

Can Bitcoin be the Future of Digital Payments?

Andrea Valente¹, David Atkinson² (1. Pearson College London, UK; 2. University of Keele, UK)

Abstract: This study aimed to investigate the conditions in which Bitcoin has developed as a leading cryptocurrency and, according to Nakamoto (2008), could become an instrument for everyday payments around the world. In comparison to other digital payment solutions, Bitcoin is based on a peer-to-peer electronic cash system using "the blockchain". This innovative technology allows for decentralised storage and movement of currency in a fully anonymous way, introducing advantageous methods for encrypted security and faster transactions (Hagiu & Beach, 2014).

Scepticism regards Bitcoin's foundation, energy consumption and price volatility, however, did not take long to arise (Holthaus, 2017). Ten years from its white paper release, Bitcoin is further supported by the same drivers which could sustain its growth as the future of digital payments (Russo, 2018). In order to investigate the key drivers and feasibility of acceptance, a London based survey was used to understand the desirability of Bitcoin as a day-to-day tool for digital payments. Additionally, this research analysed Bitcoin's stakeholders and forecast drivers of sustainability for its application to become the future of the payment industry. A space which relies on policies that involve multiple layers of society, governments, regulators and tech-firms, all on a global scale.

The findings confirmed how the increasing lack of trust of political and financial institutions, coupled with the increasing cases of data-breaches by tech-firms, encouraged over 70% of respondents to consider more decentralised and anonymous methods for their day-to-day actions; like payments. Policy makers need to cope with societies increasingly separating politically but gathering together digitally (LBS, 2017). For Bitcoin to truly establish itself as a global digital payment solution, key stakeholder acceptance must converge alongside the introduction of more robust regulation.

Key words: bitcoin; digital payments JEL codes: M

1. Introduction

The term Bitcoin was coined for the first time on October 31, 2008. Satoshi Nakamoto, a figure which identity is still somewhat a mystery, released an introduction document ("White Paper") showcasing the feasibility of a Peer-to-Peer electronic cash system. By being the pioneer of the cryptocurrency era, Bitcoin initiation was characterised by a turbulent five years' period in which transactions and integrations lacked to evolve (it took exactly 1789 days for bitcoin to reach \$1,000 in value from its first trade). The three years following the thousands dollar price milestone were characterised by extensive yet "damaging" media coverage that led to price

David Atkinson, Dr., Fellow in Strategic and Digital Marketing Management, University of Keele; research areass/interests: dynamic capabilities, resource based view and strategic drift. Email: d.g.atkinson@keele.ac.uk.

fluctuation and questions around the trustworthiness of Bitcoin.

2. Bitcoin: Growth Drivers

2.1 Avoidance of Central Authorities due to Increasing Lack of Trust

After 2008 financial crises the overall financial system built of central and corporate banks was questioned. Furthermore, trust on politicians since these events has dramatically decrease, as often alleged of corruption by various corporates looking at greedy profits. As the great stock market depression in 1929, the first financial crises of the internet era was paid at the expanse of the general public [taxpayers], \$700 billion in the US alone (Kimberly, 2017).

The Dodd-Frank, Consumer Protection Act and humongous sanctions to Wall Street banks were some of the actions taken by Barack Obama in 2010 as a result. In Europe, the first solid legislative action would be a revisited version of the already existing MiFID (in fact called MiFID 2) that has come into force on January the 3rd, 2018. Governments have taken massive actions to limit and control the day-to-day activities of financial institutes however each bank (by being a business for its nature) would always seek the best for their customers' profit (and their own). The general opinion gathered from a sample of 28 individuals surveyed in November 2017. showed how banks lack in earned trust from its consumers (rating them as 60% on trustworthiness) as the dilemma if these events could happen again is not yet resolved.

There is no question about the strategic period in which Bitcoin white paper was released (45 days after Lehman Brothers filed for corruption on September 15, 2008). Many consumers and neo-unemployed finance professionals saw Bitcoin as the innovative turning point for the future of finance. By being unbounded to third parties, the digital currency provided oxygen for ingenious thoughts in the polluted Wall Street environment of that time [and some still argue if conditions nowadays really have changed]. This driver provides to Bitcoin and its crypto currencies peers a solid foundation of general consensus within different society-layers.

2.2 Technology of the Third Millennium: The Blockchain

From its disrupted nature, Bitcoin was hatched as a defiance action. The technology that made it possible is the Blockchain (or originally the "Block Chain") represent a universally accessible digital ledger. This third millennium technology brings to the simple task of tracking records within an active system (in which each record is called "block" and can be only added to the end) the link to one of each block using cryptography. In order for each block to be added onto the chain three requisites must be present:

Link to the previous block — to confirm the proof of work;

A timestamp — to avoid double spending;

Transaction data (amount of data transferred, e.g., 7 Bitcoins).

It is fundamental that all miners have access to the same updated version of the Bitcoin blockchain all the transactions are irreversible. Bitcoin miners are the key subjects in the network, investing heavily in energy, hardware, time etc. and by completing all transactions certifications practicing "good conduct" — miner is the individual who verifies transactions and add a record into the to the public ledger (Kelleher, 2018).

It can be however possible that a small group of miners bypass the blockchain trusted system and validate each other transactions going around double spending (the bigger the amount of miners in arrangement the small the probability other miners notice it, hence smaller the probability events like this happen). Bitcoin unofficial catchphrase "In Cryptography we trust" (Peck, 2017) provides a brief explanation of the importance of this

technology for the development of trust in the increasing "boom" of cryptocurrencies.

Background agreements and transactions approvals are now replaced by high-level software, secure and distributed throughout every digital user of the internet. The Blockchain has limitless monetary developments for bitcoin, and the Ethereum Virtual Machine is now leveraging its potential for building software on top of it. From identity verifications to administrative burdens, from transaction speed optimisation to voting mechanism, the Ethereum Blockchain platform could replace sections of the world's most popular apps (Uber, Netflix, Google Drive, AIG etc.) and revolutionise the way we think about technology (Russo, 2017).

2.3 Community, Accessibility and Transparency: A New Privacy Model

Satoshi Nakamoto created a system where each individual can act as a miner but required to provide costly proofs in order to be repaid for their work. This peer-to-peer system has also resolved a problem that has vexed the digital environment for years: consensus (Peck, 2017).

The openness of the bitcoin blockchain network has attracted an ever-growing number of alike individuals that have a mutual interest: the establishment of the ever-growing decentralised monetary system. Not identical but similar, is the shared digital encyclopaedia example, Wikipedia.com: articles, like blocks, could be created by every user, however is the community overlooking the system and preventing mistakes (like the process of verification of transaction) the additional intrinsic value of the system. Activities, values and sustainability of the two digital platform are analysed.

People have supported a different approach to privacy omitting the "trusted" third-party and supporting cryptography and anonymity where possible. With the current bitcoin technology, all the transactions (with respective amounts) taking place are publicly displayed on the blockchain yet senders and receivers are kept anonymous by crypted code-names. The biggest threat of this modern privacy system is the chronological history: if the actual corporate or individuals connected with the anonymous account would be released, all its activity history would be displayed. As many of other data driven technology advancements, potential leaks could provoke higher level of exposure compared to the older system, since its nature being fully cloud-based.

2.4 Digital and Physical Trends: No Barriers vs. Political Independence

In 2017 we trusted hairdressers more than our political or business leaders, leaderships surveys of London Business School support (LBS, 2017).

With the primary data gathered from a digital survey to 28 individuals based in London, some interesting patterns and correlations have been identified. A slightly negative correlation was found (-0.2 coefficient) between the likelihood of using bitcoin in the next 10 years and the level of trust in their bank to manage their money, similar result with the level of trust in central banks to prosper national economy (-0.18 coefficient). This indicates that the young community surveyed (mostly student, 90% under 25) is more likely to start using bitcoin if they feel a lack of trust on both their personal and England's central bank. Additionally, the 82% of the individuals that confirmed their full understanding on the Bitcoin environment did declare they have already completed their first investment in Bitcoin (in fact complexity has been ranked in the last question of the survey as the 1st barrier to entry for the general public).

While the UK political panorama has been characterised by an increasing independence sentiment due to Brexit events, the amount of people interviewed confirmed how the financial system should be more transparent and connected in the future (71% voted 5 or above on the likelihood they will use Bitcoin in the next 10 years, in a scale of 10). It is curious to see that, even though 71% of the 28 individuals surveyed are not happy with the results of the referendum, societies are increasingly separating politically but gathering together digitally. 24 out

of 28 people surveyed confirmed that "Immigration" was the first reason why the UK citizens were supporting Brexit in June 2016; confirming that we are in a transitional decade in which digital communities and financial advancements are making us feel more connected than human to human dialogue and diversity welcomeness.

3. Analysis of Digital Payment Industry and Bitcoin Desirability

The origin of the digital payments industry is associated with the born of the internet in 1969 with ARPANET. While the internet took several years to develop from a military based tool to a cross-society asset, the Stanford Federal Credit Union had the aim to digitalise cash in form of e-money, token or virtual currency (Tsosie, 2017). In 1998 PayPal, current market player, began as a mobile payment firm, however it then switched to a fully oriented digitised payment platform with the EBay acquisition in 2002 (Scott-Briggs, 2016).

However, vast of the digital payments industry development has been possible thanks to credit and debit cards. Starting from 1958, various companies in the US started to launch different chip-related plastic cards however Bank of America took the lead as the most innovative. "BankAmericard" became popular mostly because of its large baskets merchants accepting the newly introduced system, especially in California. For the first two decades most of the regulations around credit cards interest for example remained murky and largely unknown; to the cost of the consumers.

BankAmericard then became Visa and its life-competitor, MasterCharge, evolved to MasterCard. These two providers are now processing over 90% of transactions (Appendix 6) and while acceptance was largely growing in the first two decades, the following regulation period in the US (ended with the approval of the Card Act of 2009) structured the environment for the genuine and spontaneous growth of a technology fulfilling the demand and behavioural changes of evolving human beings.

Today, Bitcoin infancy can be compard to the early 1960s in which credit cards and digital payments were ideological concepts with good purpose but wide uncertainty. The digital payments industry is characterized by large market players and high competitive rivalry. The attractiveness of the industry is also high, and few firms have developed between the current existing network and the new crypto environment.

TenX for example is a direct competitor of the current digital payments suppliers and enables its users to openly connect their Bitcoin/Ethereum/Litecoin wallet and spend these cryptocurrencies via a normal debit cards (TenX branded). At the moment of payment in any worldwide merchant the card fetch the FIAT currency requested amount and converts it to the previously selected crypto in usage at current market rate (e.g., £50 payment would deduct "0.004194" bitcoin - at a bitcoin market value of £11,917).

The desirability of bitcoin in such industry however is highly questionable. The reason why is the lack of fundamental basis for Bitcoin valuation and other cryptocurrencies; in fact the price of Bitcoin has increased by nearly 1,000% in 2017 alone (coinmarketcap.com, 2018).

Morgan Stanley analyst James Faucette has recently released a report to various MS clients stating that the actual value of Bitcoin could be \$0 (Edwards, 2017).

To provide a desirability example, some data gathered from a survey on renewables energy outlook gathered in 2016 has been compared to the the Bitcoin data gathered in the survey. Individuals in both cases were asked about their expectations, on a scale from 1 to 10, whatever they would use Renewables/Bitcoin in 10 years' time. Renewables are expected to be part of daily lives on a 7.2 average, compared to 6.1 for Bitcoin. On both cases the two technologies are developing at the damage of old-established environments (fossil fuel energy for renewables

and the banks based financial system for bitcoin). The two realities are often covered by the media and they do nurture an interest in the public. However, the desirability on both cases does depend on how the technology develops in the future and the only variable to which desirability is vastly linked is one: time.

Additionally, Bitcoin and various other cryptocurrencies do not have a matured, regulated and tested underlying market. The products and their markets have existed for fewer than 10 years and bear little if any relationship to any economic circumstances or reality in the real world (Peterffy, 2017).

The second issue as of January 2018 is a socio-conceptualisation controversy. It is still unclear whether Bitcoin today is seen as a digital currency for payments or as a traditional "asset" to invest in for merely speculative reasons. Credit Suisse's current CEO Tidjane Thiam declared in November 2017 that "investors are only buying into the digital asset to make money, and described it as the very definition of speculation and the very definition of a bubble" (Brown, 2017).

Surely the blockchain technology and its application into decentralised cryptocurrencies, such as the Bitcoin, is a clear advancement compared to the old basket of FIAT currencies that are now mostly underling to "thin air" and are fully controlled by countries central banks. While digital acceptance of Bitcoin as a way of payment lacks to take off it is clear that it would take some time for cryptocurrencies to settle in this high competitive industry; as ARPANET took decades to become part of our daily lives bitcoin could be subject to the similar technological and social acceptance time digestion.

The Porter Generic Strategy matrix has been used below to highlight the current positioning of the major players operating in the digital payments industry [and crypto forecasted]:



Figure 1 Porter Five Forces for Digital Payments (Brown, 2017)

4. Bitcoin: Stakeholder Analysis and Stability Evolution

There is a large amount of individuals and organizations that are increasingly identified as Bitcoin stakeholders. Using a power/interest grid we can obtain a matrix of the current stakeholders positioning. 21 stakeholders have been identified to be related to the Bitcoin environment:



Figure 2 Bitcoin Stakeholder Power/Interest Grid (LBS, 2018)

The list of Bitcoin stakeholders is expected to evolve in pair with the development of the same cryptocurrency and its applications. The progress of the positioning of the stakeholders listed above is mainly affected by the events and activity expansions of six of them in particular. A power/interest grid with the future trends outlook in regards to their positioning can be found below.

4.1 Miners

Identified as individuals, groups or companies who provide computer power to mine and record the transactions. Miners are probably, after regulators, the most critical individuals within the Bitcoin stakeholder environment.

4.2 Big Tech Firms

Firms like IBM, Microsoft, Amazon, Google etc. are developing new technologies to leverage the blockchain into food distribution or driverless cars for example (Russo & Katz-Bloomberg, 2017).

4.3 Central Banks

As previously mentioned in Appendix 1, European Central Bank president Mario Draghi has already stated how the ECB is studying on thorough regulations providing for the conditions of a healthy development of the new financial systems.

4.4 Customers/Investors

Consumers are the key driver of development of Bitcoin to become a global digital payment solution. Investors logically suppose to understand and believe in the principle of Bitcoin being a concrete substitute of current online payments systems, however most of them did enter the environment for speculative reasons (as mentioned in Question 2).

4.5 Traders/Investment Banks

Traders are largely affecting the Bitcoin environment by increasing the number of exchange and financial products related with the crypto currency. ETF (Exchange Traded Funds) or Futures, for example, are expected to be traded with more frequencies and in large volumes in 2018 (Bloomberg, 2017).

4.6 Regulators/Governments

The cryptocurrency community is eager for clarity from regulators on ICO, trading, mining and taxes; as that happens more investors and end-users could dip their toes in the water (Russo & Katz-Bloomberg, 2017). Regulators are highly influential and do carry extensive amount of power from government and governments' treasuries.



Figure 3 Key Bitcoin Stakeholder Power/Interest (LBS, 2018)

As shown in the power/influence matrix above all the stakeholders key players are in a position of instability and are expected to be increasing or decreasing both in influence and power on a monthly basis; and while the volatility and uncertainty of Bitcoin application to the digital payment systems remains at current level this is very likely to continue (LBS, 2018).

5. Evolution of Bitcoin as the Future of the Digital Payment Industry

Bitcoin has clearly large potential to disrupt a big part of the digital payments industry, and in developing countries there is a very high potential, too! Various internal and external factors limiting the currency have however become clear with its development. The list below evaluates the current factors that need to evolve in order for bitcoin to become [or not] the future of digital payments on a global basis:

- **Regulations** from July 2017, the SEC regulator (US Security and Exchange commission) confirmed that US National Security Law may apply to some cryptocurrencies; without providing concrete guidelines on which cryptocurrencies in particular (Russo & Katz-Bloomberg, 2017). The current lack of national and international regulations of Bitcoin [and the crypto environment in general] represents one of the main reason why price volatility is very high and network integration is very low. A global digital payment system like PayPal would have never grown to the volumes and trustworthiness it has today with this much uncertainty.
- Market Maturity (Fear of "Bubble") bubble is a confusing term for bitcoin: If there is no fundamental value to compare the price to, who's to say it's too high? (Crane & Read, 2017). Market maturity extends to the amount and variety of services that we are seeing developed as well as the overall Bitcoin adoption. Additionally, the whole press sentiment around the globe would generally affect unsophisticated individuals' adoption hence effect the pace of which Bitcoin could develop to a global payment instrument. As shown from the graph below, the phenomenon of adoption for Bitcoin is cyclical, and would largely depend on adoption of sophisticated individual, since this group is likely going to be the majority at the time of acceptance:



Figure 4 Digital Payment Industry Development Cycle

- **Speculative Investment trends** for Bitcoin to develop into a mature market and a trustworthy digital payment system the price needs to somehow stabilise within a certain "expected" range, therefore volatility needs to reduce to "average" levels.
- Technology and Infrastructure transactions per seconds, on the technology side, are a big issue to resolve for the blockchain and its network. PayPal and Visa process an average of transactions that ranges between 200 and 1,600 per seconds (Vermeulen, 2017). Bitcoin alone can process a number of transactions that ranges between 3 and 7; reason why other cryptocurrencies have developed in this space trying to improve this inefficiency of Bitcoin (e.g., Ethereum with over 30 transactions per second, or Litecoin processing over 50-60 transactions per seconds). Up to this number, Bitcoin can only compete in digital payments niches where anonymousness is a critical requirement.
- Wallet/Transactions fees another limitation for Bitcoin: for both wallet withdraws/deposit, and for transactions. Bitcoin transactions fees in particular are skyrocketing proved to be profitable for so-called bitcoin "miners". Slow transaction speeds and fees has led to a number of splits in the original blockchain as part of the community believe that the size of blocks records of transactions on the network should be increased (SegWit2x correction in the blockchain was supposed to increase the dimension of the blocks from 1 to 2MB however this solution has then been dropped) (Browne, 2017).
- Acceptance of a "Market Leader" 97% of people interview in 2017 living in the UK have confirmed that they did not use Bitcoin before. Even though the majority of people have heard of it, a rarity section of the society has clearly found ways to leverage Bitcoin in their daily life. People believe the biggest limitation of the Bitcoin is the fact that there are no locations to spend it. Less than 3 of the top 500 ecommerce website in the US currently accepting Bitcoin, suggesting a really discouraging low level of acceptance. However, the ATMs around the world are increasing in number and is really likely this would create traction in the environment.

It is therefore clear how the acceptance/usage and well-constructed regulations are the main key drivers for Bitcoin development into the digital payment space. Concept-extensive and geographical-specific regulations would very likely need to precede the acceptance/usage in order for this last one to grow exponentially.

6. Sustainability and Changes Ahead for the Digital Payment Industry and Bitcoin

The digital payment industry has been agile to adapt to various technological advancements in the last decade. Contactless payments, Apple/Google/Android-pay and the large development of gift cards (thanks to the exponential diffusion of Amazon) are just some of the advancements the digital payments industry has developed to meet evolving social behaviours leveraging technological advancements.

The overall structure of the industry is proven to be solid and increasingly secure, by thousands of transactions completed every seconds by providers like MasterCard and Visa. The advent of the cryptocurrencies is not arguing this structure to be obsolete as a shared decentralised ledger would be more beneficial to security and integrations (mostly for the use of the blockchain).

Our lives are increasingly moving to digital usage, and payment is one (if not the one) behaviour that we are going to do more and more digitally.

The industry outlook for payments behaviours in the UK suggests that contactless payments (with debit card and other devices) are expected to surpass even the amount of times we use cash today. Smartphone and wearable devices are also expected to increase in usage for payments making it crucial for Bitcoin wallet providers to develop platforms for these devices too (1st possible Bitcoin response to changes).

Bitcoin in every of its various environments (technological, financial, media coverage and many more) requires advancement for the development of a concrete sustainable competitive advantage benefitting the long term. Bitcoin however can be used in the future not just as a payment system but also to store data, raise funds in poor countries, protect from inflations etc (Cheng, 2018).

One of the biggest structural limitation for Bitcoin is however the current rate of energy consumption. Mining is certainly the biggest energy-consumption activity however by 2030 all the coins will be issued and just-transaction activities would require less power resources. (If there would only be Bitcoin and no other coins). The reason being is that there will only ever be 21 million Bitcoin: the finite nature of the currency was Satoshi's way of making sure that, unlike the fiat currencies that governments are free to abuse, nobody could ever destroy the value of bitcoin by arbitrarily deciding to create more of it (Lanchester, 2016).

In terms of future sustainability, it is really unlikely that an socio-tech-finance shift like the Bitcoin would happen again anytime soon since it would take a long time for it to settle and gain some space in a already extremely rival industry. What is more likely to happen is that Bitcoin would be surpassed by another coin like LiteCoin, Ripple of Ethereum as not being the first sometimes allows to develop competitive technology in the dark and avoid too much press; as happened in the history of the search engine industry for Google and in the smartphone industry for Facebook.

Any action both in technology and usage would highly depend on regulations activities and social opinion around the bitcoin. In the scenario analysis below we can see how the two main factors affecting bitcoin expansion into the digital payments system provide a wide range of scenario that could happen in the future.



Figure 5 Bitcoin Sustainability Forces Grid (Lanchester, 2016)

After analysis the current drivers of growth, we position the current period (Jan-2018) in the exiting of stage 4 to move on stage 3. As soon as regulators would kick in the Bitcoin game, price is expected to drop and regulations would be probably increasing. Stage 2 is where regulators are normally found to be playing unfairly against the new technological trend and it would take a long time and various price drops to then arrive at stage 1.

From the same ideology, the intrinsic value of a bitcoin (and its prosperity) is a genuine representation of the general consensus arrangements between the communities practically using it. Same as currencies and financial asset prices (use for payments) work now: we know from the current market value that an ounce of gold is costs around \$1,300, so why is gold in financial markets worth anything more than the jewellery value of gold? It is the general consensus that supports the specific market price based on current market conditions.

The future market outlook of Bitcoin would probably be characterised by various changes and increasing regulations; at least internal technological changes are easily applicable: "any needed rules and incentives can be enforced with the mining consensus mechanism — miners will vote with their CPU power, expressing their acceptance of valid blocks by working on extending them and rejecting invalid blocks by refusing to work on them" — as we can read in Satoshi's Bitcoin white paper (Cheng, 2018). And until acceptance (and healthy regulations that comes with it) does not take an exponential route between individuals, merchants and companies around the world, the likelihood of a system for electronic transactions without relying on trust [the Bitcoin], becoming a global solution in the digital payments system, would remain highly unlikely.

References

Anon (2017). "Credit card eligibility checker", *American Express UK*, accessed on 9 Jan. 2018, available online at: https://www.americanexpress.com/uk/credit-cards/eligibility-checker.

Bernardi D. (2017). "Simulazione montecarlo applicata al bitcoin", *Diaman.it*, accessed on 9 Jan. 2018, available online at: http://www.diaman.it/blog/entry/simulazione-montecarlo-applicata-al-bitcoin.html.

Bitcoin News (2017). "It's Bitcoin's birthday: Whitepaper released 8 years ago today", accessed on 9 Jan. 2018, available online at: https://news.bitcoin.com/bitcoin-birthday-whitepaper.

- Browne R. (2017). "Banks are staying away from bitcoin 'bubble' due to money laundering, Credit Suisse CEO says", *CNBC*, accessed on 9 Jan. 2018, available online at: https://www.cnbc.com/2017/11/02/credit-suisse-ceo-banks-staying-away-from-bitcoin-bubble.html.
- Cheng E. (2018). "Five predictions for digital currencies in 2018 Including stomach-churning drops, bitcoin-related IPO", *CNBC*, accessed on 9 Jan. 2018, available online at: https://www.cnbc.com/2018/01/05/five-predictions-for-digital-currencies-in-2018.html?__source=facebook%7Ccrypto.
- Coin ATM Radar (n.d.). "Number of Bitcoin ATMs worldwide from January 2016 to January 2018", *Statista*, accessed on 7 January, 2018, available online at: https://www.statista.com/statistics/343127/number-bitcoin-atms.
- Cash Services (n.d.). "Share of consumer cash payments in the United Kingdom (UK) in 2006, 2016 and 2026", *Statista*, accessed on 8 January, 2018, available online at: https://www.statista.com/statistics/420845/cash-payments-share-in-the-uk.
- Digital Currency Council (n.d.). "What do you think the biggest challenges are for the future of bitcoin as a digital currency?", *Statista*, accessed on 7 January, 2018, available online at: https://www.statista.com/statistics/605713/main-challenges-for-bitcoin-in-the-future-in-the-united-kingdom-uk.
- Digital Currency Council (n.d.). "What do you think the biggest challenges are for the future of bitcoin as a digital currency?", *Statista*, accessed on 7 January, 2018, available online at: https://www.statista.com/statistics/605713/main-challenges-for-bitcoin-in-the-future-in-the-united-kingdom-uk.
- Edwards J. (2017). "Morgan Stanley says the true price of bitcoin might be zero", *Business Insider*, accessed on 9 Jan. 2018, available online at: http://uk.businessinsider.com/morgan-stanley-on-bitcoin-value-2017-12.
- En.wikipedia.org. (2017). "Dodd-Frank Wall Street Reform and Consumer Protection Act", accessed on 9 Jan. 2018, available online at: https://en.wikipedia.org/wiki/Dodd–Frank Wall Street Reform and Consumer Protection Act.
- En.wikipedia.org (2018). "BitLicense", accessed on 9 Jan. 2018, available online at: https://en.wikipedia.org/wiki/BitLicense.
- Holthaus E. (2017). "Bitcoin could cost us our clean-energy future", [online] *Grist*, retrieved on 9 Jan. 2018, available online at: https://grist.org/article/bitcoin-could-cost-us-our-clean-energy-future.
- IEEE Spectrum: Technology, Engineering, and Science News (2017). "Blockchains: How They work and why they'll change the world", accessed on 9 Jan. 2018, available online at: https://spectrum.ieee.org/computing/networks/blockchains-how-they-work-and-why-theyll-change-the-world#disqus_thread.
- Kelleher J. (2018). "Bitcoin mining", *Investopedia*, accessed on 9 Jan. 2018, available online at: https://www.investopedia.com/terms/b/bitcoin-mining.asp.
- LBS (2017). "Six trends to look out for in 2018", London Business School, accessed on 9 Jan. 2018, available online at: https://www.london.edu/faculty-and-research/lbsr/six-trends-to-look-out-for-in-2018?utm_campaign=1025447_MC_LBSR_Email s_FY17_Dec_Themed_Prospects&utm_medium=email&utm_source=DotMailer&utm_content=Article%201&dm_i=2SVQ,LZ8N, 2DH8KG,2AJ2S,1#.Wjt6mSOZMWo.
- Lanchester J. (2017). "LRB•John Lanchester•When bitcoin grows up: What is money?" *London Review of Books*, accessed on 9 Jan. 2018, available online at: https://www.lrb.co.uk/v38/n08/john-lanchester/when-bitcoin-grows-up.
- Payments UK (n.d.). "Past and future number of payments in the United Kingdom (UK) in 2015 and 2025, by method (in millions)", *Statista*, accessed on 9 January, 2018, available online at: https://www.statista.com/statistics/748499/paymentsmade-past-and-future-by-method-in-the-uk.
- Peterffy (2017). "Bitcoin future: Thomas peterffy ha ragione al 100%", Traglisqualidiwallstreet.blogspot.co.uk, accessed on 9 Jan. 2018, available online at: https://traglisqualidiwallstreet.blogspot.co.uk/2017/11/bitcoin-future-thomas-peterffy-ha.html.
- Raconteur (n.d.). "Share of different payment methods usage in the United Kingdom (UK) in 2017, by frequency", *Statista*, accessed on 8 January, 2018, available online at: https://www.statista.com/statistics/784352/consumer-payment-methods-uk/.
- Read M. and Crane J. (2017). "Do you really know what bitcoin is?", Select All, accessed on 9 Jan. 2018, available online at: http://nymag.com/selectall/2017/12/what-is-bitcoin-a-guide-for-the-confused.html?utm_source=GetTheElevator&utm_campaign= e64f8153ed-GetTheElevator-dot-com&utm_medium=email&utm_term=0_e6123ee6a2-e64f8153ed-19268495.
- Russo M. and Bloomberg (2018). "Bitcoin: What's coming in the year ahead", *Bloomberg.com*, accessed on 9 Jan. 2018, available online at: https://www.bloomberg.com/news/articles/2017-11-01/bitcoin-what-s-coming-in-the-year-ahead.
- Russo M. (2018). "Goldman and google are among the most active blockchain investors", *Bloomberg.com*, accessed on 9 Jan. 2018, available online at: https://www.bloomberg.com/news/articles/2017-10-17/goldman-google-make-list-of-most-active-blockchain-investors.
- Space R. (2017). "Republic crypto: Bringing inclusivity to the blockchain space", *Republic.co*, accessed on 9 Jan. 2018, available online at: https://republic.co/blog/republic-crypto-bringing-inclusivity-to-the-blockchain-space?utm_campaign=platform-

newsletter-111317&utm_content=main-content-link&utm_medium=email&utm_source=platform-newsletter.

- Scott-Briggs A. (2017). "What is digital payment, origin and history in financial technology?" *TechBullion*, accessed on 9 Jan. 2018, available online at: https://www.techbullion.com/what-is-digital-payment-origin-and-history-in-financial-technology.
- The Nilson Report (n.d.). "Market share of leading credit card brands in terms of purchase volume in Europe as of 2015 and 2016", *Statista*, accessed on 7 January, 2018, available online at: https://www.statista.com/statistics/619376/market-share-purchase-volume-of-credit-card-brands-europe.
- Tsosie C. (2017). "The history of the credit card", *NerdWallet*, accessed on 9 Jan. 2018, available online at: https://www.nerdwallet.com/blog/credit-cards/history-credit-card.
- The Balance (2018). "What caused the 2008 financial crisis and could it happen again?", accessed on 9 Jan. 2018, available online at: https://www.thebalance.com/2008-financial-crisis-3305679.
- TSYS (n.d.). "How familiar are you with virtual currencies such as Bitcoin?", *Statista*, accessed on 7 January, 2018, available online at: https://www.statista.com/statistics/787170/bitcoin-familiarity-uk.
- Vermeulen J. (2017). "Bitcoin and ethereum vs visa and paypal Transactions per second", *Mybroadband.co.za.*, accessed on 9 Jan. 2018, available online at: https://mybroadband.co.za/news/banking/206742-bitcoin-and-ethereum-vs-visa-and-paypal-transactions-per-second.html.

Wikipedia (2018). "Blockchain", accessed on 9 Jan. 2018, available online at: https://en.wikipedia.org/wiki/Blockchain. Available online at: https://www.tenx.tech/company.html.