

2020

## Effective Data Analytics and Security Strategies in Internal Audit Organizations

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*Walden University*

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# Walden University

College of Management and Technology

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Desiree Shaneeza Auchey

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Walden University  
2020

Abstract

Effective Data Analytics and Security Strategies in Internal Audit Organizations

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ABD, Nova Southeastern University, 2013

MA, Florida Atlantic University, 2012

MBA, Averett University, 1993

BSc Mechanical Engineering, University of New Orleans, 1989

Doctoral study

Submitted in Partial Fulfillment of the Requirements for the Degree

of

Doctor of Business Administration - Information Security Management

Walden University

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## Abstract

The digitization of the corporate and regulatory environment presents an opportunity for internal audit organizations to change their audit techniques and increase their value to corporations. Audit functions have not kept pace with these advancements, as evidenced by the massive frauds in recent years, and current audit methodology does not robustly incorporate analytics and security of data. Grounded in agency theory, the purpose of this qualitative case study was to explore successful strategies business leaders use to implement data analytics and security for internal auditing and fraudulent activity. The participants comprised 3 audit leaders in Pennsylvania, who effectively used data analytics and security strategies to promote quality audits and detect fraud. Data collected from semistructured interviews and company documents facilitated thematic analysis. Four themes emerged: data analytics framework, human capital, technology, and stakeholder engagement. A key recommendation for successful implementation of data analytics is a strategy to staff the audit function with the appropriate level of IT and finance skills, which would reduce the overall cost of implementation. The implications for positive social change include the potential to increase confidence in financial statements and the potential for job opportunities and support of economic growth in the local communities.

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## Dedication

I dedicate this work to my son and my partner for their love, support, and motivation while I was a working student and parent. This degree is proof that you can achieve anything if you work hard at it. Learn from your failures, they build character, and they are the steps needed to help you reach your goals.

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## Section 1: Foundation of the Study

We are in a period of rapid technological advancements, and there is strong momentum for growth as many businesses embrace the digital age (Tang, Norman, & Vendrzyk, 2017). Increasing amounts of data are becoming available, and organizations continue to seek ways to incorporate data analytics for insights, efficiencies, and competitive advantage (Botez, 2018). Internal audit has access to all data within a corporation. Although the detection of fraud is not the primary mission of internal audit functions, they have the data and can be the first defense to fraud. Additionally, because the internal audit function receives data that includes sensitive and confidential data, data security controls are of concern. *Data security* refers to the protective digital privacy measures applied to prevent unauthorized access to information (Agarkhed, 2017). I explored the strategies organizations use to effectively implement data analytics within the internal audit function and how they protect the data they use.

### **Background of the Problem**

Internal audit organizations are lacking strategies to improve their methodology to include data security and data analytics. Accounting professionals manage internal audit functions, and although this is appropriate for traditional financial audits, there is a need for these organizations to meet the demands of the changing technological business environment. With the increasing technological advancements over the past 2 decades, internal audit is now privy to more data than previously experienced. The current audit methodology is inadequate and needs enhancement to facilitate adequate coverage of the data population. Traditionally, internal audit provided reasonable assurance that

financials are reasonably reflected. However, with the volume of data that is available, there is a need to offer more than just “reasonable” assurance. Arguably, if internal auditors use data analytics within their methodology, they can provide coverage of 100% of the population of data and identify trends and anomalies that might lead to the detection of fraudulent activity and improve the quality of audits. With the development of these techniques and related tools, there might also be a way to proactively (or in real-time) detect fraudulent transactions and add value to the organization while reducing the fixed costs of the internal audit function.

### **Problem Statement**

Auditing organizations are not the primary detectors of fraudulent activity in organizations; however, business leaders using secure data analytics can improve the quality of auditing and the detection of fraudulent activity (Tysiac, 2017). In 2016, there were 2,410 occupational fraud cases from 114 countries, with a total loss exceeding \$6.3 billion (Westhausen, 2017). The general business problem that I addressed in this study was that many internal audit organizations do not have the security and analytics knowledge to implement secure data analytics within the internal audit function. The specific problem that I addressed in this study was that some business leaders lack strategies to effectively use data analytics for internal auditing and the detection of fraudulent activity.

### **Purpose Statement**

The purpose of this qualitative single case study was to explore strategies business leaders employ to effectively use data analytics for internal auditing and the detection of

fraudulent activity. Operational security influences the success of businesses, which, in turn, provides jobs and economic growth to communities (Larrimore, 2018). The target population consisted of three business leaders from publicly traded companies located in Pennsylvania with successful experience using strategies to effectively use data analytics for internal auditing and the detection of fraudulent activity. The implications for positive social change include an increase in employment opportunities as well as the protection of citizens' privacy within the community.

### **Nature of the Study**

Qualitative, quantitative, and mixed-method were the research methods that I considered for this study, and I chose the qualitative approach. Qualitative methodology is appropriate when the researcher is to identify and explore themes through interviews (Saunders, Lewis, & Thornhill, 2015). The goal of qualitative researchers is to interpret the data to discern patterns and insights (Bansal, Smith, & Vaara, 2018). Qualitative researchers typically obtain data from fewer sources (e.g., participants and observations) than quantitative researchers (Levitt, Bamberg, Creswell, Frost, Josselson, & Suárez-Orozco, 2018). Thus, the qualitative method was appropriate for this study because I explored strategies to effectively use data analytics for internal auditing and the detection of fraudulent activity.

In contrast, quantitative researchers seek to examine the relationships among variables (Saunders et al., 2015). However, the purpose of this study was to identify and explore themes and not measure the relationships among variables. Quantitative research is not appropriate when variables are not predetermined (Rutberg & Bouikidis, 2018).

The mixed-method is a combination of qualitative and quantitative methodologies (Turner, Cardinal, & Burton, 2017). A mixed-method study was also not ideal for the research because, according to Yin (2018), the quantitative portion of mixed-method research requires prediction and testing of the existing theoretical construct. I did not need to predict or test a theoretical construct in this research.

The research designs that I considered for the study were a case study, ethnography, and phenomenology. I chose a case study research design instead of ethnography or phenomenology. A case study was appropriate for this study because I conducted an in-depth investigation of a phenomenon. According to Yin (2018), researchers use case studies to explore the *what*, *how*, or *why* of a particular event. Researchers use the ethnographic design to understand and investigate the shared culture that influences the behaviors of a group (Rutberg et al., 2018). An ethnographic study is not suitable because the purpose of the research was to explore a specific business problem and not to investigate a shared culture that influences groups' behaviors. A phenomenological research design is used to understand participants' perceptions, perspectives, and understanding from experiencing a specific phenomenon (Saunders et al., 2015). A phenomenological study was not suitable for this study because the primary purpose of the study was not to understand the meanings of the lived experiences of participants.

### **Research Question**

What strategies do business leaders employ to effectively use data analytics for internal auditing and the detection of fraudulent activity?

### **Interview Questions**

1. What strategies did you employ to successfully and effectively use data analytics for internal auditing and the detection of fraudulent activity?
2. How did your employees respond to those strategies?
3. How were plans to use data analytics for internal auditing and the detection of fraudulent activity communicated throughout the organizational ranks and among stakeholders?
4. What policies and processes have you employed to successfully use data analytics for internal auditing and the detection of fraudulent activity?
5. What were the key barriers to implementing strategies to successfully use data analytics for internal auditing and the discovery of fraudulent activity?
6. How did you overcome the key obstacles to implementing procedures to successfully and securely use data analytics for internal auditing and the detection of fraudulent activity?
7. What, if any, modifications did you apply to any strategy to improve effectiveness for internal auditing and the discovery of fraudulent activity?
8. What else would you like to add about strategies to successfully and securely use data analytics for internal auditing and the detection of fraudulent activity?

### **Conceptual Framework**

The conceptual framework for the qualitative single case study was agency theory. Berle and Means (1932) introduced agency theory, and Jensen and Meckling (1976, 2009) expanded the theory. According to Jensen and Meckling (2009), the



principal assumption of agency theory is that managers will not act in the best interest of the owners or shareholders without adequate oversight. Further, Pouryousefi and Frooman (2017) posited the analytic and rigorous nature of agency theory makes it an attractive tool for decision making in complex, practical situations. Agency theory is the appropriate framework for the evaluation of the audit process because the purpose of an audit is to validate the fair presentation of financial information agents communicate to the principals in an organization.

Agency theory deals with monitoring costs, and the internal audit use of data analytic tools to detect fraud would directly affect the cost of internal controls and risk activities (George & Lin, 2017). Because there is an increased need for fraud detection due to technological advancements, the methods used to detect them should evolve as well (Internal Auditor, 2017). Agency theory serves as a potential foundation to understand strategies that business leaders employ to use data analytics for internal auditing and the detection of fraudulent activity because this reduces the operational costs of organizations.

### **Operational Definitions**

*Human capital.* Human capital describes the value of employees who possess skills, knowledge, and work experience for meeting organizations' missions (Tverdostup & Paas, 2019).

*Internal labor market.* An aarket is a group of employees within an organization with available skills and talents to move within the organization (Sarycheva, 2016).

*Strategic agility.* Strategic agility includes actions taken by an organization that operates in a volatile environment (Nejatian, Zarei, Rajabzadeh, Azar, & Khadivar, 2019).

*Succession planning.* Succession planning is the process used by management to ensure continuous availability of talent, and it includes assessing organizational needs and leadership capacities, developing leadership initiatives, and noting potential future leaders (Vito, 2018).

*Sustainability.* Sustainability refers to the practices and processes within an organization that improves the environmental, social, and financial aspects of organizations and society as a whole (Rodriguez, Svensson, Hogevoold, & Eriksson, 2019).

*Talent management.* Talent management is an employer's tool to address strategic objectives to develop employees and improve the organization's performance (Masri & Abubakr, 2019).

### **Assumptions, Limitations, and Delimitations**

There are assumptions, limitations, and delimitations associated with this study. I assumed that the participants' answers were accurate. The minor limitations included only having access to the internal audit department of companies in Pennsylvania, United States. The delimitation of the study was the inclusion of the Institute of Internal Auditors (IIA) members only.

**Assumptions**

Assumptions are the information the researcher assumed to be accurate, but without evidence (Saunders et al., 2015). I made several assumptions in this study. The first assumption was that the measurement instrument was valid and reliable. The second assumption was the sample is representative of all internal auditors in Pennsylvania and that all participants were knowledgeable of internal audit methodology. The third assumption was that participants understand the questions, and their answers are truthful.

**Limitations**

A limitation is a threat to the validity of the study that researchers acknowledge is beyond their control (Horga, Kaur, & Peterson, 2014). A limitation is the potential for researcher bias in the analysis of the interview responses because of the researcher's knowledge and experience with the problem (Yin, 2018). I did not have complete control over the individuals I interviewed, as the participants were volunteers. The participants may not be experts in the research topic. Thus, their comments may not reflect industry best practices.

**Delimitations**

Delimitations define the boundaries and limit the scope of the study (Saunders et al., 2015). The delimitation of this study was the individuals from the companies studied as it depended on which participants responded. Once the responses were received, the researcher determined the industries represented. The responses were from different industries, and the researcher had input from three different industries. The responding companies were SEC registrants and were Sarbanes-Oxley (SOX) compliant.

## **Significance of the Study**

### **Contribution to Business Practice**

This qualitative single case study may prove significant to business practice because the findings could provide internal audit leadership strategies to reduce audit costs while detecting fraud more efficiently. Auditors provide stakeholders assurance that the controls are effective, and the financial reporting is accurate (Reinstein, Hepp, & Weirich, 2018). Integrating business intelligence, big data, and data analytics is challenging (Hamister, Polak, and Magazine, 2018). Managers need real-time analytic information to detect activities that may impact resources, such as cost, revenue, and risk. When the management team detects inconsistencies timely and efficiently, this improves the efficiency of the audits and decreases the cost of the review, which directly affects operational costs. The decrease in operational expenses causes the business to be more profitable.

### **Implications for Social Change**

The findings of this qualitative study may contribute to positive social change as business leaders may use the strategies to improve confidence in financial statements. Better quality audits with lower costs result in improved confidence in financial statements. Improved confidence in financial statements can lead to more leverage, which may increase business opportunities and improve employment opportunities. Also, by increasing confidence in financial statements, more individuals could invest in the company, which would catalyze enabling increased capital spending, job openings, and growing the local tax base.

### **A Review of the Professional and Academic Literature**

The purpose of the literature review is to provide a synthesis of the related literature specific to the conceptual framework of the research study. This research study is a qualitative case study, anchored on the conceptual framework of agency theory introduced by Jensen and Meckling in 1976 to explain the relationship the audit department has with the rest of the organization. Attaining an understanding of the strategies internal audit organizations use to stay ahead of technological advancements and assess risk within the organization was the motivation to structure the literature review. Agency theory, in conjunction with leadership theory, relates to the chief audit executive's leadership (CAE) style and strategy, which influences productivity within the internal audit function and internal audit's relationship with the organization.

Productivity related strategies explained by the human capital framework introduced by Smith in 1937 and expanded by Becker in 1962. Agency theory includes monitoring costs, which are considered fixed costs and typically have a significant impact on a company's financials (Tang et al., 2017). Audit fees and the overhead costs associated with the internal audit organization are substantial, and efficiency improvements or strategies aimed at reducing these costs are needed (Appelbaum, Kogan, & Vasarhelyi, 2018). The gap in the literature exists as many researchers approach the issue of internal audit efficiency from a fraud detection or an external audit fee perspective but not from an internal audit strategy perspective.

During the past two decades, there has been a transformation in the importance and strategies of internal audit organizations. The Sarbanes Oxley (SOX) Act of 2002

requires the audit function to ensure management is performing oversight to key processes affecting their financial statements (Appelbaum et al., 2018). As SOX implementation costs were high, organizations have lowered their internal audit fixed costs through outsourcing overseas (Didia, Mayse, & Randle, 2018). Internal audit organizations typically have insight into all applications and supporting processes through walkthroughs and testing. When companies outsource audit services overseas, it provides a short-term reduction in cost. Still, it leaves the organization at a disadvantage, as there is no onsite or easily accessible personnel with institutional knowledge.

Additionally, with the changes in technology, more data is available at a much more rapid pace, and the internal audit function needs to adapt and react quickly to manage this data efficiently and effectively. Sunderland and Trompeter (2017) reiterate that the audit function needs to be effective and efficient in their assessment and monitoring of risk within the organization. The focus of this study was to explore strategies that audit executives use to improve the quality of audits through secure data analytics.

### **Literature Review Organization**

This literature review begins with a definition and explanation of the lack of data analytics in auditing and the resulting impact on internal audit organizations. Following the related theories and alternative theories are compared and contrasted. Then an overview of data analytics and the consequences of lack of security is a discussion of the trends in the industry. Management strategies used to manage internal audits, secure its data, and use analytics to detect fraud are the concepts at the center of this research study,

and the final sections outlined are audit costs and quality, and internal audit organizational transformation.

### **Literature Review Search Strategy**

The literature review strategy consisted of keyword and subject term searches such as *audit, data analytics, data security, strategic audit planning, audit costs, fraud detection, internal audit, and sustainability*. I searched online databases such as Science Direct, ProQuest, EBSCOhost, ABI/Inform, Google Scholar, and Thoreau. Academy of Management Journal, Journal of Leadership Studies, International Journal of Business and Society, International Journal of Human Resource Management, and Academy of Management Review were key online journals that provided information for the literature review. Utilizing multiple sources is vital in research to ensure completeness, richness, and depth of the study (Winchester & Salji, 2016). Formal literature reviews must synthesize scholarly and peer-reviewed evidence that is current, relevant, and valuable to the area studied (Winchester & Salji, 2016).

The literature review contains a synthesis of 162 sources, 117 include a digital object identifier (doi), and 30 include an alternative link to the source. One hundred fifty-one sources are scholarly, peer-reviewed journal articles, and six are books. Further, 141 of the resources are 5 years old or less, whereas 12 are seminal articles.

Table 1

*Types and Counts of References*

Sources	Before 2016	Since 2016	Total	Percentage of total
Peer-reviewed journals	17	133	150	93%
Government sources	1	1	2	1%
Dissertations	1	3	4	2%
Books	2	4	6	4%
Total	21	141	162	100%
Percentage of total	13%	87%	100%	

**Purpose of the Study**

The purpose of this case study was to explore strategies used in internal audit organizations to effectively integrate data analytics into the audit methodology and utilize analytics for testing and fraud detection. With the integration of data analytics in the audit methodology, both financial and IT auditors would be able to conduct analytics on the populations received before fieldwork. Additionally, the volume of data collected is significant, and audit methodology would need to be adjusted so that testing is more targeted. The security and privacy of the data received is an additional concern of the internal audit organization. The results of this case study revealed the strategies currently being implemented to address data analytics, privacy, and security of the data handled by audit departments.

**Agency Theory**

Agency theory is the management theory applicable to this study. Agency relationships traced in both English common law and the law of torts in the fourteenth century (Bowie & Freeman, 1992). Agency theory originated from the research of Adolf



Augustus Berle and Gardiner Coit Means in 1932. Their research introduced the concept of agents and their principals when applied to conflict interests in large corporations. The application of agency theory in organizational economics developed in Ross's seminal article *The Economic Theory of Agency: The Principal's Problem* (1973). Jensen and Meckling (1976) expanded agency theory in the context of risk-sharing research, and posit corporations are structured to minimize the costs of managing agents to follow the direction and interests of the principals. Agency theory focuses on the agency relationship where the agent has certain obligations that are to be fulfilled for the principal by their economic association (Baker, Baker, Turner, Yoon, & Kwon, 2019). This financial relationship is articulated by a contract between the principal and the agent with the firm as a nexus of contracts between them.

The most common form of the agency relationship is between management and shareholders of the organization. Within this relationship, the information is asymmetric because one party (principal or agent) has more information than the other (Jordan, 2018). The resulting agency problem, according to Zardkoohi, Harrison, and Josefy (2017), is that the goals of the principal and agent contradict each other, and the principal may need to verify the agent's actions. Within organizations, management personnel is agents, and the CAE is also an agent even though they have the responsibility to monitor management's activities.

Shaikh, Drira, and Hassine (2019) explain that agents are primarily intrinsically motivated, and excessive emphasis on monetary rewards and punishments can ironically subvert an agent's motives away from strategic risk-taking. Extrinsic rewards and

government regulatory requirements may create a secure environment for directors to exercise their fiduciary duties without fear of litigation (Shaikh et al., 2019). The internal audit function, however, needs to be neutral and independent in its assessment. Thus, an internal audit function acts as an independent party who reports administratively to management but is accountable to the audit committee of the organization. Internal audit is also responsible for the external auditors and is often responsible for monitoring regulatory activities.

As agents act to support their self-interest, stewardship theory is introduced concerning management acting responsibly for the assets they control. Agency theory shows that shareholder interests need protection (Garcia-Torea, Fernandez-Feijoo, & de la Cuesta, 2016). Additionally, Tripathi (2019) explains that the primary assumption of agency theory is that management will not act in the best interest of shareholders without adequate oversight to ensure compliance. Internal audit monitors management to ensure compliance and reviews detect errors and attest to the accuracy of the financial statements; therefore, agency theory is the background theory for this study.

Two primary components of agency theory relate to the costs of monitoring the agent's behavior and the detection of inappropriate activities (Jensen & Meckling, 2009). Agency costs are defined as the sum of the principal's monitoring expenses, the agent's bonding expenses, and any residual loss (i.e., reduction of principal's welfare) (Hill & Jones, 1992). The internal audit function costs are part of agency costs, and they should be managed efficiently through a strategically flexible plan.

As the primary role accountable for the internal audit function, the attitude and actions of the CAE need to be reflective of the independence and objectivity of the department. The CAE's success is reliant on their relationship with the key stakeholders of the organization, the audit committee, and their staff (Schillermann, 2018). Credibility manifests itself in the idea of independence (Institute of Internal Auditors (IIA), 2018). While the role of the CAE can vary significantly across industries, large publicly traded companies may have a business model that requires the CAE to manage the organization using a risk-based approach and to maintain the highest level of objectivity and integrity. Therefore, the internal audit function needs to maintain independence and have credibility throughout all levels of the organization.

IIA Standard 1110 specifies that the CAE report to the level within the organization that will allow the internal audit function to fulfill its responsibilities. The internal audit function assures the effectiveness of risk management and the strength of the control environment in an organization. The SOX act of 2002, the Dodd-Frank act of 2010, and recent PCAOB standards highlight the importance of the role of internal audit. According to Schillermann (2018), the CAE needs to excel in planning, organizing, staffing, directing, and controlling since they are considered an influencer. Within the internal audit function, this means tactical and strategic planning, obtaining specific skill sets, providing verbal guidance and direction on controls and compliance, monitoring and controlling of Key Performance Indicators (KPIs), including ongoing discussion with key stakeholders. CAE's leadership style becomes an influencing factor within the organization.

Leadership styles and theories identified are: authentic (Gümüşay, 2019), spiritual leader (Yang, Liu, Wang, & Zhang, 2019), transformational (Bass, 1997; Laing, 2019), servant and ethical (Heyler & Martin, 2018; Lumpkin & Achen, 2018), and leader-member exchange (Yu, Matta, & Cornfield, 2018; Lloyd, Boer, & Voelpel, 2017; Cropanzano, Dasborough, & Weiss, 2017). Gutermann, Lehmann, Boer, Born, and Voelpel (2017) posit that irrespective of the leadership style, there are behaviors, skills, knowledge, and abilities that positively affect the employee, organization, and community. Current and future audit leaders should be able to adjust and adapt their organizations in a changing business environment (Sharifirad & Hajhoseiny, 2018). The CAE is trusted to protect the interests of the various stakeholders of the organization. The stakeholders need to have confidence that the leadership of the audit function is independent, objective, and working to minimize the risk to the organization; thus, the leadership style of this role is critical to the success of the audit function.

Sunderland and Trompeter (2017) suggest that leaders can build trust among their employees. Ariyabuddhiphongs and Kahn (2017) agree that humble leaders eliminate competition and create trust, which results in increased productivity and profitability. While Guinalú and Jordán (2016) stress that without trust, the organization will experience limited success. Further, Heyler and Martin (2018) reiterate that trust is an essential ingredient for increasing employee engagement and productivity strategically. CAEs are in the position of having to support management, remaining independent, and fostering trust within the internal audit function and among employees throughout the organization. Audit leaders should realize that building trust takes time, but the rewards

surpass the effort it takes. Within the audit function, the resulting increased employee engagement and productivity could result in improved audit quality.

The strategic plan needed within the internal audit function involves both a short-term and a long-term focus for the department. The program is based on the assessment of risk associated with the organization and should be reviewed and updated annually. To structure an internal audit plan, the CAE needs to start with the development of the audit charter, creating the SOX program, annually budgeting hours for staff, and addressing the human capital with the right fit for the tasks at hand. Succession planning inclusion for the sustainability of the strategic plan, especially in light of the rapidly changing control environment that currently exists. Succession planning is needed to address the growth and risks within the organization. The internal audit plan includes consideration of the entities to be audited and their time distribution among the following components: (a) risk assessment program (b) addressing previously identified deficiencies (c) compliance with regulatory requirements (d) auditing periodicity (risk ranked areas audited at least once every three years) (e) special investigations (as a result of hotline calls), and (f) controls expertise to business units for existing processes and business improvements (IIA, 2018). Tactical planning relates to project management and the daily decisions the CAE encounters. A positive correlation exists between strategic planning and the complexity of the internal audit activity and its affiliated organization.

CAE's strategic plan incorporates obtaining and retaining the best possible talent to support the needs of the organization. Since the internal audit function is an administrative function and part of fixed costs, there is continuous pressure to do more

with fewer resources, and it compounds the issue of ensuring the right fit to handle the complexity and volume of work to be done. Efficient talent management is, therefore, critical in the structuring of the internal audit department.

Fixed operational costs are a significant concern in organizations. Overhead costs associated with the internal audit organization are substantial, and efficiency improvements or strategies aimed at reducing these costs are needed (Tang et al., 2017). During the past few years, internal audit organizations have reduced their operating costs by choosing to outsource activities (that are routine, or that need specialized knowledge (e.g., penetration testing) and reducing training of their auditors. While this approach reduces operating costs initially, the organization places itself at a disadvantage by not growing its talent base. One of the significant advantages to internal audit organizations is that the auditors have a view of the entire organization's control environment. This institutional knowledge is advantageous when auditing as control gaps and opportunities for fraud are more easily identifiable. Also, when combined with data analytics, internal auditors can contribute to the detection of fraud in organizations, and the retention of skilled auditors can result in reduced fixed costs.

### **Alternative Theories**

Agency theory focuses on managers acting in their self-interest, and stewardship theory indicates that managers will act as responsible agents for the assets they control. Stakeholder theory developed by Freeman's seminal work *Strategic Management: A Stakeholder Approach* (1984) provides an opposing view of agency theory. Freeman (1984) defined the concept of stakeholder by explaining the corporation's responsibilities

to stakeholders, along with the justification for such duties. Baker, Baker, Turner, Yoon, and Kwon (2019) explain that numerous definitions of stakeholders have evolved during the years, but the models describe a relationship based on a two-way exchange.

Stakeholders are not only affected by the organization but can affect its activities as well. For an organization to survive, there must be an appropriate balance between the interests of all stakeholder groups (Zhou, 2019). In a comparison of agency theory to stakeholder theory, the responsibility becomes principal-agent vs. stakeholder, economic vs. moral, the justification for obligations then becomes economic vs. philosophical. The similarities in the two approaches are the assumption of human behavior described as bounded rationality and risk-averse (Baker, Baker, Turner, Yoon, and Kwon, 2019). In practice, agency theory aligns the interest of agents to maximize profits, and use efficient mechanisms to minimize agency costs. In contrast, stakeholder theory seeks to balance the interests of all relevant stakeholders.

### **Human Capital Theory**

The human capital theory implies that there is potential for upward social mobility via higher education. Opposing theory by Teixeira (2017) claims that education from leading universities influence salaries as opposed to the level of education, while Galiakberova (2019) argued that performance is the reason for the higher wages. Despite the debate in human capital theory and the influences of productivity on salaries, Pravdiuk, Pokynchereda, and Pravdiuk (2019) rightly argue that all significant education theories/work relations, signaling, and credentials certification is to some degree a contributor to higher salaries.

The human capital theory supports and addresses concerns in agency theory. Adam Smith's work, *The Wealth of Nations* (1776), formulated the basis of the science for human capital theory. Becker expanded Smith's (1937) explanation of wage differentials by net (dis)advantages between different employments in 1962 and Mincer in 1984. The human-capital theory focuses on the skills, knowledge, and abilities of employees (Pravdiuk, Pokynchereda, & Pravdiuk, 2019). Galiakberova (2019) professed employees gain an advantage through the attainment of education, experience, and skills. However, this advantage is achieved only through alignment with organizational strategy and mission (Wolfson & Mathieu, 2018). Leaders who leverage human capital with qualified candidates can improve the productivity of the organization Galiakberova (2019) and organizations that invest in employee career advancement and succession planning experience favorable employee, financial, and productivity results (Wolfson & Mathieu, 2018). The human capital theory will utilize a combination of employee career advancement along with succession planning to obtain the best-suited employees within the audit function.

Wolfson and Mathieu (2018) explain the human capital theory, as assessing employees' capabilities for organizations to obtain a competitive advantage. Some researchers contend that the benefit of the human capital theory is one-sided from the perspective of the employee or the organization Galiakberova (2019). However, from an agency perspective, the assessment of employees' capabilities is used in succession planning to engage stakeholders to manage talent strategically (Pravdiuk, Pokynchereda, & Pravdiuk, 2019; Le Van, Nguyen, Nguyen, & Simioni, 2018). The assessment



initiative can result in some attrition, increased knowledge or skills, and career progression for employees.

### **Signaling Theory**

Signaling theory by Spence introduces another aspect to the human capital theory. Spence's (1978) assertion that education is an investment in human capital, analogous to investments in physical capital. This concept supports Adam Smith's statement that education is related to productivity. However, signaling theory explains that training does not increase productivity but indicates to employers the innate productivity of the employee, which is unaltered by education acquired. Weiss (1988) posits that there is a wage differential, which is not due to higher productivity gained by learning skills. Weiss explains that graduation sends a signal, and graduates command a higher wage because their graduation implies lower quit and absentee rates, which will result in higher productivity.

### **Data Analytics and Security**

Data availability and analysis increased during the past ten years as technological advancements continue to evolve (Wu & Taneja, 2019). Many functions within organizations have embraced these advancements by collecting, analyzing, and reporting on their data (Zerbino, Aloini, Dulmin, & Mininno, 2018.). While functions such as supply chain, manufacturing, and purchasing have implemented data analytics within their processes, internal audit has struggled (Appelbaum et al., 2018). The lack of secure data analytics within the internal audit function is concerning on many levels, but for this research, we restrict the concerns to fraud detection and audit quality.

Simsek, Vaara, Paruchuri, Nadkarni, and Shaw (2019) explain that auditors obtain data which includes but is not limited to a mix of traditional structured financial and non-financial data, logistics data, sensor data, emails, telephone logs, social media data, blogs, and other internal and external data. Internal audit organizations are allowed to access all company data, and through data analytics, they could provide insight into trends within the data. These data trends and anomalies may be indicators of fraudulent activity. While many may argue that the role of internal audit is not to detect fraud, however, while analyzing the data for testing purposes, fraud may be identified.

Dagilienė and Kloviėnė (2019) explain the benefits of using data analytics as a higher number of transactions tested, audit quality improved, fraud easier to detect, and provision of services that are beyond current capabilities. Auditor accountability and awareness of fraud risk could result in the prevention of fraud through early detection (Eutsler, Nickell, & Robb, 2016). Data analytics has been used in fields outside of accounting for quite some time but has only recently in finance and accounting. Finance leaders are now seeking a variety of data sources in addition to financial metrics to enable better, smarter, and faster decisions. They are integrating and leveraging nonfinancial external data as they seek to add value and improve business performance. Audit leaders should also be embracing this concept.

Some of the challenges faced in implementing data analytics in internal audit organizations are the training and expertise of auditors, data availability, relevance, integrity, and expectations of the regulators and financial statement users (Shukla and Mattar, 2019). Traditionally, internal audit organizations hire graduates in accounting and

certified public accountants with experience in public accounting. Weirich, Tschakert, and Kozlowski (2018) posit that skills such as pattern recognition and understanding how to evaluate anomalies were traditionally not included in accounting education and training within public accounting firms. Instead, these skills were acquired through many years of experience in the field. Using the internal labor market may assist in the human capital issue. Still, since CAEs tend to look for certifications and expertise in accounting, the internal labor market may be limiting. CAEs, who only staff with accounting professionals, are limiting their organizational ability to be effective and competitive in the digital age. Some audit organizations outsource their analytic needs while others build tools to automate processes needed to identify anomalies. Regardless of the option chosen, the data analytics environment requires significant audit judgment due to the potential of large numbers of abnormalities to evaluate. The right fit for internal auditors would demand robust information technology (IT) skills in conjunction with business experience and knowledge of acceptable accounting practices to successfully implement analytics.

The second challenge of data availability, ownership, and integrity relates to the type of data auditors receive (Weirich, Tschakert, and Kozlowski, 2018). In the audit process, internal audit organizations obtain confidential and sensitive data (Olsen & Dupin-Bryant, 2016). Data provided to the auditor should be traceable such that there is evidence of completeness and accuracy. Boland, Daugherty, and Dickins (2019) explain that the PCAOB is concerned about completeness in public company audits. The requirement resulting from the PCAOB concerns is that reports generated for auditors

should include evidence of the parameters used to run the report. This requirement assures the process is repeatable and that the completeness of the data can be validated if needed.

The third concern focuses on how investors and regulators view data analytics. Investors and outsiders believe and expect auditors are providing 100 percent assurance that financial statements are fairly stated, but auditors are only providing a reasonable level of assurance. This reasonable level of assurance is related to the sampling of transactions used for testing, which is significantly less than 100 percent. Data analytics provides the potential to audit 100 percent of transactions and would increase the opportunities for auditors to detect fraud. Weirich, Tschakert, and Kozlowski (2018) reiterate that traditionally auditors had a defense for not uncovering fraud if the sample they selected happened to be free of the anomaly that indicated deception. By increasing the population to 100%, auditors will no longer have their traditional industry-practice defense. Additionally, current auditing standards do not account for data analytic approaches (Zerbino, Aloini, Dulmin, & Mininno, 2018; Boland, Daugherty, and Dickins, 2019). As Shukla and Mattar (2019) state standards that require auditors to conclude based on sample testing may change significantly to accommodate the testing of 100 percent of transactions, or rules might have to be written to focus on testing data integrity.

Ahmed, Mahmood, and Islam (2016) argue that a scarcity of real-world data prevents the development of practical techniques to detect fraudulent behavior proactively. However, Wu and Taneja (2019) counter that data extraction methodologies

are improving steadily, and internal audit needs to be proactive in fraud prevention. Albashrawi and Lowell (2016) support the theory that reactive measures and consequences of financial statement fraud are well developed, but proactive detection measures still to be developed. Auditor accountability and awareness of fraud risk could result in the prevention of fraud through early detection (Eutsler, Nickell, & Robb, 2016). Further, the lack of secure data analytics could result in fraudulent transactions not being detected and may result in inaccurate financials. Fraud detection adds value to an organization and may also result in enhanced controls that prevent reoccurrence.

Many internal audit organizations are aware of the challenges and are seeking solutions to mitigate their risk. However, some audit organizations see data analytics as a separate process instead of an integrated audit process and are taking longer to implement analytics. Also, there is still resistance to accept that internal audit should be detecting fraud and giving full assurance on areas tested. Regardless of the approach taken, there is always the issue of the security of the data that needs resolution.

Data security concerns abound, but very little research has been conducted with regards to the security of data that auditors receive. The perception is that since auditors are monitoring the security standards, the assumption is that they abide by the same rules. Several issues arise in this debate, namely, (a) since a security audit is considered an IT audit, does the IT auditor audit the financial auditors to ensure they are abiding by the same standards as the organization, (b) who monitors the security of the data and the work papers in internal audit (both IT and financial), (c) when auditors make recommendations requiring the storage of sensitive data are all aspects of the data

security considered (such as access to physical and virtual files)? (d) Is the internal audit organization compliant with the data security and privacy requirements of the organization? The use of cloud computing environments provides ample data storage and computing capabilities to users (Agarkhed, 2017), but is the security of the data robust? Internal audit monitors the standards of functions within an organization, and they are not exempt from such rules. Therefore, data provided to internal audit should be as rigorously controlled and secure as it is by the data owner.

Data breaches are incidents involving unauthorized access to sensitive data resulting in the potential compromise of confidentiality, integrity, and availability of the data (Perri & Perri, 2018). Data breaches are a popular security topic for most organizations because of the difficulty in containing threats (Angst, Block, D'Arcy, & Kelley, 2017). Lack of security of data could result in severe financial and legal implications and reiterates the need for additional measures to secure sensitive data.

### **Audit Costs and Quality**

The challenge for all CAE's is to effectively execute strategies that reduce audit costs and improve the quality of audits. Technological advancements have enabled organizations to access massive amounts of previously unavailable data. Therefore, audit functions need to investigate and re-evaluate their methodology for opportunities for improvement. The audit profession needs to modify audit methodology to include data analytics (Appelbaum, Kogan, & Vasarhelyi, 2018). The use of big data and analytics gives auditors the potential to undertake advanced predictive and robust detection analytics.

Big data and analytics also mean that the internal audit organization is handling massive amounts of data, much of which could be confidential and sensitive. Handling of confidential and sensitive data brings the need for security of the data. According to Sang, Wang, Qian, Wu, & Chen (2018), applying security techniques to protect data increases costs in many industries. In the case of audit organizations, across all industry sectors, the cost of handling, storage, and security of the data adds to the audit fees for the engagement (Imran et al., 2017). Since many organizations do not currently have the infrastructure or the applications to manage the analytics and security of the data they handle, their costs have increased as they try to fund the implementation of these new process applications.

Strickler, Bohling, Kneis, O'Connor, and Yee (2016) support that leaders need skill sets to effectively manage finances, people, processes, and internal and external information rapidly. CAE's have accountability and responsibility to manage departments appropriately and maintain a budget that adds positively to the balance sheet. Unfortunately, internal audit costs are fixed costs and are typically very high (Tang et al., 2017). Schepker, Nyberg, Ulrich, and Wright (2018) provide the steps needed to strategize for success as successor identification, successor development, and evaluation. Reardon (2018) agrees that through succession planning, short-term costs increase, but the long-term gains are extensive. Schepker et al. (2018) explain that some of the intrinsic benefits of succession planning strategies show subordinates that leadership is planning for the future inclusion of the employee. Therefore, succession planning is one leadership strategy addressed to control and manage the internal audit department budget.

Internal audit leaders also need to evaluate the cost of sustainability for the organization (Buallay, 2019). Reardon (2018) agreed with Buallay's (2019) suggestion and recommended that leaders maintain awareness of organizations' dynamic environments for effective decision and strategic management. Polyak, Adamek, Farr, and Carlozo (2018) posit that audit leaders need to adapt to the future business environment by utilizing new leadership practices and thinking. The current business environment is undergoing such massive changes so rapidly that only leaders with a proactive mindset will be able to manage organizational sustainability (Reardon, 2018; Rodriguez, Svensson, Høgevold, & Eriksson, 2019). Given the rapid advancement of technology and the data available within organizations, internal audit functions need to think strategically about the security and analysis of the data they handle.

Mazza and Azzali (2018) indicate audit quality is directly related to the probability that an auditor will both discover a breach in the accounting system and report the violation. An agency relationship arises from the separation of ownership and control (Gunn, Kawada, and Michas, 2019). Haak, Muraz, and Zieseniß (2018), and Gunn, Kawada, and Michas (2019) posit independence is fee dependent, and this is directly related to audit fees. For consistency with prior studies, I examined audit fees and audit quality to see if there was any correlation. Demsetz and Lehn (1985) believed that monitoring of management decisions could reduce adverse results when management makes self-serving decisions at the expense of the shareholders. My research did not indicate any correlation of audit fees to audit quality.



Quality assurance programs cover all aspects of the internal audit activity and provide evidence of continuous monitoring. Albrecht, Howe, and Schueler (1988) explain that successful CAEs develop corporate environment, top management support, quality of internal auditors, and quality of audit work. Standard 1300 requires a quality assurance program, while standard 1310 requires internal and external assessments (IIA, 2018). Internal quality assessments are defined by standard 1311 to include ongoing monitoring of the performance of the internal audit activity and periodic reviews through self-assessments by other persons in the organization. Since Standard 1312 requires external assessments conducted at least once every five years (IIA, 2018), Mazza and Azzali (2018) posit that assessments bring transparency and increased trust in the audit function while mitigating complacency in the audit activities. The internal audit function should have an independent person conduct their ongoing assessments. The quality of the audits is only as good as the internal auditors.

Auditors identified current obstacles in data quality, security, and users' training (Tang et al., 2017). Auditors need to efficiently plan and complete procedures to gather enough verifiable evidence (Appelbaum, 2016). Audit standards dictate that auditors directly obtain and verify physical evidence as part of the risk assessment, and data collected from audit procedures or other sources (Zerbino, Aloini, Dulmin, & Mininno, 2018). By conducting an adequate amount of planning and preparation, the audit engagement can become more efficient and effective, thereby improving the quality of the audit. The efficiencies realized would reduce the amount of time needed to conduct the review, and this would ultimately reduce audit costs.

### **Internal Audit Organizational Transformation**

A focus on reduced agency costs in the internal audit function could transform an organization. The corporate environment relates to top management support such that as executive management leads top-down culture, the CAE can support senior managers by reinforcing corporate culture. CAEs for publicly traded companies need to foster coordination between the external auditor and the internal audit department. Management interaction is important to the audit function. Specific audit assignments can be based in particular areas of the risk universe concerning operations, financial, and information technology auditing. The approach regarding the promotion of talent is an essential part of the internal audit activity's organizational philosophy (Raphael, 2017). Staffing of the internal audit function typically requires hiring the most qualified candidates and basing hiring decisions on the skill sets of the auditor. Cognitive and behavioral skills are needed to comprehend information, attain knowledge, and cultivate behaviors that result in effective performance in governance, risk, and control.

Training of auditors has traditionally been a challenge. The audit profession is undergoing a rapid transformation resulting from regulatory change, technological advancements, and social expectations (Tysiac, 2017; Center for Audit Quality, 2018; Plant, Barac, & Sarens, 2019; Gepp, Linnenluecke, O'Neill, & Smith, 2018; Bressler, & Pence, 2019). Recent graduates who enter the profession are not yet trained for the changing business environment while existing auditors remain challenged to keep up with this rapidly changing landscape. Changes in the workplace are rapid and continual, which creates challenges for traditional, formal training (Inanc, Zhou, Gallie, Felstead, &

Green, 2015). In auditing departments, the auditors are the greatest asset (Center for Audit Quality, 2018). Internal auditors must be willing to learn and adapt to the rapidly changing business requirements as they are often the resource for revamping controls related to business improvements, as such continuing education is key to their success.

Auditors are involved in a multitude of distinct organizations, and as the organizations evolve, so must the personnel. This phenomenon has resulted in organizations looking for adaptable people who can keep pace with the quickly changing world and organization (Bressler & Pence, 2019). Employees know they need to be flexible to changes. However, informal learning has traditionally been the norm in internal audit organizations. After the stock market crash of 1929, the financial irregularities of the early 2000s, and again after the financial crisis of 2008, there were increased signs of a loss of confidence in the accounting profession leading to changes in professional expectations. Financial statement stakeholders began demanding more transparency in financial reporting and the auditing profession (Association of Certified Fraud Examiners, 2016). Skilled professionals' previous education no longer fits demands in the current market, job expectations are rapidly changing, and during this process, professionals should continually update their skills.

### **Conceptualization of Supporting Theories**

The following theories of human capital, signaling, and stakeholders have components that involve talent management, and leadership involvement. Using the theories of agency, human capital, signaling, and stakeholder individually is not expected to answer the research question: What strategies do business leaders employ to

effectively use data analytics for internal auditing and the detection of fraudulent activity? Harrison, Felps, and Jones (2019) explain stakeholder theory as an individual's perspective of goal attainment. The organization's stakeholders have individual needs non-inclusive of succession planning, which is a dual benefit for incumbent leaders and the organization (Jones, Harrison, and Felps, 2018). Stakeholder theory, in conjunction with human capital and signaling, will address the strategies used by successful CAEs. CAEs are challenged to be multi-faceted and successfully improve audit quality and decrease costs.

### **Conceptualization of Strategies in Internal Audit Organizations**

According to the Zerbino, Aloini, Dulmin, and Mininno (2018), internal auditing includes the efforts, methods, and measures adopted within an organization to secure and protect its assets, control accuracy and reliability of its accounting data, promote the efficiency of its operations and encourage the maintenance of its standard business policy. Porter's (2009) approach to the "Audit Trinity" explains that internal audit, external audit, and the audit committee in collaboration investigate and manage corporate fraud. Christensen, Omer, Shelley, and Wong (2019) mention relationship exists between these three groups to support a robust internal control environment while preventing and detecting fraud. The CAE is at the center of this trinity as they need to work well with the external auditor, and they need the support of the audit committee. The relationship between internal and external audit is typically an arm's length relationship. External auditors test to provide reasonable assurance of the financial statements, while internal

auditors may test any process, application, or function of the organization based on their risk assessment.

The audit strategy needs to be inclusive of succession planning, which may include specialized training for auditors. Traditionally, internal audit was the training ground for many leaders within the organization. Given the expertise and multi-discipline experience needed in internal audit, it is probable that future auditors might need training in other functions before their assignment in the internal audit function. When there is a robust internal audit function, the external auditor could choose to have some reliance on their testing. Reliance would indicate that there is some professional respect between the internal and external audit teams.

Fraud training is very specialized, and much practice is needed to become proficient. Lopez-Rojas and Barneaud (2019) support the simulation of fraud cases to help internal auditors gain experience; however, the practical application may sometimes be quite challenging. Internal auditors need to training in fraud detection. While Drogalas, Pazarskis, Anagnostopoulou, and Papachristou (2017) support internal audit protecting the financial data of the enterprise, external audit monitoring, and the audit committee monitors and supervises both for their effective operation in fraud detection.

### **Transition**

In Section 1, the foundation of the study was included, the background of the problem, the problem, and purpose statement, the nature of the study, the research question including the interview questions, the significance of the study, and the study

assumptions, limitations, and delimitations. Section 1 also included a review of the academic and professional literature, and the agency theory framework.

Section 2 contains an outline of the intent of the study, the research design, population sample, and the data collection tools and techniques used in this study.

Section 3 included an overview of the study and a presentation of the observations derived from the analysis of the data collected. Also included is a discussion of applications of the research to business practices and the implications for social change. Additionally, Section 3 includes the presentation of recommendations, reflections, and conclusions resulting from the study.

## Section 2: The Project

Section 2 includes extensive insight, analysis, and reason for the research methodology. The section consists of (a) the purpose statement, (b) the role of the researcher, (c) the selected participants, (d) a detailed description of the research methodology and design, (e) the population and sampling, (f) ethical research, (g) data collection instruments and technique, (h) data organization technique, (i) data analysis, and (j) reliability and validity. In Section 3, all data collected and analyzed disclosed along with the findings of the research study.

### **Purpose Statement**

The purpose of this qualitative single case study was to explore strategies that business leaders employ to effectively use data analytics for internal auditing and the detection of fraudulent activity. Operational security influences the success of businesses, which, in turn, provides jobs and economic growth to communities (Larrimore, 2018). The target population consisted of three business leaders from publicly traded companies located in Pennsylvania with successful experience using strategies to effectively use data analytics for internal auditing and the detection of fraudulent activity. The implications for positive social change include an increase in employment opportunities as well as the protection of citizens' privacy within the community.

### **Role of the Researcher**

Qualitative researchers are engaged in scientific discovery, the creation of new theory, and may also test theories (Collingridge, 2019). For this qualitative study, I served as the primary data collection instrument to obtain participants' views. My

responsibilities in this qualitative study included defining the data collection methods, collecting and analyzing the data, and presenting results and recommendations in an objective framework.

According to the U.S. Department of Health and Human Services (1979), participants must be treated with impartiality. The Belmont Report explains that the three basic ethical requirements are (a) demonstrating respect, (b) receiving and documenting informed consent, and (c) respecting individuals' confidentiality (U.S. Department of Health and Human Services, 1979). I compiled the ethical guidelines to protect the rights of the three participants in this study and supplied each participant with a description of the research to help them understand the contribution they will make to the research.

Although the research involved obtaining information from human participants, there was no physical contact. Through the use of the consent forms, the participants agreed to contribute to the study. The mandatory consent forms are an ethical and regulatory requirement in research. The condition aims to respect human participants and reduce any risks for participants (U.S. Department of Health and Human Services, 1979).

The topic of this study is of interest to me as I worked in Internal Audit organizations for more than 25 years. I conducted IT, financial, and operational audits and investigations in the technology, financial services, pharmaceutical, chemicals, and telecommunications industries. Although it is impossible for researchers to remove all bias from their research, I reduced errors and potential bias through the collection of data from individuals with first-hand knowledge and strategies about the research topic. I did



not use my own opinions, beliefs, or experiences to develop conclusions about the research.

### **Participants**

The goal of qualitative researchers is to explore phenomena while applying a subjective approach to analyze the participant's experiences (Saunders et al., 2015). Using a case study design allows a researcher to explore a business issue involving an experienced group of individuals (Collingridge, 2019). Saunders et al. (2015) explained that a case study could include qualitative or quantitative evidence obtained from multiple sources. Further, it is imperative that participants have experienced the researched phenomenon (Rizvi, 2019). Hence, I restricted the data collection to three companies in Pennsylvania. The population for this study included business leaders responsible for the quality of audits, such as an audit director, a senior director in internal audit, and a vice president of internal audit, who work in publicly held companies in Pennsylvania and had experience and knowledge relevant to the topic.

The eligibility criteria specified that participants needed to be personnel with direct involvement in audit methodology, audit costs, and audit resource management at three publicly held companies in Pennsylvania. Saunders et al. (2015) indicated that qualitative researchers should establish participant eligibility for effective data collection. Researchers should use eligibility criteria to select participants with experience relevant to their research topic (Latiffi, Brahim, & Fathi, 2016). The eligibility criteria for the selection of participants in this study included the following: (a) chief audit executive (CAE), vice president of internal audit, director of internal audit, or senior director of

internal audit working in an organization located in Pennsylvania; (b) more than 5 years of professional and industry experience; (c) willingness to participate in an interview; and (d) experience with developing and implementing data analytics and data privacy strategies within an internal audit function.

I had access to the participants in this study through my professional affiliation with the IIA and the Information Systems Audit and Control Association (ISACA). My strategy was honesty and being straightforward about the reason for the research and the intentions during the data collection phase.

After Walden University and Institutional Review Board (IRB) approved my proposal, I contacted each participant to discuss the purpose of the research study, criteria for participation, participant confidentiality, and the informed consent process (IRB 03-20-20-0671761). Before any data collection, I confirmed that participants met the requirements and reviewed the letter of consent.

## **Research Method and Design**

### **Research Method**

Marshall and Rossman (2016) advised that the use of an appropriate research method selection to answer the research question is an essential element of the research. When the research method is chosen, the researcher can then identify the most effective way to answer the research questions (Taylor, Bogdan, & DeVault, 2016). I used a qualitative research method as the objective is to explore strategies audit leadership use to securely use data analytics for internal auditing and the detection of fraudulent activity. I

selected a case study design as I conducted an in-depth investigation of the phenomenon, which is the security of data within the internal audit function.

Makrakis and Kostoulas-Makrakis (2016) explained that to understand a phenomenon, researchers should choose one of three research methods: (a) qualitative, (b) quantitative, and (c) mixed method. I chose the qualitative research method and case study design as I conducted an in-depth investigation by exploring the what, how, and why of the security of data used in internal audit. Rutberg and Bouikidis (2018) pointed out that the qualitative method is interpretive through observations and interviews. Further, Taylor, Bogdan, and DeVault (2016); Makrakis and Kostoulas-Makrakis (2016); Percy, Kostere, and Kostere (2015); and Turner et al. (2017) explained that the qualitative research method allows the researcher to amend and improve the interview as it progresses.

The qualitative research method is suitable for this research because the collection of data occurred in a natural setting. According to Marshall and Rossman (2016), the qualitative research methodology is participant-oriented in unstructured or semistructured interviews about the participants' lived experiences. Yin (2018) stated that the qualitative researchers' goal is to explore the depth and complexity inherent in phenomena through a subjective approach. Quantitative researchers utilize numerical data in combination with statistical procedures to determine the relationships and differences among variables (Yin, 2018). Taylor, Bogdan, and DeVault (2016) declared that the quantitative researcher method uses statistics and numbers to accept or reject a hypothesis.

The mixed-method requires expertise in quantitative and qualitative methods. Marshall and Rossman (2016). Rutberg and Bouikidis (2018) posited that combining quantitative and qualitative methods in one research study validates and enhances research findings while challenging the underlying assumptions of the two paradigms. I did not choose quantitative data. Therefore, I rejected both quantitative and mixed methods. The research will not examine the relationships between variables. Therefore, quantitative or mixed-method research methodologies are not appropriate for this study.

### **Research Design**

The research designs considered for the study were a case study, ethnography, and phenomenology. I chose a case study research design instead of ethnography or phenomenology. A case study is appropriate for this study as I conducted an in-depth investigation of a phenomenon. According to Yin (2018), researchers use case studies to explore the *what*, *how*, or *why* of a particular phenomenon. Researchers use the ethnographic design to understand and investigate the shared culture that influences the behaviors of a group (Rutberg & Bouikidis, 2018). An ethnographic study is not suitable because the purpose of the research was to explore a specific business problem and not to investigate a shared culture that influences groups' behaviors.

A phenomenological research design is used to understand participants' perceptions, perspectives, and understanding from experiencing a specific phenomenon (Saunders et al., 2015). A phenomenological study was not suitable for this study because the primary purpose of the study is not to understand the meanings of the lived experiences of participants. Fletcher, Zhao, Plakoyiannaki, and Buck (2018) explained

that researchers use a case study design for research grounded in reality and local settings, explicitly addressing the contextual conditions of theory as a natural ingredient of international business. I selected a case study design because I conducted an in-depth investigation of a phenomenon, which is data security and analysis, by exploring the *what*, *how*, and *why* to obtain strategies internal audit executives use to reduce fraudulent activities in their organization.

I included information from multiple sources to achieve data saturation while conducting the study. Abdalla, Oliveira, Azevedo, and Gonzalez (2018) indicated that data triangulation of various data sources is a means to achieve data saturation. Hancock, Amankwaa, Revell, and Mueller (2016) suggested that participants may be added to a study until no new information is received. In contrast, Nayfeh, Marcoux, and Jutai (2019) advocated that additional data or concepts may be added until data saturation occurs. The research design for this study is a single case study where participants from different organizations will contribute to the study. I conducted interviews and collected data/documentation from public companies (within the industry) until no new information emerges. I facilitated triangulation by tracking the data from public companies within the industry sector tested.

### **Population and Sampling**

In qualitative research, the researcher needs a strategy for data gathering and sampling (Marshall & Rossman, 2016). How researchers sample and whom they sample (i.e., demographic, social, or professional identities of participants) are two critical factors that can affect the overall external validity of a study's results (Erba, Ternes,

Bobkowski, Logan, & Liu, 2018). Sampling methodology and sample populations together provide population validity, which is necessary to conclude about a population based on the results of a sample studied (Erba et al., 2018). The population for the study was from three companies in Pennsylvania. I selected one participant from each company for this qualitative research case study design to explore strategies audit management used to analyze and secure data. Yin (2018) posited that there is no set sample size for qualitative research; instead, the goal was to gather sufficient data to meet the research objectives. Additionally, a case study should not have a sample of more than 10 participants (Yin, 2018).

Purposive sampling was used for this study. Purposive sampling aims to select information-rich cases whose study illuminates the questions under investigation. I used purposive nonprobabilistic sampling, as this process allowed me to confirm that the sample participants are qualified and knowledgeable on the topic. I selected participants who satisfied the following qualifications: (a) a leader in an audit function in Pennsylvania, United States; (b) willing to participate; (c) has more than 5 years of audit experience; and (d) has implemented or is implementing analytics within the audit function. Using participant criteria helped the researcher ensure that participants have the appropriate level of experience with internal audit strategies.

Lattifi, Brahim, and Fathi (2016) claimed that establishing a productive open dialogue will promote detailed and accurate responses to questions. For this study, I conducted in-person interviews with the three participants in a secure and comfortable setting. I obtained information on successful strategies being used to secure and analyze

the data used within the internal audit function. Interviews continued until I reached saturation. Nelson (2017) explained that saturation occurs when no additional data or emergent patterns emerge. Additionally, Nelson (2017) posited that to reach saturation is to achieve a sufficient depth of understanding that allows the researcher to theorize instead of entering an ultimate limit.

### **Ethical Research**

Upon receipt of the Walden University IRB approval and a signed letter of cooperation, I discussed the informed consent process with each potential participant. I also discussed the purpose of the research, the criteria for participation, and informed participants that they might withdraw from the study at any time. I asked participants what their preferred mode for communication was, and abided by their preference (i.e., email, text, or delivery of hard copy). Lee (2018) explained that researchers need to be respectful, maintain the confidentiality of the information provided, ensure there is no harm to the participants, and researchers should obtain a signed consent form before the interview. Yin (2018) agreed that researchers receive a signed informed consent form before scheduling the meeting. Additionally, researchers need to abide by the rules of research established by the Belmont Report (U.S. Department of Health and Human Services, 1979).

Once the individuals' consented to participate in the study, they received communication reiterating the verbal discussion, and the consent form included the research objectives, interview questions, the process if they wish to discontinue participation, the consent form, and my contact information. Participants responded with

an email approval, and I scheduled their interview. The consent form is in Appendix D of this research study. Lee (2018) reminded researchers that obtaining approval prior to beginning the study provides the following (a) the proposed research is reviewed for potential contribution to knowledge, (b) the rights and welfare of the study participants are protected, and (c) the risks inherent in the study can be reasonably justified with respect to the potential benefit of the research. The interview notes were available for validation and correction by the participants, and no participants received compensation for their input. Roth and von Unger (2018) reflected that participants need transparency of the process, the confidentiality of the information they provided, and assurances of the security of the data. Makhoul, Chehab, Shaito, and Sibai (2018) reiterate that researchers need to adhere to ethical research conduct.

Further, Lee (2018) reflected on the challenges facing researchers and the ethical values that underlie many aspects of the research proposal. Therefore, the organizations, the participants, and their input remain confidential and secure throughout the study and inclusive of research publication. The data obtained will be retained in the cloud for 5 years.

### **Data Collection Instruments**

Data collection processes in qualitative case study research could influence the study's outcome (Clark & Vealé, 2018). According to Yin (2018), there are six sources of case study data instruments, namely, documentation, archival records, interviews, direct observations, participant observations, and physical artifacts. I was the primary data collection instrument and used semistructured interviews as one of the data collection



methods. In qualitative case studies, primary data include original data collected from interviews (Clark & Vealé, 2018). Using interviews as a data collection instrument in qualitative research enables the researcher to unravel meanings elaborated in participants' stories, speeches, and experiences (Troncoso-Pantoja & Amaya-Placencia, 2017).

Interview protocol can add consistency and rigor to the data collection process and aid in being compliant with the ethical stance of the research (Yin, 2018). I used semistructured interviews as the primary data collection method and a review of the company documents as a secondary collection method.

Secondary data includes data provided or collected for a different purpose, such as regulatory/financial reporting or a different research study (Kamin, 2017). During the semi-structured interviews, I collected evidentiary company documents from the participants. Annual reports and other public documents related to the target industries of this study will constitute the secondary data. Review and analysis of company documentation help researchers understand the operations of an organization (Russell and Brannan, 2016). I conducted research to obtain the annual reports and other published materials and combined them with the evidentiary audit programs provided by the participants. The advantage of getting the audit programs from each of the participants is that the researcher was able to compare the analytic steps taken by each of the participating organizations. The transparency of the public documentation is an advantage, and Yin (2018) supports its use to verify findings from the primary data source. Jury (2018) cautions researchers in their interpretation of publicly available documentation. While Caretta (2016) explains that qualitative researchers may use

information from other sources to support and validate the information received from interviews. The documentation received from the participants, and thorough research used to corroborate information collected through the interviews.

Seitz (2016) posits that researchers may develop rapport with participants during face-to-face interviews, and this may result in participants being more forthcoming. When conducting the face-to-face semistructured interviews, I followed the established interview protocol outlined in Appendix B of this study. According to Yin (2018), the interview protocol explains the process used to gain access to the participants and addresses participant availability issues and unplanned scheduling activities. The interview protocol for this study consists of pre and post-interview activities, along with the interview questions. Troncoso-Pantoja and Amaya-Placencia (2017) indicate that researchers should prepare for semi-structured interviews by creating a set of fixed questions that provide the opportunity for participants to share opinions about their experiences. Yin (2018) support the use of interview protocols to ensure interview consistency and increase the reliability of the research study. Caretta (2016) reiterates that the quality of the study is directly correlated to the quality of the research questions.

My pre-interview activities consisted of an introductory meeting during which the study was described, the informed consent form explained, and privacy and confidentiality concerns addressed. This introductory meeting provided the participants with the opportunity to ask questions prior to deciding to participate voluntarily. The interview questions are included in the interview protocol so that the participants were fully informed of the expected discussion prior to making a commitment. I ensured the

participants' reviewed and signed the informed consent form before the interview scheduled activities. Wolf, Clayton, and Lawrenz (2018) reiterate the federal requirements for protecting the rights and privacy of research participants. Lloyd and Emerson (2017) also caution researchers that the rights, safety, and well-being of participants should prevail over the interest of the research, and all parties should understand their obligations. The consent form stated that participation is voluntary, and participants may withdraw at any time during the process. The interview questions and consent form are included in Appendix A and D (respectively).

My post-interview protocol indicated that member checking was used during a follow-up interview. Member checking allowed participants to verify and clarify information provided during the interview (Birt, Scott, Cavers, Campbell, & Walter, 2016). I used member checking so that participants verified the accuracy of their responses while ensuring the validity and reliability of the data collection. Member checking allows validation of results but also provides the participants' the opportunity for reflection and addition of content (Birt et al., 2016). Member checking may be conducted via a second meeting during which the transcript of the first interview is reviewed (Troncoso-Pantoja & Amaya-Placencia, 2017). According to Van Der Spuy, Busch, and Bidonde (2016), member checking is a crucial task a researcher must perform to enhance credibility. I continued using the member checking process until all of the participants confirmed my interpretations, and no new information emerged.

I was the primary instrument for researching, collecting, and reviewing all of the company documentation of the participating organization. Researchers conducting

qualitative case studies need to accurately represent the input from the participants combined with their interpretation of the company's documentation (Jury, 2018). In qualitative research, documentation reviews are used as a technique for data collection (Caretta, 2016). Document reviews may include company documents such as reports, project documentation, historical records, and archived documents (Troncoso-Pantoja & Amaya-Placencia, 2017). I used the documentation provided by the participants as well as the information obtained from the company's website.

A review of the company documentation supplemented the interview and explained the strategies that are being implemented to handle the data and detect fraudulent activity. Company documentation provided background information and insight into their innovation strategies (Caretta, 2016). A company's innovation strategy (relating to data) dictates how the audit methodologies will need to change. Internal company documentation provides insight that financial records may not capture (Kamin, 2017). I used the literature to complement and validate the interviews during my analysis of their strategies.

I used methodological triangulation by supplementing interview data with public research data, and company data to gain a thorough understanding of the strategies used to integrate analytics. The use of methodological triangulation can improve the overall quality of research, specifically the areas' accuracy, reliability, and validity of the research study (Abdalla et al., 2018). Roberts, Dowell, and Nie (2019) also support methodological triangulation to be used by researchers to improve the accuracy, reliability, and validity of their research. I used semistructured interview and company

documentation for triangulation as these two data collection methods allowed me to crosscheck and validate the data, thus improving the accuracy, reliability, and validity of the data.

### **Data Collection Technique**

Data collection began with conducting face-to-face semistructured interviews using the eight questions within the interview protocol in Appendix B. The interview protocol guided the interviews for consistency. As suggested by Troncoso-Pantoja and Amaya-Placencia (2017), semistructured interviews allow flexibility to discuss and clarify questions between the participant and the researcher. Additionally, semistructured interviews enable the use of open-ended questions and follow-up discussions that may add value to the research (Nandi & Platt, 2017). I used open-ended questions to encourage and allow the participants to discuss the topic. The semistructured interviews consisted of eight questions guided by the interview protocol in Appendix B.

The interviews were conducted in a setting that was comfortable and convenient for both the participants and the researcher. Nandi and Platt (2017) support face-to-face interviews as researchers can establish trust through building rapport with the participants. The physical interaction in a face-to-face meeting is a significant advantage to the researcher as the participant may be more open in a socially desirable environment (Ortiz, Santos, Landenberger, Emmanuelli, Agostini, & Ardenghi, 2016). The interview protocol included a brief introduction of the researcher and the study and allowed the flexibility to build rapport with the participant before asking the interview questions. This technique is supported by Jury (2018), who explains that researchers should make sure

their participants are comfortable before beginning the interview. I began the interview by thanking the participant for volunteering to be part of the research study and reminded them of the signed consent form and gave them the opportunity to ask questions or share any remaining concerns.

I then explained the interview process and explained that if they did not want to be recorded, I was able to take notes in shorthand during the interview. I reminded the participants that I would transcribe the shorthand, and their input would remain confidential. I was courteous and professional to the participants and asked each question and allowed them to finish their responses before moving to the next question. I asked probing questions if I needed clarification or additional information. O’Keeffe, Buytaert, Mijic, Brozovic, and Sinha (2016) indicate that researchers should be flexible and adjust the interview protocol as needed to obtain depth during the interview. I refined the interview protocol as needed to ensure clarity of the interview questions such that the primary research question was addressed adequately. I continued through the interview questions until all questions were discussed.

After the interview was complete, I asked participants if there is anything else they would like to share either verbally or via documentation. I explained the concept of member checking and scheduled a follow-up meeting to review my understanding of their input. I concluded the interview by thanking the individual for participating.

Upon conclusion of the interview, I immediately transcribed the shorthand notes of each interview into separate Microsoft Word documents. I anonymized the information in the transcript to ensure confidentiality. O’Keeffe, Buytaert, Mijic, Brozovic, and Sinha

(2016) explained that participants might be more open if they know that their input will be confidential. I then interpreted the transcriptions based on my understanding of the participant's input provided. While interpreting the transcriptions, I searched for themes in the interview and correlated them to themes in the literature as best as possible.

Abdella et al. (2016) explained that researchers should analyze the data and search for themes during the transcription activity. I transcribed and analyzed the data in preparation for the member checking meeting.

Since I already scheduled a follow-up meeting with each participant, I needed to complete the transcription in a timely manner. Member checking improves the credibility of the research study (Caretta, 2016). I analyzed the data collected from the interview, interpreted the data, and searched for themes in the interview and in the documentation. According to Birt et al. (2016), member checking is used to share the interpretation and confirm the accuracy of the information obtained. During the follow-up meeting, I asked each participant to confirm my interpretations. If any new information surfaced, I obtained supporting documentation and repeated the member checking process. I continued an iterative process of member checking until my interpretations were confirmed, and no new information received.

Company documentation was used to validate the information from research data. Qualitative researchers may use data from other sources to support information provided during interviews (Abdalla et al., 2018). Company documentation can be used to supplement the data from the interviews and provide a more thorough understanding of

the data (Kamin, 2017). A review of documentation helped to strengthen the findings and led to more robust conclusions within this study.

Wray, Archibong, and Walton (2017) suggest that researchers conduct a pilot study to refine methodologies and resolve practical logistic issues. A pilot study is recommended to enhance the researcher's confidence and competence to perform the main research (Wray et al., 2017). I did not conduct a pilot study as I already did a mini project on a similar topic for one of the classes completed in this program. The mini-project experience made me conscious of participants not honoring their scheduled interviews. Therefore, for this research, the participants received an email confirming the date and time of the meeting and a copy of the interview questions. Participants returned their consent to participate in the study before the date and time of the interview. Jury (2018) warned that the researcher should prepare for the possibility of participants not honoring their scheduled meetings due to conflicts or emergencies arising. The plan was to confirm the date and time of the interview 48 hours before the interview. Yin (2018) explained that assuring the participants of the confidentiality and security of the data provided could be advantageous to the researcher as the participants would be more comfortable sharing information.

### **Data Organization Technique**

Data organization technique is a critical component for analyzing and interpreting data in case studies (Kamin, 2017). Data organization is critical for data sharing (Gagliardi, & Dobrow, 2016). Semistructured interviews were the primary data collection technique for the research, and the secondary data collection source was research-based.



Qualitative data obtained is unstructured and provides actual emotional depth into a subject. When researchers efficiently organize their data, more effective data analysis results (Nayfeh et al., 2019). Gorgolewski and Poldrack (2016) reiterated that effective data organization reduces errors and facilitates quality analysis by the researcher. I organized the data using Microsoft Office tools. I used Microsoft Word for the consent forms and interview protocol. I also used Microsoft Excel for tracking and organization of all documentation received. Yin (2018) suggests using an electronic system to organize and retain information. I used the cloud to store the transcripts of the interviews, and it is accessible only by me. The data collected for the study is confidential, and the participants' identities not captured. Given the nature of this study, companies are hesitant to be identified and are reluctant to participate if they are identifiable. Therefore, the data provided is password protected on my personal computer and no hard copies of documents created or retained. All information was transferred to electronic media and will be stored in the cloud for five years, after which it will be destroyed. The information on my personal computer will also be deleted to eliminate the possibility of previously stored information being retrieved from the computer's hard drive.

Robins and Elsen (2017) support researchers' use of NVivo as a tool to organize varying sources of information. The interviews were retrieved, classified, and a transcript created using NVivo 12. Then, NVivo 12 used to pattern match, code, and identify emergent themes. Folders were created to organize the various themes that emerged and were secured using an alphanumeric code. There were no recording of the interviews, only transcripts that were encrypted, password-protected, and stored in the respective

individual folders. Notes taken during the interview were also used in the data review process, and such notes were retained in a secure location for five years after the end of the study. This secure location is in the cloud, accessible only by my account. Since the data collected for the study is confidential, the participants' identities were not captured. Also, the participant's information was not discussed with any third parties. Access to the research data is limited to me. There were no conflicts of interest or power differentials existing for this study, and no incentives offered for participation.

### **Data Analysis**

Data analysis began with compiling the data collected until I had a meaningful answer to the research question. The purpose of the data analysis was to uncover themes from multiple data sources. Using more than one type of analysis can improve the rigor and robustness of the findings (Robins and Eisen, 2017). I used methodological triangulation by supplementing interview data with public research data, and company data to gain a thorough understanding of the strategies used to integrate analytics. The use of methodological triangulation can improve the overall quality of research, specifically the areas' accuracy, reliability, and validity of the research study (Abdalla, Oliveira, Azevedo, & Gonzalez, 2018). Roberts, Dowell, and Nie (2019) also support methodological triangulation to be used by researchers to improve the accuracy, reliability, and validity of their research. Methodological triangulation was appropriate for the research study, as it enabled the researcher to search for themes across multiple data sources.

According to Yin (2018), the following steps are critical to data analysis (a) compiling (b) disassembling (c) reassembling (d) interpreting, and (e) concluding.

### **Compile**

Compiling began with documenting and verifying the data (Yin, 2018). I became familiar with the interview data and the company documentation provided. Akinyode and Khan (2018) explain that during compilation, the researcher should summarize the chronological sequence of the data retrieved and interpret the data. I created a listing of all documentation and data obtained so that it was easy to track the source of information, and it helped in the reassembly process. I reviewed all of the interview transcripts, company documentation, audit programs, and financial reports obtained.

### **Disassemble**

During disassembling, the researcher will separate the data into groups and will obtain a deeper description and interpretation of the data (Kamin, 2017). Coding is the analytic process in grounded theory (Maher, Hadfield, Hutchings, and de Eyto, 2018). Coding was used to look for explanations, patterns, relationships, and underlying meaning of data. Qualitative researchers search for patterns in data to understand the participants' perspectives (Azungah, 2018). I analyzed the interviews, company documents, and audit documentation related to the inclusion of data analytics and data privacy steps with the audit methodology. I generated a list of codes that represented the data and my research question and continued to add to the list of codes as new ideas emerged from my data.

**Reassemble**

Next was the reassembling process, which involved developing themes and regrouping the data into themes. Coding and categorization enable the researcher to categorize the data in smaller meaningful pieces, and these categories form the basis of theme development (Vaismoradi, Jones, Turunen, & Snelgrove, 2016). Coding will demonstrate the presence of constructs and their relationship (Abdalla et al., 2018). I categorized the data into themes and developed an understanding of strategies audit leadership use to integrate data analytics. The categorized codes established the major themes and ensured alignment with my primary research question.

**Interpret**

The interpretation process is iterative as it involves asking analytic questions of the data, and reassessing the data to ensure all responses and perspectives are captured. Since the data was already categorized and in themes, the researcher performed this step to analyze the data. I analyzed the patterns and recurring themes that were relevant to the research question and continued to categorize the data. Categorization of the data will help researchers to correlate the major themes discovered and will support the answer to the research question (Peticca-Harris, de Gama, & Elias, 2016). Major themes were determined after a thorough analysis of the data (Patias et al., 2016). I included data from the literature review when it was relevant to my research question, conceptual framework, or data collected. The inclusion of data from the literature will enhance the search and validation of major themes (Peticca-Harris, de Gama, & Elias, 2016). I continued to research newly published studies that were relevant to my research. I

included any new reviews found in the analysis, and this was an iterative process until all significant themes related to the research question were identified and included in the study.

## **Conclude**

I then developed conclusions based on the assessments in the interpretation phase. These conclusions were supported not only by the classic data analysis methodology outlined above, but also verified using the NVivo tool. Since the NVivo tool performs all steps in the data analysis process, this was duplicative for this study. Still, I completed the duplicate process to ensure that the findings were robust and accurate. According to Oliveira, Bitencourt, Zanardo dos, Santos, and Teixeira (2016), NVivo is an effective tool to detect correlations between themes in qualitative studies. Kamin (2017) supports the use of NVivo to manage the data and keep an audit of the decisions taken during data collection and data analysis. I used the tool to ensure that I completely and accurately interpreted all of the data.

## **NVivo12**

NVivo 12 validated the data analysis. Nvivo can be used by researchers to ensure uniformity and validity in data analysis and the creation of additional categories for future study (Patias, Bobsin, Gomes, Liszbinski, and Damke, 2016). I used NVivo to manage the data collected and track the decisions made during data compilation and analysis. I began data analysis by importing the data into NVivo to manage, organize, analyze, and find insights in all data collected. Data is arranged such that concepts or categories are created to enhance the trustworthiness of the research study (Abdalla et al.,

2018). According to Oliveira et al. (2016), NVivo improves the accuracy of the themes identified because it searches through all of the data. I used NVivo to supplement the findings through word analysis and to provide a visual presentation of the data and conclusions. The NVivo software has a word count feature, which served as an additional analytical tool to understand the frequency of words used by participants and in company documentation. The word feature can be used for categorization and also may result in themes (Oliveira et al., 2016).

Once the NVivo analysis was completed, I combined the results I had from the classic data analysis method with the results from the NVivo tool. Having the supporting analysis from NVivo allowed me to provide a visual presentation of the data and the conclusions. By using both methods, I was able to have more robust and accurate conclusions, which are supported by analysis, and NVivo validated my original conclusions.

## **Reliability and Validity**

### **Reliability**

I used an interview protocol, member checking, and methodological triangulation to address dependability concerns on this study. Moon et al. (2016) posit that dependability is a criterion for judging the reliability of qualitative research. Quality criteria for qualitative research include credibility, transferability, dependability, and confirmability (Korstjens and Moser, 2018). I included member checking for completeness and accuracy of interview data interpretation. According to Abdella et al. (2016), member checking is also part of triangulation and supports dependability. I used

the interview protocol (see Appendix B) to ensure consistency between multiple participants of the semistructured interviews. Marshall and Rossman (2016) support qualitative researchers documenting their processes and procedures to establish dependability. Triangulation refers to the use of multiple methods to obtain complete and detailed data about the research study (Abdalla et al., 2017). Methodological triangulation confirmed the observations and improved the dependability of this research study.

I included an audit trail to increase the dependability of this study. Dependability in a research study refers to the consistency and reliability of the research findings and the degree to which the procedures are documented (Rubin, & Babbie, 2016). Dependability documentation provides someone (unrelated to or unfamiliar with the research study) clear guidance to follow, audit, and critique the research process (Moon, Brewer, Januchowski-Hartley, Adams, and Blackman, 2016). The strategy needed to ensure dependability and confirmability is called an audit trail (Korstjens and Moser, 2016). The audit trail provides transparency through the inclusion of a complete set of notes on decisions made during the research process, research team meetings, reflective thoughts, sampling, research methods adopted, the emergence of the findings, and information on the data management (Korstjens and Moser, 2017). I provided an audit trail by detailing the collection of data, analysis of the data, the development of the themes, and the interpretation of the results. Nvivo also provided a comprehensive audit trail to represent decisions made by researchers during the research process (Oliveira et al., 2016). I used the NVivo data analysis software tool to ensure an audit trail of this qualitative study is documented and organized.

## **Validity**

Credibility is important in qualitative research (Appelman & Sundar, 2016). I demonstrated credibility through the participant's review of the data and documentation, referred to as member checking. I also achieved credibility by including audit executives as participants in the study. Birt et al. (2016) explain that member checking provides an accurate representation and interpretation of the data as the participants have the opportunity to add or delete inaccuracies. The participants interviewed for this study shared their experiences during the interview, and they had the chance to review and verify the researcher's interpretation of their experiences and the accuracy and credibility of the transcript of their discussion.

I included detailed descriptions of the context and procedures. Transferability occurs when in-depth research reveals valuable information that is transferable and comparable to other studies (Belotto, 2018). Transferability relates to the setting of the study (Korstjens and Moser, 2018). Since this is a single case study, findings are relevant to the industries in which the participants are currently working. Collier and Wyer (2016) posit that transferability allows researchers to determine whether the knowledge gained from the study is transferable. Findings can theoretically be transferable if researchers provide rich data within the case study (Korstjens and Moser, 2017). I provided rich data with detailed descriptions so that readers may determine whether they can apply this research in the future. Moon et al. (2016) and Korstjens and Moser (2017) indicate that researchers may use triangulation and an audit trail to address dependability. I used methodological triangulation and an audit trail captured in Microsoft Excel.



Confirmability requires an accurate demonstration of participants' responses (Moon et al. (2016) without a researcher's biases. Tong and Dew (2016) caution that researchers conducting qualitative research may introduce their skills, knowledge, and biases. However, Marshall and Rossman (2016) support the experience and trustworthiness of the researcher as essential to research validity. I presented findings to ensure confirmability. I used methodological triangulation when reviewing the documentation and used the interview protocol and member checking to improve confirmability. Researchers achieve confirmability when they establish credibility, transferability, and dependability (Moon et al., 2016).

I used data from semistructured interviews, company documents, and industry-specific research documents to achieve data saturation. I continued to conduct interviews and research until no new information emerged. De Cassia Nunes Nascimento, Vignuda de Souza, Oliveira, de Montenegro Medeiros de Moraes, Cordeiro Burla de Aguiar, and Faria da Silva (2018) posit the lack of any new emerging data or concept will lead to data saturation. Hancock et al. (2016) also support the theory that data saturation has been achieved when interviews and research do not yield new themes, and the information emerging is duplicative and expected. The use of NVivo and the constant comparison analysis performed is the support that data saturation is achieved (Tran, Porcher, Tran, & Ravaud, 2017). I used coding and NVivo to validate data saturation was achieved.

### **Transition and Summary**

Section 2 included the intent, research design, population sample, and analytical methods used for this study about the strategies used by internal audit organizations to

adopt analytics and detect fraud. I conducted a qualitative case study to enable the exploration of data security and data privacy strategies used in internal audit organizations in Pennsylvania. I gathered data from public sources, from the companies the participants work in, and from semistructured interviews to build understanding and knowledge of strategies used in internal audit organizations in various industries.

Section 3 includes an overview of the completion of the study, an analysis of the collected data, and a presentation of the findings. It also includes the application of the research in industry, and a presentation of recommendations, implications of social change, reflections, and conclusions of the study conducted.

### Section 3: Application to Professional Practice and Implications for Change

#### **Overview of Study**

The purpose of this qualitative exploratory case study was to explore strategies that audit leadership use for data security and data analysis. I collected data from audit leadership in three companies, interviewed, and performed member-checking sessions. The audit leaders interviewed were audit executives or were part of a management group with direct reports and had decision responsibility regarding audit methodology, planning, execution of audits, the analysis needed in special investigations, and strategies used in IA to implement analytics. In this study, agency theory was the conceptual framework to explore the strategies used to implement data analytics, the security of data, and close the knowledge gap in the literature.

Data collection included semistructured interviews with each participant and the collection of supporting company documents they shared. In addition, to validate the information received from the participants, their company's financials were reviewed for impact due to their data analytics implementation. Company documentation provided methodological triangulation of the data. The collection of company documentation included audit programs, PowerPoint presentations, policy documents, and standard operating procedures. Interview responses and company documentation were loaded into NVivo software, which helped categorize themes from the participants' responses. The findings showed methods that audit leadership used to implement analytics. The four themes were data analytics, human capital, technology, and stakeholder engagement. The

themes indicated are interrelated, and success may be impacted if all components are not adequately addressed.

### **Presentation of the Findings**

The main research question that guided this study was as follows: What strategies do business leaders employ to effectively use data analytics for internal auditing and the detection of fraudulent activity?

This section encompasses a dialogue of the four main themes that I identified through the study. I used methodological triangulation to analyze the data from semistructured interviews with follow-up member checking interviews, an audit trail, and company documents and procedures related to data analytics and security strategies. The presentation of the findings from the data collection includes the case organizations' strategic guidance on data analytics and data security, and how agency theory influenced the strategies. Four major themes emerged during the analysis: data analytics, human capital, technology, and stakeholder engagement. These themes illustrate potential strategies related to how internal audit business leaders effectively use data analytics for auditing and the detection of fraudulent activity.

#### **Theme 1: Analytics Strategy**

The data analytics strategy was the first theme to emerge from the data collection. During the past decade, as data has become more accessible, many organizations started using analytics to enhance their operations. The participants acknowledged that their teams did not immediately embrace analytics as they were still primarily paper-based and only had work papers in digital format. The data received from the audited areas were in

mixed mediums (paper and electronic) and could not be easily consolidated digitally. Therefore, the auditors needed first to digitize their data and then modify their tools to support the data available. The findings indicated that audit's reluctance to implement analytics was attributed to a combination of factors such as:(a) audit methodology does not require testing of 100% of the population (b) audit plans are usually very stretched so that adding tasks without adding headcount is difficult, (c) audit teams lack the expertise needed for analytics, and (d) internal audit teams do not understand or accept the need to modify methodology to incorporate analytics.

The participants indicated that internal audit leadership needs to set the tone and drive the effort to pursue data analytics. They need to research their most viable options as risk and cost were of crucial importance. All participants agreed that the options available were to build a solution in-house, hire a consultant and implement a tool, or use a combination of a canned tool customized to their needs. Multiple participants indicated that cost was a significant consideration and can be the primary inhibitor to adoption. The following will provide the pros and cons of each option as collected from the participants.

Building a solution in-house has the advantage of not requiring an outlay of funds, even though it may require obtaining additional resources to support the venture. Participant 1 stated that "existing employees had institutional knowledge and understood the applications used." The participants indicated that the resources were existing employees internally recruited to the audit function to assist with the analytics project. The disadvantage of this approach is that there may be shared resources, thus extending the length of time the project takes.

Purchasing an analytics tool and hiring a consultant to implement the tool within internal audit functions was the second choice discussed by the participants. The advantage of this choice is that the application may come with some standard queries as well as reporting tools. Participant 2 stated, “Standardizing audit tests and reporting would release resources to do more complex tasks.” The disadvantage, however, is that this option can be quite expensive, and in-house resources are still needed to help with the business requirements. The participants indicated that their auditors resisted the implementation, which resulted in the late delivery of the tool. Additionally, once the consultant left, numerous questions required a maintenance contract for support within the first year of implementation.

The hybrid solution involved using a purchased software and customizing it to meet the unique needs of the department. This solution allowed the audit team to start with the standard analytics in their initial phase, and then they developed queries to add more complex audit testing. The hybrid solution has the advantage of being customized to the specific industry’s needs. Participant 2 stated, “Commercial audit programs need to be modified to meet our needs.” Still, the implementation needed employee engagement, and when the auditors' ideas were considered, they more willingly accepted the analytics methodology. The disadvantage of this method is the cost and the longer implementation time as the audit team has limited resources, and they were still required to support the implementation. Participant 3 indicated that the audit department hired two interns and two auditors to assist during the project duration. This action added to the cost, but it was

evidence of audit leadership's commitment and importance of the auditors' input to perfect the tool.

Two of the participants indicated that they did not succeed in their first attempt at implementing analytics. Their strategy needed more flexibility and communication to be successful. The participants' advice is to learn from the team's failures as each audit function is unique, and the strategy should be customized to meet their needs. All three participants stated that to succeed the audit team needs to be committed to change.

Table 2

*Frequency of Theme 1*

Major theme	<u>Participant</u>		<u>Document</u>	
	Count	References	Count	References
Analytics	3	20	10	37

As the conceptual framework of this study, agency theory, explains that the actions of the agent are always under scrutiny. All three participants described strategies aligned with several studies found in the literature where audit executives expressed cost in conjunction with limited resources as the biggest impediment to change implementation. Sunderland and Trompeter (2017) reiterated that cost is a critical factor influencing the mitigation of risk. The industry sectors researched in this study were pharmaceutical, financial services, and technology. As such, although the audit budgets and risks were of varying proportions, the strategies aligned.

### **Theme 2: Human Capital**

The second theme to emerge from this research was the human capital strategy. This strategy has long-term implications and needs thoughtful consideration to meet the

needs of the organizations. The skillset needed within the internal audit departments is a blend of information technology (IT), finance, and accounting.

All participants were certified public accountants and agreed that they currently hire accounting majors with Certified Public Accounting (CPA) licenses. All participants felt that accounting was still the most important skillset needed. Participant 3 indicated that candidates with Master of Business Administration (MBA) degrees would be considered. While participant 1 stated that he would “consider an MBA with IT skills.” The participants indicated that they would consider a candidate with a data science or a computer science degree specifically for the IT audits. All three participants indicated that certifications such as Certified Internal Auditor (CIA) or Certified Information Systems Auditor (CISA) were relevant and valued.

Table 3

*Frequency of Theme 2*

Major theme	<u>Participant</u>		<u>Document</u>	
	Count	References	Count	References
Human capital	3	18	10	32

While all participants indicated that there was a lack of data analytics skills and abilities, they were not actively recruiting the talent needed due to resource constraints. Additionally, when there was attrition within the function, they were not necessarily backfilling with IT and analytics skills. Human capital was mentioned by all three participants during their interviews and specified within all ten documents provided by the participants.



Traditionally, accounting majors were recruited for entry-level auditing positions. During the past decade, accounting majors have pursued double majors or minors in computer science or data science. These individuals, when hired by internal audit organizations, tend to be assigned to the 'data analytics' activities or the IT audits. While IT auditing needs development, these double majors could better serve in the capacity of enhancing the financial audit methodology. Additionally, these individuals could help to implement data analytics within the financial audits as well as the IT audits.

With the current technological advancements, many processes are becoming automated, and transactions can be accurately processed. Auditors must understand the data flow and the implication of process changes, and this depth of understanding requires a background in accounting and information systems. Properly evaluated end-to-end processes reveal control gaps and are highly valued by organizations. Participant 3 stated, "end-to-end process reviews are critical" to their success.

All participants acknowledged the expertise required to conduct process reviews might change the requirements for entry-level auditors. Tang (2017) agreed that the requirements for entry-level auditors should include skillsets in multiple disciplines. All participants indicated that accounting majors needed computer science minors or IT certifications. They noted that they would also hire individuals with MBAs as they would have had exposure to modeling. For mid-level positions, experience in accounting and or IT organizations would be helpful. All participants agreed that to successfully implement data analytics, they needed individuals with extensive expertise in IT and accounting/finance, at the senior director level. These individuals would be accountable

for bringing the financial and IT streams together and identifying gaps across applications. Also, they may be in a higher salary band than a traditional audit director, especially given the skillset and experience.

### **Theme 3: Technology**

Technology risks emerged as the third theme. This theme covers the security and privacy risks of the data provided to the internal audit function. It involves the separation of private and confidential data from analytical data. Keeping private data confidential is vital as more regulations begin to require specific criteria. Given the technological advancements, the technology component has become very important, and management needs to adapt and address data security and privacy concerns.

The participants understood the importance of privacy and tried to address privacy issues during the discussions. Participant 1 indicated that going forward, organizations' existence will rely on meeting the regulatory and client requirements.

Table 4

#### *Frequency of Theme 3*

Major theme	<u>Participant</u>		<u>Document</u>	
	Count	References	Count	References
Technology	3	16	9	28

Participants 1 and 2 suggested that a privacy strategy is important for internal audit because of the volume of data they handle. They were required to have a privacy strategy to address industry regulatory requirements and client requirements. All participants indicated that security was a critical factor for IT. Nine of ten company

documents supported the theme (see Table 4). All participants indicated the need for a privacy strategy to ensure confidentiality and to meet regulatory requirements.

Security and privacy issues have been around for centuries, but with the recent technological advancement, these issues have grown exponentially. Keeping data confidential can be challenging in audit functions due to the processing of massive amounts of sensitive and confidential data. Anonymizing the data received is critical to minimize the vulnerabilities going forward. All participants agreed that internal audit organizations should conduct a security audit of the audit function as they are the recipients of confidential and sensitive data. Although internal audit functions are exempt from many organizational requirements due to their independence (of the organization), they may be vulnerable within the realm of information security. They must be vigilant and abide by the requirements of the data owner as they are not exempt from the security standards of the organization. An effective security policy helps to gain the trust of business partners and is supported by multiple studies found in the literature. Security of data was expressed as an important part of conducting business (Zhou and Piramuthu, 2015). Auditors may not know they are sharing that data, or they may share it unknowingly, which may lead to privacy issues.

Participants 1 and 2 explained that their data security aims to minimize unauthorized access. Participants 2 and 3 explained that their industry is highly regulated and that they must adhere to the best practices for privacy and security. Participants 1 and 3 indicated that their data security strategy included encryption processes applicable to data in transit and at rest. One of three participants explained that their organization did

not collect sensitive and confidential data and that all data is treated the same regardless of sensitivity.

Participant 1 faced a dilemma of exposing rich, analytical data and keeping private customer data confidential at an early stage when they deliberated on analytics requirements. They determined that the best strategy to keep private data confidential was to segment the customer data from the analytical data. Segmenting the private data enabled auditors to modify their existing privacy strategy since they would manage the sensitive data before the data analysis.

Participant 3 added that segmenting the sensitive and confidential data was the best way to eliminate privacy risks while still being able to capture analytical data. The concept of segmenting the data was fundamental because it addressed the privacy regulation of the General Data Protection Regulation (GDPR). The GDPR became enforceable in Europe beginning May 25<sup>th</sup>, 2018 (Ilman and Temple, 2019). This regulation gives control to individuals over their personal data and simplifies the regulatory environment for international business by unifying the regulation within Europe (Ilman and Temple, 2019). Organizations face heavy fines for non-compliance, and organizations need to have appropriate technical and organizational measures to implement the data protection principles. GDPR is a model for many national laws, including the California Consumer Privacy Act (CCPA), which became effective January 1, 2020 (Ilman and Temple, 2019).

The CCPA includes personal data provided by a consumer and excludes personal data that was purchased by or acquired through third parties (Kessler, 2019). Since the

sensitive and confidential data obtained by internal audit could be subject to the CCPA regulation, it is important to fully anonymize or pseudonymize the data received before performing analytics. Therefore, from a security perspective, the data received by internal audit should be subject to the same scrutiny as that of the organization. Sensitive and confidential data should be protected in accordance with the data owner's guidelines and corporate records retention policies. From a privacy perspective, the data received should be pseudonymized or fully anonymized before analytics. The anonymization activity would protect the data downstream when retained in audit work papers.

The participants believe that their method is the safest and least complex way of protecting customer data, and it meets the regulatory requirements. Participant 3 explained that their privacy strategy was not complex, addressed the regulatory requirements, and helped to avoid the collection of sensitive data altogether. Participant 1 stated, "The best way to protect private data is not to collect it."

#### **Theme 4: Stakeholder engagement**

The fourth theme to emerge was stakeholder engagement strategy. This strategy is needed to communicate with all relevant stakeholders to achieve their support. All participants agreed that the primary stakeholders were the internal auditors and management of the organization. Participant 1 indicated that although their analytics implementation was promoted and encouraged by senior leadership, there was resistance from the auditors. They attributed the resistance to a lack of analytical skills in their

current employees. Participants 2 and 3 both indicated that their employees were engaged because they owned the process, and their ideas were being used.

Table 5

*Frequency of Theme 4*

Major theme	<u>Participant</u>		<u>Document</u>	
	Count	References	Count	References
Engagement	3	14	8	25

Participants 2 and 3 indicated that the audit plan for the year is risk-based and is created in the fall of the previous calendar year. Therefore, when initiatives are introduced and need resources, there is usually resistance as no additional headcount exists. They reiterated that audit departments are not revenue-generating, and unless the organization sees the value of the activity, management will not support additional headcount. The reality is that if they do not hire the right skill sets, then they will need to bring in consultants with the specific skill set needed, and there are specific pros and cons (higher costs for a short term period and no continuity after implementation).

Additionally, participant 2 indicated that the resistance might also be resulting from the perception that their process was unique and could not be standardized. Participant 1 indicated that the perception of data analytics implementation is that this change effort is to automate and will result in job elimination, hence the resistance.

Data analysis requires additional time allocation for audits. Adding resources (time) to the audit was mentioned as a concern since audit functions have key performance indicators (KPIs) that require them to complete a certain amount of audits annually. Participants 1 and 2 indicated that they felt data analytics was a separate

activity not included within the financial audit program. Participant 3 indicated that they were successful when the data analytics step was incorporated into the audit program. Participant 3 also indicated that their audit plans evolved to incorporate more preparation time and less time in the field.

All participants indicated that their first attempt was to have the analytics steps to be separated from the audit program. They found that this impacted the timing of fieldwork as the requirements needed to be requested several weeks before fieldwork. The first time the audit planning was modified to consider time for analytics, auditors resisted. The reluctance was attributed to the change in the methodology, uncertainty of the results derived, and interpretation of the statistical results. Additionally, they were uncomfortable in only pursuing known exceptions or anomalies instead of sampling. The understanding and the appreciation for this type of testing can only be achieved when individuals can see the entire plan and see the benefits of the analytic efforts. Participant 3 relayed a story of where analytics was used on 100% of the population and resulted in two samples identified for testing. Simultaneously, judgmental sampling was used, and 20 samples were tested. The result was that the two samples (from the analytic analysis) were exceptions with significant risk associated, while the 20 samples tested did not have any exceptions. This example was the turning point for participant 3's organization, and the auditors saw the reward of time spent analyzing the data. Additionally, coverage of 100 percent of the data provided greater assurance to the organization. Data analytics requires an understanding of how the data is obtained, the data sets, and statistical

analysis of the results obtained. In many cases, the statistical analysis can be simplified using tools currently on the market.

Participant 3 indicated that the key time-consuming activity was to provide a documented step by step plan. Participant 2 cautioned that leadership should be flexible with the timing of the implementation and should consider running a pilot program in parallel with traditional auditing steps. Eight of the ten documentation evidenced detailed steps that were incorporated within the audit program.

The participants indicated that the stakeholder engagement strategy needs to be outlined in detail, and the stakeholder's stake defined. The strategy should detail the business goals and the impact of analytics (both advantages and disadvantages). Ultimately, the participants reiterated that their audit methodology needed updating, they needed to be flexible with their plan, and they needed to engage the auditors throughout the process.

### **Applications to Professional Practice**

The specific problem that formed the basis of this research was the perceived lack of robust strategies used by audit leaders to enable the adoption of data analytics and the security of the data they collect. Participants in this study provided strategies that internal audit leaders found to be successful when they implemented analytics. There were different thoughts on strategies indicating that there are different ways of implementing the program. All of the participants indicated that they used industry best practices as their guideline. After evaluating the data collected, the four major themes that emerged were data analytics framework, human capital, technology, and stakeholder engagement.



Internal audit leaders may use these results as a guide to developing analytics and security strategies. Leaders who are actively seeking to implement analytics at their organization require current information on security and analytics because of rapid changes in technology. The knowledge gained from such information will enable audit leaders to ensure appropriate processes and strategies are in place before analytics adoption. Also, the information will allow audit leaders to plan for solutions in case of new security vulnerabilities. Thus, digital data and analytics knowledge was necessary across the organization to ensure the successful adoption of the program. This study's findings were significant to professional business practices as it reduces the risk to the organization and the cost of the audits.

### **Implications for Social Change**

Organizations must understand the risks and rewards of going digital and using analytics. Understanding the data security implications requires knowledge. The findings from this research add to the existing body of knowledge by providing information on the analytics program implementation and the data security considerations. The implication for social change includes the ability for organizations to develop tools for detection, prevention, and monitoring of issues. Organizations may benefit from the strategies outlined in this study to improve productivity, efficiency, and provide improved reliability of company financials because of a strong control environment. This study's findings and recommendations may serve as a basis for positive social change.

Data collected supported the conclusion that organizations may implement analytics and improve the quality of their audits, detect fraudulent activity, and limit the

security vulnerabilities on the data within the function. This research may raise awareness in support of developing and implementing strategies to implement a data analytics program.

This study may be of value to society as its findings may better position audit leaders for success when considering data analytics implementation. Digitization and elimination of paper-based reports happen before the data analysis. Data analysis indicated a relationship between the security and the analytics implementation as the audit leaders must hire the appropriate human capital. The human capital consideration is important, as the mixture of skillsets are not typically recruited within internal audit functions. Audit leaders who are planning to implement an analytics program should have staff skilled in IT, financial, and operations. They should understand all aspects of each control and be able to evaluate end-to-end processes to maximize their efficiency. The security of the data is important as more companies outsource and / or use cloud providers. This research addressed each area of concern around data analytics programs to mitigate the risks before implementation.

This study will also benefit management because it illustrated vulnerabilities that organizations must address. Key concerns for most organizations include human capital deficits and the security of data. Within the audit function, completeness, accuracy, and reliability are important considerations for the data transmitted to auditing. Data should be anonymized before use and secured with the same vigor as when the data owner manages it.

### **Recommendations for Action**

I explored strategies that audit functions used for data analytics implementation, how they use it for fraud detection, and finally, how they secure the vast amounts of confidential and sensitive information received within the function. Study findings showed that security and privacy strategies are important for analytics implementation, and a human capital strategy must be considered for sustainability. Audit leaders should build a culture where security is a priority for data. The function should create a formal process with cross-functional training teams where they discuss security and privacy strategies. The outcome of the processes should lead to established goals and objectives with an implementation strategy. Audit leaders should separate all sensitive data from the analytical data to protect user privacy. Also, audit functions should use encryption to keep all data private in case there is any unauthorized access to their files. The audit data privacy strategy should be low in complexity and meet regulatory requirements. When possible, the audit function should take the time to anonymize the data recorded within their work papers. The privacy strategy should be aligned with the organizations' and address confidential data on the network. Limiting access to the network will reduce the number of vulnerabilities.

Audit leaders should consult with their IT function and consider using their existing best practices for security, privacy, and reliability. In general, this study might be beneficial to audit leaders in the industries studied, and I will make available a high-level summary of the results of this study to select audit leadership via email. Wherever possible, I intend to share the research results using effective and appropriate platforms

such as my place of employment, lectures, conferences, trade journals, and training seminars.

### **Recommendations for Further Study**

I have several recommendations for further research, some deriving from the limitations noted in this research and others arising from the findings of this study. The limitations of this research included the potential influence of bias and preconceived notions on the results due to the subjective nature of qualitative research and the researchers' extensive experience in internal audit organizations. The first recommendation is to continue this research with additional qualitative studies at other organizations and industries to compare with the results of this study. The researchers who conduct further qualitative studies could provide a greater sample of participants, reduce bias, and generalize the results since the consolidated data would be a result of more than three organization's perceptions and experiences. Also, the inclusion of new industries would add more insight into how other organizations have addressed data security and privacy strategies, along with human capital strategies when implementing data analytics for auditing and fraud detection.

The researchers would provide insights into the differences between industries and the role that regulations play for each particular industry. The researchers would present an opportunity for audit functions to expand their services by helping the organization implement continuous monitoring (for each specific regulation).

Since I only focused on audit leaders' perceptions for my research, I recommend performing the same research and include participants who are from other functions

within the organization. Other functions could adopt similar analytics and develop continuous monitoring so that they can detect anomalies in real-time. Robust continuous monitoring would enhance the organization's control environment and reduce internal audit testing. This point warrants further research as it would directly reduce fixed costs.

### **Reflections**

I did not intend to obtain a doctorate, but in my quest for knowledge, I found that I had completed all of the course requirements for a doctorate in finance when I had some unexpected life events. After recovering, I found the urge to learn more, and I pushed myself to complete what I had started, even if it was in a different field. I quickly realized that this process would be much more difficult than I had anticipated. However, I was very determined and driven to complete it. During the process, I learned how to conduct research, how to analyze data, and how to write the results in a way that may be noteworthy to others. I enjoyed learning about topics that may contribute to my career.

As a professional who has worked as an engineer, an auditor, a professor, and a senior director in information security and compliance, I have always been interested in automation and simplification of processes. I have had exposure to implementing data analytics within four different industries. This exposure was in multiple areas of the organization and was not limited to internal audit. In this research, I was attentive and interested in how other internal audit functions successfully implemented analytics and the effort it took. I did my best to remain objective in the results. However, it is possible that I unknowingly and unintentionally biased this research through the framing of interview questions and analysis of the collected data. During the study, I learned that

presenting an innovative idea to executives will gain more visibility when the results, risks, and investments are quantified.

### **Summary and Study Conclusions**

Audit leaders consider implementing data analytics because it provides a distinct advantage for their organization. Upon their decision to adopt it, audit leaders communicate the need for data analytics implementation to the function and share the potential benefits the organization may gain from the adoption. However, data analytics adoption is both subjective and complex. Security and privacy concerns will be alleviated by holding internal audit to the same standards as the rest of the organization. Human capital remains the biggest concern for organizations as it takes significant resources, and this study proved that to be true based on the data collected. Although human capital may remain the prominent issues that prevent organizations from adopting data analytics, piloting analytics may positively change the perception of auditors. Data analytics require experimentation to show auditors that it does not increase their workload and that once their methodology is revised, they would become more efficient in their testing. They would potentially have more value add findings.

Organizations that are on the fence about data analytics adoption may be convinced when they see analytics used within other functions in their organization. The audit function is late in adopting analytics, and most other functions are already seeing the benefits of analytics. Audit functions that are apprehensive about the vulnerabilities it may present must realize those vulnerabilities already exist, given the advances in

technology and regulatory requirements. The security vulnerabilities must be strategized to ensure that the organization's gains exceed their vulnerabilities.

## References

- Abdalla, M. M., Oliveira, L. G. L., Azevedo, C. E. F., & Gonzalez, R.K. (2018). Quality in qualitative organizational research: Types of triangulation as a methodological alternative. *Administração: Ensino e Pesquisa*, 19(1), 66-98.  
doi:10.13058/raep.2018.v19n1.578
- Agarkhed, J. (2017). Security and privacy of cyber-physical systems in IOT using cloud infrastructure. *International Journal of Advanced Research in Computer Science*, 8, 580-582. doi:10.26483/ijarcs.v8i8.4841
- Ahmed, M., Mahmood, A. N., & Islam, M. R. (2016). A survey of anomaly detection techniques in financial domain. *Future Generation Computer Systems*, 55, 278-288. doi:10.1016/j.future.2015.01.001
- Akinyode, B. F., & Khan, T. H. (2018). Step by step approach for qualitative data analysis. *International Journal of Built Environment and Sustainability*, 5, 163-174. Retrieved from <http://www.ijbes.utm.my>
- Albashrawi, M., & Lowell, M. (2016). Detecting financial fraud using data mining techniques: A decade review from 2004 to 2015. *Journal of Data Science*, 14, 553-569. Retrieved from <http://www.jds-online>
- Albrecht, W. S., Howe, K.R., & Schueler, D.R. (Eds). (1988). *Evaluating the effectiveness of internal audit departments*. Altamonte Springs, FL: Institute of Internal Auditors Research Foundation.
- Angst, C. M., Block, E. S., D'Arcy, J., & Kelley, K. (2017). When do IT security investments matter? Accounting for the influence of institutional factors in the



context of healthcare data breaches. *MIS Quarterly*, 41, 893-916.

doi:10.25300/MISQ/2017/41.3.10

Appelbaum, D. (2016). Securing big data provenance for auditors: The big data provenance black box as reliable evidence. *Journal of Emerging Technologies in Accounting*, 13(1), 17-36. doi:10.2308/jeta-51473

Appelbaum, D. A., Kogan, A., & Vasarhelyi, M. A. (2018). Analytical procedures in external auditing: A comprehensive literature survey and framework for external audit analytics. *Journal of Accounting Literature*, 40, 83-101.

doi:10.1016/j.acclit.2018.01.001

Appelman, A., & Sundar, S. S. (2016). Measuring message credibility: Construction and validation of an exclusive scale. *Journalism & Mass Communication Quarterly*, 93, 59-79. doi:10.1177/1077699015606057

Ariyabuddhipongs, V., & Kahn, S. I. (2017). Transformational leadership and turnover intention: The mediating effects of trust and job performance on café employees in Thailand. *Journal of Human Resources in Hospitality & Tourism*, 16, 215-233.

doi:10.1080/15332845.2016.1202730

Arnold, V. (2018). The changing technological environment and the future of behavioural research in accounting. *Accounting & Finance*, 58(2), 315-339.

doi:10.1111/acfi.12218

Association of Certified Fraud Examiners. (2016). *Report to the nations on occupational fraud and abuse*. Retrieved from <http://www.acfe.com>

- Azungah, T. (2018). Qualitative research: Deductive and inductive approaches to data analysis. *Qualitative Research Journal, 18*, 383-400.  
doi:10.1108/QRJ-D-18-00035
- Baker, R. M., Baker, R., Turner, J. R., Yoon, H. J., & Kwon, K. (2019). The agency of the principal-agent relationship: An opportunity for HRD. *Advances in Developing Human Resources, 21*, 303-318. doi:10.1177/1523422319851274
- Bansal, P., Smith, W. K., & Vaara, E. (2018). New ways of seeing through qualitative research. *Academy of Management Journal, 61*, 1189-1195.  
doi:10.5465/amj.2018.4004
- Bass, B. M. (1997). Does the transactional-transformational leadership paradigm transcend organizational and national boundaries? *American Psychologist, 52*(2), 130-139. doi:10.1037/0003-066X.52.2.130
- Becker, G. S. (1962). Investment in human capital: A theoretical analysis. *Journal of political economy, 70*, 9-49. doi:10.1086/258724
- Belotto, M. J. (2018). Data analysis methods for qualitative research: Managing the challenges of coding, interrater reliability, and thematic analysis. *Qualitative Report, 23*, 2622-2633. Retrieved from <https://nsuworks.nova.edu/tqr>
- Berle, A., & Means, G. (1932). *The modern corporation and private property*. New York, NY: Macmillan.
- Birt, L., Scott, S., Cavers, D., Campbell, C., & Walter, F. (2016). Member checking: A tool to enhance trustworthiness or merely a nod to validation? *Qualitative Health Research, 26*, 1802-1811. doi:10.1177/1049732316654870

- Boland, C. M., Daugherty, B. E., & Dickins, D. (2019). Evidence of the relationship between PCAOB inspection outcomes and the use of structured audit technologies. *Auditing: A Journal of Practice & Theory*, 38(2), 57-77. doi:10.2308/ajpt-52214
- Botez, D. (2018). Recent challenge for auditors: Using data analytics in the audit of the financial statements. *BRAIN: Broad Research in Artificial Intelligence & Neuroscience*, 9(4), 61-71. Retrieved from <http://www.edusoft.ro>
- Bowie, N. E., and Freeman, R. E. (1992). *Ethics and agency theory: An introduction*. New York, NY: Oxford University Press.
- Bressler, L., and Pence, D. (2019). Skills needed by new accounting graduates in a rapidly changing technological environment. *Journal of Organizational Psychology*, 19, 50-59. Retrieved from <https://www.na-businesspress.com/JOP>
- Buallay, A. (2019). Between cost and value: Investigating the effects of sustainability reporting on a firm's performance. *Journal of Applied Accounting Research*, 20, 481-496. doi:10.1108/JAAR-12-2017-0137
- Caretta, M. A. (2016). Member checking: A feminist participatory analysis of the use of preliminary results pamphlets in cross-cultural, cross-language research. *Qualitative Research*, 16, 305-318. doi:10.1177/1468794115606495
- Center for Audit Quality. (2018). *Public company auditing: A path to a dynamic, purpose-driven career*. Retrieved from <http://www.thecaq.org>
- Christensen, B. E., Omer, T. C., Shelley, M. K., & Wong, P. A. (2019). Affiliated former partners on the audit committee: Influence on the auditor-client relationship and

audit quality. *Auditing: A Journal of Practice & Theory*, 38, 95-119.

doi:10.2308/ajpt-52288

Clark, K. R., & Vealé, B. L. (2018). Strategies to enhance data collection and analysis in qualitative research. *Radiologic Technology*, 89, 482CT-485CT. Retrieved from <http://www.radiologictechnology.org>

Collier, A., & Wyer, M. (2016). Researching reflexively with patients and families: Two studies using video-reflexive ethnography to collaborate with patients and families in patient safety research. *Qualitative Health Research*, 26, 979-993.

doi:10.1177/1049732315618937

Collingridge, D. S., & Gantt, E. E. (2019). The quality of qualitative research. *American Journal of Medical Quality*, 34, 439-445. Retrieved from <https://acqm.org>

Cropanzano, R., Dasborough, M. T., & Weiss, H. M. (2017). Affective events and the development of leader-member exchange. *Academy of Management Review*, 42, 233-258. doi:10.5465/amr.2014.0384

Dagilienė, L., & Klovienė, L. (2019). Motivation to use big data and big data analytics in external auditing. *Managerial Auditing Journal*, 34, 750-782.

doi:10.1108/MAJ-01-2018-1773

de Cassia Nunes Nascimento, L., Vignuda de Souza, T., Oliveira, I. C. dos S., de Montenegro Medeiros de Moraes, J. R., Cordeiro Burla de Aguiar, R., & Faria da Silva, L. (2018). Theoretical saturation in qualitative research: an experience report in interview with schoolchildren. *Revista Brasileira de Enfermagem*, 71, 228-233. doi:10.1590/0034-7167-2016-0616

- Demsetz, H., & Lehn, K. (1985). The structure of corporate ownership: Causes and consequences. *Journal of Political Economy*, 93, 1155-1177. doi:10.1086/261354
- Dickey, G., Blanke, S., & Seaton, L. (2019). Machine learning in auditing: Current and future applications. *The CPA Journal*, 6, 16. Retrieved from <http://www.cpajournal.com>
- Didia, L. N., Mayse, A. L., & Randle, E. C. (2018). The effects of outsourcing and offshoring of independent audit procedures on bank loan officers' perceptions of financial statement reliability and loan decisions. *Journal of Accounting & Finance*, 18, 2158-3625. Retrieved from <http://www.na-businesspress.com/jafopen>
- Drogalas, G., Pazarskis, M., Anagnostopoulou, E. & Papachristou, A. (2017). The effect of internal audit effectiveness, auditor responsibility and training in fraud detection. *Accounting and Management Information Systems*, 16, 434-454. doi:10.24818/jamis.2017.04001
- Erba, J., Ternes, B., Bobkowski, P., Logan T., & Liu, Y (2018). Sampling methods and sample populations in quantitative mass communication research studies: A 15-year census of six journals. *Communication Research Reports*, 35(1), 42-47. doi:10.1080/08824096.2017.1362632
- Eulerich, M., & Kalinichenko, A. (2018). The current state and future directions of continuous auditing research: An analysis of the existing literature. *Journal of Information Systems*, 32(3), 31-51. doi:10.2308/isys-51813

- Eutsler, J., Nickell, E. B., & Robb, S. W. G. (2016). Fraud risk awareness and the likelihood of audit enforcement action. *Accounting Horizons*, *30*, 379-392. doi:10.2308/acch-51490
- Fletcher, M., Zhao, Y., Plakoyiannaki, E., & Buck, T. (2018). Three pathways to case selection in international business: A twenty-year review, analysis and synthesis. *International Business Review*, *27*, 755-766. doi:0.1016/j.ibusrev.2017.12.004
- Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Cambridge University Press.
- Gagliardi, A. R., & Dobrow, M. J. (2016). Identifying the conditions needed for Integrated Knowledge Translation (IKT) in health care organizations: Qualitative interviews with researchers and research users. *BMC Health Services Research*, *16*, 256-264. doi:10.1186/s12913-016-1533-0
- Galiakberova, A. (2019). Conceptual analysis of education role in economics: The human capital theory. *Journal of History, Culture & Art Research / Tarih Kültür ve Sanat Arastirmalari Dergisi*, *8*, 410-421. doi:10.7596/taksad.v8i3.2256
- Garcia-Torea, N., Fernandez-Feijoo, B., & de la Cuesta, M. (2016). Board of director's effectiveness and the stakeholder perspective of corporate governance: Do effective boards promote the interests of shareholders and stakeholders? *BRQ Business Research Quarterly*, *19*, 246-260. doi:10.1016/j.brq.2016.06.001
- George, G., & Lin, Y. (2017). Analytics, innovation, and organizational adaptation. *Innovation: Organization & Management*, *19*, 16-22. doi:10.1080/14479338.2016.1252042

- Gepp, A., Linnenluecke, M. K., O'Neill, T. J., & Smith, T. (2018). Big data techniques in auditing research and practice: Current trends and future opportunities. *Journal of Accounting Literature*, *40*, 102-115. doi:10.1016/j.acclit.2017.05.003
- Gorgolewski, K. J., & Poldrack, R. A. (2016). A practical guide for improving transparency and reproducibility in neuroimaging research. *PLoS Biology*, *14*(7), e1002506. doi:10.1371/journal.pbio.1002506
- Guinalíu, M., & Jordán, P. (2016). Building trust in the leader of virtual work teams. *Spanish Journal of Marketing-ESIC*, *20*(1), 58-70. doi:10.1016/j.reimke.2016.01.003
- Gümüşay, A. A. (2019). Embracing religions in moral theories of leadership. *Academy of Management Perspectives*, *33*, 292-306. doi:10.5465/amp.2017.0130
- Gunn, J. L., Kawada, B. S., & Michas, P. N. (2019). Audit market concentration, audit fees, and audit quality: A cross-country analysis of complex audit clients. *Journal of Accounting and Public Policy*, *38*(6), 1-21. doi:10.1016/j.jaccpubpol.2019.106693
- Gutermann, D., Lehmann, W. N., Boer, D., Born, M., & Voelpel, S. C. (2017). How leaders affect followers' work engagement and performance: Integrating leader-member exchange and crossover theory. *British Journal of Management*, *28*, 299-314. doi:10.1111/1467-8551.12214
- Haak, M., Muraz, M., & Zieseniß, R. (2018). Joint audits: Does the allocation of audit work affect audit quality and audit fees? *Accounting in Europe*, *15*(1), 55-80. doi:10.1080/17449480.2018.1440611

- Hamister, J. W., Polak, G. G., & Magazine, M. J. (2018). Integrating analytics through the big data information chain: A case from supply chain management. *Journal of Business Logistics*, 39, 220-230. doi:10.1111/jbl.12192
- Hancock, M. E., Amankwaa, L., Revell, M. A., & Mueller, D. (2016). Focus group data saturation: A new approach to data analysis. *Qualitative Report*, 21, 2124-2130. Retrieved from <https://tqr.nova.edu>
- Harrison, J. S., Felps, W., & Jones, T. M. (2019). Instrumental stakeholder theory makes ethically based relationship building palatable to managers focused on the bottom line. *Academy of Management Review*, 44, 698-700. doi:10.5465/amr.2018.0442
- Heyler, S. G., & Martin, J. A. (2018). Servant leadership theory: Opportunities for additional theoretical integration. *Journal of Managerial Issues*, 30, 230-243. Retrieved from <https://www.jstor.org/journal/jmamaissues>
- Hill, C. W., & T. M. Jones: (1992). Stakeholder agency theory. *Journal of Management Studies*, 29, 134-154. doi:10.1111/j.1467-6486.1992.tb00657.x
- Horga, G., Kaur, T., & Peterson, B. S. (2014). Annual research review: Current limitations and future directions in MRI studies of child-and adult-onset developmental psychopathologies. *Journal of Child Psychology and Psychiatry*, 55, 659-680. doi:10.1111/jcpp.12185
- Ilman, E., & Temple, P. (2019). California Consumers Privacy Act: What companies need to know. *Business Lawyer*, 75(1), 1637-1646. Retrieved from [https://americanabr.org/groups/business\\_law/publications/the\\_business\\_lawyer](https://americanabr.org/groups/business_law/publications/the_business_lawyer)



- Imran, M., Hlavacs, H., Haq, I. U., Jan, B., Khan, F. A., & Ahmad, A. (2017).  
Provenance-based data integrity checking and verification in cloud environments.  
*PloS one*, *12*, e0177576. doi:10.1371/journal.pone.0177576
- Inanc, H., Zhou, Y., Gallie, D., Felstead, A., & Green, F. (2015). Direct participation and  
employee learning at work. *Work and Occupations*, *42*, 447-475.  
doi:10.1177/0730888415580650
- Institute of Internal Auditors (2018). Standards & guidance - IPPF oversight council. *IIA*.  
Retrieved from <http://www.theiia.org>
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior,  
agency costs, and ownership structure. *Journal of Financial Economics*, *3*, 305-  
360. Retrieved from <http://jfe.rochester.edu>
- Jensen, M. C., & Meckling, W. H. (2009). Specific knowledge and divisional  
performance measurement. *Journal of Applied Corporate Finance*, *21*(2), 49-57.  
doi:10.1111/j.1745-6622.2009.00225
- Jones, T. M., Harrison, J. S., & Felps, W. (2018). How applying instrumental stakeholder  
theory can provide sustainable competitive advantage. *Academy of Management  
Review*, *43*, 371-391. doi:10.5465/amr.2016.0111
- Jordan, D. (2018). Agency theory (organizational economics). *Salem Press Encyclopedia*.  
Retrieved from <http://salempress.com>
- Jury, N. (2018). *Effective strategies for managing continuous consultant turnover in IT  
project teams* (Order No. 10748014). Retrieved from ProQuest Dissertations and  
Theses database. (UMI 2028061470).

- Kamin, D. A. (2017). *Exploring security, privacy, and reliability strategies to enable the adoption of IoT* (Order No.10640866). Retrieved from ProQuest Dissertations and Theses database. (UMI 1972093788).
- Kessler, J. (2019). Data protection in the wake of the GDPR. California's solution for protecting "The worlds' most valuable resource." *Southern California Law Review*, 93(1), 99-128. Retrieved from <https://heinonline.org>
- Korstjens, I., & Moser, A. (2018). Series: Practical guidance to qualitative research. Part 4: Trustworthiness and publishing. *The European Journal of General Practice*, 24(1), 120-124. doi:10.1080/13814788.2017.1375092
- Laing, C. L. (2019). An analysis of Gough Whitlam's leadership through the lens of the theories of transformational leadership and leadership as career. *E-Journal of Social & Behavioural Research in Business*, 10, 10-20. Retrieved from <https://ejsbrb.org>
- Larrimore, N. P. (2018). *Risk management strategies to prevent and mitigate emerging operational security threats* (Order No. 10747292). Retrieved from ProQuest Dissertations and Theses database. (UMI 2023213918).
- Latiffi, A. A., Brahim, J., & Fathi, M. S. (2016). Transformation of the Malaysian construction industry with building information modeling (BIM). *MATEC Web of Conferences*, 66, 1-8. doi:10.1051/mateconf/20166600022
- Le Van, C., Nguyen, A. N., Nguyen, N., & Simioni, M. (2018). Growth strategy with social capital, human capital and physical capital theory and evidence: The case

of Vietnam. *Journal of Public Economic Theory*, 20, 768-787.

doi:10.1111/jpet.12305

Lee, V. (2018). Beyond seeking informed consent: Upholding ethical values within the research proposal. *Canadian Oncology Nursing Journal*, 28, 222-227. Retrieved from <http://www.canadianoncologynursingjournal.com>

Levitt, H. M., Bamberg, M., Creswell, J. W., Frost, D. M., Josselson, R., & Suárez-Orozco, C. (2018). Journal article reporting standards for qualitative primary, qualitative meta-analytic, and mixed methods research in psychology: The APA Publications and Communications Board task force report. *American Psychologist*, 73, 26-46. doi:10.1037/amp0000151

Lloyd, K., & Emerson, L. (2017). (Re) examining the relationship between children's subjective wellbeing and their perceptions of participation rights. *Child Indicators Research*, 10, 591-608. doi:10.1007/s12187-016-9396-9

Lloyd, K. J., Boer, D., & Voelpel, S. C. (2017). From listening to leading: Toward an understanding of supervisor listening within the framework of leader-member exchange theory. *International Journal of Business Communication*, 54, 431-451. doi:10.1177/2329488415572778

Lopez-Rojas, E. A., & Barneaud, C. (2019, July). Advantages of the PaySim simulator for improving financial fraud controls. *Intelligent Computing-Proceedings of the Computing Conference*, 727-736. doi:10.1007/978-3-030-22868-2\_51

- Lumpkin, A., & Achen, R. M. (2018). Explicating the synergies of self-determination theory, ethical leadership, servant leadership, and emotional intelligence. *Journal of Leadership Studies, 12*(1), 6-20. doi:10.1002/jls.21554
- Mahbod, R., & Hinton, D. (2019). Blockchain: The future of the auditing and assurance profession. *Armed Forces Comptroller, 64*(1), 23-27. Retrieved from <https://asmconline.org/armed-forces-comptroller>
- Maher, C., Hadfield, M., Hutchings, M., & de Eyto, A. (2018). Ensuring rigor in qualitative data analysis: A design research approach to coding combining NVivo with traditional material methods. *International Journal of Qualitative Methods, 17*(1), 1-13. doi:10.1177/1609406918786362
- Makhoul, J., Chehab, R. F., Shaito, Z., & Sibai, A. M. (2018). A scoping review of reporting “Ethical Research Practices” in research conducted among refugees and war-affected populations in the Arab world. *BMC Medical Ethics, 19*, 1-9. doi:10.1186/s12910-018-0277-2
- Makrakis, V., & Kostoulos-Makrakis, N. (2016). Bridging the qualitative-quantitative divide: Experiences from conducting a mixed methods evaluation in the RUCAS programme. *Evaluation and Program Planning, 54*, 144-151. doi:10.1016/j.evalprogplan.2015.07.008
- Marshall, C., & Rossman, G. B. (2016). *Designing qualitative research* (6th ed.). Thousand Oaks, CA: Sage.

- Masri, N. E., & Abubakr, S. (2019). Talent management, employee recognition and performance in the research institutions. *Studies in Business & Economics*, 14(1), 127-140. doi:10.2478/sbe-2019-0010
- Mazza, T. and Azzali, S. (2018). Information technology controls quality and audit fees: Evidence from Italy. *Journal of Accounting, Auditing & Finance* 2018, 33(1), 123-146. doi:10.1177/0148558X15625582
- Mincer, J. (1984). Human capital and economic growth. *Economics of Education Review*, 3, 195-205. doi:10.1016/0272-7757(84)90032-3
- Moon, K., Brewer, T. D., Januchowski-Hartley, S. R., Adams, V. M., & Blackman, D. A. (2016). A guideline to improve qualitative social science publishing in ecology and conservation journals. *Ecology & Society*, 21(3), 133-152. doi:10.5751/ES-08663-210317
- Morse, J. M. (2015). Critical analysis of strategies for determining rigor in qualitative inquiry. *Qualitative health research*, 25, 1212-1222. doi:10.1177/1049732315588501
- Nandi, A., & Platt, L. (2017). Are there differences in responses to social identity questions in face-to-face versus telephone interviews? Results of an experiment on a longitudinal survey. *International Journal of Social Research Methodology*, 20(2), 151-166. doi:10.1080/13645579.2016.1165495
- Nayfeh, A., Marcoux, I., & Jutai, J. (2019). Advance care planning for mechanical ventilation: A qualitative study on health-care providers' approaches to cross-

cultural care. *Omega: Journal of Death & Dying*, 80, 305-330.

doi:10.1177/0030222817732467

Nejatian, M., Zarei, M. H., Rajabzadeh, A., Azar, A., & Khadivar, A. (2019). Paving the path toward strategic agility: A methodological perspective and an empirical investigation. *Journal of Enterprise Information Management*, 32, 538-562.

doi:10.1108/JEIM-10-2018-0233

Nelson, J. (2017). Using conceptual depth criteria: Addressing the challenge of reaching saturation in qualitative research. *Qualitative Research*, 17, 554-570.

doi:10.1177/1468794116679873

O'Keeffe, J., Buytaert, W., Mijic, A., Brozović, N., & Sinha, R. (2016). The use of semi-structured interviews for the characterization of farmer irrigation practices. *Hydrology and Earth System Sciences*, 20, 1911-1924.

doi:10.5194/hess-20-1911-2016

Oliveira, M., Bitencourt, C. C., Zanardo dos Santos, A. M., & Teixeira, E. K. (2016). Thematic content analysis: Is there a difference between the support provided by the MAXQDA® and NVIVO® software packages? *Brazilian Journal of Management / Revista De Administração Da UFSM*, 9(1), 72-82.

doi:10.5902/1983465911213

Olsen, D. H., & Dupin-Bryant, P. A. (2016). Integrating data cleansing with popular culture: A novel SQL character data tutorial. *The Review of Business Information Systems (Online)*, 20(1), 13. doi:10.19030/rbis.v20i1.9679

- Ortiz, F. R., Santos, M. D. D., Landenberger, T., Emmanuelli, B., Agostini, B. A., & Ardenghi, T. M. (2016). Comparison of face-to-face interview and telephone methods of administration on the ECOHIS scores. *Brazilian Dental Journal*, 27, 613-618. doi:10.1590/0103-6440201601134
- Patias, T. Z., Bobsin, D., Gomes, C. M., Liszbinski, B. B., & Damke, L. I. (2016). Family agro-industry clusters from the social innovation perspective. *Revista De Administração Mackenzie*, 17, 191-215. doi:10.1590/1678- 69712016/administracao.v17n6p191-215
- Percy, W. H., Kostere, K., & Kostere, S. (2015). Generic qualitative research in psychology. *The Qualitative Report*, 20, 76-85. Retrieved from <http://nsuworks.nova.edu/tqr>
- Perri, D. F., & Perri, E. D. (2018). Acknowledging the “M” in MIS: Managing a data breach crisis. *Journal of the Academy of Business Education*, 19, 9-32. Retrieved from <https://www.abeweb.org/journal>
- Peticca-Harris, A., deGama, N., & Elias, S. R. (2016). A dynamic process model for finding informants and gaining access in qualitative research. *Organizational Research Methods*, 19, 376-401. doi:10.1177/1094428116629218
- Plant, K., Barac, K., & Sarens, G. (2019). Preparing work-ready graduates - skills development lessons learnt from internal audit practice. *Journal of Accounting Education*, 48, 33-47. doi:10.1016/j.jaccedu.2019.06.001
- Polyak, I., Adamek, D., Farr, L., & Carlozo, L. (2018). Insights on key trends in an evolving profession: AICPA ENGAGE 2018 conference speakers share expertise

on financial planning, recruiting, audit innovation, and automation. *Journal of Accountancy*, 226(2), 54. Retrieved from <https://www.journalofaccountancy.com>

Porter, B. A. (2009). The audit trinity & colon: The key to securing corporate accountability. *Managerial Auditing Journal*, 24(2), 156-182.  
doi:10.1108/02686900910924563

Pouryousefi, S., & Frooman, J. (2017). The problem of unilateralism in agency theory: Towards a bilateral foundation. *Business Ethics Quarterly*, 27(2), 163-182.  
doi:10.1017/beq.2016.77

Pravdiuk, N., Pokynchereda, V., & Pravdiuk, M. (2019). The human capital of an enterprise: Theory and assessment methodology. *Baltic Journal of Economic Studies*, 5(2), 176-183. doi:10.30525/2256-0742/2019-5-2-176-183

Raphael, J. (2017). Rethinking the audit: Innovation is transforming how audits are conducted - and even what it means to be an auditor. *Journal of Accountancy*, 223, 28-32. Retrieved from <https://www.journalofaccountancy.com>

Reardon, D. C. (2018). Will you be the one who leads the succession planning process? *Journal of Financial Service Professionals*, 72(1), 17-19. Retrieved from <https://www.financialpro.org>

Reinstein, A., Hepp, G. W., & Weirich, T. R. (2018). Auditors' increased responsibilities under the PCAOB's new audit reporting standards: Communicating critical audit matters. *CPA Journal*, 88(2), 42-47. Retrieved from <https://www.cpajournal.com>



- Rizvi, S. (2019). Using fiction to reveal truth: Challenges of using vignettes to understand participant experiences within qualitative research. *Forum: Qualitative Social Research, 20*, 353-370. doi:10.17169/fqs-20.1.3101
- Roberts, K., Dowell, A., & Nie, J. (2019). Attempting rigour and replicability in thematic analysis of qualitative research data; a case study of codebook development. *BMC Medical Research Methodology, 19*(1), 1-8. doi:10.1186/s12874-019-0707-y
- Robins, C. S., & Eisen, K. (2017). Strategies for the effective use of NVivo in a large-scale study: Qualitative analysis and the repeal of don't ask, don't tell. *Qualitative Inquiry, 23*, 768-778. doi:10.1177/1077800417731089
- Rodriguez, R., Svensson, G., Høgevold, N. H., & Eriksson, D. (2019). Factors and determinants of value and business driven sustainability initiatives in health care organizations: Intrinsic differences and extrinsic similarities. *Corporate Governance: The International Journal of Business in Society, 19*, 806-823. doi:10.1108/CG-03-2019-0078
- Ross, S. A (1973). The economic theory of agency: The principal's problem. *The American Economic Review, 63*(2), 134-139. Retrieved from <http://www.jstor.com>
- Roth, W., & von Unger, H. (2018). Current perspectives on research ethics in qualitative research. *Forum: Qualitative Social Research, 19*, 798-809. doi:10.17169/fqs-19.3.3155
- Rubin, A., & Babbie, E. R. (2016). *Empowerment series: Research methods for social work*. Boston, MA: Cengage Learning.

- Russell, S., & Brannan, M. J. (2016). Getting the right people on the bus: Recruitment, selection and integration for the branded organization. *European Management Journal*, 34(2), 114-124. doi:10.1016/j.emj.2016.01.001
- Rutberg, S., & Bouikidis, C. D. (2018). Exploring the evidence: Focusing on the fundamentals: A simplistic differentiation between qualitative and quantitative research. *Nephrology Nursing Journal*, 45, 209-213. Retrieved from <http://www.annanurse.org>
- Sang, J., Wang, H., Qian, Q., Wu, H., & Chen, Y. (2018). An efficient fingerprint identification algorithm based on minutiae and invariant moment. *Pers Ubuquit Comput*, 22(1), 71-80. doi:0.1007/s00779-017-1094-1
- Sarycheva, T. V. (2016). The conceptual approaches to identification of the external and internal labour markets in terms of economic activity types in the Russian Federation Regions. *International Journal of Economic Perspectives*, 10, 309-320. Retrieved from <https://www.scimagojr.com>
- Saunders, M. N. K., Lewis, P., & Thornhill, A. (2015). *Research methods for business students*. (7th ed.). Essex, England: Pearson Education Limited.
- Schepker, D. J., Nyberg, A. J., Ulrich, M. D., & Wright, P. M. (2018). Planning for future leadership: Procedural rationality, formalized succession processes, and CEO influence in CEO succession planning. *Academy of Management Journal*, 61, 523-552. doi:10.5465/amj.2016.0071

- Schillermann, M. (2018). *Early detection and prevention of corporate financial fraud*. (Order No. 10978072). Retrieved from ProQuest Dissertations and Theses database.
- Shaikh, I. A., Drira, M., & Hassine, S. B. (2019). What motivates directors to pursue long-term strategic risks? Economic incentives vs. fiduciary duty. *Journal of Business Research*, *101*, 218-228. doi:10.1016/j.jbusres.2019.04.022
- Sharifirad, M. S., & Hajhoseiny, S. (2018). Implicit Leadership Theories (ILTs) and change behaviors: The mediating role of LMX. *Iranian Journal of Management Studies*, *11*, 715-739. doi:10.22059/IJMS.2018.251435.673004
- Shukla, M., & Mattar, L. (2019). Next generation smart sustainable auditing systems using big data analytics: Understanding the interaction of critical barriers. *Computers & Industrial Engineering*, *128*, 1015-1026. doi:10.1016/j.cie.2018.04.055
- Simsek, Z., Vaara, E., Paruchuri, S., Nadkarni, S., & Shaw, J. D. (2019). New ways of seeing big data. *Academy of Management Journal*, *62*, 971-978. doi:10.5465/amj.2019.4004
- Smith, A. (1937). *The wealth of nations* [1776]. New York, NY. Alfred A. Knopf.
- Spence, M. (1978). Job market signaling. In *Uncertainty in economics* (pp. 281-306). Cambridge, MA: Academic Press.
- Strickler, J., Bohling, S., Kneis, C., O'Connor, M., & Yee, P. L. (2016). Developing leaders from within. *Nursing Management*, *47*(9), 40-43. doi:10.1097/01.nurse.0000482261.78767.c2

- Sunderland, D., & Trompeter, G. M. (2017). Multinational group audits: Problems faced in practice and opportunities for research. *Auditing: A Journal of Practice & Theory*, 36(3), 159-183. doi:10.2308/ajpt-51667
- Tang, F., Norman, C. S., & Vandrzyk, V. P. (2017). Exploring perceptions of data analytics in the internal audit function. *Behaviour & Information Technology*, 36, 1125-1136. doi:10.1080/0144929X.2017.1355014
- Taylor, S. J., Bogdan, R., & DeVault, M. L. (2016). *Introduction to qualitative research methods: A guidebook and resource*. Hoboken, NJ: Wiley.
- Teixeira, P. N. (2017). Economic beliefs and institutional politics: Human capital theory and the changing views of the World Bank about education (1950-1985). *European Journal of the History of Economic Thought*, 24, 465-492. doi:10.1080/09672567.2016.1186205
- Tong, A., & Dew, M. A. (2016). Qualitative research in transplantation: Ensuring relevance and rigor. *Transplantation*, 100, 710-712. doi:10.1097/TP.0000000000001117
- Tran, V. T., Porcher, R., Tran, V. C., & Ravaud, P. (2017). Predicting data saturation in qualitative surveys with mathematical models from ecological research. *Journal of Clinical Epidemiology*, 82, 71-78. doi:10.1016/j.jclinepi.2016.10.001
- Tripathi, V. (2019). Agency theory, ownership structure and capital structure: An empirical investigation in the Indian automobile industry. *Asia-Pacific Management Accounting Journal*, 14, 1-20. Retrieved from <https://apmaj.uitm.edu>

- Troncoso-Pantoja, C., & Amaya-Placencia, A. (2017). Entrevista: guía práctica para la recolección de datos cualitativos en investigación de salud. *Revista de la Facultad de Medicina*, 65, 329-332. doi:10.15446/revfacmed.v65n2.60235
- Turner, S. F., Cardinal, L. B., & Burton, R. M. (2017). Research design for mixed methods. *Organizational Research Methods*, 20, 243-267. doi:10.1177/1094428115610808
- Tverdostup, M., & Paas, T. (2019). *Valuation of human capital and the gender wage gap in Europe*. University of Tartu - Faculty of Economics & Business Administration Working Paper Series, 3-43. Retrieved from <https://www.zbw.eu>
- Tysiac, K. (2017). How to enable audit innovation: Ideas, strategic alliances, and user-friendly tools help Deloitte make technological improvements. *Journal of Accountancy*, 223, 33. Retrieved from <https://www.journalofaccountancy.com>
- U.S. Department of Health and Human Services. (1979). *The Belmont Report: Ethical principles and guidelines for the protection of human subjects of research*. Retrieved from <http://www.hhs.gov>
- Vaismoradi, M., Jones, J., Turunen, H., & Snelgrove, S. (2016). Theme development in qualitative content analysis and thematic analysis. *Journal of Nursing Education and Practice*, 6(5), 100-110. doi:10.5430/jnep.v6n5p100
- Van Der Spuy, I., Busch, A., & Bidonde, J. (2016). Interviewers' experiences with two multiple mini-interview scoring methods used for admission to a Master of Physical Therapy programme. *Physiotherapy Canada*, 68(2), 179-185. doi:10.3138/ptc.2015-24E

- Vito, R. (2018). Leadership development in human services: Variations in agency training, organizational investment, participant satisfaction, and succession planning. *Human Service Organizations Management Leadership & Governance*, 42, 251-266. doi:10.180/23303131.2017.1421284
- Weirich, T. R., Tschakert, N., & Kozlowski, S. (2018). Teaching data analytics skills in auditing classes using Tableau. *Journal of Emerging Technologies in Accounting*, 15(2), 137-150. doi:10.2308/jeta-52264
- Weiss, A. (1988). High school graduation, performance, and wages. *Journal of Political Economy*, 4, 785-820. doi:10.1086/261563
- Westhausen, H. (2017). The escalating relevance of internal auditing as anti-fraud control. *Journal of Financial Crime*, 24, 322-328. doi:10.1108/JFC-06-2016-0041
- Winchester, C. L., & Salji, M. (2016). Writing a literature review. *Journal of Clinical Urology*, 9, 308-312. doi:10.1177/2051415816650133
- Wolf, S. M., Clayton, E. W., & Lawrenz, F. (2018). The past, present, and future of informed consent in research and translational medicine. *Journal of Law, Medicine & Ethics*, 46(1), 7-11. doi:10.1177/1073110518766003
- Wolfson, M. A., & Mathieu, J. E. (2018). Sprinting to the finish: Toward a theory of human capital resource complementarity. *Journal of Applied Psychology*, 103, 1165-1180. doi:10.1037/apl0000323
- Wray, J., Archibong, U., & Walton, S. (2017). Why undertake a pilot in a qualitative PhD study? Lessons learned to promote success. *Nurse Researcher*, 24(3), 31-35. doi:10.7748/nr.2017.e1416

- Wu, A. X., & Taneja, H. (2019). How did the data extraction business model come to dominate? Changes in the web use ecosystem before mobiles surpassed personal computers. *Information Society, 35*, 272-285.  
doi:10.1080/01972243.2019.1644409
- Yang, F., Liu, J., Wang, Z., & Zhang, Y. (2019). Feeling energized: A multilevel model of spiritual leadership, leader integrity, relational energy, and job performance. *Journal of Business Ethics, 158*, 983-997. doi:10.1007/s10551-017-3713-1
- Yin, R. K. (2018). *Case study research and applications. Design and methods* (6th ed.). Los Angeles, CA: Sage.
- Yu, A., Matta, F. K., & Cornfield, B. (2018). Is leader-member exchange differentiation beneficial or detrimental for group effectiveness? A meta-analytic investigation and theoretical integration. *Academy of Management Journal, 61*, 1158-1188.  
doi:10.5465/amj.2016.1212
- Zardkoohi, A., Harrison, J., & Josefy, M. (2017). Conflict and confluence: The multidimensionality of opportunism in principal-agent relationships. *Journal of Business Ethics, 146*, 405-417. doi:10.1007/s10551-015-2887-7
- Zerbino, P., Aloini, D., Dulmin, R., & Mininno, V. (2018). Process-mining-enabled audit of information systems: Methodology and an application. *Expert Systems with Applications, 110*, 80-92. doi:10.1016/j.eswa.2018.05.030
- Zhou, C. (2019). Effects of ownership structure on the relationship between multinationality and downside risk: Evidence from China. *Cross-Cultural & Strategic Management, 26*(3), 401-421. doi:10.1108/CCSM-10-2018-0172

## Appendix A: Listing of the Open-Ended Interview Questions

### Interview Questions

1. What strategies did you employ to successfully and effectively use data analytics for internal auditing and the detection of fraudulent activity?
2. How did your employees respond to those strategies?
3. How were strategies to use data analytics for internal auditing and the detection of fraudulent activity communicated throughout the organizational ranks and among stakeholders?
4. What policies and processes have you employed to successfully use data analytics for internal auditing and the detection of fraudulent activity?
5. What were the key barriers to implementing strategies to successfully use data analytics for internal auditing and the detection of fraudulent activity?
6. How did you overcome the key barriers to implementing strategies to successfully and securely use data analytics for internal auditing and the detection of fraudulent activity?
7. What, if any, modifications did you apply to any strategy to improve its effectiveness for internal auditing and the detection of fraudulent activity?
8. What else would you like to add about strategies to successfully and securely use data analytics for internal auditing and the detection of fraudulent activity?



## Appendix B: Interview Protocol

Interview Title: Effective Data Analytics and Security Strategies in Internal Audit

### Organizations

- A. I will introduce myself and the study to the participant and thank them for participating
- B. I will verify receipt of the consent form and answer any questions and concerns of the study participant.
- C. I will collect the signed consent from the study participant.
- D. I will confirm that the participant agrees to be recorded, and the interview will remain strictly confidential.
- E. If the participant agrees to be recorded, I will then turn on the recorder on my iPhone. Then I will announce the study participant identifying code and announce the date and time of the interview. If the participant does not agree to be recorded, I will explain that I will be taking shorthand to document the interview.
- F. I will start the interview with the first question and continue through to the last question.
  - 1. What is your current position and your responsibilities?
  - 2. How long have you been in your current position?
  - 3. How many years of experience do you have in auditing?
  - 4. What strategies did you employ to successfully and effectively use data analytics for internal auditing and the detection of fraudulent activity?
  - 5. How did your employees respond to those strategies?

6. How were strategies to successfully and securely use data analytics for internal auditing and the detection of fraudulent activity communicated throughout the organizational ranks and among stakeholders?
  7. What policies and processes have you employed to successfully use data analytics for internal auditing and the detection of fraudulent activity?
  8. What were the key barriers to implementing strategies to successfully use data analytics for internal auditing and the detection of fraudulent activity?
  9. How did you overcome the key barriers to implementing strategies to successfully and securely use data analytics for internal auditing and the detection of fraudulent activity?
  10. What, if any, modifications did you apply to any strategy to improve its effectiveness for internal auditing and the detection of fraudulent activity?
  11. What else would you like to add about strategies to successfully and securely use data analytics for internal auditing and the detection of fraudulent activity?
- G. End the interview questions and ask if there is any other information they would like to share (either verbally or company documentation).
- H. Inform the participant about the concept of member checking, which will be used to verify the accuracy of the initial interview.
- I. Thank the participant for partaking in the study. Confirm the participant has my contact information for any follow-up questions and concerns.

## Appendix C: Participant Invitation

Dear [participant]:

My name is Desiree Auchey, and I am a Doctor of Business Administration – Information Systems Management student at Walden University. I am conducting a doctoral study to examine how audit executives strategize the implementation of data analytics in audits and how they protect the voluminous data they receive. My research question is: What strategies do business leaders employ to effectively use data analytics for internal auditing and the detection of fraudulent activity?

All organization and participant names will remain confidential in the study. I have included a consent form for your review and signature prior to your participation in this study. The informed consent form provides background information on the study and outlines your rights during the interview process.

Based on your experiences with data analytics and the security of the data, I would like to interview you in order to gather information about your perceptions and beliefs about strategies to adopt data analytics at [organization name]. The interview will take approximately 30-45 minutes of your time and scheduled at your convenience within the next 2 weeks. I will conduct this interview at a time that is most convenient for you. I am also inviting you to share with me any company or public documents such as e-mails, administrative documents, reports, or memoranda that you feel may provide additional information about the strategies used to adopt data analytics.

Please contact me if you have any questions or would like additional information. My contact information is in my signature below. Thank you in advance for your consideration and your support for my study.

Sincerely,  
Desiree Auchey  
[dauchey@icloud.com](mailto:dauchey@icloud.com)  
(862)217-1099

## Appendix D: Consent Form

You are invited to take part in a research study about the strategies being used by auditors to implement data analytics within their audit procedures and securely handle the data of their organizations. I am inviting audit executives with more than 5 years experience in an audit role to be in the study. I obtained your name/contact information from your organization's website and you are invited to participate in this research study. This form is part of a process called "informed consent" to allow you to understand this study before deciding whether to take part.

This study is being conducted by a researcher named Desiree Auchey, who is a doctoral student at Walden University. The purpose of this study is to explore strategies business leaders employ to effectively use data analytics for internal auditing and the detection of fraudulent activity. The target population will consist of at least three business leaders from publicly traded companies located in Pennsylvania with successful experience using strategies to effectively use data analytics for internal auditing and the detection of fraudulent activity.

Here are some sample questions:

1. What strategies did you employ to successfully and effectively use data analytics for internal auditing and the detection of fraudulent activity?
2. How did your employees respond to those strategies?
3. How were plans to use data analytics for internal auditing and the detection of fraudulent activity communicated throughout the organizational ranks and among stakeholders?
4. What policies and processes have you employed to successfully use data analytics for internal auditing and the detection of fraudulent activity?

This study is voluntary. Everyone will respect your decision of whether or not you choose to be in the study. No one will treat you differently if you decide not to be in the study. If you decide to join the study now, you can still change your mind later. You may stop at any time with no impact to me or our relationship.

I am asking you to participate in an interview about the strategies and adoption of data analytics within internal audit. I am also asking that you share documents you have the authority to make available, such as audit programs.

Being in this type of study involves some risk of the minor discomforts that can be encountered in daily life, such as that encountered from a long work day as the interviews will be conducted after work hours. Also, participation in this study would not pose risk to your safety or wellbeing.

The potential benefit of this study is that other companies may be able to leverage the successful strategies discussed and may become more efficient in their data analytics and

detection of fraudulent activity. These benefits could result in an increase in employment opportunities within the community.

Participation in this research study will not result in any payment or reimbursements in any manner. Participation is voluntary and no payment will be provided. Any information you provide will be kept confidential. I will not use your personal information for any purposes outside of this research project and I will not include your name or anything else that could identify you in the study reports. I will keep the data secure for a period of at least 5 years, as required by the university. The information will be digital and coded to mask names, titles, and organizations, and will be kept in a password-protected file on a password-protected laptop.

You may ask any questions you have now or if you have questions later, you may contact me via phone at (862)217-1099 or via email at [desiree.auchey@waldenu.edu](mailto:desiree.auchey@waldenu.edu). If you want to talk privately about your rights as a participant, you can call Dr. Leilani Gjellstad. She is the Walden University representative who can discuss this with you. Her phone number is 612-312-1210. Walden University's approval number for this study is 03-20-20-0671761 and it expires on March 19th, 2021.

You may print or save a copy of this consent form for your records.

If you voluntarily agree to participate, kindly provide a few dates and times that you are available for the interview as participation in this research involves an interview of approximately 30-45 minutes.

If you feel you understand the study well enough to make a decision about it, please reply to my email with the words "I Consent".