

Scholarly Discourse of Remote Forensic Auditing and Fraud Schemes in Remote Workforce: A Scoping Review

Jean Damascene Mvunabandi
mvuna2020@gmail.com

Durban University of Technology, Durban, South Africa

<https://doi.org/10.51137/ijarbm.2024.5.2.32>

Abstract – Practical and empirical question dominating the discussion is whether or not the remote forensic auditing techniques and capabilities in detection of fraud schemes in remote workforce. The overall intent of this article is to examine the merits, and opportunities of the use of remote forensic auditing techniques in addressing the challenges for internal audits and controls during the outbreak of COVID 19 and beyond in tackling fraud schemes in remote workforce. Scoping review of literature methodological framework was employed. Studies extracted from five electronic databases such as Emerald insight, Springer, Semantic Scholar, Science Direct, IEEE Xplore Digital Library. Data was thematically analysed. The theoretical framework used in this article were Technology-Organisation-Environment (TOE) which consider the influence of technology, organisation, and environment factors on the adoption and implementation of new technology on forensic auditing and the fraud triangle which consider factors behind fraud perpetrators during COVID19. The research results revealed that the use of remoted forensic auditing tools and techniques can potentially address the weakness of internal controls and audits on fraud schemes during pandemic levels and beyond in the remote workforce. This article contributes to the to the current body of knowledge and deepens understanding on remote forensic auditing tools and techniques on fraud schemes in remote workforce. It also provides further discussion regarding what forensic auditors practitioners, internal auditors and companies can do to adapt and adopt remote forensic auditing techniques, remote forensic software and hardware tools. The study contributed to theoretical and practical contributions and proposes a remote forensic auditing framework to assist all auditors to deepen their remote and digital forensic investigation. Thus, the article recommends remote forensic auditing framework to address the issues of fraud schemes in remote workforce in South Africa context and beyond.

Keywords –Remote forensic auditing techniques and tools, remote forensic auditing framework. COVID 19, fraud schemes, occupational fraud, internal audits, internal controls

Submitted: 2024-08-17. Revised: 2024-10-03. Accepted: 2024-10-04.

1 Introduction

Occupational fraud in a remote workforce is a global concern that causes extreme and harmful financial and reputational damage to entities and no supreme audit institutions (SAIs) have remained unaffected by the global crisis COVID19 and the field of internal audits, controls systems and accounting profession has also been affected by this crisis (Levi & Smith, 2021; Zirkle, 2020). The war against COVID 19 has also brought about a war against fraud (Ahmad, 2020). The TransUnion reported that the rate of fraudulent activities globally rose 24% when comparing the pre-pandemic to pandemic levels (Ma & McKinnon, 2021). McKinnon's (2021) observations are supported in a report by ACFE (2021) to the nations on 2021 global study on occupational fraud, in which it revealed that the rate of occupational fraud and fraudulent activities in Sub Sahara Africa rose 56% when compared to the pre-pandemic to pandemic levels. ACFE report further found that since the COVID 19 began fraudsters in South Africa increased by 44% between March 2020 and March 2021. A similar situation was witnessed globally during the outbreak COVID-19 where the Stimulus Funding Amount (SFA) was \$285 billion and a significant estimated fraud amount was \$28 billion (fraud rate of 10%).

During the outbreak COVID 19, in South Africa the across industries, TransUnion found the cities with the highest percentage of fraudulent digital transactions against entities were Durban, Johannesburg and Pretoria in that order. The Southern Africa Fraud Prevention Services (SAFPS) has also warned a significant increase in fraud in South Africa, according to the organisation statistics for 2021, fraud in Gauteng has increased 120%, Eastern Cape 161%, and there were increases in every province with the exception of Limpopo (Widiyati, Valdiansyah, Meidijati, & Hendra, 2021).

Fraud risks are prevalent in the remote workforce in South Africa, and this is evident in a report by (AGSA:2021) in which it is stated that during the outbreak COVID-19, there were several instances of overpricing (the price being 200%) and in some instances, five times more than the price the national treasury had advised. The South African Auditor General in his report further states that PPE and stimulus funding amount of R500 million (\$ 26bn, £19bn) which is equivalent to 10% of the country's gross domestic product (GDP). His report also reveals shocking findings of higher risk of fraud rate was 44%. Worse still, the 2021 corruption perception index (CPI) ranked South Africa on 70 among 131 countries around the globe.

It is evident from the fraud statistics released by ACFE on their website ACFE (2021) that occupational fraud has increased significantly and exponentially during the COVID 19 crisis. Within the Republic of South Africa, occupational fraud has escalated from 5% Pre-COVID 19 to 40 % during COVID 19, which equates to an increase of 35 % (Burger & Calitz, 2021; de Villiers, Cerbone, & Van, 2020). Tax avoidance by understating revenues and or profits, concealing expenses and liabilities to misrepresent profitability to various stakeholders, inflated valuation of assets are some of the ways fraudsters cook the books to keep their companies afloat which put investors at higher risks (Gurazada, Kristensen, Sjoblom, Piatti, & Farooq, 2020).

A global forensic auditing firm, KPMG (2017:21), Conducted an analysis of global fraud patterns where it was found that weaknesses of internal controls in so many entities were an increasing contributor to occupational fraud. According to the ACFE report, Cybercrime cost the world \$6 trillion annually in 2021 up from \$ 3 in 2015.

According to Albitar, Gerged, Kikhia, and Hussainey (2020), most entities were office-centric before the pandemic with internal controls and audits structures that most always relied on in-person activities. Between 2008 and 2021, remote work has grown by 169%. This has also been compounded by the global COVID 19 pandemic. As a result of extreme crises caused by COVID 19, entities are not able to maintain effective on-site monitoring of activities and direct oversight of employees which increases the higher risk of fraud (Eulerich, Wagener, & Wood, 2021).

Globally, entities have been caught unprepared in dealing with the heightened threats and fraud risks brought by a robust crisis (COVID 19) in early 2020 which is even creates many challenges for preparing financial reports. South Africa is neither immune to, nor escaped the severe impact of the pandemic COVID 19 (Padovani, 2021). Padovani (2021) concurs with Martinelli, Friedman, and Lanz (2020) and adds that current world events have forced a sudden remote-working economy for which neither organisations nor their staff was prepared. This has impacted the occupational fraud risk of enterprises worldwide.

Additionally, some entities were forced to consolidate duties into fewer or even a single employee. Without proper segregation of duties, the chance that fraud will occur and go undetected increases significantly. A fraudster's ability and capability to circumvent existing internal controls is easier when existing policies cannot be followed (Wendling, Alonso, Saxena, Tang, & Verdugo, 2020).

A KPMG forensic survey of over 70 businesses in March 2021 has revealed a large majority (72%) believed their risk of fraud rose in 2020 during the COVID 19 crisis with two-thirds saying the general move to working from home had increased the fraud risks. 62% of the respondents reported that insider threats were their most significant fraud and corruption challenges. 89% of the respondents reported that their internal controls and systems don't travel well which would explain most finding the fraud risks were higher in 2020. 95% said Cyber –Risk was the biggest challenge with an overwhelming 98 percent believing that the danger of Cyber related fraud had increased during the pandemic (Ogundokun & Ogundokun, 2021).

Dean Mitchel, a KMPG Forensic partner, found that 72% of his respondents said that the COVID pandemic had increased the risks of fraud. 92% believed the risk of Cyber-fraud had increased during the COVID era. 67% indicated that their ability to investigate possible fraud had been comprised. 65% said with widespread remote working their own organisation was more vulnerable to fraud risks. 62% said that employees were the biggest single source of fraud risk. 68% indicated that their businesses did not detect frauds that took place during the COVID 19 crisis.

The pandemic is creating an environment of intensified pressure and the movement to a largely remote workforce is creating the fraud opportunities.

According to Padovani (2021), driven by the rapid growth in remote working, the market has significantly enjoyed a boom and some entities are still viewing remote work as a stop-gap solution of long-term sustainability to the pandemic. However, this has created a lucrative opportunity for fraudsters. Shortly after, the COVID 19 pandemic began, Bruce Dorris, president of and C.E.O of the Association of Certified Fraud Examiners (ACFE) penned, Coronavirus pandemic is a perfect storm for occupational fraud, where he predicts that economic disruption caused by COVID-19 will lead to an increase in fraud. Furthermore, ACFE (2021) note that COVID 19 is the robust trigger for growth in financial fraud and no industry is immune to this reality.

ACFE (2021) found that when employees are working remotely, it is harder to detect, prevent and respond to all types of fraud because an unsupervised working environment is ideal for fraud risks. The uniqueness of the current economic environment forces entities, chief executives, to focus on operational and financial stability as opposed to compliance and fighting fraud in a similar measure. Budgets are re-evaluated, however, compliance and fighting fraud suddenly become non-essential (Curristine *et al.*, 2020). Curristine *et al.* (2020) further note that key areas that have been affected by the introduction of remote work are: (1) segregation of duties (one person become responsible for multiple duties), (2) authorisation and approval, reconciliation and review (cross-checking transactions and records); (3) physical security, (4) accounting systems access controls.

Entities must, therefore, ensure assets are highly protected from fraudsters seeking to take advantage of potential weakened internal controls and audits structures caused by a remote workforce (Shobana, 2021). With an increased amount of staff working remotely because of the pandemic, controls that were previously put in place may no longer be operating as intended or as effectively as before. Staff reduction or staff taking on new roles due to remote work may cause substantial control gaps that could increase the risks of occupational fraud. For robust occupational fraud risk management purposes, it is absolutely crucial to re-evaluate the fraud risks and the effectiveness of entities' controls environment.

For entities to safeguard their assets and attempts to limit fraud opportunities in remote working (work from home) environment can be achieved by developing and implementing robust remote controls and forensic auditing skills and techniques or remote investigation in the Amid of COVID 19 with a good balance of preventive, detective and responsive measures that can significantly strengthen entities' intolerance for occupational fraud (Wendling *et al.*, 2020). ACFE (2021) recommends entities to ensure the following steps and strategies are part of new ways of doing the business: (1) conduct fraud risk assessments, (2) issue updated controls and procedures or prepare guidance on enhancing internal controls, (3), develop enhanced third-party due diligence, (4) leverage data analytics, (5) refresh training and awareness, (6) perform post-event assurance reviews.

According to Appelbaum, Budnik, and Vasarhelyi (2020) and Hedley and Girgenti (2021) organisations need to quickly and proactively embrace automated lifestyle forensic audits techniques that proactively detect prevent and respond to the risks of fraud using the latest techniques and technologies

around advanced analytics, data, information insights that enable forensic auditors to stay many steps ahead of the fraudsters.

Several studies (KPMG, 2020, 2021; Deloitte, 2021) have addressed the types of fraud risks that auditors should focus on over the next few years. These risks include the risk of digital transformation and digitalisation of operations, risks associated with electronic information systems and cyber security, risks associated with analysis and use of big data, risks of fraud and corrupt practices, risks of changing laws, legislations and accounting standards. Whether COVID 19 has brought about new fraud risks, or whether there has just been a change in the old fraud risks and other types of economic crimes, the traditional ways internal audits and controls have been investigating frauds in entities Pre-COVID-19 is highly debated (Adio-Moses, 2021; Diab, 2021; Levy, 2020).

Past crises have shown that emergencies and subsequent rapid responses create opportunities seriously weakening the effectiveness of entities systems, controls and audits which open windows and doors to various types of online fraud among others (Delic & Zwitter, 2020; Kopp & Grottko, 2020; Rudnicka *et al.*, 2020; Steingrüber, Kirya, Jackson, & Mullard, 2020). Furthermore, the COVID 19 crisis is already revealing gaps in existing controls, systems and internal audits for many organisations (Goldsworthy *et al.*, 2020). In addition to this, many organisations are lacking the ability to respond quickly and proactively (Culea & Constantin, 2021).

The International Auditing and Assurance Standards Board (IAASB) highlighted in their COVID 19 staff alerted the need for auditors to have heightened awareness of the possibility of fraud and error. Furthermore, the credibility of internal controls and internal audits processes in South Africa have been subject to unprecedented concern as a result of heightened fraud risks and threats brought by COVID 19 in early 2020 (Zirkle, 2020). The quality of internal controls has been questioned because of high cases of occupational fraud in a remote working environment that has led to entities failures. According to Serag and Daoud's (2021) research, due to the problems experienced in obtaining audit evidence during COVID 19 and insufficient levels of internal controls in entities, it is possible that forensic auditors take innovative measures during global economic and health crises by applying more remote forensic audit techniques by expanding their audits efforts. Recently, in view of the aggravation of the problem of occupational fraud, studies on the importance of remote forensic auditing techniques in fraud detection capabilities and in improving internal controls in the detection of financial fraud have emerged (Lewulis, 2021; Sree & Bhanu, 2020).

The application of remote forensic audit will continue to add value to audit exercises in the face of the limitations of internal controls and internal audits in a remote workforce. The question is, what is actually the effect of remote forensic auditing skills and techniques on internal controls in combatting occupational fraud in the remote workforce in South Africa. Evans (2020) identifies the field of Digital Forensics requires large amount of manual process with detailed and time-consuming analysis by experts. Remote forensic techniques are widely searched in these days for its response capability in providing a way to perform an evaluation of potentially compromised entities' controls and

systems. Discreet internal investigations are possible in remote forensics without the knowledge of the system owner. The need for eliminating the cost and time delays involved in delivering digital forensic capabilities to remote locations all around the world is profoundly increasing.

The problem that will be addressed in this article is whether the remote tools and techniques that forensic auditors and fraud examiners possess are sufficient and effective to address the challenges of internal controls on occupational fraud in the remote workforce during pandemic levels and beyond. This research narrowed the gap in assessing the significant relevance of remote forensic auditing techniques should address fraud schemes during pandemic levels and beyond and to explore the challenges that may face the accounting/auditing profession during the pandemic levels in the remote workforce in South Africa landscape? This article analyses the effect of various effective techniques, tools, and methodologies currently in force for remote forensic investigation on occupational fraud in a remote workforce in South Africa, Durban CBD. The overall intent of this article is to examine the merits and opportunities involved in those remote forensic investigation techniques in addressing the challenges for internal audits and controls during the outbreak of COVID 19 and beyond. Consequently, the article fills the gap of remote forensic investigations techniques in facing internal controls challenges on occupational fraud in a remote workforce. It is my hope that remote forensic audits and techniques would improve the quality of internal audits and controls. Individual research questions will be the focus of the articles. Thus; the following questions drive the trust of this research: (1) what types of current nature of fraud schemes are committed during the outbreak of the COVID 19 crisis? (2) how can remote forensic auditing techniques significantly address the weakness of internal controls and audits on fraud schemes during pandemic levels and beyond in the remote workforce?

In the literature, there is a lack of studies of remote forensic auditing techniques as a tool to face internal audits and controls challenges in fighting occupational fraud in the remote workforce. This study made the following original contributions to the expansion of knowledge: The first original contribution is the use of remote forensic audit as an effective tool to face internal audits challenges in fighting occupational fraud in the remote workforce. Secondly, this study shed new light on how the use of remote forensic audit is an effective tool to face internal controls systems challenges in fighting occupational fraud in the remote workforce. Thirdly, applying remote forensic audits contribute towards an existing body of knowledge for effectively fighting occupational fraud in the remote workforce. Finally, the study contributed to theoretical and practical contributions and proposes a *remote forensic auditing framework* to assist all auditors to deepen their remote and digital forensic investigation and deepens their understanding of the nature of fraud schemes committed during the outbreak of the COVID 19 crisis.

2 Literature Review

Prior research concern in preventing and detecting occupational fraud using the new fraud diamond has been studied by many researchers Christian, Basri, and Arafah (2019), Ramantha (2020), and Khamainy, Ali, and Setiawan (2021). However, the theories that will guide this research are Technology-Organisation-Environment (TOE) by (Mike & Olochukwu, 2022) and the fraud triangle. These theories were considered relevant and appropriate for this research study for the following reasons: firstly, to understand the reasons behind trust violators during COVID 19, secondly, the layering mechanism, where new technologies are typically expected to destabilise existing traditional auditing system but has potentialities to track a broader pattern of remote forensic auditing and push for the broader change by layering remote auditing delivery systems. Finally, the theories, explain in fuller detail the strategies to be employed by revolutionalising auditing profession.

2.1 Motivating factors of occupational fraud during the outbreak COVID-19

Central factors that are always present when committing occupational fraud in the remote workforce during the outbreak of the COVID 19 crisis are captured by Keller and Lorenz (2020) and Guirakhoo (2020) who point out that forensic investigators have to consider that increased operational and financial pressure due to the COVID19 pandemic which created a heightened level of economic risks such as significant reduction in trading, loss in revenue, loss in profits, loss in market demand, liquidation and total collapse which subsequently lead to increased motivation or justification to commit fraud through manipulation of financial results, misappropriation of facts, misappropriation of assets, and other fraud schemes. Keller and Lorenz (2020) further state that the current economic environment may result in increased fraud risks related to internal controls, as many organisations move to a virtual work environment, there is a significant risk that fraudsters may find new ways to override internal controls especially those critical to ICFR. Such controls may include but are not limited to segregation of duties, a delegation of authority and information systems access

2.2 Opportunities factors of occupational fraud during the outbreak COVID-19

Schuchter and Levi (2015) explored some of the explanations, underlying fraudulent activities in connection with the global financial crisis in 2008-2009 applying Clarke's (2012) opportunity theory approach, and concluded that government stimulus packages have created numerous opportunities for individuals to commit financial and economic crimes, as was the case of the global financial crisis, economic support measures were introduced quickly with no or inadequate internal audits, internal controls systems and fraud controls, many who committed such fraud may have been motivated by the need arising from loss of employment or desire to keep business trading until

economies improve, fraudsters saw the lack of internal controls and lack of fraud controls, employees have access to entities' assets and information that allows them to both commit or conceal fraud (Johnson, 2020). Johnson (2020) further notes that fraud risk indicators such, as high tolerance for poor financial disciplines and errors in financial information, weak or non-existent processes by management for identifying fraud, lack of remote fraud detection techniques, non-compliance with laws and regulations, management override controls, and lack of allegations against those charged with entities governance are also a catalyst of fraudulent activities during the pandemic COVID-19.

2.3 Rationalisation factors of occupational fraud during the outbreak COVID-19

According to Andon and Free (2020), it is clear from the above that coronavirus fraudsters are motivated by a mixture of economic need, created by a decline in business activity, remote workplace, loss of jobs, salary cuts, personal greed, and the capacity of individuals to rationalise their conduct based on personal attitudes and situational pressures driven by apparent opportunities to gain access to entities resources during a time of a perceived reduction in internal audits, internal controls systems and fraud controls.

Furthermore, the 2020 pandemic, being global in its reach and causing widespread economic as well as health consequences, has created rationalisations for fraud, including almost all of Papadopoulou and Papadopoulou's (2020) techniques of neutralisation namely: (1) *denial of authorship*-I am acting on behalf of others, (2) *sharing responsibility*- everyone is doing it, the government or entity can afford it and the funds will be spent, thus supporting economy, (3) *external influences*- actions are caused or necessitated by the pandemic COVID 19, thus reducing personal responsibility, (4) *denial of injury*- the conduct was designed to keep an entity afloat and the funds will be repaid when the economy improves, (5) *denial of illegality*-where eligibility for stimulus measures are unclear, the conduct may be seen as not technically illegal, (6) *denial of culpability*-dissatisfaction of with current or expected future employment situation or reasons for job loss may be seen to reduce the culpability, especially where unpunished misconduct of senior personal can be pointed to as negative role model, and *appeal to higher loyalties*- laws can be ignored due to higher duties owed to family and friends during the pandemic.

2.4 Ethical Egoism or Selfishness Theory

Henry Sidgwick propounded Ethical egoism or Selfishness theory in 1874 through his book titled "The methods of Ethics" (Carlson, Adkins, Crockett, & Clark, 2022). According to Tilley (2022), the psychological egoism theory explains that all humans' actions are based on their self-interests (selfishness). Biondi (2024), commonly used to refer to the principles of how individuals think rationally based on their self-interests. However, Aldousari and Ickes (2021) soundly argued that, the ethical egoism theory was silent on whether individuals have to avoid helping others. This argument is closely related to Machiavellian attitude and according to Jones and Mueller (2021) machiavellian is a

propensity to direct others' behavior through manipulations and controls for personal gains. Dalton (2021) dismissed the notion of Machiavellian attitude and soundly argue that Machiavellian individuals are less moral and are determined to achieve their personal interests and objectives. As alluded by (Carlson *et al.*, 2022), Machiavellian attitude is also considered selfishness, where individuals are willing to commit unethical or immoral actions for their personal interests. Tarsney (2023) concur with Aldousari and Ickes (2021) with and add that Machiavellian attitude negatively affect the accounting and auditing profession because Machiavellian tend to be manipulative. Aldousari and Ickes (2021) briefly identified the following characteristics of Machiavellian attitude: (1) pragmatism, (2) amorality, (3) cynicism, and (4) beliefs in manipulating others to achieve personal interests. In the business environment, employees are likely to exhibit Machiavellian attitude to achieve their personal interests unethically.

2.5 Empirical Literature

Teeter and Vasarhelyi's (2010) quantitative study on the impact of forensic investigative methods on corporate fraud deterrence in Nigeria showed that information and technology deployments are supported by extensive use of forensic auditing experts around such high technologies to curb fraudulent financial practices, misappropriation of assets, corruption, and manipulation of the figures reported in the financial statements. The study recommends that auditors need to adapt to real-time audits, quickly improvise new approaches and take a risk-based approach. However, Teeter and Vasarhelyi's (2010) did not consider new remote forensic techniques to make fraud detection in the remote workforce more reliable. Similar research was conducted by Salazar (2020) a questionnaire was used to gather data, the study concluded that creating digital and easily accessible tools to allow forensic auditors to track all emergency records and transactions is highly recommended. However, Salazar (2020) did not consider the remote auditing potential limitations and challenges as was Serag and Daoud's (2021) results were not empirically tested and the study's lacks a practical and theoretical base. Salazar's (2020) quantitative study found that allowing remote access by auditors and oversight bodies to all entity's records to ensure that audits can continue despite restrictions on carrying out physical inspections and paper-based reviews must be key to being able to demonstrate to stakeholder's professionalism's robust response to fraud risk in a remote working environment. Powers and Bannen (2020) adopted descriptive research to establish the feasibility of traditional audits to tackle the challenges of internal controls. A structured questionnaire was used to gather primary. The study concluded that auditing services are a powerful tool for making internal controls more robust to prevent fraudulent activities within entities However, this research did not investigate how remote forensic auditing techniques could promote robust internal controls systems during the crisis in the remote workforce.

In a similar study to those of Powers and Bannen (2020) that focused on traditional audits and internal controls, Castka, Searcy, and Mohr (2020) concluded that the need to audit remotely because of work from home mandates

imposed on auditors and their clients does not change that external auditors are required by auditing standards to be professionally skeptical, assess the risk of fraud throughout the course of audit engagement and alert the conditions that may indicate a possible misstatement due to fraud or error and to perform a critical assessment of audit evidence. However, Costka, searcy, and Mohr (2020) did not consider challenges for internal audit activity during the outbreak of COVID19 and beyond and how remote forensic audit techniques would address the weakness of internal audits and controls in the remote workforce. Appelbaum, Budnik, and Vasarhelyi (2020) and Alderman (2021) investigated whether remote auditing is relevant in the prevention, detection and investigation of SOEs during and after COVID 19. The study found that remote forensic audits play a major role in preventing, detecting and investigating frauds. The authors recommend the use of remote forensic audit to develop new approaches, refine priorities, controls and create new policies that are better aligned with a remote workforce to deter, detect mitigate fraud risks. However, their study did not investigate all highly ranked techniques which could assist in overcoming the challenges of internal audits and controls.

Umamaheswari and Shobana (2021) focused on remote forensic investigation to mitigate the impact of fraud risks and showed that forensic analysis is highly needed and bringing together fraud detectives, data scientists and forensic auditors to uncover the warning signals in entities' financial data. The authors recommended using artificial intelligence or forensic data analytics to identify fraud in entities' operations. However, Umamaheswari and Shobana (2021) result depend on participants' perceptions rather than empirical testing. Furthermore, they did not consider the remote principle-based techniques to build modern safer strategies and a more sustainable remote workforce that will protect against fraud risks even post COVID 19. Kaka's (2021) adopted a quantitative research design on accounting and audit considerations of global pandemic Coronavirus Covid-19 crisis and its effects on financial reports and auditing procedures and established that turning to high tech and extensive use of remote forensic audit techniques to help identify the frauds (misappropriation of assets and financial reporting fraud) that are occurring in the new remote working world. it thus recommends the use of use time tracking software to monitor employees and their productivity, ensure analytics is built on real-world fraud, not generic testing. The study further recommends expanding existing e-procurement platforms and mechanisms. However, the author did not offer a detailed analysis of remote forensic auditing to face the challenges of internal audits and controls, it also failed to test new heightened fraud risks and threats associated with COVID 19 as was Umamaheswari and Shobana (2021), and did not empirically validate potential new fraud risks linked to COVID 19.

3 Research Methods

Scoping review of literature methodological framework as presented by Arksey and O'malley (2005) and used by Sucharew and Macaluso (2019) was adopted for this article as the strategy to conduct a thorough literature.

The reviews were taken between 2018 and 2024 due to dearth of studies within the area under consideration. Studies extracted from the following five electronic databases:

- Emerald insight :(<https://www.emerald.com/insight/>),
- Springer Link: (<https://link.springer.com/>),
- Semantic Scholar: (<https://www.semanticscholar.org/>),
- Science Direct: (<https://www.sciencedirect.com/>),IEEE Xplore).
- Digital Library: (<https://ieeexplore.ieee.org/Xplore/home.jsp>).

The data of all the findings listed in table 1 were analysed using an inductive thematic analysis process based on the steps outlined by Braun and Clarke (2006) to show: types of current nature of fraud schemes are committed during the outbreak of the COVID 19 crisis, and the use of remote forensic auditing tools and techniques in address the weakness of internal controls on fraud schemes during pandemic levels and beyond in the remote workforce. The Scoping review diagram flow of literature retrieval is set out in Figure 1 below.

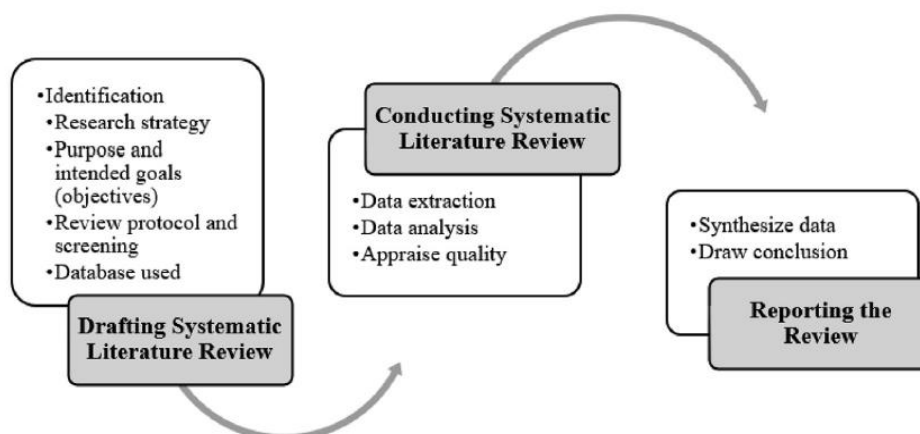


Figure 1: Scoping review diagram flow
Source: Arksey and O'malley (2005)

The figure 2 shows the logic using the PRISMA methodology how 25 articles were selected for this research study from a total of 249 identified and retrieved through database searches. Table 1 provides finer details of the 25 selected articles and discussion.

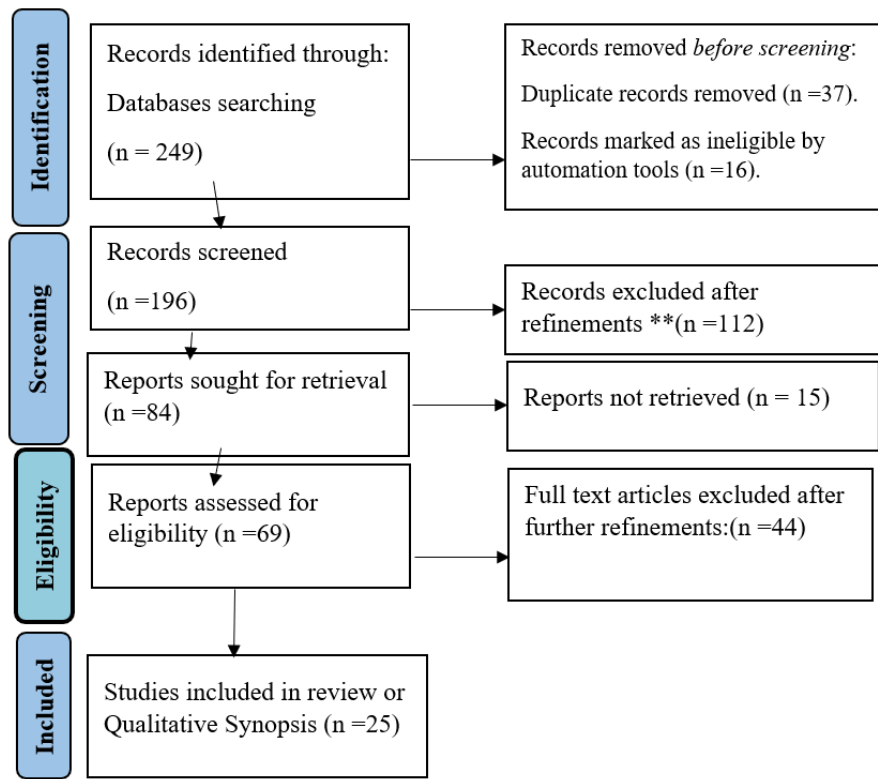


Figure 2: PRISMA diagram Flowchart of number of searched articles and final corpus.

Source: Adapted from (Page *et al.*, 2021).

4 Results

The results are fundamentally based on the review outcome of the prior 25 published studies in the area of the nature of fraud schemes committed during the outbreak of the COVID 19 crisis, and the use of remote forensic auditing techniques and tools in addressing the weakness of internal controls and audits on fraud schemes during pandemic levels and beyond in the remote workforce. We will discuss first the nature of fraud schemes committed during the outbreak of the COVID 19 crisis followed by the use of remote forensic auditing techniques in addressing the weakness of internal controls and audits on fraud schemes during pandemic levels and beyond in the remote workforce.

Table 1 below presents the studies that support the analysis to the research objectives as shown in the introductory section. After critical reading and analysing the articles presented in table, the researcher tried to match the articles and papers with the objectives formulated, as presented in the last column of the table that is, Objective 1- to critically assess what types of current nature of fraud schemes are committed during the outbreak of the COVID 19 crisis , and the objective 2- to critically assess the use of remote forensic

auditing techniques in addressing the weakness of internal controls and audits on fraud schemes during pandemic levels and beyond in the remote workforce. The systematic literature review is presented below, trying to achieve the objectives formulated and set.

Table 1: Fraud schemes are committed during the outbreak of the COVID 19 crisis, remote forensic auditing techniques and tools in addressing the weakness of internal controls and audits on fraud schemes during pandemic levels and beyond in the remote workforce

<i>Selected papers related to the research objectives</i>			
Areas	Types of fraud schemes are committed during the outbreak of the COVID 19 crisis	Relevant references	Research Objectives
Heightened Fraud Risks and Threats Caused by COVID 19	External Threats and Insider Threats, Cyber Threats, Data Theft, Time Theft, Payroll Fraud, Advance Fraud, Time Sheet Fraud, Pay Check theft, Workers compensation fraud, Overpricing, Double Dipping, and Economic Stimulus fraud , Account takeover fraud, Mobile Banking Frauds , Advance Fee Fraud , Assets misappropriation , Bankruptcy Fraud, Capitalisation of expenses , Charity scams, Commercial-Level Fraud , Computer fraud , Cryptocurrency Fraud , Cryptocurrency scams , Cyber threats , Disclosure Fraud , False expense reimbursements , Financial statement fraud , Fleet Fuel Card Fraud , Fraud in the Supply Chain , Fraud related to government funding , Fraudulent loans , Government Program Fraud , Identity fraud , Imprper billing , Insurance Fraud-Claims inflated , Internal Controls over Financial Reporting (ICFR), Investment fraud , Investment scams , Invoice Fraud , Manipulation of valuations and impairments , Margin manipulation , Money Muling , Mortgage scams/ fraudulent refinancing , Occupational fraud , Online payment fraud/theft , Overpricing, Restructurings and “big bath” charges, Stimulus Payment Fraud, Tax Fraud, Time Theft, Trade-Based Money Laundering, UIF Fraud, Understatement of allowances and reserves, Payment temparing , Wire transfer fraud, Workers Compensation Fraud, Working hours overstatement, and Employment Fraud to an organisation.	(Chawki, 2021; Coman & Mihai, 2022; Johnson, 2020; Ma & McKinnon, 2021; Martinelli, Friedman, & Lanz, 2020; Ruiz, 2020; Shobana, 2021)	Objective 1

Remote forensic auditing techniques	The use of remote forensic auditing techniques in addressing the weakness of internal controls and audits on fraud schemes during pandemic levels and beyond in the remote workforce	Relevant references	Objective 2
	<ul style="list-style-type: none"> ▪ Remote-based forensic audits tools and techniques can assist in reviewing weak internal audits during and beyond COVID 19 ▪ Remote-based forensic audits tools and techniques can promote robust internal controls systems during the crisis in the remote workforce. ▪ Remote-based forensic audits tools and techniques allow forensic auditors to develop new approaches, refine priorities, controls and create new policies that are better aligned with a remote workforce to deter, detect mitigate fraud risks. ▪ Remote-based forensic audits tools and techniques allow forensic auditors for the extraction of digital evidence from disks and store them as a large-scale XML database for allowing multiple investigators to work on the evidence dataset from different locations during and beyond COVID 19. ▪ Remote-based forensic audits tools and techniques allow forensic auditors to enjoy the following benefits (1) saving time and money by using technology, (2) avoiding travelling to difficult audit locations, (3) expanding audit coverage, (4) the audit team will be more efficient, (5) expand using of forensic specialists, (6) improved use of available technology strengthens documentation and reporting, and (7) logistics related to auditing are not needed anymore. 	<p>(Tysiac, 2020). Kashyap and Vinod (2020), Picciotti (2020), (Hedley & Girgenti, 2021), Sree and Bhanu (2020a), Picciotti (2020), Sree and Bhanu (2020b), Horsman (2021), Serag and Daoud (2021), (Kashyap, 2020)</p>	

Remote forensic auditing techniques	The use of remote forensic auditing techniques in addressing the weakness of internal controls and audits on fraud schemes during pandemic levels and beyond in the remote workforce	Relevant references	Objective 2
	<ul style="list-style-type: none"> ▪ Remote-based forensic audits tools and techniques can assist in addressing the weakness of internal controls during and beyond COVID 19 ▪ Remote evidence capturing system is proved to be crucial option for forensic investigation, high-tech strategies, techniques and tools for remote digital forensic evidence collection system are all forensically verifiable expandable, reliable and also compatible with the present computer hardware. ▪ Remote-based forensic audits tools and techniques allow forensic auditors to curb fraudulent financial practices, misappropriation of assets, corruption, and manipulation of the figures reported in the financial statements and to adapt to real-time audits, quickly improvise new approaches and take a risk-based approach. ▪ Remote-based forensic audits tools and techniques allow forensic auditors to track all emergency records and transactions. ▪ Remote-based forensic audits tools and techniques allow forensic auditors to remote access to all entity's records to ensure that forensic audits can continue despite restrictions on carrying out physical inspections and paper-based reviews which enhance robust response to fraud risk in a remote working environment. ▪ Remote-based forensic audits tools and techniques allow forensic auditors to make internal controls more robust to prevent fraudulent activities within entities. 	<p>(Tysiac, 2020). Kashyap and Vinod (2020), Picciotti (2020), (Hedley & Girgenti, 2021), Sree and Bhanu (2020a), Picciotti (2020), Sree and Bhanu (2020b), Horsman (2021), Serag and Daoud (2021), (Kashyap, 2020)</p>	

Remote forensic auditing techniques	The use of remote forensic auditing techniques in addressing the weakness of internal controls and audits on fraud schemes during pandemic levels and beyond in the remote workforce	Relevant references	Objective 2
	<ul style="list-style-type: none"> ▪ Remote-based forensic audits tools and techniques allow forensic auditors through the use of time tracking software to monitor employees and their productivity, ensure analytics is built on real-world fraud, not generic testing. ▪ Remote-based forensic audits tools and techniques allow forensic auditors can eradicate the issues of e-procurement platforms and mechanisms ▪ Remote-based forensic audits tools and techniques can assist in arranging the priority of the risks that are focused on in the internal audit plan in proportion to its likelihood and impact. during and beyond COVID 19. ▪ Remote-based forensic audits tools and techniques can assist in internal auditors in collecting of network of traffic data, remote acquisition of disk-based evidence remotely from the computers and from cloud infrastructure during and beyond COVID 19. ▪ Remote-based forensic audits tools and techniques can assist in using technological tools to access necessary evidence during and beyond COVID 19. Remote-based forensic audits tools and techniques can assist in updating the internal audit plan constantly according to the needs of the management and stakeholders, in light of the increase and diversity of risks associated with the outbreak of the virus during and beyond COVID 19. ▪ Remote-based forensic audits tools and techniques can assist in working on designing and implementing additional and non-traditional audit procedures to obtain sufficient and appropriate evidence, using modern high-tech tools during and beyond COVID 19. 	<p>(Tysiac, 2020). Kashyap and Vinod (2020), Picciotti (2020), (Hedley & Girenti, 2021), Sree and Bhanu (2020a), Picciotti (2020), Sree and Bhanu (2020b), Horsman (2021), Serag and Daoud (2021), (Kashyap (2020).</p>	

Remote forensic auditing techniques	The use of remote forensic auditing techniques in addressing the weakness of internal controls and audits on fraud schemes during pandemic levels and beyond in the remote workforce	Relevant references	Objective 2
	<ul style="list-style-type: none"> ▪ Remote-based forensic audits tools and techniques can assist in disclosing the constraints and difficulties associated with performing the audit work in the internal audit report during and beyond COVID 19. ▪ Remote-based forensic audits tools and techniques can assist in Monitoring and evaluating internal controls during and beyond COVID 19. ▪ Remote-based forensic audits tools and techniques can assist reviewing internal controls systems during and beyond COVID 19. ▪ in Enhancing internal controls efficiency during and beyond COVID 19. ▪ Remote-based forensic audits tools and techniques can assist in enhancing the internal controls in detection of fraud schemes during and beyond COVID 19. ▪ Remote-based forensic audits tools and techniques can assist in implementing new anti-fraud technologies during and beyond COVID 19. ▪ Remote-based forensic audits tools and techniques can assist in detection, reducing or eliminating fraud schemes during and beyond COVID 19. ▪ Remote-based forensic audits tools and techniques can assist in Improving internal controls during and beyond COVID 19. 	<p>(Tysiac, 2020). Kashyap and Vinod (2020), Picciotti (2020), (Hedley & Girgenti, 2021), Sree and Bhanu (2020a), Picciotti (2020), Sree and Bhanu (2020b), Horsman (2021), Serag and Daoud (2021), (Kashyap (2020).</p>	

5 Discussion

The systematic literature review of literature is briefly presented below, trying to achieve the objectives already formulated. The discussion of the results is organised in the two themes. Thus, this section presents relevant themes identified from the reviewed and analysed literature. The themes were therefore, deduced from the analysed literature in line with research questions and are discussed below: (1) what types of current nature of fraud schemes are committed during the outbreak of the COVID 19 crisis? (2) how can remote forensic auditing techniques significantly address the weakness of internal controls on fraud schemes during pandemic levels and beyond in the remote workforce?

Theme 1: Nature of fraud schemes committed during the outbreak of the COVID 19 crisis.

5.1 Heightened fraud risks and threats caused by COVID-19 crisis

In the current highly globalised world, digital transformation and other emerging technologies challenged many audit functions, organisations face strong external and insider threats and risks not only domestically but also internationally to cope with the difficulty to quantify fraud arising from the pandemic COVID 19 outbreak which requires digital audio solutions. Ahmed (2020) remote workforce has brought about heightened fraud risks and threats. Regardless of industry, all entities should consider these key heightened fraud risks and threats relevant to the remote working environment. There are many associated threats and fraud risks that are heavily impacted by COVID 19, for example, Cyber Threats (Guirakhoo, 2020), Data Theft, Time Theft, Payroll Fraud, Advance Fraud (Ruiz 2020), Time Sheet Fraud, Pay Check theft, Workers compensation fraud, Overpricing, Double-Dipping, and Economic Stimulus fraud (Johnson, 2020).

According to Deloitte (2020), when faced with COVID-19, auditors are dealing with new frauds and challenges which demand responses such as: (i) high risk and weak internal controls and audits, (ii) running parallel systems –the ‘Side Hustle’-with employees working remotely, it extremely challenging to monitor whether they are using their personal laptop and telephone side by side with the entity issued equipment which allows staff to trade on their own behalf or run parallel businesses whilst they are at work, (iii) oversight and monitoring on-site compliance- with restrictions on travel imposed as a result of the COVID 19, compliance, internal auditors and external audit teams have not been able to travel to perform on-site audits and reviews while those functions have taken to undertaking their work remotely, (iv) oversight and Monitoring on the use of devices-the use of personal devices for formal business

operations is largely prohibited in so many entities, this has become more difficult to enforce and monitor with remote working.

Conversely, there is a far greater risk of personal use of entity's equipment either by the employee or their families, (v) management override internal controls and systems- 'management override' referred to the ability of the management or those charged with governance to manipulate accounting records and prepare fraudulent financial statements by overriding these internal controls, even where controls might otherwise appear to be operating effectively.

Worse still, controls that were previously put in place (pre- COVID) may no longer be operating as intended or as effectively as before. Furthermore, staff reduction or staff taking on new roles due to remote work may cause substantial control gaps that could increase the risks of occupational fraud (vi) time-sheet Fraud where an employee takes on extra work to supplement their income in order to meet his/her financial needs. However, the obstacle for the employees' face is that most organisations have a policy against external work (employees are not permitted to perform work for remuneration outside of the scope of their employment). It includes a prohibition on conducting work on organisation's premises outside of the employee's job and related duties, using organisation's resources and equipment for private work, performing private work during working hours. then the issue with the employer is that this policy is likely to come under threat relates to the use of the employee's time and expertise that is diverted away from employer's benefit

5.2 Occupational fraud in remote working environment

Fraud against entities by employees is referred to as "occupational fraud" and sometimes characterised as 'internal', 'insider' fraud (Bonny *et al.*, 2015; Edge, 2016; Murphy and Free, 2016). The world's largest anti-fraud organisation, the Association of Certified Fraud Examiners (ACFE) defines occupational fraud as "the use of one's occupation for personal enrichment through the deliberate misuse or misappropriation of the employing entity's resources or assets (ACFE 2016). ACFE (2020:10) found that the schemes used by occupational fraudsters have increased even with the move toward digital payments and technology-based business.

According to Murrar (2021) in his article on fraud schemes during COVID-19 pandemic, occupational fraud entails three major categories: (1) asset misappropriation which includes an employee stealing or misusing the employing organisation's resources (*fictitious invoices, fictitious "ghost" employees, fictitious vendors, tempering of checks and fraudulent travel and expense reimbursement*), occurs in the vast majority (86% of cases) (2) corruption which includes offenses (*conflicts of interest and collusion, and bribes and kick-backs*), this fraud scheme occurs in 43% of the cases (3) fraudulent financial statement in which the perpetrator intentionally causes a material misstatement or omission in the organisation's financial statements which includes: *overstating or fabricate revenues, understating allowances and reserves, manipulating or delaying valuations and impairments to try overvalue some assets, write off underperforming assets and or record what is commonly referred to "big bath", or restructuring charges, entities might also be tempted to*

capitalise substantial COVID-19 expenses and deduct them over several accounting periods, and entities might avoid fully disclosing the impact of COVID-19 on its overall results, are at least the common 10% of the schemes but costliest category of the occupational fraud (ACFE, 2016; Albrecht et al 2015). The ACFE (2016) also identified three main methods of committing fraudulent financial statements, namely, changing accounting policies, procedures, and methods, altering managerial estimates and, improper recognition of revenue and expenses.

These results uphold the assumptions of the theory of Technology-Organisation-Environment (TOE) by (Mike & Olochukwu, 2022) and the fraud triangle to understand the reasons behind trust violators during COVID 19, the layering mechanism, where new technologies are typically expected to destabilise existing traditional auditing systems but has potentialities to track a broader pattern of remote forensic auditing and push for the broader change by layering remote auditing delivery systems and explain in fuller detail the strategies to be employed by revolutionising auditing profession.

Theme 2: The use of remote forensic auditing techniques and tools in addressing the weakness of internal controls and audits on fraud schemes during pandemic levels and beyond in the remote workforce

The research results on the second identified theme on the use of remote forensic auditing techniques to face the challenges of internal audits and controls in combatting occupational fraud during the COVID-19. Widiyati, Valdiansyah, Meidijati, and Hendra (2021), no system of internal audits and controls can provide absolute assurance against fraud during COVID-19 pandemic levels. As a result, the board of the organisations develops a system for prompt, confidential review, investigation and resolution of instances of non-compliance and allegations involving potential fraud.

The current COVID 19 crisis forces auditors to adjust the traditional way of working and adapt new auditing techniques and optimising the use of technology (Tysiac, 2020). Kashyap and Vinod (2020) added that there are several benefits to conducting remote audits using technological tools to access necessary evidence: (1) saving time and money by using technology, (2) avoiding traveling to difficult audit locations, (3) expanding audit coverage, (4) the audit team will be more efficient, (5) expand using of forensic specialists, (6) improved use of available technology strengthens documentation and reporting, and (7) logistics related to auditing are not needed anymore. Picciotti (2020) argues that COVID 19 shouldn't be a reason to not conduct a forensic investigation. Given the travel restrictions and employees being obliged to work from home, remote auditing is not an option anymore as it has become crucial because of the fast advances in technology, conducting remote audits is becoming more popular among entities (Hedley & Girgenti, 2021). According to Sree and Bhanu (2020), remote evidence capturing system is proved to be a crucial option for forensic investigation, high-tech strategies, techniques and tools for remote digital forensic evidence collection systems are all forensically verifiable, expandable, reliable and also compatible with the present computer hardware. However, Picciotti (2020) identified the following key inherent limitations related to conducting forensic audits: (a) remote audits are not approved by some certification and accreditation bodies, (b) high costs and difficulties related to using modern technology, (c) insufficient training of

auditors, (d) reliability and trust gap of the audit, (e) remote auditing makes it harder to build interaction with the auditees, and (f) the lack of personal interaction create more fraud opportunities.

Sree and Bhanu (2020) identified six remote forensic auditing or investigation processes namely: (1) forensic audit investigation planning, (what best approach for conducting interviews, is our online site secure enough to exchange electronic documents? How will we obtain images of desktops and mobile devices etc., (2) centralised tracking- the use of one central tracking system for cases and “Data custodians”, (3) eDiscovery collection and document review, (4) remote forensic auditing analysis to the electronic data and other supporting documents- advances in data analytics have expedited the acquisition of a large amount of accounting and financial data, and predictive capabilities have significantly shortened the time required to identify relevant transactions, (5) Business intelligence Searches- organisations predominantly conduct business intelligence research through an online database and telephone interviews except when a court or business filing haven’t been digitalised, (6) investigative interviews-most organisations commonly use teleconferencing and videoconferencing software, it is up to the forensic auditors to carefully weigh the advantages and disadvantages of conducting interviews remotely.

According to Horsman and Sunde (2022), a consistent process for conducting remote forensic investigations to all levels of employees (including senior management) can help organisations to significantly mitigate losses and manage risks associated with fraud. Horsman and Sunde (2022) pointed out that specific remote forensic audit roles in relation to fraud risk management could include an initial or full investigation of suspected fraud, root cause analysis, internal audits and controls improvement recommendations, provide ethics training sessions if assigned such duties remote auditing has a responsibility to attain sufficient skills and competencies such as knowledge of remote fraud schemes, remote investigation techniques, laws and have adequate access to the internal audit and audit committee and adhere higher professional standards.

Deloitte (2021), remote forensic auditing and investigations cover the following key areas namely: (1) remote forensic investigations throughout the investigative lifecycle, (2) digital forensic- by applying forensic auditing practices to collect preserve and process structured and unstructured data in a legally and defensible manner, (3) eDiscovery services- by delivering solutions to complex document review challenges using a wide range of advance technologies to process, host and produce relevant and reliable evidence, (4) fraud risk analytics- assisting entities with the earlier detection of fraud and the continuous monitoring of fraud risks through remote fraud risk monitoring and assessment services, (5) defensible and managed document review- by combining multidisciplinary teams of expert document reviewers such as lawyers, Chartered Accountants, forensic auditors, and certified fraud examiners, with a robust tested methodologies for conducting a defensible technology-assisted document reviews.

A study carried out by Hedley and Girgenti (2021) revealed that to this effect, remote auditing holistic approach is performed by multidisciplinary teams made up of fraud, IT and sector-specific experts such as supply chain audit

specialists, fraud experts, data and fraud data specialists, IT professionals, Cybersecurity specialists, law experts, and forensic audit experts to dig deeper and provide relevant insights into the entities' matters.

Remote auditing activities which require some adjustments and innovation to internal audit approach and process on internal controls in the remote working environment are supported by many scholars, amongst such scholars is shobana (2021), who argue that the remote audit includes the following four phases: (1), remote audit planning, (2) preparing for the remote audit-by checking availability of the auditees, evaluating remote audit feasibility, assuring confidentiality, security and data protection, setting the remote audit schedule, and clarifying new processes, (3) conducting remote audits using remote techniques such as audio or video conferencing tools, virtual interviews, document sharing platform (documentary review), and alignment with the auditees, and (4) remote auditing reporting where auditors pay attention to the key elements such as focusing on key risks, validation of findings, and documentation of the new processes.

Benjamin Onodi, Okafor, and Onyali (2015:73) identify three essential computer forensic auditing techniques to detect fraudulent activities within firms, namely, (i) cross-drive analysis - where a forensic auditor correlates information on multiple hard drivers to identify and detect anomalies (Garfinkel, 2006), (ii) Live analysis - examination of a computer from within the operating system using forensics tools to extract evidence, especially when dealing with encrypted files systems (Qasim, Rind, and Saleem, 2011), (iii) recovering deleted files, and (iv) rigorous and focused tests that yield a small sample of highly specious transactions (Ngomane, 2010; Philipp, Cowen, and Davis, 2009).

5.3 Remote Acquisition Forensic Tools and Techniques (RAFT)

According to Quick and Choo (2014) and Thompson and Manning (2021), current trends in fraud are overwhelming forensic investigators with a number of cases they have to deal with. Traditional forensic investigators commence with investigation leaving their laboratory to visit the crime scene, where they collect all relevant evidence and bring it back to the forensic laboratory for secure storage and analysis. This evidence may then lay untouched for extended periods while the forensic investigation team deals with the backlog of cases. Therefore, it is absolutely crucial to keep a keen focus on remote fraud risk management (Jain, Bhanushali, Gawade, & Jawale, 2017; Serag & Daoud, 2021). Shobana (2021) has suggested hardware write blockers for the acquisition of disk-based evidences. Tysiac (2020) has extended the support for the capture and parsing process of volatile data from memory. Carrier and Spafford (2003) and Lewulis (2021) have supported the collection of a network of traffic data, remote acquisition of disk-based evidence remotely from the computers and from cloud infrastructure.

Roux and Weyermann (2020) introduced the idea of harnessing distributed processing data for handling voluminous (big) data. An agent based distributed architecture for capturing disk and memory-based evidence in a corporate network environment was specified by (Cohen, Garfinkel, & Schatz, 2009; Shobana, 2021). Horsman (2021) developed a system for the extraction of

digital evidence from disks and storing them as a large-scale XML database for allowing multiple investigators to work on the evidence dataset from different locations. Ayers (2009) introduced a decision theoretical probabilistic method in the coordination of triage efforts in the file curving of images from evidence data. The above tools and techniques in this research will significantly contribute to the automation of the forensic audit process and data collection tools and techniques for forensic analysis in the cloud fully support remote forensics capabilities in terms of performance in a remote investigation.

5.4 Fraud Detection Techniques in Forensic Auditing

Oyedokun (2016) identifies forensic auditing techniques, including robust computer-assisted reviews (Hybrid Multimodal, Predictive Coding, Bottom Line Driven Proportional Review, Review Quality Controls) which include data mining techniques such as regression (predictive); Association Rule Discovery (descriptive); classification (predictive); clustering (descriptive); and document review; interviews; background reading; fraud risk assessment; benchmarking; systems analysis; mathematical modeling; analysis of financial ratios; technology-assisted reviews; litigation; lifestyle audits; qualitative and quantitative approaches to fraud risk assessment; vertical financial statement analysis (which entails analysing the relationship between different financial accounts); horizontal financial statement analysis (comparing the current year's financial statements with those of previous years or comparison of financial statistics across time periods); surprise audits,; and operational ratios analysis, among others.

Ola (2018:147-148) highlights the following six critical forensic audit techniques that are employed to combat fraud within entities: (i) indirect techniques such as income items not reflected in the financial reports, large transactions, concealed or paid cheques, real estate transactions, direct evidence of undeclared, and unreported income and financial ratios, (ii) embezzlement investigation techniques (proactive preventive and therapeutic approaches) such as effective and powerful internal controls, financial and operational audits, intelligence work to gather information, registering exceptions and reviewing deviations; (iv) detective techniques (therapeutic approach) such as the funds method (Funds T) – an analysis of funds received and spent by a suspect within a period, and the net worth method – significant changes in assets and liabilities from one year to another; (v) the source and application of funds method or expenditure approach that consists of a list of the use of funds at the beginning of the period, less the source of the funds. If actual funds exceed declared ones (including the funds accumulated at the beginning of the period) the difference is considered non-disclosed income, and (vi) the bank deposits method that focuses on the funds deposited during the year from unknown sources by checking bank statements and financial transactions. These substantive, rigorous tests are relevant to any entity whether small or large, for-profit, and not for-profit or government-related (Nigrini, 2020).

Nigrini (2020) notes that the techniques used by forensic auditors to detect fraud, errors, and other anomalies include (i) analysis of credit card transactions, (ii) risk scoring with regard to access, (iii) FRAs using forensic units, (iv) time series analysis, (v) correlation, (vi) abnormal duplications within subsets,

(vii), the relative size factor test, (viii) the largest subsets and largest growth tests, (ix) testing the internal diagnostics of current period and prior period data, (x) Benford's law, (xi) Access, (xii) Excel, (xiii) Powerpoint, and (xiv) high-level data overview tests.

Benjamin Onodi, Okafor, and Onyali (2015:73) add that forensic auditing techniques such as net worth, expenditure and tracing techniques, which involve the flow of funds; cheque spreads if the subject uses such; deposit spreads in relation to payments into a cheque account; credit card spreads if the subject frequently uses credit cards; gross profit analysis in cases of money laundering or skimming; bank deposits, especially for a subject who only operates one business and income seems to come from only one source; and telephone calls to identify the subject's contacts and associates. A database is established to identify telephone contacts. Organisational, operational, and chronological flow charts are popular, and unsupervised and semi-supervised techniques are employed to detect anomalies, as well as data cleaning to avoid poor data quality and noise, adaptive and incremental techniques to adapt to new fraud detection tools, cost-based scoring techniques, statistical techniques such as Benford's law, descriptive statistics correlation and time series analysis to detect fraud and errors, risk profiling techniques, case escalation techniques, and digital analysis techniques, among others. The *Remote forensic auditing framework* -based conceptualised model is proposed and presented in the Figure 3 below

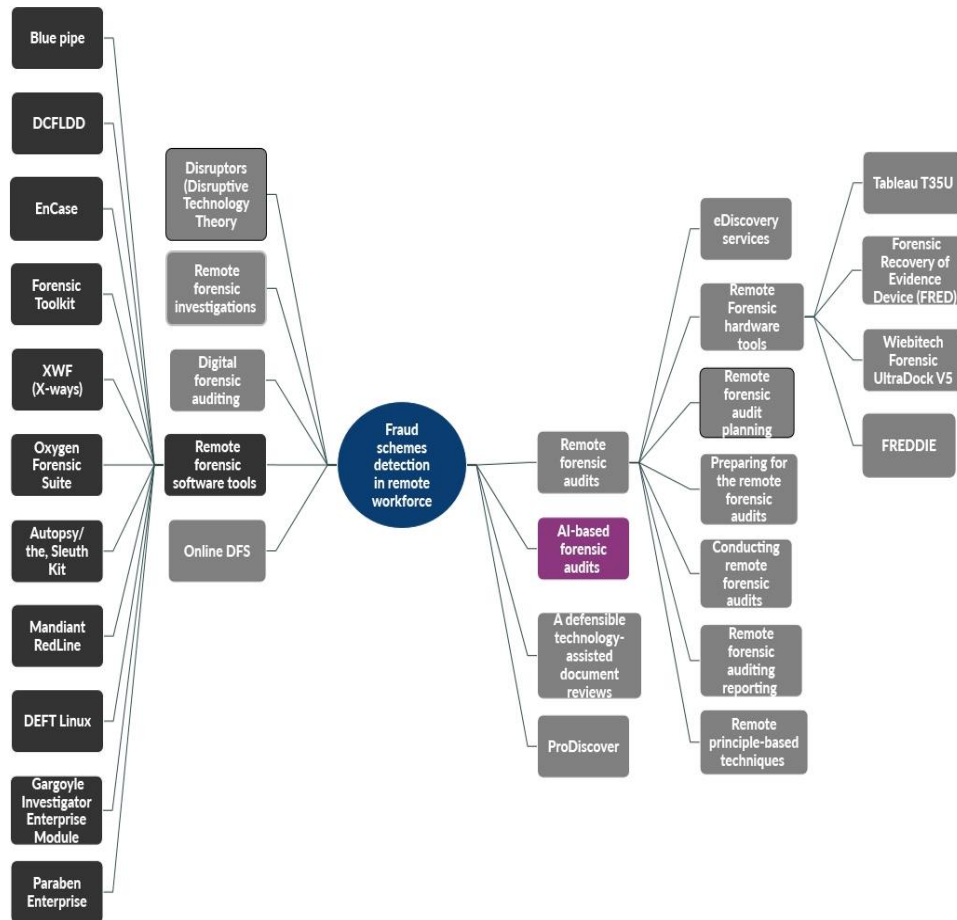


Figure 3: Remote forensic auditing framework.

6 Conclusion and Recommendations

Evidence revealed that, COVID 19 disrupted the traditional ways of internal controls audits, posing threats to auditors to swiftly respond to fraud schemes within a big volume of data. Hence, the fundamental aim of this study was to find out how can remote forensic auditing techniques significantly address the weakness of internal controls and audits on fraud schemes during pandemic levels and beyond in the remote workforce so as to propose the framework that addressing the challenges experienced by auditors handling audits in remote workforce. This study adopted scoping review strategy and preferred Reporting items for Systematic Reviews and Meta-Analysis (Scoping review of literature methodological framework). Overall, the research results showed that remote forensic auditing techniques, remote forensic software and hardware tools are able to highlight and address the weakness areas of internal controls and audits. The conclusion was arrived at because the results from 25 published studies in the area of the nature of fraud schemes committed during the outbreak of the COVID 19 crisis. It also presented several benefits

of using remote forensic techniques, remote forensic software and hardware tools to address the challenges by internal auditors in handling the detection of fraud schemes and voluminous of digital evidences during pandemic levels and beyond in the remote workforce. The study was limited in that it reviewed only 25 peer reviewed articles and five electronic databases. This study adopted secondary data analysis through systematic literature review and all limitations linked to this methodology apply to this research. Hence, future research could be conducted using qualitative and quantitative approaches to overcome the limitations this study encountered. Our review on the literature examining technology acceptance theories and digital realities in accounting education was only limited to prior studies published in English. Any future study, could also consider literature published in French and other languages to fill the research gap. The study has highlighted remote forensic auditing capabilities through the use of forensic software and hardware tools in remote evidence acquisition. This study contributed the knowledge by providing valuable insights for practitioners and policymakers and academia. This study also proposes a *remote forensic auditing framework* to assist all auditors to deepen their remote and digital forensic investigation and guide future scholars to further on the subject matter in the areas that were not addressed by this research.

In light of the research results of the review outcome of the 34-peer reviewed and published studies, the researcher recommend the following:

- Internal audits to turn to technology to help identify the frauds that are occurring in the new remote working world.
- The use of artificial intelligence or forensic data analytics to identify fraud in their operations.
- The use of remote forensic software and hardware in handling challenges experienced by auditors in remote workforce.
- Remote forensic analysis is highly needed and bringing together, fraud detectives, data scientists and forensic auditors to uncover the warning signals in entities' financial data in a remote workforce.
- The use time tracking software to monitor employees and their productivity.
- Offer company-issued devices and home office equipment to reduce data theft and ensure safe remote working environment.
- Develop new approaches, refine priorities, controls and creating new policies that are better aligned with a remote workforce to deter, detect mitigate fraud risks.
- Build modern safer strategies and more sustainable remote working environment that will protect against fraud risks even post COVID 19.
- Remote monitoring and audit are extremely difficult, but previous audit and compliance plans are highly needed to be updated to address the changing fraud risks and heightened threats landscape. Therefore, entities should, where possible, resist the inclination to cut the lines of defence.
- The need to audit remotely because of work from home mandates imposed on auditors and their clients does not change that external auditors are required by auditing standards to be professionally sceptical, assess the risk of fraud throughout the course of audit engagement and alert the conditions that may indicate a possible

misstatement due to fraud or error and to perform a critical assessment of audit evidence.

- Allowing remote access by auditors and oversight bodies to all entity's records to ensure that audits can continue despite restrictions on carrying out physical inspections and paper-based reviews must be key to being able to demonstrate to stakeholder's professionalism's robust response to fraud risk in a remote working environment.
- Creating Digital and easily accessible tools to allow forensic auditors to track all emergency records and transactions remotely.
- Expanding existing e-procurement platforms
- Auditors need to adapt to real-time audit, quickly improvising new approaches and take a risk-based approach.

7 References

- Aarvik, P. 2020. Blockchain as an anti-corruption tool. Case examples and introduction to the technology. U4 Issue 2020:7. Bergen: U4 Anti-Corruption Resource Centre, Chr. Michelsen Institute.
- ACFE (2020). Fraud in the Wake of Covid-19: Benchmarking Report.
- Adio-Moses, M. (2021). The impacts of COVID-19 on audit practices.
- Ahmad, T. J. A. a. S. (2020). Corona virus (covid-19) pandemic and work from home: Challenges of cybercrimes and cybersecurity. *Available at SSRN 3568830*.
- Albitar, K., Gerged, A. M., Kikhia, H., & Hussainey, K. (2020). Auditing in times of social distancing: the effect of COVID-19 on auditing quality. *International Journal of Accounting*, 6(1), 1-10.
- Alderman, J. J. E. J. P. o. I. E. C. d. t. C.-P. (2021). How Do Remote Audits Impact Auditor Liability Exposure? Exploring Jurors' Perceptions of Interview Evidence Collected during the COVID-19 Pandemic.
- Aldousari, S. S., & Ickes, W. (2021). How is Machiavellianism related to locus of control?: A meta-analytic review. *Personality and Individual Differences*, 174, 110677.
- Al-Jabali, W., S., A. (2020). The impact of the spread of the Coronavirus COVID-19 pandemic on preparing and reviewing financial statements - a field study. *The Scientific Journal of Accounting Studies*, Issue 1, 1145-1205.
- Al-Tahan, I., M., & Abdel, E. A. M. (2020). The current and potential impacts of the Corona virus outbreak on the financial reporting environment in light of international and Egyptian accounting standards: an exploratory study. *Alexandria Journal of Accounting Research*, Faculty of Commerce - Alexandria University, 4(2) , 296-379.
- Amundsen, I. (2020). Covid-19, cash transfers, and corruption. *U4 Brief*, 9. U4 Brief 2020:9, Chr Michelsen Institute, available from <https://www.u4.no/publications/covid-19-cash-transfers-and-corruption.pdf>, accessed on 23/01/2021
- Andon, P., & Free, C. (2020). Strain, coping and sustained fraud offending. *Trends Issues in Crime Criminal Justice*. (596), 1-14.

- Appelbaum, D., Budnik, S., & Vasarhelyi, M. J. T. C. J. (2020). Auditing and Accounting During and After the COVID-19 Crisis. *90*(6), 14-19.
- Arksey, H., & O'malley, L. (2005). Scoping studies: towards a methodological framework. *International journal of social research methodology*, *8*(1), 19-32.
- Arndt, C., Davies, R., Gabriel, S., Harris, L., Makrelov, K., Robinson, S., ... & Anderson, L. (2020). Covid-19 lockdowns, income distribution, and food security: An analysis for South Africa. *Global Food Security*, *26*, 100410.
- Association of Certified Fraud Examiners (ACFE), 2021. Report to the Nations on Occupational Fraud and Abuse. *22*(2), 151-205.
- Ayers, D. J. d. i. (2009). A second generation computer forensic analysis system. *digital investigation*, *6*, S34-S42.
- Ayers, R., Brothers, S., & Jansen, W. (2014). Guidelines on mobile device forensics (NIST SP 800-101r1; p. NIST SP 800-101r1). National Institute of Standards and Technology.
- Biondi, C.-A. (2024). Aristotle, Egoism, and the Common Advantage. In *Principles and Praxis in Ancient Greek Philosophy* (pp. 295-319): Springer.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, *3*(2), 77-101.
- Burger, P., & Calitz, E. J. S. A. J. o. E. (2021). Covid-19, Economic Growth and South African Fiscal Policy. *89*(1), 3-24.
- Carlson, R. W., Adkins, C., Crockett, M. J., & Clark, M. S. (2022). Psychological selfishness. *Perspectives on Psychological Science*, *17*(5), 1359-1380.
- Carrier, B., & Spafford, E. H. (2003). Getting physical with the digital investigation process. *International Journal of digital evidence*, *2*(2), 1-20.
- Casey, E. (2011). *Digital evidence and computer crime: Forensic science, computers, and the internet*. Academic press.
- Casey, E., Ferraro, M., & Nguyen, L. (2009). Investigation delayed is justice denied: proposals for expediting forensic examinations of digital evidence. *Journal of forensic sciences*, *54*(6), 1353-1364.
- Castka, P., Searcy, C., & Mohr, J. J. J. o. C. P. (2020). Technology-enhanced auditing: Improving veracity and timeliness in social and environmental audits of supply chains. *258*, 120773.
- Chairman Jay Clayton, *The Deep and Essential Connections Among Markets, Businesses, and Workers and the Importance of Maintaining those Connections in our Fight Against COVID-19* (January 24, 2020), available at <https://www.sec.gov/news/public-statement/statement-clayton-covid-19-2020-03-24>.
- Chawki, M. (2021). *Cybercrime in the context of COVID-19*. Paper presented at the Intelligent Computing: Proceedings of the 2021 Computing Conference, Volume 3.
- Christian, N., Basri, Y., & Arafah. (2019). Analysis of fraud triangle, fraud diamond and fraud pentagon theory to detecting corporate fraud in Indonesia. *The International Journal of Business Management*

- Cohen, F. (2009). Two models of digital forensic examination. In *2009 Fourth International IEEE Workshop on Systematic Approaches to Digital Forensic Engineering* (pp. 42-53). IEEE.
- Cohen, M., Garfinkel, S., & Schatz, B. (2009). Extending the advanced forensic format to accommodate multiple data sources, logical evidence, arbitrary information and forensic workflow. *digital investigation*, 6, S57-S68.
- Coman, I., & Mihai, I.-C. (2022). The Impact of COVID-19 on Cybercrime and Cyberthreats. *Special Issue 5 Eur. L. Enft Rsch. Bull.*, 61.
- Culea, M. S., & Constantin, D. J. O. U. A., Series Economic Sciences. (2021). Covid-19 Crisis and the New Challenges for Supreme Audit Institutions Management. *21*(1).
- Curristine, T., Doherty, L., Imbert, B., Rahim, F. S., Tang, V., & Wendling, C. (2020). Budgeting in a Crisis: Guidance for Preparing the 2021 Budget. *IMF Special Series on COVID-19*, 1, 1-10.
- Dalton, D. W. (2021). The effects of machiavellianism and ethical environment on whistle-blowing across low and high moral intensity settings. In *Advances in Accounting Behavioral Research* (pp. 29-49): Emerald Publishing Limited.
- de Villiers, C., Cerbone, D., & Van. (2020). The South African government's response to COVID-19. *Journal of Public Budgeting, Accounting & Financial Management*.
- Delic, A., & Zwitter, M. (2020). Opaque Coronavirus Procurement Deal Hands Millions to Slovenian Gambling Mogul.". In: OCCRP.
- Deloitte. (2021). COVID-19 and Fraud Risk: Managing and responding to the risks of fraud in times of crisis.
- Diab, A. (2021). The implications of The Covid-19 Pandemic for The Auditing and Assurance Processes. *Journal of Legal, Ethical. Digital Forensics*. 13(4), 403-417.
- Dubey, H., Bhatt, S., & Negi, L. (2023). Digital Forensics Techniques and Trends: A Review. *The International Arab Journal of Information Technology (IAJIT)*, 20(4), 644-654.
- E&Y Technical Line – Accounting and reporting considerations for the effects of the coronavirus outbreak (March 2020)
- Eriş, F. G., & Akbal, E. (2021). Forensic Analysis of Popular Social Media Applications on Android Smartphones. *Balkan Journal of Electrical and Computer Engineering*, 9(4), 386-397.
- Eulerich, M., Wagener, M., & Wood, D. A. J. A. a. S. (2021). Evidence on Internal Audit Effectiveness from Transitioning to Remote Audits because of COVID-19.
- Evans, C. D. (2020). Forensic Accounting and Fraud Deterrence. In *Corporate Fraud Exposed*: Emerald Publishing Limited.
- Eyisi, A., & Ezuwore. (2014). The impact of forensic auditors in corporate governance. *Research Journal of Finance Accounting*. 5(8), 31-39.
- Gao, Y., Richard III, G. G., & Roussev, V. (2004). Bluepipe: A scalable architecture for on-the-spot digital forensics. *International Journal of Digital Evidence*, 3(1), 1-18.
- GiveDirectly. (2020). We're responding to COVID-19 internationally.
- Glencorse, B. (2020), Why Tackling Corruption Is Crucial to the Global Coronavirus Response, WPR,

<https://www.worldpoliticsreview.com/articles/28689/why-tackling-corruption-is-crucial-to-the-globalcoronavirus-response> (accessed on February 29, 2021).

- Goldsworthy, D., Sunmmersgill, K., Karneback, Shoko, E., Jahan, M., Wille, S. Amayo, D.S., and Barry,(2020), Accountability in a Time of crisis: How Supreme Audit Institutions and Development Partners Can Learn from Previous Crisis and Ensure Effective responses to Covid-19 in Developing Countries, INTOSA.
- Guirakhoo, A. J. D. S. (2020). How cybercriminals are taking advantage of COVID-19: Scams, fraud, and misinformation. 12.
- Gurazada, S., Kristensen, J.K., Sjoblom, M.C., Piatti, M. and Farooq, K. 2020. Getting government financial management systems COVID-19 ready. World Bank Blogs.
- Hedley, T. P., & Girgenti, R. H. J. J. o. F. C. (2021). The forensic professional's perspective on fraud and fraud detection. 5(1), 85-93.
- Homem, I. (2018). *Advancing Automation in Digital Forensic Investigations* (Doctoral dissertation, Department of Computer and Systems Sciences, Stockholm University).
- Horsman, G. (2021). Digital evidence and the crime scene. *Science & Justice*, 61(6), 761-770.
- Horsman, G., & Sunde, N. (2022). Unboxing the digital forensic investigation process. *Science Justice*.
- Ibrahim, Mohamed Zidan and Mohamed Abdel Moneim Zayed 2020. The accounting implications and implications of the Coronavirus (COVID-19) crisis - An analytical view from an accounting perspective. *Alexandria Journal of Accounting Research*, Faculty of Commerce - Alexandria University, 4(2) ,1-28.
- Jain, N., Bhanushali, N., Gawade, S., & Jawale, G. (2017). Physical and Cyber Crime Detection using Digital Forensic Approach: A Complete Digital Forensic Tool. *Int. J. Adv. Res. Ideas Innov. Technol*, 3(1), 834-841.
- Johnson, J. J. T. F. E. (2020). Vegas trips and Lamborghinis: How fraudsters defrauding government stimulus programs are being caught. 18.
- Jones, D. N., & Mueller, S. M. (2021). Is Machiavellianism dead or dormant? The perils of researching a secretive construct. *Journal of Business Ethics*, 1-15.
- Kaka's. (2021). Covid-19 and auditing. *Journal of Applied Accounting and Taxation*
- Kashyap, V. (2020). Remote audit during and beyond COVID 19. The 50th World Continuous Auditing and Reporting Symposium. November 6&7, 2020.
- Kashyap, V. (2020). *Remote Audit During and Beyond COVID-19*. Paper presented at the 50th World Continuous Auditing & Reporting Symposium. <http://raw.rutgers.edu/50WCARS/Presentations/50th%20WCAR>.
- Kaur, P., Awasthi, A., & Bijalwan, A. (2021). Evaluation of feature selection techniques on network traffic for comparing model accuracy. *International Journal of Computational Science and Engineering*, 24(3), 228-243.
- Keller, M., & Lorenz, T. J. N. Y. T. (2020). Coronavirus spurs a wave of suspect websites looking to cash in. 24.

- Khamainy, A. H., Ali, M., & Setiawan, M. A. J. J. o. F. C. (2021). Detecting financial statement fraud through new fraud diamond model: the case of Indonesia.
- Khasiani, K., Khoshima, y., Mfombouot, A. and Singh, A., (2020), Budget Execution Controls to Mitigate Corruption Risk in Pandemic Spending, IMF, Fiscal Affairs
- Kopp, K., & Grottko, M. (2020). Essays on Fraud and Forensic Accounting- Research from a German Accounting Perspective.
- KPMG. (2020). Fraud Risk Management.
- KPMG. (2021). Global profiles of the fraudster
- Kupperman Thorp, T. (2020), "To Defeat the Coronavirus, Stop Corruption", <https://foreignpolicy.com/2020/04/06/defeat-coronavirus-stop-corruption-humanitarian-crisisdisaster-response-emergency-medical-supplies/> (accessed on 19 January 2021).
- Lein, J. K. (2012). Forensic remote sensing. In *Environmental Sensing* (pp. 279-301). Springer, New York, NY.
- Levi, M., & Smith, R. G. J. J. o. F. C. (2021). Fraud and pandemics.
- Levy, H. B. J. T. C. J. (2020). Financial reporting and auditing implications of the COVID-19 pandemic. *90(5)*, 26-33.
- Lewulis, P. (2021). Digital forensic standards and digital evidence in Polish criminal proceedings. An updated definition of digital evidence in forensic science. *International Journal of Electronic Security*
- Ma, K. W. F., & McKinnon, T. (2021). COVID-19 and cyber fraud: Emerging threats during the pandemic. *Journal of Financial Crime*, *29(2)*, 433-446.
- Martinelli, M., Friedman, A. E., & Lanz, J. J. T. C. J. (2020). The impact of COVID-19 on internal audit. *90(6)*, 60-63.
- Mike, M. E. E., & Olochukwu, A. P. (2022). The use of artificial intelligence in forensic auditing: opportunities and challenges. *ACHIEVERS JOURNAL OF SOCIAL AND MANAGEMENT SCIENCES*, *1(2)*, 164-179.
- Murrar, F. (2021). Fraud schemes during COVID-19: a comparison from FATF countries. *Journal of Financial Crime*, *ahead-of-print*(ahead-of-print). doi:10.1108/JFC-09-2021-0203
- Ogundokun, R. O., & Ogundokun, O. E. (2021). A Survey on Forensic Accounting. In *Encyclopedia of Organizational Knowledge, Administration, and Technology* (pp. 35-44): IGI Global.
- Padovani, E., Iacuzzi, S., Jorge, S., & Pimentel, L. (2021). Municipal financial vulnerability in pandemic crises: a framework for analysis. *Journal of Public Budgeting, Accounting & Financial Management*. (2021). Municipal financial vulnerability in pandemic crises: a framework for analysis.
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., . . . Moher, D. (2021). Updating guidance for reporting systematic reviews: development of the PRISMA 2020 statement. *Journal of clinical epidemiology*, *134*, 103-112.
- Papadopoulou, S., & Papadopoulou's. (2020). The accounting profession amidst the COVID-19 pandemic. *International Journal of Accounting Financial Reporting*. *10(2)*, 39.

- Patel, A., Sharma, P., & Dholariya, D. (2021). A Forensic Evidence Recovery from Android Device Applications. *International Journal of Scientific Research in Science, Engineering and Technology*, 3(4), 135-140.
- Pathak, S. K., Pathak, S. K., & Gupta, A. K. (2015). Digital Forensic and Cloud Computing. *EDITORIAL BOARD CONTENTS*, 140.
- Picciotti, D. J. Q. (2020). Remote Quality Management System Audits: An ISO 9001 Auditor's Perspective and Lessons Learned. *59*(13), 52-55.
- Pilli, E. S., Joshi, R. C., & Niyogi, R. (2010). Network forensic frameworks: Survey and research challenges. *digital investigation*, 7(1-2), 14-27.
- Powers, T., & Bannen, E. J. G. W. (2020). Overcoming the Challenges of Remote Auditing During the COVID-19 Crisis.
- [PwC In depth No. Us 2020-02 FAQ on accounting for COVID-19 and market volatility](#) (February 2, 2021).
- Quick, D., & Choo, K. K. R. (2014). Impacts of increasing volume of digital forensic data: A survey and future research challenges. *Digital Investigation*, 11(4), 273-294.
- Ramantha, I. W. (2020). Fraud pentagon theory in detecting financial perception of financial reporting with good corporate governance as moderator variable. *International research journal of management, IT social sciences*. 7(1), 84-94.
- Ramkumar, V., (2020), Overpromising and underperforming budgets during Covid-19: Possible Solutions, IMF Public Finance Management blog, internet, available from <https://blog-pfm.imf.org/pfmblog/2020/07/-overpromising-and-underperforming-budgets-during-covid-19-possible-solutions-.html>, accessed on January 4, 2022.
- Roux, C., & Weyermann, C. (2020). Can forensic science learn from the COVID-19 crisis?. *Forensic science international*, 316, 110503.
- Rudnicka, A., Newbold, J. W., Cook, D., Cecchinato, M. E., Gould, S., & Cox, A. L. (2020). Eworklife: Developing effective strategies for remote working during the COVID-19 pandemic. In *Eworklife: developing effective strategies for remote working during the COVID-19 pandemic*. The new future of work online symposium.
- Ruiz, D. (2020). Coronavirus scams, found and explained. *Malwarebytes blog*, 19.
- Ruiz, D. J. M. B. (2020). Coronavirus scams, found and explained. 19.
- Sachdev, H., & Wimmer, H. (2018). A Digital Forensic Tool for Mobile Devices: Paraben. *Management*, 16, 18.
- Sachdev, H., & Wimmer, H. (2018). A Digital Forensic Tool For Mobile Devices: Paraben. *Management*, 16, 18.
- Salazar, C. (2020), "Monitoring COVID-19 emergency procurement with data", *Open Contracting Partnership Blog*, Open Contracting Partnership, <https://www.opencontracting.org/2020/03/25/monitoring-covid-19-emergency-procurement-with-data/> (accessed on 14 April 2022).
- Sampana, S. S. (2019). FoRCE (Forensic Recovery of Cloud Evidence): A digital cloud forensics framework. In *2019 IEEE 12th International Conference on Global Security, Safety and Sustainability (ICGS3)* (pp. 212-212). IEEE.

- Scanlon, M. (2009). *Enabling the remote acquisition of digital forensic evidence through secure data transmission and verification*. University College Dublin (Ireland).
- Scanlon, M., & Kechadi, M. T. (2009). Online acquisition of digital forensic evidence. In *International Conference on Digital Forensics and Cyber Crime* (pp. 122-131). Springer, Berlin, Heidelberg.
- Serag, A. A. E.-m., & Daoud's. (2021). Remote Auditing: An Alternative Approach to Face the Internal Audit Challenges During The COVID-19 Pandemic. *25(2)*, 228-259.
- Shaghghi, A., Kanhere, S. S., Kaafar, M. A., Bertino, E., & Jha, S. (2018). *Gargoyle: A network-based insider attack resilient framework for organizations*. Paper presented at the 2018 IEEE 43rd Conference on Local Computer Networks (LCN).
- Shobana, G. (2021). The State of the art tools and techniques for remote digital forensic investigations. In *2021 3rd International Conference on Signal Processing and Communication (ICPSC)* (pp. 464-468). IEEE.
- Shobana, G. (2021). *The State of the art tools and techniques for remote digital forensic investigations*. Paper presented at the 2021 3rd International Conference on Signal Processing and Communication (ICPSC).
- Sree, T. R., & Bhanu, S. M. S. (2020). *Data Collection Techniques for Forensic Investigation in Cloud*. Paper presented at the Digital Forensic Science.
- Steingrüber, S., Kirya, M., Jackson, D., & Mullard, S. J. U. A. R. C. U. B. (2020). Corruption in the time of COVID-19: A double-threat for low income countries. *Technology*. *3(4)*, 1-6.
- Sucharew, H., & Macaluso, M. (2019). Methods for research evidence synthesis: the scoping review approach. *Journal of hospital medicine*, *14(7)*, 416-418.
- Tarsney, C. J. (2023). Average utilitarianism implies solipsistic egoism. *Australasian Journal of Philosophy*, *101(1)*, 140-151.
- Teeter, R. A., Alles, M. G., & Vasarhelyi, M. A. J. J. o. E. T. i. A. (2010). The remote audit. *7(1)*, 73-88.
- Thompson, P., & Manning, M. (2021). Missed Opportunities in Digital Investigation. In *Cybersecurity, Privacy and Freedom Protection in the Connected World* (pp. 101-122): Springer.
- Thompson, T. J. U., Collings, A. J., Earwaker, H., Horsman, G., Nakhaeizadeh, S., & Parekh, U. (2020). Forensic undergraduate education during and after the COVID-19 imposed lockdown: Strategies and reflections from India and the UK. *Forensic Science International*, *316*, 110500.
- Tilley, J. J. (2022). Does Psychological Egoism Entail Ethical Egoism? *The Review of Metaphysics*, *76(1)*, 115-133.
- Trifonov, R., Tsochev, G., Manolov, S., Yoshinov, R., & Pavlova, G. (2021, July). Cyber Trends in Industrial Control Systems. In *2021 25th International Conference on Circuits, Systems, Communications and Computers (CSCC)* (pp. 41-45). IEEE.
- Tysiac, K. J. J. o. A. (2020). Remote auditing comes to forefront during pandemic. 36-40.

- Tysiac, K. J. J. o. A. (2020). Remote auditing comes to forefront during pandemic. 36-40.
- Umamaheswari, K., & Shobana, G. (2021). *A defensible role-based case management system for remote forensic investigation*. Paper presented at the 2021 International Conference on Computing, Communication, and Intelligent Systems (ICCCIS).
- Vittori, J. (2020), *Corruption Vulnerabilities in the U.S. Response to the Coronavirus*, CARNEGIE, <https://carnegieendowment.org/2020/03/20/corruption-vulnerabilities-in-u.s.-response-to-coronavirus-pub-81336> (accessed on 19 April 2022).
- Wangchuk, T., Tshering, Y., Mandela, N., & Rughani, P. (2024). Forensic analysis of Scientific Linux image using commercial and opensource forensic tools. *Journal of Applied Engineering, Technology and Management*, 4(1).
- Wendling, C., Alonso, V., Saxena, S., Tang, V., and Verdugo, C., (2020), Keeping the Receipts: Transparency, Accountability and Legitimacy in emergency responses, Special Series on Fiscal responses to Covid-19, IMF Fiscal Affairs.
- Widiyati, D., Valdiansyah, R. H., Meidijati, M., & Hendra, H. J. G. R. o. A. R. (2021). The Role of Public Accountants in Fraud Prevention and Detection in the Taxation Sector during Covid-19. 1(2), 70-82.
- Zirkle, J. (2020). Coronavirus fraudsters add to the anxiety and misery. In.