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Final Research Paper

**Decentralization: Who will reap the gains of Blockchain Technology?**

*Abstract*

Ever since the invention of Bitcoin, a new disruptive piece of technology was in the making. Blockchain, the underlying protocol of Bitcoin, allows for true peer-to-peer transactions without the need of intermediaries. Traditionally, intermediaries are present to validate and regulate transactions; this results in transaction fees in order to pay for the wages of the intermediaries. Blockchain promises to disrupt many industries and the economy by removing the needs for intermediaries, where trust is now shifted away from central authorities, towards math and code. This paper aims to educate readers on the characteristics of Blockchain as well as to provide a fair gauge of its potential impact on the economy through scopes as financial inclusion, productivity and economic-ethicalness.

*Final Draft*

Ever since the Bitcoin[[1]](#footnote-1) whitepaper was released by an anonymous individual who went by the cyber-name ‘Satoshi Nakamoto’, a revolution was in the making. Bitcoin has quite frequently been known as “digital gold”, because it is the first ever, and naturally the de facto, cryptocurrency. Cryptocurrencies are analogous to gift cards, whereby they are purchasable online with fiat currency and are accepted by many merchants in exchange for goods and services. Although both Bitcoin and fiat currencies can be used as tokens of exchange for goods, instead of being minted by a central authority, bitcoins are minted from complex mathematical algorithms and are distributed to stakeholders in the Bitcoin system[[2]](#footnote-2). Moreover, instead of having a central authority, such as a bank, that keep tracks of everyone’s account and transaction details, every individual within the system has a ledger that shows everyone else’s transactions and balances.[[3]](#footnote-3) As such, the lack of a political and central governance and the increased individual autonomy over the distribution and ownership of “assets” sparked early interests in several groups of individuals. Libertarians, for instance, celebrate Bitcoin because it is a currency that removes the need for government intervention, hence supporting their political ideology. Criminals were also early adopters of Bitcoin because it is often hard for authorities to track down their real-life identities. As such, over the years, Bitcoin has received a negative image, due to its being used as a form of payment for illegal goods and services on the dark web. Despite this, its value has sky-rocketed over the past few years and has recently surpassed the price of gold.

One of the core characteristics of Bitcoin is that it is a digital currency that can be transferred peer-to-peer in a trustless environment. In laymen’s term, the technology underlying Bitcoin allows individuals to transact with each other without the need of an intermediary. Without getting into too much of the technical specifics, on a high-level, in Bitcoin, trustless peer-to-peer transaction is possible because trust is shifted away from central authorities and towards math and code. Double-spending problems as well as various other fraudulent activities are not possible in Bitcoin, or in any other cryptocurrencies available now, because they are either mathematically impossible or economically illogical[[4]](#footnote-4) to do. However, despite its rise in value over the past few years, it has failed to take off and be adopted universally[[5]](#footnote-5) because it is only a simple payment-transfer protocol. Over the years, people started to discover that within Bitcoin, however, there is a powerful underlying technology that has much more applicability and is more ubiquitous. As such, this paper aims to educate and to help navigate through the prevailing opinions on Blockchain, while also analyzing some of the core implications of Blockchain on the economy.

Abstracting away the notion of the cryptocurrency in Bitcoin, what is left is a powerful and revolutionary technology – Blockchain. Bitcoin, in itself, has very limited applicability because it is only a peer-to-peer decentralized payment protocol. However, its underlying technology, Blockchain, is what allows it to be so robust—at the heart of Bitcoin is a technology that allows transactions to be secure without an intermediary overlooking the system. Blockchain, also known as a distributed ledger, can be thought of as a Google Spreadsheet or ledger that shows and keeps track of every transaction that has ever happened. In a Blockchain ecosystem, every stakeholder has a copy of the ledger and is updated automatically whenever a new transaction is authenticated and confirmed. In this way, instead of being validated by central governing entities such as the bank, transactions are validated by all the stakeholders (also known as miners) simultaneously. Moreover, in a Blockchain, all data that are authenticated and confirmed become immutable because blocks of data are chained together in such a way that each block of data is referenced by its succeeding block, and therefore any slight change to any information or data in any particular historic block will be immediately noticed. [[6]](#footnote-6)

As seen, the immutability of Blockchain allows for easy auditing and traceability. By making it impossible to change previously-confirmed data, Blockchain ensures the validity of all data as well as the prevention of corruption. This is a value-proposition for many firms as it could potentially reduce billions of dollars in costs by reducing fraud and manpower needed for annual audits. Blockchain’s immutability as well as its absence of need for intermediaries to validate transactions therefore makes Blockchain a valuable technology that seeks to revolutionize many different industries.

At the very core, Blockchain also promises to be a revolutionary technology because it removes the need for intermediaries. In economic and financial terms, this translates into a great reduction in operation costs because with Blockchain, there is no longer a need to pay much of the transaction fees that we currently pay for. Transactions fees exist today because the intermediaries that we depend on today to validate transactions need to hire employees to validate transactions manually. With Blockchain, there is no longer a need for central intermediaries to validate transactions and data because validations occur automatically through math and code. In the world of macro-economics, this also means potentially improving efficiency and productivity drastically since validations are now automatic and cheaper. With lower transaction time, lower transaction costs and overall higher transaction efficiency, an overall increase in the world’s economic well-being is possible.

With the aforementioned characteristics, Blockchain is therefore potentially a highly disruptive technology that could lead to a future of decentralization. And in order to better understand the true impact of Blockchain on the technology, it is important to inspect some of its core implications on society and the economy. I tend to regard Blockchain as a catalyst for open-sourced capitalism. Traditionally, capitalism is very confined to the privileged—participation in markets requires special connections as well as huge initial capitals. The saying “the rich will only get richer” stems from the fact that having access to huge capitals means having first-access to more value-generation opportunities. For example, large funds have priority access to equity investments before individuals get to invest and participate in the secondary markets (stock exchanges). In recent years, however, Silicon Valley and the rest of the tech-industry has slowly begun to embrace the notion of “open-source”, meaning that anyone can contribute freely to projects. As much as open-sourced projects are beneficial to society at large, economic incentives can be introduced to open-sourced projects to increase productivity. In the Blockchain industry, there is a practice that is known as the Initial Coin Offering (ICO) that is very similar to IPOs in stock markets. However, with ICOs, any individual with any amount of capital can contribute to the funding of projects and receive proportionate shares in return. With economic incentives aligned, faster development and changes can happen. A good analogy for this is to think about the ability to invest in the next TCP/IP (internet protocol) or the next Linux system. With ICOs in the Blockchain industry, regular individuals can now participate freely and contribute to the development of the entire industry, leading to faster infrastructure developments.

Socially, the rise of technologies in recent years has led to a greater wealth inequality. Although the world’s Real GDP has risen over the years[[7]](#footnote-7), the gap between the rich and the poor has also increased[[8]](#footnote-8). Many developing economies are now in worse states than before because they have no means of having financial security. In the current world, more people have access to the internet than to basic financial services – this needs to change. With the rise of the internet and Blockchain, basic financial services can be made universal. In order to bridge the gap of financial inequality and to increase social mobility, financial literacy and financial inclusion are crucial. Having access to basic financial services, such as being able to store and have control over personal assets and value, is therefore a necessity for change in these developing economies. With Blockchain, the reduction of intermediaries and the removal of central authorities allows for almost-to-none transaction fees, as well as an easy access to basic financial service (value-storage) without needing much credentials. This makes it easy to support the transaction of micro-loans developing economies. In their book, Vigna and Casey argue that “Bitcoin can facilitate economic integration of the global poor, the roughly 2.5 billion adults who don’t have bank accounts. Foreign workers remit $500 billion home annually, and Bitcoin could eliminate the fees of 10 percent or more paid to middlemen.”[[9]](#footnote-9) Instead of remitting or storing fiat currency via banks, foreign workers and individuals in developing economies can store and transfer value as cryptocurrencies in cryptocurrency-wallets, hence reducing the often-costly transaction fees; whenever they need fiat currency to purchase goods and services, they can easily transfer the cryptocurrencies back into fiat-currency on online exchanges. As summarized by Sarah Underwood, a technology journalist, Blockchain “could empower people in developing countries with recognized identity, asset ownership, and financial inclusion; and it could avert a repeat of the 2008 financial crisis, support effective healthcare programs, improve supply chains and, perhaps, clean up unethical behavior in high-value businesses such as diamond trading.”[[10]](#footnote-10) Even though Blockchain technology is still in its infant phase, its potential is already widely recognized; its immutability, trustlessness as well as robustness promises for large-scale disruption across many industries.

The ability to truly crowdfund is also an important implication of Blockchain technology. In the past year, the development of smart-contracts[[11]](#footnote-11), contracts that run on Blockchain whose terms are enforced via code instead of law and regulation, has also greatly increased Blockchain’s applicability. With Blockchain and smart contracts, true peer-to-peer crowdfunding can happen. Using smart-contracts, individuals can now ensure that their funds are appropriately distributed and that the fair share of equity will be received in return. Therefore, crowdfunding can happen in its true sense (“crowd”-funding) without risks of fraud or transaction fees. With applications such as smart contracts, individuals now can do micro-loans securely, without risking counter-party risks. Hence, with Blockchain technology and applications built on top of it, true progress toward greater financial inclusion can take place. Even though financial inclusion is only half the equation for true social mobility, it is a critical first step that needs to be done. However, with that said, moving forward, the Blockchain industry has to figure out means to increase adoptability as well as reduction in the price-volatility of cryptocurrencies if they are to be used as storage of values.

While the characteristics and possible applications of Blockchain have been described in-depth above, it is also important to synthesize the varying public opinions of Blockchain to gain a fair gauge of the technology itself. Despite being a relatively new technology, the range of public opinions on Blockchain ranges from absolute hype to absolute pessimism and it is often hard to distinguish facts from opinions without having a true understanding of the technical build-up of Blockchain. As such, this section of the paper aims to synthesize this spectrum of opinions as well as to demystify and debunk some of the misconceptions.

Lying on the very end of the “hype” spectrum, Outlier Ventures recently published a whitepaper that argues that Blockchain is pivotal to the Convergence. At its very core, Outlier Ventures argues that “we believe Blockchain technologies, including distributed ledgers & smart contracts are the mega-trend that allow all other macro-trends to scale securely, converge and combine.”[[12]](#footnote-12) . This white-paper, written by a team of experts in the field, argues that the rapid development of Blockchain technology will inevitably result in a shift from centralized forms of governance to trustless decentralized networked systems whereby there is no longer a need for central intermediaries acting as authorities.

In another cover article of a technology magazine, Rob Marvin argues that “Within the next handful of years, large swaths of digital life may begin to run atop a Blockchain foundation – and you may not even realize it.”[[13]](#footnote-13) While Marvin’s arguments are more realistic and seems more relatable compared to our current progress in the Blockchain space than Outlier Ventures’, it is still necessary to keep in mind that one of the biggest issue with Blockchain is its privacy-issues. While assets and information can be transferred peer-to-peer via Blockchain, there are countless Blockchains out there, each with a different setting and protocol that allows for different uses; therefore, the big question that needs to be answered before migrating our mass of data “atop a Blockchain foundation” is if one Blockchain protocol is truly sufficient to maintain our varying data-types. For instance, personal-health data should definitely not be transferred on a public Blockchain where there is total transparency.

An alternative view on Blockchain technology’s impact is that it has the potential to factor in social ethical concerns into economic transactions. In a peer-reviewed journal article by Goertzel, it quotes that the transparency of Blockchain “can make the most complicated economic exchanges transparent to consumers, allowing them to factor ethical and sociological considerations into their purchasing decisions.”[[14]](#footnote-14) Provenance is indeed a widely-explored Blockchain application whereby the source and origin of goods and services should be tracked via a Blockchain. For instance, there are efforts made to track the origin and source of diamonds to ensure that they are not “blood diamonds”, also known as diamonds that are mined in warzones to finance insurgencies. With Blockchain, it is possible to track the origin of diamonds and as such, allow consumers to factor in ethical and regulatory concerns when deciding to make a purchase.

Beyond social and ethical concerns, Blockchain also give rise to political concerns, albeit more pessimistic ones. In a peer-reviewed journal article by Huckle and White, they claim that Blockchain has the potential to support socialist regimes because its transparency facilitates better central-planning as well as cooperativeness.[[15]](#footnote-15) While this argument definitely seems more far-fetched, and should be viewed more as an exploratory thought than as an implication of Blockchain, it is important to recognize that Blockchain technology, which promises for decentralization and lack of central governance, has the potential to result in a shift in governance form. While I am not a firm believer that Blockchain technology will result in a future of complete decentralization devoid of any central intermediaries or governance, I do think that the more important consideration is how would Blockchain technology bring about greater efficiency and what trade-offs are there.

On the other extreme end of the spectrum lies a total pessimistic take on Blockchain. Pessimists overly-exaggerate Blockchain’s potential to disrupt many industries and take away the needs for all intermediaries and fear that job-loss would be a huge issue. In order to respond to this common misbelief, it is important to note two things. Firstly, Blockchain, like all other technologies, are not going to become universal; instead, the first question often asked when developing Blockchain is if the Blockchain-based solution is better than the current central-database-based solution, and very often, the answer is no. Like all technologies, not every industry and business-model requires it—for instance, it would not make economic sense for brick-and-mortar stores to implement Blockchain because Blockchain’s value proposition is to remove the need for trust between different entities (such as between large corporations). As such, Blockchain is not a zero-sum game where its success definitely yields the downfall of intermediaries; in fact, central intermediaries can and have already been experimenting with implementing Blockchain to improve their internal efficiency. Secondly, although certain levels of job-loss can be expected, it is not going to be significant because just as any other revolution like the Industrial and Internet revolutions, the total amount of jobs within an economy stayed relatively stable because new technologies implies new forms of job-opportunities.

In reality, the future of Blockchain lies somewhere in the range of the middle of the spectrum—while many large industries have already began experimenting with Blockchain-based applications, the Blockchain industry is still in its proof-of-concept phase and it will take a couple of years before any significant progress can even be possible. Moreover, a future of total decentralize seems vaguely possible given the current social-structure that has proved to be relatively stable and efficient. In the next few years, Blockchain startups will start to move from their current proof-of-concept phase into industry-pilot phase and we should be starting to see real-life applications of Blockchain technology in supply-chain and provenance use-cases.

**Works Cited**

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2. Jaumotte, Florence, Subir Lall, and Chris Papageorgiou. "Rising Income Inequality: Technology, Or Trade And Financial Globalization?." *IMF Economic Review* 61.2 (2013): 271-309. *Academic Search Complete*. Web. 12 Feb. 2017.
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4. Underwood, Sarah. "Blockchain beyond bitcoin." *Communications of the ACM* Nov. 2016: 15-17. Print.
5. Outlier Ventures Research. *Blockchain-Enabled Convergence*. *Outliers Venture*. N.p., n.d. Web. <https://outlierventures.io/convergence-wp>.
6. MARVIN, ROB. "BLOCKCHAIN: THE INVISIBLE TECH THAT's CHANGING THE WORLD. (Cover Story)." *PC Magazine* (2017): 91-113. *Academic Search Complete*. Web. 12 Feb. 2017.
7. Goertzel, Ben, Ted Goertzel, and Zarathustra Goertzel. "The global brain and the emerging economy of abundance: Mutualism, open collaboration, exchange networks and the automated commons." *Technological Forecasting and Social Change* 114 (2017): 65-73. *Engineering Village*. Web. 1 Mar. 2017.
8. Huckle, Steve, and Martin White. "Socialism and the Blockchain." *Future Internet* 8.4 (2016): 49. *Engineering Village*. Web. 1 Mar. 2017.

**Annotated Bibliography**

**A Strategic Perspective on Blockchain and Digital Tokens. "Blockchain and Digital Tokens: A Strategic Perspective." *Http://blockchain.bcg.com*. N.p., n.d. Web. 10 Apr. 2017.**

Published by Boston Consulting Group, this article aims to analyze the industrial applications of Blockchain technology. Throughout the article, the potential impact of Blockchain on healthcare and financial sectors is emphasized and analyzed via economic theories. For instance, the article describes the potential for Blockchain to remove intermediaries in the financial sector—in other words, due to the “trustless” nature of the Blockchain proof-of-work protocol, there is no longer a need for clearinghouses and brokers in order to facilitate financial securities trades, and therefore leading to lower transaction costs for end-users and costs for banks. This source would be vital for my body paragraph describing the effects of lowering transaction costs, and it could also be used as a basis to argue that with blockchain technology, many jobs will be lost.

Boston Consulting Group’s blockchain research team seems to be a credible source since they are responsible for advising clients, whom are traditional firms, on preparing for the Blockchain technology revolution. However, since it is their incentive to write about the potential impact of Blockchain, the article might be a little exaggerated, but then again, since Blockchain is a rapidly advancing space and no one knows exactly what the future holds, this source’s content should be compared to those of other sources to determine if it is slightly exaggerated.

**Goertzel, Ben, Ted Goertzel, and Zarathustra Goertzel. "The global brain and the emerging economy of abundance: Mutualism, open collaboration, exchange networks and the automated commons." *Technological Forecasting and Social Change* 114 (2017): 65-73. *Engineering Village*. Web. 1 Mar. 2017.**

This peer-reviewed journal article argues that recent technological advances such as artificial general intelligence and Blockchain technology can finally facilitate for the transparency and open-collaboration across boundaries. Moreover, with such technologies that foster transparency, ethical and social factors can now be factored into individuals’ transactions, potentially disrupting the entire world-economy. With that basis, the article then proceeds on to argue that by allowing more participants to transact in the global economy, Blockchain technology will, in the long run, reduce social preoccupations with maximizing economic gain, but rather, bring more focus to social and ethical concerns with economies.

Being a peer-reviewed journal article, its contents are fairly credible. And with that, its arguments can be very useful in helping me argue that Blockchain’s potentials transcends financial impacts and can even have an effect on the economic system at large; since the article begins with a description of Marx’s economic theory of a centralized socialist government, this article can be used towards the end of my research paper as a segway to the section whereby I address some of the concerns of Blockchain technology.

**Huckle, Steve, and Martin White. "Socialism and the Blockchain." *Future Internet* 8.4 (2016): 49. *Engineering Village*. Web. 1 Mar. 2017.**

This peer-reviewed journal article examines some of the economic implications of Blockchain technology from the perspective of politics and economic systems, mainly focusing on a socialistic point of view. Many libertarians celebrate Blockchain because it promises for less government control due to its peer-to-peer nature and for greater security due to its consensus mechanism, however none have examined Blockchain’s potential service to a Socialist model. This article argues that Blockchain’s transparency and auditability properties are great fits for a socialist regime due to its nature of the concept of public ownership.

Being a peer-reviewed journal article, it is definitely a credible source but I do think that since this is a very opinionated piece, I should use it more of a representation of some of the opinions out there in the space than as an evidence for any of my claims. I plan to include this piece’s argument in the section dedicated to synthesizing some of the existing claims and opinions on Blockchain.

**Jaumotte, Florence, Subir Lall, and Chris Papageorgiou. "Rising Income Inequality: Technology, Or Trade And Financial Globalization?." *IMF Economic Review* 61.2 (2013): 271-309. *Academic Search Complete*. Web. 12 Feb. 2017.**

This in-depth research paper argues that information technology has a greater impact on income inequality than globalization. Moreover, this paper provides data regarding the effects of trade, globalization and technology on inequality, collected from over 51 countries. The paper is roughly divided into 2 sections—the first being an empirical analysis of the trends of inequality in developing and developed countries over the year, then the second section analyzing the impacts of technology (as measured by the increased share of technology and communications technology) on these rising trends of income-inequality.

Using the empirical data from the first section of this paper, this primary data makes explicit the trends of income inequality between the developing and developed countries, and although this source aims to argue a thesis that is not exactly what I am trying to argue for in my research paper, its empirical data is helpful in illustrating my point that currently, individuals in developing countries face income inequality issues; with this basis as an introduction to set the scene, I will then be able to proceed on to my argument that blockchain technology has the potential to solve this current problem in the world, by making financial services more accessible to individuals in developing countries. And also since this is a research paper published in the IMF Economic Review, its data should be fairly credible and therefore as long as I use only its data without its analysis, the data should be seen as a fair representation of the levels of inequality—then, I can use the data, which is credible, to support my arguments.

**MARVIN, ROB. "BLOCKCHAIN: THE INVISIBLE TECH THAT's CHANGING THE WORLD. (Cover Story)." *PC Magazine* (2017): 91-113. *Academic Search Complete*. Web. 12 Feb. 2017.**

This is a broad article that provides a high-level summary of the current stages and industry-developments of Blockchain technology. One of the most important information gained from this article is its description of the Delaware government’s initiative to incorporate Blockchain technology into the legislative and financial sectors to help increase efficiency. Another rather important information is its description of the shift of our society as we progress from the internet of information to the internet of things when “trust” becomes a big issue—blockchain provides this level of trust in an autonomous fashion.

Being a magazine article, however, reduces some of its credibility as a source, but some of its facts, such as the Delaware government’s initiative, can be fact-checked and they are indeed credible. While working with its other opinionated contents, such as its argument that Blockchain will definitely disrupt the markets, some levels of caution is definitely needed and I would use it more as a representation of some of the prevailing opinions of Blockchain and then synthesize it with other similar/contrasting opinions, rather than as an evidence to support my argument.

**Outlier Ventures Research. *Blockchain-Enabled Convergence*. *Outliers Venture*. N.p., n.d. Web. <https://outlierventures.io/convergence-wp>.**

This is a white-paper that argues that Blockchain technology will inevitably yield the Convergence. One of the key points that I want to address in my research paper is that there is a lot of hype going on in the Blockchain space just because there is a lack of thorough understanding of the technology itself. This white-paper, written by a team of experts in the field, argues that the rapid development of Blockchain technology will inevitably result in a shift from centralized forms of governance to trustless decentralized networked systems whereby there is no longer a need for central intermediaries acting as authorities.

Written by experts in the field, this source is fairly credible in terms of its technical-related content. The argument, however, is definitely opinionated and should be used in the synthesis-of-prevailing-opinions section of the research paper. With that said, however, I do think that this is a fairly substantial and credible paper that could be used to Segway into a concluding thought that Blockchain does indeed have revolutionary potentials since even experts think that its potentials are limitless—even to the extent of arguing that Blockchain will lead to the Convergence.

**Tani, Dariana. "The World Economy – 50 Years of Near Continuous Growth." *World Economics*. N.p., Mar. 2016. Web. <The World Economy – 50 Years of Near Continuous Growth>.**

This paper provides primary data that shows the growth of Real World GDP over the past 10 years. In the paper, it is evident that there has been a stable increase in the Real World GDP and this is important as it can be used to support the argument that despite the growth in the world economy, basic services such as banking are still not accessible to the billions of individuals in developing economies.

Published in World Economics, this source’s data should be fairly credible and unbiased since the data can be fact-checked with other data-banks available. However, since I am only using a minute part of this source to support a small point, its credibility will not affect my overall argument significantly.

**Underwood, Sarah. "Blockchain beyond bitcoin." *Communications of the ACM* Nov. 2016: 15-17. Print.**

This magazine article briefly describes some of the benefits of using block-chain in the finance industry. Beyond lowering the transactions costs, henceforth allowing the billions of individuals in developing countries to have access to micro-financial-services and to enter the global economy, block-chain technology also fosters higher security by having immutability and transparency as its core features.

Even though it is a magazine article, which means that its arguments tend to be based on opinions and not research-based data, I still think that this source is relatively credible just because in a new and uprising technology field where there is simply not enough means to conduct convincing research, any article that details the impact of the technology in a way that is not exaggerative and fits in with most other prevailing consensus out there should be considered more as a credible source than as a speculative source.

**Vigna, Paul, and Michael J. Casey. *The age of cryptocurrency how bitcoin and digital money are challenging the global economic order*. New York, NY: St. Martin's Press, 2015. Print.**

This book describes the financial and economic implications of block-chain technology, focusing on the potential to provide the billions of “unbanked” individuals with an opportunity to have access to the global economy. This book also provides an extensive study as well as the downsides and trade-offs of cryptocurrency and block-chain technology. This secondary source will help in the body paragraph in which I propose that one of the metrics I use to determine the impact of blockchain is its potential to provide financial services to the billions of “unbanked” people.

As a book that includes extensive study as its content, this source should be fairly credible. In addition to its credibility, this source is actually quite accurate in its description of Blockchain technology in the sense that it provides both the benefits and downsides of Blockchain technology, henceforth providing a non-exaggerative analytical piece that dissects the technology in a non-opinionated way.

**Research Reflection**

I knew from the very start of the semester that I wanted to explore Blockchain technology from a socio-economical approach. Very often, new disruptive technologies receive a lot of attention from technologists, but very little from the general public. Or rather, it is hard for the general public to understand how these disruptive technologies will affect them, personally. As such, I made it my goal to try and explain one of my passions through a lens that is more accessible and relatable to most peers. I began my research knowing what I wanted to research, but I did not know where to begin. All my knowledge of Blockchain either came from White Papers or passionate technical-discussions with peers because there is simply a lack of high-level overview information out there. As such, it is evident that in the first few pages of my research essay where I attempted to explain Blockchain and its characteristics, I had to do so in my own words, often adding in footnotes to provide technical explanations that some might find interesting. Most of the prevailing research material out there are either too opinionated, or just unrealistic thoughts rather than facts because there is too much hype around the Blockchain-space and comparatively too little individuals with the right technical knowledge whom truly understand what Blockchain is.

A majority of the time spent on my research paper is trying to synthesize the prevailing opinions of Blockchain so that I can help my readers navigate through this flood of information that may be biased. In order to sort through these research materials, I read through each article and wrote a summarizing paragraph that aims to make light of each’s central theme. Then, I ranked them on and placed them on a spectrum and realized that only two of the sources were more unbiased. And in order to validate my judgment, I went to my Blockchain @ Berkeley friends and asked them for their opinions. By the end, I was fairly certain that there is indeed too many hype within the industry and that Blockchain is not a one-size-fits-all solution for all needs nor is it an omnipotent technology that will lead to a future of centralization with no central governance of any sort.

Reflecting back to the start of this research paper, I recall being initially nervous and in fact, a little uncomfortable to write this paper because I feel that I am not an expert in the field and hence I should not be labelling sources as biased and not factual. However, I have come to realize that sometimes it is very important to analyze matters based on a first-principles approach. Just because things are presented in a certain way does not necessarily mean they are the way they are. Learning to inspect the credibility of sources helped me justify/debunk their arguments. Moreover, having a firm technical foundation in Blockchain also gave me an edge to explain socio-economic implications of the technology from an unbiased approach since I know the physical limitations of the technology and what are the potential concerns (such as privacy and varying tiers of permissions).

I am very glad that I have chosen to take on this paper with a topic I am so passionate, yet initially hesitant. I could’ve written on a more well-researched field such as social media or artificial intelligence (both of which I am interested in as well), but I realized that it would be more meaningful for me to choose and pursue a topic that I truly care about, despite it being harder due to having less research material to work with. On a macro-level, I also hope that my endeavor will help and empower my readers with the necessary knowledge to better understand a future that could potentially benefit them. As the quote goes “knowledge is power”, I believe that just as my research paper will hopefully help readers better understand Blockchain, Blockchain, with its transparency, will also bring more knowledge to individuals, henceforth empowering them.

*Supplementary Materials For Readers*

To better understand how Blockchain works from a more technical approach:

1. <https://blockgeeks.com/guides/what-is-blockchain-technology/>
2. <https://blockgeeks.com/guides/>
3. <https://blockchain.berkeley.edu/decal/>

1. Bitcoin with capital letter “B” refers to the entire technology, whereas bitcoin with lower-case “b” refers to the currency. [↑](#footnote-ref-1)
2. In order to become a stakeholder, you have to dedicate certain amount of computational power to run the system’s validation processes, also known as Proof of Work, whereby you receive bitcoins in exchange. [↑](#footnote-ref-2)
3. However, there is still privacy since every user within the system goes by a unique account number and are not identified by their real identity, therefore even though everyone has a record of everyone else’s balances, it is hard to trace back to the real-life identity of the account owner.. [↑](#footnote-ref-3)
4. Technically, it is possible to attack the system, also known as a 51% attack, but it is extremely expensive to carry out such an attack because it would require a huge amount of computational power, which if used ethically in the system rather than trying to fraud it, would result in more bitcoins. [↑](#footnote-ref-4)
5. Its rise in value is mainly due to increased speculation of the cryptocurrency; while there have been increased endeavors to support the adoptability of Bitcoin, it is nevertheless only a simple payment protocol, which does not appeal enough to regular individuals. [↑](#footnote-ref-5)
6. Each block’s data, which consists of multiple transaction details, is turned into a single hash value which is then referenced in the subsequent blocks, therefore changing any minute data in the block will result in a different hash value, which then results in a chain breakage because the subsequent blocks are then referring to an old hash value that no longer exists because of the change in data. [↑](#footnote-ref-6)
7. Tani, Dariana. "The World Economy – 50 Years of Near Continuous Growth." *World Economics*. N.p., Mar. 2016. Web. <The World Economy – 50 Years of Near Continuous Growth>. [↑](#footnote-ref-7)
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