internationally.

Flash forward to today, where the Internet of value is bringing entirely new types of cryptoassets including securities.

Flash forward to today, where the Internet of value is bringing entirely new types of cryptoassets including securities. They can be bought and sold globally and move across the country or around the world at the speed of light, bypassing not only provincial and national borders but also stock exchanges, investment bankers, dealers, custodians, lawyers, clearing houses, and all the other participants in today's capital markets.

In general, roundtable attendees agreed that a balkanized regulatory regime has no hope of developing a sensible, fair, coherent, consistent, and sophisticated response to this explosion of new securities and what may well lead to the complete upending of capital markets. This is a world where anyone in the country can create a security, raise funds through a token initiation event, or take any asset and tokenize it.

Valet of Carnations by Paul K, 2008, used under CC BY-SA 2.0.

As many participants including regulators noted, developing effective regulation that both protects investors and fosters innovation in business and capital markets is a profound challenge. Consider the difficulty of reaching consensus on any taxonomy of cryptoassets, let alone formulating policy and regulations around them. These tasks require sophistication, access to good research, regulatory sandboxes that can scale, and strong links to policy development and law enforcement—all on a national level. Otherwise, picture thirteen regulators from Canada seeking the attention of, or participating effectively in, the growing global regulatory infrastructure.

Developing effective regulation that both protects investors and fosters innovation in business and capital markets is a profound challenge.

Not one participant at the roundtable opposed this idea. Capital markets are in the early days of a complete blockchain upheaval, overall for the good. We need national and global responses sooner rather than later.

Agree on distinctions among cryptoassets

A starting point for regulatory clarity is to develop a clear and sensible taxonomy of digital assets. One of our frameworks to do this was presented at the roundtable. It has seven types of cryptoassets:

- *Cryptocurrencies* like bitcoin, the granddaddy of all cryptoassets, are instruments of exchange, stores of value, and units of account. To wit, Bitcoin today holds over $100 billion and supports billions a day in global transactions. Banks are taking notice, going from "bitcoin bad, blockchain good," to "bitcoin, yikes!" JPMorgan and Bank of America are speaking openly about the risks cryptocurrencies pose to their business, and Goldman Sachs and TMX Group's Shorcan are moving swiftly to trade these assets.
- *Platform tokens* like ether of the Ethereum blockchain, a $40 billion mega-unicorn and Canada's most successful start-up *ever,* are designed to support decentralized applications that eliminate intermediaries in virtually every facet of the economy. Ethereum has also emerged as the leading platform for ICOs where a project can tap into global pools of capital. To date, entrepreneurs have raised over $7 billion through ICOs, 70 percent of them using Ethereum's standard, ERC-20. Ethereum and its challengers—Cosmos, Aion, and ICON—will form the backbone of the next era of the Internet.

A starting point for regulatory clarity is to develop a clear and sensible taxonomy of digital assets.

- *Utility tokens* are programmable blockchain assets that have utility in an application such as Golem, which aims to aggregate the power of the world's smartphones into a decentralized supercomputer that anyone can use to run computations in exchange for golem tokens. Think Amazon Web Services without Amazon.
- *Security tokens* are native digital bonds, equities, and other securities that trade peer to peer without financial intermediaries. Why should a stock trade settle in three days (T+3) when buyer and seller can trade directly and settle instantaneously (T+0) on a decentralized exchange? The CSE intends to get into this market. Others would be wise to

follow. ICOs have already upended venture capital. Bay Street will be next.

- *Natural asset tokens* represent tangible goods like gold, oil, or carbon in peer-to-peer markets with real-time settlement. For example, the Royal Mint partnered with the Chicago Mercantile Exchange to create Royal Mint Gold, a digital gold token backed by gold bullion in the Royal Mint's vaults. The entire commodities market is up for grabs, as is mass-market carbon trading.

Companies like Everledger are enabling the tracking and trading of rare and very real collectibles on the blockchain.

- *Crypto collectibles* are unique digital assets. Consider CryptoKitties, an app that enables users to purchase, raise, and even breed unique virtual pets. As of January 2018, CryptoKitties' 235,000 users had conducted $52 million in transactions. Crypto collectibles can also represent unique tangible assets like Picasso's paintings. Companies like Everledger and others are enabling the tracking and trading of these rare and very real collectibles on the blockchain.
- *Crypto fiat currencies* are issued and governed by central banks. In 2017, Venezuela shocked many by announcing its launch of the petro, a cryptocurrency backed by the country's vast oil reserves. The Federal Reserve and the Bank of Canada should take notice: implemented properly, crypto fiat currencies can make markets more efficient, transparent, and inclusive—and central bank policy more responsive to crises and shocks.

Support blockchain entrepreneurs and innovators

As noted above, entrepreneurs in the blockchain space have greater difficulty securing bank accounts and related financial and professional services than entrepreneurs in other technologies. Contributors to our roundtable said that the mere mention of the words, *bitcoin*, *blockchain*, or *cryptocurrency* was cause for rejection.

Entrepreneurs in the blockchain space have greater difficulty securing bank accounts and related financial and professional services than entrepreneurs in other technologies.

Bank executives at the roundtable listed their reasons for declining the business of blockchain entrepreneurs, chief among them:

- Legal risk of unwittingly facilitating criminal activity or holding the proceeds of crime
- Financial risk of the companies' failing (especially without assets to liquidate or know-how to apply)
- Reputational risk; no one wants to back criminals or people who talk a good game but can't deliver

These reasons reflect the banking sector's lack of understanding of the blockchain ecosystem. Many blockchains are public and fully transparent, and so these platforms are a poor choice for criminal activity. From an investigator's perspective, the architecture of blockchain—an open forensic ledger of transactions between parties—has provided material evidence in the prosecution of criminal cases. The adage that sunlight is the best disinfectant applies very

Ace of Carnations by Paul K, 2008, used under CC BY-SA 2.0.

much in these circumstances. Companies that use distributed ledgers and public blockchains can prove the provenance of their funds quickly, openly, and transparently.

In terms of financial risk, banks have no solid business reason for treating blockchain ventures differently from any other technology start-up. While many start-ups fail, banks should evaluate their credit risk case by case, rather than by blockchain industrywide.

In terms of financial risk, banks have no solid business reason for treating blockchain ventures differently from any other technology start-up.

Where reputation is concerned, financial institutions must to do their due diligence on a company's management team, advisory board, and business plan, as they would with any early-stage company. While know-your-client procedures are time-consuming and costly, banks should understand blockchain technology and its broader applications to distinguish one business account applicant from another. The task for financial institutions is not to paint all blockchain companies with the same brush.

In this vetting process, banks should also be able to distinguish three types of companies in this space, each with its own special considerations for financial institutions:

» *Companies that have conducted or plan to conduct a token initiation event*. Token-based finance has raised massive amounts of cryptocurrency from a worldwide base of

investors, with varying policies for KYC and AML. Many companies have conducted ICOs with rigorous KYC and AML policies, have raised funds from accredited investors, and attempted to follow the rules in their jurisdictions, though not all.

- *Companies (exchanges, wallet providers) not conducting a token initiation event*. Many blockchain companies are privately funded through the appreciation of one or two cofounders' early investments in cryptocurrency. Banks need to come to terms with the reality that early adopters of cryptocurrencies are simply a new kind of high net worth client. Any market volatility of the assets underpinning these types of blockchain companies has been characteristic not just of blockchain start-ups but to any start-up.
- *Companies building on non-financial platforms*. Organizations such as think tanks, advisory firms, exchanges, or distributed applications each have a role to play in the ecosystem, and often have simple, transparent business practices.

It is time for banks to develop real expertise in assessing blockchain businesses and create a more equitable and competitive landscape by opening accounts for this growing new industry.

Not all financial services are created equal, and neither are all blockchain companies. As Wells Fargo demonstrated, some banks take greater risks than others. Limiting access to banking services has deprived many blockchain start-ups of basic business tools and the ability to compete. It has forced them to pay for products and services in cryptocurrencies and operate out of the mainstream. It is time for banks to develop real expertise in assessing blockchain businesses and create a more equitable and competitive landscape by opening accounts for this growing new industry.

Encourage special interest groups

All aspects of blockchain technologies are moving quickly. No one group can move forward all issues in all applications in all industries. We need multiple governance bodies as we have for the Internet or for banking and finance. For example, Jeff Bandman described the formation and launch of Global Digital Finance (GDF) as a group of cryptoasset stakeholders who seek to "drive the acceleration and adoption of digital finance technologies to support the next era of digital commerce."[45] Its working groups involve both private and public sectors.

All aspects of blockchain technologies are moving quickly.

Jeff explained that global capital flows often require global standards, yet standards for the token markets and the token economy do not yet exist. GDF aims to be the global convening body for creating a taxonomy for global digital finance, developing a professional code of conduct, promoting industry best practices, and interfacing with such global regulatory and policymaking bodies as the International Open Solutions Centre, the OECD, the Financial Stability Board, and the Bank for International Settlements.[46]

Conclusion: A new vision for regulation

"Whose job is regulation anyway?" asked one of our roundtable members. It was a rhetorical question. Just as war is too important to leave to the generals, regulation is too important to leave to the regulators.

Just as war is too important to leave to the generals, regulation is too important to leave to the regulators.

Today a limited number of non-governmental entities help to ensure that capital markets run effectively and participants behave honestly. These entities include voluntary industry trade organizations that provide guidance and establish consensus on best practices and standards, as well as brokers, investment bankers, and lawyers—all of whom typically advise clients to act with integrity and within the law.

However, in a world with potentially billions of new digital assets being issued, millions of individuals and small companies creating and selling what are very likely securities, and a pace of innovation faster than today's by orders of magnitude, we need new ideas and new actors to protect investors and the optimal functioning of markets.

Our work on the governance of blockchain ecosystems attracted interest at the roundtable. For years, we have been investigating how non-state, multistakeholder networks involving the private sector, civil society, and governments at any level can help solve problems and govern processes previously considered the exclusive purview of government regulators. The Blockchain Research Institute has

Valet of Hares by Paul K, 2008, used under CC BY-SA 2.0.

defined seven types of these multistakeholder networks that together can govern a resource like ocean fisheries, old growth forests, or even the Internet itself (Figure 2).

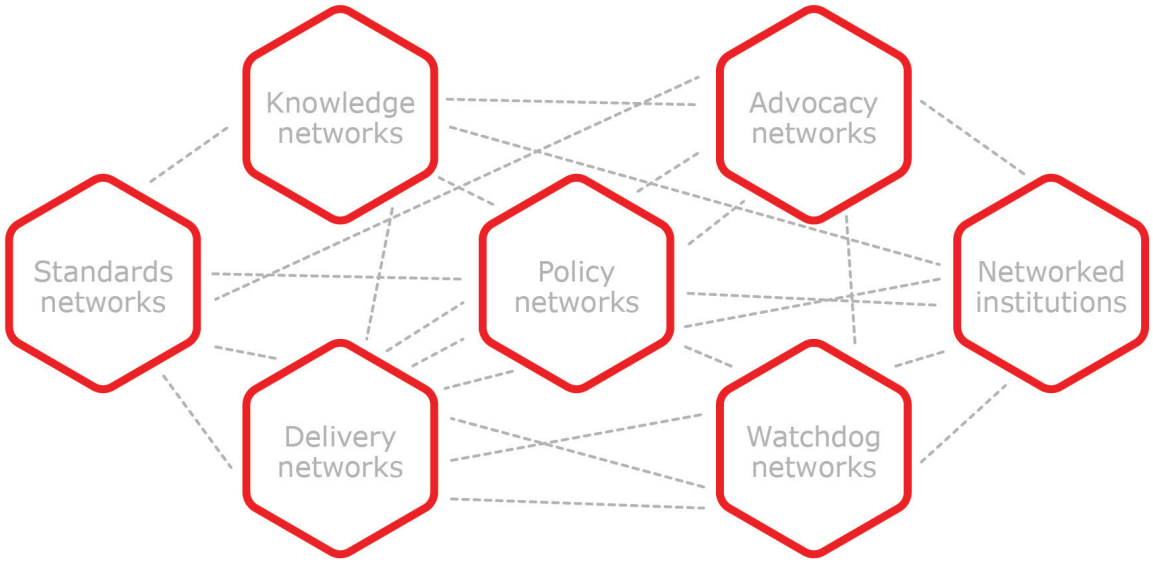
Today the Internet is stewarded through standards networks like the Internet Engineering Task Force and World Wide Web Consortium. Policy groups like the Internet Governance Forum develop Internet policy and proposed rules. Advocacy groups like the Electronic Frontier Foundation fight for an open Internet and to protect privacy of users. Networked institutions like the World Economic Forum participate in ensuring a heathy Internet development. Operational networks such as Internet Committee for Assigned Names and Numbers deliver basic functions and infrastructure and dispense domain names.

The issue is how to achieve effective governance beyond what government alone can do.

The issue is how to achieve effective governance beyond what government alone can do. In 2017, pre-dating our work on this topic, Alex Tapscott and I wrote, "Realizing the Potential of Blockchain: A Multistakeholder Approach to the Stewardship of Blockchain and Cryptocurrencies," for the World Economic Forum (WEF). As the forum press release said:

> *The report provides structured analytical framework and taxonomy for use by industry, technical, governmental, civil society and other stakeholders in considering how they might collaborate to resolve problems and unlock opportunities beyond the reach of any single actor. It argues that the model that evolved in the 1990s and 2000s to govern the Internet serves as a model for how to govern this new resource: through a multistakeholder approach involving business, government, civil society, and the technical community.*[47]

Figure 2: Multistakeholder networks



How might this apply to the governance of capital markets in the age of cryptoassets and blockchain transformation? Rather than governments shouldering the entire regulatory burden, they would have a strong role in creating principles that drive the behavior of all participants in capital and other markets—implemented not primarily by regulators but by a vast self-organizing ecosystem of stakeholders driven by common interest and applying blockchain-based solutions. Different types of these organizations and multistakeholder networks could perform different functions of the regulatory portfolio.

How might a multistakeholder network apply to the governance of capital markets in the age of cryptoassets and blockchain transformation?

Stakeholders in the space could codify their common ground through standards networks; respect members' interests and constraints through advocacy networks; help ensure that no one does any harm through watchdog networks; welcome stakeholders with radically diverse views of what needs to be done through networked institutions like the WEF participate in policy debates and coordinate regulation through policy networks; get up to speed through knowledge networks; and build required market infrastructures through operational networks.

Such a regulatory system could respond faster to innovation with a lighter touch and deal with the myriad complexities of the countless new actors in blockchain-enabled markets because a broader ecosystem could step up to safeguard market functioning and participant behavior. Transparency could act as a good disinfectant rather than as government enforcement only. Above all, the ecosystem could use blockchain itself to help oversee the process.

Is this a utopian ideal? Not necessarily. We already use multistakeholder networks to govern the Internet today. What about those who flout the system and violate the principles of the ecosystem? Of course, as a last resort, when users break laws, governments should take action. We view such concerns as "implementation challenges" rather than as "reasons why blockchain is a bad idea."

Above all, the ecosystem could use blockchain itself to help oversee the process.

One participant suggested that the Blockchain Research Institute explore such a regulatory ecosystem further, and legal scholar Joel Telpner—partner and head of the fintech and blockchain practice for the global law firm, Sullivan and Worcester—agreed on the spot to be our project manager. We are expecting research from his group in a few months.

Appendices

Appendix A: Participants

Organization	First name	Last name	Title
Accenture Canada	Iliana	Ortiz Valiente	Managing Director, Global Blockchain Innovation Lead
Aion	Kesem	Frank	Co-founder
Autorité des marchés financiers	Moad	Fahmi	Director, Fintech and Innovation
Bandman Advisors	Jeff	Bandman	Principal
Bank of Canada	Scott	Hendry	Senior Special Director, Fintech, Funds Management and Banking
Bitfury	John	Mercurio	Chief Communications Officer
Blockchain Research Institute	Maryantonett	Flumian	Director, Client Experience
Blockchain Research Institute	Don	Tapscott	Executive Chairman, Co-founder
Blockscale Solutions, Blockchain Learning Group	Chami	Akmeemana	Chief Executive Officer
BMO Financial Group/BMO Harris	Stuart	Davis	Enterprise Chief Anti-Money Laundering Officer
Canaccord Genuity	Patrick	Burke	President, Capital Markets
Canaccord Genuity	Rachel	Kirkwood	Associate Investment Advisor
Canaccord Genuity	Michael	Kogan	Managing Director, Blockchain and Digital Assets, Canada
Canadian Securities Exchange	Richard	Carleton	Chief Executive Officer
Capgemini Canada	Sanjay	Tugnait	Chief Executive Officer
CIBC	Bob	Kapur	Deputy Chief Anti-Money Laundering Officer
Coinsquare	Cole	Diamond	Chief Executive Officer
ColliderX	Mawadda	Basir	Executive Director
Communitech	Stephen	Bacso	Executive-in-Residence
Consensus Systems Canada	Russell	Verbeeten	Managing Director
Decentral	Addison	Cameron-Huff	President
Diagram Ventures	Mathieu	Boulianne	Lead, Blockchain Initiative
Diagram Ventures	Francois	Lafortune	Founder and Chief Executive Officer
FAIR Canada	Frank	Allen	Executive Director
GMP Capital	Harris	Fricker	President and Chief Executive Officer
Gowling WLG	Ian	Palm	Partner
Gowling WLG	Usman	Sheikh	Partner; National Head, Blockchain and Smart Contract Group; National Litigation Lead, Securities, Compliance, and Investigations
Hut 8 Mining	Andrew	Kiguel	President, Chief Executive Officer, and Director
iComplyICO	Matthew	Unger	Chief Executive Officer
Institute on Governance	Matt	Jackson	Director
Interac	Debbie	Gamble	Vice President, Digital Products and Platforms
International Monetary Fund	Jess	Cheng	Counsel, Legal Department
Investment Industry Regulatory Organization of Canada	Wendy	Rudd	Senior Vice President, Member Regulation and Strategic Initiatives
KPMG Canada	Frankie	Davenport	Senior Manager, Tax Transformation and Technology
KPMG Canada	Corina	Deaconu	Director, Financial Risk Management

Organization	First name	Last name	Title
KPMG Canada	Paritosh	Gambhir	GTA Audit Innovation Leader; Partner, Audit Financial Services
KPMG Canada	Diana	Lowe	Partner
KPMG Canada	Kapil	Ramgirwar	Senior Manager, Audit
Manulife	Amit	Bhatia	Head, Lab of Forward Thinking
MMH Blockchain Group	Emma	Todd	Chief Executive Officer, Co-founder
Office of Alec Ross, Candidate for Maryland Governor	Ben	Scott	Tech Advisor
Ontario Securities Commission	Pat	Chaukos	Deputy Director, OSC LaunchPad
Osler, Hoskin, and Harcourt	Blair	Wiley	Partner, Corporate
Osler, Hoskin, and Harcourt	Blair	Wiley	Partner, Corporate
Outlier Solutions	Amber	Scott	Founder and Chief Anti-Money Laundering Ninja
Paycase Financial	Zach	Justein	Head, Business Development and Legal Affairs
Polymath	Chris	Housser	Co-founder and Chief Operations Officer
Polymath	Rachel	Lam	Vice President, Regulatory Strategy
Power Corporation of Canada	Kris	Hansen	Chief Technology Officer
Province of Ontario	Giles	Gherson	Deputy Minister, Research, Innovation, and Science; Deputy Minister, Economic Development and Growth
Province of Ontario	Steve	Orsini	Secretary of the Cabinet, Head of Public Service, and Clerk of the Executive Council
Royal Bank of Canada	Matt	Lowe	Associate Director, Emerging Risk
Royal Bank of Canada	Alexander	Peh	Vice President, Innovation and Enterprise Architecture
Royal Bank of Canada	Jay	Stark	Chief Anti-Money Laundering Officer, and Senior Vice President, Financial Crimes
Royal Canadian Mounted Police	John	Corelli	Deputy Director, Crown Law Office, Criminal Division, Office of the Attorney General
Scotiabank	David	Lee	Anti-Money Laundering Manager
Scotiabank	Mark	Strang	Senior Vice President, International Banking and Enterprise Programs Compliance
SOFTEL Communications	John	Cognata	Business Development Executive
SOFTEL Communications	Shelly	Peled	Software Development Manager
Sullivan and Worcester LLP	Joel	Telpner	Partner, Corporate and Finance
Sullivan and Worcester LLP	Mari	Tomunen	Associate, Corporate
Tendermint	Ethan	Buchman	Co-founder and Chief Technology Officer
The Blockchain Initiative	Alan	Quarry	Founder, Chair
TMX Group	David	Stanton	Enterprise Chief Risk Officer
TokenFunder	Alan	Wunsche	Chief Executive Officer and Chief Token Officer
Toronto-Dominion Bank	Caitlin	Riddolls	Vice President, Anti-Money Laundering
TSX Venture Exchange	Brady	Fletcher	Managing Director

Appendix B: Research for further reading

For more information about the topics discussed and the issues raised in this summary, we recommend reading the following case studies and white papers. (The titles of forthcoming papers are approximate and meant only to denote the research underway.)

Davide Cargnello and Matt Jackson, "Certifying Canada's IP on the Blockchain: Canadian Intellectual Property Office Prepares for the Future," Blockchain Research Institute and Innovation, Science and Economic Development Canada, forthcoming 2018.

Michael J. Casey, "The Token Economy: When Money Becomes Programmable," Blockchain Research Institute, 28 Sept. 2017.

Soumak Chatterjee, Louisa Bai, Vikas Singla, Kshitish Balhotra, and Neha Bhasin, "Blockchain in Global Trade: Breaking Down Barriers and Revitalizing International Commerce in the Digital Era," Blockchain Research Institute, forthcoming 2018.

Soumak Chatterjee, "State-Backed Cryptocurrencies," Blockchain Research Institute, forthcoming 2018.

Alan D. Cohn, "Blockchain at our Borders: US Customs and Border Protection Explores the Promise of Blockchain Technology," Blockchain Research Institute, 30 Nov. 2018.

Primavera De Filippi and Greg McMullen, "Governance of Blockchain Systems: Governance of and by Distributed Infrastructure," Blockchain Research Institute and Coalition of Automated Legal Applications, 27 June 2018.

Primavera De Filippi, Constance Choi, et al., "Identity and Privacy: Exploring the Potential of Distributed Ledgers," Blockchain Research Institute and Coalition of Automated Legal Applications, forthcoming 2018.

Primavera De Filippi, Benedikt Schuppli, et al., "Regulatory Framework for Token Sales: An Overview of Relevant Laws and Regulations in Different Jurisdictions," Blockchain Research Institute and Coalition of Automated Legal Applications, 30 April 2018.

Paritosh Gambhir and Jennifer Han, "Blockchain Technology in Commercial Banks: The Safer Globalized Future of Banking," Blockchain Research Institute, forthcoming 2018.

Vlad Gheorghiu, Sergey Gorbunov, Michele Mosca, and Bill Munson, "Quantum-Proofing the Blockchain," Blockchain Research Institute, 23 Nov. 2017.

Thomas M. Isaacson, "Patents and Blockchain Innovation: Strategic Approaches to Intellectual Property," Blockchain Research Institute, 29 Jan. 2018.

Christian Keil, "Standardized and Decentralized? Rethinking the Blockchain Technology Stack," Blockchain Research Institute, 28 Feb. 2018.

Alan Majer, "How Blockchain Could Help Regulators: A Case for Piloting Government Agency Projects," Blockchain Research Institute and Innovation, Science, and Economic Development Canada, forthcoming 2018.

Massimo Morini, "Derivatives," Blockchain Research Institute, forthcoming 2018.

Andreas Park, "Managing Blockchain Transparency: Strategies for a Private/Open World," Blockchain Research Institute, 10 Nov. 2017.

Rachel W. Robinson, "Distributed and Collaborative Marketplaces: Blockchain Serving the Unbanked," Blockchain Research Institute, 22 Jan. 2018.

Tony Scott, "Reinventing Government," Blockchain Research Institute, forthcoming 2018.

Usman Sheikh, "Blockchain and the Chief Legal Officer," Blockchain Research Institute, forthcoming 2018.

Usman Sheikh, "Reverse Takeovers," Blockchain Research Institute, forthcoming 2018.

Prima Shrikrishna and Vineet Narula, "Belt and Road Blockchain Consortium: Building Digital Trust for Cross-Border Trade," Blockchain Research Institute, 24 May 2018.

Nick Szabo, "Winning Strategies for Smart Contracts," Blockchain Research Institute, 4 Dec. 2017.

Bob Tapscott, "Reinventing International Clearing and Settlement: How Distributed Ledger Technology Could Transform our Global Payment System," Blockchain Research Institute, 16 Jan. 2018.

Don Tapscott, "Declaration of *Interdependence*: Blueprint for a New Social Contract in the Digital Economy," Blockchain Research Institute, 16 Jan. 2018.

Don Tapscott, Hilary Carter, and Jill Rundle, "The Networked Hotbeds of Blockchain: Creating Global Hubs for the Internet's Second Era," Blockchain Research Institute, 15 Jan. 2018.

Don Tapscott and Christian Keil, "Nets, Webs, and Chains: How Blockchain Can Secure the Future of the Open Internet," Blockchain Research Institute, forthcoming 2018.

Murtaza Tawawala, "Indian State Land Title Transfers on the Blockchain," Blockchain Research Institute, forthcoming 2018.

Joel Telpner, "Rethinking the Regulation Paradigm: Principles and Practice," Blockchain Research Institute, forthcoming 2018.

Joel Telpner, "The Lion, the Unicorn, and the Crown: Striking a Balance between Regulation and Blockchain Innovation," Blockchain Research Institute, 10 May 2018.

Fennie Wang, Primavera De Filippi, Alexis Collomb, and Klara Sok, "Financing Open Blockchain Ecosystems: Toward Compliance and Innovation in Initial Coin Offerings," Blockchain Research Institute and Coalition of Automated Legal Applications, 16 March 2018.

Anthony Williams, "Consolidating Multiple Ledgers with Blockchain: A Single Digital Ledger for the Government of Canada Accounts," Blockchain Research Institute and Innovation, Science, and Economic Development Canada, forthcoming 2018.

Alan Wunsche, "Business Licensing: Governance for Government Blockchains," Blockchain Research Institute and Innovation, Science, and Economic Development Canada, 29 March 2018.

About Don Tapscott

Don Tapscott, CEO of the Tapscott Group and cofounder and executive director of the Blockchain Research Institute, is one of the world's leading authorities on the impact of technology on business and society. He has authored over 15 books, including *Wikinomics: How Mass Collaboration Changes Everything,* which has been translated into over 25 languages.

Don has been advancing groundbreaking concepts for over four decades. His 1992 bestseller, *Paradigm Shift,* helped coin this seminal management concept, and *The Digital Economy*, written in 1995, changed business thinking about the transformational nature of the Internet. Two years later he helped popularize the terms "Net Generation" and "the Digital Divide" in *Growing Up Digital.*

Don's most recent and ambitious book was co-authored with his son, start-up CEO and bitcoin governance expert Alex Tapscott. *Blockchain Revolution: How the Technology Underlying Bitcoin is Changing Money, Business, and the World* was published in May 2016, was updated and expanded as a paperback in May 2018, and is "*the* book, literally, on how to survive and thrive in this next wave of technology-driven disruption," according to Harvard Business School's Clay Christensen.

Don is a member of the Order of Canada and ranked the second most influential management thinker in the world by *Thinkers50*. He is an adjunct professor at the Rotman School of Management and chancellor of Trent University in Ontario.

About the Blockchain Research Institute

Co-founded in 2017 by Don and Alex Tapscott, the Blockchain Research Institute is a knowledge network organized to help realize the new promise of the digital economy. It builds on their yearlong investigation of distributed ledger technology, which culminated in the publication of their critically acclaimed book, *Blockchain Revolution* (Portfolio|Penguin).

Our syndicated research program, which is funded by major corporations and government agencies, aims to fill a large gap in the global understanding of blockchain technology and its strategic implications for business, government, and society.

Our global team of blockchain experts is dedicated to exploring, understanding, documenting, and informing leaders of the market opportunities and implementation challenges of this nascent technology.

Research areas include financial services, manufacturing, retail, energy and resources, technology, media, telecommunications, healthcare, and government as well as the management of organizations, the transformation of the corporation, and the regulation of innovation. We also explore blockchain's potential role in the Internet of Things, robotics and autonomous machines, artificial intelligence, and other emerging technologies.

Our findings are initially proprietary to our members and are ultimately released under a Creative Commons license to help achieve our mission. To find out more, please visit www.blockchainresearchinstitute.org.

Leadership team

Don Tapscott – Co-Founder and Executive Chairman
Alex Tapscott – Co-Founder
Joan Bigham – Managing Director, International
Hilary Carter – Managing Director, Canada
Kirsten Sandberg – Editor-in-Chief
Jane Ricciardelli – Director of Marketing
Maryantonett Flumian – Director of Client Experience
Luke Bradley – Director of Communication

Disclosures

We have made best efforts to confirm titles and affiliations of those who were able to attend. As of this writing, Mathieu Boulianne is co-founder, operations and strategy, at EOS Canada; Rachel Lam is market lead, financial services, at Hedera Hashgraph; and Giles Gherson is deputy minister, red tape and regulatory burden reduction, in the Cabinet Office of the Province of Ontario. We were unable to confirm Kris Hansen's status at Power Corporation of Canada. Finally, Zach Masum, head of the tech team and manager of legal services, capital markets regulation, at the British Columbia Securities Commission attempted to join via TelePresence; we were unable to establish a connection.

Notes

1. Jason Weinstein, "How Can Law Enforcement Leverage the Blockchain in Investigations?" *Coincenter.org*, Coin Center, 12 May 2015. coincenter.org/entry/how-can-law-enforcement-leverage-the-blockchain-in-investigations; and Gareth Jenkinson, "Unpacking the Five Biggest Cryptocurrency Scams," *Cointelegraph*, Cointelegraph, 18 April 2018. cointelegraph.com/news/unpacking-the-5-biggest-cryptocurrency-scams, both accessed 25 July 2018.
2. Samuel Haig, "Regulatory Round-Up: South Korea Says Laissez Faire, Zimbabwe Dislikes and Singapore to Regulate," *Bitcoin News, Bitcoin.com*, Saint Bitts LLC, 24 Nov. 2017. news.bitcoin.com/regulatory-round-up-south-korea-says-laissez-faire-zimbabwe-dislikes-and-singapore-to-regulate, accessed 25 July 2018.
3. Joel Telpner, "The Lion, the Unicorn, and the Crown," White Paper, foreword by Don Tapscott, Blockchain Research Institute, The Tapscott Group, May 2018.
4. "Chatham House Rule," *Chatham House*, The Royal Institute of International Affairs, n.d. www.chathamhouse.org/chatham-house-rule, accessed 25 July 2018.
5. Don Tapscott, Hilary Carter, and Jill Rundle, "The Networked Hotbeds of Blockchain: Creating Global Hubs for the Internet's Second Era," White Paper, Blockchain Research Institute, The Tapscott Group, 12 Jan. 2018.
6. Nikhilesh De, "Hacks, Scams and Attacks: Blockchain's 2017 Disasters," *CoinDesk*, Digital Currency Group, 29 Dec. 2017. www.coindesk.com/hacks-scams-attacks-blockchains-biggest-2017-disasters, accessed 30 July 2018.
7. Pindar Wong, interviewed via telephone by Don Tapscott, 7 April 2017.
8. Computershare, "Canadian Proxy Reform–The Continuing Story," *Computershare*, Computershare Trust Company of Canada, 2017. www.computershare.com/ca/en/insync/winter-2017/proxy-reform, accessed 30 July 2018.
9. "CSA Staff Notice 54-305: Meeting Vote Reconciliation Protocols," Notice of Publication, Ontario Securities Commission, 26 Jan. 2017. www.osc.gov.on.ca/en/SecuritiesLaw_csa_20170126_54-305_meeting-vote.htm, accessed 30 July 2018.
10. The S & P 500 is an American stock market index based on the market capitalizations of 500 large companies having common stock listed on the NYSE or NASDAQ. The S & P 500 Index components and their weightings are determined by S & P Dow Jones Indices. Typically, the smallest member of the index has a market capitalization of around $7 billion to $9 billion.
11. Jim Epstein, "Bitcoin Sends Elite Economists into Glorious Fits of Confusion," *Reason.com*, Reason Foundation, 30 Nov. 2017. reason.com/blog/2017/11/30/bitcoin-joseph-stiglitz-crypto-outlaw, accessed 10 April 2018. Both Joseph Stiglitz and Paul Krugman have expressed skepticism about bitcoin.
12. Noah Buhayar, "Munger Calls Bitcoin a 'Noxious Poison' Government Should Tackle," *Bloomberg Markets*, Bloomberg LP, 14 Feb. 2018. www.bloomberg.com/news/articles/2018-02-14/munger-calls-bitcoin-a-noxious-poison-government-should-tackle, accessed 10 April 2018.
13. David Floyd, "$6.3 Billion: 2018 ICO Funding Has Passed 2017's Total," *CoinDesk*, Digital Currency Group, 19 April 2018. www.coindesk.com/6-3-billion-2018-ico-funding-already-outpaced-2017, accessed 30 July 2018.

14. Mike Orcutt, "EOS's $4 billion Crypto-Democracy Has Just Launched—and It's Probably Going to be Ruled by Fat Cats," *MIT Technology Review*, Massachusetts Institute of Technology, 14 June 2018. www.technologyreview.com/s/611475/eoss-4-billion-crypto-democracy-has-just-launchedand-its-probably-going-to-be-ruled-by-fat, accessed 30 July 2018.
15. Anthony Cuthbertson, "Telegram Cancels $1.7 Billion ICO Cryptocurrency Crowdfund," *The Independent*, Independent Digital News and Media Ltd., 3 May 2018. www.independent.co.uk/life-style/gadgets-and-tech/news/telegram-ico-cryptocurrency-bitcoin-ton-a8334551.html, accessed 30 July 2018.
16. "SWIFT gpi: Delivering the Future of Cross-Border Payments, Today," *Society for Worldwide Interbank Financial Telecommunication*, SWIFT SCRL, Jan. 2017. www.swift.com/file/31751/download?token=BK_pC-m9, accessed 9 Jan. 2018.
17. "SWIFT global payments innovation (gpi)," *Society for Worldwide Interbank Financial Telecommunication*, SWIFT SCRL, n.d. www.swift.com/our-solutions/global-financial-messaging/payments-cash-management/swift-gpi/the-technological-transformation-of-cross-border-payments, accessed 9 Jan. 2018.
18. "SWIFT global payments innovation (gpi)."
19. Bob Tapscott, "Reinventing International Clearing and Settlement," White Paper, foreword by Don Tapscott, Blockchain Research Institute, The Tapscott Group, 16 Jan. 2018.
20. Those include ISO/TC 307 SG1 reference architecture, taxonomy, and ontology; ISO/TC 307/SG 2 use cases; ISO/TC 307/SG 3 security and privacy; ISO/TC 307/SG 4 identity; and ISO/TC 307/SG 5 smart contracts.
21. "SWIFT Tests Show Blockchain Has Potential for Global Liquidity Optimization," Press Release, *Society for Worldwide Interbank Financial Telecommunication*, SWIFT SCRL, 13 Oct. 2017. www.swift.com/news-events/press-releases/swift-tests-show-blockchain-has-potential-for-global-liquidity-optimisation, accessed 25 July 2018.
22. Innovator working group, Blockchain Regulation Roundtable, KPMG Canada, Toronto, 10 May 2018.
23. "OSC Highlights Potential Securities Law Requirements for Businesses Using Distributed Ledger Technologies," Press Release, Ontario Securities Commission, 8 March 2017. www.osc.gov.on.ca/en/NewsEvents_nr_20170308_osc-highlights-potential-securities-law-requirements.htm, accessed 30 July 2018.
24. Canadian Securities Administrators, "Cryptocurrency Offerings," CSA Staff Notice 46-307, Ontario Securities Commission, 24 Aug. 2017. www.osc.gov.on.ca/en/SecuritiesLaw_csa_20170824_cryptocurrency-offerings.htm, accessed 31 July 2018.
25. "Margin requirements for cryptocurrency futures contracts," Notice 17-0238, Investment Industry Regulatory Organization of Canada, 11 Dec. 2017. www.iiroc.ca/documents/2017/77509C44-8E4B-45A1-8FFB-4FD478FD076D_en.pdf, accessed 31 July 2018.
26. Amy Castor, "FinCEN Deals Major Regulatory Blow to ICOs and Exchanges," *Bitcoin Magazine*, BTC Media LLC, 7 March 2018. bitcoinmagazine.com/articles/fincen-deals-major-regulatory-blow-icos-and-exchanges; and "When to identify individuals and confirm the existence of entities–Securities dealers," Financial Transactions and Reports Analysis Centre of Canada, 29 June 2017. www.fintrac.gc.ca/guidance-directives/client-clientele/client/sec-eng.asp, both accessed 30 July 2018.
27. Regulator working group, Blockchain Regulation Roundtable, KPMG Canada, Toronto, 10 May 2018.
28. Regulator working group, Blockchain Regulation Roundtable, KPMG Canada, Toronto, 10 May 2018.
29. James Langton, "OSC LaunchPad gets commitment for the long term," *Investment Executive*, Transcontinental Media Inc., 19 Oct. 2017. www.investmentexecutive.com/news/from-the-regulators/osc-launchpad-gets-commitment-for-the-long-term, accessed 30 July 2018.
30. Nikhilesh De, "Ontario Securities Regulator Approves TokenFunder ICO," *CoinDesk*, Digital Currency Group, 25 Oct. 2017, updated 26 Oct. 2017. www.coindesk.com/ontario-securities-regulator-approves-tokenfunder-ico, accessed 30 July 2018.
31. CSA, "Decisions," *CSA Regulatory Sandbox*, Canadian Securities Administrators, as of 1 Aug. 2018, www.securities-administrators.ca/industry_resources.aspx?id=1626, accessed 1 Aug. 2018.
32. Financial Conduct Authority, "Discussion Paper on Distributed Ledger Technology," Discussion Paper DP17/3, April 2017. www.fca.org.uk/publication/discussion/dp17-03.pdf, accessed 30 July 2018.
33. Financial Conduct Authority, "Discussion Paper on Distributed Ledger Technology."
34. European Central Bank, "Distributed Ledger Technologies in Securities Post-trading: Revolution or Evolution?" Occasional Paper Series, no. 172, April 2016. www.ecb.europa.eu/pub/pdf/scpops/ecbop172.en.pdf, accessed 30 July 2018.
35. European Central Bank, "Distributed Ledger Technologies in Securities Post-trading."
36. European Securities and Markets Authority, "The Distributed Ledger Technology Applied to Securities Markets," Report, 2 June 2016. www.esma.europa.eu/sites/default/files/library/2016-773_dp_dlt.pdf, accessed 30 July 2018.

37. FINRA, "Distributed Ledger Technology: Implications of Blockchain for the Securities Industry," Jan. 2017. www.finra.org/sites/default/files/FINRA_Blockchain_Report.pdf, accessed 30 July 2018.

38. "SEC Obtains Another Order to Freeze Plexcoin ICO Assets," *Coinfidice*, VIRALDICE, 22 June 2018. coinfidice.blogspot.com/2018/06/sec-obtains-another-order-to-freeze.html, accessed 30 July 2018.

39. William Hinman, "Digital Asset Transactions: When Howey Met Gary (Plastic)," Remarks at the Yahoo Finance All Markets Summit: Crypto, San Francisco, *SEC.gov*, US Securities and Exchange Commission, 14 June 2018. www.sec.gov/news/speech/speech-hinman-061418, accessed 1 Aug. 2018.

40. "No Action Letters," *SEC.gov*, US Securities and Exchange Commission, last modified 23 March 2017. www.sec.gov/fast-answers/answersnoactionhtm.html, accessed 25 July 2018.

41. Sylvain Théberge, "*AMF Creates Fintech Lab and Signs Partnership with R3*," News Release, Autorité Des Marchés Financiers (AMF), Quebec, 27 April 2017. lautorite.qc.ca/en/general-public/media-centre/news/fiche-dactualites/amf-creates-fintech-lab-and-signs-partnership-with-r3-1, accessed 1 Aug. 2018.

42. Shafi Goldwasser and Mihir Bellare, "Chapter 8: Hash Functions," *Lecture Notes on Cryptography*, Massachusetts Institute of Technology, July 2008. cseweb.ucsd.edu/~mihir/papers/gb.pdf; and "Public-key," *Merriam-Webster.com*, Merriam-Webster Incorporated, n.d. www.merriam-webster.com/dictionary/public-key, both accessed 25 July 2018.

43. Blythe Masters, interviewed via telephone by Alex Tapscott, Don Tapscott, and Kirsten Sandberg, 29 July 2015.

44. The Royal Mint, "Invest," The Royal Mint Ltd, n.d. www.royalmint.com/invest, accessed 30 July 2018.

45. Global Digital Finance, n.d. www.gdf.io, accessed 25 July 2018.

46. Jeff Bandman, e-mail to Jenna Pilgrim and Hilary Carter, 10 June 2018.

47. Vivian Yang, "Blockchain: The Next Generation of the Internet," Press Release, World Economic Forum, 28 June 2017. www.weforum.org/press/2017/06/blockchain-the-next-generation-of-the-internet, accessed 30 July 2018.

blockchainresearchinstitute.org