# Blockchain:  Opportunity to Improve Financial Reporting and Corporate Governance

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**Executive Summary**

Technology has always been the driving factor behind human advancement throughout time. The innate ability for humans to add to the world in benefit of others is stunning especially with the constant innovation that builds from one invention to another. Satoshi Nakamoto is credited to have invented Bitcoin, but he had no idea that it would lay the groundwork for a technology that would potentially alter how financial reporting is done forever. The implications of what proper application of blockchain can provide for auditors, companies, and regulators alike are immense. Each of their roles in the capital markets will be intensified as they will soon be able to autonomously and securely store and aggregate data for the use of investors.

After learning about the invention of Bitcoin and its underlying technology, blockchain, it will become clear that its ability to be utilized for cryptocurrency will be far surpassed by its usefulness in other areas. Public companies are always looking to provide further assurance that their financial statements are free from material misstatement. Triple-entry accounting, through the use of blockchain, will allow for extensive verification of transactions autonomously, putting managers at ease, and helping maintain confidence in the financial data that maintains the structure of capital markets.

Confidence in capital markets stems from two main areas, transparency and monitoring. These two "arms" create and reinforce the corporate governance model that helps assure financial data being used by shareholders is accurate and reliable. Standard and regulations maintain that companies are properly representing their financials to the best of their ability; while those that monitor the adoption of those standards help reinforce that companies are representing themselves fairly to the public.

Blockchain has the ability to reinforce both arms of the corporate governance model by helping companies become more transparent, while also helping monitors have more reliance on the data that they are reviewing. Both of those opportunities provide a pathway for creating an environment where shareholders truly believe that they can count on the financial data being presented to them. Along with the promise and aspirational nature of this technology, governments and accountants have been taking notice. There has been increased legislation surrounding utilization of blockchain, and public accounting firms have been creating task forces in order to ensure the profession does not become obsolete. This technology will change average CPA's role forever, and for that reason, it is important to be on the forefront as all stakeholders work towards ensuring that financial statements are free from material misstatement.

The practice of accounting dates back thousands of years to the Zenon Papyri and carvings on blocks. Now, a newly developed technology, blockchain, has prompted a disruption in the corporate and public accounting industries. Blockchain has become a formidable player in the conversation of how to securely collect and report financial information in the ever-changing and threatened cyber world of data storage. When most people think about blockchain, they immediately tie it to Bitcoin, a decentralized currency with a public ledger. Although blockchain was created by way of the creation of Bitcoin, blockchain will surpass the Bitcoin in usefulness and prove to shape a new era of how accounting information is stored, audited, and monitored to ensure confidence in capital markets remains high. Currently, companies, auditors, regulators, and the public alike are looking to stay in front of the coming disruption to financial reporting and auditing. All parties will need to be calculated and poised when evaluating the true potential that blockchain has to change how accounting information is produced worldwide.

**Corporate Governance**

Since 2002, when the Sarbanes-Oxley Act (SOX) was passed, there have been major shifts in the amount of attention paid to internal controls, fraud, and corporate governance. Following scandals in the early 2000s such as Enron and WorldCom, corporate governance became the overarching theme that was integral in restoring confidence in the validity of financial statements. The corporate governance model being utilized in this research focuses on the accounting information that is presented in the financial statements and ensuring that information is accurate and reliable. To evaluate the strength of the accounting information being reported, the model breaks the accounting information into two separate branches, transparency and monitoring.

Transparency is comprised of the guidance and standards that are issued by the Financial Accounting Standards Board (FASB) and other standard setting bodies. This includes generally accepted accounting principles updated by the FASB (GAAP), and any standards that help establish and shape the substance and form of information being presented in the financial statements. The monitoring branch of the corporate governance model focuses on proper and ethical application of standards when financial reporting occurs. This includes any party that is privy to reviewing financial information or regulating the companies that provide that financial information. The monitoring portion includes internal and independent auditors, the Securities and Exchange Commision (SEC), the Board of Directors and so on. These bodies are charged with providing oversight and taking action to ensure confidence in capital markets is rooted in accurate and reliable accounting information. The relationship between the two branches increases investor confidence which further strengthens the capital markets.

**The Creation of Bitcoin and Blockchain**

In 2008, a technical paper was released, authored by the alias, Satoshi Nakamoto, that detailed the creation and explanation of what Bitcoin was. This paper laid the ground for Bitcoin to become the first in a brand-new type of virtual currency, called cryptocurrency. To understand the implications of this technology and its benefits further than the currency itself, it is important to grasp the basis for why Bitcoin and cryptocurrency were created. A virtual currency is "a medium of exchange existing entirely in intangible form that is not legal tender, but which can

substitute for legal tender" (Piazza, 2017). Cryptocurrency, as a broad category within virtual currencies, is defined as currency held within the internet and verified through the process of cryptography. The technology behind cryptography established the most important part of Bitcoin's creation, the blockchain.

The blockchain as it relates to Bitcoin, is a decentralized collection of "blocks" in a public yet anonymous ledger that lists each time a Bitcoin is transferred or used in a purchase. Each "block" is created when one of the aforementioned circumstances is executed. The importance behind the creation of blockchain technology comes from the inability to edit a "block" once it is added to the blockchain. Before any type of transfer is recorded on the blockchain, the process of adding a "block" to the chain must occur. This slang for this process in the case of Bitcoin is defined as "mining." When people talk about "mining" for Bitcoin, they are saying that they are using their computer power and their electricity to solve a complex math problem that encrypts, or secures, the "block" and adds it to the ledger. The solution to the math problem, provides a unique encryption key that is used one time only to add a "block" to the chain.

In return for using their resources to solve the equation, they are paid in Bitcoin, introducing more into the Bitcoin economy (Moore, 2015) showing why it is called "mining." The Bitcoin ledger of transactions is decentralized, or not governed by anybody. Therefore, it relies on "miners" to add transactions to the chain. Once a transaction is added, it cannot be reversed. It is important in Bitcoin's case to compensate the average person using their resources because just the electricity used is exorbitant and expensive.

**Blockchain and Distributed Ledger Technology**

As discussed, Bitcoin's onset brought its blockchain technology to the forefront of storage and access of data. Many other cryptocurrencies were created that are reliant on blockchain technology and businesses in many industries took notice and are actively evaluating and pursuing the possibility of creating their own blockchain to use in their businesses. Blockchain's applicability to use in a business setting stems from it being a type of distributed ledger rather than its use in underpinning cryptocurrencies. A distributed ledger, through algorithms, allows all users within a network to collaboratively create the ledger itself (UK Government Chief Scientific Advisor, 2015). That ledger can be comprised of any type of information such as electronic, financial, legal, or physical assets showing the vast possibilities for use in a business setting. The technology behind cryptography and the blockchain allows for that network to be secure and sequential in nature. The organized and secure nature of this technology is why it is appealing to so many different types of parties interested in utilizing it for their business. It has the possibility to disrupt what record keeping looks like and that affects auditors, companies, regulators, and standard setters alike as the word moves into a new technological age of storing and reporting.

**Smart Contracts**

The smart contract has been heralded as a "key development" (Bible, 8) in the growth of blockchain technology. The smart contract is a way to modify the average contract by automating the process and removing the human aspect of a third party. The smart contract was first introduced on the Ethereum platform, the second largest blockchain network after Bitcoin (Bible, 9). Because smart contracts originated from Ethereum's creation, it has established itself as one of the most popular networks for conducting smart contracts. Ethereum is dubbed as a "public protocol," (Bible, 9) which means that its whole network is visible (not editable) to the public, allowing for great transparency of the details of the contract to anyone at any time. However, an Ethereum-like system could be created so each company could have their own private network to create and execute contracts on. The contracts would not have monetary value, they would only have reporting value in order to aggregate and hold data in the blockchain ledger.

Smart contracts consist of two parties entering into a contract agreement for a product or service. The contract details are clarified and entered into the basis of the smart contract. Once the basis for the contract is created, it cannot be edited. The blockchain keeps track of the details of the contract, which includes important fulfilling aspects of the deal, such as a pending date or the delivery of goods or services. Once the contract is complete, the smart contract identifies the conclusion of the deal, and automatically records the amounts of the contract via blockchain.

**Revenue Recognition**

In an everchanging world, new industries and products appear out of nowhere. Current accounting procedures may not fit the needs of companies just starting to gain their footing. To respond, new guidance is issued to help with transparency and validity of accounting data. For example, the FASB released ASC 606 which outlined new guidance for revenue recognition that would be required at the end of calendar year 2018. This guidance completely altered how revenue was recognized when a transaction included use of a contract.

ASC 606 specifies five steps that must be satisfied in order to be able to recognize revenue. The first step is to identify the contract. They can be oral or written, but either way through the contract, a company must obtain the rights to receive consideration and also assumes the obligations to transfer the goods or services to the customer. Those obligations are considered "performance obligations." The next step is to identify performance obligations and whether or not there are multiple performance obligations. If obligations are not highly dependent on each other, each obligation should be accounted for separately. Next, the company must determine the transaction price which can be comprised of variable consideration, non-cash consideration, and in the case of long-term agreements, adjustments for the time value of money. After the price of the contract is determined, the price is allocated to the separate performance obligations highlighted earlier. Finally, recognition of revenue can occur.

Recognition of revenue occurs when the customer obtains control of a good or service. This means the customer can direct the use of and collected substantially all of the remaining benefits from the asset or service. The customer obtains control when the have the significant risks and rewards of ownership, and they have accepted the asset. They obtain control also when the company has a right to payment for the asset, has transferred legal tile, and the physical possession of the asset. The new guidance is required to be implemented by the end of calendar year 2018. As accounting units in companies discuss implementation, each product will need to be evaluated and judgements will need to be made following each of the five steps above. As companies define their contracts, performance obligations, and allocations, they will have information that when gathered, could prove valuable in the implementation of smart contracts and even further, blockchain.

**Blockchain's Application to the Enhanced Financial Reporting**

The current process of financial reporting and performing an audit can be analyzed like a Rub Goldberg machine. All of the actions performed within have an important purpose, but a lot of them are non-value-added activities being done primarily because technology has not helped the profession evolve past them. Blockchain provides an avenue to cut out some of the nitty gritty work that creates lengthy processes for financial reporting and audits that only provide reasonable assurance that the financial statements are free from material misstatement.

Currently, accounting, auditing, and compliance costs are massive for all businesses around the world. Fines alone of over $200 billion dollars have been assessed sheerly because double entry accounting provides avenues to commit errors and fraud (Watson, 2017). All assertions only being reasonably assured creates atmosphere that allows for some misappropriations to occur. In a perfect world, managers would not make errors or commit fraud and auditors would like to provide complete assurance that that is the case. Blockchain's application to accounting both in industry and public firms will help cut down on the risk involved with auditing and reporting and help increase transparency of reported accounting information.

**Reshaping Entry Based Bookkeeping**

Throughout time, accounting systems have developed into comprehensive ledgers that when combined provide insight into the company's financial health. Accounting systems at the beginning consisted of single-entry systems. These systems were able to show management cash flows and the current cash balance of the company (Brandon, 2016). Although that information was useful, management in companies began to seek further numbers to examine the financial health of their company. That is when double-entry bookkeeping was created. Double-entry bookkeeping allowed for transactions by the business to be placed on ledgers and aggregated. Debits and credits showed not only the inflow and outflow, but the underlying purpose behind each transaction. The ledger was then able to be aggregated to show amounts being spent in certain areas, amounts owed by customers, and so on to create the generic financial statements that adhere to current GAAP standards today. Now, with the onset of new technology such as blockchain, companies will be able to transition to triple-entry bookkeeping.

Triple-entry bookkeeping was originally considered too complicated to actually implement. The new method of bookkeeping would verify every entry to strengthen the validity of the data represented in the financial statements (Dai, Vasarhelyi, 2017). To verify the data, it was thought that a neutral third party would need to authorize transactions in order for them to be included in the ledgers and statements. Blockchain technology and smart contracts provide the potential to eliminate the need for a neutral third party to be hired and rather have that third-party represented as a programed technology.

The basics that blockchain technology can provide include mitigating risk and distributing and automating storage and verification of data, or the third entry. To do this, the

private blockchain system of the designated company would utilize the existing double-entry enterprise resource planning (ERP) system. To make the third entry, a smart contract would need to be fulfilled and when it is fulfilled, the data will be released to make a third entry into the blockchain "verified" ledger. To accomplish this, the system would actively verify all entries made in the ERP system by cross-referencing them with the journal entry, asset transfers, and total ledger balances. Those areas would provide verification that would enable the posting to be created in the blockchain ledger.

**Strengthening Accounting Systems**

This new technology would shift the focus of how an accounting system is maintained to further increase adaptation to standards. Instead of focusing on journal entries, accountants would need to focus on new standards being issued. Smart contracts will represent an agreement of the company to follow GAAP and those that program the smart contracts will be the ones interpreting GAAP. When the system is implemented, the focus will not be on when a specific entry should be made, but how the basis behind that entry affects the larger picture of making sure financial statements are valid. There are also opportunities to automate actions that can relate themselves to collusion and management override. Both of those actions present inherent risk that was previously found to be nearly impossible to prevent.

The application of this technology is vast because it shows a viable option that strengthens both transparency and monitoring. Companies will be able to focus on adopting new GAAP standards without making drastic changes to their internal controls. Transparency is rooted in five standards: truthfulness, completeness, materiality of information, timeliness, and accessibility (Watson, 2017). The use of smart contracts to initiate adding information to the blockchain ledger automatically, will reinforce those five standards further providing accurate accounting information. The regulators that ensure standards are being adhered to will also benefit. They will benefit from the accessibility of the information and the adaptability of the system. When companies begin to implement the use of smart contracts, they will be able to better adhere to the regulations set. Regulators will then find monitoring automated information easier because there is less inherent risk. All monitors from auditors to the SEC will find solace in the benefits that blockchain will provide.

**Roadblocks to Implementation**

The benefits of blockchain can only be realized with proper and calculated implementation. Beyond programming, hindrances to implementing blockchain will also stem from technological incapability. As discussed before, the blockchain that bitcoin runs on already utilizes more power than the entire country of Ireland. This poses significant problems for a small to large company implementing the technology. For a company to implement blockchain, they would need computers running equations to solve them in order to add a block to the chain. For security purposes, these computers would need to be spread throughout the world so they

could not be compromised all at the same time. The power that all of the computers will utilize will be immense, but as technology advances and new companies emerge, there may even be a disruption to the cloud and data storage industry where data centers house blockchain intiating computes. Again, the security threats that come with this problem are present, but in the next ten years computing power will be greatly enhanced, and with the backing of various audit firms and companies, the problem will undoubtedly be solved.

## Example of Blockchain Implementation

Every new technology has its weaknesses, but the inherent weaknesses presented below do not differ drastically from weaknesses of current accounting systems, especially as risks brought up when they were being implemented. The companies that are going to begin offering consulting for blockchain implementation as well as the companies starting to write code for smart contracts will not have a company use the platform unless they know it is as or more secure than current systems being used.

The attraction to using blockchain does not stem from security alone. The advantages of using blockchain lie in its automation and verification of storing data. If this new technology will be as or more secure than current systems, the attractions of its added effectiveness and efficiency will be the determining factor when companies decide to use it. To illustrate how it will create added value within accounting systems as applied to transparency and monitoring, its benefits in applying the new revenue recognition guidance ASC 606 will be illustrated.

AS discussed, the FASB released new revenue recognition standards. Revenue presents one of the most common areas for fraudulent behavior and the new guidance presents a unique opportunity to overhaul current policy and test new blockchain technology as well. This research is not arguing that blockchain will create a system that will not need to be audited. It is presenting a scenario that aims to bring down the need for human intervention in reporting which would further validate the data, decreasing the risk associated with such data.

## Application to a Video Game Publisher

To illustrate implementation of smart contracts and blockchain, a video game publisher will be used as an example. Currently, software, especially video games, have become more than just a one-time purchase for use. New technology has allowed developers to update a game throughout its lifespan to add new offerings, features, and even significantly alter gameplay. This new "service" aspect of selling video games has completely altered its value chain. An executive from Microsoft has discussed that no longer is the intention of video game publishers to make a point of sale (BestBuy, Amazon, etc.). They want to create a long term relationship with their consumers that includes updates, fixes, and new offerings that will be given to the consumer throughout the duration of the game's life span (Gonzalez-Pinero, 2017).

Given these new types of offerings from video game publishers, there are more moving pieces to be applied to the new revenue recognition guidance. As an example of blockchain application, a "deluxe" package for a given video game will be detailed and applied to implementation. The average video game is sold for approximately $60, and deluxe versions, $80 to $100. For purposes of example, the given video game package being sold will be sold on the higher end of the spectrum for $100 and the game lifespan is one year (until the next edition is released). The package includes the basic game, monthly bug fixes (updates), three new content downloads (DLCs), and 1000 virtual currency to be used within the game. For purposes of this example, the breakdown of those obligations and their assigned transaction price obligations are:

| Performance Obligations | Cost if Separate (usd) | Price assigned to Performance Obligations |
|---|---|---|
| Actual Game (includes fixes) | 60 | 39 |
| 12 Monthly Bug Fix Updates | - | 1.08 each |
| 3 New Content Downloads | 15 each | 13 each |
| 1000 Virtual Currency | 10 | .009 each |

(See exhibit A for calculation of prices assigned to each obligation)

**Implementation of a Smart Contract and Blockchain**

After management does the work above, a smart contract will be coded leading to the creation each time a deluxe edition is sold. As discussed in depth before, a smart contract is an automatic way to keep track of and fulfill obligations to customers. Once the performance obligations and price allocations are determined and entered (into an API), the smart contracts will be ready to use upon sales.

When a sale for the deluxe game is made through the online third-party marketplace, the contract between the publisher and customer for revenue recognition purposes is created (ASC 606 step 1). The publisher is then responsible to fulfil the performance obligations detailed above (ASC 606 steps 2-4). Each time a game is sold, the publisher will be notified as each unit downloaded has a unique serial number that can be matched to the user. Upon notification to the publisher of a sale, a smart contract tied to the unique serial number will be created. The smart contract represents the performance obligations that are the basis for the contract identified between the customer and the publisher. This will all be initiated autonomously when the sale is made with no ability for human intervention.

Each smart contract created will contain separate agreements to provide performance obligations to the customer. When the game, updates, or DLC are downloaded, the publisher will know from the unique serial number sending the request to download. A notification will be sent to the publisher which will be recognized by the smart contract designated as the game deliverable part of the contract. After confirming download, that obligation in the smart contract

will be settled. A token will be released by the smart contract with the value of the price assigned, or $39. When encrypted onto the blockchain ledger, that $39 will now be shown as revenue for the company.

The same process will occur over the year monthly, when updates are downloaded, and three times when new downloadable content is released and downloaded. When one is downloaded, the token will be sent for encryption and added to the blockchain ledger. At the end of six months, six updates will have been downloaded, and one DLC will have been downloaded. Now, in the blockchain revenue ledger, it would read $58.48 (39+13+6.48). When virtual currency is used in the game, the same process will occur. This entire process will be complete autonomously via the use of smart contracts recognizing notifications from the systems that video game publishers already have developed for game downloads.

## Strengthening the Corporate Governance Model

### Transparency Improvements for Financial Reporting

As illustrated above, implementing an autonomous system that utilizes smart contracts in conjunction with a blockchain can minimize the amount of human interaction in the financial reporting process for revenue recognition. After the company management decided how they would like to recognize revenue, that guidance was entered into the smart contract software. The software would apply that guidance to all contracts moving forward with an inability to alter smart contracts open or in the past. Once fulfilled, the contract would release a token into the blockchain ledger that would record the revenue, again without any ability for human intervention.

This new technology will take the human out of the process of actually recording the revenue being earned. Without the download, the smart contract will not execute, and without the smart contract being executed, no revenue information will be sent to the blockchain. This means that unless someone purchases the download, the revenue will not be triggered. Also, the revenue tokens being released and added to the blockchain have the ability to have more than just the amount connected to them. The tokens can have information within them such as the date of purchase, date of recognition, and type of product. They could even carry links to receipts which would be useful in auditing.

Having such detailed information regarding each specific transaction making up the blockchain ledger will provide useful for management. With certain people having access to view the all encompassing blockchain ledger, they can program settings that allow them to aggregate the data to use as metrics and support guidance. An overlay to apply to the blockchain could be a graph with a dropdown produced by utilizing all of the data in the ledger. The CAO and CFO could have the ability to look at this data and with one click of a button, they could see all revenue recognized from DLC downloads in the third quarter. In an age where data analytics is becoming more and more important, the presentation and interpretation of this data showcase how the accounting profession will transform with the implementation of new technology.

In this scenario, management would decide how to adhere to GAAP requirements in the current day, set the guidance and move on to looking to the future. They could also set dates for changing to new guidance with the system that would automatically apply new protocols moving forward after a certain date. This management guidance can also be applied further than just revenue. Smart contracts and ledgers can be created to move inventory to cost of goods sold upon shipment, accounts receivable to cash upon reception, and even work-in-progress to finished goods upon completion. As internal control systems become more automated, these data will become available making it easier to set up smart contracts that automatically add to blockchain ledgers. This level of automation will shift the focus of corporate accountants to how to set instructions for the contracts in an effort to adhere to new GAAP guidance. This shift will also alter the focus of auditors when they perform an audit.

**Making Monitoring More Efficient and Effective**

The above scenarios illustrate how corporate accountants can be taken out of much of the reporting part of financial reporting. This can be a welcome sight to auditors while also be a troublesome realization. The possibility to take accountants out of reporting could mean that they are next as many articles allude to. Although far in the future auditors may wear different hats, the current outlook of blockchain implementation does not look to make auditors obsolete. It could be looked at as getting to the heart of interpreting standards rather than needling through data to find the one fraudulent journal entry.

As discussed, much human intervention is taken out of the actual reporting process which would automate many internal controls. This automation would start to make lower level positions incorporated into those automated internal controls, making them obsolete. Instead of performing substantive testing on randomly sampled data, the auditor would have access to an entire blockchain ledger of data. That data could be tested by recalculation to ensure the system is adding together the final number properly and that it matches those recorded in the ERP. No human intervention and no ability for management override will lead to a large part of the inherent fraud risk being taken out. This would shift what auditors provide reasonable assurance on more to the guidance by management.

While performing the audit with access to the blockchain, the auditors would be able to see changes in smart contract guidance. Each time a smart contract's basis is changed, that change would lie in the tokens within the blockchain. This way if a manager changed the basis to a more favorable revenue recognition policy, for example, the auditors would immediately be able to pick up on that change and get to the bottom of it. Also, when management properly changes the basis for the smart contracts in accordance with new GAAP issuances, auditors can spend their audit hours discussing with management the basis for their decision. That basis should be the most important part of an accountant's job rather than the actual recording of data.

One could argue that having accountants on the corporate and auditor side discuss proper application of FASB guidance would lead to the purest form of accounting on both ends. This

new direct form of accounting will help auditors work to provide better levels of reasonable assurance that is based in fact, not just randomly sampled files. At a further point in time, auditors could also serve as the preemptive step to changing the guidance for a smart contract. Companies could have an open dialog about adjusting their contract guidelines prior to actually making the changes.

As more areas of the financial statements are woven into the blockchain infrastructure, there will be applications past auditors in the monitoring branch of corporate governance. When contents of full financial statements are held within internal blockchains, they will be able to be linked to the EDGAR and XBRL systems. The statements could be automatically tagged so at the click of a button, filings would be produced. They could first be updated after auditors reviewal, but as auditors are able to take a more preemptive role, financial statements could be kept in real time with verified information held in the blockchain. Strengthening the completeness of this system and technology will further strengthen the monitoring branch of corporate governance. This will provide that the accounting data consumers maintain the utmost confidence in the reliability of accounting information they are utilizing.

## Opportunities and Weaknesses in New Technology

Blockchain technology, alike to other developing technologies, may provide large benefits if implemented successfully. Those benefits, however, can tend to be overshadowed by the potential risks involved with the implementation. This new technology has proven its benefits, but it is important to evaluate the opportunities and weaknesses involved with successful implementation. To counter these threats, governments across the country are passing laws surrounding the preliminary use of blockchain technology. Firms are also starting to take notice as potential jobs are at risk. The risks associated with blockchain and smart contracts that will be discussed pose threats mainly based in data security in a developing technological age. These threats are similar to technology already being used seeing as KPMG just declared cyber security the largest area of risk for companies (KPMG, 2018).

### Legislation

Even though many people want to dismiss blockchain as a passing fad, states across America are proving it is not. States are taking notice to the current applications of blockchain technology and are doing their best to actually pass laws surrounding blockchain use. The openness to pass laws shows promise to help define the limits and expectations for companies when they decide to use this technology. Delaware, the state almost two-thirds of Fortune 500 companies are registered in, has been leading the way for Blockchain legislation. In 2016, Delaware launched its own "Blockchain Initiative," aimed at bringing "blockchain innovation" (Tinianow) to the state. Since its inception, Delaware has made numerous amendments to the

current legislation, as well as having passed new bills to keep up with technological changes in the industry.

The most noteworthy of the changes has come from the "Blockchain Bill" that was passed in 2017. This bill made "inclusion of blockchain technology in the infrastructure of corporate governance" now legal. The passing of this bill led to amendments of other laws regarding corporate governance. For instance, §151(f) was amended so that certain shareholder communication was allowed via distributed ledger platforms, and §224 granted "statutory authority" for corporations to use distributed ledgers to create and maintain corporate records (Song, 17).

So why did Delaware decide to be the first state to pass blockchain related legislation? Well for starters, the state understood the necessity for some legal position to be taken about this new, incoming technology. Before this legislation was passed, it was not *illegal* to use blockchain technology with regards to items such as corporate record keeping, but nowhere in the law did it say anything about blockchain. Because of this, corporations had no idea if any records they kept on a distributive ledger would be "legally binding in a court of law." (Prentiss) Delaware sought to put this issue to rest and ease the minds of the thousands of business owners registered in the state by addressing the legal issues with legislation.

Another reason Delaware passed the bill was to address corporate governance issues that blockchain was attempting to solve, as well as bring greater transparency to the business world. At the time, Delaware had witnessed a major problem with one of its corporations, the computer company Dell. A shareholder vote with significant ramifications on the company had been scored incorrectly as an intermediary between the shareholders and Dell incorrectly recorded the votes of the shareholders and told Dell the wrong number (Song, 16). This created all sorts of issues, and people within the blockchain community quickly pointed out that this could have been avoided by using blockchain. The shareholders could have voted directly with their votes being added to a blockchain therefor congregating in the distributed ledger, removing the intermediary and the chance of error. Doing this would also be faster and cheaper without involving a third party. In addition, the benefit of transparency would aid all parties involved because the public and secured ledger would allow for transactions to be seen and stored safely in the blockchain.

Delaware is not the only state that has been vigorously pursuing legislation related to blockchain, as Wyoming has also been an active participant in the blockchain. Following the lead of Delaware, Wyoming passed laws in the beginning of 2018 related to both cryptocurrency and blockchain. The two laws of importance were H.B. 0101 titled, "Electronic Corporate Records" and H.B. 0070 titled, "Open Blockchain Tokens – exemptions" (Miller, 6). The law about corporate records is exactly like the one in Delaware, where the state made using blockchain for items such as corporate record keeping, shareholder voting, and electronic signing legal.

The law passed about blockchain tokens was an interesting one, as it was not related to anything Delaware has passed. Blockchain tokens is an interesting concept. These tokens are part

of an "initial coin offering," also known as an ICO. This new law makes utility tokens exempt from certain regulations imposed on securities. Utility tokens are one of three different types of ICO's, and they differ from the other two types because the utility token is typically not held as an investment (strategiccoin.com). While the other tokens may be held and exchanged with another party in the future for profit, the utility token is usually bought in advance by a customer for use later. For example, a company may be creating a cloud storage service that customers are interested in. The customer could buy tokens now and exchange them with the company in the future for the limited storage space available.

This new law makes these utility tokens "exempt from securities legislation" (Miller, 6) meaning people can freely trade these tokens without anyone being a registered broker or having any legitimizing factor attached to their name. This may seem a bit scary to some investors, but it is a nice show of deregulation by the Wyoming government as it tries to establish itself as a blockchain friendly state. These laws are conducive to quick growth of blockchain and is already paying dividends are blockchain technology start ups have begun to flock to Wyoming. The state has recognized that "not everything is a security" (Miller, 9) according to Lewis Cohen, an attorney from law firm Hogan Lovells. Not every investment in a company is profit-seeking, as with a security. These utility token investments are often just done to help a business grow, and Wyoming has recognized this and removed attached legislation. By doing this, it should be easier for blockchain-based companies to sell their services to future clients without being bogged down in security related laws.

As states begin to pass laws related to blockchain, one cannot help but wonder where the US federal government stands on the issue. After all, federal law trumps state law. The SEC has been forced to discuss the issue because the constant buzz around cryptocurrency and blockchain has not gone away. The SEC held a town hall style investments meeting in Atlanta, GA in 2018, and more than half of the question and answer session was centered around cryptocurrency. This then sparked the first ever SEC town hall meeting at the Blockchain World Conference in New Jersey this past July. This meeting was more of an overview of the technology, providing a platform for the SEC to educate and create awareness about the new technology. While no groundbreaking events came out of the town hall, the SEC did not kill blockchain either. The SEC established that this new technology poses both benefits and risks, and needs monitoring. (PR Newswire) This comes as a great sign to those in the blockchain community, as it seems the SEC is also ready to take a step in the right direction with its stance on the technology. Adding any regulation and the creation of an oversight body would be a monumental leap forward to ensuring safety to the users of blockchain. Increasing the monitoring duties seems to be the SEC's type priority related to blockchain, and that certainly comes as a relief to investors because of how corporate records and transactions will be held in a public distributive ledger.

**True Security of the Blockchain**

Although there have not been many successful attempts to hack into and alter a blockchain, it has not been ruled out as a possibility. As computers and their users progress, there

will be a continually heightened amount of risk associated with utilizing current and new technology. The only way to try to prevent hackings is to be proactive in security and possible cases that could come about. The largest threat is for someone to gain access to the network and gain access to the key that is used between the notification of purchase and download system and the smart contract themselves. For this to occur, an entire private network of the company would need to be breached. This would take a very coordinated attack and for an employee to give up their access would be a large breach of duty of care. As in the case with many tech related issues, the humans are the people that put computer systems at risk (Park, 2017). The other form of attach stems from a more technological approach. This attack type mainly focusses on taking over the encryption network. If more than 51% of the encryption power is taken over, they will have control over when and how tokens would be released into the blockchain. As discussed, the immense power required for use of the blockchain poses problems for companies to implement the technology. For any individual or group to gain that amount of power proves to be currently infeasible. It is worth taking into account, however, that if a company has the ability to implement blockchain stemming from its ability to have the power to do so. That technological feat will not be far off from someone else obtaining it and using that power to take over a network.

Even though this seems like a perfect way to remove the human aspect of contracts, there are examples that prove otherwise. In 2016, a venture capital fund operated as a fully decentralized organization, carrying all its operations out via the blockchain. The company utilized tokens as a way of accomplishing tasks. Investors bought into the company in exchange for these tokens, which were then invested in projects to generate returns for the shareholders. The organization had several smart contracts outstanding that were pending on the accomplishment of projects that were invested in. In June of 2016, a hacker was able to penetrate the blockchain system and understand the terms of the contracts in a way that allowed him to fulfill the contract requirements and directly pay the funds to him (Lafarre, 7). Since the entire process is automated, once the hacker did this, about "$40-50 million" was diverted out of the fund and paid directly to the hacker, who got away. The money stolen represented almost one-third of the entire fund, which then ceased to exist thereafter, as frantic investors immediately pulled their remaining money from the organization. There is the possibility that the hacker was someone who was a part of the organization, because it is hypothesized that the hacker must have had a full understanding of the contract details. These examples and possibilities shed further light on the technology threats that are known however in any developing technology, risk of hacking is high and that risk should never be taken lightly.


**Opportunities for CPA's**

As technology continues to grow in the ever-changing world we encompass, more and more jobs seem to be phased out to automation. Just as machines have replaced many jobs within internal control processes, some wonder if the auditor is next. Blockchain offers a number of benefits that have already been mentioned up until this point, ranging from increased efficiency to greater transparency. However, the idea that the auditor can be completely eliminated because

all transactions can be pulled from the blockchain and used to automatically create financial statements is a bit of a stretch.

For starters, simply recording a transaction in a blockchain "may not provide sufficient appropriate audit evidence related to the nature of the transaction." (Bible, 10) There are a number of reasons why this is the case:

- The transaction that took place may have been illegal or fraudulent.
- The transaction may have taken place between related parties, meaning it is null toward the financial statements.
- The transaction could be part of a side agreement that is "off chain," meaning that the value associated with the transaction has left the blockchain.
- The transaction could be incorrectly classified on the financial statements
- Not all financial statement assertions can be met by only looking at the transaction in a blockchain. For example, the occurrence of a transaction can be seen in a blockchain, but it cannot prove the deliverance of a good or service.

(Bible, 10)

Even though blockchain will help to better manage transaction history, there are still these inherent risks related to transactions that require the work of an auditor. Auditors and CPA's will still be needed to add an outside opinion of the statements filed by the company to generate greater trust.

Financial statements issued by management are also filled with management estimates that blockchain would have to take from management and use in their calculations. The estimates that management uses cannot be trusted at face value. An auditor will still be needed to perform "audit procedures" (Bible, 10) to verify management estimates, further proving that the auditor will not cease to exist in the future.

Auditors will be needed not just on the financial statement side of blockchain, but also for dealing with smart contracts. There will be numerous roles available with respect to smart contracts, ranging from providing an independence evaluation of the blockchain system, to reviewing and editing contract agreements between parties before the smart contract is entered into. Smart contracts are based off business logic, and will not function if they are entered improperly. This could leave an opening for a CPA to evaluate contracts, as well as read any blockchain programming that provides feedback on the entered smart contract and make the necessary changes to appease the system. The last opportunity related to smart contracts comes from a regulation side. There are currently no standards issued for smart contracts, and current contract standards outstanding may not be fully applicable to the smart contracts of the future. This opens up a whole new area of rules that will need to be ironed out. CPA's will have a great opportunity to voice their opinion on the changes in the industry and help write and carry out the rules that will regulate smart contracts in the future.

Another opportunity for CPA's could be as serving as an administrator for a private blockchain. (Bible, 11) Even though blockchain helps to decentralize the business world, there

still needs to be someone in charge to deal with abnormalities and settle disputes. Main responsibilities of this person would also include performing security and independence testing on the system. Having an outside CPA perform this function as opposed to someone who already has access to the blockchain will help to establish trust between all parties involved.

While there will be many opportunities for CPA's in the blockchain world that is inevitably coming, it is evident that only the strong will survive. Accountants will need to evolve their skills and have a better understanding of topics such as coding to keep their jobs. To perform an audit in the future, auditors are going to have to understand how to do new tasks. Assignments such as extracting data from a blockchain and reviewing general information technology controls of a specific blockchain are things that CPA's will be doing in the future. Most people do not have any idea how to do these things, and many (especially those established in the industry) likely will not want to learn how to do these things. However, those who put in the time and learn these skills will be an invaluable resource. The technology should make audits more efficient by reducing the grunt work, meaning fewer workers will be needed. Those who understand the change and learn the skills necessary to operate these new blockchain audits will be a hot commodity, while others who do not evolve will be in less demand.

## **Concluding Thoughts**

Blockchain has the potential to revolutionize the way financial reporting occurs. As companies use their current accounting systems, they continue to accumulate audit fees and risk. With a decentralized system preventing the ability for human intervention, there will be a different scope applied to the profession of accounting.

Triple-entry accounting data, even if not through blockchain, will allow companies to automatically verify transactions among other accounting events. Blockchain's implementation, however, will take accounting past the aggregation of numbers and ledgers to produce financial statements. As accountants look to implement new forms of technology, they should utilize the grace period allowed by the FASB when issuing new guidance. Implementing new technology with new guidance will allow both to be tested to see if the system is working properly and if the right judgement is being made in adapting new standards. This provides a new opportunity for companies to be more transparent. It also gives auditors the chance to preemptively assess risk factors associated with new guidance implementation. Both the transparency and monitoring branch of the corporate governance model will be reinforced.

The advantages of using blockchain are clear and how its use will affect reporting in the future is apparent. This new technology shows how the industry will be transformed to allow more of a proactive approach to implementing standards and being as transparent as possible. Much work will need to be put in by companies and firms, but in the end, the resources utilized to find a true way to implement this new technology will be worth it to have the most accurate and reliable data for investors to use.

If blockchain's implementation was not a possibility, governments would not put so much thought into regulating in. Technological fads to come and go, but blockchain is here to stay. Many governments across America have recognized that and have begun to learn more about the potential that comes with blockchain's implementation. In order to maintain the monitoring branch of the corporate governance model, monitors will also need to learn about this technology. The SEC will need to come out with further guidance for use in more than just currency. Auditors will also need to invest heavily to train their employees to evaluate integrity and independence of these new technologically advanced systems. Proper due care by constituents under both branches of the corporate governance model will lead to companies providing more accurate and reliable accounting information than ever before.

Currently auditors spend hours auditing transactions that make up financial states, while in the near future, those financial statements could be created at the click of a button. The possibilities of this being implemented within the next ten years show how technology is shaping industries and practices rooted in old ways. Blockchain technology, however, will shape more than its direct users, it will shape all users of financial data and restore proper integrity to the financial information that supports the capital markets.

Appendix A

Total Deluxe Game Price: $100

Includes: Monthly bug fixes,3 DLCs, and 1000 Virtual Currency

| Performance Obligations | Cost if Separate (usd) | Revenue from Obligations | Percent of Total Contract Price | Price Assigned to Each Performance Obligation |
|---|---|---|---|---|
| | ( a ) | ( b ) | ( c ) | ( d ) |
| 1 Actual Game (includes fixes) | 60 | 45 | .39 | 39 |
| 12 Monthly Bug Fix Updates | - | 15 | .13 | 1.08 each |
| 3 New Content Downloads | 15 each | 45 | .39 | 13 each |
| 1000 Virtual Currency | 10 | 10 | .09 | .009 each |

( a ) - The cost if sold separately on the online marketplace

( b ) - Revenue attributed to each obligation in the case they are sold separate

- Assuming management determined the value of the bug fixes as to how they improve the game over its lifetime
- Important to remember, the game can be played at any point in time without the bug fixes, therefor the contract is not recognized over time

( c ) - Row of column b divided by the sum of column b

( d ) - (Column C multiplied by the contract price of $100) divided by number of obligations per type of performance obligation

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