

A BITCOIN GOVERNANCE NETWORK:

The Multi-stakeholder
Solution to the
Challenges of Cryptocurrency

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Cryptocurrencies are products of the digital revolution and the networked age. As distributed networks with no central issuer and no central command, they are also a distinctly global phenomenon that will force national governments to not only re-evaluate a number of substantive regulatory issues but perhaps also re-think the very nature of governance itself. Cryptocurrencies are wresting control over many issues from traditional decision-makers.

Multi-stakeholder governance, founded on principles of transparency and inclusiveness and legitimized by consensus, is the 21st century solution. When leaders of the old paradigm adapt and collaborate more closely with private enterprise, civil society organizations and other stakeholders in the network, then bitcoin and other cryptocurrency technologies can fulfill their potential and gain widespread adoption.



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Idea in Brief

Cryptocurrencies are products of the digital revolution and the networked age. Where most modern currencies are tokens issued by government monopolies, cryptocurrencies are decentralized peer-to-peer networks that function as electronic cash and as an online payment system. As the leading example of cryptocurrency innovation, bitcoin holds the potential to lower transaction costs between consumers and improve the speed and efficiency of capital markets, open financial markets to the world's unbanked, and lower fees for cross-border payments. Furthermore, as an open source technology, the bitcoin protocol offers a fertile platform for new and as yet unforeseen innovation. Conversely, bitcoin's decentralized nature and lack of central control can create user vulnerability to fraud and theft.¹ Bitcoin is illiquid compared to fiat currencies and has not yet gained widespread adoption. As bitcoin and other cryptocurrencies become more systemically important to global financial markets, the need for governance will become increasingly important.

One of the outcomes of the digital revolution is that multi-stakeholder networks, collaborating with governments globally, can now provide governance for important global resources. In considering the foundation for a bitcoin governance network, we pose a number of critical questions and develop a framework for answering them.

- How does one design such a governance network?
- Does one create a new network from scratch or build around an existing institution that already has a constituency that deals with international financial issues?
- What will be the mandate for this network and will it have the power to implement and enforce policy?
- In whose interests will a bitcoin governance network act and to whom is it accountable?
- And critically, will nation-states actually cede any authority to a global network?

Ultimately, a bitcoin governance network would strive to be inclusive and welcome participation from all relevant stakeholders groups. The network should be a meritocracy, meaning that viable proposals are championed by the community regardless of the rank and status of the proposer. The network should be transparent, releasing all of its data, documentation and meeting minutes for public scrutiny. Finally, decisions should be reached, as much as possible, by consensus in order to gain legitimacy for the outcomes.

Four Global Solution Network (GSN) types will play a critical role in a bitcoin governance network. *Global standards networks* are needed to set technical standards for interoperability and other key performance issues for the industry. *Policy networks* are required to provide international guidance on



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issues such as crime, fraud, consumer protection, money-laundering, and other substantive policy issues. *Watchdog networks* will scrutinize the actions of powerful stakeholders in the ecosystem and ensure that all players behave ethically and observe key standards set by the community. Finally, *knowledge networks* will help to educate and inform a growing network of diverse stakeholders, including government policymakers, merchants and users. Today, none of these GSNs exists in a complete form, but there are promising signs that these networks are emerging. One such example is the Windhover Principles for Digital Identity and Trust, a framework created by a private-public collaboration between MIT Media Lab spinout ID3, and more than twenty leading companies and prominent figures in the bitcoin community.

Windhover developers argue that the challenges of bitcoin governance (and Internet privacy) cannot be met by traditional government and private sector practices. Instead they propose an open source, multi-stakeholder platform to develop standards and policies that will reflect the growing complexity and global nature of the technology. The ink is still drying on the press release announcing the Windhover Principles (having just been announced on October 20, 2014),² so the potential is, as yet, unfulfilled; nevertheless, this is a positive development. The challenge and opportunity for the stakeholders in the network will be to address the power vacuum in the bitcoin ecosystem and take steps to fill it with strong multi-stakeholder governance that is based on openness and collaboration.

The Challenge for Governments

Bitcoin has come a long way since the original whitepaper was posted on an Internet forum in 2009. Governments, incumbent financial interests and everyday people scarcely noticed it during its early development. bitcoin was a fringe curiosity from a techno-libertarian wellspring, confined to forum boards and small Internet communities. In late 2013 and early 2014, the crackdown on Silk Road (a virtual criminal bazaar that accepted bitcoin payments), and the collapse of Mt. Gox (one of the earliest bitcoin exchanges), put bitcoin in the headlines and exposed the scale and reach of the technology. It also revealed that the cryptocurrency was changing hands on the edge of a wild and unregulated frontier. Law enforcement agencies and regulators were understandably concerned. Yet in spite of these spectacular shocks, the bitcoin ecosystem proved remarkably resilient and, if anything, is picking up speed.

Today, governments are cautiously optimistic about the technology. The Bank of England, the New York Department of Financial Services, the European Banking Authority and other government bodies have spoken favorably of many of the potentially positive outcomes from this digital revolution and have also voiced their concerns about its risks. While quick to voice their initial opinions, governments have taken a wait-and-see approach rather than devising new policy measures to address the technology. The first



attempt at a bitcoin policy was proposed in New York in July of 2014 and is still under review.³ Jerry Brito, former Policy Director of the Mercatus Center at George Mason University and now Executive Director of Coin Center, a non-profit research and advocacy center focused on the public policy issues facing cryptocurrency technologies, argues that caution by government is a good thing. Governments should not rush to ring-fence a technology without first seeing how it evolves and what long term innovations it can spawn.⁴ Though such prudence is warranted in the short term, in the long run national governments will need to play a strong role in the governance of the bitcoin ecosystem, as they do for all financial products, by enacting new policies (or modifying older statutes) that address anti-money laundering (AML), know-your-client (KYC), combatting the financing of terrorism (CFT) and anti-fraud protections, as well as enforcing privacy laws. As the technology matures, additional policy issues will emerge that will also require a response.

The major challenge for policymakers is that bitcoin does not fit neatly into existing regulatory boxes, one of the hallmarks of a disruptive technology.⁵ Bitcoin is also global in reach, meaning nation-states cannot hope to govern it alone. Furthermore, officials in government are not always in possession of all the information on this new technology that would be necessary to make decisions in the public interest, nor do they always have all the resources to govern it effectively. Indeed, cryptocurrencies are but one example of how digital technology is wresting control over many issues and processes from traditional decision makers, including governments. Governments should be prepared to act as leading stakeholders in a bitcoin governance network. Indeed, they can play a leadership role by establishing new global networks when necessary (such as in the formation of policy networks), and supporting other stakeholders when appropriate (as in the formation of technical standards bodies). Governments should not assume, however, that bitcoin is governable using the traditional hierarchical models that exclude relevant stakeholders. Nor should they fragment a bitcoin governance ecosystem by pursuing independent national approaches when a global architecture for multi-stakeholder governance that establishes harmonized rules, standards and data will be more likely to yield the most efficient and effective outcomes.



A Brief History of Money: From Barter to Bitcoin⁶

In the beginning there was barter: the exchange of my production for your efforts; my cow for your tools; his rice for her weaving. But my cow is worth ten of your tools and I don't need ten tools. Barter is simple, but it is problematic when needs don't coincide. Any object that allows storage of the value of production is money. At first domestic animals—cows, sheep, camels—were the basis of exchange systems, but they weren't exactly convenient to carry, and how to make change? Clearly this model was insufficient, so early civilizations began to use natural resources whose supply was scarce, such as the cowrie shell in ancient China, or precious metals in Europe, as the basis for money. These objects were divisible, difficult if not impossible to counterfeit, and their production was limited to their own natural abundance, either in the ground or in the sea.

The dawn of the Industrial Revolution saw the rise and widespread use of fiat currency, a token issued by a monopolist (such as a government). Originally, that token acted as a claim to a physical asset, such as gold. Nowadays, fiat currencies derive their value solely from the good faith in the issuing government.⁷ Bitcoin strives for market-based legitimacy through distributed trust. This is an enormous leap from previous iterations of money.

How Cryptocurrencies Work

Bitcoin, the first digital currency based on modern cryptography, was conceived as a peer-to-peer form of electronic cash that would allow online payments to be sent directly from one party to another without going through a financial intermediary.⁸ Bitcoin's major technical breakthrough is that it solves two central problems of previous attempts at digital money: how to manage supply growth and how to avoid the duplication, or "double spending," of a digital dollar—otherwise an infinite amount of bitcoin could be created and a single bitcoin could be spent a hundreds of times. A public ledger, known as a "block chain," uses the resources of the peer-to-peer bitcoin network to verify and approve each bitcoin transaction. In exchange for their efforts, the nodes of the network that do the verifying get rewarded with new bitcoin, and they're known as bitcoin "miners." Bitcoin relies on the network members to verify each transaction, which simultaneously eliminates the need for a financial intermediary, making the payment process far more efficient, and serves as a means for currency creation.

The following example, from a paper written by currency experts Jerry Brito and Andrea Castillo of George Mason University, illustrates the process:



Bitcoin in Brief

Until bitcoin's invention in 2008 by the unidentified programmer known as Satoshi Nakamoto, online transactions required a trusted third-party intermediary. For example, if Alice wanted to send \$100 to Bob over the Internet, she had to rely on a third-party service like PayPal or MasterCard. Intermediaries like PayPal keep a ledger of account holders' balances. When Alice sends Bob \$100, PayPal deducts the amount from her account and adds it to Bob's account. Without such intermediaries, digital money could be spent twice. Imagine there are no intermediaries with ledgers, and digital cash is simply a computer file, just as digital documents are computer files. Alice could send \$100 to Bob by attaching a money file to a message. But just as with email, sending an attachment does not remove it from one's computer. Alice would retain a copy of the money file after she had sent it. She could then easily send the same \$100 to Charlie. In computer science, this is known as the "double-spending" problem, and until bitcoin it could only be solved by employing a ledger-keeping trusted third party.

Bitcoin is revolutionary because for the first time the double-spending problem can be solved without the need for a third party. Bitcoin does this by distributing the necessary ledger among all the users of the system via a peer-to-peer network. Every transaction that occurs in the bitcoin economy is registered in a public, distributed ledger, which is called the block chain. New transactions are checked against the block chain to ensure that the same bitcoins haven't been previously spent, thus eliminating the double-spending problem. The global peer-to-peer network, composed of thousands of users, takes the place of an intermediary; Alice and Bob can transact without PayPal.⁹

Bitcoin Volatility and Price

Bitcoin is more volatile than many conventional currencies. Prices skyrocketed in late 2013, with the price of each BTC (one unit of bitcoin) going from \$100 to \$1,000 in two short months. Following the Silk Road crackdown and later the Mt. Gox scandal, prices collapsed to \$350 before recovering slightly. This volatility can be explained in two ways. First, many bitcoin users have viewed their holdings as a speculative investment rather than a fungible unit of exchange or a functional currency. Second, an estimated 40% of the bitcoin float is still in the hands of only a thousand or so individuals.¹⁰

Extreme volatility generally befalls speculative assets with limited liquidity. Throughout 2014, prices have been somewhat more stable, but have continued a steady decline from a post-Mt. Gox high of \$650 to \$337 (as of November 5, 2014). This downward trend stands at odds with a number of important developments. Since the Mt. Gox scandal, thousands of merchants have begun accepting bitcoin. Numerous large and professionally managed exchanges and other bitcoin wallets with strong AML and KYC requirements have also gone into business. Regulators globally are gradually embracing the technology, taking a more collaborative and open approach to policy creation, for example the New York Department of Financial Services has developed the most comprehensive regulatory framework for bitcoin and welcomes stakeholder feedback. PayPal has announced partnerships with numerous bitcoin companies illustrating how existing financial exchanges are taking notice. What's more, prominent figures in technology, business and



government have spoken of bitcoin's virtues. So why, in light of these clearly positive trends, are prices declining?

Perceptions are shifting. Though many speculators still buy and hold with the expectation of making a "profit," more and more people now view it as a functioning currency—a unit of account and a medium of exchange (though presently not a store of value). Furthermore, adoption can in fact be good for bitcoin but bad for bitcoin prices, at least in the short term. How? Merchants who accept payments in bitcoin almost immediately exchange them for some form of fiat currency in order to realize their gains in a traditional financial system. After all, Dell Computers, DISH Network, Expedia, Overstock and other businesses who now accept bitcoin report their earnings in US dollars. This can create selling pressure that the market needs to absorb. In all likelihood, accelerating merchant adoption could continue to suppress prices in the short term. Exchanges that allow users to exchange bitcoin for fiat currencies assume similar exposure to that of the digital currency and are also likely to sell or hedge bitcoin at the first opportunity in order to lock in gains on what are, in their businesses, very narrow margins. Finally, the "mining" business today is predicting a US\$500 million per year bounty of new bitcoins, which means they've grown more proficient, employing complex and sophisticated technology. Miners who verify blocks and win new bitcoins are keen to translate gains into fiat currencies, adding additional selling pressure.

These three factors—merchant adoption, new venues for using and exchanging bitcoin, and the sophistication of mining infrastructure—are all positive for the development and mass adoption of bitcoin, but they can weigh on prices, which means the bitcoin ecosystem should welcome an active derivatives market. The Commodity Futures Trading Commission (CFTC) announced in early September the approval of the first bitcoin derivatives exchange.¹¹ Swaps and other such products, when carefully and properly regulated, can help smooth over volatility. In short, bitcoin is transitioning from speculative investment to financial value token, which is a sign of its growing maturity as a currency.

Opportunities and Challenges

In order to establish a workable framework for a bitcoin governance network, it is important to understand the core use-cases and main opportunities for bitcoin technology as well as examine its key challenges.

Opportunities

Virtually all non-cash payments are made through a financial intermediary of some kind. Bitcoin eliminates the need for those intermediaries, opening



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up possibilities for a faster and more cost efficient payment network. Today, half the world's adult population is unbanked and financially illiterate, largely because it can be unprofitable, using today's models, for banks, payment systems and other financial companies to push into those markets.¹² This barrier to financial inclusion prevents many from participating in the global economy. Because the barriers to entry for bitcoin are low, there are opportunities to improve financial inclusion globally, though not without a broad-based financial literacy campaign. Governments hold a monopoly on money. While many governments are good shepherds of their economies, some governments badly mismanage their finances, which can lead to high inflation and result in currency devaluation. Bitcoin offers consumers and citizens an alternative.

Improving Efficiency and Cost

The global financial system is dominated by powerful financial intermediaries that process trillions of dollars of transactions annually. The payment card industry alone processes \$20 trillion in volume and generates \$292 billion in fees.¹³ Today, consumers make a trade-off: paying fees in exchange for the assurance that their funds are being stored safely and moved securely. However, the fee structure within financial markets and between financial intermediaries can vary widely, from virtually free to over 10% in the example of global remittance charges. Because there is no third-party intermediary, bitcoin transactions can be cheaper and faster and also allow for innovations like micropayments which are generally understood as payments of less than \$1.¹⁴ Jim Bailey, Head of Payments, North America at Accenture Plc, explains that aspects of bitcoin will ultimately be “adopted into currency systems around the world as well as payment systems around the world because you can argue that the speed and cost and the efficiency of a bitcoin model is superior.”¹⁵

For the unbanked and for poor migrant workers, fees can be especially onerous. In the first quarter of 2013, the World Bank reported that remittance fees averaged more than 9%.¹⁶ According to *The Nilson Report*, cross-border remittances generated US\$19 billion in fees in 2012.¹⁷ Kausik Rajgopal, Head of Payments at McKinsey & Company, explained that cross-border payments make up only around 5% of payment volume for payment networks, but generate about one-third of the revenue and half of the profit.¹⁸ He suggests that such transaction fees are the equivalent of the telecom industry's roaming charges. By solving a hard problem they get to collect a significant fee. As a distributed network that disintermediates traditional financial transactions, bitcoin holds the potential to dramatically reduce these fees, which would have the potential to disrupt a number of industries in the process.

Promoting Financial Inclusion

Today, the global financial system is walled away from many of the world's inhabitants, particularly in the developing world. One estimate, developed in 2009, suggests there are around 2.5 billion adults in the world who do not use any savings or borrowing, most of them living in Africa, Asia, Latin



America and the Middle East.¹⁹ A 2013 Global Solution Networks report on financial inclusion argued, “The opportunities for banking institutions to develop markets for these populations have been untapped primarily because it is untenable to use the models and products that have worked for larger depositors in wealthier communities...In the banking industry of the developed world, these customers would not be considered profitable.” Bitcoin transactions cost very little to conduct and can range in size from very large to tiny (fractions of a penny, theoretically), making them viable for even the smallest financial participant and for uses previously unforeseen, such as metering Wi-Fi hotspots or monetizing digital content. Bitcoin transactions also have a relatively low barrier to use.

Dr. Balaji Srinivasan, Managing Partner at Andreessen Horowitz and a lecturer at Stanford University, argues, “If you can access the Internet on a mobile phone, suddenly you’re able to access all these other things. You can access a bank account already or at least the mechanisms for it and there are no forms to fill out.” Point-of-access is a critical issue for financial inclusion. Consider that in Nigeria, a country with 160 million people, there are only 16,000 financial access points of any kind—bank branches, ATMs, mobile money agents, etc. Most of them are in urban areas, leaving rural areas especially unengaged.²⁰

Bitcoin removes the need for physical point-of-access, but still depends on access to Internet connectivity. While Internet-connected mobile devices are spreading rapidly across the developing world, according to ITU data there are still significant gaps in access, especially in the least developed countries.²¹ In Africa, for example, mobile cellular penetration will reach 69% by the end of 2014, but the cellular penetration rates are significantly lower in the least developed African countries. Meanwhile, mobile broadband penetration, which is commonplace in developed economies, will only reach 19% in Africa by the end of 2014. Taking both fixed and mobile connectivity into account, there will be 3 billion Internet users by the end of 2014, which corresponds to an Internet user penetration rate of 40% globally. More than 90% of the people not on the Internet are in the developing world, which highlights an enduring digital divide that will continue to impede financial inclusion in the near future.

Mitigating Political Risks

Because traditional currency creation is controlled by state monopolies, it is subject to any number of political risks. In Argentina,²² where inflation is running in excess of 25%, consumer confidence is plummeting and the government is imposing strict capital controls, bitcoin use is skyrocketing as it provides an alternative for the exchange and transfer of value. One criticism of cryptocurrencies is that they are too volatile to be a legitimate alternative to conventional currencies. Compared to the US dollar or the euro, this is true, and one of the many reasons cryptocurrencies are unlikely to displace the world’s reserve currencies.

But for people living in countries going through war, turmoil or just bad fiscal management, bitcoin is comparably stable, liquid and fungible. Russia today is a prime example. Since hostilities in Ukraine began, the ruble has



collapsed and the Russian economy has gone into a tail-spin. In the midst of such disruption, how has the government responded to bitcoin? By imposing fines on anyone who transacts in bitcoin with levies of 50,000-100,000 rubles. Setting up a bitcoin exchange or entity that transacts in bitcoin or any other “money substitute” can result in a fine of one million rubles.²³ In China, bitcoin has been tremendously popular. Two of the largest bitcoin exchanges, Huobi and OKCoin, are located there. This can be explained in part by the highly developed Internet industry in China and by the fact that China has the world’s largest population of Internet users. However, a general lack of speculative assets, a rigid currency market and a distrust of government policy are also very likely causes.



Remittances: A Use Case for Bitcoins

Remittances of funds sent back to their homelands by people living in distant locations connect diasporas globally. Diasporas are global communities formed by people dispersed from their ancestral lands but who share a common culture and strong identity with their homeland. The Global Solution Networks Program has identified diasporas as critical to its taxonomy of multi-stakeholder networks for global problem solving. Thanks to the Internet, these people can now collaborate in multi-stakeholder networks. One of the functions of many of today's diasporas is to address and help solve common, global problems.

Remittances to developing countries surpassed \$400 billion in 2012 and are expected to reach the half-trillion mark by 2016.²⁴ They represent one of the largest flows of capital to developing countries and can have an enormously positive impact on the quality of the lives of some of the world's most vulnerable people. In some countries, remittances are a huge and vital component of the economy. In Haiti, for example, remittances account for 20% of GDP. In the Philippines, which receives \$24 billion every year, remittances are 10% of GDP.²⁵ According to the IMF, remittances are generally spent by recipients on necessities—food, clothing, medicine and shelter, meaning they “help lift huge numbers of people out of poverty by supporting a higher level of consumption than would otherwise be possible.”²⁶ Remittance flows to developing nations are estimated to be 3-4 times as large as foreign aid flows.²⁷ The positive effects of remittances on the poor in developing countries are well understood, yet despite this enormous economic injection, remittance costs are still appallingly high. In some of the most expensive corridors between nations, fees on remittances can run north of 20%.²⁸ Why use bitcoin and other cryptocurrencies for remittance? Simply put, cryptocurrencies can drop remittance costs much closer to zero.

Governments have responded to bitcoin's very new role in the remittance market with a mixture of cautious optimism that cryptocurrencies can in fact lower remittance costs, and concern that the poorest and most vulnerable of their citizenry could be defrauded or bankrupted by using the technology. Despite these concerns, most of the world's largest economies have allowed bitcoin to develop and grow organically, and most have done little to curb its use in the remittance market (though they have done little to encourage it).³² Canada is one of the largest net-senders of remittances in the world. In Ontario, Canada's largest province by population and largest economy, 3.6 million people identify as being foreign-born and every year billions of dollars leave the province in the form of remittances.³³ Perhaps the most deleterious effect of high remittance costs is the impact on the end recipients who are penalized by the high fees. However, senders are equally vulnerable. After all, they are the ones earning the income to support their families and they share in the burden of high costs.

Giles Gherson, former Deputy Minister of Consumer Services of Ontario, places lowering remittance costs near the top of his priority list. Mr. Gherson is open to the idea of finding innovative ways to lower remittance costs, but is reluctant to embrace cryptocurrencies, citing consumers' lack of knowledge of the technology, the risk of consumers being defrauded and also the government's reluctance to sign off on a technology that is still very much in flux. He views a GSN solution—one in which governments at the local and federal level work with the private sector and intergovernmental organizations such as The World Bank—as the best solution. Such a solution, combined with cryptocurrency, could offer the best of both worlds: broad based cooperation of important stakeholders leveraging digital technology.



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Challenges

Cryptocurrencies today still have far less utility than conventional money such as dollars, euros and yen. They suffer from a lack of mass market understanding and adoption and they are more volatile than most currencies. Many enterprises, and service providers in the bitcoin ecosystem, such as e-wallets and exchanges, have historically lacked strong cyber-security systems, making them vulnerable to attack—though this is changing rapidly with the advent of professionally managed, better capitalized and more technologically robust companies. Bitcoin has also emerged as yet another means for criminals to move and spend illicit funds online in a rapid and frictionless fashion. These are serious challenges that must be addressed.

Lack of Widespread Adoption

Cryptocurrencies have enjoyed limited mass-market assimilation and even less adoption by retailers, though that is changing. According to payment services Coinbase and Bitpay, an estimated 75,000 merchants, including Dell Computers, Expedia, Zynga, Wordpress and Virgin Galactic, now accept bitcoin, but that pales in comparison to the estimated 24 million merchants globally who accept Visa payment cards.³⁴ While adoption is accelerating, payments experts at both Accenture and McKinsey, two leading consulting firms, reported that most of their clients in the financial services industry—Fortune 500 companies and other multi-nationals—are not actively thinking about integrating Bitcoin into their systems, though they are watching it closely. One of the criticisms of Bitcoin is that the technology is non-recourse, and it becomes far more difficult to challenge a payment. This has meaningful implications, especially with regard to chargebacks. A non-recourse payment system presents challenges for consumers, e-wallets, banks or charge-card companies who might need to reverse a prior outbound transfer of funds.³⁵ This obstacle is being addressed by stakeholders in the network. One solution to this problem is multi-signature. Via multi-signature, two parties can agree to grant a third party, such as an e-wallet or exchange, the right to arbitrate and undo erroneous transactions.³⁶ This is not well-understood and underscores the need for knowledge networks to disseminate such information, and standards networks to address common standards for arbitration and mediation.

Until cryptocurrencies gain widespread acceptance they will not penetrate the mainstream global payment industry. Cryptocurrencies also suffer from inadequate understanding on the part of the mass-market.³⁷ Recent polls have shown that 53% of people know “not much” or “nothing at all” about cryptocurrencies.³⁸ Interestingly, the numbers split along racial and ethnic lines. 42% of Hispanics said they were likely to use Bitcoin vs. just 24% for Caucasians.³⁹ The author of the survey speculates that age is a factor as Hispanics polled skew younger and also that remittance payments could be important as well, as the US-Latin America corridor is one of the busiest for remittance payments. Still, there are clear signs of mainstream adoption. The Bank of England estimated that there are 41 million active Bitcoin accounts worldwide.⁴⁰ Other estimates have suggested payment volumes have doubled year-over-year.⁴¹



Developer adoption is another way to look at penetration and awareness of cryptocurrencies. While user and enterprise adoption may be limited, Bitcoin is spawning a massive boom in new technologies developed to harness and leverage the cryptocurrency. On github.com (a developer platform), adoption of Bitcoin is greater than PayPal and Stripe, two popular payment technologies. The innovation cycle leads to the deployment of new, user-friendly applications that ignite a positive feedback loop in which better tools promote greater user adoption, which in turn promotes developer innovation and so on.

Safety Concerns

Widespread adoption of Bitcoin has been hindered by a shortage of trusted third parties. While peer-to-peer Bitcoin payments do not require a third party, transferring Bitcoin to fiat currency does. The Mt. Gox exchange scandal, during which Bitcoin's largest exchange went bankrupt and many customers lost their deposits, still casts a long shadow on the Bitcoin market and raises important questions about theft and fraud. Consumer advocates in government, as well as government regulators have taken notice. The Consumer Financial Protection Bureau in the US warned, in August 2014, of some of the risks of the technology, advocating that consumers "need to be cautious and need to be asking the right questions."⁴²

On July 4, 2014, the European Banking Authority (EBA), the main banking regulator of the European Union, released a detailed report on the potential risks of cryptocurrencies (as well as an almost equal number of potential benefits). Some of those risks are not unique to cryptocurrencies and could easily apply to any other currency or asset, such as "the user experiences a drop in value of virtual currencies due to significant or unexpected exchange rate fluctuation."⁴³ Similarly, many traditional merchants and payment processors also run the risk of a "user's identity being stolen when providing identification credentials,"⁴⁴ as has been the case as several large customer database have recently been hacked. Also, some of the risks never actually existed, such as the "double spend problem," which the report also identifies. Still, the report does identify a number of meaningful and real risks, most of which target the robustness and safeness of the Bitcoin network. A user is indeed exposed to risk when a Bitcoin exchange gets hacked, or goes out of business. An exchange could be liable if its users trade in virtual currencies for the purpose of laundering money or paying for illicit goods and services. The EBA suggests a regulatory framework whereby market participants would form a so-called "scheme governance authority," a non-governmental entity that establishes and governs the rules for the use of a particular digital currency, whilst also adhering to existing regulatory requirements.⁴⁵ Such a non-governmental, self-regulated organization would fit well into a Bitcoin governance network.

Opportunities for Crime

Bitcoin is often condemned as a tool used by criminals to launder money or take payment for illicit goods. Critics say that Bitcoin, by its very nature, makes it a useful tool for nefarious actors. Because Bitcoin has no central



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issuer and no central clearing house, and very little regulatory oversight, this criticism at first appears completely valid, and indeed there is some truth to it. However, the argument that Bitcoin is both anonymous and untraceable is actually false. Because all Bitcoin transactions are published in the block chain, it is in fact easier to track the origins of a payment with Bitcoin than with cash. Bitcoin is not anonymous, it is pseudonymous. Regulators have begun calling Bitcoin “prosecution futures” for this reason.⁴⁶ Also, just because Bitcoin is used in an illegal transaction, does not mean *ipso facto* that the digital currency is culpable. When someone robs a bank, we don’t blame the money that sits in the vault for the robbery. The fact that Bitcoin is used in criminal transactions speaks more to the lack of strong governance, regulation, advocacy and education than to its underlying virtues. Furthermore, the accusation that Bitcoin is used disproportionately by criminals is not supported by the evidence. One study suggested that the total monthly Silk Road transactions amounted to \$1.2 million of \$770 million (or 1.6% of total volume) in transactions during the studied period.⁴⁷ Furthermore, the economy as a whole is vulnerable to criminal activity. The United Nations Office on Drugs and Crime (UNODC) found that criminal proceeds amounted to 3.6% of global GDP, with 2.7% (or \$1.6 trillion) being laundered. Put into perspective, the amount of fiat currency laundered annually is 267 times as large as all Bitcoin outstanding.⁴⁸ Money laundering is as much a global problem for fiat currency as it is for cybercurrency and will require a multi-stakeholder response.

Finally, while a small part of Bitcoin’s early user base used the technology for cybercrime, that group is unlikely to define the technology in the future. After all, half of PayPal’s revenue came from gambling and pornography sites when it began operating. In its early years, the credit card industry lacked many of the regulations we take for granted today. In 1966, before the advent of strong regulation and oversight, a number of Illinois-based banks indiscriminately sent out over five million credit cards by mail. Cards were mailed out to convicted felons, toddlers, even dogs. Innocent people who had never seen a credit card received bills for thousands of dollars in fraudulent charges. In the Congressional hearings that followed, lawmakers called for credit cards to be outlawed entirely, not unlike their early opinions of Bitcoin.⁴⁹

A Bitcoin Governance Network

The question of who ought to govern Bitcoin and other cryptocurrencies is the subject of ongoing debate and discussion. Many stakeholders could be disrupted by this technology—governments, financial incumbents, consumers and merchants, to name but a few—and all are responding differently. Jim Bailey, Head of Payments at Accenture North America, says,

“In the United States, the regulators are taking a hands-off approach, for now, to see how cryptocurrencies grow, how



they behave in the market, how consumers react to them, and how businesses react to them before taking formal action. The security community is looking at how cryptocurrencies could be a threat or be an enhancement to the tracking of usage of money for illegal activities around the world, and the academic community is looking at how this impacts the overall financial system and business community, and the way we do commerce in the world.”⁵⁰

This is not to say that individual government officials have remained silent on the subject. Former Attorney General Eric Holder has said, “As virtual currency systems develop, it will be imperative to law enforcement interests that those systems comply with applicable AML and KYC controls.”⁵¹ Ben Bernanke, former Federal Reserve Chair, has said that the Fed has no direct role to play (for now) in regulating Bitcoin, but he has made positive statements about Bitcoin’s long-term potential.⁵² Interestingly, it was current Federal Reserve Chair Janet Yellen who most clearly identified the central problem of governance, stating, “It’s not easy to regulate Bitcoin because there is no central issuer or network operator to regulate,”⁵³ a statement that implicitly calls attention to the limitations of traditional regulatory models and supports a multi-stakeholder approach.

Governments must be key stakeholders and important leaders in the governance process. However, they must also acknowledge that their role in governing Bitcoin will be fundamentally different than it has been for currency and financial transactions historically. After all, for millennia, states have had a monopoly on money. Of course, governments still issue money, control the money supply and manage monetary and fiscal policy. But what happens when “money” is not issued by a central authority but instead is the creation of a distributed global peer-to-peer network? Governments will respond since, according to Mr. Bailey of Accenture, “One of the primary policy levers that governments have in the world today is their monetary policy, so the minute a non-government based currency becomes material in the world, we start to see the regulators move from observation to action.”⁵⁴ However, they cannot hope to govern this technology alone, as existing state-based regulatory paradigms are not well adapted to this new global phenomenon. As Mark Andreessen says, “There is no shortage of regulatory topics and issues that will have to be addressed, since no country’s regulatory framework for banking and payments anticipated a technology like Bitcoin.”⁵⁵ In short, this is a global challenge that requires both new thinking and new structure for governance.

In “The Remarkable Internet Governance Network,” Don Tapscott and Lynn St. Amour outline how the Internet is governed by a global ecosystem of many different stakeholders, arguing, “One of the most extraordinary outcomes of the digital revolution is that multi-stakeholder networks, rather than state-based institutions, now govern important global resources. The Internet itself is curated, orchestrated and otherwise governed by a large and diffuse collection of individuals, institutions and organizations.”



“...where governments are needed and where they have the special power and authority other stakeholders lack (creating and enforcing laws, prosecuting criminals, etc.), they should be positioned to lead.”

The standards for interoperability and other technical aspects of the Internet are governed by a number of GSNs, specifically the Internet Engineering Task Force (IETF), World Wide Web Consortium (W3C) and ICANN, all supported by the Internet Society. In addition, other GSNs advocate, spread knowledge, provide operational and delivery capabilities and perform many other critical functions. However, many of the truly controversial issues are still very much under the control of individual governments, including privacy, data protection, child pornography, cyber-crime and so forth. The same ought to be true for cryptocurrencies: where governments are needed and where they have the special power and authority other stakeholders lack (creating and enforcing laws, prosecuting criminals, etc.), they should be positioned to lead.

However, there are issues that will invariably be points of conflict between governments and other stakeholders in the network. These areas of disagreement should be met as an opportunity to wield the multi-stakeholder model. The Windhover Transition, a plan developed at a convention of ID3 (a research and educational non-profit with a mission to develop a new social ecosystem of trusted, self-healing digital institutions) and many leading stakeholders in the Bitcoin network, is seeking to fill the power vacuum in the Bitcoin ecosystem by addressing a range of governance issues, including setting standards and drafting policies. While ID3 is primarily focused on forging new security and privacy standards and policies, they still argue more generally that, “The increasing complexity of technical systems render effective and balanced regulation of identity and personal data—including KYC (Know Your Customer) and risks of AML (Anti-Money Laundering)—a deeply complex and rapidly changing global process that cannot be sustained by current governmental and private sector practices.”⁵⁶ With a focus on privacy, this group might be setting itself on a collision course with governments who, for many reasons, may want to make it easier for companies and governments to know user information for the express purposes of ensuring KYC and AML compliance. Privacy will be a central point of discussion and discourse within a Bitcoin governance network, as various stakeholders weigh the importance of the individual’s right to privacy against government mandates to require disclosure and prevent wrongdoing.

Furthermore, as Bitcoin is still a nascent technology, stakeholders will have to balance the need for strong governance and the desire by network participants to continue to promote innovation, especially considering that the Bitcoin protocol (the source-code that underpins all Bitcoin applications) is still ripe for change and adaptation. Dr. Srinivasan of Andreessen Horowitz says, “In the parable of the elephant, one person is pulling the tail and one person is pulling the trunk and one is grabbing the leg and each of them is saying it’s something different... Is Bitcoin a commodity? Is it a currency? Is it a programming language that you can do contracts on? Is it futures? Is it a security? Is it any of these things? Is it all of these things?” Fortunately, governance and innovation are not mutually exclusive. Indeed, fostering innovation can be a core principal of a Bitcoin governance network.

Many different types of GSNs will have roles to play in a Bitcoin governance network but four GSN functions are absolutely critical. First, standards networks are needed to set technical standards for interoperability and



“*The spirit of the community is open source so in some places we set a very high standard and in some places we set a very low standard and if somebody can come in and do it better than us then kudos to them...It's not about creating roadblocks.*”

other key performance issues for the industry. Second, policy networks are required to create international guidance on issues such as crime, fraud, consumer protection, anti-money laundering and other key policy issues. Third, knowledge networks should study the evolution of cryptocurrencies and their impact on societies and economies and disseminate findings to key stakeholders by leveraging technology. Finally, watchdog networks must scrutinize the actions of powerful stakeholders in the ecosystem and ensure that all players behave ethically and observe key standards set by the community. Tim Berners Lee describes the Internet Governance Network as a “multi-dimensional, interconnected system that allows a shorter path from problem to solution than a hierarchical model...The diameter of the system is smaller as are the degrees of separation.”⁵⁷ A Bitcoin governance network should adhere to similar principals, with all network types working in close cooperation to promote the robustness, safety and success of cryptocurrency.

GSN Types for a Bitcoin Governance Network

Standards Networks

Bitcoin is still in its adolescence but as it matures the need for common standards grows. Global standards networks—one of the ten network types identified in our Global Solution Networks taxonomy—create the frameworks for common operations, transparency and interoperability across private and public sectors worldwide. In the Global Solution Networks report “Global Standards Networks,” author Rawn Shah describes how standards form the fundamental building blocks for product development and allow a promising innovation to make the leap to mass adoption. For Global standards networks to work, they must “engage the expertise of individuals, institutions, civil organizations and, most of all, private sector enterprise.”⁵⁸

Today, no such network exists for cybercurrency, but that does not mean there aren't stakeholders in the cybercurrency community thinking about these issues. The Bitcoin Foundation, one of the most prominent Bitcoin advocates, counts standardization as one of its core principals. Patrick Murck, General Counsel for the Bitcoin Foundation, describes their role: “... we try and standardize Bitcoin so as to fund the development of the Bitcoin Core reference implementation,” ensuring that all future implementations, modifications and applications reference the correct source code.⁵⁹ Because “Bitcoin Core” is open source, many more implementations can arise that build off and also deviate from the original code. While the Bitcoin Foundation is a leading voice on the issue of standards, the founding members support a multi-stakeholder approach. Mr. Murck explained, “The spirit of the community is open source so in some places we set a very high



standard and in some places we set a very low standard and if somebody can come in and do it better than us then kudos to them...It's not about creating roadblocks. Every time I see another association announced I think it's good news. It means more people are active and engaged and involved.”⁶⁰

In most instances, standard setting is best left to global standards networks where governments take a back seat, so as to let technical and administrative standards form organically. Jeremy Allaire of Circle, a leading Bitcoin company, told us, “This is a computer science revolution and... it is critical that the intellectual property development and the development of the software or the protocols, the reference implementations, [and] new standards be free and unencumbered from regulation.”⁶¹ States can mandate usage through compliance, but enforcement is not adoption. A networked solution is preferred where adoption is spurred from the bottom up, rather than the top down. While states can offer incentives to inspire adoption or use, only mass adoption can legitimize technical and administrative standards.

The process for establishing Bitcoin standards could resemble the process used for Internet standards, where groups resembling the Internet Engineering Task Force (IETF) might come into existence to engage a volunteer core of participants, establish core standards for the Bitcoin protocol and enforce the shared ownership of intellectual property, when appropriate. Jerry Brito argues that the governance network for Internet standards is a useful starting point for many aspects of Bitcoin governance. He explains, “It's kind of like IETF, which essentially standardizes all of the technology that powers the Internet. They have no building, they have no office, they have no budget, really, and yet they operate completely in a bottom up process.”⁶²

While the IETF may be a global operation, 81% of the standards have been authored by American engineers. The World Wide Web Consortium, another standards network, is hosted from four locations across the globe—in the US, France, Japan and China.⁶³ Bitcoin has come about in a time of global connectivity, so perhaps a global standards network for Bitcoin ought to reflect that, with more global and diverse support. As noted, many of the world's largest Bitcoin exchanges are Chinese and one of the most exciting use-cases for Bitcoin is in lowering remittance costs and improving financial inclusion. As a result, a more global and diverse chorus of stakeholders ought to have a say in the development of standards.

How would such a network be structured? While simplicity and agility are key, standards networks will mature with the development of four key functions: the administrative body, which guides overall operation of the network; the standards development workgroups or committees, which manage the proposals, creation and lifecycle of the standards; the standards implementers that build and sell products or services, and the end users that will be the net-beneficiaries of this process.⁶⁴ Above all else, this network must include the key stakeholders that make all GSNs work: government, civil society, the private sector and individual citizens.



“ Governments do not always possess the time or the know-how to evaluate the information they have and therefore have difficulty formulating the right policy to address it. Multi-stakeholder policy networks offer an alternative policy development paradigm that can help address some of the challenges besetting governments by bringing knowledgeable participants into the policy formulation process. ”

Policy Networks

The development of the Bitcoin protocol and its subsequent implementation in a variety of disruptive ways has caught many regulators off-guard and exposed many shortcomings in the existing regulatory framework. According to Mr. Allaire, legacy policy frameworks that address financial crimes, money laundering and know your customer requirements (the most important policy issues for Bitcoin), “never contemplated cryptographic instruments such as Bitcoin and never contemplated digital bearer instruments that can move anywhere on the planet.”⁶⁵ This highlights one of the central issues of developing policy in a fast-changing world: governments do not always possess the time or know-how to evaluate the information they have and therefore have difficulty formulating policy to address it. Multi-stakeholder policy networks offer an alternative policy development paradigm that can help address some of the challenges besetting governments by bringing knowledgeable participants into the policy formulation process.

Policy networks are “Internet-enabled networks of participants that contribute a broad range of skills, experiences, perspectives and resources to constitute an effective policy-making unit.”⁶⁶ The goal of policy networks is not to wrest control of the policy making process from governments. Policy networks have power but not formal power. Instead, their goal is to turn decision making from the traditional hierarchical broadcast model to one of consultation and collaboration.

Today, there are early signs of a nascent policy network emerging in the world of cryptocurrencies. Various stakeholders, such as academics, industry and professional associations, and civil society organizations have begun to discuss and collaborate on this issue. Conferences are held all over the world that bring together thought leaders and industry experts to debate and discuss the many critical policy issues related to Bitcoin, namely how to fight crime, prevent fraud, protect consumers and integrate KYC and AML requirements internationally to meet the challenge of providing global governance.

Collaboration with government will be necessary in order to turn ideas into meaningful policies that can be appropriately monitored and enforced. There are early signs that this collaboration is already happening. Congress held hearings on Bitcoin with industry experts in 2013, and the New York State Department of Financial Services instituted a comment period after drafting its BitLicense proposal. Such efforts are commendable, but these are still old-paradigm solutions. A better solution that fully leverages digital technology would include the creation of an online policy forum through which government can collaborate with key stakeholders in the Bitcoin ecosystem, specifically leading the private sector, academics and civil society organizations such as the Bitcoin Foundation. Not merely a means to aggregate different opinions, this online discussion would be a way to assemble insight and capability and could derive legitimacy by being inclusive, and transparent and by pledging to commit to meaningful action.

Governments would benefit by gleaning insights and suggestions from a diversity of stakeholders. One advantage of an open and diverse policy



“...knowledge networks must foster a culture of openness and inclusion, be transparent and involve multiple stakeholders. They must also use technology and social media to collaborate, share and access ideas.”

forum, according to Mr. Brito, is the ability to shift the dialogue on Bitcoin away from its early advocates—whom he describes as “really libertarian...anti-government and looking at this technology as a way to decouple a mode of exchange from the monopoly of the government”—and reflect the diversity of opinions in the ecosystem today. Embracing openness, transparency and inclusivity would also give government the moral authority to enact laws that address this global challenge. A collaborative approach to assembling best practices and viable governance solutions would lead to better policy outcomes and would allow governments to position themselves as trusted partners in policy creation.

Knowledge Networks

Policy networks work when they use technology to leverage the knowledge of various stakeholders and when they possess the authority, legitimacy and resources required to foster meaningful long-term change. Policy networks often depend on knowledge networks to support the development of evidence-based policy, empower advocates with access to timely information, promote the development of technical standards and help drive mass-market awareness and adoption of policy solutions. As discussed in a Global Solution Networks report on the topic, knowledge networks are “the origination points for disseminating new thinking to other GSNs, and the broader world.”⁶⁷ Like so many other GSNs, knowledge networks must foster a culture of openness and inclusion, be transparent and involve multiple stakeholders. They must also use technology and social media to collaborate, share and access ideas.

Bitcoin already has a number of fertile knowledge networks. There is a Bitcoin Wiki with a strong community of contributors engaged in knowledge exchange. On Reddit, the online forum board, Bitcoin, Dogecoin, Litecoin and other crypto-related subjects all have active subreddits, or forums for discussion and the exchange of information. The subreddit Ask Me Anything has also served as a platform for discussion with thought leaders and industry experts such as Peter Thiel, the venture capitalist, the founders of Mt. Gox, the controversial Bitcoin exchange, the Winklevoss twins, who are founding a Bitcoin ETF, and Ben Lawskey, the Superintendent of the New York Department of Financial Services.

The conversation with Ben Lawskey, arguably the world’s most influential regulator on the subject after releasing his “BitLicense” plan, attracted over two thousand active participants. This wasn’t some boilerplate Q&A by a government spokesperson, but a living breathing knowledge exchange. Mr. Lawskey answered dozens of questions and was thoughtful and candid. For example, he opened up on privacy, a critical point of contention, by saying,

“I think financial privacy is an important value. I certainly don’t love the fact that when I purchase something online, I quickly receive a bunch of email solicitations which clearly show that



my information has been sold to other companies...the tricky question is whether we can come up with smart rules that might require personal identifiers for certain transactions at certain entry points into the system while still protecting financial privacy while moving around within that system. We're obviously still in progress on this topic."⁶⁸

What forum other than Reddit would have provided an opportunity for such an open and candid dialogue with a variety of interested participants?

As useful as Reddit might be for knowledge exchange, there are two shortcomings to this model. First, it does little to foster mass-market understanding. Kausik Rajgopal, who leads McKinsey's Silicon Valley office, told us that Bitcoin needs mass-market education. He argues that, "Most successful payments innovations begin by winning in a niche, but then they must broaden. To succeed at scale, Bitcoin must appeal to a much broader base of users than the tech community in which it first emerged."⁶⁹ Most of the forum's users are already in the Bitcoin camp, and the findings and insights from this exchange were not widely disseminated or shared through other networks or other forms of new media. Second, they do not necessarily lead to meaningful outcomes. Fortunately, other GSNs can use the knowledge gleaned from these networks to drive change. Knowledge networks are urgently needed to address a lack of mass market understanding. More informed and savvy users are able to better protect themselves from fraud and theft and protect their privacy. They would also be able to realize the full value of this disruptive technology, making their payments, purchases and money transfers faster, less costly and more efficient.

Watchdog Networks

Watchdog networks scrutinize and are generally highly adept at using technology to hold powerful institutions accountable for their actions. In the process, they drive public debate, boost transparency and ignite movements for change. Like all GSNs, watchdog networks find strength in numbers.⁷⁰ Watchdogs are needed in a Bitcoin governance network for three reasons. First, they can be an ally to governments in exposing money-laundering, fraud, and terrorist financing that has used Bitcoin. Second, they can perform a self-regulating function for the companies operating in the Bitcoin world, ensuring there are no predatory activities or breaches of trust or privacy by exchanges, e-wallets or other financial service providers. Finally, they can be watchdogs of governments themselves, ensuring that government does not overreach in regulating the Bitcoin economy or break the law by violating the privacy and other legal protections of Bitcoin users. These different watchdog functions are enabled by technology in two critical ways. First, smart technologies allow watchdogs to find, collect and analyze evidence much more quickly. Second, watchdogs can use new media and other forms of digital distribution to disseminate their findings, raise awareness and drive meaningful change. The role of watchdogs is inherently inter-



twined with that of advocacy networks and policy networks. Policy networks collaborate with government to shape policy that works. Watchdogs ensure that industry compliance with policies is being effectively monitored and enforced. Or, if governments are overreaching or abusing public trust, watchdog networks can sound the alarm bells while advocacy networks step up and demand reforms.

Of the four GSN types that comprise a Bitcoin governance network, watchdog networks are the least developed. Government watchdogs, such as the European Banking Authority and Consumer Financial Protection Bureau, have come out with recommendations for consumers and banks regarding cryptocurrencies. But a truly independent watchdog networked has yet to emerge. While the opinions of government watchdogs are clearly helpful, they still represent just one opinion within the network, which in turn raises the important question: who watches the watchdogs?

It is possible to establish the principles and imagine the framework for such a watchdog network. First, it would employ rigorous research methods and leverage technology as a tool to conduct its monitoring, evaluation and reporting work. Second, it would employ media-savvy stakeholders who can use new-media and tap into broader networks to give its findings broader exposure. Finally, it would approach its role with an eye on outcomes. Leading watchdogs measure impact by assessing how well public interest has been galvanized and has effected change. While there is no shortage of potential applications for the Bitcoin protocol, for now the technology is primarily used as a payment system and an alternative to fiat currency. Fraud, theft and abuse are a fact of life for the Bitcoin economy, requiring savvy watchdogs to keep all stakeholders honest.

The GSN Approach: Core Principles, Conclusions and Implications

Core Principles of the Network

A Bitcoin governance network would come into existence as these disparate networks mature and then coordinate their activities in a manner that produces a coherent and cohesive system of global governance. In order to do so, stakeholders must self-organize and lead this effort. They would be wise to follow some basic principles. Indeed, the Global Solution Networks outlined in our proposed Bitcoin governance network broadly share four common characteristics, consistent with all GSNs.



1. **Diverse Stakeholders:** There are participants from at least two of the four pillars of society (government or international institutions, corporations and business interests, the civil society and individual citizens).
2. **Beyond One Nation State:** The network should be global or at least multi-national, having participants from more than one country. There are to date few governance networks that are truly global and that operate on multiple levels—other than the Internet itself. But there are a growing number of problems that are truly global.
3. **Networking:** It must be a 21st century network in the sense that it harnesses some form of digital communications tools and platforms to achieve its goals.
4. **Progressive Goals:** The network seeks to improve the state of the world through developing new policies or new solutions, influencing states and institutions or otherwise contributing to economic and social development, human rights, sustainability, democracy, global cooperation, building empowering platforms and global governance. One way of thinking about this is that these networks seek to create global public good.

Moreover, there are four principles that should define how a Bitcoin governance network ought to operate:

First, a Bitcoin governance network should not be a closed system, but an open network with porous organizational boundaries. While this might lead some to assume an anarchic free-for-all or a cacophony of varying opinions, in practice it can be far more orderly and productive. A Bitcoin governance network, as a network of the able and committed, can create meaningful outcomes that shape policy and move the mandate for the network forward.

Second, a Bitcoin governance network should be non-hierarchical. Bitcoin is a complex and global phenomenon. As the value of Bitcoin increases and as user adoption accelerates, Bitcoin will have greater systemic importance in the financial system. A failure to address this systemic importance—and indeed systemic risk—could lead to catastrophic outcomes. Traditional hierarchies, with command and control frameworks, are inherently limited in dealing with technologies that are interconnected, complex and global. Therefore, a networked model is needed.

Third, the Bitcoin governance network should be based on merit rather than status. There are, of course, exceptions to this rule. In our policy network, for example, the special status and legitimacy of governments gives them ultimate say on the enactment and enforcement of laws and policies in their jurisdictions. The alternative, whereby governments cede those special powers to a network, is not desirable. Governments, as elected bodies (at least in free democracies), have a unique authority that power networks can never possess. However, governments are increasingly seeing the limits to



their own knowledge and are inviting feedback from different stakeholders. Anyone, regardless of status, wealth or geography, ought to be able to contribute to that discussion and be instrumental in producing key outcomes.

Fourth, decision making should be influenced by, if not directly based on, rough network consensus. This is most true for a global standards network that serves a Bitcoin governance network. Standards are not mandated through compliance nor are they enforced. They derive legitimacy from adoption. Consensus is important in policy networks as well. Though government may have the final say on policy, new laws carry more weight if they are derived from a consensus building exercise. Consensus also applies to watchdog networks and knowledge networks. Wikipedia, the archetype of a knowledge network, does not have a formal decision-making process on what goes into entries. Similarly, the knowledge networks within a Bitcoin governance network would seek to build consensus rather than codify edicts.

Conclusions and Implications

Bitcoin is an important innovation that has the potential to disrupt many industries. By lowering remittance costs and driving financial inclusion, it could even be a tool for solving global problems and improving human welfare. However, Bitcoin will not fulfill its potential without strong governance, based on openness, transparency and accountability. Governments clearly will be instrumental in determining its future. Other incumbent interests stand to gain (or lose) depending on what approach they take. Payments and other financial services represent the most obvious and currently the most pervasive use-case for the technology, however developers are working on a myriad of other applications for Bitcoin. In a report issued in September, 2014 the Bank of England suggested that the distributed ledger that forms the basis of the Bitcoin protocol could become the backbone of many financial assets, such as bonds, derivatives, precious metals or shares in companies.⁷¹ Some new start-ups are using the Bitcoin protocol's private key technology to create unique user IDs that make security breaches more difficult to execute. Other, yet untested and still theoretical applications of the technology are also being developed. Bitcoin may become the engine of content monetization, the backbone of digital contracts, or the future of charitable giving, as some have predicted.⁷² Our objective is not to predict which use-case for the technology will be successful or whether or not Bitcoin will endure in its current currency-based form. Instead, we have provided a workable framework for a multi-stakeholder approach to Bitcoin governance. The network itself will have to determine what works and what does not.

A networked approach to governance, following the GSN principles, provides the best blueprint to the long term sustainability, growth and widespread adoption of Bitcoin. Leading stakeholders in a network must take the reins in developing its core functions. As it stands today, national governments, NGO associations such as The Bitcoin Foundation, Windhover Principles, Coin Center and leading developers in the ecosystem are best positioned



to be the early leaders in this regard. Because no one can mandate the existence of this network, all stakeholders will have to collaborate to grow and sustain it. Governments can play an enabling role in helping to develop policy networks, while technologists and developers ought to play more of a role in setting standards. NGOs can provide intellectual leadership, spread knowledge and keep a watchful eye on other stakeholders in the network. Today, there is an unmistakable power vacuum that the community will need to address collectively. Because this technology is developing so quickly, all stakeholders must approach leadership, organization structure and implementation with an eye to the future.

Remember that in 1992, the founding members of the Internet Society (ISOC) could not have predicted the multitude of revolutionary and disruptive ways that the Internet would be used 20 years later, yet today the ISOC is as important and relevant as it was in the formative years of the Web. A Bitcoin governance network, comprised of diverse stakeholders, adhering closely to the principals of openness, transparency and cooperation, could do the same for Bitcoin—legitimizing it, nurturing it and stewarding it into the future.



Appendix

Digital currencies such as bitcoin are products of the digital revolution and the networked age. As their usage and value have grown, government policy makers have struggled to play catch-up, finding it difficult to comprehend this phenomenon, let alone regulate and govern digital currencies effectively. Incumbent interests, such as large financial institutions, have been similarly caught off guard. Meanwhile, digital currencies march forward. The bitcoin economy has grown to over \$8 billion in value and the bitcoin ecosystem, once composed exclusively of a few hobbyists and technologists, now includes merchants, financial services firms, start-ups, foundations, advocacy groups, investment companies, venture capitalists, government regulators, law enforcement agencies and NGOs.

Thought leaders and business innovators are now pushing forward with bold new applications for the bitcoin protocol. We were fortunate enough to sit down with several of the top players in the bitcoin space for candid and in-depth interviews.

We would like to thank our interviewees for their time and for their thoughts on this disruptive and fast-changing technology.

Interview with Jeremy Allaire, Founder and CEO, Circle Internet Financial



Jeremy Allaire

Tapscott

Thanks very much for taking the time. As I mentioned, I'm working with the Global Solution Networks program at the University of Toronto, which is a landmark study of the potential of global web-based networks for cooperation, problem solving and governance. bitcoin, and more broadly cryptocurrencies, are an area that we've identified as having a potentially important role in the financial system of the future, and also having potentially a big windfall for consumers, merchants, for people in the developing world etc. At the same time we've identified some potential risks and also the ways in which it can disrupt existing players in the system. So



we'd like to talk with you, Jeremy, about Circle specifically and also about your thoughts more generally on how you think bitcoin and cryptocurrencies will progress through regulations, and also more broadly about governance of digital currencies. But before we get into that, I'd like a little bit of background about how Circle came into being and how you first got involved in the bitcoin role.

Allaire

Sure. I started Circle with my co-founder Sean Neville in the spring of 2013. Prior to founding Circle, I've founded and built multiple Internet software and online service companies, fairly high growth public companies with millions of customers around the world, and have really been an enthusiast for open internet platforms and the role that those can play in transforming society and the economy but also very specific industries. I learned about bitcoin in mid-2012 and was very curious about it. I have sort of a long-standing personal interest and prior academic interest in political economy issues and broader international economic issues and so it really was an interesting convergence of areas of interest for me.

And I had recently moved from being CEO of my last company, Brightcove, to being Chairman and it freed me up to look at different opportunities. I got more and more excited about bitcoins specifically, and in the February/March 2013 time frame, I looked around at the ecosystem a very, very nascent ecosystem, and there were very few, if any, serious business projects under way around it and it struck me as something that, with the sort of broad business and technical skills I had, that I could be very effective in starting a business in this industry.

And the sort of specific genesis for Circle was really a kind of shared belief system for Sean and me that an open format for money and open protocol for the transmission of value were a next logical phase in the Internet and that there was an opportunity to build a significant global consumer finance company that was anchored on those platforms.

And so that's really at the core of what Circle is about, which is trying to transform retail finance, consumer finance, globally using digital money and using platforms and networks like bitcoin.

Tapscott

Thank you very much for this synopsis. Bitcoin has often been criticized in the media, rightly or wrongly, and perhaps the issues have been clouded by overly heated rhetoric, but for being volatile, unsafe and used commonly by the criminal element for cybercrime and the exchange of illegal goods. How do you respond to those criticisms and what's your viewpoint on those criticisms?

Allaire

Yes, we're in the very early stages of the development of this market and this technology and I think this is not dissimilar from where we were with the commercialization of the Internet and the birth of the commercial web in 1994. Complex technology perceived by the mainstream to be on the fringe,



not secure and a lot of people questioning the kind of utility value of it and really creating a lot questions for government around governance issues. What we have now is a very similar kind of feeling to then.

I think the important thing is that the development in platforms like this happens very organically. It also happens over a much longer period of time than people ultimately expect. It's been 20 years since the birth of HTTP and HTML, at least in a meaningful form, and it takes a very long time for that to evolve. And so it's totally reasonable that at this stage with something that is so new and doesn't fit cleanly into the boxes that people understand, that there'd be a lot of concern or criticism. Obviously you know bitcoin itself, relative to the existing financial system, is a tiny, tiny, tiny drop in the bucket in terms of where criminals spend their time. In fact I testified to the US Senate in November of last year and the head of financial crimes enforcement for the US government testified at the same time and she made it very clear that the scale of criminal or money laundering activity that might be happening in virtual currency is sort of infinitesimal compared to what's happening in the US banking system and the US dollar where she estimated nearly two trillion dollars a year in criminal activity has taken place on a worldwide basis.

And so it's easy to level these criticisms but it's minor impact. I think the second piece is in an early market like this, the industry is seeing the disruptive potential but also acknowledging consumer protection issues, acknowledging that in a world where you have digital assets that are controlled by private keys in a kind of cryptographic system, that new best practices have to be established by commercial institutions to secure user funds, to keep fraudsters off of platforms that transmit those funds, and those are exactly the kinds of things that venture-backed companies are doing, including Circle.

The development of a more mature commercial industry, including one that follows governmental rules around money storage, money transmission, things like that, it's going to address a lot of that. Volatility issues similarly... we're in a tiny illiquid market and tiny illiquid markets are volatile because there isn't enough volume and velocity and liquidity to have a more stable pricing environment. I think what's really exciting is the number of more mature institutionally focused exchange platforms that are launching regulated exchanges in the US and London and Hong Kong and other markets, which I think will, over time, drive these digital assets and the trading and pricing and exchange of these assets to be more in line with other forms of electronic market places and systems that provide price stability, price discovery and the like.

That's something that's just going to take time and I think people would love to see it be consistent and gradual in it's kind of price movements but we're just in the early stages and until you see that institutional participation and there are more mature exchanges, you'll continue to see bigger movements than you see in some other, certainly currency markets, but other types of categories of tradable assets.



Companies like Circle or payment processing companies like BidPay can simplify the experience for consumers and merchants and remove volatility risk using bitcoin as a format and a network that has some benefits without exposing people's price volatility. And so that's something that I think will become more and more common as well.

Tapscott

You mentioned these congressional hearings—the person you're talking about, was that Jennifer Shasky?

Allaire

Yes.

Tapscott

And I think she said the government welcomes this development in technology and I think that probably speaks more to the US climate of supporting entrepreneurship than anything else. But I think at the same time she said that she wanted anybody, any company or organization that's operating, you know, with bitcoin or in the bitcoin ecosystem, to submit to all of the same regulations that are in place for companies that deal in conventional currencies. And I heard you mention a couple of times about well-regulated companies gaining advantages precisely for some of those reasons. And I think you've said in the past that regulation is a necessary requirement for bitcoin and cryptocurrencies to gain mainstream traction. So on that, and correct me at any point if I'm misrepresenting what you've said in the past, but what is your view on government regulations specifically, how important do you think the role of governments will be in the development of bitcoin governance?

Allaire

There are a lot of pieces to this. Actually what Shasky said, and also the guidance from the Treasury department, was actually a little different than that. Specifically the Treasury department issues rules saying exchangers, essentially those companies that are sort of the on- and off-ramps between the traditional banking system and digital currency, are subject to anti-money laundering laws and that's different than any company that is providing technology products or services in digital currency, and that's a really critical distinction. My co-founder and I just recently penned editorials that were directed at a response to the proposed Bit Licence in New York...

Tapscott

Yes, I'm looking at it right now and I was about to point out you made that distinction...so sorry, continue.

Allaire

It's a really critical distinction which is, I look at the innovation that's happening with crypto-ledgers, with distributive trusts, with trust-less transact-able assets—all these things are really powerful innovations and they go well beyond the scope of just the transmission of monetary value. They really reach into fundamental rethinking of the architecture of the Internet and even how services and applications and software and data live on the



Internet. This is a computer science revolution and it's applicable in many areas and it's really, really critical that the intellectual property development and the development of the software or the protocols, the reference implementations, new standards, new stacks, whether it's commercial or open-source, etc., be free and unencumbered from regulation.

I think once you have businesses that are set up, that are explicitly custodians for consumer funds, and explicitly providing that liquidity and interaction with the existing banking system, there are some rules that are reasonable and those are rules that we expect to be subjected to, and we are already subjected to at the Federal level, and we'll see more at the State level, and we'll see likewise similar regimes emerge in other jurisdictions around the world. But it's really important that that intellectual property development be unencumbered.

I think the second thing is existing frameworks of policy that address, for example, financial crimes or money laundering or know-your-customer, that are applied and used on a worldwide basis in the existing banking system—these never contemplated cryptographic instruments and never contemplated digital instruments that can frictionlessly move anywhere on the planet. The response can't be "let's apply all the same rules that exist on existing financial transactions." It really ought to be "how can we innovate on top of distributive trusts and cryptographic ledgers to provide greater transparency, to provide more and more protections for consumers, so consumers are not subject to identity theft and credit card fraud and things like that."

And so the message for regulators is that this is a nascent industry, there ought to be some baseline rules that are not totally inconsistent with those that are applied to existing money services businesses, but that the industry needs time to grow and there are technical innovations to some of these issues that haven't even been thought of and developed and so it's important to leave enough room in the market for that kind of innovation to happen.

The other message is the nature of start-up disruption and technology, open-technology disruption that you see on the Internet and that's impacted some of the other industries. It really helps when you know thousands of companies in a process of creative destruction can iterate and innovate and build value, and in order to enable that without having an overly burdensome regulatory regime really requires really two things—a kind of principle faced approach to policy as opposed to a prescriptive approach, so say the principle is consumers should not be able to have their funds stolen or whatever that is, versus a specific prescriptive policy; but more importantly, what we call a kind of risk-based approach to an on-ramp that's really based on the size of the operation. And so small start-ups that are seed-funded should be able to get going and get a banking relationship, and get an auditing relationship, and get a cyber-security relationship but as they get beyond a certain scale have greater levels of oversight, greater level of reporting requirements and things like that.



So that's an important message that we are certainly conveying as we interact with governments around the world.

Tapscott

I'm really glad you brought out the idea of a principle-based approach versus a prescriptive approach. The principles that you mention, do you think that they will come about strictly from government policy or do you think that those principles are something that can be formulated or at least discussed openly in a multi-stakeholder environment?

Allaire

I would hope that they could be discussed openly in a multi-stakeholder environment. That certainly would lead to better outcomes in my opinion. And I think we're working towards that, I mean the volume of intelligent industry dialogue on this, the number of stakeholders that are focused on this, is really remarkable and I'd like to think that the bodies that are thinking about rule making or about interpretation of law, etc., would welcome that.

I mean you're seeing that in some other forums, so for example in the United States there is an organization called the Conference of State Bank Supervisors, it's basically all the commissioners of banking oversight from all across the US and they've created a task force which is aimed at looking at regulatory and rule making issues related to digital currency and they've solicited very broad participation and input into that, and that's a more open process. And things like that can occur but at the same time the digital currency industry needs to prepare to be able to react and put forward its own ideas for how this can move forward.

One interesting thing that happened, if you've been tracking this space, which I thought was very interesting, is when Mt. Gox collapsed and it looked like it was negligence and lack of controls, lack of audit, lack of independent verification of funds and a number of things like this. The industry rallied around this concept of proof of reserves and that any exchange, any custodian could use cryptographic proof to demonstrate that the entity you're trusting with your private keys, or with your money, actually has it. And that's an example, instead of saying we need a government rule that requires a big four accounting firm to perform annual audits, the industry said "hey, look, we can actually do this with cryptographic proof" and that's even more powerful.

And so I think things like that can emerge from the industry in a number of areas that actually self-regulate and get out ahead of the concerns that exist with policy makers.

Tapscott

In addition to the policy makers and entrepreneurs and private sector actors, like you, who are the other stakeholders in the bitcoin ecosystem?

Allaire

Yes, you know I think...



Tapscott

Or let me rephrase—we've seen a couple of non-governmental organizations emerge as advocates for a policy regarding bitcoin—there's one in the US, the Bitcoin Foundation for example, whose express goal is to promote user awareness, to promote policies that will allow bitcoin to spread around the world. I know people have varying views on that organization and their efficacy but I'm just curious about your perspective on other stakeholders outside of the private and public sector.

Allaire

There's absolutely the need for advocacy organizations and by that I don't mean literally like lobbying firm, but advocacy organizations that focus attention both on broader market place awareness as well as kind of focused education aimed at industry and policy makers—I think there's a great role for that. I think there are, as you know, emerging organizations that are trying to do it but I think we're going to see many things emerge that are aimed at that issue.

Another area... you'll see many organizations emerge that look to fill that role, not just in the US but in countries all around the world and it's been interesting to see almost every country in the world has a bitcoin association which is an industry association that's aimed at promoting bitcoin, educating government, etc., and that's really remarkable. You don't see organizations like that emerge so spontaneously around technology very often.

Tapscott

And then on the subject of advocacy, watchdogs—outside of regulators themselves and self-regulation by industry—is there a role for watchdog networks or watchdogs to scrutinize the actions of powerful stakeholders in the ecosystem and ensure that all the players behave ethically and observe the key standards that have been set?

Allaire

I guess I don't know enough about what kind of examples you'd give for that. Interestingly, you know in the US you have the historical institutions like Moody's and Standards and Poor's and the rating agencies, obviously they face their own controversy in the context of the sub-prime mortgage crisis, but the idea of having third parties that are not the auditors of the books or the government regulators that oversee, but actually third parties that are attempting to use publicly available information to assess the quality of a firm, its assets and its products. And you can see a kind of ratings agency type model emerge around cryptocurrency. I don't think you would look to a Moody's or a Standards and Poor's for that but you might see organizations emerge that are really out to look at rating the quality of products and services in the digital currency space. And they may even be able to use automated messaging for determining some of that.

Tapscott

You provided your thoughts on the New York BitLicense proposal last week. How has the New York Department of Financial Services responded, or how do you think the dialogue has been with government—is it a two-way street



at this point or is it more broadcast model from government to folks like yourself?

Allaire

As both Sean and I mentioned in our pieces, we've had lots of meetings with state regulators, federal regulators, international regulators—it's been an on-going process of communicating, educating, etc. And I also, I think I made this point in my piece as well, there's a great deal of interest amongst regulators in this field and in this disruption and there's a desire to support this industry because of what it represents in terms of the potential benefits to consumers and businesses and to, as you say, developing markets.

And so there are the core themes and the core benefits that are expressed in those themes, and that's been, I think, positive. And a year ago when I was really getting started interacting with government, I didn't know what I would find, and it's been really... I've been pleased with that. I think there's a tendency sometimes in the bitcoin community to demonize government or regulators as people that want to basically protect the existing system or protect the existing banks and I don't think that's a totally fair characterization.

But you know, specific to your question about response, there's no specific response that we've gotten from New York. I think they're very clearly in an information gathering mode, they're getting a lot of structured commentary back, some of it public communication, some of it specific communications directed to the department. We're providing formal and legal commentary as well, which I expect to go on the public record. So there's a lot of data they're going to get and I think they're going to most likely continue to engage with industry and academics and others and iterate on this.

Tapscott

Yes, I'm personally of the view that any smart government will view this as a massive opportunity to attract investment. I know George Osborne, Chancellor of Exchequer in the UK, wants to make London the bitcoin center of the universe and I know that certain government actors in New York have said the same thing, you know everybody wants the next Silicon Valley and the fact that it's in the financial services industry makes it very appealing for big financial centers like London and New York. I'm personally of the view that they're just looking for ways to mitigate damage control and prevent any kind of embarrassment but also to foster innovation.

Allaire

I think that's broadly correct.

Tapscott

Is there anything you would add to that kind of thinking?

Allaire

I think there are parts of the regulatory apparatus that have very, very specific things that they're responsible for and so they're maybe more



narrowly focused in what they're commenting on or trying to accomplish. But I would say, you know, in general that's... that's accurate.

Tapscott

Great. We're planning on publishing this paper in the fall. If I have any follow-up questions I hope I can reach out to you and your team?

Allaire

Yes, sure. Absolutely.

Tapscott

Well thanks a lot Jeremy, really appreciate it, appreciate your time and your insights and we'll certainly be in touch if we have any follow-up.

Allaire

Great, thanks a lot.

Interview with Jim Bailey, Global Managing Director, Accenture Digital, Mobility



Jim Bailey

Tapscott

Hey, Jim. Before we launch into bitcoin specifically and digital currency as a subject, I'd like to talk a little bit about the work you're doing at Accenture on payment services. I've been reading a lot of your material and it seems to me that the digital payment transformation, that is, the migration of cash payments and classic card payments to digital channels, is a big thing that you think holds enormous potential for your client base. Could you spend a little bit of time talking about the work you're doing and what you view as the opportunity and also some of the challenges?

Bailey

Sure. Just by way of introduction, I've been with Accenture 26 years. My current role in our financial services practice is I lead our payments business in North America, so I have responsibility for our client base that supports the existing payments Visa system as well as the business service around



payments-related profits for our clients. We do get into the subject of digital currencies from time to time. There is a distinction, though, between digital payments and digital currencies. In digital payments we're seeing quite a bit of activity with our client base where consumers are adopting new technologies to simplify and add value to the way that they make payments in the world, and mobile wallets is one example of that. But there are other different schemes out there. It's a little bit different than digital currencies, which are the global technology based cryptocurrencies that exist in the world, such as bitcoin, that kind of are a separate topic. Our client base, while we're seeing a fair amount of activity on digital payments using existing currencies, the US dollar or Euros, *etcetera*, our client base is not spending a lot of time right now, or at least not a lot of money, on digital currencies. They're watching and they're very interested, so we do have conversations from time to time but not a lot of engagement at this time where our clients are investing in the business to try to figure out how they incorporate bitcoin or others into their business model.

Tapscott

And why do you think that is? Why do you think that, at this time, at least for now, they're watching intently but not prepared to take any action at this point in time?

Bailey

Well, I think... and again, I wouldn't qualify myself as an expert on digital currencies from the limited client uptake that we've had on them to date, but I think most of the interest in digital currencies comes from either the technology community, the regulatory community, the security community, or the academic community. It seems to me that many in the world are looking at these digital currencies almost as an experiment, and the technologists are saying "can we pull this off, can we do this in a secure, easy to use way?"

Eventually there will be lessons that will be incorporated into all currencies and the way currencies are managed around the world. In the United States, the regulators are taking a hands-off approach to see how digital currencies grow, how they behave in the market, how consumers react to them, and how businesses react to them before taking formal action. The security community is looking at how digital currencies could be a threat or be an enhancement to the tracking of usage of money for illegal activities around the world, and the academic community is looking at how this impacts the overall financial system and business community, and the way we do commerce in the world.

So all of those different angles are looking at it, I think, like somewhat of an experiment where you're saying let's see how this evolves over the next year or two, three years, to see whether it flourishes or survives or doesn't survive. And businesses are... they're smart about how they use their money, so they're waiting to see. Is this a fad, or is this something that turns into the wave of the future? Then they'll decide about a serious investment.



Tapscott

And Jim, the client base for Accenture, correct me if I'm wrong, is comprised mostly of large corporations, public enterprises, multinationals and the like, is that correct?

Bailey

That is basically a way of thinking about it, yep.

Tapscott

So you could argue perhaps that at least for large, established corporations, the technology or the development is a little too early stage, and it lacks mainstream adoption and therefore it's something they'd rather wait and see than take action prematurely?

Bailey

I think so for now. I'd be interested in your feedback as well, what you're seeing as you've talked to other people, but at least from our client base, we have talked about it and done workshops in a variety of different venues and that's generally the position they're taking, which is let's wait and see how big this thing becomes. Now, there have been announcements by different businesses about accepting bitcoin. To my mind, that's a bit more of a marketing gimmick, where a business may want to get its name out there in the press, in the news, and that's an easy way to do it. But scratching under the surface you see exactly how much business traffic are they taking between bitcoin and other digital currencies, and it's almost none. So bitcoin is a very interesting topic, but not one that is commercially making a big splash right now with our client base. That of course may change, but that's where we are right now.

Tapscott

Speed and cost are the two things that bitcoin proponents point out as being the two key aspects that make it superior to say, conventional financial instruments or electronic payments. The speed is instantaneous while the cost is basically next to nothing because the network is supported by miners who, in order to verify every blockchain, get compensated in the form of bitcoin. We all know how this works. So those two advantages, would you address them? You, I'm sure, deal with them on a day-to-day basis when talking about conventional digital payment systems using existing currencies. How important are those two things to your clients and what do you think about bitcoin essentially improving upon the speed and ease of use?

Bailey

Well, first, I would agree with Marc Andreessen in that the speed and the rendered line technology is superior, no doubt about it, and I think there are things that we, as a society and an economy, are learning from bitcoin that will ultimately be adopted into currency systems around the world as well as payment systems around the world, because you can't argue that the speed and cost and the efficiency of a bitcoin model is superior.

I do think you need to break down bitcoin into: What is it? What are the characteristics of bitcoin? It's based on a new technology system that



enables that speed and cost structure, it's also a global currency, so there are benefits that eliminate the need for foreign exchange, it's a virtual currency, it's not tied to any single government schema or monetary policy and it operates outside the current financial system. As you look at those different characteristics, I think there are some that are going to be durable and then some that perhaps are not. The one you mention around the technology base and the fact that it is far more efficient, has speed and cost characteristics that I think people are going to want in the future, I think that is something that will likely stay in some form or fashion in the world five, ten plus years from now. If we fast forward and say that five years from now, everybody's going to use bitcoin, then there's zero chance that governments are going to allow them to operate outside of any government authority.

One of the primary policy levers that governments have in the world today is their monetary policy, so I think the minute a non-government based currency becomes material in the world, then I think we start to see the regulators move from observation to action.

For the moment, I think they're looking at the overall phenomenon of technology to say there are enough of the characteristics that we think are going to be usable in the future that make this worthwhile to allow it to continue in its current form, before we figure out okay, how do we take the good pieces and incorporate that into the future of the world. So I think it's significant, but I think it's going to be pieces of the bitcoin model that actually survive, versus bitcoin becoming a universal dominating global currency would be my opinion, we'll... time will tell.

Tapscott

This is a great segue into the next part that I want to talk to you about, which is governance, and what we've seen so far is that governments have taken a fairly open approach to digital currency, particularly in the US, and this probably stems from a culture of innovation and entrepreneurship. The counterpoint to that is that they're pretty eager at this point to make sure that bitcoin as a financial instrument satisfies all the existing regulatory requirements for "know your customer" and "anti-money laundering," terrorist financing, etc., and also may change some of the security protocols and robustness of security that a lot of existing financial institutions have.

If digital currencies have any chance of going mainstream and getting widespread adoption, those conditions need to be satisfied, but the bigger issue is down the road, if cryptocurrencies end up gaining widespread adoption. Is government's response, do you think, to take the US dollar and make it a cryptocurrency of sorts? And by that I mean digitizing the US dollar. Or is the response to limit the utility of bitcoin through regulation, or some combination thereof?

Bailey

I think it's some combination thereof. It's actually a very interesting topic, because we're getting far out there in our thinking. I actually was a bit surprised, because when I learned about digital currencies several years ago, and I've got a college classmate who was one of the early guys in bitcoin



and it was one of these deals where he would attach bitcoins to e-mails he sent out to his friends just to try to get the name out there. Now those e-mail attachment are worth \$50,000 or something to people.

At first I thought there's no way that the regulatory bodies and particularly the security bodies are going to allow this thing to really take hold, but virtually, as you said, they've taken a much more balanced approach and allowed it to run. I do think that, to your question, there are some minimal standards that are in place, but bitcoin is operating in a very open, unregulated environment, for all intents and purposes. So the market is driving whether bitcoin is going to be successful or not, whether people are going to tolerate the volatility and all the issues that are around it, to get the benefits of using bitcoin as a currency. But let's say for the sake of argument that bitcoin were to take off. There's a significant issue, and this is probably a better question for a regulator, but I think there's a point when the United States government or other large economies around the world will say look, you can't let all currencies kind of flow into this large, global virtual unregulated currency, because we're basically ceding our monetary policy at that point. I do think there's a point at which governments put the harnesses on digital currencies to limit their use and impact so that they can preserve the levers that they have for managing the US dollar and the euro and such.

To the point about digitization of the US dollar, I look at that and I look at our existing monetary policy, and to some degree we have that conceptually, because you think about the difference between M1 and M2 monetary measures, really beyond zero you're moving away from physical currencies to virtual currencies, so if you have a repurchase agreement or a demand account or there are substantiations of the US dollar that are virtual and not backed by physical currency, then I would say, going back to the point about characteristics, what part of bitcoin would be potentially adoptable by established authorities in managing their existing currencies?

Maybe there is a portion of the technology that governments adopt to improve the way they manage the existing physical currency, as well as the overall monetary system. I think there are definitely lessons that are going to be adopted into the existing monetary system. It's not clear, though, which those are and when they will happen, but I think that's the primary motivation, really, for the regulators to allow this to run, because I think they're seeing there's probably a better mousetrap here and we can use parts of it to improve the way we manage our currencies."

Tapscott

It's interesting, governments globally have a really hard time cooperating. On issues like climate change, for example, the biggest improvements we've seen on that front have been on a state-by-state basis in the US, or by individual countries like Germany. Governments globally have not been able to coordinate, and so I wonder when it comes to something like digital currencies if they run the risk of losing that monetary lever as you called it, I think it's almost like an existential threat to the nation-state as an issuer of currency, whether or not they might decide this is actually an issue that we really need to get together on and coordinate on.



Bailey

Yeah, potentially, and that's part of where the conversation goes. Unfortunately for either a businessperson or an academic, the minute we step into the political world, all bets are off and logic doesn't always apply to the way those bodies are going to potentially cooperate or not cooperate with each other to apply action. For now, generally they're taking a hands-off approach and not paying a lot of attention to it, but eventually, they're all going to get there, I would think.

Tapscott

And you never know, certain states might be more hospitable to it than others. I feel like the US government is probably pretty secure in its feelings about the US dollar, maybe not as a global reserve currency but at least as a going concern, but it might be less obvious in a place like Argentina, for example.

Bailey

That's also because of the invented base. So if it's \$10 million or \$100 million or whatever it is in bitcoin activity, in the United States, that's a drop in the bucket. In Argentina, that could cause major swings, in the actual currency or other economic events.

Tapscott

Yeah, for sure, and I know this is a question. I've been posing it a lot to certain people, specifically government people, about the question of governance. Digital currencies are a global phenomenon. They're not something I think that can be regulated or governed alone by one specific government, one specific regulatory body. It's going to require cooperation. The question now is what is the role of stakeholders in a governance network and what tasks do they perform. What I envision is a multi-stakeholder network where you've got governments globally, regulators globally, non-governmental organizations, advocacy networks—like the Bitcoin Foundation, for example—and also groups of individual developers all cooperating to steer this technology. Now, that doesn't mean that governments are going to cede control of regulatory functions. Obviously that's something that's going to always be the role of government, but because it's global in scope, much like the Internet, this technology might require a similar response. What are your thoughts about that?

Bailey

I think that's a great way to look at it. The difference between digital currencies and the Internet analogy is that users of bitcoin, just to use a generic term, will ultimately need to convert the digital currency into some form of value. You can only use bitcoins in so many ways, so eventually a holder of bitcoins will likely want to convert to existing established currencies so that they can be used for a broader variety of purposes. I think there is a role for a multi-stakeholder approach to determine both the positives and the negatives of how the ecosystem can encourage, discourage or potentially put guardrails around the digital currency network.



One interesting sample scenario is if users of bitcoins don't necessarily see the need to convert to established currencies, and that there is enough traction in the ecosystem where the fact that they have a bitcoin, I've got 101 different ways to think about that I can buy or use and convert that to value by spending on things that accept bitcoin, then it potentially takes a life of its own where the number of ways stakeholders can put up guardrails potentially start to fall away and it becomes truly the market's going to decide how big it gets and the way it's used and how accessible it is. It's a very interesting topic.

Tapscott

Bitcoin advocates would argue that the goal here is a situation where you never have to convert bitcoin to another currency because it will serve all the basic functions of money, as a medium of exchange, fungible, liquid, *etcetera*, but that remains to be seen. I think at this point in time 40,000 businesses and organizations accept bitcoin as a form of payment, and I think there are 3 million merchants globally that accept Visa, so it's a ways away, but a really interesting topic. What I'd love to hear from you— if at any point in time you start to notice your client base at Accenture starting to think a bit more seriously about this and seeing more of an urgent need based on the reaction of their customers and the demands of their customers to begin integrating this technology into their digital payment platform, I think that would be fascinating and very helpful for us, as well.

Bailey

Yeah, I think Accenture would be a good canary in a coal mine, if you will, where today it's not on the list for a lot of our clients. But as with a lot of these innovations, people ask me when we are going to hit the inflexion point around digital currencies, and that's really the \$64,000 question. It could be 9 months away or it could be 9 years away. User adoption is a tough thing to predict.

But the minute we start approaching that inflexion point, or if I start to see traction, then I'd be happy to reach out and let you know and we can talk about what you're hearing, as well.

Tapscott

Great, thanks Jim for your time I really appreciate it.

Bailey

Okay, you have an interesting project. If you have any outputs you think would be of interest, I'd love to take a read.

Tapscott

By way of background, we're going to be interviewing people from all different perspectives on this. I interviewed Balaji Srinivasan and Marc Andreessen and they've got a view that this is going to be transformative, the same sort of disruption as the internet, and then you've got others... I've spoken with some people that do the mobile payment systems of the Bank, for example, in Canada, and they're of the view that it's a wait and see approach but that it's probably going to have pretty limited utility in the long



run. So there are all sorts of different viewpoints, and then governments... one of the issues that's come up is the question of remittance payments. Of course, people in the world pay the highest fees to move money around, so bitcoin offers an alternative, and I'm talking to people in government on that issue. So lots of varying viewpoints. We're obviously still in the early stages, but your thoughts are much appreciated. Thank you very much.

Interview with Jerry Brito, former director of the Technology Policy Program, George Mason University



Jerry Brito

Tapscott

Thank you very much for taking the time. I think I described in the e-mail that I'm writing a whitepaper on behalf of a program called the Global Solution Networks Program at the University of Toronto. What GSN is, is essentially a landmark study of the potential of global web networks for cooperation, problem solving and governance. The program started last year and since then we've written a number of substantial papers and as a result have gotten quite a bit of traction with large corporations, NGOs, heads of state, etc. The whitepaper that we're writing on virtual currencies tries to tackle largely the question of governance, meaning how do you govern something that has no borders, is distributed, is open sourced and is spreading rapidly around the world. With that in mind, we're talking to key stakeholders within the bitcoin ecosystem, government and the private sector, regulators, people in law enforcement, academics, etc. I came across your name through my research largely from the Beyond Silk Road testimony from last fall.

Brito

Right.

Tapscott

On the back of that I would just like to open up a bit of a discussion here. Before we get started, would you please tell me a little bit about your background and how you ended up becoming an authority on the subject?



Brito

Sure. So until very recently, until last week actually, I was Director of New Technology Policy Programs at Mercatus Center at George Mason University. What we did there was we focused on the regulation of emerging technologies, so everything from old school telecom issues and copyright privacy to issues affecting emerging technology like bitcoin currencies. We just focused on looking where emerging technologies were butting up against regulatory issues and tried to make a survey of the cost benefit of the regulations. I came across bitcoin in 2011 or 2102, and I was just fascinated by it. I thought it was amazing. It's a simple yet profound innovation and at the same time I immediately saw all of the obvious regulatory issues that would no doubt surface, so I began to write about it and research it. Talking to people here in DC, policy makers, I discovered it was something that was beginning to bubble to the surface of popular consciousness and there was just absolutely no understanding of it, they didn't really understand what it was, how it operated, what it meant and so we wrote to policy makers and explained what it is, what are the challenges to governments, what are the benefits for the country and the economy? That was very successful and that led to a lot conversations with a lot of regulators, members of Congress and opportunities to testify. Since then I have just continued to write about this.

Tapscott

So since 2011, when you first started looking at this in earnest, how in your opinion has the outlook or viewpoint of government changed, or has it?

Brito

I think the initial reaction was negative. But since then folks in government have begun to educate themselves about what this is and what it means and have begun to understand it. So now their reaction I think has changed. It is more about the challenges, but also the potential and figuring out a way to meet the challenges without squelching any of that potential. I think at this point they're sort of optimistic about it. At the same time they are sort of suspicious, and I think for a lot of the regulators and law enforcement as well that it is one more thing they have to deal with. They could stand to live without it but they appreciate it. Using New York as an example, the initial reaction of the regulator there was very negative. The way he announced his entry into the space of investigation was by subpoenaing a dozen bitcoin companies and venture capitalists. So quite aggressive but since then, you know, he himself has realized this is not just... this is not even primarily about criminal enterprise so he says there's challenges here but I accept the benefits now and how do we deal with it? That's what happened last year.

Tapscott

Most recently the Department of Finance Services came out with the BitLicense proposal, and then I think we're still in the midst of question period or the comment period.

Brito

The comment period yeah.



Tapscott

I know that a lot of people in industry are actually asking that they extend it so they can put their comments together in full. So on one hand you started off by doing something that clearly showed a different or constructive bitcoin and now we're looking at something that looks like green sense to the entire industry. What do you think of those new regulations? Do you think they are suitable or do they go too far or not far enough?

Brito

We actually just filed comments in that proceeding and they are available on the Marcatus website if you want to find them—it goes into obvious detail there. So just to mention quickly, I don't understand this call for extending the comment period. I have found a lot of the time at a lot of proceedings at the federal level you get 60-90 days, so 45 days is a little stingy but not unreasonable. What I think is more important is taking the time and issuing a second draft and us getting a second round of comments.

But putting that aside, what do I think? I think that the proposal misunderstands a lot about the currency so I think there's a lot wrong simply out of ignorance. That's to be expected, and is the reason we have a comment period, so the parties can point out certain mistakes and certain things that regulators missed or need to think about. Number one, the reason why they were going to create a BitLicense, and you have to understand that; but during the whole BitLicense proceeding, bitcoin businesses, cryptocurrency businesses would be regulated as money exchanges. In New York State this already exists, and in every other state what regulators are doing is figuring out how to apply that to bitcoin businesses until guidance says you follow this law and here's how it applies to you. But what Superintendent Lawsky and the department said is New York's money law was especially antiquated. I think it was made in 1800 or something like that, early 1800s. It really didn't fit the technology and they saw unique characteristics with bitcoin currency and they wanted to make sure they got it right and so they are going to create this new BitLicense to address the unique characteristics for bitcoin. So that's terrific, that's laudable, the problem is that they ignore a lot of the unique characteristics of the cryptocurrency, what makes it so revolutionary, so useful, so beneficial.

Then one of the biggest issues I have with the proposals is what they call a virtual currency business activity. So if you are engaged in a currency activity you need a license and any transactions you conduct on behalf of customers you have to make a record of not only the identity and the physical address of your customer, but also of the recipient of the transaction. That totally destroys the entire value of cryptocurrency. If you think about PayPal, if we each have PayPal accounts and I want to send you money it is perfectly simple to take out and have my identity and my physical address because I'm a customer of PayPal and they have yours because you are a customer of PayPal so they have both files. With cryptocurrency you only have one side and requiring the company to have both sides as a condition of the license would be like asking Gmail to know the identity and physical address for the recipient's e-mail from the addressers. It's a non-starter, it destroys the open nature of the network and so the only way you could respond to that if you



were trying to set up a cryptocurrency business in that world would be to allow your customers to send money to your customers the same way that at one point CompuServe only allowed you to send e-mail to other CompuServe customers. What's the point of having cryptocurrency if you could do that already on your regular license? You create a BitLicense in order to take into account the specific unique characteristics of bitcoin, and then you do this? We should point it out to them. I hope it is a matter of ignorance and then they read this and go, "oh wow, we didn't realize," and they change it. More likely it is just ingrained in the anti-money laundering law enforcement mentality that you always need intermediaries to track both sides, but we'll see how it plays out.

The other thing I'll say about the proposed regulations is: but for this new license these businesses would have been regulated as money transmissions. That should mean these licenses are no more onerous, no more difficult to get, no more difficult to comply with, than a money transmission license. But if you compare them it is way more onerous to comply, way more onerous to acquire for lots of reasons and we point out all of those. We need a level playing field for sure. Part of the reason why they are doing this in New York is because they want to maintain their lead as financial capital of the world and they want to promote financial innovation. That's what they're trying to do in creating a license that is more onerous to comply with and that's just not going to work and we are going to point that out as well.

Tapscott

One final criticism I've heard from people within industry: I had a conversation yesterday with Jeremy Allaire from a company called Circle and he filed comments as well, basically saying the law as it is written right now is built to distinguish between actual exchangers, the companies that will be taking bitcoins and transmitting them into CI currencies or acting as an intermediary or a comment wallet, versus companies that happen to be just using the coin protocol for any number of novel new applications and having them need to apply or requiring them to uphold the same level of scrutiny requirements, AML requirements, etc. is unrealistic. Are you of a similar viewpoint?

Brito

Yeah, absolutely. We make the same point in our filing. I was just talking to someone today who is a technologist and he has an idea for a product that is basically—I'm not going to do a good job of explaining this but basically—it's like a notary service where it kind of proves that two documents are identical at a certain point in time. The reason they are not doing that in the States at least is because they are never going to comply with all of this so they are probably going to do it overseas somewhere and I think that's part of the issue here. To the extent that regulators are involved in US competitiveness, they're going to have to think about this because other jurisdictions might be more progressive.

Tapscott

It's interesting you mention that. I saw that George Osborne, the ex-Chancellor in the UK, said they are planning on releasing their report



on bitcoin I think in December and he said they want to make London the bitcoin capital of the world in keeping with its global preeminence in the financial system. One of the reasons New York was quick to act was a bit like this proposal because I think people recognize that although there are obviously some challenges and risks here, there could potentially be a pretty meaningful economic opportunity. I find that at least encouraging.

Brito

I think that's right.

Tapscott

The question from my perspective is we are no longer regulating something that is discreet in the sense that it is contained within the boundaries of one country or managed by a state monopoly like a CS currency, this is something that is distributed globally, moves quickly and is pseudonymous, is that how you say that word?

Brito

Pseudonymous, yes.

Tapscott

Pseudonymous. My point being even if government can put together an intelligent response, is government regulation enough to govern this whole system or do you think it requires a more multi-stakeholder approach?

Brito

It depends what you mean by government.

Tapscott

I can elaborate on that. Sets policies, act as a watchdog, sets technical standards, advocates education, etc. All of these functions of governance are what I think about when I think about governance.

Brito

Yes I think there's a lot of that which is already happening sort of privately because this is an open sourced process, so the standardization of the protocol happens on IRC, on forums on Github. Anybody is welcome to contribute or you can have a small group of people who are making the most contributions and setting the direction. It's kind of like IETF, the Internet Engineering Task Force, that essentially standardizes all of the technology that powers the Internet and they have no building, they have no office, they have no budget really and yet they operate completely in a bottom up process. I think there's a lot happening. Now when you get to the consumer side, when you get to the money laundering side, that's less about governance protocol and more about developing and enforcing individual government policies. So there I think it works the same way it has worked on the Internet, where you go after intermediaries. Intermediaries are still going to be subject to jurisdictions in their operations and they are going to have the law enforcing that. I think we've done this before and it has worked out.



Tapscott

It is interesting that you bring up the Internet as an example of how you could see it progressing because we have been thinking about using the governance model for the Internet as something of a rough comparative. When we talk about governance we're talking about what you are alluding to, which is a network of sorts where you have different stakeholders performing different roles—governments performing one role on a regulatory basis for AML functions, people within the academic community such as yourself who are acting as educators and advocates, people in the technology community that are setting standards in the protocol itself— and together this is functioning like a governance ecosystem not unlike what we do with the Internet. So this is the direction we're moving with our argument—that as this matures it could begin to resemble what the Internet looked like in the early to mid-1990s and then it could develop as the Internet governance network has developed.

Brito

Absolutely. I think that is exactly how I see it. To me, and the reason I'm excited about bitcoin, is this feels like it felt in the mid-90s. It is exactly the same, with the added bonus that there is no ICANN. So ICANN is this organization that is the one centralized bottleneck of the Internet, where you do have a central authority and so this weird compromise is created. Most recently ICANN has been put on a path to full independence, but with bitcoin you will have that eventually. It is only IETF and IFAC so it's even better than that. Now what we need, and I recommend to you to read The Green Paper that... do you remember that?

Tapscott

I don't think I've come across that one.

Brito

Yeah, so Ira Magaziner was sort of Bill Hartney's Internet... let me see if I can find it and send it to you. But essentially this is when NSF Net had been opened for commercial use and the question was how do we regulate this? Do we allow anybody to use the Internet? At one point it was illegal to do commerce on the Internet, it was against norms for federal law as well which is fascinating. Ira Magaziner led a commission to study this and the recommendation was made by the Clinton administration that basically said we're going to allow anybody to come on the Internet and basically connect and innovate and integrate and do commerce and we will intervene when necessary. That gave us the explosion of innovation that we saw. It's a fascinating... we already have the policy that works, and it is amazing we have to relearn it in this case. It's a fantastic sort of articulation of the policy towards the Internet that gave us the Internet we have today. For me, it's like a perfect template for what we should have. I wish we could see the same statement about bitcoin that we saw made back then about the Internet.

Tapscott

It sounds to me you think the response thus far has been more heavy hand than light touch.



Brito

No, I wouldn't say that. I think it has potential to become more heavy handed. In the US at least, I'm not going to comment on other countries where I'm not as familiar, but in the US, what have we seen? Well we've seen FinCEN guidance in March 2013. Since then I think regrettably they did not ask for comments before issuing that guidance and so they got some of that wrong and then since then it's the usual thing, it's negative but then they learn and they watch. What they issued was, well, if you are a virtual currency business you qualify as a money service so you need to register with FinCEN and comply with the Bank Secrecy Act. There's no way we're going to sustain that so I'm not sure that's heavy handed but it's a little different than the Internet where the Internet is completely permission-less. If you want to start a new website, a new product, a new Facebook, you just launch it and you don't have to ask for permission so this introduces the same that you would normally have on the Internet. It's the sort of thing where you are doing money transmissions and there is no way you are going to escape that. Beyond that what else have we seen? Not much. We've seen the IRS issue guidance on tax treatment. There I think their hands are tied. The IRS looks at the law, at their statute, and bitcoin could only fit into one of two buckets, it is either property or currency and as the statute is written it is clearly not currency because it is not US money and it's not a foreign country's money so they chose property which I think is the only thing they could choose. You could call it heavy handed, but I think at some point that may be changed, but that is mostly a factor of the law that existed that never had bitcoin in mind. Beyond that, at the federal level there has been very little federal regulation. CFPB recently put out a consumer alert but I don't think that means much as we have seen a lot of these consumer alerts.

Tapscott

The EBA in Europe, the European Banking Association, has put out similar alerts.

Brito

A lot of countries have done that.

Tapscott

But again, that's not a regulatory framework, it's just identifying reasons why this might be either risky or potentially...

Brito

It is risky at this point, you know, so that leaves the States where the action really is because the States are the main regulators of money transmitters and so this is why the New York Regulation was formed. I think a lot of states are going to attempt to follow New York's lead and in that sense I do think that New York's regulations as they are proposed today would be very heavy handed but we're not there yet. I am very optimistic that we will continue to see right touches in New York. I don't think we have seen heavy handed yet.

Tapscott

Using the model of the Internet, policy makers in the US will take that approach. There's one thing about this that is potentially a bit more



incendiary than the Internet which is that bitcoin advocates early on were really libertarian politically, anti-government, and they were looking at this technology as a way to decouple a mode of exchange of the monopoly of the government I guess.

Brito

Undermine the whole system, yeah.

Tapscott

Undermine the whole system, bring down the man, take down the whole government, you know. I'm of the view that is probably not going to happen, and that this is going to end up just getting integrated into the more conventional society, but having said that it does pose some sort of existential threat to government monopoly of issuing and printing of currency. If there is a unit of exchange that is not directly issued and controlled by government they begin to use their certain levers and powers, specifically the utility to move interest rates up and down and other monetary policies and measures. I wonder from that perspective is there any part of you that looks at government and thinks that they maybe want to tread even more lightly or be more careful with this technology than other technologies?

Brito

Right, so a couple of things. First I would point out the early enthusiasts and developers of the Internet, and they similarly were Libertarian and anarchists. Go read John Perry Barlow's Declaration of Independence of Cyberspace.

Tapscott

I remember that book, I actually read it.

Brito

So this is the same thing all over, the Internet is going to be something that undermines the system, you know, you can't touch us here and of course no actually you can. So I think that is history repeating itself. The monetary implications—I'm not an economist, but I don't understand people who think bitcoin is going to replace the dollar. I see it as virtually impossible and we actually commissioned a paper for Mercatus about that by Will Luther. You can find that on the website as well where he says no, the network effects of the dollar are just so massively bigger that switching costs would be huge, it's impossible. You have to understand that money is three things, it is a unit of account, it is a unit of exchange and I forgot the third one.

Tapscott

Stored value?

Brito

Stored value, thank you very much. Bitcoin is, you know, paying for value depending where you are relative to the dollar and if you take a longer view it has a stored value and it is a great means of exchange, better than paper dollars because you can't send paper dollars over the Internet. There



is going to be a day when you go into Walmart and prices are going to be denominated in bitcoin. I think that we are a long way away from that and it doesn't affect any of the monetary functions the government has. It is going to have prices written in dollars, you're going to have contracts written in dollars, you're going to have loans written in dollars, so as a result the central bank is still going to have its power over the economy. That's not to say that it's going to be the case in some small country with a really bad monetary policy—you might get enough network effects for bitcoin to supplant the currency there. But as far as the dollar, the Euro, the yen go, I just don't see it.

Tapscott

It's interesting that you mention that. A lot of people like bitcoin in Argentina, a country where you've got a relatively weak currency and a government that is not particularly stable and strong capital controls and onerous taxes—it is getting popularity there. Okay great so I think I've asked all the questions that I wanted to ask.

That was really helpful and quite honestly, as I work through this, I would like to keep an open dialogue with you and anything that you might have from our conversation, for example some of those Mercatus papers if you have those handy or can tell me where to get them I would love to know as well.

Brito

I'll shoot you an e-mail right now. I'll send you the Magaziner green paper and the Luther paper.

Tapscott

The Luther paper that was the one. Alright thank you very much Jerry I appreciate it.

Brito

Sure anytime and please...

Tapscott

What's the next stage for you?

Brito

I can't say yet. It's crazy, it's ridiculous to be in this position, but in a couple months it should be launched. We're not ready to launch it yet so we're not saying but it's basically going to be doing a lot of what I have been doing already, just focused on cryptocurrency and more research and academic work, but focusing really on cryptocurrency.

Tapscott

That sounds exciting, I'm looking forward to it.



Interview with Patrick Murck, General Counsel, Bitcoin Foundation



Patrick Murck

Tapscott

We've launched this program called the Global Solution Networks program which is studying the potential of global web-based networks for cooperation, problem solving and governance and we're looking at this pretty broadly. Any new technology or new application of technology that seems to be doing good in the world, or is at the very least disruptive, is something that we care about. And digital currency we've identified as being one of those technologies and so part of our effort here is to make sure that we understand the viewpoints of all the different stakeholders in what I call the bitcoin ecosystem. I've spoken thus far to people in the private sector, people in government, people in the legal community, the academic community and, from my perspective, speaking to someone like yourself—an advocate, someone who's trying to promote the technology from an NGO viewpoint, if that's a fair characterization—it's something that we're very interested in doing. So thank you very much for the time.

Murck

Sure, happy to help.

Tapscott

I've read the website and I know a lot about the Bitcoin Foundation but I'd love to hear it in your own words. What is it that you're trying to accomplish?

Murck

The Bitcoin Foundation was created to promote, protect and standardize the bitcoin protocol. What does that mean in practical terms? We have simply three goals. One is to create a transparent funding mechanism for technical development of the bitcoin protocol. The second is to create a safe public policy framework within which bitcoin and other decentralized currencies can evolve. And the third is educational, to help people understand the benefits of the new digital economy. Those are the three things that we set out to do.

Before the foundation was started, Gavin Andresen, who is our chief scientist, posted on one of the prominent bitcoin forums back when



no-one was really paying attention to bitcoin, when it was a very, very small community. He said he would like to see a foundation, sort of like the Winnick Foundation, spring up around bitcoin. And a group of us came together to help bring that vision into the world. And the first thing we did was to essentially hire Gavin to work full time on the bitcoin protocol. So he had a funding mechanism to do the work that he's doing which is extremely important, but also to create transparency so people understood how he was being compensated for the work that he was doing. So there was no conspiracy theory, right, in that matter.

Tapscott

So your mission statement is to standardize, protect and promote; can you explain or maybe just elaborate a little bit on how you go about that? Does the work that's being done at the Bitcoin Foundation happen internally, or are you reaching out to other stakeholders?

Murck

Yes, sure thing. So we start with standardize. What we mean by that is supporting the Bitcoin Core reference implementation, so this is the original Futoshi code that was released, and when Futoshi moved out from the project he turned it over to Gavin. And that's one way, one method by which you can kind of standardize an implementation of bitcoin so people understand, okay, if I want to send outputs from one address to another, this is the way I should do it. If I want to include metadata I can do it this way, if I want to create invoices with unique pay-to addresses, I can do it this way. And it's not so much in the form of a whitepaper; it's in the natural implementation, a reference implementation. And so that's what Bitcoin Core is. My current project, it's been around for little while and it's hugely, hugely important and influential, and recently BitPay, a Bitcore project which is another implementation of bitcoin. It's good to have diversity of implementation but what we do is try and standardize bitcoin as to fund the development of the Bitcoin Core reference implementation.

Tapscott

My understanding here is that a lot of participants, entrepreneurs, technologists etc. have been finding a wide array of uses for the bitcoin architecture and are applying it in a variety of very innovative ways. So you mentioned, for example, like BitPay's Bitcore, that's something that was developed or the standard was set outside of the Bitcoin Foundation.

Murck

Well, it's an implementation. So they could set different standards if they chose to. They tend to implement things that have gone through the Bitcoin Core process. But then some other things too; like they have their own version of multi-signature transactions called Copay which they're able to implement and put out into the wild and without having to go through the bit process which is the process which changes the name to Bitcoin Core, so it allows for more experimentation. If they are successful experiments, people love Copay or they love, say, CoinJoin or some of these other techniques for kind of pre-mixing coins, then they can create a bit that says okay, here, not only do I think this is a good idea, I've tried it in this implementation, it



works really well, people love it, go ahead and add this into the next version of Bitcoin Core which is kind of the standard. So that's a great reason to have multiple implementations out there.

It should be noted that Bitcore, which is BitPay's implementation, is a project team led by Jeff Garzik who is also one of the core developers for Bitcoin Core. Jeff and Gavin work together. It's still a small community of developers working on all of these things. And just to give you some insight, and I'm not trying to stay on this conversation too much, but when somebody says, "I'm a Bitcoin Core developer," there's a technical implication to that which is sometimes lost in common conversation. So there are only a handful of Bitcoin Core developers and those are people who have what's called "commit" access to the Bitcoin Core repository, that's the original Futoshi code. Gavin, Peter, Vladimir, Jeff, Greg and then somebody like Mike Hearn who is hugely influential, is not technically a Bitcoin Core developer because he doesn't have commit access on the repo. Now, that's his own choice to not have that because he has his own project but he would certainly be offered that any time he wanted it. But he's technically not a Core developer. You do see that term bandied around a bit where people claim to be Core developers because they contribute code. But contributing code technically isn't what makes you a Core developer.

Tapscott

Why is that so few people have access to the original code?

Murck

I think it's just a matter of managing the process. You certainly want to trust the people who have commit access to the code. You don't want any random person to be able to push a new version out into the community or create a million competing versions of something called Bitcoin Core. You can fork the code and create whatever version you like but the one that has the brand association, Bitcoin Core, that has a few people who maintain that repository and who are in charge of it. Gavin actually handed down the kind of day-to-day duty for maintaining that, in other words going through all the commits and looking at the codes that have been submitted and managing the bit process to Wladimir van der Laan who's also employed by the Bitcoin Foundation to create again the transparency and the funding. So that's why; you want to make sure that you keep the integrity of the process.

Tapscott

And then anything that a developer might want to use the original code to, as you say, fork in some other direction...it's open source, right, people can...?

Murck

It's open source. Anybody can take and do whatever they want but...

Tapscott

But they can't change the underlying fundamental code, right?



Murck

Yes, well... Right, exactly. There's one reference repository that's managed by the six individuals, the access, and then the seventh is Futoshi but he or she or they have kind of disappeared from the scene.

Tapscott

Okay. Can we go onto the second aspect, the protection?

Murck

Sure. So protect, so for example if there is a legal challenge to bitcoin's legitimacy or use of bitcoin in a peer to peer environment, something like that, that's an issue where we will extend resources to protect the free and open permission of use of the protocol. A good example of that is in Florida there is a criminal case brought against two defendants for selling bitcoin to undercover agents, who claimed to want to do some criminal activity. They caught two guys doing it [selling bitcoin]. One of the charges was unlicensed money transmission, and while we in the trial didn't make any, we filed an amicus brief contesting the application of Florida's money transfer laws in peer to peer transactions like the one that was being applied against one of the defendants. The rest of the issues we left alone.

If you look at the Liberty Reserve's notice of proposed rule-making, when the Treasury Department since then have taken special measures against Liberty Reserve, some of the language in that MTRN, even though Liberty is a specialized currency, it has nothing to do with bitcoin. Between you and me, frankly they're criminals and there was a criminal enterprise; it's pretty obvious, we still had to step in and file a comment in that MTRN proceeding because some of the language in the special measure was too broad and it would have implicated or it could have implicated very legitimate uses of digital currencies like bitcoin. So we wanted to clarify things. And we're seeing that play out in New York right now as well where you have a regulator who's proposed rules that are sweeping and would stifle innovation for the industry. So we're trying to protect the freedom of people to use the protocol and open permission this way.

Tapscott

I had a call earlier today actually with Jeremy Allaire of Circle...

Murck

Yes, I know Jeremy.

Tapscott

And he had written what I thought was a really eloquent rebuttal to the rules or the initial proposal that was made in New York. His view was interesting because it was quite balanced. You know, on one hand I think he's someone who welcomes government's role but doesn't want them overstepping and, as you said, stifling innovation. His view is when it comes to organizations that are simply the on- and off-ramp for transferring other currencies, companies need to abide by AML standards that have been set at the federal level, and ones that maybe are set at the state level. He doesn't want those kinds of requirements for compliance being set for companies



that are using the bitcoin protocol for something else. And I thought that was quite interesting.

I want to wrap up just the third goal, promote, and then I want to talk more broadly about governance. So why don't you just run through what you mean by promote and then we can move on...

Murck

Sure. Protect and promote sometimes overlap because generally it's a policy issue. But promote is also kind of like what we did in the US senate. When the Senate had hearings we worked very closely with both committees to make sure that there was a positive message that came out about bitcoin and digital currency. So that's an example of promoting and educating—there's educating lawmakers but there's also this example: I was at CYBOS—the Swiss Correspondent Banking Conference—to promote digital currency and bitcoin to that audience. If you know ACAMS, the Anti-money laundering specialists certification body, I've been to their conference, their international conference and I do webinars to educate the compliance officers and BSA officers on such practices and the positive aspect of bitcoin, things like that, so it's fortuitous I suppose.

Tapscott

I'm learning that a lot of the people that are part of your organization have been there from very close to the beginning of this phenomenon. That's fair, right? I mean the original app of the developers who posted this to a forum board before it exploded into mainstream. And what I find, you know, reading online in the forum board is that a lot of the earlier adopters of the technology had a really anti-government bent, sort of this was an opportunity to wrestle exchange and the free flow of money away from government monopolies and that government intervention, by definition, categorically had to be something bad and had to be something that had to be forestalled or prevented. But at the same time it sounds to me like you're now in communication with regulators, with legislators to help examine policies, which brings me to my next question which is, what's the role of government regulators in fostering the growth of this industry or helping to legitimize it?

Murck

The foundation has been pretty controversial since its inception and some of that is shooting ourselves in the foot and things like that as a group, and some of it is just distrust of government and this idea that even engaging in a conversation with the government or regulators or something like that is either foolhardy or kind of tacit like surrender.

Lawrence Lessig wrote about this in Code 2.0—if you read it—but he called it libertarian failure, so it's market failure, government failure and the third one is libertarian failure. That would be a kind of dogmatic insistence that you should never sit at the table with a regulator because the only people who sit at the table are the people who don't agree with you. And then rules inevitably come out looking like something you wouldn't like. I'm actually a libertarian. I worked on the Obama campaign so I'm kind of a weird guy in



bitcoin I guess. But I don't buy into that, the argument that you shouldn't engage on these issues or that government or regulators don't have a role in it. And as a group we took a lot of heat, I personally took a lot of heat late 2012 and then early 2013 for proactively engaging with the regulatory community to start the conversation and to set the terms of the debate as best we could. At the time, the message was "there's a thing called bitcoin and it's basically used to buy drugs and it's for criminals."

Tapscott

Yes, I remember that.

Murck

And that's pretty much what the thought pattern was in DC. And so we made a decision to go at that headlong, take that on and change the perception. And we were very successful at that and I think it culminated in the senate hearing. So now we have a different conversation happening which is not "should there be a regulatory framework, should the government be involved" but "to what degree and what's the best way," with an understanding that we're all on the same page, that there are significant benefits with technology.

Tapscott

That in and of itself I think was a big shift in perception that people in government were willing to acknowledge that this technology could have benefits to their constituents and to the economy. How responsible do you think the Bitcoin Foundation was in helping to change that conversation? Was it something that you believe you spearheaded on your own or was it something that came about from multiple stakeholders?

Murck

I think without the foundation it wouldn't have happened. I'm usually a very humble guy, but in this case that was something that no-one else was willing to do.

Tapscott

So looking forward, if...

Murck

It wasn't just all me by the way. I had a lot of people who helped me do that obviously. It's not a one-person thing.

Tapscott

So here's another question for you: If bitcoin grows to what you think it could be in terms of its potential, inevitably there are going to be other advocacy groups, other—to reuse the word, other stakeholders—that are going to be trying to perform a lot of the same tasks that you're doing. Do you welcome that and do you plan on cooperating, or is it something where the goal of standardizing, protecting and promoting is something that you view as being the domain exclusively of the Bitcoin Foundation?



Murck

No, I don't. That's not in the spirit of community. I mean the spirit of the community is open source so the idea is we set a standard, in some places we set a very high standard and in some places we set a very low standard and if somebody can come in and do it better than us then kudos to them. In any aspect of what we're doing, or the totality, it's not about creating roadblocks that other people get stuck on. Every time I see another association announced I think it's good news. It means more people are active and engaged and involved. For me it was always so difficult in the early days to get anybody's attention on policy issues that to see today that it's the new hot trendy thing is pretty great. I think it's very cool and I'm glad to see that there are other groups out there. I know there are at least half a dozen, some announced, some not announced. I think it's all great. And some of them are going to be higher quality than others but... Yes. It's much like how Bitcoin Core is a reference implementation of bitcoin but the bitcoin ecosystem is more robust, more diverse and a better ecosystem overall when there are more implementations allowed. I would say it's the same thing when you're talking about policy, policy organizations as well.

Tapscott

So part of our project, the GSN project, is to identify ten different types of global solution networks, and these are broad categories used to describe organizations that are effecting changes in technology and doing so in a multi-stakeholder fashion. So things like a standards network, for example, is one of them and we've seen standardization networks in different technologies before. Policy networks is another one, watchdog networks is a third example. So I'd just like to touch on a couple of those—policy and watchdog. Do you think we need policy networks to create international guidance on issues such as crime, fraud, consumer protection, anti-money laundering, etc., or do you think that's something that's going to come from the top-down from government? Is there any role for you or for any other organization to have a seat at the table when discussing issues like crime, fraud and anti-money laundering, etc.?

Murck

I've been very active in that discussion. There's a difference between helping law enforcement understand the technology so that they can develop new methodologies and do a better job, the same for anti-money laundering professionals; there's a difference between that and, say, like what FNIC does where they're actually engaging and stopping illicit activity. So the foundation isn't an SRO, we're not a certification body. We've made a conscious decision not to even attempt to be that or try to do those things. But I've been very involved in the conversation with law enforcement and regulators and anti-money laundering specialists. I've had many conversations with the FBI, Secret Service. There was a conference up in Montreal just last year talking about shady operators and consumer fraud and all these different things. So the better educated those agencies are, the better they're able to root out illicit activity, the better the overall bitcoin ecosystem is going to be and the more useful it will be for people.



Tapscott

Who are those law enforcement agencies and governments reaching out to learn more about this? Are they reaching out to developers in the private sector?

Murck

I don't know if they're reaching out to software developers, not that I'm aware of. I think there's some outreach to companies operating in this space. I think right now for the most part a lot of the agencies have a pretty good handle on the technology, the underlying technology and they're more interested in how people operate in the space, there's operationalized protection around this, this is how they harden their systems against illicit activity and any trends in the data that they're seeing at an operational level. I think that's where the interest is right now. So it's not so much the developers as it is businesses. There is probably a great deal of interest in cooperating with people who are active in this space to understand the trend.

Tapscott

And on the subject of watchdogs, do you need watchdogs to watch the watchdog? If governments are setting standards, setting rules and if the private sector is self-regulating to a degree, is there some other entity whose role is necessary in keeping a tab on what powerful stakeholders in the ecosystem are doing?

Murck

Yes. This is kind of a cornerstone of our advocacy and why we always advocate for things like user-defined privacy on the network and open permission on protocol and things like that. The idea around bitcoin is that you can operate directly with the bitcoin protocol without having any regulatory overhead, without having to submit to any kind of surveillance of your activity. That is within your rights to do. If you choose to do something that's more convenient, like go through some third party operator, one, you assume the consumer risk of storing your bitcoin there potentially, or whatever counter-party risk you're taking on using a third party operator, and of course you're going to have to turn over identity information, you're going to have some surveillance on your transactions, things like that, so giving consumers the option of choosing between different levels of service and with the understanding that those different levels of choice can come at a price in terms of privacy and security. But that balance should be preserved, the ability for people to use the protocol and to transact in a completely peer-to-peer manner, that I think is what's going to protect them and create that watchdog effect to check any sort of abuse of the system. I don't know if there's a specific organization that needs to be formed to do that or if it's inherent in the protocol as open.

Tapscott

Okay.

Murck

Does that make sense or is that too abstract?



Tapscott

Can you give a practical example, like how would the fact that it's open and that users determine things like anonymity etc. lead to...

Murck

So say you're concerned that... what would be an abuse? I suppose surveillance of your transactions or something like that, right?

Tapscott

Sure, so a corporation is trying to use that information against you, government is surveilling you without all the necessary legal rationale for doing so, that kind of stuff.

Murck

Exactly. So if this is your concern, you should always have the option of downloading a bitcoin wallet onto your hard-drive, storing your bitcoins locally yourself without anybody else involved in that process and transacting on a purely peer-to-peer basis without ever interfacing with a third party intermediary. Now that's going to be difficult when it comes to exchanging bitcoin for fiat currency, making certain types of transactions, right? That's why there's a market for commercializing aspects of that flow. But at the same time, if people always have the ability to interact directly with the network on a peer-to-peer basis without any intermediaries, then who are we worried about? As long as there aren't any sort of back doors or anything like that in the protocol, as long as the protocol is unaffected by regulation then that serves as the check. So am I there?

Tapscott

That was extremely helpful.

Murck

I will say on that point there is this constant struggle that has been ongoing since bitcoin was first introduced in the world between, you know, privacy on the network and surveillance of the network. And I'm not just talking about the on-ramps and off-ramps where we all agree that some level of regulation is appropriate and in the actual data mining of the blockchain and clustering and tying identities to addresses and things like that and then privacy enhancing technology like CoinJoin and mixing services. The more pressure there is to surveil and data mine the blockchain, the more of a response you're going to see from privacy advocates to obscure transactions on the network. And that's been something that's played out time and time again.

Tapscott

It sounds like your role is needed more than ever.

Murck

Yes, well it keeps things interesting for me that's for sure.



Tapscott

My view is that something like this should never be in the hands of, or I guess its fate shouldn't be in the hands of one interest group or one organization. It shouldn't be government, it shouldn't be exclusively developers, it shouldn't be, sort of, you know, technology freedom fighters and libertarians, whatever you want to call it. Like in order for this to thrive it's going to require balance and it might be messy but the more voices, the better.

Murck

I think that's right. When you get down to... Have you had a talk yet with someone about how government works within the bitcoin ecosystem itself?

Tapscott

No, I'd love to do that.

Murck

It's not so much the developers that you need to think about. They're more front-facing. But it's really kind of tripartite, so you have the users themselves, anybody using the network can accept or reject any change; you don't have to upgrade your bitcoin wallet. If you're running a company you don't have to implement the latest version, so there's the consumer choice. You can always walk away. That's one leg. There are the developers, in particular the core heads who say okay, this is what we're adding to the reference implementation, so the last big change was 0.9, the payment protocol which allowed you a structured way to insert metadata, to issue invoices and things like that. And usually people focus on the developers and say well, they're the guys who are pushing code, they update software so therefore they have the control. But really none of their changes ever get implemented or accepted unless the miners, the payment processors, the transaction processors on the network upgrade their version. So if the developers push out a controversial version of bitcoin through Bitcoin Core and none of the miners accept it, the network doesn't change. Or the miners can turn to another development group and accept those changes. So there has to be coordination between the developers who are writing the code, the miners who are essentially implementing the software and running the network and then the users who choose not to just simply walk away.

Tapscott

Is it coordination or is it just rough consensus? I mean if the developer's modification of the code has the backing of the miners then it will be implemented, and if users want to use it, they'll use it? This isn't a democracy right, it all just happens organically. Or am I misunderstanding what we're talking about here?

Murck

It's messier in practice. Practically speaking that's right. In practice it's messier of course and so it does require some level of coordination between the developers and the miners to say, you know... Basically there's no point in pushing an update to Bitcoin Core if the miners are going to reject it. That's just simply a waste of everybody's time and effort and it can create other problems. So there is coordination there. And then also, you know, there have



been incidents for some things, like that where it's been pretty critical for the developers to issue an alert for the miners to roll back to a previous version to correct an error and that's happened too. So there is some coordination that happens practically speaking.

Tapscott

Which area, this is more for my own sake, I'm just curious; which area of growth within bitcoin do you think holds the most long term practical private sector potential?

Murck

I don't think anybody has the answer to that. I mean, to be honest, I'm not trying to dodge the question. I think that no one knows.

Tapscott

I look at all these different people approaching it from so many different angles, wallets, exchanges, you know, big commercial sized miners; I just want to know which of these is sustainable and which aren't? How important are they to the long term success of the technology?

Murck

The way I generally look at the ecosystem, I have a slide I usually use to map this out, but thinking about waves of innovation, the first wave is the pioneering wave and it's all about peer-to-peer interaction with the protocol. Those are the really, really early adopters. The next wave, and we're kind of in the middle to tail end of the infrastructure phase, and that's building liquid performance exchanges, building wallet services that make sense, mining equipment, scaling to process lots and lots of transactions, investor services, merchant services. That's the infrastructure that's happening.

On top of that is where you're going to see the real innovation and that's the stuff that's on the horizon. And so it's hard to predict what that will be but certainly this idea of structured payment flows, you know, you can correlate any type of data to any type of payment essentially on a skewed level, you can attach all sorts of interesting payment flows to purchases so that if I'm a manufacturer and I want to pay my suppliers, I can just, instead of getting a loan or paying them, I just cut them into my revenue stream in a completely transparent way so that every time a customer buys something online it's dispersed to all the stakeholders or rights holders. This is especially important for digital content. There's certainly this idea of, like, a passive payment layer for, you know, to throw out another buzzword, for the Internet of Things, right? I talk about the idea that, when I have a three-and-a-half-year-old and when he's old enough to have a phone he might think the idea of paying for phones is crazy, like we would think of stenographs or something, right? You don't pay for phones but you just pick one up and it pays for itself. It shows you context-relevant advertising and there are bandwidth matters that are all accepting payments passively on the payment network. You don't need any human interaction to create a payment flow, things like that. And then of course capital markets; I think there's a huge opportunity through what are called "smart contracts" to disrupt some



capital markets, particularly for trading markets. I would not be surprised that within the next decade you see a move in that direction.

Tapscott

Wow, pretty exciting stuff.

Murck

Yes. But all of my guesses may be wrong.

Tapscott

It's like that old line, a kid goes to medical school and they say 50% of what you learn here today is wrong, I just can't tell you what 50%. Maybe not an exact metaphor but...

Murck

Yes, that doesn't really give me confidence when I go to the doctor but yes.

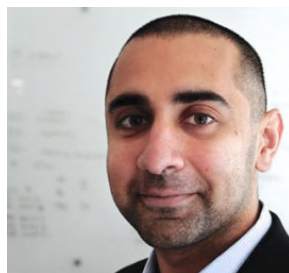
Tapscott

Well, you know, the kids are 20 years old so they probably figured out which half was wrong. Anyway Patrick, I've used up a lot of your time. Thank you very much for your help and for your insights.

Murck

Great. Thanks a lot.

Interview with Balaji Srinivasan, Board Partner, Andreessen Horowitz



Balaji Srinivasan

Alex Tapscott

Thank you for taking the time to join us. Let's start with a high-level question. You and Andreessen Horowitz are big supporters of digital currency technology. When did you realize the potentially transformative or disruptive nature of bitcoin? How have you gotten involved since then?



Srinivasan

Good question. If you look at bitcoin in mid-2011, there was a moment where the price spiked and then it crashed down to about \$2, but it then came back up in the fall and winter. I found this interesting because it was almost exactly like a Gartner hype cycle in miniature. In a Gartner hype cycle, there's a trigger and then there's a burst of enthusiasm and then there's a crash and then it kind of rises in a plateau. Few things have had the same resilience as bitcoin. So that piqued my interest. So I got into reading about bitcoin and looked at the code and so on and followed it over the course of 2012. For most of the first three years of bitcoin, you could only really get the coin either by mining it or by buying it through an exchange like Mt. Gox. And if you looked at the Mt. Gox website at that time, it didn't have the graphic design or polish that made me comfortable using it for large wire transfers, and it seemed like that estimate on the basis of fonts was later validated.

In late 2012 Coinbase got set up and they actually had a fairly clean UI. So now I started working with it a lot more and messing around with the code. I got very heavily involved towards the beginning of 2013. This was partly a function of Coinbase entering the market and partly as a function of bitcoin's "halving day" in early 2013. Every four years or so bitcoin's reward for mining a block of transactions drops in half. So, the first four years it was 50BTC per mined block and then in early 2013 it dropped to 25BTC per mined block. It will do this again in four years to 12.5 and so on until it reaches a terminal point. So, this combination of availability via being able to buy on Coinbase and coupled with scarcity which came from the fact that fewer things were being mined—I think—led to a price spike. I had been following bitcoin for a while, saw that it had resilience in 2011, and then got more involved towards late 2012 and early 2013.

Alex Tapscott

That's great and actually the subject of the halving day and the fact that the supply of new bitcoin is declining is something I'd love to talk about a bit later when we're discussing liquidity, but first let's take step back. Marc Andreessen and you have talked about ways in which the bitcoin protocol can be applied to solve a variety of problems. It seems this is about a lot more than money and it could even be about a lot more than e-commerce; that there are other disruptive ways in which this technology can be applied. What are the biggest or most disruptive opportunities for the bitcoin protocol? What do you see happening over the next decade?

Srinivasan

The bitcoin protocol itself is based on the innovation of the blockchain and distributed consensus. This fundamental innovation makes it possible to decentralize a whole host of things that we previously couldn't necessarily decentralize. So, for example, DNS and public key infrastructure and Tor. All these kinds of things can now be decentralized. So there are many possibilities.

But let's just talk about bitcoin as a paying mechanism for a second. There are things that you can do with bitcoin that you couldn't do with any other payment mechanism before. For example, you can send an international



B-to-B wire of an arbitrary amount in ten minutes from Japan to Nigeria. That was simply not possible before if you needed the money to get there in minutes rather than days. That was infeasible. Not only can you send very large payments, you can also send very small payments. So, you can send micro-fractions of bitcoin all the way down to one Satoshi, which you simply couldn't do via PayPal. Very small amounts of bitcoin can be used for example as heartbeats for lots of different applications, such as content monetization or compensation for open sourced software development. So bitcoin payments can be very large, very small, cross national borders and happen very quickly. There are whole new areas of payments that are now being opened up and new businesses that are now possible.

A second aspect of bitcoin's revolutionary nature is its low or zero fees. So, as an analogy, in 1987 we would send information by affixing a stamp to a piece of mail. That is to say, we paid a fee to send information. When that fee went to zero, we first got e-mail and then we got social networks and chat rooms and forums and P-to-P and so on. If you think about it, while e-mail can be thought of as sort of physical mail without a stamp, when we start talking about a social network or an online forum, nobody is really going to send a postcard to all of their friends with a photo of their kid, get back comments from all of them, write responses to the comments, and then send those out again. When you think about how many physical letters would be involved to do this and the overhead in terms of stamps and logistical arrangements, it would be just infeasible. It could be millions of dollars for one page of a Facebook thread. What's interesting is what might happen when you set every fee in finance to zero. So, setting every fee in information to zero meant we got e-mail, social networks, P-to-P, and more. So, what happens when we set every fee in finance to zero? So, not just ATM fees but wire transfer fees and even things like an IPO roadshow can be viewed as a fee without which you can't get investment in your company. You have to go through the process. So, every fee in finance is vulnerable over the next 10 to 20 years and I think we're going to see some really interesting things that come out of that.

Alex Tapscott

Very interesting. One of the things that we're tried to do is provide a taxonomy for the existing financial system and to understand its limitations and what problems could be solved by bitcoin. As we see it, the first limitation is financial intermediaries- you mentioned PayPal. Financial intermediaries are a burden on consumers and merchants. The second limitation is lack of financial inclusion. The very architecture of today's financial institutions precludes engaging half the world's population simply because their balances are too small and it would be deemed unprofitable. The final problem is exposure to political risk. We've been observing the uptake of bitcoin in particularly volatile parts of the world. One is in Argentina, where capital controls and a sky-high inflation rate are causing people to look elsewhere for a store of value and a way to transfer funds. Can you speak to those three challenges? You already mentioned the issue with financial intermediaries- the speed, the cost, etc. of transferring money and making financial payments. What about financial inclusion and the political risks?



Srinivasan

Financial inclusion is a very big deal for bitcoin. People talk a lot about digital technology's potential in the early nineties. Now we're really seeing it. Billions of people have smartphones. You've got billions of people on the global Internet and they're using it for real things—not just Google but also things like Coursera and online education. The things that people promised in the early nineties are actually happening.

With bitcoin, if you have an Internet connection, you can send and receive payments. So, if you can install an Internet connection and someone has it on a phone, suddenly you've installed all these other things. You've installed a bank account already or at least the mechanisms for it and there are no forms to fill out. There's no bureaucratic process to go through. There's no corrupt official to bribe if you're in a country with high levels of corruption. You have just reduced the barrier to entry to get an account. It's free. It's accessible to anybody with an Internet connection. So, I do think that bitcoin will be a big deal just from a convenience and inclusion standpoint.

I think it's also going to become a big deal from a pragmatic standpoint. Recently there was a case where Somalis in Minnesota were trying to send money back and the State Department had basically flagged that whole area as a potential terrorist hotbed. So one by one various banks withdrew from facilitating remittances and so these people were out of luck. If you have them use bitcoin, boom, they can hit enter and it can't be blocked in this way by bureaucracy. In terms of political risk, in many of those countries you mentioned, bitcoin could be a pretty big deal. Senator Branden Petersen from Minnesota is interested in creating a favorable environment for bitcoin in Minnesota.

Alex Tapscott

I often chuckle at the cognitive dissonance of US politicians. On one hand some denounce bitcoin as a tool used by criminals and an affront to the US dollar and on the other hand they accept bitcoin campaign donations.

Srinivasan

Yes. I think that's going to become a big thing, by the way, this year: donations in bitcoin. Look for a few different projects on that coming up.

Alex Tapscott

Bitcoin has gotten a bit of a bad rap largely due to the high-profile collapse of Mt. Gox and also because of Silk Road. The coverage strikes me as a bit alarmist and really only highlights a couple of bad actors. Still, I would like to discuss the challenges and limitations of bitcoin. First, bitcoin is still very volatile. There is still a lack of widespread adoption by retailers and there's an inadequate mass market understanding. And then finally, there is currently a lack of trusted third parties. The bitcoin protocol itself may allow for the disintermediation of financial companies—which is one of its great virtues—but one still needs strong, safe institutions to convert bitcoin, to store bitcoin, etc. Can you speak to these challenges?



Srinivasan

Let me see if I can summarize that: reputation, adoption, volatility, safety. Any early technology often has these kinds of characteristics. Snapchat was thought to be for sexting and Facebook for stalking and so on and so forth, right? PayPal actually in its early days was actually used on a lot of porn and gambling sites and in fact that was more than 50% of its revenue in the early 2000s. So lots of technologies initially start as either toys or they're used by people who are a bit dodgy at the beginning. So, that's actually pretty common and the thing about it is that it's not really a judgment on the technology. If an Internet business goes bankrupt, you don't blame the Internet, right? If a bank is robbed, you don't blame the dollar bill. So, that's kind of what I'd say about reputation.

With that said, I think there are a lot of very heavy hitters who are getting into the space now. Jim Beyer, an early investor in Facebook, who sits on the board of Walmart, was quoted in the New York Times as saying that he thinks bitcoin is going to be an important part of payments all around the country. Fred Wilson of Union Square, who was an early investor in Twitter and Tumblr and many others, said that the next phase of his fund is going to be the blockchain cycle. So from a reputation standpoint a lot of really big hitters are getting into it.

In terms of adoption, every new technology starts with one person, right, and then you have to scale up to billions of people over time. If you looked at Mary Meeker's Internet trends presentation which just came out and you sum up the reported user numbers for blockchain.info, Coinbase, and a few other places, bitcoin's number of wallets has increased at least 8X in the last year. If that growth continues for another year you're talking about 50 or 60 million worldwide users. So, adoption is also improving.

Kashmir Hill of Forbes wrote a series last year on trying to live on bitcoin and she updated it this year and she observed that this year it was vastly easier. Last year while she lost a few pounds that week by virtue of the fact that it was hard to find food with bitcoin, this year she ate the best meal she's ever had because so many places now accept bitcoin. I've been encouraging her to do one every six months or 12 months because I think it'll be a very interesting time capsule.

I'm reminded of one of Marc's comments where he said that in 1993 there was so little on the Internet that when an Indian restaurant put a menu on the Internet, it was a big deal. People clapped and celebrated. And I'm reminded of that when I see on Reddit or Twitter, a law firm is accepting bitcoin now, for example. It will be a major milestone when the first country starts accepting taxes in bitcoin. There is already discussion about using bitcoin for parking meters and small kinds of taxes like that. So, I think that adoption is going to solve itself. The velocity there is tremendous.

The third piece of evidence I would give would be to go to github.com and go to search. Type in bitcoin there and compare to Stripe and PayPal and other kinds of things and you will see developer adoption is just off the charts. It's greater than Stripe. It's greater than PayPal. Those are all great



companies, but bitcoin is bigger than all of them. AngelList is another good example. There are more than 130 or 140 companies now in the BTC space and that's just in the first half of 2014. So, that's adoption.

Third, in terms of volatility, there are actual technical fixes to this. Once we get a functioning derivatives market around bitcoin, people can choose to have exposure to volatility or not. For example, merchants may not want volatility and may actually give up some upside in return for protection against downside, whereas an investor might want to be exposed to volatility. I'd also remark that volatility is a function of two things. First, it's a function of the fact that the market is artificially illiquid right now because there aren't enough banks that are allowing wire transfers for bitcoin. So, the smaller the market, the higher the volatility in many ways. Volatility is also an external function of human psychology and has really no impact on the bytes moving back and forth in the bitcoin protocol.

Last, in terms of safety, I think this is going to be the sort of thing where we figure out best practices over the years to come. One thing that's very interesting is this concept of the coin network as being trackable. If somebody steals your coins, you can track them through the network and see where they're spending it. That's something that doesn't really exist right now. If somebody steals a briefcase of \$100 bills, you're just out of luck, right? They can just do whatever they want with it. So, safety—I think—is going to be something where there's a lot of technological innovation on that in response to various kinds of hacks. You have to actually see the attack vector before you can build the defense.

Alex Tapscott

You mentioned one of the big sorts of “Aha!” moments that you expect is when governments begin to accept bitcoin for taxation. How have governments responded to this technology and specifically, how exactly will bitcoin, given the fact that it exists outside of state control and outside of the existing monetary system, be regulated? Who will govern the bitcoin ecosystem?

Srinivasan

It's a good question. So, I would say that there's a great website, bitlegal.net, where you can actually get a global view of all regulations on bitcoin and which jurisdictions are favorable and which are not and so on. If you look at it, the map is mostly green and yellow. Green is okay and yellow is okay with some caveats and red is negative. Governments accepting bitcoin for taxes will take a while, just as it took a while before the IRS allowed you to use the Internet to file taxes. It did not happen in the year after the Internet came out. Governments are by their nature going to be relatively conservative, so the rest of society will have to catch up first.

In terms of regulation, I think that's very much open-ended right now. Some countries are looking at it as a commodity and some as a currency and so on and so forth. I think regulation can be somewhat premature potentially. My analogy is the Internet. In the parable of the elephant, one person is pulling the tail and one person is pulling the trunk and one is grabbing the



leg and each of them is saying it's something different. In the same way, what is the Internet? Is it like physical mail in that you can send e-mail? Is it like broadcast in that you can have YouTube and you can put movies on it? Or is it like telephony in that you can make audio calls through it, right? And each of those three areas is regulated in a completely different way in the physical space, but they all blend together when you're sending packets in the informational space. So, a premature regulation would miss the point—is bitcoin a commodity? Is it a currency? Is it a programming language that you can do contracts on? Is it futures? Is it a security? Is it any of these things? Is it all of these things? I think that we want to let it develop for a while and see what people do with it before we jump in prematurely.

Alex Tapscott

Staying on the topic of regulation—it's a lot easier to regulate usage of a currency when you're the monopoly that issues it, which is the case for government and—I guess—large intergovernmental organizations like the European Union. Because bitcoin is this global phenomenon, will it require a global response? Will various states need to band together to regulate it cooperatively?

Srinivasan

I think it's like the climate change discussion, where it's really hard to get every state to cooperate on this. It was hard to get them to cooperate on terrorism. It's hard to get ten people to cooperate something, let alone ten nation-states. So, I'm not sure that global cooperation is really going to happen. You already have lots and lots of different jurisdictions with their own opinions on bitcoin if you look at bitlegal.net. So, I think each country is going to figure out its own rules. For example, the US is not going to be cooperating with Russia anytime soon on this, right?

Don Tapscott

That's a good segue for me to step in. In this project, we're exploring ten different types of these multi-stakeholder networks. They involve private sector, civil society, government and others and one of the ten types...we call them governance networks and the ecosystem that governs the Internet is a great example of that, but it's a truly multi-stakeholder network and it's got a lot of different moving parts to it, but so far at least in creating the technical standards and the basic operations of the Internet, it's working really well. Now, it's trying to evolve into some higher-level governance activities, but we've been studying this. It's actually Tim Berners-Lee, Vint Cerf, me, Lynn St. Amour (who is the CEO of the Internet Society), and Fadi Chehade (the CEO of ICANN). We've done—I think—the most in-depth evaluation of how that thing works, what makes it tick, how it's achieved legitimacy, and so on. We're exploring the idea that a similar multi-stakeholder ecosystem could address a lot of the requirements for small-g governance for bitcoin. Have you thought about that, sort of a multi-stakeholder model?

Alex Tapscott

Let me expand that. Will there be a network model of actually managing the bitcoin ecosystem or will it be something that happens more just by rough consensus? In our minds a hypothetical bitcoin governance network—if



there is such a thing—would perform a number of important tasks: setting standards, advocating governments, acting as a watchdog scrutinizing bad actors and improving on faults or shortcomings in the network itself. Is this something that will happen organically?

Srinivasan

Yes. I think so. Niall Ferguson has this interesting thing on hierarchies versus networks and I think that here it's going to be very much a network-driven kind of thing. Bitcoin's origin was a post on a forum board five years ago. Now governments around the world are reacting to it. The beginnings of things often shape them and the people who are the most knowledgeable about bitcoin, who have the ability to modify it, who are invested in the community, and so on are the kinds of people who were just doing it from the very beginning. They achieved what I call the execution veto. That is to say, by virtue of actually doing things, they gain control of it because they have the practical knowledge to modify the code and improve it and so on. So, yes, I do think it will be much more organic.

Alex Tapscott

In terms of liquidity you mentioned that the amount of new bitcoin being created is declining and will stop, for all intents and purposes, in our lifetime. How do you address the challenges of a currency with a fixed supply? To me, it harks back to an earlier era when the supply of a currency was based largely on its availability and accessibility in nature, such as gold or cowrie shells. Now in the modern monetary system we just create new money. As bitcoin becomes larger and more pervasive in our economy, how do you think we'll deal with the question of scarcity and supply?

Srinivasan

My short answer on that is that digital currencies offer something new which is neither deflation nor inflation as classically understood but rather subdivision. That is to say, subdivision allows perfectly distributed inflation. Proponents of a fixed money supply say if there's a fixed money supply, then the government or some other entity can't monkey around and get an artificial amount of new money, like the financial services bailouts and so on. The counterargument to that is if we are all transacting in gold bricks, as productivity increases, the value of a gold brick increases to the point that you can buy a whole house with it and we'd enter a liquidity trap where people would otherwise transact but couldn't or didn't because the value of their holdings was too large and so they were not actually transacting. So, that's the liquidity trap argument.

But what if you didn't have gold but you had bitcoin and you could issue ten new "decaBTC" for every one BTC, right? That is to say, what if for every dollar you could take it back into, say, the Federal Reserve and issue ten new dollars, right? This would have the effect of getting you out of the liquidity trap because now you have tokens that were more sub-dividable and more tradable. You no longer have one thing that bought a whole house. It would be reduced in value and this is effectively organically what is already happening. If you go for example to bitcointy.org, you'll note that at the top they now measure the price of bitcoin in milliBTC rather than BTC;



that is, one one-thousandth of a BTC rather than a BTC because bitcoin has increased in price about 1000X over the last few years. So, as such, this organic process of subdividing the currency to get perfectly distributed inflation and thereby avoid liquidity traps is not even theoretical. It's already ongoing and moreover has no upper limit. You could have a trillion-dollar economy in bitcoin and people just transact in microBTC and then nanoBTC and then picoBTC and so on. The protocol needs to be extended to go below nanoBTC. It has eight decimal places right now but that is easily fixed with a change to the protocol. So, I don't look at that as a long-term problem.

Alex Tapscott

Great. And then one other question: we've talked a lot about bitcoin, but there are other digital currencies such as Litecoin and Dogecoin. Do you envision a world where there is a plurality of digital currencies or will one ultimately become the dominant or only digital currency?

Srinivasan

I do see a plurality of digital currencies. I would say that basically you have a tri-archical decomposition here. You've got bitcoin itself, right? You've got what we call alt coins, which are, like, Litecoin and Dogecoin, which are basically the same as bitcoin except with a different hashing function and maybe different approval times. Dogecoin is no longer exactly the same because it also prints more. It's not scarce in the same way that bitcoin is, but these are pretty similar in that they work the same way. There's a third group which are the appcoins. So, these are the things where I think there will be a profusion of them. So, for example, Namecoin...that is something which does a different function of bitcoin. It allows you basically to set up a distributed DNS and so it's not just a matter of changing the parameters in bitcoin but actually has a different function and I think we're going to see many more of these appcoins.

You can Google the bitcoin model for crowdfunding. The basic concept is: let's say that you wanted to come up with a new version of Tor. What you might do is you might say, there's going to be a million Tor coins and 30% of them at the beginning I will sell for some amount of money to early holders. Then I will develop the software open-source and I will give it to be people and anybody who runs a server based on this can accept Tor coins in order to return requests, so now we've created a way to monetize open-source in a way that was never possible before, right? So, the early holders of the Tor coins now have a use case for them, which is to say, to pay for digital labor; namely, somebody hosting a piece of code on their server and also engaging in long-term development of it, right? So, in this fashion I do actually anticipate there being quite a few different appcoins. Every single protocol that you can think of can potentially be attacked with some sort of blockchain-based methodology. I see half a dozen of these a week now. I see distributed DropBox. I see distributed Facebook. I see distributed Google. I see distributed Twitter. Many of these are rudimentary right now, but the entire Internet is going to get decentralized. I'm not sure of the exact timescale. It might take a while, but it's likely going to happen because we have a new model for monetization.



Alex Tapscott

Balaji, thank you so much for your time. It has been enormously helpful and enlightening speaking to you.



Endnotes

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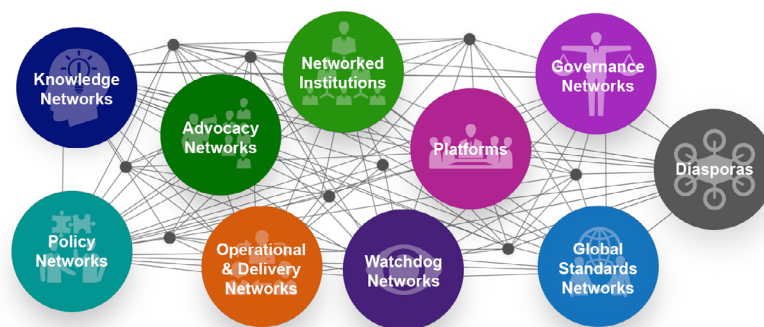
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