Blockchain 101: Cryptocurrencies, Digital Assets and Blockchains

NYC Blockchain Week: ‘All Things Blockchain’
15 May 2019
New York, New York

Sandra Ro, CEO, Global Blockchain Business Council (GBBC)
Session 101:

- Brief Introduction

- Blockchain 101: Let’s Start from the Beginning...Money, Bitcoin, a Brief History

- Trading, CryptoCurrencies, & Digital Assets, a Primer

- Blockchains, the Inspiration Technology: Paradigm Shifts, Risks, and ‘Data as Value’
What is ‘Money’ to you?

Paper bills were first used by the Chinese, who started carrying folding money during the Tang Dynasty (A.D. 618-907) — mostly in the form of privately issued bills of credit or exchange notes — and used it for more than 500 years before the practice began to catch on in Europe in the 17th century.

While it took another century or two for paper money to spread to the rest of the world, China was already going through a fairly advanced financial crisis: the production of paper notes had grown until their value plummeted, prompting inflation to soar. As a result, China eliminated paper money entirely in 1455 and wouldn’t adopt it again for several hundred years. Another not-so-well-known fact: the word “cash” was originally used to describe the type of round bronze coins with square holes commonly used in the Tang Dynasty, called kai-yuan.
Evolution of Transfer of Value

Barter

Gold

Fiat Currency

2008: White Paper
2009: Bitcoin protocol released
Financial Crisis 2008

- GDP shrank by 4.7% from 2008 through the first half of 2009.
- 8+ million jobs disappeared between 2008 and 2009.
- $17 trillion in household net worth evaporated from 2007 through the first quarter of 2009, a larger amount than the nation's GDP of $14.4 trillion in 2008.
- 8+ million home foreclosures is an estimate of what the final number may be since the crisis.
- Home prices plummeted 32% on average from their peak in 2006 to their bottom in early 2009, but some regions experienced much steeper declines than that.
- Retirement account assets fell by $2.8 trillion from September 2007 through December 2008, about a third of their value at the time.

Perception vs Reality: The World of ‘Magic Internet Money’
Bitcoin: a Network, a System

“Announcing the first release of Bitcoin, a new electronic cash system that uses a peer-to-peer network to prevent double-spending. It’s completely decentralized with no server or central authority.”

– Satoshi Nakamoto, 09 January 2009, announcing Bitcoin* on SourceForge

* Significant breakthrough: Bitcoin solved the ‘double spend’ problem (using the same money more than once)
Bitcoin Explained, BBC Video
How a blockchain transaction works

1. A and B wish to conduct an 'interaction' or 'transaction'.
2. Cryptographic keys are assigned to the interaction that both A and B hold.
3. The interaction is broadcast and verified by a distributed network.
4. Once validated, a new block is created.
5. This block is then added to the chain, creating a permanent 'golden source' of the interaction.
6. The transaction between A and B is completed.
Bitcoin: Proof of Work (SHA 256 Hash Algo, Miners, Core Developers, Hodlers, Maximalists)

Miners: computers that validate bitcoin network transactions and are compensated by receiving bitcoins when a ‘block is mined’

Proof of Work: type of consensus algorithm in which output is difficult to produce but easy for others to verify, allows ‘trustless’ consensus without a third party

Bitcoin Core: is an open source project which maintains and releases Bitcoin client software called “Bitcoin Core”. Anyone can contribute to Bitcoin Core
https://bitcoincore.org/en/about/
Ethereum: Launched 30 July 2015

Ethereum took the basic elements of bitcoin and advanced it by launching a decentralized platform that runs smart contracts for decentralized applications (DAPPs)

Ether is the unit of cryptocurrency on Ethereum and is also the ‘gas’ for building smart contracts

August 2014: Crowd sale raised $18MM in bitcoin to fund the project

The Ethereum Foundation (https://www.ethereum.org/) is a Swiss nonprofit and is a valuable source of information / technical updates
Blockchain Technology Benefits and Challenges

**Benefits:**
- ✓ Distributed, decentralized architecture
- ✓ P2P trustless transaction system
- ✓ Security: encrypted key signatures
- ✓ Timestamping, linear recording of records
- ✓ Transparency
- ✓ Fraud mitigation

**Challenges:**
- ➢ Public vs private blockchains
- ➢ Scalability
- ➢ Confidentiality
- ➢ Privacy
- ➢ Private key vulnerability
- ➢ Inter-operability of multiple blockchains
The Blockchain? No, many blockchains...
Smart Contracts: the Humble Vending Machine

Smart Contracts Described by Nick Szabo 20 Years Ago Now Becoming Reality

Smart contract technology is booming with the release of Ethereum and programming languages such as Solidity and Serpent, that have made contracts much simpler to build and deploy. The idea has been around for a long time, though. Nick Szabo, the cryptographer known for his research on digital currency, wrote an article about smart contracts as early as 1995. Szabo’s article, “Smart Contracts,” was published in early 1996 in the
On top of that, the Governor is concerned that “one of the main reasons for their use is to shield illicit activities” and wants to take steps to end this “anarchy”.

“The time has come to hold the crypto-asset ecosystem to the same standards as the rest of the financial system,” he said.

“Being part of the financial system brings enormous privileges, but with them great responsibilities.”
Limited Edition Bitcoin Socks by Kimchi Socks
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Let’s get some perspective...
And some more perspective...

Source: https://howmuch.net/articles/visualizing-the-biggest-economic-bubbles
# New Asset Class?

## Crypto Asset Classification

<table>
<thead>
<tr>
<th>Category</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cryptocurrencies</td>
<td>(e.g. bitcoin, ether, litecoin, zcash, monero)</td>
</tr>
<tr>
<td>Digital Assets</td>
<td>(e.g. UK’s Royal Mint Gold (RMG), Digix Gold)</td>
</tr>
<tr>
<td>Digitized Fiat Currencies</td>
<td>(e.g. digital central bank money)</td>
</tr>
</tbody>
</table>
Cryptocurrencies, largely ignored until 2017...

Source: https://coinmarketcap.com/

<table>
<thead>
<tr>
<th>#</th>
<th>Name</th>
<th>Market Cap</th>
<th>Price</th>
<th>Volume (24h)</th>
<th>Circulating Supply</th>
<th>Change (24h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bitcoin</td>
<td>$140,194,213,800</td>
<td>$7,920.21</td>
<td>$31,928,262,252</td>
<td>17,700,825 BTC</td>
<td>0.04%</td>
</tr>
<tr>
<td>2</td>
<td>Ethereum</td>
<td>$22,541,084,081</td>
<td>$212.51</td>
<td>$12,286,604,765</td>
<td>106,070,019 ETH</td>
<td>6.19%</td>
</tr>
<tr>
<td>3</td>
<td>XRP</td>
<td>$16,664,849,890</td>
<td>$0.395527</td>
<td>$5,576,492,355</td>
<td>42,133,310,721 XRP</td>
<td>20.85%</td>
</tr>
<tr>
<td>4</td>
<td>Bitcoin Cash</td>
<td>$6,830,235,455</td>
<td>$384.10</td>
<td>$3,569,382,362</td>
<td>17,782,275 BCH</td>
<td>-1.90%</td>
</tr>
<tr>
<td>5</td>
<td>Litecoin</td>
<td>$5,567,604,810</td>
<td>$90.13</td>
<td>$4,905,164,793</td>
<td>61,773,411 LTC</td>
<td>0.79%</td>
</tr>
<tr>
<td>6</td>
<td>EOS</td>
<td>$5,397,980,049</td>
<td>$5.92</td>
<td>$3,889,211,100</td>
<td>911,622,163 EOS</td>
<td>4.55%</td>
</tr>
<tr>
<td>7</td>
<td>Binance Coin</td>
<td>$3,293,602,800</td>
<td>$23.33</td>
<td>$328,253,329</td>
<td>141,175,490 BNB</td>
<td>-3.10%</td>
</tr>
<tr>
<td>8</td>
<td>Tether</td>
<td>$2,787,632,678</td>
<td>$0.995067</td>
<td>$30,736,646,710</td>
<td>2,801,452,915 USDT</td>
<td>-1.15%</td>
</tr>
<tr>
<td>9</td>
<td>Stellar</td>
<td>$2,118,802,931</td>
<td>$0.110439</td>
<td>$782,075,277</td>
<td>19,185,275,688 XLM</td>
<td>8.79%</td>
</tr>
<tr>
<td>10</td>
<td>Cardano</td>
<td>$2,070,308,359</td>
<td>$0.079851</td>
<td>$181,635,208</td>
<td>25,927,070,538 ADA</td>
<td>8.04%</td>
</tr>
</tbody>
</table>
Rise of Crypto Trading Platforms

Fiat-focused platforms

Coinbase
GDAX
Kraken
Bitstamp (acquired)
Gemini

Crypto-focused platforms

Bittrex
Binance
Shapeshift
Poloniex (acquired)
Bitfinex
CryptoFacilities

Major crypto-platforms have established brand presence and limited services such as margin trading.

Source: Ajit Tripathi @chainyoda
Initial Coin Offering (ICO), Paradigm Shift

**Funds raised in 2016**
Total raised: $90,250,273
Number of ICOS: 29

**Funds raised in 2017**
Total raised: $6,213,002,958
Number of ICOS: 875

**Funds raised in 2018**
Total raised: $7,852,477,041
Number of ICOS: 1258

**Total 2019 ICO funding:** $99,530,000

STOs: Security Token Offerings, 2019 Version?

- Security Token Offering (STO)
  Characteristics: a compliant form of ICOs?

 [xyz] project is a STO raising funds under Regulations D & S in the USA

For US citizens to contribute, each contributor must be an accredited investor

Citizens of other countries must be equivalent accredited investors
What are Stablecoins?

A Stablecoin is a digital currency pegged to another asset e.g. USD or Gold or Algo

“[..] key issue with cryptocurrencies is their unstable value. This arises from the absence of a central issuer with a mandate to guarantee the currency’s stability.”

(BIS Annual Economic Report June 2018)
Crypto Trading is NOT 100% User Friendly Yet...

**Wallets:**
- Coinbase
- Blockchain.info
- Bitgo
- Jaxx
- MyEtherWallet
- Paper (yes, literally on a piece of paper)

**Cold Storage / Custody Solutions:**
- Ledger
- Trezor
- Xapo

**Crypto Insurance:**
Virtually non-existent – work in progress

**Tax & P&L Reporting:**
Messy – work in progress
Enter Financial Services...
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Blockchain Technology: Where are We Going?

Blockchain 2018:
Crypto Winter & Crash of ICO Mania

Blockchain 2019++: Commercial and Growth Opportunities
- Blockchains’ infrastructure evolution
- Real world use cases, including ‘blockchain for good’
- Impact across industries and geographies
Potential of Blockchain Technology

Governance
Audit and Financial Controls
Repair Trust
Protect Sensitive Data
Promote Sustainability
Safeguard Property Rights
Shape the Future of Work
Assist in Workforce Development
Blockchain Technology Benefits and Challenges

**Benefits:**
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**Challenges:**
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- ➢ Scalability
- ➢ Confidentiality
- ➢ Privacy
- ➢ Private key vulnerability
- ➢ Inter-operability of multiple blockchains
The Blockchain? No, many blockchains...
Blockchain 2019-20 Trends

1. Geographic distribution and growth
2. Government and regulatory engagement
3. ‘Going mainstream’ across industries – use cases
Countries Advancing Blockchain Technology Development
11 Years Ago: Forbes Front Cover...
Mobile (smart) phones: the most valuable real estate of the future
Technology & MegaTrends

01  Demographic Changes – Age and Population Growth

02  Environment & Climate Change

03  Governments and Conflicts

Source: http://www.worldometers.info/world-population/africa-population/
Blockchain 2019-20 Trends

Government and regulatory engagement
Blockchain Consortia & Regulatory Sandboxes
Digital Assets & Blockchain Technology: Benefits & Risks

Potential Benefits:
- Non-siloed Information Sharing
- Increased Data Security
- Transparency
- Fraud Mitigation
- Cost Reduction
- Payment Efficiency
- Enhanced Customer & Provider
- Predictive, Proactive Decision Making

Potential Risks:
- *Multiple Blockchains’ Interoperability Issues*
- Regulations & Jurisdictional Arbitrage (similar to financial services)
- *Technology Convergence Implications* (AI, IoT, Quantum Computing, Robotics, Blockchain)
- New Technology Leapfrogs Blockchain
- Too Much Hype, Not Enough Doing!
- *We Recreate GAFAA World*
Blockchain 2019-20
Trends

‘Going mainstream’ across industries – use cases
Potential Use Cases for Blockchain
Real World Use Cases for Blockchain

Republic of Georgia to Develop Blockchain Land Registry

Walmart and IBM Are Partnering to Put Chinese Pork on a Blockchain

SAP Ariba Inks Blockchain Supply Chain Partnership With Everledger

Dubai Government Taps IBM For City-Wide Blockchain Pilot Push

EU Politician Pushes Parliament to Test Blockchain Identity for Refugees

Malta's Government Is Putting Academic Certificates on a Blockchain
Identity Management

- People
- Employees / Contractors
- Suppliers / Partner Institutions
- Regulators / Safety Groups
Major Sectors / Industries

Energy

How to help create secure, sustainable and low cost energy for all?

Financial Services

How to expand financial inclusion? How to improve existing financial services system?

Agriculture / Food / Commodities

How do we help reduce fraud and inefficiencies?

Healthcare

How to help deliver better, lower cost healthcare to more people with better records?

Land / Real Estate

How to recognize ownership of land? Reduce fraud and provide fractional ownership?
Blockchain in Food Safety

IBM Food Trust™ makes food traceability possible, tracking products to their source for enhanced food authenticity and safety.

Alibaba’s Blockchain Food Tracking Program Launches In New Zealand

Proliferation of Healthcare Use Cases

Top Use Case Areas:
1) Provider Licensing & Credential Verification
2) Payer Administration & Big Data Management
3) Invoicing and Payment Reconciliations => cost reduction
4) Medication monitoring & supply chain tracking (+IoT)
5) Public Health Surveillance & Population Health Management
6) Predictive Markets & Price Transparency
Aviation and Potential Blockchain Applications:

PEOPLE
- Identity Management (customers, employees, suppliers, partners)
- Tokenisation - Loyalty Miles as Digital Money and Gaming
- Bundled Services Management – Improve customer experience; mitigate overbooking issues

SUPPLY CHAINS & LOGISTICS
- Identity / Credentials Management - Identify & verify ‘credentials’ of people and institutions
- ‘Real Time Track & Trace’ – Counterfeiting / Fraud Mitigation, Increase Transparency
- Data Analytics – Improve information sharing for regulatory & ROI benefits
- Aircraft Leasing / Insurance

SAFETY, SECURITY & REGULATIONS
- Flight Records Systems Security – e.g. Malaysia Airlines Flight 370 March 2014
- Data Sharing & Analytics – Enables faster info flow across agencies & stakeholders – ‘BUREAUCRACY KILLER’?
- Insurance & Financing - Integrated digital financial services to improve risk analysis; fraudulent claims reduction

Photo Credit: https://www.acsi2000.com/supply-chain-management
To the Cynics...

who may think crypto / blockchain is just a fad technology...
Find Your New Job (23)

Viewing 1 - 10 of 23

Results per page: 10+

Lead Commercial Counsel, Blockchain
- Legal
- Legal, Finance, Facilities & Admin
- San Francisco, CA, Menlo Park, CA

Product Manager, Blockchain
- Product Management
- Tel Aviv, Israel

Product Manager, Blockchain
- Product Management
- Menlo Park, CA

Finance Analyst - Blockchain
- Finance
- Legal, Finance, Facilities & Admin
- Menlo Park, CA
Software Engineer / Frontend Javascript - React / Blockchain
Intelletec
New York, New York, United States
Easy Apply · Promoted
Be an early applicant

Blockchain Engineer
CyberCoders
New York City, NY, US
1d
For the first time, a shift to new technologies has emerged as the top opportunity for growth at respondents’ companies.

Potential opportunities for growth at respondents’ companies, next 12 months, % of respondents

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>Shift to new technologies (e.g., automation, artificial intelligence)</td>
<td>26</td>
<td>25</td>
<td>29</td>
<td>39</td>
</tr>
<tr>
<td>Growth in existing markets</td>
<td>33</td>
<td>33</td>
<td>38</td>
<td>32</td>
</tr>
<tr>
<td>Expanded and/or new offerings</td>
<td>27</td>
<td>26</td>
<td>25</td>
<td>26</td>
</tr>
<tr>
<td>Operations improvements</td>
<td>33</td>
<td>28</td>
<td>21</td>
<td>24</td>
</tr>
<tr>
<td>New market segments</td>
<td>26</td>
<td>25</td>
<td>23</td>
<td>23</td>
</tr>
</tbody>
</table>

1Out of 12 potential opportunities that were presented as answer choices in Mar 2019 survey; question was asked only of respondents working at private-sector organizations. In Mar 2016, n = 2,544; in Mar 2017, n = 1,570; in Mar 2018, n = 1,123; and in Mar 2019, n = 1,338.

McKinsey & Company
Together,
We Can Make Positive Change for a Better Society and Create Opportunities for Many

Thank You!

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WeChat ID: coredigitiser
Twitter: @srolondon
APPENDIX: Blockchain Resources
If Interested, Going Down the Rabbit’s Hole…

Satoshi Nakamoto’s White Paper: [https://bitcoin.org/bitcoin.pdf](https://bitcoin.org/bitcoin.pdf)

Andreas Antonopoulos’ videos and Internet of Money (Vol 1 & 2), Mastering Bitcoin (editions 1 & 2) books

Chris Burniske & Jack Tatar, CryptoAssets book (valuation and basic of crypto trading)

Michael Casey & Paul Vigna’s Age of Cryptocurrency & The Trust Machine books

CoinCenter.org resources on crypto currencies [https://coincenter.org/](https://coincenter.org/)

Global Blockchain Business Council [https://www.gbbcouncil.org/](https://www.gbbcouncil.org/) (curated content)


Universities with crypto thought leadership: MIT Media Lab/DCI, Berkeley, Cornell, Imperial, Cambridge and many more
Basic Crypto Terms

- **Consensus Algorithm**: a process used to achieve agreement regarding a certain set of data and its validity across a distributed network
- **Distributed Autonomous Organisation (DAO)**: an organization that is run through rules encoded as computer programs called smart contracts
- **Digital Signature**: a code attached to an electronic document to verify its contents and the sender ID
- **Genesis Block**: the first block of data in a chain
- **Hard Fork**: is a permanent divergence from the previous version of the blockchain requiring miners and nodes to upgrade protocol software to newest/latest version of the blockchain
- **Hash Function**: a cryptographic mechanism used to verify and authenticate the integrity of information by producing a value for a specific object
- **Node**: A point in a network where there is an intersection (e.g. a computer connected to the network that ideally performs a function)
- **Oracle**: a bridge between the outside world and blockchain which verifies real world information and submits it to the blockchain
- **Permissioned / Permissionless**: types of blockchains which are private or publicly accessible
- **Private Key**: A form of cryptography that provides access, similar to a password
- **Smart Contracts**: code that are executed by a network of computers, which facilitates the self execution of previously agreed upon conditions
- **Smart Laws**: a concept which allows human logic to intervene in smart contract execution where necessary
- **tps**: transactions per second: the speed at which a network can record data
The Global Blockchain Business Council (GBBC) is the leading industry trade association for the blockchain ecosystem, which brings together innovative organizations and founding thought-leaders from over 40 countries to advance understanding of blockchain technology amongst global regulators and business leaders. Conceived on Sir Richard Branson’s Necker Island, the GBBC is a Geneva-based non-profit, which launched formally during the 2017 Annual World Economic Forum Meeting in Davos, Switzerland. The organization is dedicated to furthering adoption of blockchain technology through engaging and educating regulators, business leaders, and global change makers on how to harness this groundbreaking tool to create more secure, equitable, and functional societies.
GBBC Pillars

- Advocacy
  
  The GBBC works with partners from a broad range of sectors to advocate for the adoption of blockchain technology and supports the development of industry standards and appropriate regulation that enable more efficient use of blockchain technology across different regions, platforms and sectors.

- Education
  
  The GBBC serves as an educational hub for businesses and regulators seeking to learn more about blockchain technology and benefit from its potential – producing content and events that bring key insights on blockchain technology to business audiences.

- Partnership
  
  The GBBC facilitates partnerships between organizations of all kinds, with a focus on building commercial, educational, and civic alliances that support the needs of our members.