

# Probing the Effect of Artificial Intelligence and Machine Learning on Accounting Functions (Evidence from Selected Companies)

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**Abstract:** Artificial intelligence technology has no doubt gained ground in the field of accounting and in the performance of several routine functions. This is going to be a growing phenomenon as the entire world continues to seek for ways to use and depend more on technology and machines to perform functions hitherto done by humans, especially with the new normal of remote work brought to the fore by the COVID-19 global pandemic. This study focuses on the impact of the adoption of artificial intelligence and machine learning technologies on the accounting functions of business organisations. Survey questionnaire in addition to qualitative literature review was used to gather data from respondents and analyse previous academic and professional works on the subject. The result of this study shows that, although artificial intelligence technology will be used to replace most programmable and monotonous accounting activities, AI will also create new opportunities for the upward mobile accounting professional to grow into more strategic and rewarding career path rather than just being a 'book keeper'. However in the case of companies in Nigeria specifically, the regression model is not significant since the probability value 0.846 is greater than 0.05 meaning that the null hypothesis is not rejected, implying that there is no significant statistical relationship between AI and accounting functions of Nigeria companies. The recommendation of this study is that accountants, business entities and relevant government agencies should seek for ways to profitably tap into new growing arena of artificial intelligence rather than being in denial of its impact or trying to suffocate a technology that has come to stay.

**Keywords:** Artificial Intelligence, Machine Learning, Accounting Functions,

## I. INTRODUCTION

The accounting profession has witnessed significant transformation over the years up to migrating from fully manual routine activities to substantially automated processes. With the rapid development of artificial intelligence (AI) and machine learning (ML) technologies, the profession no doubt is about to witness a paradigm shift in the way it is practiced. For example, the not too distant transition of Nigerian financial institutions from manual to semi-automatic and then to full computerisation no doubt improved delivery of financial and banking services including savings in man hours, it also led to massive loss of jobs, especially by old-school financial sector workers and bankers, to computers and communication systems. It is comedy now to remember that

there was a time in Nigeria when customers literally went to the banking halls with their mats and pillows in anticipation of a long wait for their tally numbers to be called. This was when banks official closing time was around one o'clock in the afternoon to enable them manually balance their accounts and close their ledgers for the day. We are not also quickly forgetting those days when you must visit the physical location of your specific bank branch to do any transaction on your account. These primordial practices have since given way to technological innovations. The introduction of cutting edge technologies like internet transfers, mobile banking, and short-code coupled with ATM machines and POS facilitated agency banking, it is becoming obsolete to visit bank branches in person except for some very special transactions requiring face to face interactions. This is even as newer technologies like AI will soon take over from today's novelty methods.

Parloff, (2016) as cited in Eleonora, (2018) posited that artificial intelligence comprises any system that enables machines to imitate the natural intelligence of humans and includes machine learning and deep learning, being part of the branches of AI. It is of utmost importance to scrutinize the activities content of the accounting function in order to verify which functions are capable of and will likely be taken over by intelligent machines and which areas human accountant is needed to explore and expand together with the skill sets required for the new era of accounting.

### 1.1 Statement of the Problem

All aspects of accounting functions are essentially been affected by AI especially, aspects of accounting that relate to information collection (Odoh, 2018). Accounting functions previously performed by individuals manually are currently been taken by various computer systems and as a result, accounting systems and processes are being shifted away from paper journals and ledgers and toward computer-based formats. For example, just about forty years ago in the mid 1980s, Many Nigerian banks were fully manual using ledgers and cards to update customers record, gradually there was a transition to mechanised banking where some specialised machines like typewriters and cheque vending machines helped improve service delivery in the banks; From mechanised banking, came the era of electronic banking when banks started using electronic devices to carry out routing

tasks and complex calculations, and then to full computerisation with the rapid introduction of all kinds of information and communications technology (ICT) hardware and software infrastructures including internet and mobile banking. Today, artificial intelligence technology is quickly being embraced by many companies and banks alike in a bid to stay ahead of competition and achieve strategic corporate objectives. AI is fast replacing and/or complementing traditional automation technologies in advanced countries like United States of America, Canada and the United Kingdom. In developing countries like Nigeria, the adoption and utilisation of AI in record keeping, is beset with myriads of challenges ranging, from underfunding to inadequate human skill (Avneet, 2015). Lack of proper understanding of the concept and application of AI in itself is a disincentive for the adoption and utilisation of the technology in Nigeria.

According to Yanling, (2020) the advent of the period of artificial intelligence in accounting is the predictable result of the integration and development of internet technology and artificial intelligence technology in the accounting industry. Various AI-related technologies, such as natural language processing (NLP), computer vision, robotics, machine learning and speech recognition have substantially progressed over the years to systems that do, think, learn and continuously adapt.

Incidentally not much work has been done by researchers as regards the Nigerian economy and the adoption of artificial intelligence technologies, especially as it relates to the commercial and corporate organisations in Nigeria. This research therefore is focused on examining how artificial intelligence and machine learning will impact accounting functions.

### 1.2 Objectives of the Study

The major objective of this study is to examine the level of adoption and the effect of artificial intelligence (AI) on accounting functions of companies in Nigeria.

The following are the specific objectives:

1. To determine the level of adoption of AI in the accounting functions of companies in Nigeria.
2. To ascertain the effect of AI on the accounting functions of companies in Nigeria.

### 1.3 Research Questions

The following research questions will be utilized as a guide in reaching the research objectives listed above:

- i. What is the level of AI adoption in the accounting functions of companies in Nigeria?
- ii. What is the effect of AI on the accounting functions of companies in Nigeria?

### 1.4 Scope of the Study

This research focuses mainly on the effect of AI on the accounting functions of companies in Nigeria. The study was

carried out in Lagos where the headquarters or corporate office of many of the companies in Nigeria is located. The key accounting staff of thirty (30) of these companies were randomly selected and interviewed by the use of Questionnaire and in some cases oral interaction as necessary.

### 1.5 Significance of the Study

This research will provide a comprehensive picture of AI adoption in the accounting functions of companies in Nigeria, determine the effect and identify ways to improve the positive impacts of AI on the accounting functions of companies.

## II. LITERATURE REVIEW

Some basic concepts are examined herein to lay a background on the understanding of this research work.

### 2.1 The Concept of Artificial Intelligence (AI) and Machine Learning (ML)

The word 'artificial' implies man-made as against natural. Artificial intelligence (AI) has to do with 'man-made-machines mimicking man'. It is a progressive attempt to make the computer learn, memorise, think and act in human-like manner. Shaffer, Gaumer and Bradley, (2020) opined that AI is man-made or machine intelligence that is capable of simulating logical functions. They went on to define artificial intelligence as the use of computing tools to solve problems that traditionally required human intelligence. Machine Learning (ML), according to Shimamoto (2018), is the ability of a computer to recognize and apply patterns, create its own algorithms based on those patterns, and enhance those algorithms based on feedback. In other words, machine learning technology enables the computer to learn, understand and retain knowledge over time and subsequently empowered to make decisions from those experiences. ML uses algorithms to analyse data to carry out specific tasks, such as making predictions, without relying on explicit programming as in rule-based expert systems. Machine Learning uses pattern recognition and inference to learn from data. The larger the data set, the more examples from which the algorithm can learn through trial and error (CPA Canada, & AICPA, 2019) as cited in (Ng & Alarcon, 2020). Machine learning technology is very vital component of artificial intelligence.

Artificial intelligence (AI) has been dubbed one of the most disruptive technologies in recent years, affecting a wide range of industries and enterprises. Researchers and practitioners link AI's advent to the industrial revolution of the previous century; AI is a collection of technologies that will alter the way we do business. Artificial Intelligence has already disrupted the financial lending sector with several Nigerian 'Fintechs' adopting an AI-driven approach (Oyeniran, 2019). Today in Nigeria, it is now possible to apply for and receive a loan from a financial institution within a few minutes to a few hours in the comfort of your location and without personal contact between the lender and borrower. All the lender needs is your bank details and bank verification number (BVN) to be able to track all your accounts and debit any as necessary.

They are also authorised to gain access to your phone and social media details so that they can ‘embarrass’ you before your contacts in case of default, thus ensuring you pay back the loan. Some technology-savvy insurance companies are also leveraging on AI technologies to offer insurances services to prospective clients through their mobile phones and other communication devices, premiums are deducted from call and data credits or directly from the bank account of the subscriber. All these are made possible and easy basically via deployment of intelligent technology systems.

According to Danimir, Mirjana, and Ivana (2019), AI and machine learning will allow accountants to have better access to a variety of accurate and timely data from a wider range of sources. Eleonora, (2018) opined that AI will replace accounting professionals in a number of their more routine and repetitive activities since it is apparent they can accomplish more things faster and with higher accuracy than humans. There exist many accounting job functions today that will be automated even in the short term but accountants can still be trained and equipped with powerful new resources to tackle all the challenges and maximise the opportunities of the future” (ICAEW, 2017). Obviously, routine activities and monotonous tasks not requiring human instant articulation and intervention or such skills as critical thinking, emotional intelligence and human touch will ultimately be taken over by AI technology. But tasks requiring natural human intelligence such as stated above cannot be susceptible to artificial intelligence automation; there will always be the superiority of the human edge over technology. Artificial intelligence optimists, according to Danimir et al, (2019) have predicted that deployment of robotic machines and intelligent computers will significantly improve the service delivery instead of diminishing it. They further believe that general accounting services can and will be rendered in a better way, allowing accountants dedicate more of their precious time to discuss through their client’s state of affairs including short and long term requirements.

## 2.2 History and Evolution of AI

The history of AI can be traced from ‘abacus’ the flagship of computing to the ever evolving technological innovations we have today. Artificial intelligence was first proposed in 1956 at the Dartmouth Society, and it has gone through two key stages of theoretical development and commercialization (Chaoyi, Song & Fu, 2020). The coinage of the term Artificial Intelligence is credited to John McCarthy and it all started as an experimental area of computer science that seeks to develop a machine that can perform diverse tasks by using its own machine intelligence (Yadav et al, 2017 as cited in Odoh, Silas, Uguanyi and Chukwuani, 2018). Between the period of 1974 to 1980, governments significantly withdrew funding and interest in artificial intelligence as a result of several reports criticizing seeming slow progress in its development. These periods became popularly known as ‘AI winter’. Attention came back massively to the field in the 1980s as a result of strategic funding intervention by the British

Government with the intent to compete with efforts by the Japanese. Unfortunately, between 1987 and 1993, the field of AI went through another major downturn, happening the same time markets were collapsing for computers and general purpose machines amidst reduction in government funding.

However, in 1997, IBM developed ‘Deep Blue,’ the first AI-based computer to defeat Russian grandmaster Garry Kasparov in chess. This was a few years after research began to revive again in the field of artificial intelligence. Another invention of IBM name Watson debuted in 2011, defeating the then reigning champions Brad Rutter and Ken Jennings thus winning the quiz show "Jeopardy".

The application of artificial intelligence started becoming a phenomenon in the field of accounting sine 1980s. The use of AI in auditing, taxation, financial accounting, management accounting, and personal financial planning has been extensively researched by academics and practitioners (Eleonora, 2018). One of the world's four largest accounting firms, Deloitte Touche Tohmatsu, said in 2016 that artificial intelligence would be used in accounting, taxation, and auditing (Jiaxin, Qingjun & Yan). In the same year, KPMG announced ambitions to use AI on audit engagements in Australia, utilizing IBM's Watson cognitive computing technology (Cindy, 2017). Throughout history, technology has played an essential part in accounting for company operations, from the use of an abacus over 2,000 years ago through the acquisition of a computer solely for accounting purposes in 1955, up to the creation of the first electronic spreadsheet software Visicalc in 1978, which enabled financial modelling on the computer and then to the desktop, mobile and cloud based accounting software of today; AI is proven to be the next major technical innovation, and it will continue to play an important part in the accounting profession for many years to come (Ng & Alarcon, 2020).

Today in Nigeria and the world over artificial intelligence is widely applied in varying degrees to almost every aspect of human endeavours, including the practice of accounting, and it appears there is definitely no plan to go back to the old ways.

## 2.3 Components of Artificial Intelligence

Some of the major branches or subsets of artificial intelligence are machine learning, neural network, robotics, expert systems, fuzzy logic, natural language processing and computer vision.

**Machine learning** is an important subset of AI that allows computers to intelligently develop the ability to learn from their experiences without being explicitly guided by software programming. In other words, the computer through ML technology studies and understands patterns as it receives, processes and stores data over time, from where it builds its own algorithm to predict future cause of action. An example of machine learning application includes speech recognition, recommendation engines like Netflix and so on.

**Neural network** are a type of artificial intelligence that uses the biology principle of neurology and blends cognitive science and technology to complete tasks. Artificial neural networks, like the human brain, comprise neurons (or nodes) that are linked to one other in various layers.

It is a branch of AI that assists machines in comprehending information and making judgments in a human-like manner.

**Robotics** is a discipline of artificial intelligence and engineering that deals with the creation and construction of robots. Robotic drones can be used to performed cumbersome accounting tasks like stock count. Robots can also go to places that may be very dangerous for humans, such as in search and rescue operations.

**Expert systems** simulate the ability of human experts especially in solving decision-making problems within a particular domain e.g. medicine. Rather than using traditional procedural code, these systems are designed to tackle complicated problems using bodies of information (knowledge base).

**Fuzzy logic** is a method for representing and modifying ambiguous data by determining the degree to which a hypothesis is right. It was created to allow a computer to distinguish between data that is neither true nor untrue; this is comparable to human reasoning, in which a situation or problem may not necessitate an unequivocal true or false answer.

**Natural Language Processing (NLP)** represents the evolving approaches for communicating with machines in human languages like English.

**Computer vision** is a subclass of artificial intelligence in which computers are trained to use digital images from cameras, movies, and deep learning models to record, recognize, and understand the visual environment. Machines that use computer vision can effectively recognize and classify objects and behave based on what they see.

#### *2.4 Artificial Intelligence and Accounting Functions*

According to a 2015 study conducted by the University of Oxford, accountants have a 95% risk of losing their professions as machines take over data analytics and figure crunching. However, according to the same analysis, as technology advances, some jobs may be lost while others will be created (Griffin, 2016 as cited in Cindy, 2017). According to Eleonora, (2018) it is really unsettling to know that the accounting profession is among the fields of human endeavour predicted to have high likelihood for computerization in some empirical studies. He however, further opined that we do not have to accept such dark prophecies arguing that the accounting profession will still be very relevant to the foreseeable future. Artificial intelligence can help tackle the problems of inefficiency and low added value in accounting, allowing accountants to focus on more creative work and adding more value to the organization. (Jiixin, Qingjun & Yan

2018). According to Fogarty, (2019) since the widespread usage of data warehousing and relational databases on client servers around the turn of the millennium, the use of sophisticated analytics for business has grown as well, he went on to argue that, despite the fact that machine learning and artificial intelligence techniques have been present for decades, they have had few effective breakthrough applications until lately. Today cloud computing and the ability to take advantage of tech companies' infrastructure, such as Amazon and Google's Cloud Services, enabled these algorithms to be used to their full potential in businesses. This powerful infrastructure, combined with big data, is consistently delivering innovative applications across a wide range of business models.

#### *2.5 Application of Artificial Intelligence*

Several AI applications and devices are already being used all over the world and are impacting on the way we live and interact with our environment. Some of the popular AI technologies include:

**Apple's Siri** - This is a smart digital personal assistant that employs machine learning technology to develop and better forecast and comprehend our natural language questions and needs.

**Amazon's Alexa** – A revolutionary tool to power smart homes by interacting with electronic and other devices and therefore reduces mandatory mobility around the house. It can be deployed to search the web for relevant information, do shopping online, scheduling of appointments, setting time alarms and a host of other functionalities.

**Cogito** – This is a combination of machine learning and behavioural science to improve the customer interaction for phone professionals. It is an augmented intelligence for call centres, able to analyse voice calls in real time and helps to better interact and engage customers.

**Elon Musk's Tesla** – amazingly intelligent technology car with self-driving features and powerful predictive capabilities. Tesla is increasingly becoming a dream car for many lovers of smart technology.

**Google Assistant** – Similar to Apple's Siri, it is a virtual assistant by Google that can be used on mobile phones and smart devices to interact and assist users to accomplish various tasks including searching the web, setting alarms, scheduling events and more.

**Netflix** – This entertainment AI tool relies on predictive technology to accurately predict films a user or customer may want to watch based on the customers previous online behaviour and reaction to films.

**Nest** – This is a learning thermostat that uses behavioural algorithm to learn the cooling needs of the user and thus anticipate and adjust temperatures in the home, office or immediate environment.

Some of these AI tools are daily being used by some of us almost automatically and without obviously noticing that we are deploying and enjoying AI capabilities. A few examples of our everyday application of artificial intelligence are social media interactions, e-payments for our daily financial transactions, Google maps for navigating and finding locations, ride-hailing apps for connecting to taxis, face recognition and proximity detection for accessing and locking some of our devices, text autocorrect for composing accurate messages, chat bots for seeking online assistance and many more. All these are machine intervention that has made life easier and more interesting for man. AI is being deployed in various fields like astronomy, healthcare, entertainment, finance, data security, robotics, social media, education, agriculture, transportation, automotive industry and so on. For example, in robotics, intelligent robots are created to go beyond the general programmed robots to perform tasks using its own intelligence and experience without explicitly being coded. In education, AI is helping to automate content delivery and grading of students giving more time for teachers to be more creative in research and other important areas. In social media, AI is being used to analyse vast amount of data to identify latest news and event trends, hot topics, hash tags and the need of various users.

In the accountancy industry specifically, the four largest global accounting firms have embraced and progressively deployed AI capabilities to varying degrees to help improve the quality of their work. Amongst other AI capabilities, **Deloitte** has created a framework called insight-driven organization (IDO) to assist businesses in achieving their objectives; they have also made a platform for analysing speech and voice communications.

The GL.ai robot was developed by **PricewaterhouseCoopers (PwC)** to check uploaded transactions in milliseconds and detect anomalies and suspicious transactions in the general ledger. PwC has also made an anti-robbery and anti-corruption reporting solution in collaboration with Narrative Science. PwC deployed 'Quill' to create robotic software that flag potential misconduct based on risk models and data, cutting report production hours considerably and boosting general report uniformity and value (Keeney, 2018).

**Ernst & Young (EY)** is actively working on a number of accelerators, assets, and solutions that will be enabled by its big data platform. (Candela, 2018). EY uses unmanned aerial vehicles to aid with stock surveillance and analysis on a real-time basis together with RPA (Robotics Process Automation) and NLP (Natural Language Processing) technology (such as optical character recognition). Drone data is sent immediately to EY Canvas, EY Assurance's global audit digital platform that connects over 80,000 auditors across the world (EY, 2017). EY has also implemented Machine Learning technology to detect fraud in order to boost professional productivity. Using machine learning, EY's Fraud Investigation solution was able to identify questionable invoices with a 97 percent accuracy rate. (EY, 2017).

**KPMG** created "K-analyzer," a tax analysis program that can analyze hundreds of transactions in seconds, using Robotic Process Automation technology. To decrease errors, this new invention by the accounting firm extracts relevant data from the database of companies, automates the analysis of a vast volume of the downloaded data, and then succinctly explains the output. The technique creates an unambiguous trail of audit transactions that tax authorities accept and is capable of cost-effectively analyzing data. (KPMG, 2018). The FBT Automator, designed by KPMG, is a robot that reduces the time it takes to accomplish FBT (fringe benefit tax) compliance procedures. This tool can analyze line project and ledger data, as well as integrate with business systems like SAP and Oracle to gain access to backend data and prepare FBT for return to work files using numerical coding and fuzzy word matching instead of manual line-by-line inspection. The Automatic Exchange of Information (AEOI) reporting solution from KPMG promises to make the reporting process easier by creating and embedding the relevant XML (extensible markup language) files for submission utilizing hundreds of data validation checks. (KPMG, 2017).

From the reviews of the use of AI, and ML technologies by the global big four accounting firms, we can clearly see two common trends. Number one, there is a growing increase in investments in, and integration of artificial intelligence into their core business; number two, these global four firms claim that AI will be a crucial element in accounting's future success (Yingying, Feng, Yi, Xuan & Haifeng, 2020). Therefore present and prospective accounting professional should see AI as a friend rather than a foe and be ready to adapt to the new world of artificial intelligence accounting.

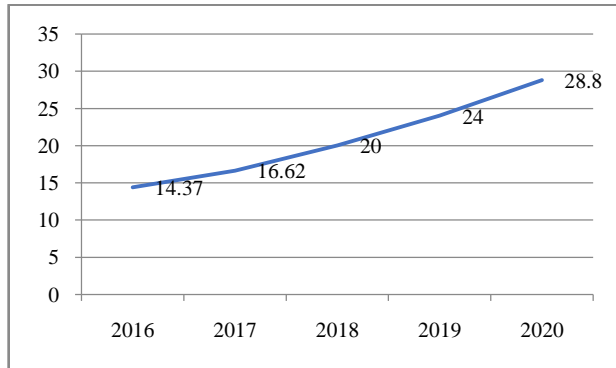
The deployment and integration of artificial intelligence by companies have been on the upward movement all over the world, the companies in Asia region are more active in adopting it in their organisations and specifically Chinese businesses are on the frontline. Beijing, Shanghai, Guangdong, Zhejiang, and Jiangsu are major AI development and implementation hubs. China unveiled its "Next Generation AI Development Plan" in 2017, which is a three-step plan to make China and Chinese companies leaders in AI deployment. The goals are to improve Chinese AI competitiveness by 2020, achieve AI breakthroughs by 2025, and strengthen global AI management by 2030 (Suleiman et al, 2020).

#### *Fraud Detection and AI Algorithms*

In organizations, industries, and corporations, artificial intelligence has substantially improved the identification and prevention of fraud. Fraud has long been a huge issue in businesses, particularly in the financial services sector, and fraud detection is one of the most important areas in banking where artificial intelligence systems have excelled. AI aids in the better knowledge of client behaviour, allowing for more accurate detection of new and emerging scams. (Kaur, Sahdev, Sharma, Siddiqui, 2020).

Artificial intelligence thrives on algorithms. Machine learning consists of series of algorithms. According to oxford languages, Algorithm is a process or set of rules to be followed in calculation or other problem-solving operations by a computer. Finding patterns in real time is a skill that AI excels at. It detects suspicious conduct using extra behavioural indications and makes recommendations for risk mitigation. Feedzai, a data science firm, for example, utilizes algorithms to detect e-commerce fraud (Kuar et' al, 2020).

Figure 2.6.1: Size of fraud detection and prevention (FDP) market worldwide, from 2016 to 2020 (in billion U.S. dollars)



Data source: Statistical.com Chart source: Author using MS Excel

From the graph or chart above (fig. 2.6.1) it is evident that artificial intelligence has been of immense positive impact of fraud detection and prevention all over the world increasing the size of fraud detected or prevented to 28.8 from 14.37 billion U.S. dollars representing about one hundred percent growth.

### 2.7 How Artificial Intelligence (AI) will Improve Accounting Practice

The merits of AI in the profession and practice of accounting will basically be the extension of the merits of traditional computerisation in the performance of accounting functions. In other words, all the improvements we have seen from accounting system automation and much more will form part of the benefits of AI in the profession and practice of accounting.

- AI will enable automation of routine and tedious accounting activities including gathering, recording and analysing data.
- AI will drastically increase the speed and efficiency in the processing of massive and complex data.
- AI will make access and availability of relevant and large amount of accounting data easier than ever.
- AI will enhance the quality management decision due to accurate and timely availability of accounting information.

- AI will help entities to meet deadlines and comply more with regulatory reporting and disclosure requirements.
- AI will eliminate fatigue and errors associated with humans as machines are not usually subject to emotions.
- AI deployment will enable organisations achieve overall better quality delivery to its customers.

Artificial Intelligence however has its down side including initial high cost of implementation, displacement of human labour and the fact that machines do not possess the initiative, empathy and decision making ability of humans and as such cannot fully operate without human intervention.

Another challenge with AI systems is its susceptibility to easily being compromised or breached or even displays unwanted characteristics. The Microsoft experiment "Tay" from 2016 is a prime example of this manipulation. It took less than 24 hours for Twitter to thoroughly corrupt this AI robot, which was impersonating a typical female user and spewing sexist, racist, and other offensive comments in response to a dialog. This is a fantastic example of one of the flaws of AI data. Most AI systems today are unable to overcome this initial hurdle and recover if the data being used to learn from is of poor quality. (Sakata 2018) as cited in (Max, Dan, Okyanus, Cornelius, Minna & Othmar, 2020).

### 2.8 Theoretical Review

Several theories are available in the subject of artificial intelligence. In this study, we shall be aligning with a few theories in our specific subject area.

#### *Efficient Structure Theory*

Demsetz established the efficient structure hypothesis in 1973. According to this hypothesis, organizations that function more efficiently than their competitors get a significant competitive advantage as a result of lower operational expenses. According to Jeon and Miller (2005), in terms of timing, bigger earnings come first, followed by more concentration. To put it another way, better management and procedures lead to larger profitability, which leads to increased market share and concentration over time.

Consequently, this research is based on the assertion that companies that deploy artificial intelligence technology in its accounting operations, thus improving its management techniques and practices will perform more efficiently and maintain competitive advantage in the market.

#### *Technology Adoption Model*

This model was founded by Davis in 1989 and has been one of the most influential models of technology acceptance, with two primary factors influencing an individual's intention to use new technology: perceived ease of use and perceived usefulness. According to the concept, adopters form beliefs about the utility and simplicity with which technologies can

be adopted; these perceptions, in turn, shape adopter attitudes, which drive behavioural intentions, and, finally, actual system use. (Calantone, Griffith & Yalcinkaya, 2006)

For example, an older adult who believes that digital games are too difficult to play or a waste of time is unlikely to want to learn how to use them, whereas an older adult who believes that digital games provide needed mental stimulation and are simple to learn is more likely to want to learn how to use them. This theory is adopted in this study to demonstrate that user friendliness is a key consideration in the deployment of any artificial technology tool.

#### *Diffusion of Innovation Theory*

The original S-shaped diffusion curve was plotted by French sociologist Gabriel Tarde (Toews, 2003 as cited in Kaminski, 2011), followed by Ryan and Gross, 1943 (as cited in Kaminski, 2011) who introduced the adopter categories that were later used in the current theory popularized by Everett Rogers. Katz, 1957 (as cited in Kaminski, 2011) is also credited with being the first to introduce the concepts of opinion leaders and opinion followers, as well as how the media interacts with these two groups to influence them.

According to the theory, a user's attitude and impression of a system or technology is influenced by five factors: relative benefit, compatibility, complexity, observability, and trialability.

According to Kaminski (2011), the Diffusion of Innovation hypothesis is a popular change paradigm for guiding technological innovation, in which the innovation is developed and presented in ways that meet the needs of consumers at all levels. It also emphasizes the need of communication and peer networking during the adoption phase. Simply put, the diffusion of innovation is the process by which people adopt a new notion, product, practice, ideology, or other concept. Rogers detailed this process, emphasizing that just a few people are open to and adopt the new thought in most circumstances. As these early innovators 'spread the word,' more individuals become interested, resulting in the formation of a critical mass. Over time, the new idea or product spreads throughout the population until it reaches saturation.

The diffusion of innovation theory (DIT) is one of the most common ideas that have attempted to investigate the elements that influence an individual's decision to accept a new technology or an innovation. DIT attempts to explicate how, why, and how quickly new ideas and technologies spread across cultures. Rogers describes diffusion as the adoption of a new concept, behaviour, or physical innovation "over time by the given social system." As a result of diffusion processes, a new idea, behaviour, or physical innovation is accepted or penetrated. (Al-Jabri and Sohail, 2012).

This theory is relevant in this research to elucidate the fact that artificial intelligence technology will gradually but consistently be adopted by many businesses.

#### *2.9 Empirical Review*

Relevant academic and professional literatures are reviewed and analysed to provide an adequate understanding of existing works regarding adoption and impact of AI in the various activities of accounting functions. Academic Literatures were obtained mostly from Association of Business Schools (ABS) rated journals via [www.emerald.com](http://www.emerald.com) and other authoritative journals and publications. Professional literatures were mostly obtained from the Institute of Chartered Accountants of Nigeria (ICAN) through their Technical and Education department and the web pages of the global big four audit firms.

The accounting profession appears to be fast approaching the era where Income Statement will no longer necessarily be for the year ended 20xx and Statement of Financial Position will cease to wait to be as at 20xx but as at now; a time when the age long 'periodicity concept' may be a subject of academic debate as to its continued relevance, because AI will make 'closing of books' and reporting at any time possible and simple. According to Danimir et al (2019), artificial intelligence technology and machine learning tools will avail accountants better opportunity to access wider information scope on time and from various sources.

The accounting profession has undergone significant changes as a result of the deep integration of emerging technologies such as big data, machine learning, artificial intelligence, and blockchain in the field, including reengineering accounting procedures, reducing accounting information errors and distortions, improving accounting efficiency, and promoting the transformation of accounting career paths. (Yingying, Feng, Yi, Xuan & Haifeng, 2020). In the field of accounting and auditing, the potential of robotic process automation (RPA) and artificial intelligence (AI) is growing and is already being exploited. (Max et al, 2020).

According to SAS Institute, 2019 (as cited in Max et al. 2020) Data mining, machine learning, speech and picture recognition, and semantic analysis are just a few of the technologies that fall under the umbrella of artificial intelligence. To find patterns in big data sets, data mining, for example, use a combination of statistics, machine learning, and artificial intelligence. This is critical since the amount of data is always growing, and unstructured data accounts for 90% of all data. Data mining aids in the faster discovery of relevant information.

According to Suleiman, Amneh, Hela, Phung, Muhammad, and Ali (2020), the introduction of AI tools and techniques can greatly benefit the world of finance and accounting by enabling task automation and improving analysis capability as compared to previous techniques that are quickly becoming obsolete. Although intelligent computers are faster and possess better ability to carry our analysis and complex calculations, for the results of this analysis to be useful, it should be subject to interpretation by humans. As a result, AI-

based algorithms or robots cannot replace human creativity and inventiveness.

McKinsey Global Institute (as cited in Shaffer et al. 2020), Noted that between 400 million and 800 million of current jobs will be automated by the year 2030, causing major disruptions in labour market. According to the study, prospective new sources of labor will lead to the creation of new jobs. AI will influence many employments in legal work, housing development organisations, and general accountancy services. Payroll, audits, bank reconciliation, risk assessment, invoice classification, and payments are all examples of basic accounting tasks that require predictable data collection and processing. For decades, programed software has been commonly used to prepare federal and state income taxes. This frees up tax accountants to provide more tax advisory services.

PwC, 2017 (as cited in Max et'al 2020) has calculated that 45 percent of labour activities may be automated, saving \$2 trillion yearly in global workforce costs. This goes a long way to highlight the benefits accruable to companies that will effectively implement AI technology. As AI becomes more widely used, it is strategically vital for businesses to begin investing in innovation. Those who are successful in their deployment will see enormous productivity increases in their work.

From a the study carried out by MIT Boston Consulting Group as reported by Chaoyi et al, (2020), it was observed that while 79% of respondents agree that technology can improve a company's performance, over 80% of the respondents affirmed that AI can also provide a competitive edge. Cheah and Farzana (2020) studied the usage and impact of AI on accounting and concluded that the technology of AI is excellent for replacing lower level and repetitive tasks. Lower-level accounting professionals may stand the risk of losing their jobs as a result of artificial intelligence; the basic work of the accounting sector will be taken over by intelligent financial software, resulting in a major decline in the demand for accounting skills in entry-level roles. According to Yanling (2020), accountants are under pressure to modify their skills as a result of artificial intelligence. Yanling (2020), on the other hand, sees artificial intelligence as both a potential and a challenge for the accounting industry's growth. Every accountant should keep up with the times, recognize the need for personal skill development and functional transformation, actively change his or her resistance to artificial intelligence, leverage his or her own strengths to compensate for the shortcomings of intelligent accounting software, and cultivate a tolerance mentality.

Technology alone will not be able to guide us into the future. The idea is to figure out how people can make appropriate use of new technology in order to increase its long-term value. As accounting software becomes more automated, accountants will be tasked with not only transcribing data, but also interpreting it and passing it on to consumers. (Zehong & Li, 2018).

Artificial intelligence and machine learning, according to Danimir et al. (2019), will provide accountants with improved access to a wider range of near-real-time data from a bigger number of sources. This will improve the job of the accountant rather than replace him. Obviously, the profession's role and functions will alter as a result of the significant AI turmoil. Embracing technological challenges and adapting to changing business and management requirements by building new skill sets and competencies will be the winning strategy. And the educational system must play a critical role in educating professionals for this rapidly changing environment (Eleonora, 2018). Many present work duties and decisions will be automated, but accountants can still be equipped with significant new capabilities to meet all of the future's difficulties and opportunities (ICAEW, 2017).

According to Ng & Alarcon (2020), Accountants with a strong technical background in programming languages will be best positioned to work with data scientists in implementing AI initiatives. For those do-it-yourself accountants who may want to customize AI technologies to solve applications, learning a programming language will be quite useful. Proficiency with popular open-source programming tools for AI, such as Python and R, will

enable accountants to customize AI applications to suit the unique business needs of their firms or clients. Other tools, such as SQL and NoSQL, will be useful for retrieving, editing, and manipulating data to be used with AI applications.

Ng & Alarcon (2020) also posited that accountants without a strong background in programming languages can also help develop AI-enabled applications by using “nocode” and “low-code” platforms. These platforms use drag-and-drop editors for application development rather than traditional coding languages. Some of the world's leading technology companies offer these solutions. For example, the “Create ML” application by Apple allows users to develop and train ML models using different datasets. Google's AI Platform supports “Kubeflow”, their open-source application that enables developers to build AI/ML projects. Lastly, Microsoft's Cognitive Toolkit “CNTK” enables applications built for the Azure platform and allows users to develop customized applications for computer vision, natural language understanding, facial recognition, and prediction models. No-code and low-code tools are undoubtedly useful for accountants in implementing AI initiatives.

According to Kefiyalew (2021), as AI systems advance, they may eventually be able to supply autonomous knowledge. Algorithms designed to attain ideal efficiencies, on the other hand, may inadvertently have undesirable or unintended outcomes. This unplanned outcome which occurs when the exact problems we're trying to correct or solve create more harm than good, is a risk to be aware of. If we design systems to increase productivity, we should be aware that there may be unintended consequences. We may never achieve a level of AI intelligence where we can trust it to prevent all negative



events. Machines can be taught to perform operations that are redundant, repeating, and, at times, exceedingly time demanding. However, there is no machine that can now replace emotional intelligence in accounting job.

Within the next 10 years, according to Shaffer et al (2020), the accounting profession may appear significantly different from what it is now. Only accountants who embrace emerging technology, such as artificial intelligence, will be able to survive and even thrive as their fields become more specialized. This will necessitate education and, in some cases, re-education. Those development expenditures must be borne by the organization. They believe that new graduates will bring current skills to the industry, adding value to companies and businesses that have been in the field for many years. The most difficult task may be retraining accountants who have been in practice for a long time and dealing with opposition to change. Employers must first set an example by embracing the inevitable, and then encourage and assist people in their efforts to enhance and upgrade their abilities. They will also have to guide employees through the adjustments, assuring them that those who embrace the change would have a lower likelihood of losing their jobs. Embracing accessible technology will allow businesses to serve customers more efficiently and effectively by delivering up-to-date business solutions, regardless of the services provided. The results of a recent study by Leitner-Hanetseder, Lehner, Eisl, and Forstenlechner, (2021) show that there will be major changes in tasks and skills for current skilled occupations in the general accounting context within the due to AI-based innovations, core accounting roles and tasks will keep on existing in the future but some will not be performed by humans but by intelligent computers. Humans will of necessity make informed use of digital technologies and to take on some of the news roles.

Chaoyi et al (2020) posits that the deployment of artificial intelligence technology on the accounting profession has a very significant impact. The accountant is freed from clerical repetitive tasks to focus on more sophisticated aspects including offering strategic information support to the company's operational decision-making.

In his study of artificial intelligence in relation to proper record keeping of Micro Finance Banks in Nigeria, Odoh (2018) opined that artificial intelligence systems in Nigerian microfinance institutions influence good record keeping. Microfinance banks, especially those that engage in online transaction often face the challenges of adequate record keeping, hence the need for adoption of artificial intelligence to keep proper books of account. Odoh et al (2018) studied accountancy practice in the south eastern part of Nigeria and found that artificial intelligent systems in accounting profession remain a very potent tool that is rapidly changing the sphere of accounting as they provide outputs that are extremely accurate hence far superseding human efforts. It is therefore a proper time for accounting professionals to bask in excitement in anticipation of more interesting profession due

to the imminent elimination of monotonous and repetitive tasks. These tasks will be transferred to machines for effective and efficient accounting and auditing operations. Cindy (2017) posited that artificial intelligence is critical to the future of the accounting and auditing professions, however, AI in the accounting world will not replace accountants, it will simply change the focus.

With the growing adoption of digitization and other advancements in technology, businesses can either choose to tap in to the abilities of AI and cognitive computing to transform or risk becoming redundant (Oyeniran, 2019).

In spite of the various studies in the field of AI and Accounting, there has not been a focus on accounting functions in the context of a developing country like Nigeria, thus the motivation for this empirical research work.

### III. METHODOLOGY

In other to achieve the objective of this study, the researcher used quantitative primary data sources. Survey questionnaires were sent to respondents through online means (Google Forms). The population consist of selected companies in Nigeria from which random sampling technique was used to selected thirty companies as the representative sample size for this study.

#### 3.1 Research Design

This research work sought to study the impact of Artificial intelligence on accounting functions using selected companies in Nigeria. The design for the questionnaires is close-ended questions. The research study is designed to be descriptive and empirical in value.

#### 3.2 Population of the Study

The target population for this study is companies in Nigeria. The Population consists of the entire companies in Nigeria with main focus on those in Lagos.

#### 3.3 Sample Size and Sampling Techniques

The sample size is thirty (30) randomly selected key accounting and management staff of companies in Nigeria. Specific companies surveyed include the Keystone Bank, The Nation News Papers, West African Examination Council, Central Securities Clearing Systems Plc, Adekunle Alabi & Co. (Chartered Accountants), Templars & Associates, Covenant Visions International Limited, Watershed Capital, Intertel Nigeria Limited, ARM Life Plc, AjoCard Limited, Fidson Healthcare Plc, Tangerine Africa, Bristow Helicopters, Wichtech Group, Daily Need Industries Ltd, Honeywell Group, Nigeria Institute of Public Relations amongst others who did not want their organisation mentioned here. The sampling technique used in the course of this research is simple random technique; this simple random technique method is adopted to reduce the degree of biasness or one-sidedness of respondent's opinion during distribution of

questionnaires. The sampling process gives every member of the population equal probable chance of being included in the sample.

3.4 Sources of Data

The data collected for the purpose of this research is primary data. These data were collected through the use of survey questionnaires and oral interview administered to the accounting department of the selected companies.

3.5 Method of Data Collection

The data collection technique for this research work is the use of is questionnaires administered through online means using Google Forms. Interviews were also used where necessary.

3.6 Method of Data Analysis

To test and accept or reject the formulated hypotheses, simple regression technique is used to test the result.

3.7 Model Description

$$AF = F(AI)$$

Where:

AI – Natural language processing, Rule-based system, Machine Learning Method, Robotic process automation, Expert Systems, Neural Networks, Optical Character Recognition, Intelligent Data Capture, Speech recognition

AF – Financial Accounting, Auditing, Taxation, Payroll, Mgt Accounting, Cost Accounting, Forensic Accounting

The estimated regression model is given as

$$BENEFIT = F(KINDAI)$$

$$BENEFIT = \beta_0 + \beta_1KINDAI + e$$

IV. DATA ANALYSIS, INTERPRETATION AND FINDINGS

The focus of this chapter is on the data presentation and analysis of the survey conducted for this research study. In the data analysis, both the descriptive and inferential analysis are consider. A number of estimation techniques. For the descriptive analysis, frequency count, percentages, mean and standard deviation and for the inferential analysis the ordinal regression is employed to establish relevant relationship between the variables of interest. The empirical results of the research questions was reported and interpreted. Lastly is the presentation of the summary of the findings.

4.1 Demographic Analysis of Respondents

The social and demographic information of the thirty (30) respondents’ gender, level of education, company size, job title and industry are summarised and therefore presented in

Tables 4.1 and 4.2. Table 4.1 Summary of Demographic Factors of the Respondents:

						Mean	Std. Deviation
	male	female					
<b>Gender</b>	25(83.3)	5(16.7)				1.17	0.379
	<b>Bachelor's Degree</b>	<b>Master's Degree or Higher</b>					
<b>Education</b>	12(40)	18(60)				2.6	0.498
	<b>Micro (&lt;10)</b>	<b>small (&lt;50)</b>	<b>medium (&lt;250)</b>	<b>large (&gt;250)</b>			
<b>Company size</b>	5(16.7)	8(26.7)	6(20)	11(36.7)		2.77	1.135

Percentages are in parenthesis ‘()’

Source: Author’s Computation, 2021

Figure 4.1.1 Gender of Respondents 30 responses

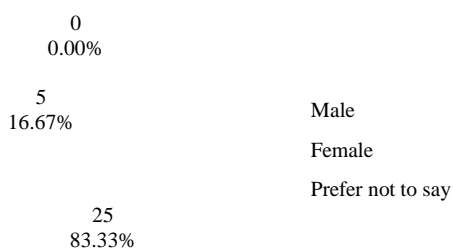
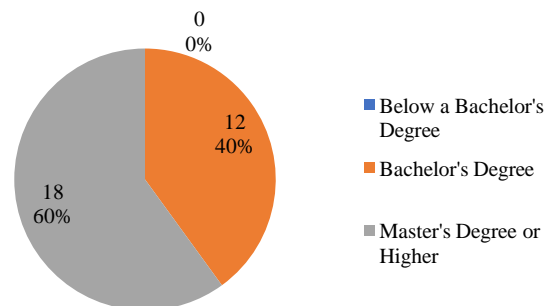
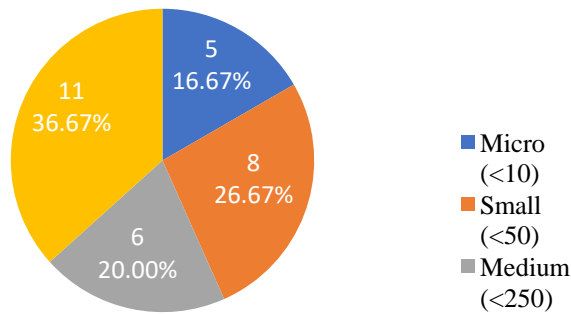


Figure 4.1.2 Education of Respondents 30 responses



Charts source: MS Excel

Figure 4.1.3 Company size of Respondents 30 responses



Charts source: MS Excel generated

Table 4.2: Job Title and Industries of Respondent.

Job Title	Frequency	Industry	Frequency
Accountant	6(20)	Education	2(6.7)
Analyst	1(3.3)	Accounting/auditing practices	2(6.7)
Bursar	1(3.3)	Aviation	1(3.3)
CFO	2(6.7)	Building	1(3.3)
Chief Operating Officer	1(3.3)	Ecommerce	2(6.7)
Compliance & Audit Manager	1(3.3)	Financial service	6(20)
Core Banking Application Manager	1(3.3)	Fin-tech industry	2(6.7)
Data Analyst	1(3.3)	Health	3(10)
Divisional Head, Technology	1(3.3)	ICT	2(6.7)
ED, Finance And Administration	1(3.3)	Insurance	1(3.3)
Finance Manager	6(20)	Manufacturing	1(3.3)
Internal Auditor	2(6.7)	Media	2(6.7)
Lecturer/Consultant	1(3.3)	Oil & Gas	4(13.3)
Managing Partner	3(10)	Public Sector	1(3.3)
Managing Director	1(3.3)		
Surveyor	1(3.3)		

Table 4.1, present the demographic distribution of respondent in this survey, therein are the. summary statistics of frequency count, percentages, mean and standard deviation (SD). 83.3 percent of the respondents are males while 16.7 percent are females.

All the respondents are degree holders, about 60% are master or higher degree certificate holders. Given the information on academic qualification, it can be inferred that a reasonable number of accounting professionals participated in this survey. Also Table 4.2 summarises the designation and the participants' industry. And it thus reveals that 20 percent

(highest recorded) of the respondents are finance managers and from the finance sector.

#### 4.2 Research Questions

For the two research questions addressed in this study, the empirical results of percentage, frequency, mean and standard deviation are presented and therefore discussed for each of them.

##### 4.2.1 Research Question I:

What is the level of AI adoption in the accounting functions of companies in Nigeria?

Table 4.3: Level of AI adoption in the accounting functions

Variable	frequency	Percentage	Mean	Std. Deviation
Natural Language (artificial Intelligence) application use in accounting function	16	53.33	11.31	9.583
Rule-based system (artificial Intelligence) application use in accounting function	17	56.67	12.06	12.085
machine learning method (artificial Intelligence) application use in accounting function	9	30.00	6	7.176
Robotic process automation (artificial Intelligence) application use in accounting function	6	20.00	9.67	13.663
Expert systems (artificial Intelligence) application use in accounting function	10	33.33	11.5	10.533
Neural networks (artificial Intelligence) application use in accounting function	3	10.00	11.67	18.475
Optical character recognition OCR (artificial Intelligence) application use in accounting function	5	16.67	7.4	14.311
Intelligence data capture (artificial Intelligence) application use in accounting function	10	33.33	14	15.362
Speech recognition (artificial Intelligence) application use in accounting function	4	13.33	1	0
Technology not listed above (artificial Intelligence) application use in accounting function	8	26.67	15.75	14.859

Source: SPSS 24 Computation

As shown in Table 4.3, ten kinds of artificial intelligence applications are examine in the survey to convey information on the level of their use in accounting functions. Evidence from the survey reveals that rule-based system application is the most used among the artificial intelligence applications. 56.7% of the respondent use this tool in performing accounting function tasks, some respondents only use it in financial (7 respondents) or costing accounting (one respondent) while others use it in performing multiple task in accounting functions. Natural language is another artificial intelligence application popularly used as reported; about 53%

of the respondents use this tool. Neural network application recorded the lowest responses only 10 percent of the participant use this application and it is specifically used by 2 respondents in solely performing financial accounting task while just one respondent uses it in multiple tasks, financial accounting, taxation, costing accounting and management accounting.

Table 4.4: Plans to deploy artificial intelligence application in accounting functions

	Frequency (%)	Mean	Std. Deviation
Natural Language (artificial Intelligence) application we anticipate to deploy in next 12 months	4(13.32)	8	10.924
Rule-based system (artificial Intelligence) application we anticipate to be deployed in next 12 months	9(29.97)	10	8.916
Machine learning method (artificial Intelligence) application we anticipate to be deployed in next 12 months	8(26.64)	10.38	8.262
Robotic process automation (artificial Intelligence) application we anticipate to be deployed in next 12 months	8(26.64)	9.25	9.453
Expert systems (artificial Intelligence) application we anticipate to be deployed in next 12 months	6(19.98)	11.5	9.182
Neural Networks (artificial Intelligence) application we anticipate to be deployed in next 12 months	4(13.62)	11.5	11.733
Optical character recognition OCR (artificial Intelligence) application we	6(19.98)	11.33	9.873

anticipate to be deployed in next 12 months			
Intelligence data capture (artificial Intelligence) application we anticipate to be deployed in next 12 months	9(29.97)	14.67	13.295
Speech recognition (artificial Intelligence) application we anticipate to be deployed in next 12 months	3(9.99)	15.33	11.15
Technology not listed	7(23.31)	13.57	8.96

Another related variable that pertain to this research question, is the type of artificial intelligence application respondents are intending to deploy in the next 12 months. Based on the frequency count and percentage, about 30% of the respondents signified that they have plans to deploy rule-based system and intelligence data capture application in performing accounting functions in the next 12 months.

4.2.2 Research Question II:

What is the effect of AI on the accounting functions of companies in Nigeria?

Respondents' view on the benefit of artificial intelligence in performing accounting related functions were reported in Table 4.5. It can be inferred that for all the seven accounting functions (financial accounting, taxation, auditing, costing accounting, management accounting, payroll and forensic accounting) highlighted in the questionnaire over 80 percent of the respondents agrees that artificial intelligence application transform and improve the efficiency in workflow. As a result, indicating that artificial intelligence applications have a substantial impact on accounting functions.

Table 4.5: Opinion on benefits of AI in accounting function

	Strongly agree	Agree	Neutral	Disagree	Mean	Std. Deviation
In financial accounting, AI will transform the workflow and increase efficiency.	13(43.3)	15(50)	2(6.7)		1.63	0.615
AI will revolutionize the auditing procedure and increase efficiency.	7(23.3)	17(56.7)	3(10)	3(10)	2.07	0.868
AI will change the workflow and improve the efficiency in taxation accounting	10(33.3)	13(43.3)	5(16.7)	2(6.7)	1.97	0.89
In cost accounting, AI will change the workflow and increase efficiency.	11(36.7)	16(53.3)	3(10)		1.73	0.64
In management accounting, AI will revolutionize workflow and increase efficiency.	8(26.7)	18(60)	3(10)	1(3.3)	1.9	0.712
AI will revolutionize payroll workflow and increase efficiency.	14(46.7)	14(46.7)	1(3.3)	1(3.3)	1.63	0.718
In forensic accounting, AI will change the workflow and increase efficiency.	7(23.3)	14(46.7)	5(16.7)	4(13.3)	2.2	0.961

Source: SPSS 24 Computation

Even though a very large proportion (more than 80%) of respondents supported the efficacy of artificial intelligence, but varying proportion are of the opinion that in some specific accounting functions artificial intelligence applications replaced human accounting professionals. For auditing, taxation and forensic accounting functions more than 57% either disagree or neutral about the total replacement of human by artificial intelligence application.

Table 4.6: Accounting Professionals, replaced by Artificial Intelligence in the next 10 years

Variable	Strongly agree	Agree	Neutral	Disagree	Mean	Std. Deviation
Humans (accounting professionals) will be replaced by AI in Financial accounting	8(26.7)	14(46.7)	4(13.3)	4(13.3)	2.13	0.973
Humans (accounting professionals) will be replaced by AI in Auditing	3(10)	7(23.3)	10(33.3)	10(33.3)	2.9	0.995
Humans (accounting professionals) will be replaced by AI in Taxation	5(16.7)	8(26.7)	9(30)	8(26.7)	2.67	1.061
Humans (accounting professionals) will be replaced by AI in Cost accounting	9(30)	9(30)	6(20)	6(20)	2.3	1.119
Humans (accounting professionals) will be replaced by AI in Management accounting	7(23.3)	10(33.3)	5(16.7)	8(26.7)	2.47	1.137
Humans (accounting professionals) will be replaced by AI in payroll	17(56.7)	6(20)	3(10)	4(13.3)	1.8	1.095
Humans (accounting professionals) will be replaced by AI in forensic accounting	2(6.7)	9(30)	9(30)	10(33.3)	2.9	0.96

Source: SPSS 24 Computation

Lastly on the effect of artificial intelligence on accounting function, Table 4.6 displays the risk and limitation of the use the application. Of all the limitations identified in the survey on artificial intelligence, about 97% of the respondents agree that high cost of implementation is the major issue in the use of artificial intelligence in carrying out accounting activities. The loss of employment is a major risk for the full implementation of artificial intelligence application as reported in the survey. 77% of the respondents attest to the fact that deployment of artificial intelligence applications could lead to loss of means of livelihood for accounting professionals.

Table 4.7: Risks and limitations of Artificial Intelligence in accounting profession

Variables	Strongly agree	Agree	Neutral	Disagree	Mean	Std. Deviation
High cost of implementation	17(56.7)	12(40)		1(3.3)	1.5	0.682
Loss of employment	17(56.7)	6(20)	5(16.7)	2(6.7)	1.73	0.98
Lacks human creativity	8(26.7)	10(33.3)	3(10)	9(30)	2.43	1.194
Risk of data security	6(20)	11(36.7)	4(13.3)	9(30)	2.53	1.137
Skills shortage	7(23.3)	12(40)	6(20)	5(16.7)	2.3	1.022
Unavailability of adequate data	5(16.7)	7(23.3)	10(33.3)	8(26.7)	2.7	1.055
Legal & Privacy issues	8(26.7)	9(30)	8(26.7)	5(16.7)	2.33	1.061

### 4.3 Research Hypothesis

In this section, regression analysis is employed to establish the relationship among the variables. Based on the normality test result, the linear regression estimation technique is used to estimate the relationship and hence its test statistic deployed to test the hypothesis. Two major variables, benefit of artificial intelligence (BENEFIT) and the kind of artificial intelligence application used in accounting functions (KINDAI). The dependent variable is BENEFIT while the independent variables are KINDAI

Table 4.8: Normality Test

Tests of Normality						
	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
kindai	.155	23	.158	.888	23	.015
Benefit	.129	23	.200*	.952	23	.323

\*. This is a lower bound of the true significance.  
a. Lilliefors Significance Correction

Presented in Table 4.6 is the Normality test, whose result has guided in choosing the specific type of regression technique, linear regression analysis. In the test of normality, the

significance of Kolmogorov-Smirnov statistics is used. The result reveals that the variables are normally distributed.

4.4 Regression Analysis

Table 4.7 shows the regression result, three major results are reported in this table, firstly is the model summary, the second is the ANOVA table, lastly is the coefficient table. The model summary displays the adjusted R square and Durbin Watson.

Table 4.9: Regression

Model Summary <sup>b</sup>									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson				
1	.043 <sup>a</sup>	0.002	-0.046	0.45737	2.681				
a. Predictors: (Constant), kindAI									
b. Dependent Variable: Benefit									
ANOVA <sup>a</sup>									
Model		Sum of Squares	df	Mean Square	F	Sig.			
1	Regression	0.008	1	0.008	0.039	.846 <sup>b</sup>			
	Residual	4.393	21	0.209					
	Total	4.401	22						
a. Dependent Variable: Benefit									
b. Predictors: (Constant), kindAI									
Coefficients <sup>a</sup>									
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	1.655	0.146		11.354	0.000			
	kindAI	-0.002	0.011	-0.043	-0.197	0.846	-0.043	-0.043	-0.043
a. Dependent Variable: Benefit									

In the analysis of the simple linear regression, parameter (coefficient) estimates of the result is interpreted and discussed taking into consideration the model fitting information, goodness of fit, the adjusted R-Square and probability value of the coefficient.

For this model, the coefficient of KindAI is -0.002 and the probability value (0.846) is statistically insignificant since this value greater than 0.05. Interpreting this result based on the sign of the coefficient, this finding indicates that artificial intelligence applications and accounting functions have a negative association. Furthermore, the ANOVA table that shows the significance of the overall model reveals that the regression model is not significant since the probability value (0.846) is great than 0.05.

Hence, to test the null hypothesis, no significant effect of AI technology on the accounting functions of Nigerian companies, the probability value of KindAI is considered and this result suggested that the null hypothesis is not rejected since the probability value 0.846 is greater than the 0.05 level of significance. Therefore based on this result there is no statistical significant relationship between artificial

intelligence application and the accounting functions of companies in Nigeria.

V. CONCLUSION AND RECOMMENDATION

Empirical Researches and studies into the nexus between artificial intelligence and accounting are still relatively scanty but progressively emerging. The expectation for the near future is that this and many other researchers will develop ways to dig deeper into various aspects of this relationship and come up with further findings and conclusions.

5.1 Conclusion

The results as shown in the descriptive summary attested to the fact that artificial intelligence impacts on accounting function, only that statistical test does not establish a significant relationship. Based on this survey, the relationship between AI and accounting function is not statistically significant. However, all the previous studies reviewed agree that artificial intelligence will impact the way accounting is practiced but this research appear to support the opposite. This is in line with the findings of Bakarich and O'Brien (2021) in their work titled "The Robots are Coming... But Aren't Here Yet: The Use of Artificial Intelligence in the Public

Accounting Profession". They posited that AI technology, specifically Robotic Process Automation and Machine Learning are presently under used by practicing accountants and their clients, and a few of these firms are conducting some basic but not in-depth training on these technologies. However, their respondents strongly believed that AI will significantly impact their daily responsibilities in five years and public accountants are very receptive to these changes. Additionally, they found that firm size appears to be the most significant factor impacting differences in responses.

Max et'al, (2020) posited that AI is still in its infancy in terms of adoption for its application to effect society in general. This, they claim, is owing in part to relatively large investments in AI technology adoption, as well as the likely difficulty of a skills scarcity within firms. However, organisations ought to and will strive to gain expertise in the field because of the enormous potential benefits of using AI technologies.

These results suggest that even though extensive AI adoption has not yet come to public accounting practice, the prospect of considerable changes are very high. The gap in opinion here could be attributed to the following:

- 1) Many of the previous researches in this topic were done with evidences from more advanced economies in Asia, Europe and America where advancement and adoption of new technology is much faster than in developing countries like Nigeria. Nigeria like many countries in Africa tend to wait for others before queuing behind in embracing new technology and inventions and this is what we see playing out from the result of this research in the understanding and deployment of AI.
- 2) The only related research done within the Nigerian context was more on computerisation generally rather than artificial intelligence specifically. More so, the studies with reference to artificial intelligence were limited to review of extant literatures. This researcher could not find a more detailed rigorous empirical and statistical data analysis but review of previous work many of which draw inferences from researches on computerisation and accounting functions generally.
- 3) The whole concept around artificial intelligence technology and its application to accounting functions is an emerging phenomenon and as such there is very little knowledge and attention to this technology by accounting professionals and other stakeholders in the profession especially in developing countries like Nigeria. For example, during the survey and oral interview, many of the respondents and participants were coming to terms for the first time as to role of artificial intelligence and accounting. Many were unknowingly confusing explicit software programming with artificial intelligence and machine learning.

It can therefore be inferred that the result of this research is localised to Nigeria and developing countries where adoption and use is still very limited and as such it is almost impossible to accurately measure its impact with the data available.

However, limiting our opinion to empirical review of existing literature, the conclusion will be completely different. According to extant studies reviewed by this author, the shift from traditional methods of carrying on accounting functions to AI dominated accounting is likely to have a two sided effect on the accounting discipline. On the one hand, there is going to be a significant improvement in the processes and output of the accountant. Unfortunately, the impending shift may also lead to significant loss of major accounting functions to artificially intelligence machines leading to loss of employment (Yangling, 2020).

The good news however is that AI does not have 'common sense' as in humans but 'artificial sense and therefore cannot be inductive and reason as man. Artificial intelligence will not effectively take the place of humans especially in decision making. AI will certainly compete for space with the accountant but will not replace the upward mobile accounting professional who will rather learn to use AI technology to achieve his goal rather than allowing AI to use and dump him. Most of the literatures reviewed agree that all repetitive, conventional and programmable accounting tasks and functions will eventually be taken over by the computer especially through AI capability. In other words, once a task is predictable to a certain degree and can be broken down into logical steps or performed by the use of formulae, AI is the way to go. Artificial intelligence fits more for quantitative rather than qualitative accounting tasks and functions and therefore will most definitely have more speed and predict accurately, *ceteris paribus* (other things being equal). The human accountant will go beyond technology to consider unforeseen events and unexpected external variables. that will normally make 'other things not to be equal'. This supports the view of Suleiman et al (2020) which acknowledged that computers are more effective to carry our complex analysis, yet the human touch is indispensable in understanding these analysis and therefore the imagining and creativity of man cannot be replaced by machines. Artificial intelligence technologies will be used to enhance the work of the accountant and the output of the accounting profession but not to replace it.

According to Najjar (2019), Artificial Intelligence can perform incredibly well but not very amazing in the many tasks and natural dexterity plus creativity of humans. Human beings make many decisions based on circumstance. It will take human professional services providers to understand and interpret the rules and regulations their clients must adhere to, and they are able to present options and recommendations in a manner the client can understand. Artificial intelligence machine learning systems do not handle this type of context well at the moment. Futurists and AI enthusiast have asserted the benefits of AI for many years now, painting the picture of

an amazing world where machines and robots make our everyday life one of ease and relaxation. Incidentally that future may be here faster than we think, but for now, accounting services rendered by humans have an advantage the most advanced algorithms cannot duplicate, that is the human touch.

### 5.2 Recommendations

As AI technology is gradually taking over accounting functions, urgent and practical steps will need to be taken by the relevant stakeholders in the industry to forestall the downside of the impact of artificial intelligence, and tap into the merits to keep the profession in its pride of place;

- i. Accounting professionals, companies, governments and other stakeholders in the accounting professional should as a matter of urgency seek to understand and adopt artificial intelligence technology rather than pretend that the 'doomsday' will not come, realising quickly that AI more than many other technological inventions will impact the profession in ways that may not be fully imagined.
- ii. The accountant should begin to take back finance, management and other tasks including taxation which were previously part of accounting.
- iii. There is also an urgent need for the accounting professional to acquire information technology (IT) and basic programming skills to enable him take his rightful position in the AI space.
- iv. Educational institutions, both academic and professional should include AI skills into their accounting curriculum or develop a course that incorporates programming and accounting to prepare the accountant for this new normal. This agrees with the opinion of Qasim and Kharbat (2020) that current industry implementation of new technologies should be considered by academia when designing accounting curriculum to prepare graduates for the market and to ensure their employability. They call for radical changes in the accounting curriculum to reach a balance between existing accounting knowledge and information technology skills relevant to the profession.
- v. The relevant government agencies should seek to understand new technologies like block-chain and the global trend in accounting transactions so as to tap into the benefits and mitigate their adverse effect rather than legislate out-rightly against them like we saw recently in the case of Central Bank of Nigeria (CBN) and crypto currencies; although the bank appears to be rethinking its decision as it has announced plans to introduce its own crypto currency.

### 5.3 Areas for Further Research

More scientific empirical studies should be conducted to dig deeper into the relationship between artificial intelligence and

accounting functions with a view to propping the understanding of the technology by stakeholders in the accounting profession and the application thereon to accounting functions.

More specifically, studies should be undertaken to find out the reason for slow penetration and adoption of artificial intelligence technologies for accounting functions in developing countries like Nigeria.

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