M.A. Thesis Presentation

Blockchain Technology as A Mean to International Integration:

A comparative study of Permissionless Blockchains (Bitcoin and Ethereum) from 2012 to 2018

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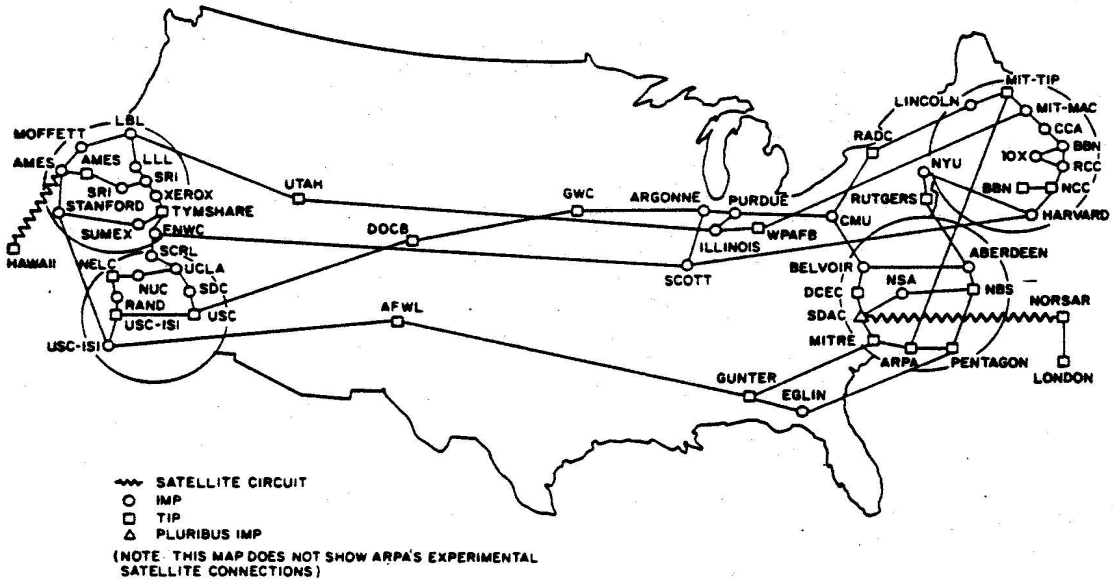
Available at: http://RakibFiha.com/blockchainTIU.pdf

Presentation Agenda

- What is Blockchain?
- Literature Review
- Statement of Problem
- Research Question
- Hypothesis
- Methodology
    - Bitcoin Statistics
- Limitations of Study
- Expected Results
- Schedule until final submission
- References
- Q&A
- Appendix
- Written Comments after the presentation
- Audio Comments after the presentation (will be added)

The Map of Internet in the 80s



Source: https://www.are.na/block/343510

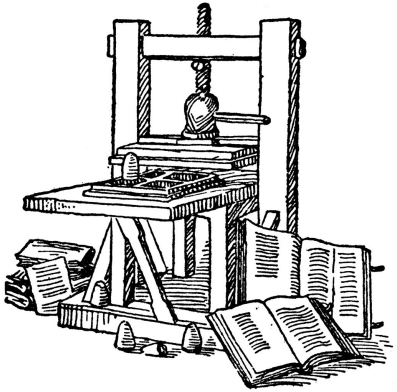
* “Paradigm”

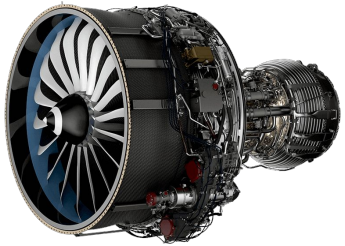
* 1994: "Today Show": "What is the Internet, Anyway?"

* Question is: Do we have a new paradigm which is perhaps the next big thing ?

* What are the gaps a paradigm had filled in the past?

Filled the knowledge gap
> transferred knowledge
> changed perception
Printing Press (1400)





Engine/ Industrial Revolution (1800)
> abolished slavery
> revolution
Filled the power gap

Filled the distance gap
> made world smaller
> communication
Internet (1900)

Let’s Imagine We want to Buy a House

In Traditional Ledger Transaction (Tx) history will look like this

Traditional Ledger is Highly Temperable

Traditional Ledger is Highly Temperable


THE MIDDLEMAN

* In the current world we have intermediaries that generate this trust.

    * Banks, Credit Agencies, Title Companies
    * Banks are vulnerable to attack, hack and many other threats

    * There is more than 2.5 billion people in the world who do not have access to any financial services.

* Blockchain is Trustless , distributed, decentralised, immutable

    * Blockchain --> verification

This How Blockchain Records Transactions (Tx)

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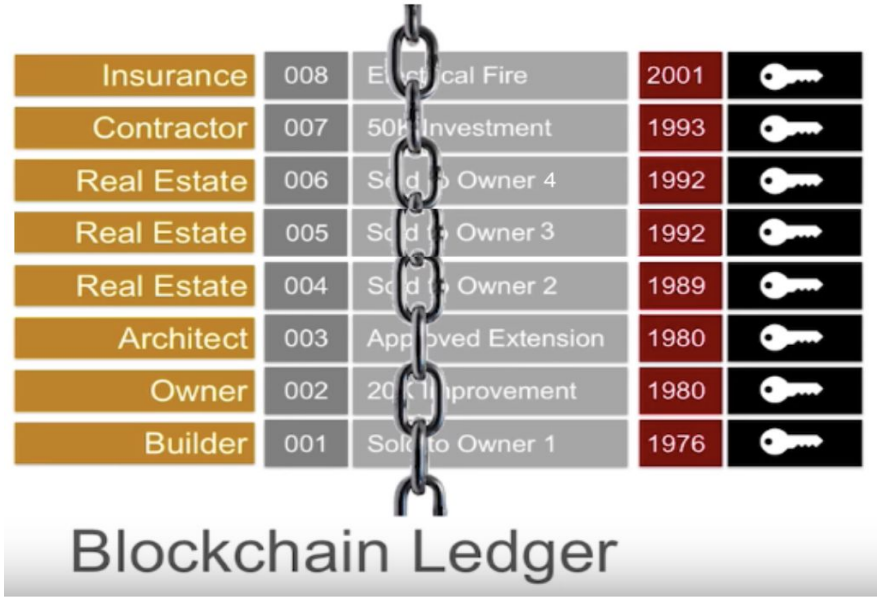
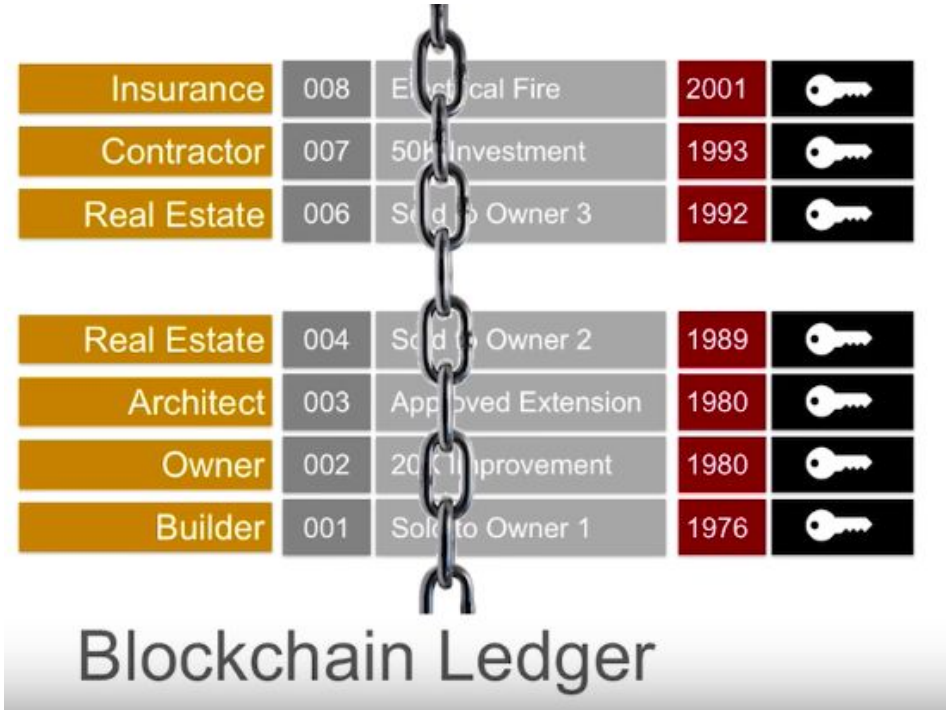
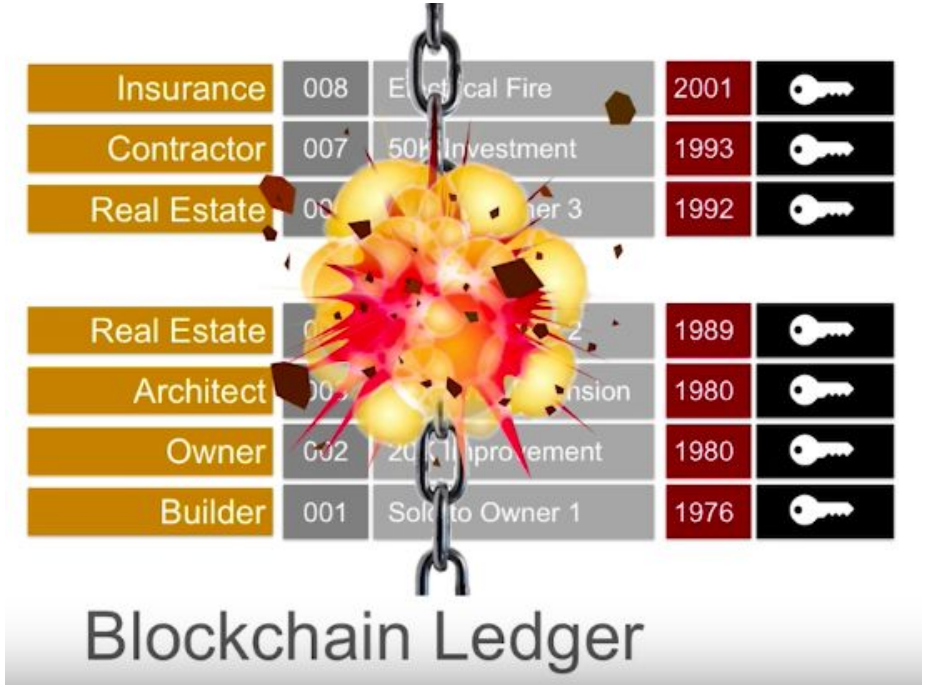


Blockchain is Immutable and Tamper Proof and if someone tries to manipulate the information:

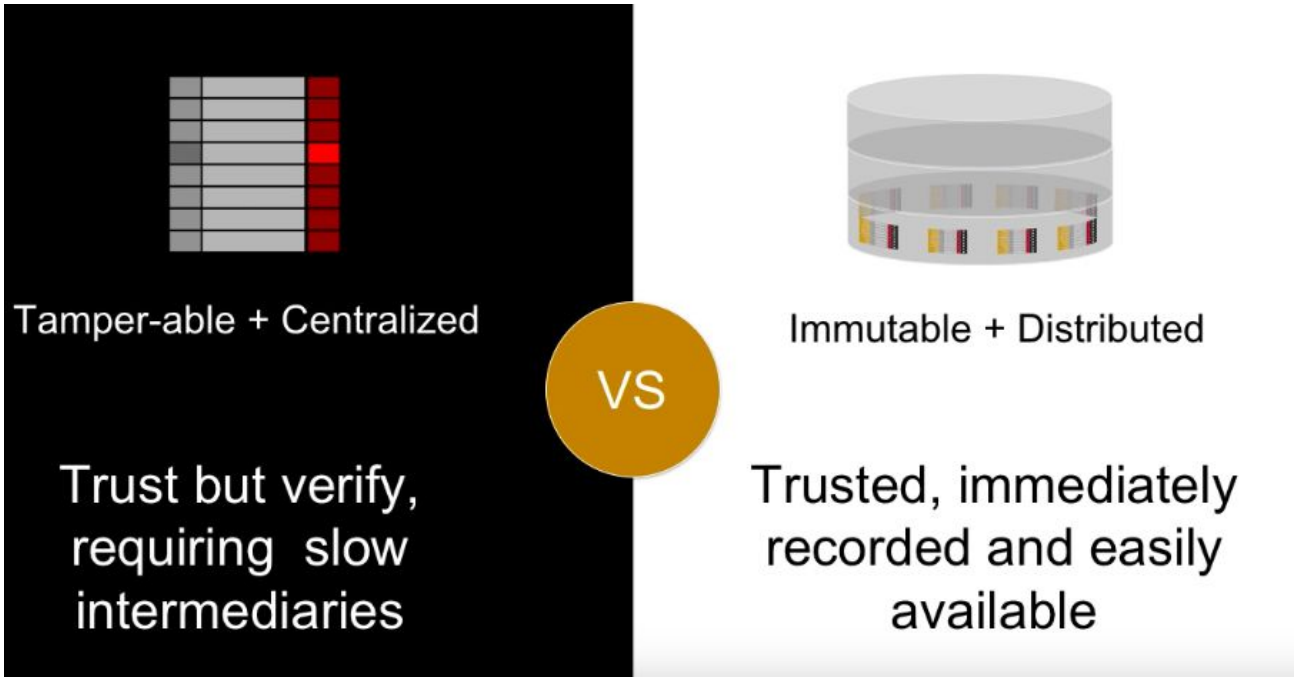


Other nodes in the network immediately recognises that this is not a valid block.



Immutable

Traditional Ledger vs Blockchain



Filled the knowledge gap
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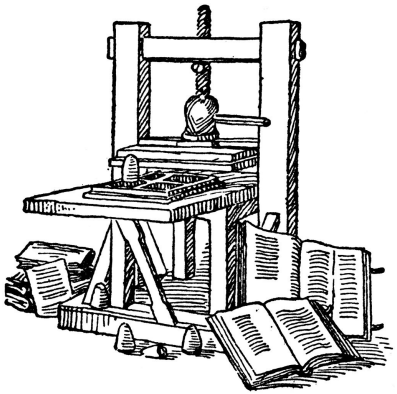
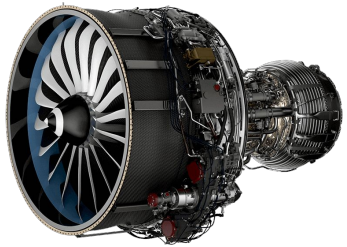
Printing Press (1400)





Engine/ Industrial Revolution (1800)
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> revolution
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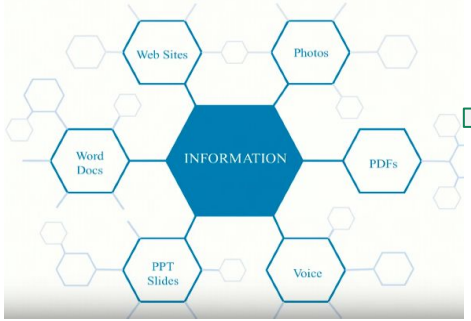
Internet (1900)

BLOCKCHAIN

Fills the trust gap
.
Changes the fundamental way of
Trusting each other
Revolutionising to finance

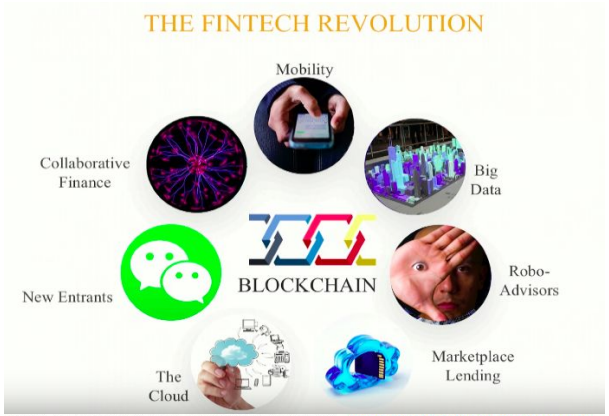
THE INTERNET OF INFORMATION



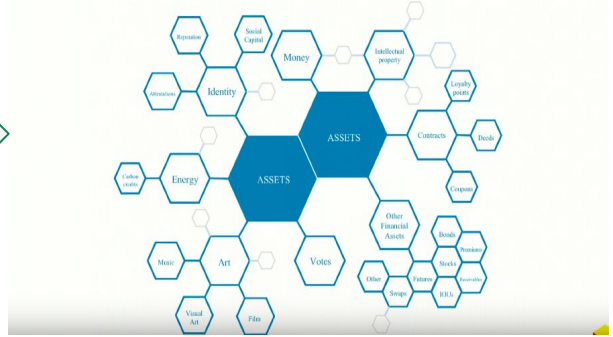
Bitcoin: A Peer-to-Peer Electronic Cash System

Satoshi Nakamoto
satoshin@gmx.com
www.bitcoin.org

Abstract. A purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another without going through a financial institution. Digital signatures provide part of the solution, but the main benefits are lost if a trusted third party is still required to prevent double-spending. We propose a solution to the double-spending problem using a peer-to-peer network. The network timestamps transactions by hashing them into an ongoing chain of hash-based proof-of-work, forming a record that cannot be changed without redoing the proof-of-work. The longest chain not only serves as proof of the sequence of events witnessed, but proof that it came from the largest pool of CPU power. As long as a majority of CPU power is controlled by nodes that are not cooperating to attack the network, they'll generate the longest chain and outpace attackers. The network itself requires minimal structure. Messages are broadcast on a best effort basis, and nodes can leave and rejoin the network at will, accepting the longest proof-of-work chain as proof of what happened while they were gone.



THE INTERNET OF INFORMATION ▸ THE INTERNET OF VALUE



Literature Review: Where is it disrupting?

- According to this research paper conducted by ETH Zurich and Imperial College London

  Wust, K. and Gervais, A. (2017). *Do you need a Blockchain?*. [online] ETH Zurich & Imperial College London. Available at: https://eprint.iacr.org/2017/375.pdf [Accessed 1 Dec. 2018].

  - The paper analysed three main use cases:
    - 1. Supply Chain Management
    - 2. Interbank and International Payments
    - 3. Decentralised Autonomous Organisation (DAO)
  - Blockchain is suitable for any applications where multiple parties are involved and the trust element is present.

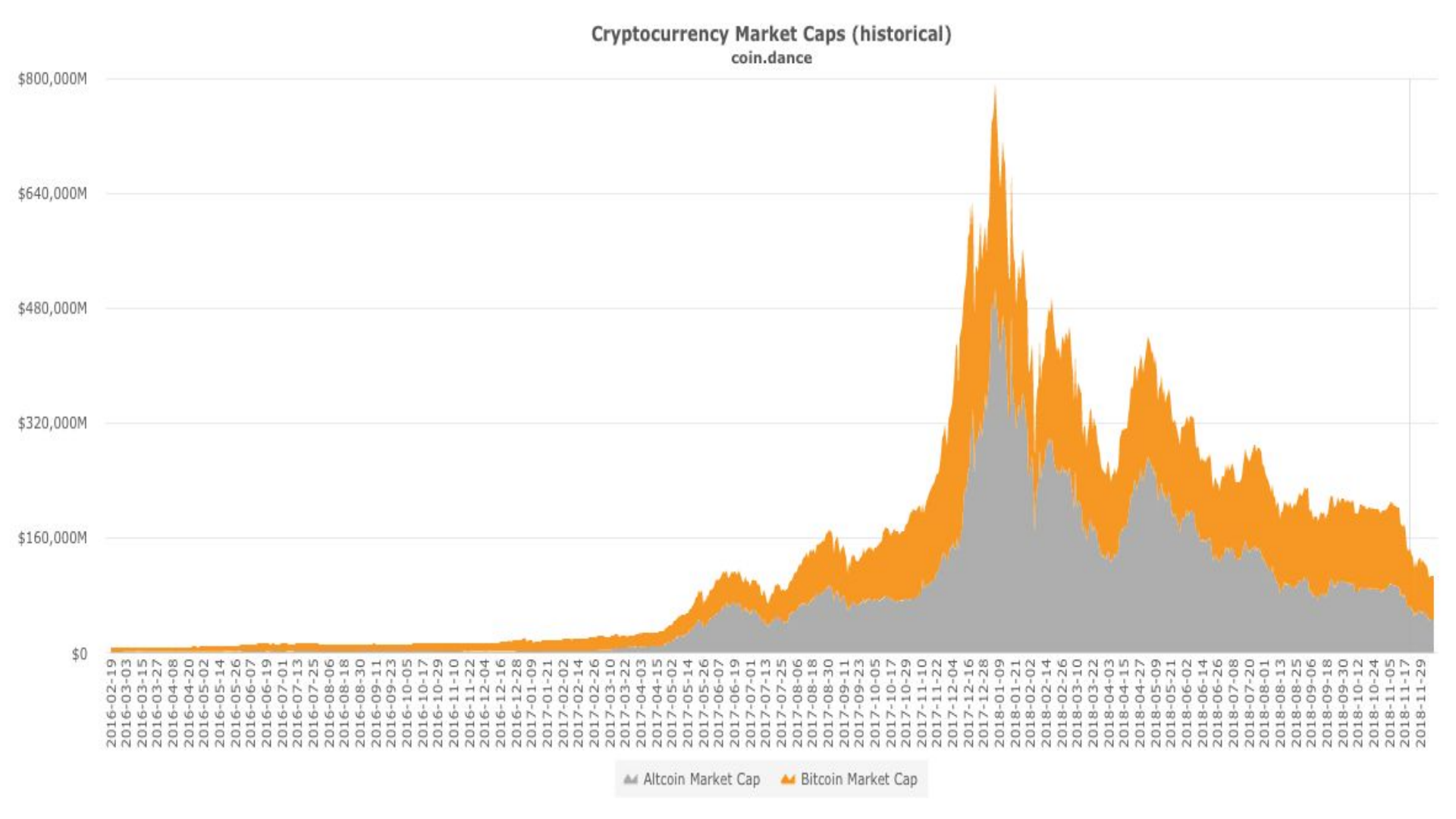
Literature Review

- The research that had been conducted before mainly focussed on International Trades and Law.
- 1. Werbach, K. (2018). *Trust, but Verify: Why the Blockchain Needs the Law*. [online] Berkeley Law Scholarship Repository. Available at: https://doi.org/10.15779/Z38H41JM9N [Accessed 6 Dec. 2018].

- 2. Ganne, E. (2018). *Can Blockchain revolutionize international trade?* [online] Wto.org. World Trade Organisation Available at: https://www.wto.org/english/res_e/booksp_e/blockchainrev18_e.pdf [Accessed 10 Dec. 2018].

- 3. Caria, R. (n.d.). A Digital Revolution in International Trade? The International Legal Framework for Blockchain Technologies, Virtual Currencies and Smart Contracts: Challenges and Opportunities. [online] Uncitral.org. Available at: http://www.uncitral.org/pdf/english/congress/Papers_for_Programme/5-DE_CARIA-A_Digital_Revolution_in_International_Trade.pdf [Accessed 4 Dec. 2018].

- 4. Boucher, P., Nascimento, S. and Kritikos, M. (2017). How blockchain technology could change our lives. European Parliament. [online] Europarl.europa.eu. Available at: http://www.europarl.europa.eu/RegData/etudes/IDAN/2017/581948/EPRS_IDA(2017)581948_EN.pdf [Accessed 1 Dec. 2018].


Cryptocurrency Market Caps (historical)
coin.dance
$800,000M
$640,000M
$480,000M
$320,000M
$160,000M
$0
2016-02-19
2016-03-03
2016-03-15
2016-03-27
2016-04-08
2016-04-20
2016-05-02
2016-05-14
2016-05-26
2016-06-07
2016-06-19
2016-07-01
2016-07-13
2016-07-25
2016-08-06
2016-08-18
2016-08-30
2016-09-11
2016-09-23
2016-10-05
2016-10-17
2016-10-29
2016-11-10
2016-11-22
2016-12-04
2016-12-16
2016-12-28
2017-01-09
2017-01-21
2017-02-02
2017-02-14
2017-02-26
2017-03-10
2017-03-22
2017-04-03
2017-04-15
2017-05-02
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2017-07-25
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2017-10-05
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2017-10-29
2017-11-10
2017-11-22
2017-12-04
2017-12-16
2017-12-28
2018-01-09
2018-01-21
2018-02-02
2018-02-14
2018-02-26
2018-03-10
2018-03-22
2018-04-03
2018-04-15
2018-04-27
2018-05-09
2018-05-21
2018-06-02
2018-06-14
2018-06-26
2018-07-08
2018-07-20
2018-08-01
2018-08-13
2018-08-25
2018-09-06
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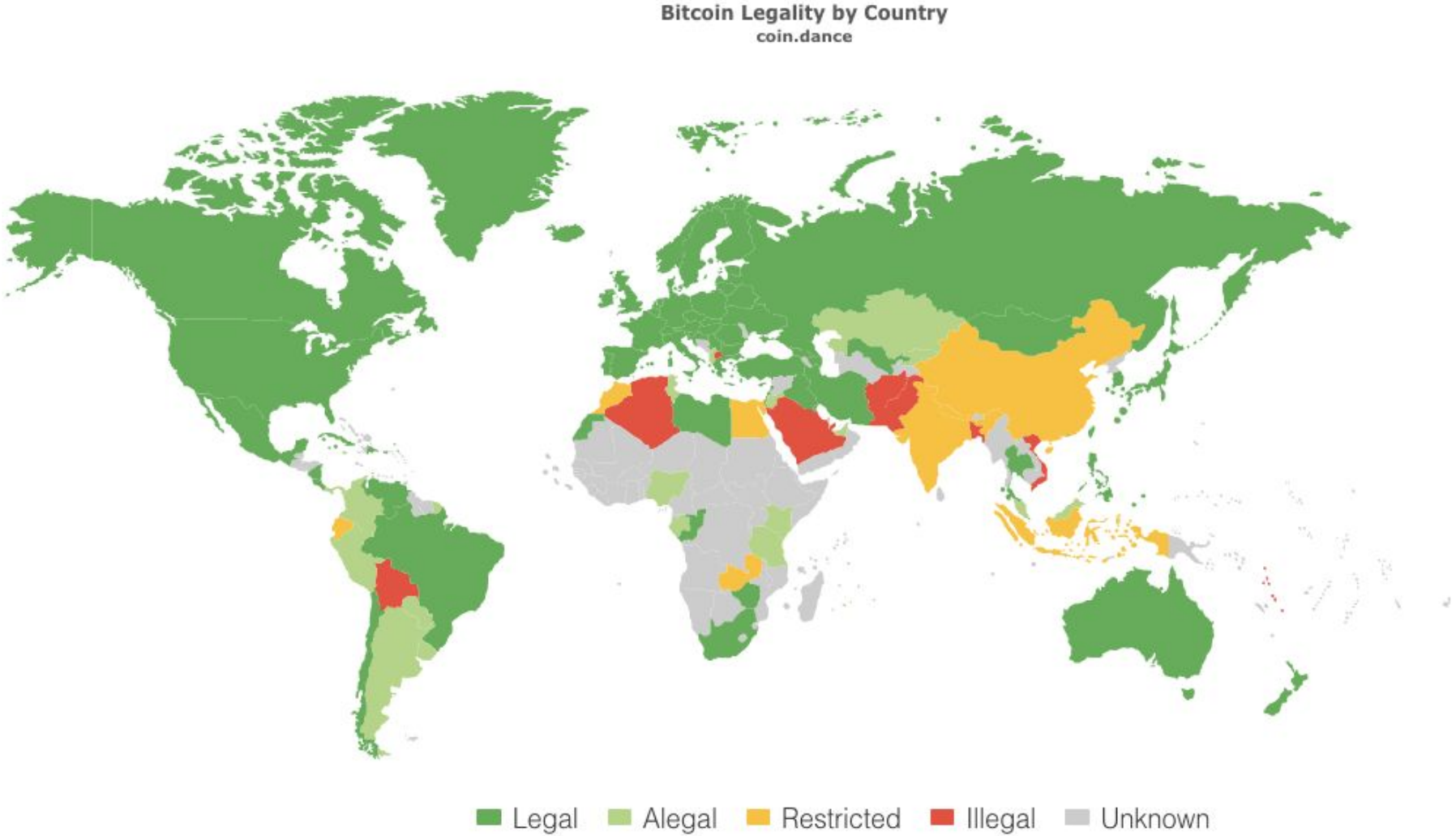
2018-11-17
2018-11-29
Altcoin Market Cap
Bitcoin Market Cap

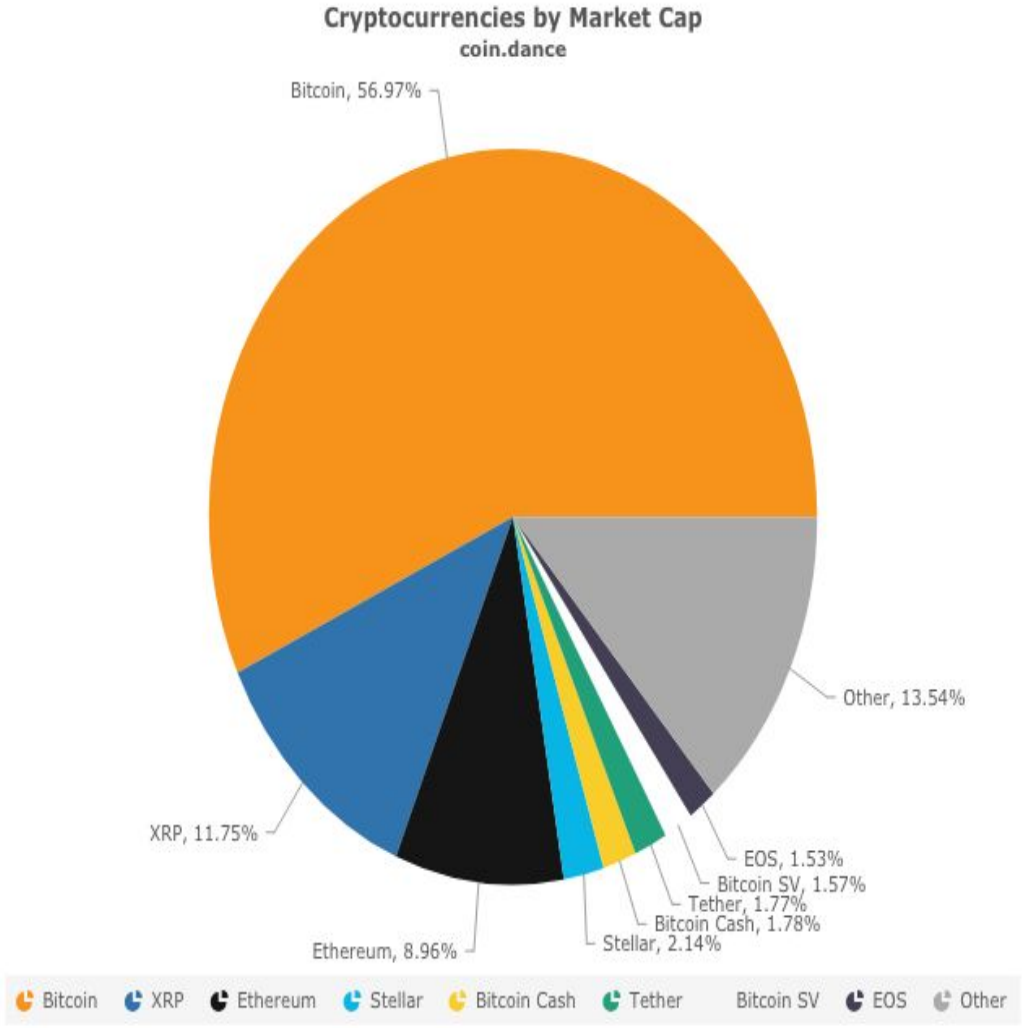

Bitcoin Legality by Country
coin.dance
Legal
Alegal
Restricted
Illegal
Unknown

Literature Review: Countries where Bitcoin is unrestricted

- 110/251 countries Cryptocurrency is unrestricted.

Number of countries	Classified as
52 (UK, Japan etc)	Currency
28 (France, Israel, Hong Kong, etc)	Commodity
7 (USA, Argentina, etc)	Property
23	Unclassified

- Source: coin.dance


Cryptocurrencies by Market Cap
coin.dance
Bitcoin, 56.97%
Other, 13.54%
XRP, 11.75%
EOS, 1.53%
Bitcoin SV, 1.57%
Tether, 1.77%
Bitcoin Cash, 1.78%
Stellar, 2.14%
Ethereum, 8.96%
Bitcoin
XRP
Ethereum
Stellar
Bitcoin Cash
Tether
Bitcoin SV
EOS
Other

Statement of the problem

- Blockchain technology is a new technological revolution which was initiated by the rise of the Internet and various Internet protocols

- Blockchain can be compared to the Internet Revolution of 1990s

- By gathering data of permissionless blockchains; parallel with the data of internet revolution can be made and can be proven that bitcoin and blockchain is here to stay

Research Question

- Can blockchain be a decentralised solution to International Integration?
    - International Integration is a broad topic
    - In this study, I will primarily focus on economic integration

Hypothesis

H1: Blockchain is receiving adoption because of Financial Seclusion of over 2.5 billion people from the global market

i. Blockchain is receiving adoption because people and non state actors do not trust Financial Intermediaries (i.e. banks, government etc)
ii. Blockchain is receiving adoption because it provides non state actors opportunities to Challenge and Compete With State actors by forging their own tokens (currency, smart contract etc) of financial values.

H2: Blockchain is receiving adoption because of Technological Evolution

Methodology

- I will test H1 only implementing mixed sets of analysis
- It is difficult to define Technological evolution so I will ignore H2
- Chapter 1: Historical Background and Literature Review
- Chapter 2: Quantitative Analysis
  - Quantitative Analysis of H1:
  - Source of data:
    - Newspapers and articles (cointelegraph, coindesk, ccn)
    - Statistical data
      - Coin.dance, Bitcoinity & Governmental Bureau
      - Blockchain data (case study)
        - Bitcoin blockchain and BIP (Bitcoin Improvement Proposals)
        - Ethereum blockchain (Smart Contract Platform), EIP and ERC (Request for Comments)

Methodology

- According to WTO:
    - “Blockchains can be public, private or managed by a consortium of companies, and they can be accessible by everyone (permissionless) or restricted (permissioned)”

- I would mainly utilise the open permissionless blockchains (2008-2018) as source of my data

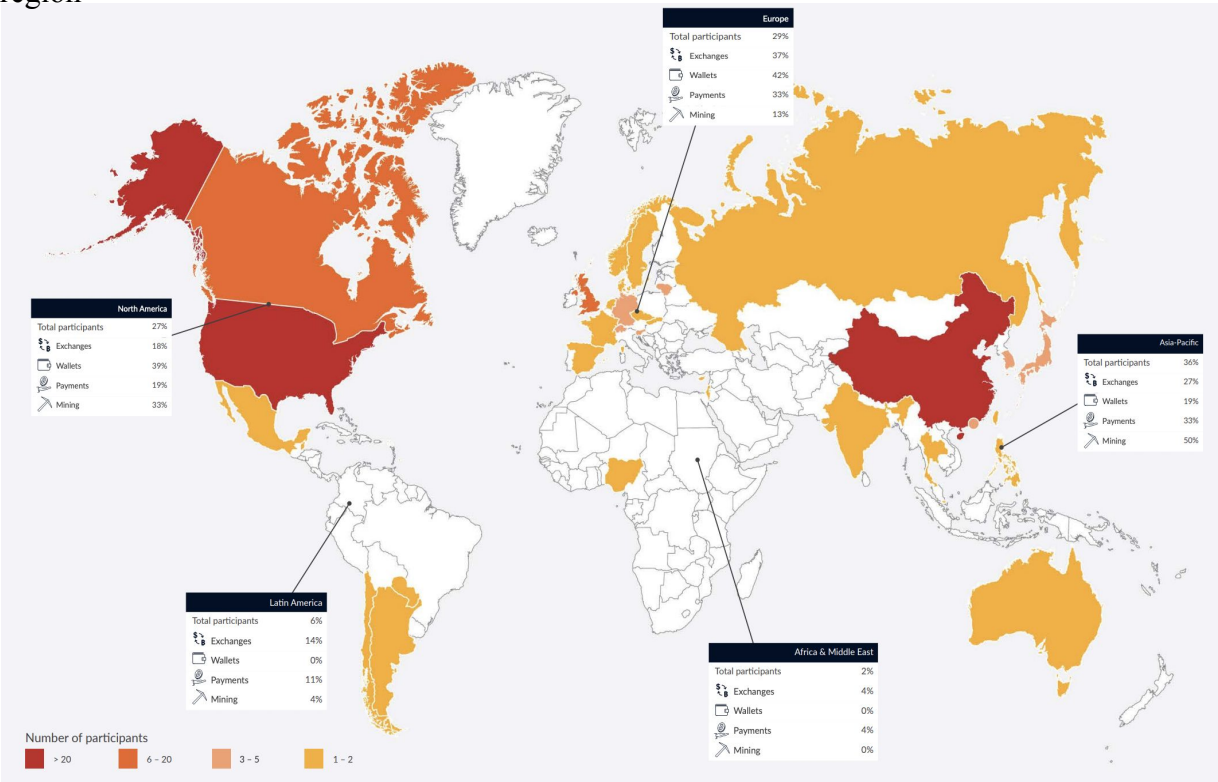
- I will also investigate the growth of Ethereum Blockchain (2015-2018) to evaluate Smart Contracts, DApps why it can be used more efficiently among governments

Cryptocurrency Benchmark Studies 2017 by University of Cambridge

Surveyed 38 countries in 5 different region

By Country	Participants
U.S.A	32%
China	27%
UK	16%
Canada	7%

By Region	Participants
Asia-pacific	36%
Europe	29%
North-America	27%
Latin America	6%
Middle East and Africa	2%



Bitcoin statistics

Figure: Largest Bitcoin Exchange by daily volume (12th December 2018) (Source: Bitcoinity.org)

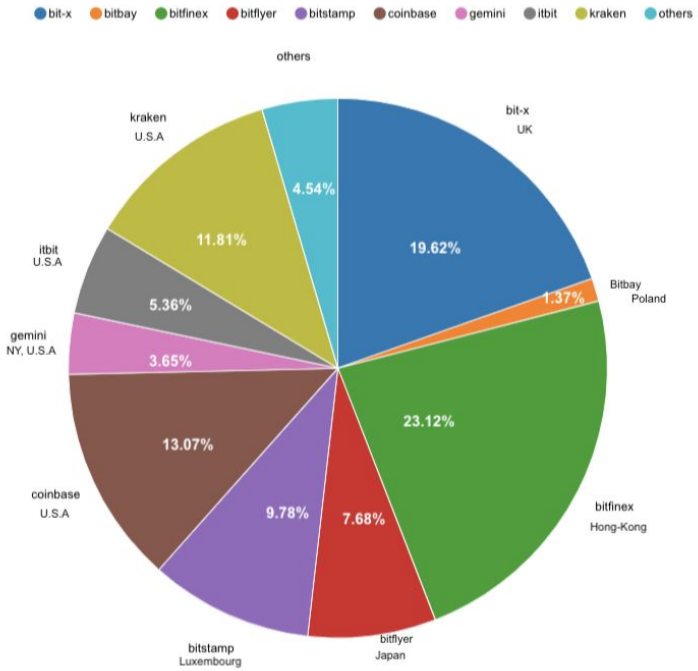
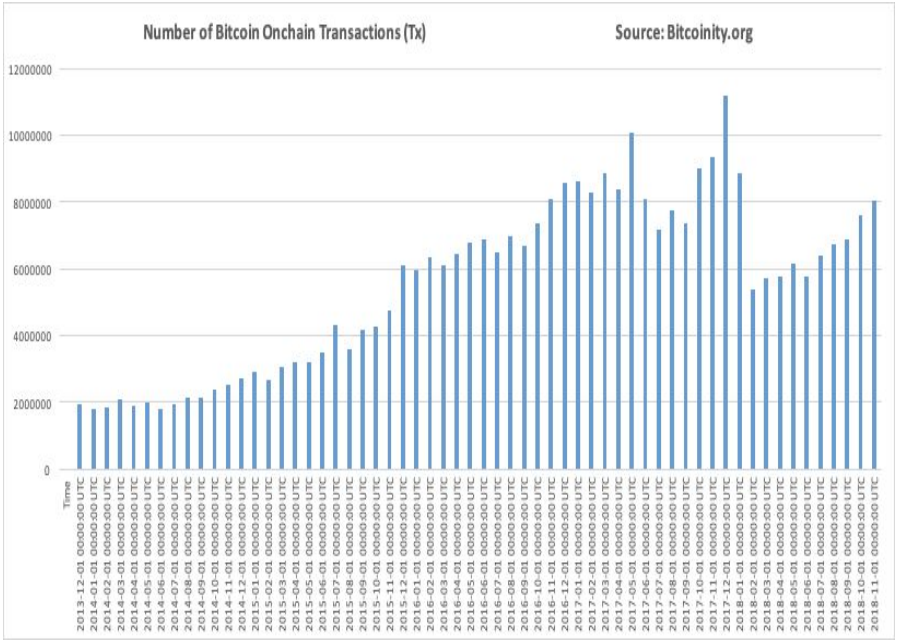
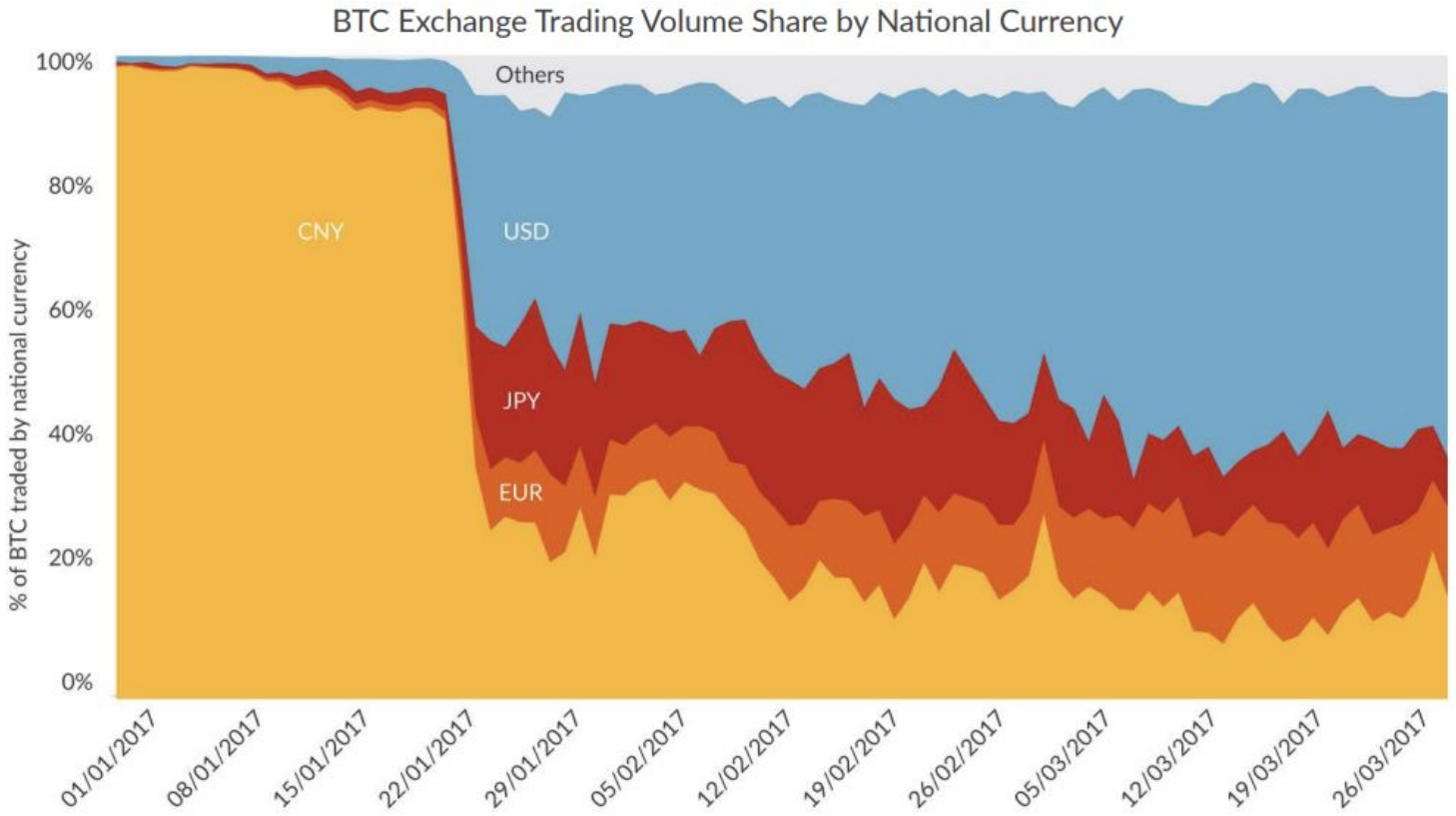


Figure: Number of Bitcoin Transactions Per Month (2013 to November 2018)



Bitcoin statistics



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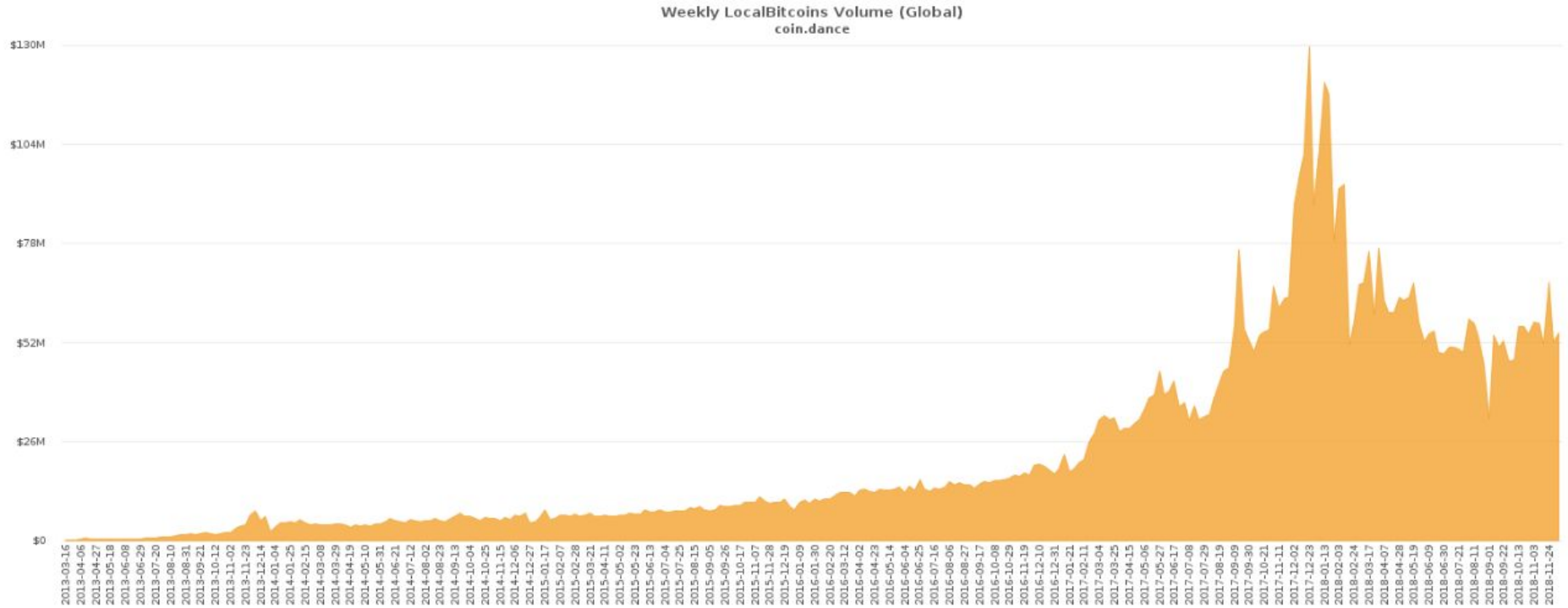
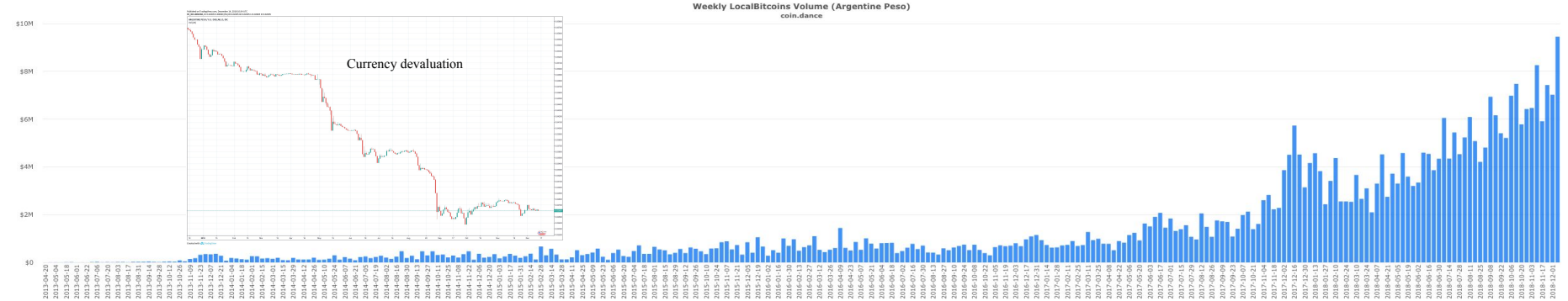
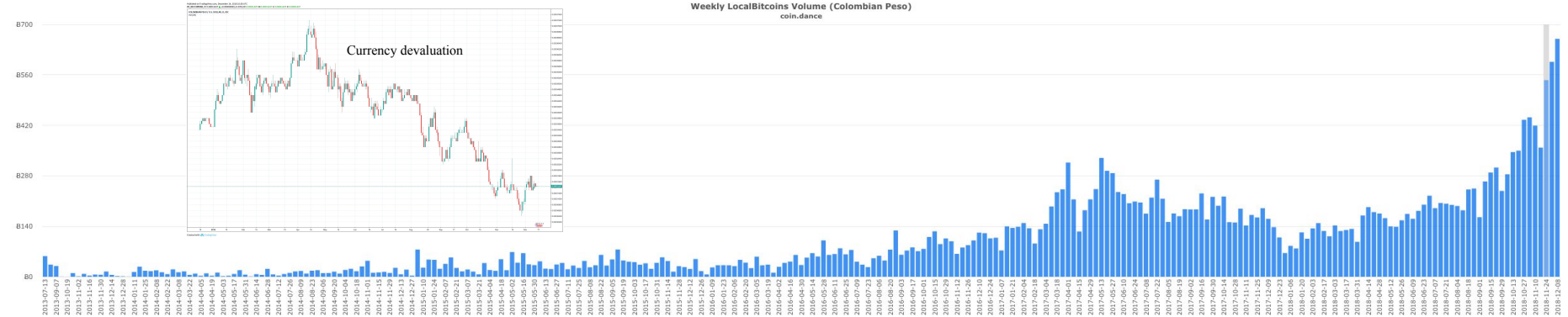


Bitcoin statistics





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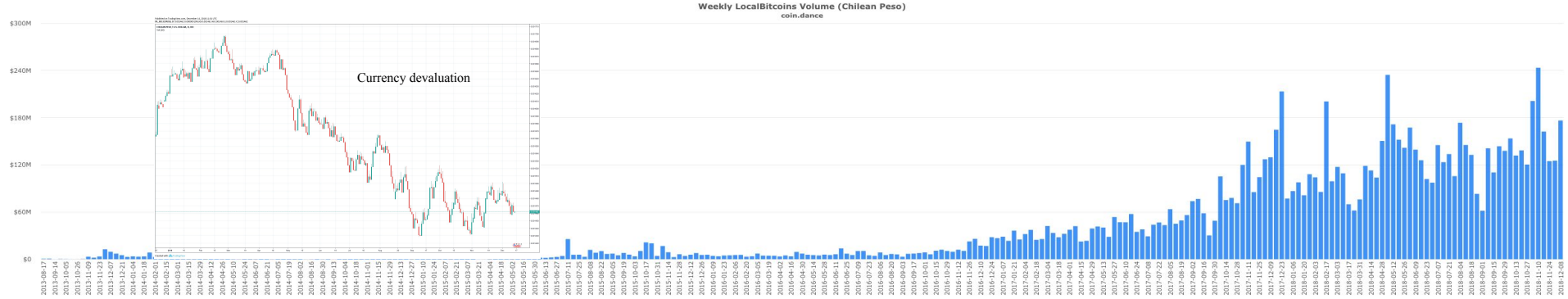
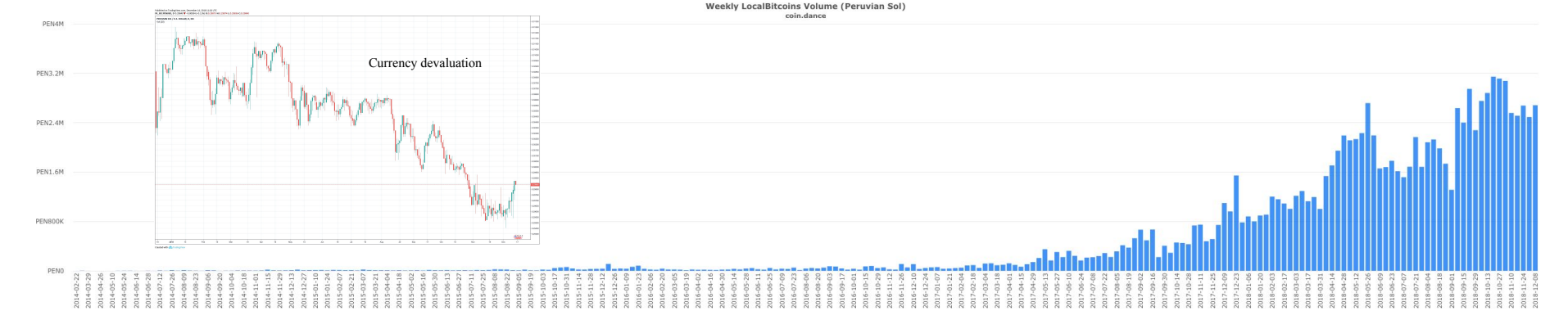
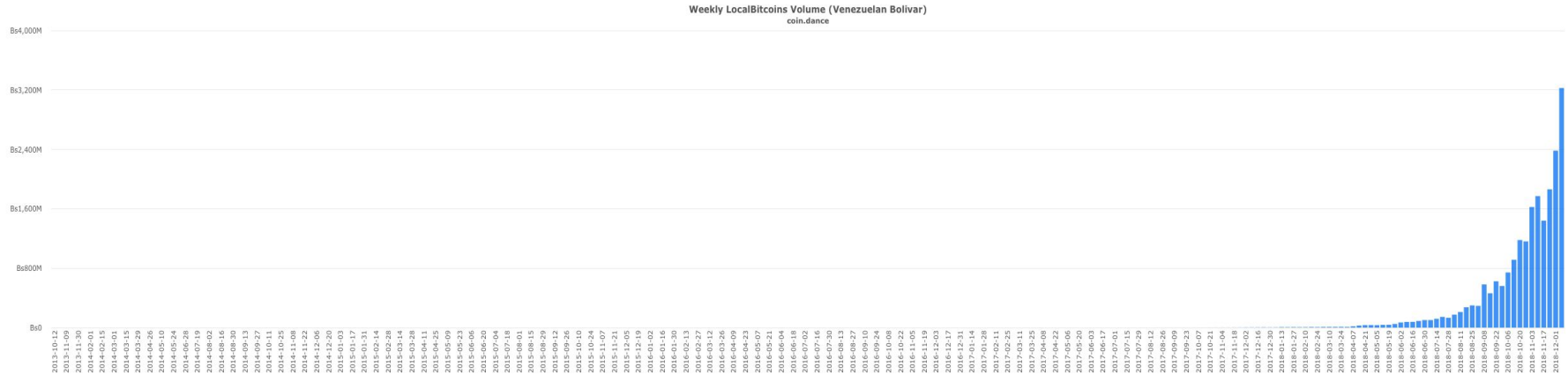
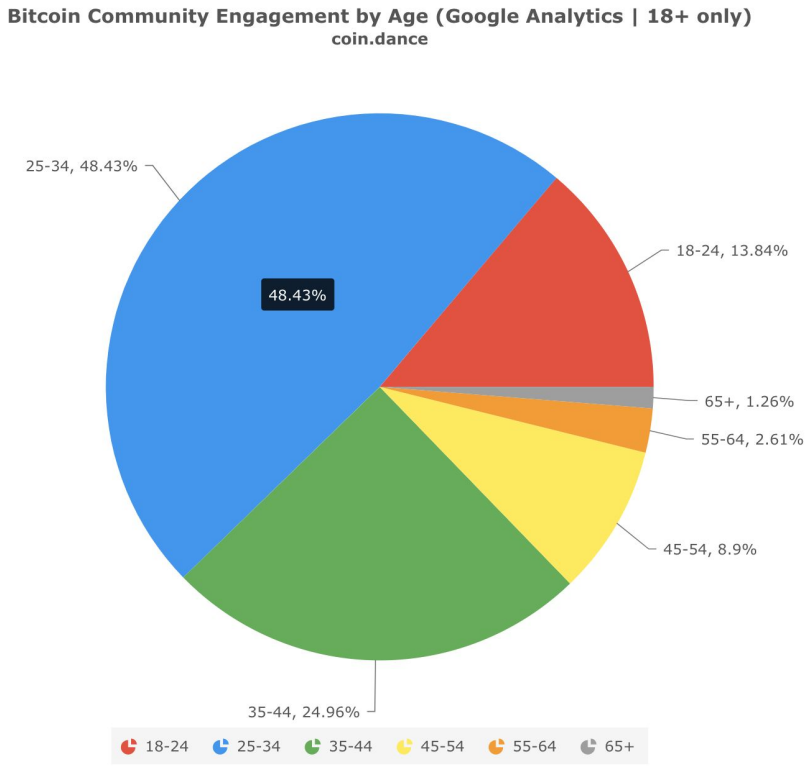


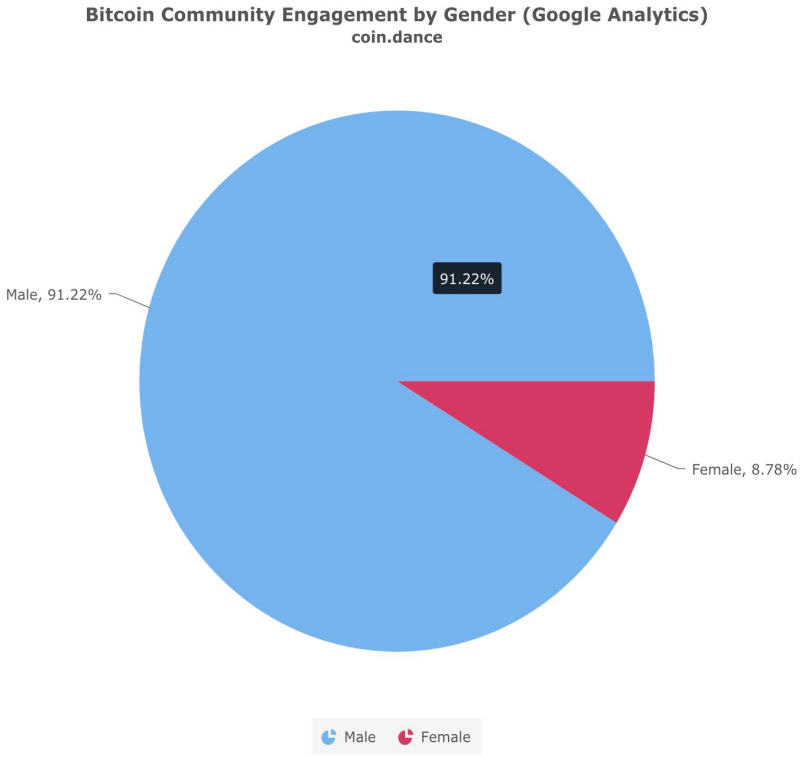


Bitcoin statistics



Bitcoin statistics





Methodology

- Chapter 3: Technical Jargons of Cryptocurrency and Blockchain Simplified

- Chapter 4:
  - Qualitative Analysis:
    - Interviews and surveys that will be performed:
      - CEO of Bitcoin.com, Bitflyer, and other Tokyo based blockchain facilitators
      - Blockchain startups like hardware wallets, software wallets providers

Limitations of Study

- This particular field of technology is evolving rapidly, thus it is difficult to track the data

- New forks of Bitcoin (BTC) is regarded as Alt (alternative currency) such as BCH
  - Bitcoin Cash (BCH) stats will be regarded separately as an Alt. not as Bitcoin

- ICOs and Airdrops statistics will be not be included

Limitations of Study

- According to World Trade Organisation (WTO), blockchain is being used by not only cryptocurrencies but also can be used by governments

- However, the research will mainly focus on the:
  - Economics of blockchain

- Political aspects is beyond the scope of this research due to limited frame of time.

Expected Results

- I would determine the results to be true positive:
- If,
  - The data correlates with financial seclusion, lack of access to banking and currency instability
    - Developing countries are using crypto. because of currency instability
    - Developed countries are using crypto. as speculation, and automation of financial governance and innovation
- Else,
  - For a type 1 error, I can decide that:
    - People trust intermediaries thus private blockchains (e.g. XRP) are receiving adoption
  - For a type 2 error, I can decide that:
    - People do not trust intermediaries thus public blockchains are receiving adoption

Schedule until final submission

Timestamp	**Agenda**
January-February	Statistical Analysis of Bitcoin Blockchain and Ethereum Blockchain
March	Surveys and Interviews of some of the Blockchain Thought Leaders
April	Qualitative Data Analysis
May	Report Progress to Professor Kim and receive advice from Professors
June	Conclusion and submit the final thesis

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Q&A

- Thank you for spending your valuable time.

Appendix 1: Use cases of Blockchain

Use case scenarios: Literally any third party based industry where multiple parties are involved

Finance
* Real Estate
* Financial Services (Bank)
* Decentralised Internet (Golem, Substratum)

Retail banking
* Cross border remittances (Bitcoin, Ripple, Litecoin, etc)
* Mortgage verification, Mortgage contracts (smart contract) (Ethereum, EOS, Cardano, NEO, Lisk, Stratis, etc)

Public record
* Vehicle registration, certificates ie. marriage, birth, degree, business license and ownership records etc
* “EU offers €5 Million ‘Blockchains for Social Good’ Contest

Appendix 2: Abbreviations

- Airdrops - Crypto. bounty (A way of distributing crypto assets among the network)
- Alts - Alternative currency that emerged after BTC
- BTC - Bitcoin, peer to peer electronic cash payment network (2008)
- BCH - Bitcoin Cash (The most popular *Hard Fork* of BTC)
- Chain split - When there is political dispute in a particular blockchain network, a different child chain can emerge if consensus is not met. This event is known as *Hard Fork*, but if there is full consensus for a hard fork then no chain split will occur.
- DApps - Decentralised Applications
- DAO - Decentralised Autonomous Organisation
- DLT - Distributed Ledger Technology (i.e. Blockchain, Tangle, Hashgraph etc)
- ETH - Ethereum, a blockchain that facilitates smart contract, DApps, ICO
- ICO - Initial Coin Offering, is a way of raising money for projects in the Smart Contract platforms like Ethereum
- LN - Lightning Network, is a offchain solution to Bitcoin’s and Litecoin’s scalability problem
- Smart Contracts - Programmable contract which is executed in the Blockchain
- Token - Blockchain native currencies are referred as Tokens depending on their use cases
- XRP - Ripple a centralised blockchain, is used by many renowned banks worldwide

Appendix 3: Blockchain

- Blockchain is an emerging technology [1] that revolutionises how everyone trades and interacts with each other.
- It provides unique properties of allowing mutually mistrusting entities to exchange economic values without depending on trusted third party by utilising law of mathematics and cryptographic game theory [2].
- Blockchain is a form of immutable borderless, censorship resistant ledger with continuous updating record of transactions, smart contracts, code, laws etc. mainly used by cryptocurrencies. (World Trade Organisation)
- Some of the most famous open blockchains that are well knowns are Bitcoin(2009), Ethereum, Litecoin etc.
- Blockchain is also known widely as the web 3.0

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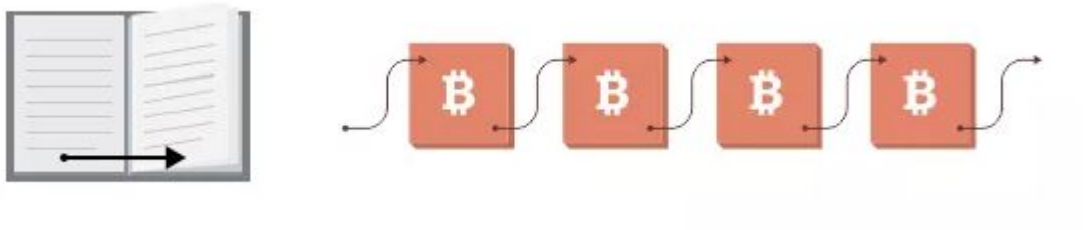
1. According to world economic forum, the blockchain, Internet of things and artificial intelligence are one of the few new disruptive emerging technologies. "*Meyerson, B. and DiChristina, M. (2016). Top 10 Emerging Technologies of 2016. [online] Available at: http://www3.weforum.org/docs/GAC16_Top10_Emerging_Technologies_2016_report.pdf [Accessed 28 Nov. 2018]"*
2. See Appendix of *"Hileman, Dr. G. and Rauchs, M. (2017). GLOBAL CRYPTOCURRENCY BENCHMARKING STUDY 2017. [online] Cambridge Centre for Alternative Finance, University of Cambridge. Available at: https://bit.ly/2o3zHcW [Accessed 28 Nov. 2018]"*

Appendix 3: Blockchain

- In simplest analogy Blockchain is like a book, its pages are the blocks and each pages are chained together to form a chain of pages thus the name blockchain.



Source: antonylewis2015, V. (2015). *A Gentle Introduction to Blockchain Technology – Bits on Blocks*. [online] Bits on Blocks. Available at: https://bitsonblocks.net/2015/09/09/gentle-introduction-blockchain-technology/ [Accessed 1 Dec. 2018].

Written Comments after the presentation

Dr. H. Yamamoto

1. Research questions should have been stated at the beginning.
2. Define DV (Reg. organisation / Integration), Functionalism (Critique of Functionalism > study it)
3. Research Question is not falsifiable according to some but it can be reframed from different angle.
4. Many hypothesis according to some
5. No measure of Integration, (Integration is not equal to transition). Topic is interesting but not clearly framed, no good structure.

Dr. J. Schawk

1. How do you define “paradigm”? Literature
2. If you identify a solution in blockchain, it implies that there is a problem. What is the problem with international integration?

Dr. Barbara Greene

1. With the declining value of bitcoin after its recent bubble, how does it fit a specific need that could not be filled by traditional currencies that would allow it to be more than a specific trend?
2. This ties blockchain to bitcoin, but couldn't this have a number of different applications? For example, during the period after the 2008 financial crisis there was an issue with mortgages that had been sold and resold. With incomplete records-resulting in the ownership of the debt being obscured (or completely unknown). Wouldn't blockchain technology solve this sort of financial oversight? Or is blockchain primarily applicable to digital currencies like blockchain?

Written Comments after the presentation

Dr. Chris. Lemmont

1. Very informative presentation but you need to better frame your research question, what is your puzzle? Does literature on regulation help shed light on your question?

Dr. Nathan Munier

1. I am somewhat unclear on what your research question (puzzle) is? I know in Zimbabwe, a country that lacks a viable currency, bitcoin is used now. Maybe looking at one or two specific cases where blockchain is used might be easier.

Dr. Samuel Amponsah

1. Interesting topic: State your variables clearly?? What will be your dependent variable?
2. Data: Create Quarterly or yearly volume sales or transactions and graph them

Written Comments after the presentation

Kim. Ueda Soares

1. Have a non-hypothesis, and being falsifiable
2. Improve definition of integration
3. Literature review about nation state bitcoin adoption

Nguyuen Vu Viet (Peter)

1. You need to have a causal question, and I think you need a narrow scope for your thesis
2. For example: you could look at how blockchain would affect countries sovereignty