Effect of ICT Infrastructure on Audit and Assurance Performance in Nigeria

AGBOLA, Oyeniyi Joshua

Department of Accounting,
Bingham University,
Karu, Nasarawa State
E – Mail: agbolaoyeniyi@gmail.com, Phone No: +234 8034446183

Abstract

The objective of this study is to determine the effect of ICT infrastructure on audit and assurance performance in Nigeria. The study is to increase the understanding of the effects digitalization has on the tools and working methods of the audit profession. This journal assesses the technologies having most impact on the audit profession as we know it today. Drawing on existing research and exploring the views of leading practitioners, it provides an understanding of how the changing business environment is shaping technological change in auditing. It also provides a unique summary of how different technologies could be expected to impact its future. The study provides insights for both businesses and auditors themselves on how they may adapt most effectively in the face of this significant change. The technology has caused a lot of disruption in the business which auditor is expected to embrace in order to perform their duties as expected.

Keywords: ICT infrastructure, Disruption, Audit and Assurance, Digitization

INTRODUCTION

The technology has changed the way we interact with the rest of the world. This change reflects in the way we work, communicate, shop, bank, travel, learn, govern, manage our health and enjoy ourselves. The advent of innovation like the Web and digitized content led this change. The concept of digitalization is not necessarily new. Some organizations have used technology to gain unprecedented levelsof operational efficiency and improve profitability. This technology has also led to the increase in market share of some companies. Organizations across sectors are being revolutionized by the digital transformation bug. For the auditors to cope with this technological transformation there is an urgent need for the auditors to embrace these technologies in order to remain relevant in today's world. It would not be possible to audit a company that you do not understand their mode of operation. The disruption in the business sector is currently being triggered by the advent of the technology like Robotic process automation, data analytics, artificial intelligence, machine learning, distributed ledger technology to name but a few: These ICT infrastructures are already having and will continue to have an indelible impact on the audit process. Technology of course is never the panacea to resolving all the current challenges in audits, or conversely seizing all of its future opportunities. These ICT infrastructures are catalyst that will help shift the focus of the audit process from a retrospective view to one which is prospective, enabling much deeper insights to clients and anenriched narrative on corporate performance and its sustainability for the future. Yet it is the nexus of emerging technology with human endeavour, skill and judgement where real future value from auditing will be unlocked. Digitalization could have profound implications on how auditors conduct their activities, as well as potentially raising new ethical and moral considerations.

This article assesses the ICT Infrastructures having most impact on the audit and assurance. Drawing on existing research and exploring the views of leading accounting and auditing professionals, it provides an understanding of how the changing business environment is shaping technological change in auditing. It also provides a unique summary of how different technologies could be expected to impact its future. We hope it also provides insights for both businesses and auditors themselves on how they may adapt most effectively in the face of this significant change. The advent of Covid-19 disrupted most professions across the globe with accounting and auditing being no exception. Mandatory lockdown measures were imposed by governments to control the spread of the virus, with individuals having to work from home

where possible. For auditors, this means they can no longer travel toperform their auditing task, nor to their own offices and this implies that their audits will have to be completed remotely. If there is a positive side to this significant challenge for auditors, it is that the audit profession was already on a journey to becoming more digital, and the investment in digital capability has allowed many firms and practitioners to adapt to the new circumstances relatively more quick than other industries. Notwithstanding this, a number of practical challenges have emerged. The paper also refers to useful links published by regulators, standard setters and by other relevant stakeholders.

LITERATURE REVIEW

Conceptual Clarifications

Audit and Assurance

In its modern sense according to Emile woolf, 1997, an audit is a process (carried out by suitably qualified auditors) whereby the auditors of business entities, including limited companies, charities, trusts and professional firms, are subjected to scrutiny in such details as will enable the auditors to form an opinion at to their truth and fairness. The opinion is then embodies in an audit report, addressed to those parties who commissioned the audit or to whom the auditors are responsible under statute. Auditing can also be defined as a systematic and a scientific examination of the books of accounts and financial statements of a company. It is a critical review of the system of accounting and internal control. Auditing is performed with the help of source documents, vouchers and explanations received from third parties. Auditing is undertaken by an independent qualified accountant. An auditor must be a qualified accountant who has a thorough knowledge of general principles of law, taxation and computer information systems. An auditor is recommended by directors but appointed by shareholders.

Assurance is defined by Merriam-Webster as the state of being assured: such asbeing certain in the mind, confidence of mind or manner, easy freedom from self-doubt or uncertainty. The key difference between Audit andAssurance is that Audit is the systematic examination of the books of accounts and the other documents of the company to know that whether the statement shows true and fair view of the organizations, whereas, the assurance is the process in which the different processes, procedures and the operations of the company are analyzed.

Deep Learning (DL)

Deep Learning is a subset of Machine Learning. This technology closely mimics human learning through the use of artificial neural networks to perform more complex tasks such as visual object recognition. The best known example is Google's AlphaGo, which mastered Go, a game which exceeds chess in intellectual complexity and where it was thought that computers could never match the best human players. Unlike previous programs, which learned winning strategies from databases of previous games, AlphaGo taught itself and not only defeated its human opponent but also used highly inventive winning moves, which –according to Demis Hassabis, CEO of the Google subsidiary DeepMind, which created AlphaGo 'were so surprising they overturned hundreds of years of received wisdom' (Hassabis 2017). DL systems are commercially available and have already been deployed by the Big Four accountancy firms: KPMG uses IBM's Watson to analyse commercial mortgage loan portfolios, while Deloitte works with Canadian-based legal AI company, Kira Systems to 'read' thousands of complex documents, such as contracts, leases and invoices, extracting and structuring textual information such as key words or phrases. In the era of Big Data, the structured information accessible to auditors is only a fragment or an abstraction of the much wider universe of data. But this 'dark matter' exists in unstructured formats: the ability of DL to analyse a range of internal and external sources means that Big Data can potentially supply complementary audit evidence and feed into the narrative requirements of audit.

For instance, content analysis of social media postings and news articles could inform auditors of potential litigation risk, business risk, internal control risk, or risk of management fraud…auditors may

identify troublesome products or services by analyzing customers' reviews sentiment scores of the Q&A section of earnings conference calls can help the auditor predict internal control material weakness' (Sun and Vasarhelyi 2018). Used in audit, DL potentially goes beyond merely extracting set words or phrases or even what has been explicitly said: 'auditors interview management, internal auditors, employees, predecessor auditors, bankers, legal counsel, underwriters, analysts, or other stakeholders. The language that subjects use and how they respond to questions over the course of the interview can be just as important as the answers themselves, because they may indicate deception. For example, the use of terms that suggest uncertainty, such as "kind of," "maybe," or "sort of," as well as response latency, could be signs of concealment or falsification' (Sun and Vasarhelyi 2017).

Drone Technology, Internet of Things and Sensor Technologies

Drones are machine like technology used for surveillance and others special functions. Unmanned drones are used in a variety of commercial projects, such as power line inspection, and the Big Four accountancy firms have spotted the potential for their use in inventory inspection, particularly where physical scale or distribution is an issue. For example, PwC recently announced its first stock count audit – of an open cast mine – using drone technology (PwC 2019). Drones are the aerial component of the Internet of Things, the constantly growing number of devices and sensors connected via IP (internet protocol). An example of a sector that is ripe for the adoption of such technologies in audit and assurance is agriculture.

Distributed Ledger Technology (DLT)

DLT, is part of technologies like blockchain, which is of great interest to both auditors and businesses. Distributed Ledger Technology ensures that 'in a distributed ledger all participants are looking at a common view of the records (ACCA 2017), which are validated without the need for a central authority for this purpose. 'So if the majority of participants agree that an update has been correctly validated, that becomes the basis for the updated entry to be added to the ledger.' (ACCA 2017a). For businesses, the attraction of DLT is that it greatly enhances performance in areas where inefficiencies are introduced by the so-called 'efficiency visibility' and 'trust' deficits. Examples include the inefficiencies and delays involved in setting up trade finance, the need to establish trust via 'know your customer'/'customer due diligence' (KYC/CDD) requirements in finance and banking or the lack of visibility in the global garment supply chain are all key areas for distributed ledger applications. For the auditor, distributed ledgers become a sort of universal bookkeeping service, removing the need to reconcile multiple databases of records and providing a perfect audit trail. A key principle of DLT is immutability: historical entries cannot be changed, only corrected with a balancing entry. While this may help auditors to test audit assertions such as occurrence and cut-off, it does not remove the need for higherlevel auditor judgements. Transactions may exist outside the ledger and, while those recorded are unlikely to be false, they still may not be legitimate. The auditor therefore needs to combine the ledger information with judgements based on accounting principles and an understanding of the nuances applicable to ownership and valuation. For auditors, DLT offers the possibility of generating exception reports that are based on all transactions rather than on using sampling techniques – a return to the roots of auditing. Today's audit cycles could potentially be replaced by more frequent or even continuous, real-time, audit. This is likely to release resources and provide the material for a deeper and more contextual understanding of the business, as required for the production of extended audit reports. However, this is also likely to increase resources with specialised skills in DLT, at least in the short-term. While DLT may be supported by standardisation and automation of data collection – possibly via 'accounting-as-a-service' platforms – the removal of mundane tasks will bring the contribution of the auditor's judgement into stronger focus.

The report concludes that the auditor role may pivot towards non transaction management elements requiring human judgement, business context and knowledge of technical accounting policy and of the outputs created by the application of these elements to specific questions within the audit, for example the fair value of assets' (ACCA 2017a). As noted in CA ANZ's and Deloitte report The Future of Blockchain, 'Distributed ledger technology and blockchain are important innovations in themselves. But

there are many potential uses ahead, as augmenting these technologies with others can create novel applications' (CA ANZ and Deloitte 2017). The implications for audit as an industry suggest a reversal of the current model, in which largely predictable, high-volume work is charged on an input basis, with the attendant risks of commoditisation and low margins. Instead, the audit model could move towards a value-based charging model based on outputs: higher margins, fewer people and more high-end skills. It has even been claimed that blockchain will become the industry standard for accounting and reporting. According to Jon Raphael, audit chief innovation officer at Deloitte & Touche LLP: 'Blockchain has the potential to be very transformative. By itself, blockchain will likely change how records are maintained and how value is transferred between counterparties… 'Most compelling, however, is blockchain's potential for transformative analytic capabilities. One of the beneficial outcomes of blockchain is easy access to structured data which can then be used to generate advanced analytics and accelerate machine learning. This will enable tools to get smarter and drive us further and faster toward more continuous auditing and assurance' (Deloitte 2018).

Smart Contracts

Although DLT has mainly come to prominence for its use in underpinning cryptocurrencies such as Bitcoin, it originated in relation to smart contracts. A smart contract is self-executing: the terms are written into code which, like a Bitcoin, exists in a blockchain network and therefore shares the same characteristics. Smart contracts are literally anarchic in that they do not require external enforcement by any kind of central authority. Smart contracts therefore allow transactions to take place without any underlying basis of trust, or even anonymously. Suggested uses include land registers and trade finance. From this perspective, a cryptocurrency such as Bitcoin is just a minimal instance of a smart contract to transfer value from one person to another. More generally, a smart contract is just an instance of more general ability to generate code that executes exactly as its originators intended. For example, Ethereum, a smart contract platform that enables developers to build new decentralised applications ('dapps'), is a programmable blockchain that potentially has uses in many areas of finance, including audit. Of course, just because an app executes as intended does not mean that the intentions of those using it are good or correctly expressed, or that there may not be unintended consequences as programs automatically execute, as has happened on trading platforms. The audit of smart contracts themselves is a requirement, and is already a nascent industry. Blockchain is a system for dealing with information, and the effectiveness and resilience of platforms such as Ethereum is very much a factor of their size. The Big Four firms could conceivably set up blockchains for businesses or for entire industries; however, that would have potential implications for example, on auditor's rotation and independence. In regards to distributed ledger technology, we are not there yet in terms of real implementation in audit' Lukas Caputa, Senior Manager Risk Assurance, PwC Czech Republic

METHODOLOGY

In a bid to assess the effect of ICT Infrastructure on Audit and Assurance performance in Nigeria, the study utilized an exploratory approach, by focusing om some critical discussions on ICT Infrastructure on the one hand as well as Audit and Assurance performance in Nigeria on the other hand, so that the study objective can be clarified.

RESULT AND DISCUSSION

Effect of Change in The Technology to the Auditor

The auditor has to change some processes and procedures in order to cope successfully in this changing technological age. The operating model for the assurance function has to continuallyevolve to meet the needs of the "digital organization". This will require the leveraging of new technologies for optimized outcomes and equipping professionals with the requisite skills and knowledge to identify and manage emerging risks. Key digital trends such as cloud computing, APIs & ESBs, large data, robotics& analytics amongst other trends are areas that will require focus and knowledge acquisition for the assurance professionals.

Reason for Technological Change in Audit

Changes in Business Models

The changes in business models across most industries are the first hand disruptive changes that are affecting their auditors. These changes need to be distinguished from innovation and technology. The disruption was caused by technology and it creates innovation in business models, new ways of working in markets and new sources of value. Disruption can be enabled by technology. For example, a food delivery app such as JustEat or Deliveroo rests on some very basic underlying technology – kitchens, bicycles and a smartphone app – but puts them together in a way that radically changes the way users order food. There is disruption in transportation sector caused by technology which has revolutionized the sector. The application like uber, bolt and so on caused disruption in transportation business in Nigeria and the auditors of those company need to brace up to the challenges imposed by the technology. In order to remain relevant, auditors must be able to adapt to the changes in business models of their clients. These technological changes in businesses require the attention of audit professionals. Understanding how technologies such as Blockchain [and] Machine Learning work is necessary to enable auditors to assess and respond to the current and prospective risks of the organisations that place their trust in us the organization.

Increase in Volume of Data

The increase in the volume of transactions and data in businesses has increased over the period and is expected to keep increasing in the future. It has been estimated that over 90% of the world's data has been generated since 2016, and significant amounts of it are financial data (Marr 2018). This rapid increase in the volume of data requires auditors to be equipped with the latest available technological tools to analyse a much higher volume of data in their audits than has previously been the case.

Change from Manual Processing to Automation

Most companies have automated their processes. The most immediate impact of technology on the profession is in the automation or even elimination of manual and routine tasks. The movement is accelerated because it has multiple drivers. The movement to cloud-based accounting systems and the attendant standardisation of processes has made data more easily and more widely available, easier to move between systems, easier to manipulate and analyse, and less prone to corruption and errors. For example, where data cannot move seamlessly between systems, the use of robotic process automation (RPA) can remove the need for manual intervention to cover the 'last mile'. Despite this, there seems to be little appetite for 'human-free' audit – automation can reduce errors and spot patterns, but that merely provides the opportunity for individuals to exercise thought and judgement, and to bring into play other skills such as communication, persuasion and empathy. Auditors may find they are asked to look into fewer anomalies – but these will be the ones that count. It seems that the role of the auditor as filter, narrator and independent challenging voice remains secure.

Need For a Proactive Approach in Audit

The use of advanced technologies such as AI and ML, blockchain and data analytics promises a transformation in the audit profession, changing audit from a reactive and backward-looking exercise to a proactive, constant source of forward-looking insights that can be used all the time, with the auditor as the custodian and interpreter of the underlying data foundation. Even in its traditional context, technology now offers an opportunity to produce higher-quality audits that better serve for their existing purpose.

ICT Infrastructures that are Causing Disruption in Audit and Assurance

Businesses across almost every industry are experiencingdisruptive changes that are also affecting their auditors. Find below the advanced technologies that are impacting the audit and assurance profession.
In April 2019, ACCA surveyed members and affiliates about their understanding of terms such as artificial intelligence (AI), machine learning (ML), natural language processing (NLP), data analytics and robotic process automation (RPA). On average, 62% of respondents had not heard of it, or had heard the term but did not know what it was, or had only a basic understanding. On average, only 13% of respondents claimed a 'high' or 'expert level' of understanding of these terms. There's a need for greater awareness of what these technologies are and their implication for the audit profession.

Artificial Intelligence (AI)

AI is often described as 'an evolving technology' that is equipping computer systems with something akin to human intelligence, but it is better seen as an umbrella term for a group of technologies that can be combined in different ways,whether for driving your car, controlling your central heating, or managing your investment portfolio. It is also the subject of a large amount of hype, with 'humanlike intelligence' predicted to appear in 2029 (or whatever the current date is plus ten years) and either drastically reducing the workforce or destroying us all. The 'intelligence' in AI often constitutes a combination of processing power and access to data: for instance, a computer will play a game such as chess by analysing all the possible outcomes of a move, using datasets from past games and selecting the winning option. But that fact alone makes AI highly useful to people: it enables the analysis of entire populations of data to identify patterns or exceptions. Auditors are freed from mundane tasks and can focus their time on deploying their skills, training and judgement: although technology is making progress in areas such as speech processing and sentiment analysis, professional judgement is much harder to apply technology to.

Robotic Process Automation (RPA)

RPA is a software routine that are more like very sophisticated Excel spreadsheet macros than genuine AI. As highlighted in ACCA's joint report with CA ANZ and KPMG; Embracing robotic automation during the evolution of finance, 'RPA is software that can be easily programmed or instructed by end users to perform high-volume, repeatable, rules-based tasks in today's world where multiple loosely integrated systems are commonplace (ACCA et al. 2018). RPA is commonly used when the output of one financial process needs to be input into another, or where multiple sources of information need to be consulted. As a result, it is sometimes referred to as 'swivel chair automation', conjuring up the image of an employee swivelling their chair around as they consult multiple systems and re-key and check information. Such work is repetitive, mundane, time consuming and, when done by individuals, prone to error. It is also difficult to scale to cope with variations in workload. A classic example would be processing timesheet information from seasonally employed temporary staff.

One solution is to deploy or lease a 'robot', a software routine that precisely mimics the actions of the chair-swivelling person shifting between systems. Looking back to the timesheet example, the robot would take the information gathered by optical character recognition (OCR) from the paper records and feed it into the payroll system. Because it mimics a process rather than analysing data, RPA itself is not AI, which could be used later to look for the anomalies that previously a human operator might have had to spot. RPA offers many benefits: the robots work non-stop and are faster, more accurate and scalable. Nonetheless, there are also questions about accountability and ownership of the RPA process and security of the data that passes through. There is also the question of whether RPA simply perpetuates inadequate processes that should have been overhauled. We can distinguish between 'good RPA', which closes gaps and contributes to straight-through data processing and 'bad RPA', which simply disguises the flaws in obsolescent or badly implemented systems. In short, fix the process first before applying RPA.

Data Analytics

Data Analytics is an improved technology that allows the auditor to test 100% of the transactions. Some firms are already using data analytics as part of their transactions testing, gradually moving away from traditional sampling techniques. Analytical tools have long been applied to the data derived from accounting and operational systems. The use of Data Analytics makes the analysis of the past more insightful. Rather than sampling transactions data to test a snapshot of activities, we can now analyze all transactions processed, allowing us to identify anomalies and drill down on the items that show the greatest potential of being high risk. Our systems automate this process, increasing its ability to produce high quality audit evidence (KPMG 2015).

However, the UK Financial Reporting Council (FRC) has found that 'the use of data analytics in the audit is not as prevalent as the market might expect' (FRC 2017) and it is not yet used consistently across the entire ledger. Even where it is used – such as in journal entry testing, auditors will still need to consider the issue of completeness, as well as the increasing amount of corporate reporting that does not derive from transactions in the ledger. 'Being able to test 100% of a population does not imply that the auditor is able to provide something more than reasonable assurance opinion or that the meaning of "reasonable assurance" changes.'(IAASB 2016) The next step for auditors and finance is to apply AI and ML algorithms to improve the quality of analysis and forecasting, and increase the rate of fraud detection.

Machine Learning (ML)

With this technology, the entire transactions could be reviewed to assist the auditor to test for items that are outside the norm' (ACCA 2019b). Machine Learning uses statistical analyses to generate predictions or make decisions from the analysis of a large historical dataset. The major issue of the audit profession is the extreme proliferation of data, accompanied by a less extreme but nonetheless rapidly expanding volume of regulation. The rapid growth in the volume of financial transactions, if not properly managed, could pose a threat to the work of accountants. For auditors, this may relate to the sample they need and its ability to be representative of the population, enabling them to form conclusions that can be generalized beyond the sample' (ACCA 2019). A classic example would be credit scoring decisions for loans. The accounting software company Xero has implemented ML to make coding decisions for invoices. Machine Learning can achieve surprising levels of accuracy quite quickly: in the case of Xero's software, the system achieves 80% accuracy after learning from just four invoices. ML 'predictions' can be both backward and forward-looking. It has clear applications in risk management and the detection of fraud and inaccuracy by comparing historical data sets with current data, which can help with risk assessment. Or it can look forward, predicting, for example, the likely future value of an asset.

In practice, the usefulness of ML is crucially dependent on the data it 'learns'from. This means the possibility of bias is ever present. Examples have come tolight where ML has introduced bias into areas such as credit-scoring and CVassessment. The machine correctly sees that a previously excluded group had notcompleted many successful loan transactions or risen very high in management and wrongly concluded that the defining characteristics of those groups, such as gender, were predictors of poor future performance. An example using ML in audit can be found in PwC's report Confidence in thefuture: Human and machine collaboration in the audit report. As per this example'company A was way out of line with the peer group benchmarks on a particularpoint. This data is then shared with the audit team, who can decide whether thatvariance is really an anomaly and if so, what caused it.The team's decision about the anomaly and its cause is then fed back to themachine, which is 'taught' how to respond to similar relationships in future.And the more this exercise is carried out, the better the machine will get atspotting real anomalies — meaning we'll be better able to identify unusualpatterns and anomalies in huge amounts of data in an instant (PwC, 2017). The self-instructing nature of ML means that decision-making can often be a 'black box', with no one able to say precisely how decisions have been arrived at.There is also the danger that during the learning stage – when ML is shadowinghuman auditors – it will pick up any human errors and repeat them eternally.ML therefore needs to be validated in some way: it is a risk as well as a tool.This raises the possibility that the challenging and testing of internalalgorithms may become part of the external auditor's role, with a much widerremit than assessing accuracy: as the

Harvard Business Review comments:'the auditor's task should be the more routine one of ensuring that AI systemsconform to the conventions deliberated and established at the societal andgovernmental level' (Guszcza et al. 2018).

Natural Language Processing (NLP)

Natural Language Processing refers to the ability of the computer to recognise and understand human speech. These data and information may not be financials but could have impacts on the organization. This data could be anything from recordings of phone calls to board minutes or postings on social media, which are unstructured and therefore require an understanding of natural language. The most immediate impact is speed. NLP has been shown to achieve orders of magnitude improvements in due diligence exercises involving very large numbers of documents. In 2017 Forbes reported that Deloitte's use of NLP took contract review from a task keeping 'dozens' of employees occupied for half a year to one which six to eight members could complete in less than a month (Zhou 2017). Deloitte's Audit of the Future Survey found that 70% of audit committee members and other stakeholders believed that auditors should not only use advanced data analytics but consider information beyond traditional financial statements (Deloitte 2016).

Cloud Technologies

The rise of cloud-based systems goes back a long way: arguably, a mainframe computer connected to dumb terminals in regional offices represented an early form of 'cloud'. Now, a cloud system will be hosted remotely and accessed remotely by generic devices such as tablets, PCs or smartphones. The attractions of cloud systems are summed up in the ACCA report, The Race for Relevance: 'Compared with an organisation's own legacy physical infrastructure, cloud technologies provide high functionality at a low price point. The associated maintenance costs are also reduced cloud technology costs may be classed as operating expenditure rather than capital expenditure.' (ACCA 2017b). 'As well as the cost benefits, cloud storage can provide seemingly infinite capacity, with the business only paying for the space that it uses (ACCA 2017). 'One benefit of cloud is that it allows employees to work from anywhere in the world, which means that geographically dispersed teams can work on the same project in real time (ACCA 2017). However, cloud systems also force the organisation to adopt standardised processes: 'they need to adapt their business models and processes to suit these applications, rather than adapting the applications to suit their business models. Arguably, this is a benefit, preventing finance functions from unnecessarily overcomplicating their work and reducing the complexity for auditors when dealing with entities comprising different or multinational companies: even companies that have standardised their functions around a common ERP system are generally running multiple variations and lack the skill or the resource to create appropriate APIs between them. For cloud to be useful it must contain critical data, and a key benefit for audit is that organisations will increasingly be referring to a single data source, which updates for everyone, everywhere with no time lags or inconsistencies. This also comes with risks arising from the need to protect critical data and comply with relevant regulation. 'Cyber risk is one of the most talked-about business risks. In our increasingly disrupted world it is at the forefront of our minds.' (ACCA et al. 2019) While implementation of appropriate risk-mitigation strategies rests with the cloud provider, the risk itself remains with the data owner. In practice, however, many smaller entities argue that cloud vendors offer better security than, say, an in-house server. According to KPMG, auditors need to integrate more cyber security capability in the audits and rethink and re-evaluate their approach in providing assurance around cloud systems. 'This can be achieved by transforming audit approaches leveraging data analytics-driven procedures in order to address the less preventive controls in the system. In addition, the processing and storing of data in the cloud for cloud bases systems introduces new challenges around third party management and data security and confidentiality.' (KPMG 2018)

CONCLUSION AND RECOMMENDATION

It is very clear that ICT infrastructures have an indelible effect on Audit and Assurance performance in Nigeria. The recent technological advancement raises many questions about the future of audit, a number of which reflect some long-standing tensions.Technology offers the ability both to improve the quality of audit and to add value to it. The effect of ICT infrastructure is moving audit from being reactive and backward looking exercise to a proactive, predictive, forward-looking one, working in real time. As such, it provides further opportunity to help businesses through timely insights. Nonetheless, if Artificial intelligence, deep leaning, machine learning and other related technologies mentioned in this journal are fully implemented, it could raise questions about the auditor's independence. 'A quality audit requires the auditor to maintain independence at all times when performing the audit. At the same time, audit quality is enhanced by the closeness to an audited entity that is acquired through repeated involvement in the engagement.' (ACCA 2018).Data analytics seems to be the most mature of the advances in technology and is currently used in audit practice, particularly in journal entry testing. The Big Four accountancy firms are already expanding their use of data analytics in risk assessment as well as in testing revenue, receivables, payables, and salaries. Data analytics tools are also easily accessible by SMPs at a reasonable cost. Given the foregoing, the following recommendations are put forward;

- **i)** Auditors need to adapt to the changes in business models in order to remain relevant.
- **ii)** Auditor should strive to exploit the opportunities bring about by the technology,
- **iii)** The audit profession is still at a very early stage with AI and has not embedded it as deeply as it could.
- **iv)** In this technological advancement era, auditors need to maintain good relationship with the clients as everything can be replaced by technology.
- **v)** Auditors will need to be more adaptable to change in future.
- ***vi)*** Auditors need to be more technological incline and seek for training and retraining.

References

ACCA (2017a), Divided we Fall Distributed we Stand <https://www.accaglobal.com/content /dam/ACCA_Global/Technical/Future/Divided%20we%20fall%2C%20distributed%20w e %20stand%20%20The%20professional%20accountant%E2%80%99s%20guide%20to% 20distributed %20ledgers%20and%20blockchain.pdf>, accessed 1 June 2019.

ACCA_ {2019). Global/professional-insights/embracing-robotics/Embracing%20robotic%20 automation.pdf>, accessed 16 June 2019.

ACCA (2019b), Machine Learning: More Science than Fiction <https:// www.accaglobal.com /content/dam/ACCA_Global/professional-insights/machine-learning/pi-machine-learning - report.pdf>, accessed 1 June 2019.

ACCA, CA ANZ, KPMG (2018), Embracing robotic automation during the evolution of finance <https://www.accaglobal.com/content/dam/Deloitte (2016), Deloitte's Audit of the Future Survey Results [website] <https://www2.deloitte.com/content/dam/Deloitte/us/ Documents/audit/us-aers-audit-of-the-future.pdf>, accessed 1 June 2019.

Emile Woof, (1997). *Auditing Today, sixth edition*. Prentice hall, New York.

Finamore, E. and Dutta K (2014) 'Artificial Intelligence is 'summoning the demon' Independent 26 October <https://www.independent.co.uk/life-style/gadgets-and-tech/news/tesla-boss- elon-musk-warns-artificial-intelligence-development-is-summoning-the-demon-9819760 .html>,accessed 5 June 2019.

Hassabis, D. (2017), 'The mind in the machine: Demis Hassapis on artificial intelligence' Financial Times, 21 April <https://www.ft.com/content/048f418c-2487-11e7-a34a-538b4cb30025>, accessed on 1 June 2019.PwC (PricewaterhouseCoopers) (2019), PwC completes its first stock count audit using drone technology <https://www.pwc.co.uk /pressroom/press-releases/pwc-first-stock-count-audit-drones.html> accessed5 June 2019.

Sun, T, Vasarhelyi, M.A. (2017), 'Deep Learning and the Future ofAuditing: How an Evolving Technology Could Transform Analysis andImprove Judgment', CPA Journal, June <https://www.cpajournal.com/2017/06/19/deep-learning-future-auditing/>, accessed 1 June 2019

Sun, T. and Vasarhelyi, M.A. (2018), 'Embracing Textual Data Analytics inAuditing with Deep Learning',*International Journal of DigitalAccounting Research,* 18: 49–67 <http://rabida .uhu.es/ dspace/bitstream/handle/10272/14727/Embracing.pdf?sequence=2>, accessed 1 June 2019.

Zhou, A. (2017) EY, *Deloitte And PwC Embrace Artificial IntelligenceFor Tax And Accounting Forbes*, 14 November https://www.forbes.com/sites/adelynzhou/2017/11/14/ey-deloitte- and-pwc embraceartificial-intelligence-for-tax-and-accounting/#387d38493498accessed 5 June 2019.