Revolutionizing the Segregation of Duties

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ABSTRACT

The accounting profession has seen a backlash due to business scandals that took place in the past. Particularly in response to such situations, the United States Congress, enacted the Sarbanes-Oxley Act to enforce reporting controls on businesses. These controls are designed to increase stakeholder confidence through improved accuracy and reliability within the financial statements of companies. However, almost two decades later, I suggest that through a system that utilizes technology, we can increase stakeholder confidence while fulfilling the legal responsibilities required by the Sarbanes-Oxley Act. Advancements in technology are currently mitigating past human control errors. Although systems that utilize technology do exist, I will illustrate the factors that need improvement for an automatized reporting process with an internal control monitor to satisfy all demands. Modernizing the controls for businesses could achieve the utmost stakeholder confidence through continuously monitored financial accuracy and reliability.

I. INTRODUCTION

Technology is revolutionizing our daily lives. Since technology assists with completion of tasks through ease of accessibility, we should consider using it to assist us with a complex task like segregation of duties. Segregation of duties is known as a basic building block of sustainable risk management and internal controls for businesses. The Association of International Certified Public Accountants (AICPA) defines segregation of duties as "a key process that disperses critical functions within a transaction cycle to more than one person or department" ("Segregation of Duties"). Without separation, fraud or error risks are less manageable for businesses.

In 2002, the United States Congress passed legislation that had a profound effect on the United States' publicly traded corporate businesses. The act required businesses to follow legal regulations and possessed several principles that were needed to enforce liability, strengthen controls and enhance consumer confidence. The business profession needed the enforcement of the act to be effective, which is why legislation needed to enact legal consequences through the Securities and Exchange Commission (SEC). The SEC was created as a result of the Securities Act of 1933 and the Securities Exchange Act of 1934. Our federal government designed the SEC to restore investor confidence in the capital markets. This confidence would provide individuals with reliable information to reduce risk and establish honesty in our markets. Overall, the SEC's mission is to protect investors, maintain fair, orderly efficient markets, and facilitate capital formation.

Through further research, I will address the importance of the law enforced on corporate businesses to enable the standards to be effectively upheld. Additionally, I will propose a system that utilizes technology that has been created to assist businesses to

adhere to the regulations implemented. Even though related systems do exist, I will argue for an improved system which will meet the businesses' needs more effectively while adhering to all enforced regulations and standards. When it came to the accounting profession the SEC determined that the standards in place were not the issue; it was the lack of enforcement from the auditors (Coates).

II. INSTITUTIONAL BACKGROUND

On July 30th of 2002, the Sarbanes-Oxley Act (SOX) was enacted into law. Congress enacted the legislation to implement the necessary changes to the corporate governance of public companies. The changes were a necessary response to some significant business scandals. A few of the scandals involved the following businesses of Enron, Arthur Andersen, and WorldCom, which affected the entire economy.

The first business was known as Enron, which represented a global gas and energy company. The chief executive officer Jeffery Skilling and Chairman of the Board Ken Lay were the individuals responsible for the company's fallout due in part to not reporting the company's debt fully on their financials. Investors and employees lost their financial stakes within the company and their jobs. The pressure the men both were responding to were derived from the need to produce quarterly earnings. Since the company needed to make a profit to continue the mergers and remain solvent fraud on the company's financial statements was the men's solution. Yet, most companies have an auditing firm to come in and inspect the company to ensure accurate financial reporting. However, Enron's auditor was known as Arthur Andersen, where negligence was represented in their role as an auditor (Albrecht). Eventually, Arthur Andersen was charged for obstruction of justice as a result of them shredding their Enron auditing

papers. Nevertheless, two years later the charges were dropped, but the firm's reputation was not rebuildable.

WorldCom was the second business scandal - a telecommunications company that defrauded their investors. The chief executive officer Bernard J. Ebbers was the instigator of the accounting fraud, manipulation, and betrayal. Ebbers actions of overstating the company's assets resulted in the bankruptcy of the company and thousands of individuals losing their jobs. Ebbers knew the company needed to eliminate debt for investors. Therefore, Ebbers had "management conduct mergers to cover the outstanding long-term debt created by the company" by taking "expenses and capitalize these expenses despite the fact that this is not allowed" under accounting guidelines "or 'revenue recognition principles' (i.e. recognizing revenue in the period in which it is earned)" (Albrecht, pg. 3). WorldCom represented similar pressures that Enron experienced, which was to eliminate debt and remain solvent (Albrecht). However, WorldCom's auditors were not fulfilling their duties or adhering to the laws in place. The auditors of WorldCom were the same as Enron's, Arthur Andersen. This auditing firm continued to fail to protect investors. Andersen was not adhering to their duty as auditors and violated the securities law. It was three years after Enron that Arthur Andersen was in backlash again in response to the WorldCom bankruptcy (Albrecht).

Enron and WorldCom were considered inefficient in the key areas of risk assessment, reporting, and fraud detection. However, if segregation of duties were implemented throughout the companies, it would have been a dynamic force to deter fraud (Albrecht). In addition, the last business known as Arthur Andersen was considered flawed too. Andersen represented an unprofessional relationship with respect to their client, Enron. Andersen performed several services to Enron, which resulted in Andersen

auditing their own paperwork (Kleckner). Furthermore, “Mr. Anderson’s services aided Enron in a massive financial statement fraud creating misstated financial figures and aggressively ‘cooked the books’ which lead to one of the most distressing financial crises in United States history” (Albrecht, pg. 4-5). Notably, Mr. Andersen himself was the sole auditor for Enron, which represents a lack in the internal controls and the opportunity for fraud, since audit engagement teams do not typically consist of only one individual (Albrecht). With the audit of Enron being overseen by one individual, it represents an opportunity for misstatements, familiarity and implied why segregation of duties is necessary. Therefore, knowing the issues presented by Andersen, legislators was aware of a significant change that needed to be implemented (Kleckner).

Due to the previously stated business scandals, Congress enacted the Sarbanes-Oxley Act to reassure stakeholders that the significant impacts prior to the Act would not reoccur. The law was implemented for all business organizations, and compliance was mandatory (*United States Congress*). The SOX Act consists of eleven titles, of which four will be analyzed for the purpose of understanding the importance of segregating duties.

The first title established the Public Company Accounting Oversight Board (PCAOB). Congress formed the PCAOB for auditors of public companies to receive external and internal oversight. Before SOX, the auditing profession was self-regulated, which contributed to the business scandals previously stated (Hochberg) (*United States Congress*). However, it was not the self-regulation within the profession that caused the downfall; it was because the laws that were in place were not effective enough for companies (Coates).

The purpose of title one was to provide a regulating body for the profession to effectively enhance consumer confidence through the PCAOB. The PCAOB was established to 1) oversee auditors that audit public companies to assure compliance; 2) establish auditing reporting standards; 3) inspect, investigate, and enforce compliance on public accounting firms, people of association, and certified public accountants (CPAs). Overall, by forming the PCAOB, Congress assisted in establishing the reassurance needed for the public and potential stakeholders (Hochberg) (*United States Congress*).

The second title of the act addresses the requirement for auditor independence within nine sections. Auditor independence is essential for the audit to be free and clear of any forms of bias. The auditor is prohibited from performing clearly specified non-audit services that occur alongside with an audit. Additionally, the auditor must be pre-approved by the company's audit committee. These two requirements address the flaws that arose from the significant business scandals previously stated. Audited financial statements should represent the true position of a company, which was not represented within Enron or WorldCom. If an auditor is not independent either due to familiarity or relationships; it could result in the manipulation of the company's position. By removing independence issues, the potentiality for misguidance decreases, which would result in a direct increase in stakeholder confidence (Hochberg) (*United States Congress*).

Additionally, the second title also addresses the new auditor approval requirements, audit partner rotation, and auditor reporting requirements. The importance of this title is how it addresses these significant issues that came to light following the Andersen debacle. Furthermore, by enforcing this title, it will effectively combat any opportunities for fraud, familiarity, and conflicts of interest (Sarbanes-Oxley, A.C.T.).

The primary focus of the third title deals with corporate responsibility. The third title consists of eight sections, which specifies that the senior executives are now required to take individual responsibility for the accuracy and completeness of the financial reports (Sarbanes-Oxley, A.C.T.).

Additionally, the title assigned the audit committee responsibility to appoint, compensate, and oversee the public accounting firm that audits the business. The senior executives now are required to take responsibility by certifying that they have disclosed: 1) any significant internal control deficiencies; 2) acts of fraud involving individuals that possess a significant influence on internal controls; to the audit committee and firm that is performing the audit. By implementing this third title on public companies, it will enforce accuracy and reliability by compelling the audit committee and senior corporate officers to take responsibility (Sarbanes-Oxley, A.C.T.).

Prior to SOX, higher forms of management would argue that they were unaware of the situation that resulted in company turmoil. Wells Fargo is an example of how an executive stated their unawareness of a problematic issue but due to SOX he was held accountable. In 2017, Wells Fargo was fined 185 million dollars to settle the allegations that employees opened accounts for customers unauthorized to meet the sales goal pushed by upper management (McCallister). While CEO, John Stumpf made a public statement he did accept full responsibility for the unethical actions. However, Stumpf was feeling the pressure and stated how he was aware of this issue in 2013 (McCallister). Stumpf was significantly criticized for his approach to the scandal of his company. Yet, he shifted the blame from himself to his employees, firing approximately 5,300 individuals who acted unethically within the company to hit sales targets and earn bonuses (Cheslow). Additionally, it revealed in an audit that nearly 3.5 million accounts

were opened in customer's names unauthorized. The CEO Stumpf retired from his position in October 2016 stating, "While I have been deeply committed and focused on managing the company through this period, I have decided it is best for the company that I step aside" (Cheslow).

The implementation of the third title that prompted senior management to certify statements and disclosures reduces the unknown implications of weak controls or fraud (Hochberg) (*United States Congress*). Therefore, the influence of title three has provided integrity for the company's financial reports and correlates to the reason for Stumpf's unplanned retirement after the company hit turmoil.

Title four addresses the enhancement of financial disclosures, which calls for annual evaluations. Within nine sections, the enhanced reporting requirements for financial transactions are described. Additionally, this title requires for internal controls, such as segregation of duties, to be in place to address assurance needs on financial reports and within disclosures. Timely reporting of significant changes to the company's financial position is now enforced and reviewed by the SEC to assure the necessary internal controls are in place (Sarbanes-Oxley, A.C.T.). The internal report states the company's position which is utilized by potential and current investors. The report should consist of a statement that acknowledges, identifies and evaluates internal controls over financial reporting.

Similarly, the report should detail any material weaknesses the company may have concerning internal controls over financial reporting. A material weakness represents when internal control(s) are ineffective within a company and pose a significant impact to the financial statements. The other aspect that this title enhanced

was the effectiveness of companies' internal controls through independent inspection within the audit. The efficiency would be determined by an independent auditor, who will issue a report on internal controls over financial reporting (Wagner). Title four was designed to enforce companies to disclose and establish internal controls effectively. Overall, title four imposed an annual review over internal controls by an independent auditor to establish an accurate report that upholds integrity.

Consequently, Congress's steps towards reassuring stakeholders were essential for accountants to regain their prestigious reputation. For instance, Enron's actions were detrimental to the accounting profession. Enron left their stakeholders in turmoil, due to the lack of oversight, accounting manipulation, conflicts of interest and unethical behavior. Thus, Enron's top management drove the company's unethical actions.

Overall, in-depth knowledge was required by Enron's top management to manipulate the company without any immediate repercussions. It was not until the CEO left Enron that the real position of the company unfolded. Even with several members of Enron's management left with jail time, there was more than needed to be done. Following the business scandals, regulations were designed to mitigate damage to the economy. As a result, businesses were forced to potentially change several areas within their company.

However, technology could have assisted companies with the regulations imposed by SOX. Suppose a system contained an algorithm that could assist with the fulfillment of SOX requirements. If this system was available during the transition than the execution process would have been more effective. Considering the requirements imposed by SOX, the internal controls and mandatory reporting required months to

implement. Meeting the requirements of SOX possessed timely issues due to the immediate demand for adherence by investors and analysts.

Nevertheless, the establishment of internal controls for companies could have been timelier if a system was available for ease-of-use and for sustaining adherence. It has been years since the passage of the SOX Act; yet, companies are still struggling with the compliance and are paying for it through labor hours. Based on "the report, from the consulting firm Protiviti, found the average costs depend in some respects on the number of locations at an organization. While companies with between one and three locations pay an average of $657,383 per year on compliance, those with more than 12 locations are paying $1,561,000 annually. The report is based on a survey of 468 chief audit executives, and internal audit and finance leaders and professionals in U.S.-based public companies in a variety of industries" (Cohn, pg 1). With companies today currently struggling with compliance aspects, a system could reduce the cost of compliance for companies in the long run.

An automated system that aligns with the legal implications of SOX already exist. Shortly after SOX was implemented a system known as *Microsoft® Office Solution Accelerator for Sarbanes-Oxley,* (Accelerator) was created (*Microsoft*). This system was created by Microsoft two years after the SOX Act was enacted. The Accelerator was designed as a shared workplace, which documents all the flows that occur within a business. Additionally, the workplace was designed to adhere to the SOX Act while considering the companies' unique needs (*Microsoft*).

Microsoft designed the Accelerator to be a fundamental part of a company's information infrastructure that could be personalized to any company's needs. The

system was designed to meet internal and external needs. Internal and external auditors could utilize the system by observing an overview of the company, SOX compliance status, workflows, confirmation testing, assessments, issues and even remediation plans (*Agrawal*).

The benefits of a company possessing the Accelerator was stated by Microsoft: 1) facilities SOX sections 302 and 404 compliance needs; 2) provide long-term corporate governance that can be expanded corporate-wide; 3) defines control processes that assist with full SOX compliance; 4) integrates the company's checks and balances to achieve efficiency and minimize errors within documentation and reporting; 5) tracks inaccuracies within the company's data and reports; 6) aids a company to evaluate how a problem occurred and a prevention plan for the future. Therefore, the Accelerator performed the following functions: 1) documentation and information management; 2) process automation and workflow; 3) communication and collaboration; 4) monitoring and reporting. By implementing a system to assist with fundamental parts of the business could ease companies by saving time, avoiding noncompliance issues, and reducing costs (*Agrawal*).

However, the Accelerator did not live up to its expectations. The Accelerator was not adequately for most companies. Rich Mogull, the director at Gartner, stated, "We were expecting a little more, and are a little disappointed…" This program was designed with no security. Mogull said the Accelerator consisted of "no document-level security, which meant that a user cannot be absolutely certain a document being viewed has not been altered." However, the product has been created as a software that can be used with other applications (*Sisk*). Which makes Michael Sisk, the author of "*Experts Pummel*

Microsoft's Sarbanes-Oxley Play," believe that the Accelerator "has the possibility to provide expanded control, business process workflow and reporting capabilities."

Furthermore, an analyst at TowerGroup, Virginia Garcia, stated the following about the Accelerator, "it's very basic technology with no technological innovation." This statement is regrettable considering that Microsoft is a technology-based company. Therefore, Microsoft had an innovative product in mind, although it did not live up to the standards that the companies expected.

Additionally, technology within businesses is being utilized to guide governance and controls. However, due to the lack of a framework, the regulators are experiencing difficulty determining evaluation methods for the technology-based controls. Likewise, with technology not having a framework or governance, it can result in serious risks or malfunctions. These issues could result in deliberate or accidental corruption. The ramifications for these failures can damage security, credibility, profitability and could result in litigation costs. Therefore, with technology rapidly evolving businesses need to build trust (*Ernst and Young*).

Businesses and external stakeholders need to have confidence in their technology systems. Placing trust in their systems will ensure that the businesses are interacting with a purpose, integrity, and security through means of innovation. Thus, the system needs to be fully functioning, reliable, and accurate. Ultimately, stakeholders and businesses want a system that is understandable and contains a regulating framework (*Ernst and Young*).

III. PROPOSAL

"Internal controls continue to be a key focus area for companies, regulators, and shareholders. Compliance costs are increasing in organizations. Companies are

using the three lines of defense to manage internal controls: 1) Operational Management,2) Risk management and compliance/controllership function, 3): Internal Audit. Global organizations today are adopting certain operating models to bring in efficiency and perform ongoing monitoring of internal control" (Seshadri).

Revolutionizing the segregation of duties to adhere to SOX regulations could produce a boost in consumer confidence and focus on critical priorities for companies. Consider a system that is designed to assist companies, internal or external auditors, and meet regulations. This system could aid in the reduction of human errors and combat potential conspiracies within companies. Overall, this system could provide an incremental advantage with respect to a conspiracy by reducing the threat that the company's segregation of duties failed to meet or recognize.

Since technology is evolving throughout our daily lives, a system could assist with the struggles of meeting the regulations required by law. The system would be designed to have a shared workplace for employees. By implementing this designed workplace, employees could track changes and see who was authorized to make the changes. Furthermore, employees could utilize this system to assist with actions that require segregation of duties. This could improve current procedures by providing another factor in the accounting cycle to assist with a range of task from simple to complex. The system could aid with the potential problems that companies face when it comes to complex situations such as selling an asset, for instance, a building. Issues that arise within companies could vary from transposed human errors, the potential for greed, or even the opportunity that benefits an individual(s) yet harms the company.

A simple transaction system could assist with deposits. Consider that an employee needs to deposit a check. The employee could deposit the check into the system, and the system could then deposit the check. Following the deposit, the system could track precisely by whom and when it was deposited. This example could even be utilized by an employee needing to pay an invoice from a supplier. An employee could let the system know an invoice needs to be paid. Then the system could complete the transaction with trackable authorization from the employee. Additionally, other employees within the workplace who has authorized access within the system could see the changes that the employees made from deposits or payments.

However, not all transactions that the system could assist through assurance are simple. The system should be able to assist through a wide array of transactions. A more complex transaction could be the selling of stock of a company. For instance, the system should be able to identify how many shares of stock has been sold while already knowing the current market price. With the system knowing this information, it will be able to accurately reduce human errors, combat manipulation, record the transaction, and provide information on the authorization of the transaction. When complex transactions such as the selling of stock are occurring, it is essential that the transaction upholds integrity, accuracy, trustworthiness, and objectivity. Therefore, with the assistance of technology, it would provide improvement for upholding legal regulations and assuring the confidence of stakeholder within companies.

With the SOX regulations being implemented, it may be harder for smaller companies to meet every aspect due to the limited number of employees. Of the previously stated business scandals, Enron possessed a conspiring tone at the top. This fiasco resulted in great turmoil for stakeholders and the economy. Not only would the

implementation of a system assist with upholding segregation of duties it would be designed to make a business more efficient and timelier. However, implementing a new system could be costly, and the overall benefits of increased confidence may not outweigh the costs. Still, I would argue that such costs outweighed the benefit and increasing confidence is worth the overall expense. Therefore, I believe a revolutionized system would benefit the accounting profession and the economy in the long run.

IV. GATHERING DATA

To evaluate the proposal, I conducted interviews with professionals who possess substantial experience which enables them to provide feedback on this proposal. The interviews took place with two prior public auditors, an executive employee at Stinnett and Associates, an accounting manager from The Walt Disney Company and a former Senior Deputy Director of the PCAOB. Through these interviews, I gathered information through feedback and questions, which provided insight for my proposal. Therefore, following the interviews, I determined if the proposal possessed a significant possibility of acceptance.

V. RESULTS OF DATA

Initially, I interviewed prior auditors from Grant Thornton (GT) and Ernst and Young (EY). First, I wanted to analyze how much time is spent within an audit that is focused on the segregation of duties. Companies are required to implement segregation of duties to reduce the potential for fraud or even errors within the company. One of the auditors stated that "We think about segregations of duties at a high level within the risk assessment phase of the audit, which consist of spending approximately 80% of the time

analyzing the controls in place." Therefore, it appears an audit consists of a great deal of time focusing on the controls implemented to segregate duties within the company.

Next, I wanted to gather the thoughts from both auditors on a revolutionized system. The auditors believed that such a system could benefit companies and auditors through error reduction. However, both shared concerns about the potential costs of such a system. One auditor believed that after time, "adhering to the SOX regulations through technology, in the long-run, could reduce auditing hours and result in a manageable system." Accordingly, the auditor's opinion represents a long-term benefit provided by innovation.

Furthermore, I considered the feasibility of implementing controls with the system. I asked both auditors if they believed a white hat hacker could be a control for such a system. A white hat hacker, also known as ethical hackers, uses their knowledge to aid companies by attempting to find flaws within their security systems. The consensus of both auditors was the belief that it would be an appropriate control if the company was unaware when the hacker would attempt an attack.

My third interview was with an executive employee at Stinnett and Associates. Stinnett and Associates is an advisory firm for public and private companies. The firm has expertise in internal audit, SOX compliance, business process design and reengineering, cybersecurity reviews, nosiness continuity and disaster recovery, anti-corruption, and compliance, vendor audits and fraud investigations.

My first question I asked the executive employee was how often they test internal controls for their clients. The response was, "Our business is almost exclusively structured to evaluate internal controls at our clients' businesses. Like SOX, we will

evaluate the design of controls, identify potential gaps in controls, and when appropriate, test the internal controls in those areas." Additionally, I asked if the individual had faith in businesses fully utilizing segregation of duties (SOD). The response was, "With regard to SOD, I believe most organizations strive to achieve a balance with resources available to them, systems in place and appropriately segregating responsibilities. We often work with organizations that do not have the resources to fully staff to support 100% SOD. In those instances, we either identify additional controls they have in place to mitigate the risk of SOD issues or help them design those controls if they are missing. SOD can be difficult to achieve in a pure sense depending upon system limitations and level of staffing, but generally, there are other controls that can be established to help reduce the risk of a SOD issue arising that would go undetected for a long period of time." Notably, segregation of duties is hard for smaller sized companies to adhere to effectively and additional strides are needed to achieve the appropriate controls and balance of responsibilities within a business.

Next, I wanted to inquire about the individual's thoughts on an improved system representing implementation challenges. The individual stated, "Updating SOD in a manual environment or one where the system used cannot adequately assist in evaluation can be time-consuming and cumbersome…if the system was designed appropriately, the results would be more reliable and could be evaluated more regularly – perhaps even "real time." There would still be human intervention related to identifying where conflicts would exist, roles in the system that are inherently conflicted, etc. But once those thoughts have been gathered, the system could potentially identify any issues on a regular basis."

Similarly, from my interview with the auditors, I asked the executive if my proposed system boosted stakeholder's confidence but was not required, would the individual personally consider implementing the system anyway. The overall response was noted on evaluating the system on a cost-benefit basis. If the costs of such a system were worth the benefit, then implementing the system could be considered.

Additionally, I interviewed an accounting manager from The Walt Disney Company (TWDC). First, I wanted to inquire how often internal controls are tested within their business. The response was that at TWDC internal controls are embedded into all the business areas with each department having their own controls that they are responsible for. Secondly, I wanted to know if the individual had faith in their employer fully utilizing the segregation of duties. The individual responded by saying, “At TWDC, we are so large that duties are inherently segregated. There is a department for each function and then subgroups or teams to further divide the work. Therefore, I have faith that we are sufficiently adhering to SOD requirements to the fullest extent where possible.” Therefore, I claim that TWDC represents a prosperous business due to the company inherently possessing the internal control of segregating duties.

Lastly, I asked the individual if a revolutionized system could boost stakeholder’s confidence but was not required, based on her experience, if they believed TWDC would consider implementing it anyway. The response was, “WDC tends to lead in best practices and has processes in place to ensure safety, security, etc. in advance of actual requirements, so if a revolutionary system was available TWDC would likely consider it.” Therefore, it would appear notably from the interviewee having experience with what is applied at TWDC, that such a company could utilize a revolutionized system for segregation of duties.

Lastly, I interviewed a former Senior Deputy Director of the PCAOB. I inquired with this individual who had personal experience with the PCAOB to gather insight from the regulatory perspective. To begin, I wanted to see if the former director believed that the segregation of duties had increased consumer confidence within the financial markets. The individual's response expressed a strong belief that the strength of internal controls and the audit which are now done has generated more confidence in the financial markets.

Next, I sought the former director's view on the likelihood of fraud to result from a collaboration scheme despite the segregation of duties. The response was, "A well-controlled company that is in tuned to appropriate segregation of duties provides a foundation for controls and the culture of the company." Notably, if the culture and the controls possess a foundation that creates an environment for fraud, then fraud is more likely to occur, than in a company that utilizes strong controls and a positive culture.

Lastly, I wanted to see if the former PCAOB Senior Deputy Director thought that that the segregation of duties and the evolving technology today, could produce a more efficient building block for risk management and internal controls. The individual responded positively by noting the revolutionizing blockchain technology.

a. BLOCKCHAIN

Presently, blockchain is being considered one of the most important forms of recently developed technology (Dai, pg. 5). Initially, blockchain was utilized for trading Bitcoin (Moldof). Blockchain establishes a decentralized public ledger, which offers a secure infrastructure for businesses. What a public ledger provides is a record of transactions and its details within a business. However, a decentralized public ledger

allows for transactions to be recorded in a ledger across different locations and people all while reducing the risk of manipulation by removing central authority. Therefore, blockchain allows for the infrastructure in businesses to utilize the technology with transactions among unfamiliar parties without the central authority (Dai, pg. 5).

For instance, blockchain allows for someone to request a transaction with a broadcast to a peer-to-peer network. In a network of computers, it employs a set of procedures or an algorithm to validate the transaction of the user's status. Once the transaction is verified, the system creates a new block of data to be placed within the ledger, and this is when the transaction is considered complete (Chaudhry).

Without a doubt, the growing interest behind this technology is related to the functions it possesses. The objective of blockchain's functions is to reduce trading costs, increase transaction settlement speed, reduce fraud risk, improve the auditability of transactions and increase the effectiveness of monitoring (Dai, pg. 5). Currently, the accounting industry is focusing its attention on blockchain. One of the big four accounting firms, PricewaterhouseCoopers (PwC), believes that the blockchain technology is the "next-generation business process improvement software to structurally alter shared practices between customers, competitors, and suppliers" (Dai, pg. 5). Another one of the big four accounting firms, Deloitte, expects for blockchain to, "improve collaboration among businesses and individuals, the transparency of business processes and, ultimately, the productivity and sustainability of the economy" (Dai, pg. 5).

Furthermore, blockchain is attracting the attention of the accounting industry to look towards broadening their technological reach. Businesses that do not have enough

employees to meet legal regulations could use technology, such as blockchain, to support various business activities. For instance, an activity that blockchain can assist with is segregating the duties within the payroll process. With a business that has several employees fulfilling the segregation of duties is plausible. When considering payroll within a company, the process should be segregated with at least two individuals. One person's duty is to compile the gross and net pay information for payroll, and another person's duty is to verify the calculations to record the necessary accounting entry for the business' financial reports. Overall, by segregating these duties, this keeps a payroll clerk from increasing the compensation of some employees, or from making and compensating fake employees. After learning about the segregation of duties that would be necessary for the payroll process, it is vital to consider the smaller businesses that do not possess enough employees to segregate the process. Therefore, the blockchain system could be utilized by smaller businesses to segregate processes previously executed by one individual. With the necessary means of segregating duties representing a form of internal control, blockchain would be effective in adhering to the fourth title within the SOX Act.

Despite positive interest for blockchain, it suffers from three main issues. These issues address patentability, the potential risk of hacks and IRS investigations. Blockchain was initially created to facilitate transactions of the digital currency Bitcoin, which consisted of a series of steps. Therefore, the patent on blockchain would be based on a software idea or algorithm. Within patent law, there is a Mayo test that devises a method for determining if patent applications are patentable or not (Chaudhry). The first step within the test is to determine if the patent application claims laws of nature, natural phenomena, or abstract ideas, or patent-eligible applications of those concepts. Since

blockchain's algorithm represents an abstract idea, it would fail the Mayo test under US law resulting in all the patent applications currently being filed to be declined (Chaudhry).

Overall, the approval of the patents on blockchain could eventually reduce the exchange between businesses across all platforms, potentially resulting in less innovation (Chaudhry). Consequentially, with blockchain initially created to improve collaboration and transparency among businesses and individuals, I would conclude it to be counterproductive to patent the algorithm. There have been a few blockchain patents that have been granted. For instance, Goldman Sachs was granted a patent on its proposed SETLcoin cryptocurrency settlement system (Chaudhry). This allows for the issue of patents on blockchain to represent a concerning issue for all businesses that are interested in the technology.

Another issue that causes concern is the ability for the blockchain technology to effectively thwart risks of hacking attacks, while the risk may be minimize the risk is not obsolete. The technology entails a system to record transactions with details of every entry. The details within the database include when the entry was made and by whom, making the hacking attack nearly impossible. When considering what blockchain is made for, it instantly records transactions which make the accounting process timelier, simpler and more accurate (Stroupe).

Knowing how blockchain works it is difficult to alter or compromise the public ledger and thus it is believed that blockchain is resistant to fraud and hacking. However, the technology is limited to detecting ballot-stuffing and camouflage attack (Efanov). Ballot-stuffing is essentially whereby an individual submits multiple votes which can be

considered electoral fraud through the blockchain technology; while camouflage attack is used as a smokescreen and distracts the victim while stealing data from the victim's network. These attacks can affect a business through manipulating a voting process or by stealing information from the business' records. Attacks of manipulation for a business could result in the potential of intimidation within the accounting for businesses. Considering these limitations, I believe through advancements by software engineers, businesses, and individuals learning and inquiring about the technology that these weaknesses could eventually become obsolete.

An additional issue stated with the blockchain technology is the IRS investigations. In September of 2017, the IRS decided to increase their efforts in a serious investigation to see if the bitcoin transactions were complying with the current tax law. A federal court case stated that the U.S. taxpayers utilized bitcoin for transactions as means of a tax avoidance scheme. Eventually, the IRS filed an additional enforcement action in U.S. District Court to demand that the Coinbase, the virtual currency, comply and divulge its records. Therefore, the blockchain system that bitcoin uses were a means for taxpayers to avoid paying taxes (Moldof). These actions suggest that the IRS has now mitigated these concerns for blockchain. Overall, it is important to become aware of a system's limitations before considering implementing the system into a business.

After learning about the issues associated with blockchain, as a profession how will we gain public confidence in implementing the system? We are aware of how blockchain stores data in a ledger format that is designed to be unalterable through forms of encryption, but artificial intelligence could advance blockchain. With the data being securely monitored through the filing system, it possesses private keys, which must be kept safe for all data to maintain security. Therefore, with artificial intelligence, it could

provide plenty of security through the idea of emerging blockchain with artificial intelligence algorithms that can reduce security risk incidents (Marr).

Also, a blockchain system can improve several forms of operations within the government. This improvement can overflow into the economy and benefit society. There are already blockchain systems that have been embraced by other countries that use it to track estate transactions. Additionally, the United Arab Emirates announced a "plan to complete half of the government transactions on a blockchain platform by 2021" (Stroupe). With the United Arab Emirates implementing a plan like this to utilize the blockchain technology, it is projected to save three billion on routine transactions and seventy-seven million working hours annually (Stroupe). Therefore, it would appear to provide a better service to citizens and for the public sector by embracing the technology that is behind blockchain.

Artificial intelligence can assist individuals in understanding the decisions that the algorithm makes by determining if a transaction appears fraudulent and should be investigated. Blockchain records the data immediately to the system making it simpler to audit with the confidence that the data has not been unaltered. Nevertheless, the advantages offered by artificial intelligence must still be trusted by the public and regulators to assist with blockchain, and a level of transparency is still needed to gain the public trust (Marr).

Furthermore, a still-new technology like blockchain faces obstacles to being fully implemented. When considering implementation for businesses it poses the same kind of challenges that other information technology implementations possess (Rapoport). Technologies such as artificial intelligence and blockchain have generated attention in the

accounting industry. While the algorithm scans data in real time, which provides alerts on questionable transactions, alerting auditors to investigate. As the auditing profession moves towards revolutionized systems, new processes and people rather than numbers; it will lead to a more efficient way to conduct research by integrating the data analytics needed within the auditing process. The auditing services within the accounting profession are the ideal example of how technology will transform the traditional services in the accounting industry (Tysiac). Audits usually requiring massive hours of work, an automized system can reduce hours and costs by undergoing the revolutionizing of accounting duties.

However, the accounting profession would be under new implications regarding technology advancement, such as blockchain. With a system like blockchain, an individual would need to understand the system and obtain a new array of skills. Consequently, an advancement could have downsides related to training and system costs, implementation and maintenance. Nevertheless, the advancement could have a profound positive effect through the reduction in compliance costs, ease regulatory requirements, assist with internal controls and establish a more efficient auditing process.

Overall, the prior PCAOB Senior Deputy Director concluded that "…everyone is pushing for blockchain and its' revolutionization…audits need to be objective of the system, but personally, I believe that the PCAOB would not necessarily require ethical hackers to come in and test the system. Rather, the businesses could have someone come in and see if the system is working properly." It would appear likely that the PCAOB could eventually require blockchain as an aid to internal control regulators for companies. The transformation that the industry could undergo is projected to take several years. Yet, some firms have not started planning for the data-dominated future and considering the amount

of training and skills that will be necessary for this type of change. Businesses should begin to plan for the future of a system, such as blockchain, to keep ahead of the changing curve; otherwise, the catch up will be far too distant (Tysiac).

VI. CONCLUSION

After researching, I would conclude that revolutionizing the segregation of duties to adhere to SOX regulations can produce a boost in consumer confidence. After considering a system, such as blockchain, which possesses functions that are designed to reduce costs, immediately record transactions, reduce fraud risk, improve the monitoring of businesses, assist companies' internal or external auditors, and comply with regulations; blockchain represents innovated potential for the accounting profession. Overall, this system could aid in the reduction of human errors and combat potential conspiracies within companies. With blockchain possessing these functions and objectives it would represent an increase in the plausibility of the segregation of duties becoming revolutionized. Furthermore, the feasibility of implementing a system like blockchain is becoming intriguing for companies to mitigate potential threats that their segregation of duties failed to meet or recognize.

Subsequently, based on research presented, technology is evolving throughout our daily lives and blockchain can assist with the struggles of meeting the regulations required by law. Additionally, after mitigating the concerns the system possess, blockchain represents a compelling revolutionized aspect to the accounting industry. With the system provoking monumental attraction, I believe that the industry must prepare for a revolutionized system to assist in multiple areas of business.

VII. REFERENCES

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