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The Rhetoric of Blockchain Technology

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Abstract

The purpose of this honor's thesis is to consider the rhetoric about blockchain technology. It is recognizable that blockchain technology does not share a common definition, method, or general understanding; this absence or opacity influences its use in institutions and industries. To advance my thesis about the rhetoric of blockchain, I developed a framework to analyze and critique blockchain technology use. Then, I applied this framework to two articles that discuss the adaptation of blockchain in the financial industry. My findings were that advocates for the technology are influencing its intended use. The rhetoric surrounding the technology is why the technology is believed to enforce trust-free transactions.

Executive Summary

The information, media, and projects that involve blockchain are foundationally unsound; the components, like definition, design, and purpose, which support a complex technology are inconsistent. My concerns stem from an observation that the rhetoric behind these components helps shape or determine the uses and designs of blockchain technology. The purpose of this research project is to understand the rhetorical positioning of blockchain technology; and whether beliefs, benefits, and consequences of using the technology can be understood through the way the technology is discussed.

In order to support this claim, I developed a framework to analyze two papers about blockchain technology in the financial industry. I chose the financial industry because it supports two widely understood, and talked about, blockchain applications: public and private chain. The public chain is commonly known as the blockchain that supports Bitcoin, or other cryptocurrencies; while the private chain supports uses of smart contracts. The framework has six criterion that examine the different components of blockchain technology. Each part of the criteria is based off of the ideas of Carolyn Miller (1998). I read the two papers and critiqued them to my proposed framework. The first paper was a technical chapter excerpt from an academic book about technology and banking, while the second was a Harvard Business Review article. The intention was to see how the framework supported two different types of papers.

My findings were limited because I only critiqued two papers; however, the similarities found between a paper written for a technical audience and one written for busy executives were alarming. Neither had a comprehensive understanding of blockchain, which cannot be solely attributed to the specific financial sector use. While the academic paper danced around complicated blockchain architecture by clouding their paper with confusing technological

frameworks; the Harvard Business Review article defined blockchain principles elusively to the characteristics of a public blockchain. I attribute this error to Bitcoin's role of being blockchain's momentum, which is one of the framework's criterion. Momentum is the influence that supports blockchain's use (Miller, 1998). If the authors connected the history of blockchain with Bitcoin, it would affect the technology's definition, design, intended user, and an important blockchain concept — trust.

My findings reveal a broad confusion of blockchain and its use. It is apparent that its technical function is that of a distributed database, yet it is being presented as an entirely new idea. The exaggeration of blockchain success and ability will have consequences for the users who have been sold the idea of a blockchain based future.

Table of Contents

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I would like to thank Professor Steven Sawyer and Professor Krista Kennedy for their time and knowledge; the conversations I had with them supported the ideas of my thesis. I would also like to thank Jason Markins, who taught me how to write clearly and with purpose. Finally, I thank Professor Carl Schramm who influenced me to be a contrarian thinker.

To my parents, thank you for supporting my education. And to Poppy, thank you for the inspiration through humor.

Advice to Future Honors Students

Each Honors course I took not only built upon each other, but also on the courses of my major. My advice to future Honors students is to take as many classes in 306 Bowne as possible; do not be deterred by the small class size or the expectations of the first class. It is worth it.

Preface

"My assumptions are reliable" – *Poppy, Aged 95*

I trust my grandfather, but I do not trust the promises of a blockchain-based future.

Introduction

In my blockchain management class, a peer asked "how does the blockchain know if the information entered is incorrect?" A blockchain enthusiast would say that the technology has an indisputable record of the truth. However, the empirical answer is that the technology would not know. The scenario that incorrect information is entered onto a blockchain is possible; but it is carefully avoided when explaining and exploring the technology's use. In fact, many of the proposed use cases are reliant on the misconception that information on the blockchain is without doubt trustworthy. Misconceptions about blockchain extend into design, technical and user capabilities, and initial understanding. The goal of this paper is to determine how the rhetorical positioning of blockchain is dictating its use.

By considering the rhetoric of an emerging technology, an advantageous insight is gained. This insight will reveal that blockchain technology is not definite; the opaque history, definition, and understanding will catch up to those who have promised a decentralized future. A successful blockchain use case is contingent on understanding the technology's current limitations. This understanding will lead to more thoughtful approaches, discussions, and observations of blockchain.

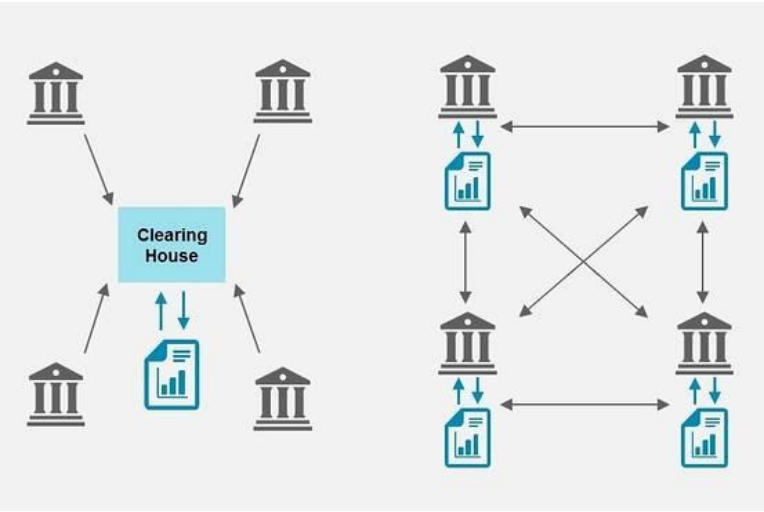
Blockchain has been positioned to disrupt industries that directly impact the well-being of a person. An unsettling fact when so many fundamental concepts are inconsistent or uncertain. To see this technology continuously encouraged without standardization of basic principles should not sit well with anyone. The rhetoric of this technology is crucial to understand, because it will determine issues not yet understood by the people advocating for its use.

Different understandings of the same technology will undoubtedly impact end users. As the end users of this proposed technology, we need to ensure that a blockchain use case has a

comprehensive understanding, rather than an assumptive one. The ability to make connections between design choices and known fallacies will reveal the extended impact of a blockchain-reliant process. If we continue to willingly and blindly accept the promised benefits of a poorly understood technology like blockchain, we will be susceptible to negative sociotechnical change — users trusting an untrustworthy technology.

Blockchain Understanding

The history, definition, and possible uses of blockchain technology are both opaque and discretional to the user. However, it is important to have a guided understanding of the technology's design before reading the proposed framework. Blockchain is a record keeping ledger that is permanent and decentralized; meaning no third-party has to authenticate the recorded information. The idea is that once a record or transaction is added to the blockchain, it cannot be changed or deleted. In Figure 1, there is a representation of the centralized process of validating a transaction on the left, while the right depicts the decentralized process made possible with blockchain (Wall Street Journal. 2016).



(Figure 1, Normal Ledger Process vs. Blockchain Ledger Process)

Blockchain technology has different applications, including digital currency, record keeping, and as a platform. Platform uses include smart contracts, where the agreements of a contract are supported with a complete record of both parties. For example, you have bought a house with a regular contract, and the seller has decided to not mention the basement has a significant amount of water damage in the basement. That becomes your loss, you signed on the dotted line. However, if this transaction was done through a smart contract, the condition "must not have water damage" would not have been met. You would be free to renegotiate the terms, because the smart contract, using blockchain, has a complete record of the house you want to buy (Etwaru, 2017). The understanding of blockchain technology is that it is capable of disrupting current business processes, because it has the ability to replace the middleman. Blockchain has been positioned as a technology with a built-in characteristic of reducing time, labor, and costs.

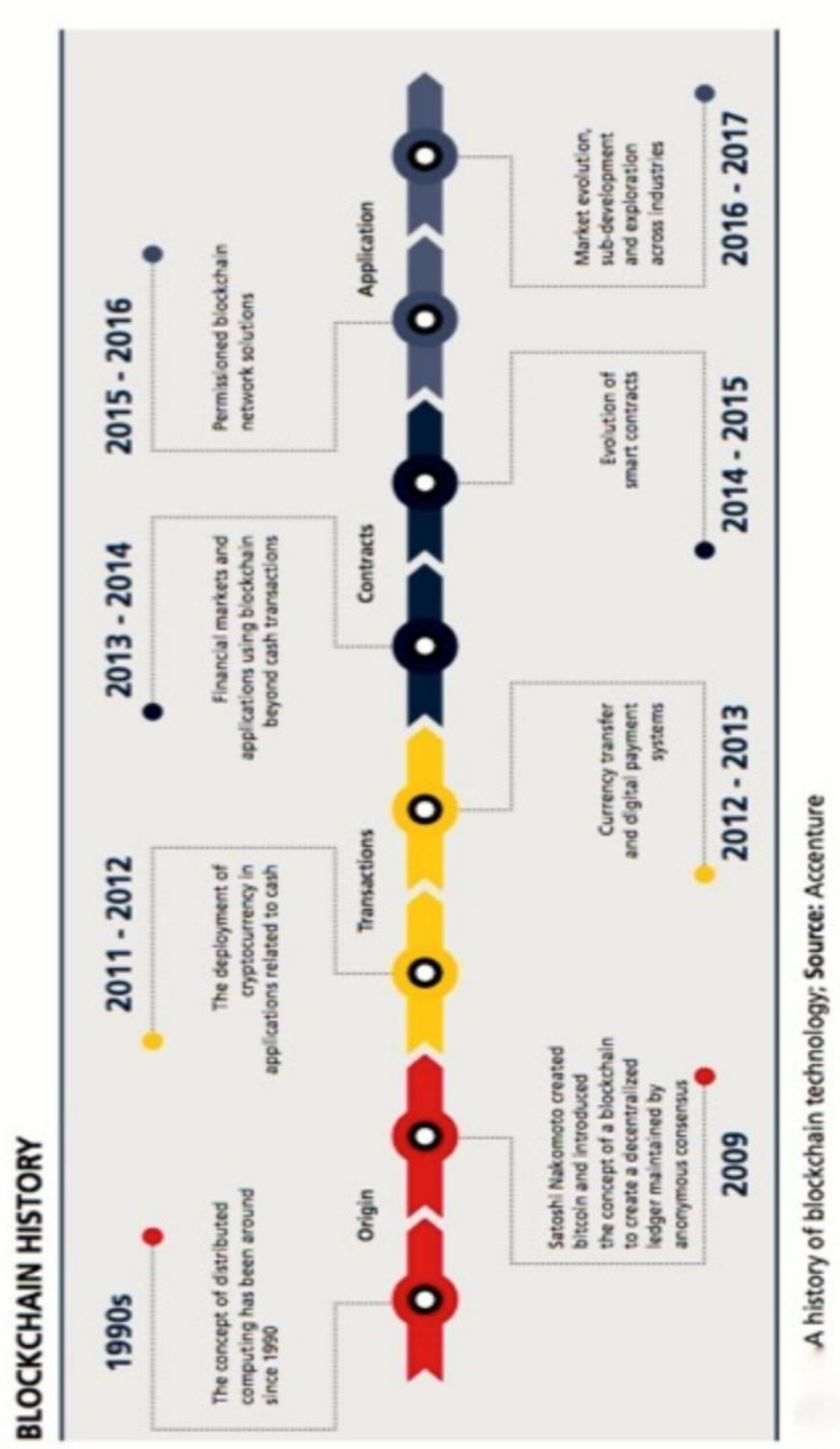
Blockchain History

No one person can be names as the the inventor of blockchain; the defining characteristics have aggregately come together. A comprehensive timeline attributes the concept of decentralization and anonymity to two papers from the 1980s (Hobbes, 2018). A course reader for a blockchain course at the University of Washington includes a paper from 1999 (UWDB, 2018). The paper proposes a time-stamping service that would lower the need, or trust, of a third-party. This proposal cites an article from 1992 titled "Improving the efficiency and reliability of digital timestamping," which prospectively is the core purpose of blockchain technology. There is a documented history of blockchain technology's roots, however in figure 2 we see a reputable institution glossing over it. I believe this to be a point of concern, because if reputable players are either unaware or avoiding the full picture, what are the implications?

The most detailed notch on the timeline in Figure 2 is the invention of Bitcoin, which is a shared characteristic of many similar graphics. It is undeniable that Bitcoin is the first public-known use of the technology, however is it reliable to root core blockchain understanding to an application created by an unknown person or persons?

Section Conclusion

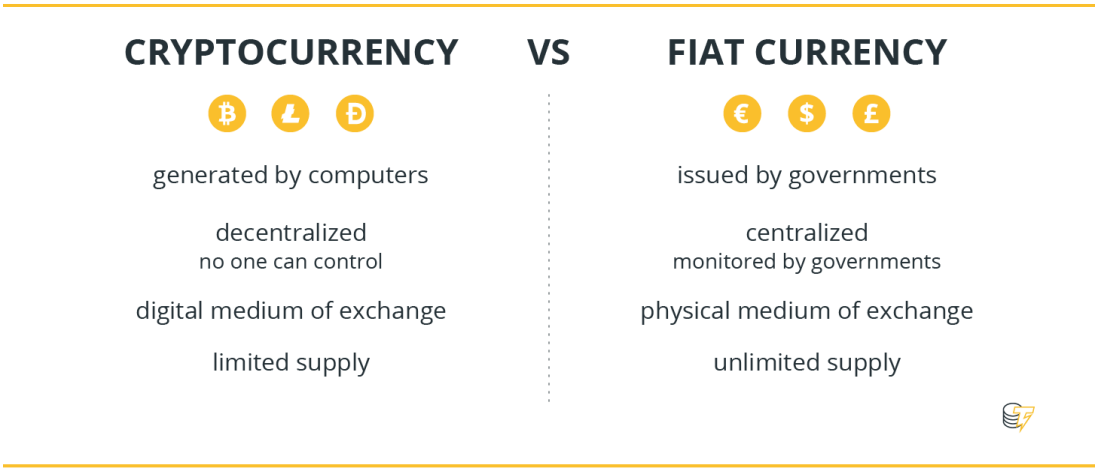
Blockchain allows for transactions to occur between two untrusted parties. The information is verified through a technology-based agreement called consensus, which is done via the blockchain. This replaces the trusted intermediary that would normally be used to facilitate this process. The history of the technology is linked to the creation of Bitcoin, allowing for the widespread belief that blockchain has the technical ability to create trust. The fundamental aspects of blockchain combined with a brief history of the technology will be important in understanding the proposed framework, a dissection of the rhetorical components of blockchain.



(Figure 2, Accenture Blockchain History Timeline)

Financial Industry Use Case

From healthcare to retail, blockchain technology has been enlisted to *disrupt* many industries; however, the financial industry is an authoritative force across different use cases. It is important to understand the intended use of blockchain in finance because these proposals could have a widespread effect on many different business processes. Additionally, the financial sector has an interest in two different uses of blockchain: cryptocurrency and blockchain as a platform (WSJ, 2016). Though each application has underlying technical similarities, the functional use, or how the technology works in businesses, differs. Cryptocurrency, identifiable by the characteristics in Figure 3, is an accessible currency not controlled by a central bank. However, many of the financial services proposed to be put on a blockchain will need more security, control, and a singular authority. These contrasting uses of blockchain will result in conflicting financial compliance.



(Figure 3: Cryptocurrency and Fiat Currency)

Method

The first step was to identify criteria for the framework, building from the ideas of Langdon Winner in "Do Artifacts Have Politics?" Winner argues persuasively that the design of a technology, and the rhetorical way the technology is used, have political characteristics. This applies to blockchain because we are limited to the rhetoric surroundings its use, but we are unaware of the political intentions that could be found in its design (Winner, 1980).

I focus on analyzing the rhetoric of two recent works on blockchain. Doing this serves as both some evidence and a proposal that others should consider how the rhetoric of blockchain has an impact on its use. Future rhetoric-oriented research on blockchain might include the review of industry and academic papers, discussion boards, tweets, presentations, and a survey of cryptocurrency users Hawlitschek et al., 2018) It would also be important to look at similarities and differences across different industries. This could result in understanding if blockchain definitions and uses change across industries, and the consequences of that.

Starting with Google Scholar to understand what different key terms returned. The search "blockchain + financial industry" would return papers about the overall technology, financial uses, and other industry uses. While "blockchain + banking" would return papers discussing the application of blockchain in financial services. Initially, a specific use case of blockchain in finance seemed to be a good starting point, however I settled on two views that blockchain will be an overall disrupter of financial services. The first article was found in the Springer database, and the second article was found using Google Scholar using the same search term "blockchain + financial industry".

The first analysis is an excerpt from a book titled *Banking Beyond Banks and Money*, which is a "guide to banking services in the 21st Century" (Tasca et al., 2016). The chapter is

titled “Understanding Modern Banking Ledgers through Blockchain Technologies: Future of Transaction Processing and Smart Contracts on the Internet of Money” (Panayi and Peters, 2016). It was written by Gareth W. Peters and Efstathios Panayi. Peters is the chair professor in statistics for risk and insurance at Heriot-Watt University, and Panayi is a PhD candidate in the department of Computer Science at University College London.

The second analysis is a Harvard Business Review article titled “How Blockchain Is Changing Finance” was written by Alex Tapscott and Don Tapscott (Tapscott and Tapscott, 2017). The authors are co-founders of the Blockchain Research Institute, which is “investigating blockchain strategies, opportunities and use-case” (see alextapscott.com).

There are papers that discuss that problems and limitations of blockchain technology, however in my search of financial use cases, it was uncommon to find a paper that would present the technology comprehensively. The use of my framework will help us consider if a comprehensive understanding of the technology is uncommon due to the rhetoric used to discuss and describe blockchain.

Framework

The framework developed here highlights different rhetorical characteristics of blockchain technology, and how its rhetorical position is determining its use. This framework is separate from established rhetorical characteristics of a written piece. Each analysis will include an overview of the author, audience, tone, and intended purpose, which will position the authors’ understanding of the technology. However, the intended use of this framework is to better understand the rhetoric about this technology (Miller, 1998). Each part of the criteria builds from Carolyn Miller’s “Learning from history,” specifically her characterization of high technology.

These characteristics include: fundamental technical nature, complexity, opacity to the user, and momentum (Miller, 1998). My framework is summarized in Table 1 and discussed below. For each of the framework's criteria, I offer a background explanation, explain how I applied it in the analysis, and reflect on the future uses of applying this framework to a broader range of materials.

Criteria	**Definition**
Momentum	The influence that supports the use of blockchain.
Definition	The definition used to explain blockchain.
Design	The design of a blockchain process; which changes via use case.
Technical Requirements	The set of features and standards that define the technology.
Functional Requirements	The business functions of blockchain use.
Trust	Trust is used to define blockchain's immutability of records.

(Table 1: Analytic Framework (per Miller, 1998)

1.1 Momentum

My understanding of a technology's momentum comes from Carol Miller's paper about the culture of high technology. Miller defines a technology's momentum as the comprehensive and extensive commitments of "expertise, money, pride, other supporting technologies, and

sometimes political power" (Miller, 1998). However, a leading question behind my framework is if a use case is dependent on explaining blockchain through Bitcoin, do they know the blockchain's intended momentum? We, the public, do not know the creator of Bitcoin, which means we are unaware of the true purpose of this technology. If we continue to root our understanding of the technology to Bitcoin, we are putting ourselves at risk to not only the issues the digital currency faced, but also the fact that we are putting a bet on something that could have been maliciously created.

To determine the author's understanding of blockchain's momentum, I looked at how they introduce the technology's origin. It is my belief that the initial momentum of blockchain is almost exclusively connected with Bitcoin. This will rhetorically influence the social, economic, and political factors that Miller discusses in her definition of momentum.

If this framework is used to critically analyze more papers, I believe we will see patterns that will isolate different variations of the technology's initial momentum, which could reveal more dependable origins and isolate potential malicious ones.

1.2 Definition

Prior to the framework section, I explained that blockchain's definition is constantly changing. There are no standards to the definition, which has a long list of consequences. Mainly, misconceptions or differences in understanding blockchain technology can lead to the technology becoming overly trusted and misused. Often, I see the definition of blockchain tied in with immutability and trust, however there are instances where these 'definable characteristics' are broken. Though it is presented as impossible, it is possible to change information of a blockchain transaction. We trust a blockchain transaction because the network has consensus;

however, it is not full consensus since only the majority need to agree in order to 'trust' a transaction.

To determine this characteristic, I considered the author's definition of blockchain to the fallacies mentioned above, and the alignment of the definition to the use case. I analyzed if the language surrounding the technology's explanation was wary, unaware, or carefully avoidant of the absence of standards.

The goal of this characteristic is to establish a standard for blockchain definitions. If the meaning or understanding of blockchain's defining words change between different use cases, it will become evident that those words cannot be used to define the technology.

1.3 Design

The design of blockchain technology is an important consideration for this framework. However, since the technology's design process will change between different uses, the rhetorical component is how the the technology's design is introduced and discussed. This idea is influenced by Richard Buchanan's "The Declaration of Design" (1985). The paper expands the theory of rhetoric to design (Krippendorff, 1985). Buchanan discusses the rhetorical properties of language, and applies them to the idea that an object is designed with arguments in mind, which determine how an object is used. For example, if a blockchain use case is directly influenced by the design of bitcoin, what are the possible benefits and consequences?

To gather information about the role that design plays in understanding the rhetoric about blockchain, I looked at the language the authors use. Whether they discuss the design directly or indirectly. This means if the author discusses the technology's process to reach the desired outcome, or if they discuss the outcomes without explaining how or why blockchain is

necessary. I also looked at the origin of their blockchain understanding, and applied that to the claims of their proposal.

Analyzing the rhetoric about blockchain's design will lead to insight about the rhetoric within blockchain's design (Miller, 1998). I am influenced by Langdon Winner's narrative about the bridges of the Long Island Expressway designed by Robert Moses (Winner, 1980). The bridges were low to prevent buses from taking the expressway, because Moses believed the future was cars. My question is when the design of blockchain is fully understood, what will the design say about the future?

1.4 Technical Requirements

The technical requirements of blockchain technology will depend on its intended use. A broad overview of a blockchain's requirements include: speed, storage, latency, and scalability. The functional, or business, requirements are dependent on the technical requirements, and I believe there are assumptions, or embellishments, of blockchain's technical capabilities.

To address this, I first looked at whether the authors discussed the technical requirements, either in relation to their proposal, or when they were introducing the concept of blockchain. Then, I examined if they discussed potential problems, or how blockchain compares to other technologies. Lastly, I looked for an understanding of the industry needs, whether or not they compared blockchain to current system capabilities. This framework could identify which blockchain projects are going to fail because they are dependent on a misunderstanding of blockchain's technical functionality. This will determine how behind a project is to catching up with established solutions (Deloitte, 2017).

1.5 Functional Requirements

Functional requirements are dependent on two things: the technical requirements and users. The functional requirement of a lock is to stay locked until a key is entered, however what if the user forgets the key. The functional requirements for this framework will be focused on users. This idea comes from "The Limits of Trust Free Systems" by Florian Hawlitschek et al., which identifies that a user's "...willingness to rely on blockchain technology may well depend on the technical knowledge, experience, and affinity." It seems that blockchain use cases often make an assumption of their intended user; yet, functional requirements may not be within the user's technical grasp. The consequences of this extend from issues with misuse and training problems to potential societal and regulatory changes. This may seem like a jump, but if a user is blindly trusting this technology to complete processes, to take out the middleman, how will they know if it isn't doing that? (Hawlitschek et al., 2018)

To determine the expectations of blockchain and the user compared to the two financial papers, I considered what the functional requirements of the proposal would be. If they were not explicitly mentioned, I worked backward from the outcome of the processes. Then I was able to understand what the expectations of the user were, which also allowed me to identify players.

This criterion proposes the long-term question who will blockchain technology benefit? For example, the technology is presented as autonomous with the ability to perform tasks that a human would normally do. This will reduce time and money spent, however it is important to consider the rippling effect of putting a process on the blockchain.

1.6 Trust

Trust is used to support blockchain's promise of decentralization. Advocates of the technology convey that trust is the problem with centralized systems, and then say that blockchain is the solution because of its intrinsic ability to ensure trust. The argument is that the cost of trust in a centralized economy is expensive and can lead to crises. Enter Blockchain. It is mapped out that the technology will replace traditional and centralized business processes because it will be trusted to do so.

The technology's core components, algorithmic consensus and distributed record-keeping, are communicated as trustworthy (Casey, 2018). However, the two components use different understandings of trust. Consensus is trusted because there is no single-entity governing the process, and distributed record-keeping is trusted because it is immutable. Is it possible to validate a blockchain transaction if one of the components isn't working correctly? For example, in a permissioned blockchain, there is a single entity overseeing the transaction. If we apply this logic to that scenario, trust cannot be ensured. My argument is that trust or trust-free cannot be used to define or explain blockchain because it is entirely dependent on the application and user (Hawlitschek et al., 2018).

I did two things to determine the author's use of trust in their writing. I took note of how many times trust was used in context with blockchain, and then analyzed its positioning. Were they using it within the confines of the definition, or to describe why a blockchain process will be better than current processes? Do they mention issues related to blockchain securing data, but still describe the technology as immutable? This allowed me to identify misconceptions, and understand the author's belief of how trust is built (Hawlitschek et al., 2018l).

This criterion is the most important because the cost of trust is not loss in a decentralized economy. If this technology is deployed without consideration that trust is not an inherent characteristic, blockchain will be incorrectly used with the possibility of harm.

Each of the framework's criteria influence and support each other. The momentum criterion has a threading influence in each part, but one part of the framework should not limit other parts. This will hinder blockchain understanding, because a negative perspective of the technology could be gained. Though a use case may find itself contributing to the critical components of the framework, we should consider that this is still a budding and developing technology that has the ability to meet its promises. A major goal of this framework is to identify when a use case makes claims that do not align with the core components of the technology. If we begin to understand these limitations, we can begin to solve for them.

Critical Analysis 1

The audience for this paper is someone who has an interest in how disruptive technology will affect the financial sector. A reader would have to be capable of understanding both technical and financial jargon. For example, there is a discussion of how blockchain will have to change in accordance with a specific UK financial law. The chapter can be found on the Springer database via Google Scholar. According to Google Scholar, it has been cited 171 times, and Springer says it has been downloaded 5,700 times. This correlates to the purpose of this paper, which is to stand as an overall discussion of blockchain technology and its potential to disrupt the financial industry. A reader could read one part of the paper and learn something beneficial or pertinent to their outlook of blockchain. Many different facets are explained, both positive and negative. For example, they explain database technology, which is essential information to someone who may be more familiar with the financial side and may need help understanding the

technical side. Specifically, that section could lead someone away from a hyped-up blockchain project because they realize a database is a better choice.

The purpose of this chapter is to discuss blockchain and distinguish between different uses. The authors define the technology, explore innovative uses, and identify pros and cons throughout. The chapter is 30 pages long, and offers a very thorough explanation of blockchain and the financial space it is proposed to enter. One specific goal of the paper is to discuss the underlying architecture of blockchain, which is done through a discussion of how the technology will need to change to ensure data security, confidentiality, and integrity. Though the authors expand on concerns of the technology, their overall perspective is that blockchain will change future business processes.

Initially, I thought that the momentum behind the chapter's understanding of blockchain was detached from Bitcoin and cryptocurrency. However, the technology is immediately introduced as the architecture behind Bitcoin. The introduction says the chapter will discuss blockchain applications that do not concern cryptocurrency, however the concluding sentence of the chapter ties the future of blockchain directly with digital money. "…[We] believe that with the onset of the internet of money, the blockchain revolution will play an integral part in this brave new world." They make it appoint to separate the applications throughout the paper, but their conclusion says otherwise.

The introduction presents blockchain has a technology that has different applications, and even defines the authors' perspective of decentralization. They are aware that the technology can be understood in different ways; however, in the section "Blockchain Technology Emerges," which includes the principles of the technology, they use Bitcoin defining characteristics. I argue

that even though they discuss the different applications of blockchain in future sections, they have rooted the reader's understanding of blockchain to cryptocurrency.

The design of blockchain is connected to the idea that the technology is a platform that can be adapted to many different financial processes. Even including that the technology will have to become adaptive of current financial compliance rules. Throughout the paper they highlight issues that may arise, but they do not discuss positives and negatives together. The cons are hidden in long paragraphs, mixed in with financial jargon. I conclude that this is a purposeful technique which would not hinder the possibility of a blockchain based future.

The design criteria of the framework also consider how the authors compare blockchain technology to other similar technologies - databases. The comparison identifies the advantages of a database, but does not directly state if these are advantages over blockchain technology

A goal of this chapter was to discuss the underlying technical architecture of blockchain. The authors discuss the limitations of blockchain technology, specifically how the cryptocurrency application will not support other financial services. Then, in future sections, the authors detail changes that will be needed in order to implement blockchain for bank ledgers and financial accounting. They identified that the technology is not ready to support these parts of the financial sector, but they are presented as hurdles, instead of drastic changes that need to happen.

Since the chapter has a focus on the underlying technology, the functional requirements take on a secondary, or back-seat, role. The users of blockchain are indirectly mentioned, which allows me to consider that the authors believe that a typical blockchain user is highly technical. I believe this because of the section titled "Data Security, confidentiality, availability and integrity on the blockchain". In this part, they identify the importance of data to companies and organizations, and how data integrity issues of blockchain will need to be addressed. Their

proposed solution was to adapt several different data integrity frameworks “within the context of a blockchain network.” Essentially, these are ways to ensure that the users of a blockchain supported system will not mess up data, but the frameworks are very confusing. I do not believe that this could be understood by all of the intended users of blockchain. The authors are assumptive of the user’s ability.

Trust-free is used to describe blockchain’s processes, but later on the authors identify trust issues that will arise when blockchain is used unquestionably. The word trusted is used to describe how permissioned and smart contracts work, an attempt to avoid saying third-party. A permissioned, or private, blockchain needs an authenticator, who governs all transactions that occur. This party should not be associated with the word trusted because that is an assumption. I believe that the authors of the paper are aware of this because their proposed frameworks to combat data issues identify similar concerns. In the section “Clark-Wilson Model for data integrity”, they identify that changes will need to occur to ensure that data is protected. For example, they say there needs to be further development to who has access to the information on a smart contract, which is permissioned use, and they clarify that this differs from a cryptocurrency use, a permissionless use.

The authors correctly connect that the information stored on a blockchain with the word immutable; however, they say that the technology’s perception of immutability is changing because of emerging blockchain frameworks. They refer to a framework called the Enigma Project, which only allows “...access to data for secure computations in reversible and controllable manners” (17). This is a characteristic of database technology, which is mentioned in a previous section, but not referred to in this part.

There is an attempt in this paper to highlight the problems and limitations of blockchain; however, the authors are purposeful in not connecting limitations with their projected use of the technology. Even though they identify that the financial industry will not entirely benefit from a Bitcoin based blockchain, they connect the future of blockchain with cryptocurrency. However, the last sections of the chapter discuss a different application use of the technology. This leads me to believe that the authors of this paper use theoretical frameworks of technology to conceal their limited understanding of blockchain.

Critical Analysis 2

The aim for Harvard Business Review includes both senior executives (the so-called "C-suite") and young professionals, which determines the author's intended audience for this paper. Specifically, a reader with a knowledge or interest of finance, because there is background financial information. Google Scholar has found 28 citations for this article, including research papers about blockchain use cases for accounting, supply chain systems, digital currencies, audit, and initial coin offerings (ICO). It was not possible to identify the number of downloads. However, in a Google search, in a private browsing tab, of "blockchain finance", it is within the first three results after the ads. It is an accessible and brief paper with the ability to influence many different types of reader, mainly because of its reputable publisher and authors.

The premise of this article is that the financial system is inefficient. With the introduction supporting this claim with statistics of annual economic crime, a description of outdated digital and paper processes, and a reminder that the consumer is the person who suffers. The second part of the introduction simplifies the financial system's issues in order to align it with the definition

of blockchain: a digital, distributed, and public ledger. While the next section explains how the technology works, coincidentally solving the mentioned major financial issues.

Blockchain is introduced as being "...originally developed as the technology behind cryptocurrencies like Bitcoin" (Tapscott and Tapscott, 2017). This is familiar and seemingly supportable claim, pointing back to figure 2 - Accenture's blockchain timeline. This does not fulfill the momentum criteria, since it is common to see an expert associate blockchain and Bitcoin. However, the authors make incomprehensive claims when listing the five principles in the section that explains how the underlying technology works.

For example, one of the principles is "Transparency with Pseudonymity," which explains the unique address assigned to a node, or user (Tapscott 2). The language suggests that the users have the ultimate decision of whether or not they remain anonymous. However, at a high level this would depend if the transaction was happening on a public versus private chain. Identities are known on a private blockchain, because it is an invitation-only network governed by a single entity (In The Black). Another principle that only applies to a public blockchain is that records are irreversible. In Figure 4, it is identified that only permissioned users can write or read the blockchain, which means they would have access to either change or omit information.

	Public	Private
Permission	Permissionless Open read Open write	Permissioned Closed write Open or closed read
Consensus Mechanism	Proof of work, proof of stake, etc...	Pre-approved actors within organization
Speed	Slower	Faster
Identity	Pseudonymous, anonymous	Known

(Figure 4, Medium: Differences between Public (permissionless) and Private (permissioned) Blockchain)

My claim is that the Tapscotts have an understanding of how Bitcoin works, and because of its relevant success they used bitcoin defining characteristics to explain blockchain. This factor fulfills the momentum criteria and leads to inconsistencies that fulfill the definition, technical and functional requirements criteria.

The authors position blockchain's definition to solve the issues of the financial industry; making the following examples and information seem attractive to the reader. The definition is not supported with technical details, but the Tapscott brother cite several name-brand financial institutions investing in blockchain solutions. This makes the technology appear fool-proof, and supports the delusion that the technology supporting blockchain is capable of anything.
In the first paragraph, the authors say the financial system is "... exclusionary, denying billions of people access to basic financial tools" (Tapscott 1) However, in the concluding paragraph, adapting blockchain is compared to the idea that GE could have created Uber. The idea is presented that big financial companies will prosper if they invest in blockchain solutions, but it is not mentioned how the everyday user benefits.

Design is discussed indirectly through an example of how blockchain has changed venture capital. Blockchain is presented as completely changing the way venture capital works. The Tapscotts discuss reputable firms changing their investment strategy to match blockchain based startups, and the creation of firms who solely invest with cryptocurrency. This example does not align with their discussion of how blockchain technology will change various financial services; it presents a Bitcoin success story, which will not meet the functional design needs of other financial processes. The definition used in this paper establishes a slanted perspective on the technology's design. Since technology design is determined by the problem it is solving, it seems that the authors are unaware of how blockchain will revitalize different financial services.

The absence of trust, or the idea that trust is not needed, is used to describe the benefit of blockchain technology. The authors say trust is created by listing the following components of blockchain "network consensus, cryptography, collaboration, and clever code" (Tapsccott and Tapscott, 2017). They do not identify if these components are synonymous with all applications of blockchain, but each component parallels to the principles of blockchain section. In the next sentence they jump to the conclusion that blockchain has the ability to perform different financial sector transactions because it can "...verify their identities, establish trust, or perform the critical business logic — contracting, clearing, settling, and record-keeping tasks that are foundational to all forms of commerce" (Tapscott and Tapscott, 2017). This highlights that the authors of this paper believe that a user should blindly trust blockchain because they misunderstood the technology's capability. A user may in fact blindly trust blockchain, but experts should not be conveying this knowledge to other industry leaders.

This article follows an understood definition of the work in Harvard Business Review, which is cliff-notes for executives. Blockchain information was either obscured by name-dropping or unreliable. There is no consideration that this technology is still developing, but the Tapscotts have confidently proclaimed the success of blockchain.

Discussion

The purpose of this section is to compare both analyses, which has two benefits. The first benefit is to see how the framework's criteria manage different perspectives. Which introduces the second benefit, the potential that this framework can identify similarities and differences across many different source materials. The discussion will be based off of the information in the Table 2; I will discuss my findings from comparing the articles to the criteria.

Criteria	Article 1	Article 2	Comment
Momentum	Bitcoin/ Permissionless Blockchain	Bitcoin/ Permissionless Blockchain	Future blockchain uses dependent on bitcoin/ permissionless characteristics
Definition	Overall definition is permissionless, but identifies permissioned	Defines the technology using permissionless characteristics	Definitions are different from each other
Design	Directly discussed and identified that changes will be needed	Indirectly discussed through an apparent success story	Different design goals for the same industry
Technical Requirement	Hopeful	Assumptive	Detailed understanding of the technical architecture is non-existent in both
Functional Requirement	Users will be very technical and will not mess things up(they will)	Not for everyone, only big players involved in blockchain's future	Users are not directly mentioned in either paper

Trust	Uses trust to explain different applications	Uses trust to explain how blockchain works	Both are not concerned with the weight of the word.

(Table 2: Comparison of the Framework to Article 1 and 2)

The dates these papers were written also affected my perspective. The chapter was written in November of 2015, and the Harvard Business Review article was written in March of 2017. Since the chapter addresses concerns, identifies different applications, and provides detail about the technology it's place in the financial sector, why did the Tapscotts completely ignore it? The concerns of the technology were not exhaustive; but, the ones mentioned were substantial and supported with reasoning and even two solutions. With almost a year and half between these the published dates of these articles, I find it hard to believe that during the research process of the HBR article the Tapscotts did not come across similar information. It is foolish to pass along misinformation about a technology that has been positioned to disrupt so many industries. To reiterate, the Harvard Business Review is an influential media source to powerful people, and it is scary to think of the published pieces similar to the Tapscotts' attempt.

The momentum for both of these articles is Bitcoin; this is understandable because of the encouraged belief that the *first* use of blockchain was so successful. There are slight differences between the two, which can be attributed to the differences of length and the intended audience. However, the criteria are still applicable and it was possible to identify where each author's initial idea of blockchain came from. In the future, this may become more difficult because it will not be necessary to explain the technology directly to its history and first widely recognized

use case. For example, when I was learning about SQL, my professor did not walk us through the history of the database.

I identified in the conclusion of the Framework section that one criteria should not limit other parts of the framework. This became a challenge during the critical analyses. The simple route was to attribute a misconception of blockchain to the author's initial understanding or explanation of bitcoin, which would be the momentum and definition criteria. However, the route that will lead to further understanding and that welcomes change considers the intentional and unintentional consequences and benefits. Not only understanding an article's rhetorical positioning of each criterion, but also identifying the future of their perspective. An example would be in " Understanding Modern Banking Ledgers through Blockchain Technologies…" when the authors propose two frameworks that will ensure data security. I concluded that these frameworks were too complicated for every user of blockchain, but could the application of these frameworks create a next next-generation blockchain. In my mind, that is a blockchain that is aware of immoral and unethical transactions. My critique of these articles should not be considered a limitation, instead a starting point for further discovery (Krippendorff, 1985).

Trust has been intrinsically linked to blockchain, which is just as concerning to me as the quality of information published in the Harvard Business Review. I believe that improvements and change will be possible in each criteria; it is possible to identify the technical and functional aspects of blockchain that differs between uses. This will allow more successful use cases and proposals, which is dependent on the user's ability to understand this information. I am guided empirically that this process is how technology develops and advances. However, current blockchain based proposals, projects, companies, and other uses will be adversely impacted with

no solution in sight. The belief that blockchain has an inherent characteristic of trust will continue the creation of ignorant blockchain solutions.

Conclusion

Overall, blockchain has been defined as accessible to anyone because its technical design can ensure trust; however, it is appropriate to conclude that the end user is not a concern. Rhetorically, we are either regarded as highly-technical and capable of understanding blockchain, or we are not mentioned. Alluding to the hope that we don't realize that blockchain is another word for database. Those who have a say in the adaptation of blockchain may not consider the unintended impact on end users; but if we are resistant to the idea that a technology can undoubtedly ensure trust, a redesign, or a renamed, technology will emerge.

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