



Perceptions on the Use of Artificial Intelligence in Accounting: An Empirical Study among Accounting Professionals in Nigeria

Research dissertation presented in partial fulfilment of the requirements

for the degree of

MSc in Accounting and Finance Management

Griffith College Dublin

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27th August 2020

Candidate Declaration

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I certify that this dissertation entitled:

Perceptions on the Use of Artificial Intelligence in Accounting: An Empirical Study Among Accounting Professionals in Nigeria

submitted for the degree of: **MSc in Accounting and Finance Management** is the result of my own work and that where reference is made to the work of others, due acknowledgment is given.

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Dedication

This dissertation is dedicated to God and my lovely family.

Acknowledgements

I would like to appreciate my supervisor, Mr. Godwin Agbo for his guidance and valuable inputs throughout the dissertation process.

I would also like to appreciate my parents who supported me through this journey and gave me the opportunity to achieve my dreams. Also, my wonderful sisters who provided me with moral support.

I would like to also appreciate all my friends here in Ireland and Nigeria, and everyone who took the time to fill out my questionnaire and passed it on to their colleagues.

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List of Abbreviations

AI – Artificial Intelligence

Abstract

Perceptions on the Use of Artificial Intelligence in Accounting: An Empirical Study among Accounting Professionals in Nigeria

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Artificial Intelligence has been widely discussed in accounting for some years now, this study examined the level of awareness and perceptions on the use of artificial intelligence in accounting among accounting professionals in accounting, it also examined if the individual characteristics of accountants affect their perception on the use of artificial intelligence in accounting.

A random sample of 399 Accounting Professionals in Nigeria was used in the study. The study adopted a between group design, and an independent samples T-test, and one way between group Anova was used to test for the effect of accountants' characteristics on their perception. The study found that there is a high level of awareness on the use of artificial intelligence among accounting professionals in Nigeria, but their knowledge is mainly theoretical, gotten from personal readings and the media. Overall, the accounting professionals have a positive view on the use of artificial intelligence in accounting with the majority showing support for the development of AI in accounting, and minimal worries about job displacement due to AI.

The results indicated that male accountants tend to hold a more favourable opinion of AI compared to female accountants, while accountants of different ages, level of education, years of experience, area of specialization, qualification status and professional bodies do not differ in their perceptions on the use of artificial intelligence in accounting. The results of the study also highlighted the need for reform in accounting education and continuous personal development for accountants to adapt to emerging trends.

1. INTRODUCTION

1.1 Overview

Artificial intelligence is gradually becoming an integral part of our daily lives, from virtual assistants on our mobile phones to smart speakers, driverless cars, accurate recommendation algorithms on Netflix, google translate, etc. AI today has reached a level where it can carry out conversations with people, compete with humans in games, work alongside humans, and make financial decisions in the real world. AI technologies are now capable of carrying out tasks that were in the past said to be hard to automate, i.e. tasks that require cognitive capabilities (McKinsey, 2017), and have been performed by humans for a long time with the introduction of predictive analytic tools, semi-autonomous robots, and intelligent algorithms (Smith, 2016).

Artificial Intelligence is not a new phenomenon, lately, however, there has been a lot of speculations and questions regarding artificial intelligence and the impact it will have. AI is an umbrella term that is used to describe any technique that allows computers to imitate the intelligence of humans (Stancheva-Todorova, 2018). Simply put, artificial intelligence refers to the capability of systems to perform tasks that will ordinarily require human intelligence (Oxford Dictionary). Cognitive technology is a branch of AI that can do the things that only humans had the capabilities to do in the past, and it is fast evolving. It includes speech recognition, computer vision, robotics, natural language processing, machine learning, etc. (Schatsky *et al.*, 2015). AI is being widely used in the medical industry, finance, economics, management, weather forecast, gaming industry, etc. (Taghizadeh *et al.*, 2013), the reality is that almost all occupations will experience a transformation due to AI and automation to a certain degree (Frank *et al.*, 2019).

Accountants have a history of depending on source documents like supplier invoice, sales order, bank statements, vouchers, etc. to manually create journal entries in the accounting system, but several accounting, auditing, tax processes, and tasks are already being automated by specialized software, and the result of these processes are provided to accountants who possess professional judgement for analysis (Smith, 2016). It is important to note however that not all these technologies have intelligence and cognitive ability, and technology would only be regarded as AI if it is cognitive, has the capability of learning over time, and is independent (Kokina and Davenport, 2017). With the rapid developments in AI, AI could do more than repetitive or

mechanical tasks and begin to take on more tasks like decision making, monitoring regulatory compliance, etc. (Jariwala, 2015).

The fact that accountants are adopting AI is the biggest pointer to AI being relevant and applicable to accounting, although this adoption is in different stages in different countries, accounting practices, and companies. Deloitte announced that it would introduce AI into its accounting, auditing and taxation process in 2016, and in partnership with Kira systems has adopted a system called “Argus” that learns and enhances its capability over time from its interaction with human, the system is used for extraction of relevant information from legal documents, contracts, employee agreements, invoices, and so on (Kokina and Davenport, 2017). Pegg, the world’s first-ever accounting chatbot was introduced by Sage and becomes more intelligent with continued interaction (Duffy, 2018). KPMG is applying IBM’s Watson in a range of applications like extraction of information from documents and facial recognition. EY has focused more on big data analytics, and for analyzing journal entries, PWC uses Halo

AI, cloud computing, mobile accounting, blockchain, has started to have a significant effect on daily activity, revenue streams, and client relationships (CaseWare, 2019). All accounting professionals, whether those working within corporate finance departments or with an accounting practice will feel the impact of artificial intelligence and other emerging technologies. Therefore, it is worthwhile to find out if these accounting professionals are embracing these technologies and excited at the chance to move from manual tasks to more value-added tasks, or if they are fearful of the impact it might have.

Accountants in this research refer to accounting professionals working in various areas of accounting, such as financial accounting, auditing, management accounting, tax accounting, advisory and consulting, etc.

1.2 Research Purpose

Previous research in this area shines light on the impact that artificial intelligence might have on the accounting profession and the changes it might bring to the profession, but one often neglected area is the perceptions of accounting professionals regarding the use of artificial intelligence in accounting. Artificial intelligence and automation, in general, would indeed have a significant impact on accounting firms, accounting departments, accounting regulators,

accounting educators, accounting bodies, etc., but accounting professionals will be the most hit by these changes, as they might begin to experience changes in the demand for their skills. It is therefore important to analyze the thoughts of these professionals and understand whether they perceive artificial intelligence as a threat or opportunity, as their perceptions can impact the adoption of artificial intelligence in the accounting industry. Considering this, the purpose of this study is to answer the following research questions:

1. What is the level of awareness on the use of artificial intelligence in accounting among accounting professionals in Nigeria?
2. What is the perception of accounting professionals in Nigeria on the use of artificial intelligence in accounting?
3. What is the effect of the individual characteristics of accounting professionals in Nigeria on their perception of artificial intelligence?

1.3 Significance of the Study

This study, by presenting the perceptions of accounting professionals in Nigeria on the use of artificial intelligence in accounting, has the potential to increase awareness on the use of artificial intelligence and raise awareness among accounting professionals in Nigeria on the need to be prepared for the possible changes in the profession. It could also start a conversation on the much-needed reform in accounting education and encourage the professional bodies to do more in educating their members and preparing them for the possible changes that lie ahead. This study would especially be beneficial to accounting professionals, professional accounting bodies, accounting regulators, accounting firms and every organization with a finance function as it provides insight on how accountants perceive the use of artificial intelligence in accounting, which is an important factor in the successful adoption of artificial intelligence in the profession.

1.4 Research Objectives

The main aim of this study is to understand the perspectives of accounting professionals in Nigeria on the use of artificial intelligence in Accounting. This can be further broken down into three objectives:

1. Assess the level of awareness on the use of artificial intelligence in accounting among accounting professionals in Nigeria

2. Assess the perceptions of accounting professionals in Nigeria on the use of artificial intelligence in accounting
3. Analyze the effect of the individual characteristics of accounting professionals on their perception of artificial intelligence

The individual characteristics considered in this study are age, gender, level of education, area of specialization, experience, and qualification status, and professional body of accountants.

1.5 Structure of the Study

This study is structured into five chapters. The first chapter gives an overview of the research, the research purpose, significance, and objectives. The second chapter is a detailed review of relevant literature to the study, the concept of artificial intelligence and its impact on accounting is broadly discussed, it also includes empirical literature and a conceptual framework for the study. The third chapter discusses the research methodology and provides a detailed account of the research design employed in the study, outlines the methods of data collection, and explains the rationale behind the given method. The fourth chapter presents the findings from the primary data collection, analysis was carried out using descriptive and inferential statistical tools. The fifth and final chapter contains the discussion, suggestions for further research, recommendations, limitations of the research, and concludes the research study.

2. LITERATURE REVIEW

2.1 Introduction

In this chapter, the concept of artificial intelligence, its functions, advantages, limitations, and the possible impact on work are explained. Also, the current applications of artificial intelligence in accounting are discussed, and the areas in which artificial intelligence will impact the accounting profession is mapped out.

2.2 Artificial Intelligence

AI can be defined in several ways, but all definitions have one thing in common, the fact that AI has the capacity to learn and think, and accomplish tasks ordinarily carried out by humans. Haenlein and Kaplan (2019) defined AI as a system that possesses the ability to do the following: the correct interpretation of external data, ability to learn from the data, and ability to use what is learnt in the achievement of particular tasks and goals through flexible adaptation. Artificial Intelligence gives a device the capability to carry out activities that only the human brain would be expected to be able to achieve, and this includes the ability to acquire knowledge, the capability to understand relationships, provide judgement, and original thinking (Chukwudi *et al.*, 2018). From the perspective of business, AI is a set of tools, and the method of using those tools in solving business problems (Hunt, 1986). Machine learning is the basic principle underlying AI. By continuous analysis of its interactions with the world, a computer can improve on its capabilities, and this is what is known as machine learning (Garbuio and Lin, 2019). According to Taghizadeh *et al.* (2013), the overall goal of artificial intelligence is the development of a system that can think, have emotions, and expand its knowledge. Artificial intelligence technology might overlay other emerging technologies such as blockchain, cloud services, data analytics, robotic process automation, etc. (Moll and Yigitbasioglu, 2019).

Alan Turing in his 1950 essay, (Turing, 1950) came up with two tests to ascertain if machines could think. The first test examines if AI can hold a conversation that can be undistinguished from that of a human. Several attempts have been made over the years to pass this test, the most recent attempts are seen in the likes of Siri and Cortana, but the difference is still clear. The second test has to do with the halting problem, that is, AI might never know when it is right because it is subject to continuous feedback (Upchurch, 2018). His tests, especially the first one

has been criticized because some believe that it is possible to have an intelligent machine that does not communicate like humans do (Taghizadeh *et al.*, 2013). There has been various artificial intelligence winters and springs, but the activities in this current artificial intelligence spring are greater than any of the past seasons, this can be attributed to the fact that processing power and substantial data, the elements that AI needs to function are readily available today. (Kokina and Davenport, 2017).

To aid a better understanding of AI, Davenport *et al.*, (2020) built a multidimensional framework (shown in fig 1) based on extant research that gives insight to the present state and the possible evolution of AI (Davenport *et al.*, 2020). The framework integrates three subsets into one. The first one is Intelligence levels; AI is classified into task automation and context awareness. Task automation is when AI is programmed to do a single task. Context awareness on the other hand is AI that can learn how to learn, that is perform outside its original programming. This however remains distant, and there is only a 50% chance that AI would reach such levels even by 2050. The second subset is “tasks”, and this is divided into numerical and non-numerical data. Numerical data is easier to process than non-numerical data. Also, data that is in tabular form is relatively easier to process. Some non-numerical data can be transformed into numerical data, but the analysis of non-numerical data remains limited, if this ability can be fully developed, then the full power of AI is closer to being realized. The third subset is AI form, AI can either be virtual or embedded in a robot (Davenport *et al.*, 2020).

There are several other ways in which AI can be classified. This distinction between task automation and context awareness is consistent with the concept of narrow and general AI. Narrow AI cannot extend into other domains that are not its specific domain (Baum *et al.*, 2011). While general AI means that one cannot distinguish the behavior of the AI from the behavior of actual human, meaning that AI would have complete cognitive, social and emotional capabilities (Haenlein and Kaplan, 2019). Both have been said to outperform humans (Baum *et al.*, 2011). Haenlein and Kaplan (2019) also state that AI can be classified according to its stage of evolution as general, narrow, or super intelligence, according to its intelligence type which could be social, cognitive, or emotional, or classified as analytical, humanized or human-inspired.

Task automation technologies, deployed currently or to be deployed in the short to medium term

	Digital form	Robot form
Analyze numbers	1 – Controller of Numerical Data Business Use Case Kanetix IBM	3 – Numerical Data Robot Business Use Case Café X Topsy Robot
Analyze text, voice, faces, images	2 – Controller of Data Business Use Case Conversica Stitch Fix Replika	4 – Data Robot Business Use Case LoweBot 84.51/ Kroger Walmart/ Bossa Nova K5 from Knightscape

Context awareness technologies that *may* be deployed in the long term

	Digital form	Robot form
Analyze numbers, text, voice, faces, image	5 – Data Virtuoso Example Use Case Jarvis	6 – Robot Expert Example Use Case Dorian

Fig 1. The present state and the possible evolution of AI. Sourced from: (Davenport *et al.*, 2020)

There are certain drivers and barriers of implementing AI. According to Upchurch (2018), four factors have contributed to the growth of robot and AI use; improvement in the mobility of robots, advances in deep and machine learning that has led to the improvement in the scope and range of AI, advances in cloud computing that makes it possible for robots to be programmed remotely as opposed to physically, economies of scale, i.e. the cost of using robots is falling in comparison to human labor. The author also noted that there are technical, social, and economic limitations that might hinder AI taking over work. The technical limitation is that the answer to

Alan Turing’s test mentioned above has not been achieved until now. The social limitations are evidenced in legal and insurance issues. For example, driverless car insurance would have to be paid by the manufacturers and not the individual, AI cannot be sued because they cannot take responsibility (Upchurch, 2018). Kokina and Davenport (2017) argue that the fact that economies have not seen tangible improvement in productivity in the past several years and are expectant of whether cognitive technology can improve the growth in productivity, and the impossibility of humans to handle the analysis and decision making in certain situations today due to the large volume of data and time frame required for those decisions drive the demand for AI today. Renz and Hilbig (2020) also identify drivers and barriers to the development of AI as shown in fig 2 below.

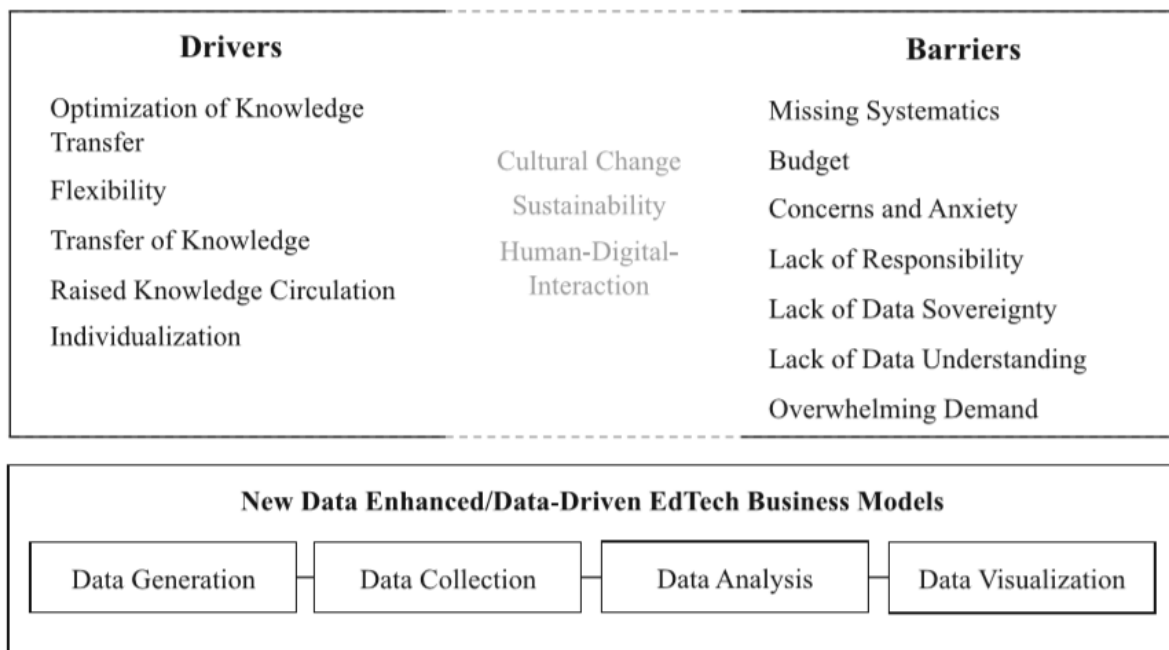


Fig 2. Drivers and Barriers to developing AI. Sourced from: (Renz and Hilbig, 2020)

2.3 Artificial Intelligence and its Impact on Work

There have been times in the past where similar concerns of technology causing massive job displacement have been raised, it is important to consider if AI is a different concept and completely new to the concerns of the other technologies. When writing was introduced, they were concerns about if it will displace the human memory, and when reading was introduced, there were concerns about if it will substitute real knowledge for just mere data. In the 19th

century, there were also riots concerning the industrial revolution by the Luddites (Frank *et al.*, 2019). There were predictions of reduced working hours in the past due to increased productivity when new information technology like communication devices, computers, telegraph, internet of things was introduced, but this has not been the case. The predictions were always proved wrong, and although there were reductions in working hours at some point, it was due to other factors like trade unions, social democratic politics, growing economy, etc. (Upchurch, 2018). Despite all these concerns in the past, human labour has remained relevant, does this mean that human labour is somehow resilient to these technologies and automation? It is believed that AI is new technology altogether, as it possesses cognitive and emotional capabilities in addition to technical capability, therefore the technology-driven trends of the past cannot be used to predict the AI trends of today (Frank *et al.*, 2019).

Economic research on AI and robotics suffer a great lag despite the enthusiasm surrounding the revolution of AI. At the point we are now, the main studies on the subject can be grouped into two: assumptions from labour economist from innovations of the past, and theoretical arguments from the angle of economic growth theory using a singularity hypothesis (Morikawa, 2017). Some barriers make the measurement of the impact of technology on work difficult for researchers. The first barrier is the limited data on the nature of work i.e. there is limited data on the specific skills and tasks required to carry out work. The second barrier is the limitation in models of resilience, i.e. the technology-driven trends of the past might not capture the AI trends that we are facing today. The third barrier is that impact on technology in places are usually measured in isolation, the problem with this is that there is a different impact of technology in different cities and different geographical areas, and the impact in one city can affect the impact in another city (Frank *et al.*, 2019). (Mokyr *et al.*, 2015) argues that the focus of future labour market prediction are generally on existing jobs and the problem with this is that it can only offer insight on the displacement of jobs but ignores the possibility of new occupations emerging as a result of new innovations. They further went on to say that there would be the creation of new services and unimaginable occupations as a result of new innovations.

A job comprises of tasks. The impact of AI on employment should be framed into tasks and not jobs. Some tasks will be complemented by AI, some substituted by AI, and there will be the creation of new tasks (Sako, 2020). Huang et al (2019) concluded that it is useful to group tasks

required for a job into mechanical, thinking, and feeling intelligence to ascertain the tasks that AI can currently do and those it might be able to carry out in the future. When AI has mechanical intelligence, it can do repetitive and mechanical tasks and do not require large amounts of adaptation or learning. Analysis and decision-making capability in AI mean that AI has thinking intelligence, e.g. autonomous cars. This area is seeing fast development in today's world. An AI with feeling intelligence means the AI can Identify, imitate, and give a suitable response to human emotions (Huang *et al.*, 2019).

2.4 Different Scenarios of Artificial Intelligence Impact on Jobs

Different scenarios might happen when AI is adopted, these scenarios are explained below.

2.4.1 Job Displacement

This is the Doomsayer's perspective which states that although technology is adopted to improve human efficiency, technology can cause obsolescence to human labour if it continually sees huge improvements (Frank *et al.*, 2019). This is consistent with the pessimistic scenario of what the impact of AI will be, that is, robots will completely replace humans, and because of this humans would be demotivated to work and give the computers full power to make decisions. (Makridakis, 2017). A more optimistic scenario holds that robots will completely replace humans at work, but the free time would be spent doing work that interests them (Makridakis, 2017). If a business adopts AI in an autonomous way, that is, when the AI adopted can carry out activities on its own without human assistance, then the job displacement scenario is very likely to happen. The development of this stage in AI is currently ongoing (Garbuio and Lin, 2019)

2.4.2 Job Augmentation

The optimist perspective holds the point of view that technology may indeed lead to the substitution of some labour, but the benefits will outweigh the costs, although research done to follow up these statements have stated that the gain is not sustainable but temporary (Frank *et al.*, 2019). The pragmatic scenario of AI's impact on labour is in line with the optimist perspective and holds that the power of computers will be capitalized on and used to augment human ability (Makridakis, 2017). If a business adopts assisted and augmented intelligence, then the job augmentation scenario is likely to happen. This is because assisted intelligence is when the adopted AI assists in the improvements of the business present activities, i.e. carrying out of rote,

repetitive tasks, etc, and augmented intelligence is when the adopted AI creates completely new capabilities of the business, therefore creating a shift in the business model (Garbuio and Lin, 2019).

2.4.3 Nothing Changes

There is one other scenario that projects that everything stays the same, the doubting scenario is that humans are not affected at all by computers in tasks that require them to be creative (Makridakis, 2017). A perspective that unifies everything stated above agrees that technology creates uncertainty, but to understand the impact that technology has on occupations, occupations should be broken down into skills, this is because the direct impact of technology is on skills and not the entire occupation. Therefore, to unify the contrasting perspectives a framework that connects particular skill types to career mobility and whole urban workforces could be used (Frank *et al.*, 2019).

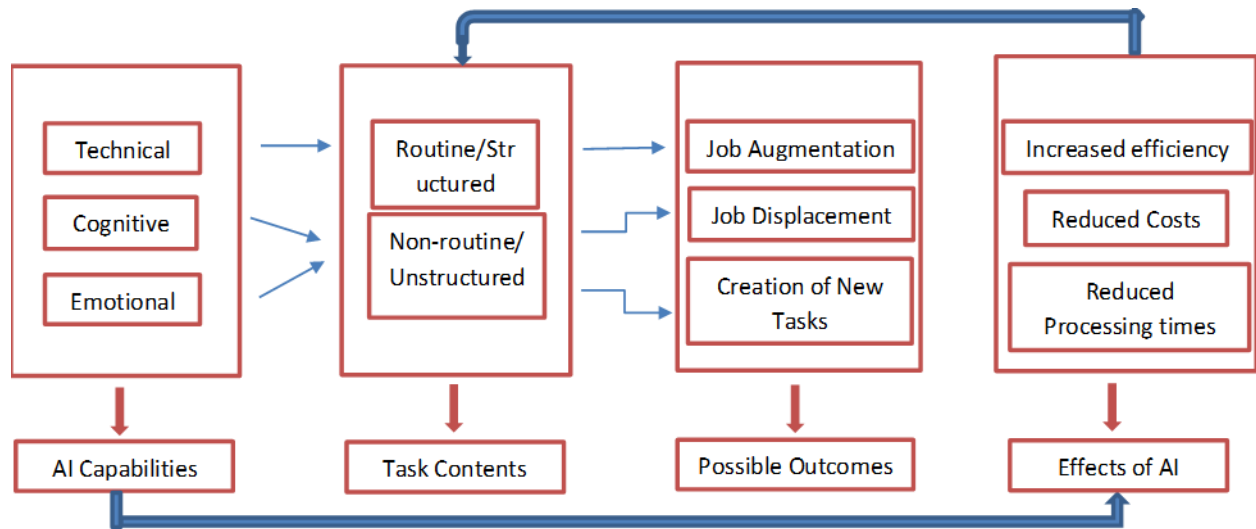


Fig 3. Artificial Intelligence Impact on Jobs (Assembled by author)

2.5 The Accounting Profession

One of the most important traits or attributes of a profession is that it is a body of knowledge, and the existing body of knowledge gives the profession a legitimate claim of expertise, autonomy, control over work, professional powers, etc. Simply put, it is the body of knowledge that makes them experts in their fields (Hines, 1989). Professionals act as agents or carriers of this formal knowledge. Freidson in his article, reviewed by Baszanger also states that the existence of a body of knowledge is a crucial trait of a profession, but that this body of knowledge can see a significant transformation in how it is applied and how it is practiced. (Baszanger, 1988). This might explain why the job description of accountants is ever-changing, 20 years ago the role of an accountant was very different from what it is now, and in another 20 years, accountants would surely be playing a completely different role (Greenman, 2017). Professionals usually hold a license to practice, this could make human oversight essential, although work may be delegated to machines. For example, only doctors with license and certificates can practice, because of this, social and professional norms might trump technical feasibility (Sako, 2020).

One of the most crucial roles of accountants is the identification of transactions and the process of recording those events through journal entries in line with a generally acceptable framework, like IFRS or US GAAP (Petkov, 2019). The financial statements are the final output of the accounting process, and it is usually based on the historical performance of the organization recorded over time in form of journal entries, they are used as a basis of decision making by the stakeholders of the company. These accounting processes are carried out by humans in the accounting or finance department of companies and as such are prone to errors, this is where auditors come in. The role of the external auditor is to make sure that the financial statements follow the generally acceptable framework as mentioned above, present a true and fair view of the performance of the company, and are suitable for decision making by the stakeholders (Petkov, 2019).

The accountants' job requires a great deal of judgement based on technical accounting knowledge, accounting standards, regulations, and experience, for instance, in the recording of liabilities and making estimates, the financial accountant must first decide if the transaction or item meets the definition of a liability and also reflect changes to the transaction in the books.

The auditor on the other hand also must decide based on their judgement if the financial accountant's judgement is correct. All this goes to show that the accountants cannot be eliminated in the accounting process but will work alongside artificial intelligence (Li and Zheng, 2018).

(Shaffer *et al.*, 2020) argues that the areas of bookkeeping, audit, and risk management would be greatly impacted by AI, financial reporting and tax accounting would experience moderate impact, while financial planning and management accounting would experience little impact. Management accountants main function is to interpret financial information and facilitate internal decision making, that is, help the management make decisions such as profitability of a line or product, and as such this role might not be adequately performed by AI, as it requires a high level of cognitive thinking and capacity (Shaffer *et al.*, 2020). Management accountants are also involved in budgeting, assessing, and evaluating the performance of management (Li and Zheng, 2018). AI technologies can use models to predict trends and provide data for the management accountant to work with, but it cannot wholly and completely carry out the job of a management accountant (Li and Zheng, 2018).

2.6 Current Applications of AI in Accounting

AI applications have been long used in the accounting domain since the 1980s. A lot of AI literature in accounting is focused on how expert systems are applied in accounting. (Stancheva-Todorova, 2018). Expert systems are programs that can simulate the way an expert in a specific field thinks. It is an intelligent program that reaches a level of expertise that can replace the decision-making abilities of specialists in a particular field (Taghizadeh *et al.*, 2013), and in general acts like a human expert in a number of ways (Hunt, 1986). One thing to note here is that expert systems are applied in a narrow problem area (Hunt, 1986). Expert systems are the most commonly used and easily implemented AI technology, they can be implemented for decisions which are based on logical steps (Chukwudi *et al.*, 2018). (Hunt, 1986) outlined some advantages of expert systems, they include the fact that expert systems do not forget things like humans do, can be easily reproduced compared to the training of new human experts, efficiency, consistency, breadth, completeness, timeliness, and permanent documentation. However, it has been argued that because the earlier expert systems were developed using decision trees and strict logic, and were therefore unable to correct themselves if they were wrong as they were not capable of

learning (Makridakis, 2017), they did not live up to their expectations (Stancheva-Todorova, 2018). These early attempts at automation indicate that accountants are always looking for ways to add value to the workplace by increasing their efficiency. Research is beginning to shift from the old expert system applications and is now focusing on the changes in the accountants' role, the benefits of AI to accountants, and the vision for AI and accounting in the long run (Stancheva-Todorova, 2018).

AI has been successfully used in the financial function for a long time, an example is the virtual closing process that was developed by Cisco in 2011 that was able to balance the books and provide consolidated financial statements at any time during the year to facilitate prompt decision making (Petkov, 2019). According to Kokina and Davenport (2017), AI is going to have the most impact on audit tasks that used to be manually performed but are now being supported by some form of technology, and these tasks are mostly in the substantive test phase, examples of such tasks are the mathematical accuracy verification of schedules, tracing transactions to the general ledger, recalculating depreciation and amortization, analyzing debt agreements and contracts, etc. Using AI, auditors can expand their focus from just the information provided in the financial statements and combine financial information with data from various sources like news feeds, social media, etc. Although it has been said that when the auditor has access to an overwhelming amount of information, it can result in inferior judgement (Ukpong *et al.*, 2019).

(Luo *et al.*, 2018) states that applying artificial intelligence in accounting comes with its challenges, one of the challenges is the insufficient experience in the early stages of its application. According to them, artificial intelligence in accounting is still at early stages, and AI used till date are mostly weak AI that drives automation, artificial intelligence in accounting has not reached the level at which it can change the fundamentals of accounting and bringing changes to accounting standards, and one the factors impending on its development is the “know-how” when it comes to its application. Another challenge is that the introduction of AI technology to the accounting functions in organizations is a big strategic adjustment and it requires a high level of investment, and the return on investment is slow. Other challenges include the higher level of expectations that are placed on accountants as they have to combine their accounting knowledge with information technology skills in other to function well in the new environment, and lastly, universities have not begun to adjust their curriculums to fit into

the current demand for accounting graduates. AI and other emerging technologies often come with security risks because of the handling of sensitive data (Rîndaşu, 2017), and if such systems are completely relied upon, an attack on the system will attract huge costs to the organization (Petkov, 2019). Another risk is the risk of AI projecting the prejudices and biases of humans as humans are responsible for training the system (Moll and Yigitbasioglu, 2019).

The implementation of AI in accounting has been somewhat handicapped or limited and it appears like there is some resistance to shift from the traditional ways as it is expected with all major changes (Petkov, 2019). There is a gap between accounting domains and the domains of AI and computer science, researchers from each domain should engage in cross-disciplinary research to close the gap between the two domains (Stancheva-Todorova, 2018). The successful development of AI in the accounting profession would require a healthy collaboration between accounting professionals, IT personnel, and developers of the AI program (Shi, 2020).

2.7 Artificial Intelligence Adoption in Nigeria

As advancement in artificial intelligence and other technologies improves, organizations begin to realize the potential and prospects of artificial intelligence, but there are lot of challenges that can hinder adopting and using AI for record-keeping in a country like Nigeria that is regarded as a developing country, some of these challenges are inadequate expertise and skills, and underfunding. (Chukwudi, 2018). Ukpong *et al.* (2019) also establish that issues are surrounding the adoption and application of AI in Nigeria and Africa at large and although there is excitement over possible AI applications, policymakers in Africa are faced with the fear of humans becoming redundant. Graduate unemployment is steadily growing in African nations, and a severe crisis would be lurking if AI takes over the few blue-collar jobs that are available, therefore the current situation right now in Africa is that of “waiting and seeing what happens”. Also, changes in skills and the need to review curriculums to accommodate the new skills demanded from graduates as a result of new technologies is another challenge. The third challenge has to do with the perceptions and attitudes towards AI, as not everybody is convinced that AI reality will match its promise and that its power will be fully harnessed.

The banking sector in Nigeria has experienced a digital wave sweep through the sector, banks are beginning to implement AI technologies to support automation of processes, reduce costs

associated with providing services to customers by providing human-like interactions supported by AI, and in areas of fraud detection, forecasting of loss, monitoring compliance, customer segmentation, etc., although adoption and implementation vary in different operation stages (Agidi, 2019).

2.8 Major Areas in which Artificial Intelligence will Impact Accounting

The replacement of some accounting tasks are already in progress, and reports show that automating these tasks are cost-effective solutions (Peng and Chang, 2019). Tasks that involve data collection and processing like bank reconciliation, payroll, categorization of invoices, preparation of income taxes, inventory management, etc. have long been automated, AI, however, takes this automation to the next level (Shaffer *et al.*, 2020). Stancheva-Todorova (2018) mapped out four areas in which artificial intelligence will impact the accounting profession (task displacement, education and training, new tasks and roles, and new skills). From the literature reviewed the researcher mapped out an additional area of impact and developed on the other four areas. These five areas are discussed below.

2.8.1 Performance Enhancement

Using AI will allow accountants to spend more time on the analysis and interpretation of results and meeting the superior needs of clients (Shaffer *et al.*, 2020). The capabilities of intelligent systems can greatly benefit accountants. AI applications can free up their time and allow them to engage in more value-adding tasks, give them access to superior and cheaper data, and improve the profoundness of their data analysis, all these would improve their ability to support the decision making processes in business by providing new insight (Stancheva-Todorova, 2018). It has also been observed that artificial intelligence impacts accounting operations positively by improving internal and external reporting, cutting down the use of paper, and increasing the accuracy of financial information, (Chukwudi *et al.*, 2018). It also improves the timeliness of the information and facilitates better decision making as there are normally lags between the occurrence of an economic event and when it is reported, it would also improve comparability between companies' financial statements, and reduce costs in the long run as only monitoring costs would be required (Petkov, 2019).

2.8.2 Job Displacement

The AI revolution is expected to change the accounting profession in many ways, although AI technologies can improve accounting work significantly, it can also cause the crisis of making accountants redundant, and this makes the technology a double-edged sword (Shi, 2020)

Stancheva-Todorova (2018) states that to find the potential of job displacement in the accounting profession as a result of the adoption of AI, accounting work would have to be split into tasks. Some tasks can be easily automated and some other tasks not. To find out the job displacement impact, one must find out which of the tasks has the probability of being automated and when will it happen, and to what extent will it be. Abdolmohammadi (1991) argues that accounting and auditing are a mix of structured and unstructured tasks, and although the application of social and creative intelligence is important, some tasks do not need such a level of creativity. The author identifies 400 audit tasks and states that some of the tasks are not structured and involves the reliance on information that is incomplete and uncertain, and because of this they are not suited for AI applications (Abdolmohammadi, 1991). In contrast to this, Kokina and Davenport (2017) state that a lot of audit tasks are repetitive and structured, and there are large volumes of unstructured and structured data needed to have a proper understanding of the performance of organizations, both financial and non-financial, and this makes auditing well suited for AI and data analytics application.

As we have discussed earlier, the impact of AI on employment is usually on specific tasks and not the entire occupation, as a result of this, loss of jobs due to AI in accounting will probably not be drastic or sudden soon but gradual and marginal.

2.8.3 Creation of New Tasks/Change in Tasks

Although AI would lead to loss of jobs in accounting, there would be an increase in accounting tasks and roles, and because of the collaboration accountants would have with data scientists, IT professionals, etc., these roles would not be focused on accounting and finance alone (Rîndașu, 2017). Examples of these new roles are the involvement of accountants in the testing and training of models and algorithms that would be integrated into the workplace (Gamage, 2016), and considering the ethics of data (Moll and Yigitbasioglu, 2019). Kokina and Davenport (2017) also argue that when the AI revolution entirely sweeps the accounting profession, the jobs left in

accounting would be things of the following nature, the supervision of intelligent machines, collaborating with vendors in the development of new AI technologies, monitoring the performance of AI technologies, developing relationships with clients, interpreting financial information, and overseeing accounting tasks that systems cannot automate. It has been reported that the continued growth in accounting jobs can be traced to two reasons: skill reforms and the creation of new tasks that are tech-dependent (Peng and Chang, 2019).

There would also be a change in accounting tasks. Gamage (2016) noted that the role of accountants would change because of their newly acquired data analytics skills, technological and financial modeling skills, they would no longer just be needed to prepare historical financial data but would also be needed to carry out proactive and strategic roles in the workplace, The accounting profession would be revolutionized and accountants would become some sort of “professional hybrid” because of their collaboration with finance, information, and technology.

2.8.4 Adoption of New Skills

One of the major challenges of artificial intelligence is that it can cause the progressive de-skilling of accountants and result in the placement of value in new skills. AI has been regarded as one of the top five threats to the accounting profession (Chukwudi *et al.*, 2018), and accountants need to develop new skills that adequately prepare them to efficiently work with AI and other emerging technologies (Rîndaşu, 2017).

The skills required to be a successful accountant in the future are expected to be different from what is required today (Kokina and Davenport, 2017). There are new skills required of accountants that probably wasn't required some years back, Stanheva-Todorova (2018) lists some of this skills as big data analytical skills, expertise in machine learning, critical thinking, leadership, and communication skills which include (eye contact, confidence, presentation skills, etc). Shaffer *et al.* (2020) argue that it is time to retrain accountants as AI products have reshaped and will continue revolutionising the accounting profession. Financial accountants and tax accountants should be trained in optical character recognition (OCR) which can significantly decrease the time used in capturing data manually from paper documents by 75%, auditors need to be trained in cognitive technology which can significantly enhance data processing and analysis as it has the capability to broaden and refine its knowledge. Li and Zheng (2018)

suggest that accountants should develop management skills, computer skills, ability to make decisions, predicting ability, analytical skills, etc.

Companies are also saddled with the responsibility of continuously retraining their staff to keep up with the innovation pace (Stancheva-Todorova, 2018). A massive challenge will be the re-training of the experienced accountants and managing how they might be resistant to change (Shaffer *et al.*, 2020).

As these changes occur, more significance is placed on an accountant's ability to understand and explain data and trends than merely carrying out activities like recording or vouching (Kokina and Davenport, 2017). Accountants would need to be well rounded with technical accounting knowledge, analyzing data, learning to work, and adapt to emerging technologies (Shi, 2020).

2.8.5 Accounting Training and Education

Educationists would need to play an important role in the transformation of the accounting profession. It is pertinent that the education system adapts to the world we are in today, the disciplines taught in school should be structured in a way that mirrors the skills that are expected from the future workforce, for example, tech-savvy and creative skills (Stancheva-Todorova, 2018). Researchers have emphasized the fact that universities need to provide accounting students with the knowledge needed to develop IT skills, even if it is just theoretical knowledge because universities are the bridge between future accountants and the profession (Rîndașu, 2017).

The timely response of the profession to the coming revolution lies in the hands of accounting educators. Accounting education would have to take a more interdisciplinary approach, borrowing expertise from statistics, computer science, information systems, engineering, big data, etc. as technical accounting knowledge alone is becoming highly insufficient. The gap between industry and accounting education would need to be bridged in this coming era, this is the only way to ensure that future graduates have a successful accounting career (Stancheva-Todorova, 2018).

Currently, a lot of accounting programs do not adequately prepare students for the new roles that they would be faced with in the future. The accountant's new role will require effective

communication skills and a deep understanding of businesses, and these skills are most likely to be found among more experienced accountant. Entry roles which accounting graduates take up are very structured and repetitive and would probably be the most impacted by the fourth revolution, and this might dramatically reduce the number of entry-level accountants needed. All these raise a question that begs to be answered, if there are lesser roles for entry-level accountants, how would younger accountants develop experience in accounting (Kokina and Davenport, 2017).

2.9 Empirical Literature

Some studies conducted have explored the perceptions and attitudes towards AI. Perceptions and attitudes are often used interchangeably in these studies.

Rkein *et al.*, (2019) conducted a qualitative study that explored the impact of automation on the accounting profession in Lebanon and found that there is a great degree of awareness among employers, employees, instructors, and graduates regarding the necessary change that automation will bring and the importance of being ready for it. Also, that this group of people mentioned above are aware that there might be job displacement due to automation, but that those jobs would be substituted with the creation of new jobs (Rkein *et al.*, 2019). Peng and Chang (2019) carried out a survey issued to accountants in accounting firms in Taiwan and Taichung to explore the thoughts of the accounting professionals regarding their possible replacement by AI. They found that 32% of the accounting practitioners that were surveyed possess a sense of crisis about losing their jobs to AI, while 40% felt like they cannot be affected, and the remaining 28% were neutral concerning the issue. According to the study carried out, people who were not bothered about being replaced by AI felt that they were adequately prepared to meet whatever challenges that lie ahead. On the other hand, people that were concerned about the effect AI might have on their employment felt like they were not prepared to meet the challenges that could be brought about using AI in the future (Peng and Chang, 2019). They suggest that accounting practitioners engage in continuous education, sharpen their communication skills, develop professional ability, and try to live and connect seamlessly with AI (Peng and Chang, 2019).

Rîndaşu (2017) concluded that although the accounting professionals in Romania are quite familiar with emerging technologies, they need additional IT skills to make their working

capabilities and data protection more efficient and that the foreignness of these technologies to accountants could be explained by the fact that they are not included in accounting curricular. Chukwudi *et al.*, (2018) carried out a study that focused on accounting firms located in South-east Nigeria and concluded that artificial intelligence as a positive influence on accounting functions, and as a result of this more decision-making roles will be ceded to intelligent systems.

Brougham and Haar (2018) developed a new measure, STARA awareness that measures employee's feelings towards job displacement due to "Smart Technology, Artificial Intelligence, Robotics, and Algorithms (STARA) in their jobs and how they are preparing for it. They found that there is little believe within the 120 employees surveyed that their jobs will be lost due to STARA, also career satisfaction and organizational commitment are generally lower among employees with more STARA awareness, and there was no correlation between STARA and job insecurity (Brougham and Haar, 2018).

Many previous studies that measure the perceptions or attitudes of a group of people towards artificial intelligence have been carried out in the medical field. One study carried out in Saudi Arabia investigated the level of awareness and perception of artificial intelligence in medicine among physicians, the study also tested for differences between each of the demographic variables (Abdullah and Fakieh, 2020). Abdullah and Fakieh (2020) found that the knowledge of AI among the respondents was low, there is a fear of job displacement among the respondents due to AI and there was a significant difference by job type in respondent answers as technicians had more positive views toward AI than doctors. Oh *et al.*, (2019) sought to find out the level of awareness, and attitude towards artificial intelligence among Korean doctors and tested for differences in responses according to demographics. They found that that awareness is low among Korean doctors and medical students, the majority of those surveyed think AI has useful applications in medicine, and the doctors are confident that AI cannot replace them. They also found that there was no difference in attitude towards AI based on specialty and working location, but there were differences in attitude based on their working status and amount of medical experience (Oh *et al.*, 2019).

Sawar *et al.*, (2019) also conducted a study of pathologists in 54 different countries to find out their opinions and views on integrating AI in practice, they also tested for differences based on demographics. They found that attitudes towards AI among pathologists are positive, and 75% of

them express excitement towards the use of AI, although there were concerns raised towards job displacement. They also found that males are more enthusiastic than females in their perspectives of AI, academic pathologists were more optimistic than community pathologists, those that are more than 40 years of age were optimistic about the reduction of errors due to AI, and that US respondents expressed more interest in AI and were less concerned about the loss of jobs compared to Canadian respondents (Sarwar *et al.*, 2019). Pinto dos Santos *et al.*, (2018) studied the awareness and attitudes towards AI among medical students. They found there is awareness of AI in medicine and in general among medical students, and they do not worry that AI would replace human physicians and that medical training should include AI. Males and tech-savvy people were more optimistic, expressed less concerns on job displacement (Pinto dos Santos *et al.*, 2018).

2.10 Conclusion

It is still unknown what the effect of artificial intelligence in accounting because there are so many uncertainties surrounding artificial intelligence and all so it cannot be predicted with certainty what will happen in the future. Artificial intelligence is not just another automation technology that can improve the efficiency of accountants, with its cognitive capabilities it can greatly benefit accountants. Accountants can keep adding value if they are prepared to work alongside with AI, therefore it is important to find out how accountants perceive artificial intelligence.

Only a few studies have investigated perceptions on artificial intelligence, and even fewer studies have measured the perceptions of accountants on the use of artificial intelligence in the accounting industry, most of these studies were purely qualitative, and the only quantitative study was conducted in a developed country (Peng and Chang, 2019). The adoption of AI among accountants, accounting firms, accounting departments within companies are at different stages, also different countries are at different stages of technology adoption, therefore accountants in different countries might perceive the impact of artificial intelligence differently. To the best of the researcher's knowledge, no study has explored the perception and views towards AI in accounting among accounting professionals in Nigeria where there is still a vast use of manual accounting. Therefore, to fill this gap, this study aims to investigate how aware accountants in

Nigeria are regarding these topics, whether they have a sense of crisis, and their general perceptions of the use of AI in accounting.

2.11 Conceptual Framework

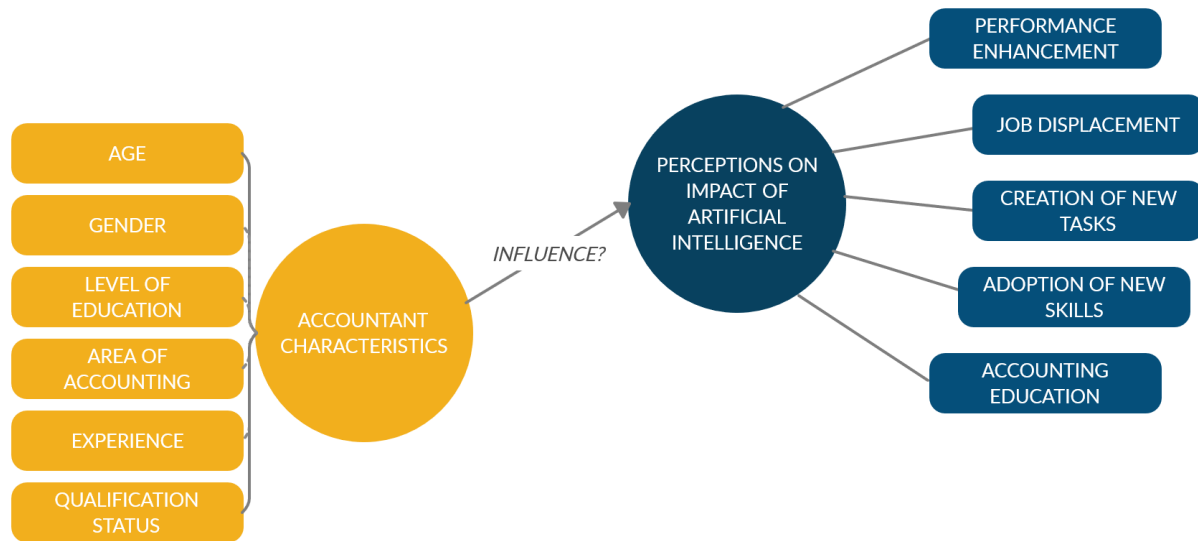


Fig 4. Conceptual Framework

The conceptual framework (fig. 4) was assembled by the author of this research based on the reviewed literature. From the literature reviewed, the researcher mapped out five areas in which artificial intelligence will influence accounting, the five areas are discussed above. This study aims to analyze the perspectives of accounting professionals in Nigeria regarding the use of AI and test if individual characteristics such as age, education, etc. of accountants influence their perception on the use and impact that AI will have on the accounting industry. In this study, the accountant characteristics will serve as the independent variable and their perceptions will be the dependent variable.

3. METHODOLOGY AND RESEARCH DESIGN

3.1 Overview

In this chapter, the philosophy that influences the research approach, the sources of data, method used to gather data, research design, access and ethics, and approach to data analysis are discussed.

3.2 Research Philosophy and Approach

The way a researcher conducts research is influenced by their philosophical position. (Saunders and Lewis, 2012) defined philosophy in relation to research “as the development of knowledge and the nature of that knowledge in research”. Positivism is one of the main strands of research philosophy, the main aim of a positivist researcher is to study variables that can be observed and measured and describe how these variables react to treatments carried out by the researcher (Saunders and Lewis, 2012). Positivism is also underpinned by the belief that the researcher is independent of the data collection process and their influence is not reflected in the data. (Saunders *et al.*, 2009). Positivism often leads to developing a hypothesis, testing the hypothesis, accepting or rejecting the hypothesis, and generalizations. The positivism philosophy is the philosophy underlying this research because one of the objectives of this research is to analyze the effect of individual characteristics of accountants on their perception on the use of artificial intelligence in accounting, and by doing this, the researcher will be subjecting the observed variables in the research to treatments and describing how they react to this treatment.

A deductive approach will be used in this research as it is consistent with the positivism philosophy, Deductive approach is used when the theory or hypothesis is developed, and then a research strategy is designed to test the hypothesis, it emphasizes on searching and explaining causal relationships between variables, and moves from theory to data. (Saunders *et al.*, 2009). One of the objectives of this research is to test if there is a significant difference in the way accountants perceive artificial intelligence in accounting based on their characteristics. This implies that, in this research, the theory comes before data as the researcher was clear on what will be tested before commencing data collection.

The emphasis of this research lies on understanding the perception of artificial intelligence of a large number of accountants and testing if the individual characteristics of the accountants have

an effect on their perception in a way that can be more generalizable than previous qualitative studies, using a highly structured methodology and quantifiable variables that can be subject to statistical methods. The positivism philosophy and the deductive approach are characterized with collecting a sample that is large enough to generalize to a certain extent.

The research is both descriptive and analytical/explanatory, which is sometimes called a “descripto-explanatory” study. The descriptive part of the research is usually used as an introduction or precursor to the analytical part of the research (Saunders *et al.*, 2009), which was what was done in this research. This research describes the level of awareness of the use of artificial intelligence in accounting among accounting professionals in Nigeria, and their perception on the use of artificial intelligence in accounting, and the way it will impact the profession. It then goes further to establish if the individual characteristics of accountants influence their perception of AI in accounting, which is what analytical studies do, they establish relationships between variables and aim at explaining the how and the why.

3.3 Research Strategy

The research questions, objectives, and resources available to the researcher are usually the deciding factors for the research strategy (Saunders *et al.*, 2009). A quantitative strategy was used in this research by employing questionnaires, as this is consistent with the deductive approach. Questionnaires are used for the collection of data from a large sample (Saunders *et al.*, 2009), and as said earlier on, the emphasis of this research is to assess the perception of the use of artificial intelligence in accounting among a large number of accountants.

A quantitative strategy was used because data were collected from a large sample, the researcher aimed to gather the opinions of many accountants across different spheres, and the best way to achieve that is through quantitative methods, as quantitative methods are usually characterized with large samples. Another reason for using a quantitative strategy is that there have been few qualitative studies assessing the impact of artificial intelligence in accounting, but because qualitative research is usually characterized with small sample sizes, the results of those studies were oftentimes not generalizable. Therefore, the researcher wanted to extend existing research by getting the perspectives of accounting professionals on a larger scale in a way that can be more generalizable than the qualitative studies, and relationships could be deduced. The

challenge of using a quantitative approach is that in-depth insight cannot be gotten from the data, as the respondents are limited to the options that are provided in the questionnaire. Also, the researcher does not have the opportunity to probe further and understand the reasons underlying why the subjects of the research think the way they think. In the case of this study, the researcher would only be able to report on the accountant's perceptions but would not be able to report the "why" and the "how" they formed these opinions. However, one of the important benefits of using a quantitative approach is that the researcher is independent of the data gathering process and their influence is not reflected in the data, this allows for a more objective research process and often leads to more objective results. Furthermore, trends in the data can be analyzed and this can be used to give a little insight into the reasons for the perceptions, and the quantitative approach is less time-consuming. Finally, the results and findings are more generalizable than qualitative research as the sample size is larger and the data is subjected to scientific treatments.

Deductive research is usually conducted at one point in time, i.e. on a "one-take basis" (Saunders *et al.*, 2009). Therefore, the study was cross-sectional because the data was collected at a point in time as the study was focused on the current perception of accountants on the use of AI in accounting at this point.

The research design for the study was a differential design. A between-group design as the participants were divided into different groups based on gender, age, level of education, years of experience, qualification status, professional body, and area of accounting, and these different groups were compared.

3.4 Collection of Data

3.4.1 Sources of Data

A mono method of data collection was employed as this is a quantitative study and the only data collection instrument employed was questionnaires. Self-administered questionnaires were used to gather data from the respondents. The questionnaire was internet-mediated, the questionnaire was designed on google forms, and then the link was shared with respondents. The researcher began by sharing the link to the questionnaire with accountants within her network, and they in turn shared it with their colleagues and other accountants that they know. The researcher also made use of professional networks like LinkedIn and other social media platforms to invite

respondents to fill out the questionnaire. The link was also posted and shared on several accounting forums.

The questionnaire was divided into three different sections. Attribute variables on the respondent's characteristics were collected in section A, these included age, gender, level of education, years of experience, area of accounting, qualification status, and professional body. A short definition of artificial intelligence was given as an introduction to section B to ensure that respondents did not misinterpret the phenomenon. Section B contained two questions on respondent's awareness of artificial intelligence and how they became aware of it were asked. Section C contained questions on the perception of the respondents on the use and impact of AI in accounting, which were asked in a Likert scale format, it contained questions about support for AI, excitement at the changes it might bring, if AI has useful applications in accounting if AI could replace human accountants, etc. The detailed questionnaire can be found in the appendix.

3.4.2 Population and Sample Size

The target population of the research was accountants working in Nigeria. This includes accountants working across different accounting areas and from different spheres. This includes financial accountants, management accountants, external auditors, internal auditors, tax accountants, accountants in advisory and consulting, and accountants working in other areas not mentioned above.

A random sampling method was used, but because the target population was unknown, all the accounting professionals in Nigeria did not have an equal chance of getting picked. As mentioned earlier, the questionnaire was posted on different professional networks and various social media platforms. It was also posted on several accounting forums. As a result of the methods employed in distributing the questionnaire, the response rate of the study could not be computed.

The ideal sample size needed for a study can be calculated with the Cochran formula, this formula is used when the population is large or unknown (Qualtrics, 2020).

$$n_0 = \frac{Z^2 pq}{e^2}$$

Where e is the margin of error (5%), p is population parameter and this taken as 50% (or 0.5 variability), q is $1-p$, and Z is the confidence interval (1.96), 95%.

Using this formula, the minimum sample size needed for this study was 384. The sample size of this study exceeded the minimum sample size at 399 responses.

3.4.3 Access and Ethical Issues

An introduction was added at the beginning of the survey, which explained the purpose of the research, the estimated time of completion of the survey, and the group of people the survey was meant for. Respondents were advised that participation in the research was completely voluntary. It was also clearly stated to respondents that their responses would be used exclusively for this research, and the completion of the questionnaire will be taken as informed consent to use the responses they provide in the study. No personal questions were asked, and the respondents were advised that their responses would remain completely anonymous. The first question in the questionnaire, right after the introduction asked about their willingness to participate in the research, it read “I have read and understood the above information and I choose to participate in this research”. Only respondents that answered yes to this question could move on to the next section of the questionnaire. The next section of the questionnaire contained a screening question to ensure that the respondents were accountants and currently working in Nigeria, as this is the target population of the study. The question read “are you an accountant currently working in Nigeria”. Only respondents that answered yes to this question could move on to the main questionnaire.

3.4.5 Nature of Data

The data gathered in the study were mainly categorical. The data gathered in the section of the questionnaire on demographics or individual characteristics like age, gender, etc were nominal. The data gathered in section B which asks about awareness was also nominal because a “Yes/No” option was used. A Likert scale was used to measure the perception of accountants on the use of AI in accounting. Likert scale data is ranked or ordinal.

3.4.6 Measures

Measures and method of analysis should normally be consistent with other studies to allow for comparisons between results, but from the review of literature carried out, it is observed that there are no standard measures and almost all the studies did not use the same measures and method of data analysis, therefore the researcher adapted some items from previous studies, and also come up with her own items grounded in the literature. Some of the questions were adapted from (Oh *et al.*, 2019), (Peng and Chang, 2019), (Brougham and Haar, 2018), (Sarwar *et al.*, 2019), and (Abdullah and Fakieh, 2020). The questions were in a 5-point Likert scale format.

Dependent Variable – The dependent variable in this study was the perception of the use of artificial intelligence among accounting professionals in Nigeria. The perception variable was measured by 14 items and was measured on a 5-point Likert scale, ranging from strongly disagree to strongly agree. The Cronbach alpha for this measure was 0.806, which implies that the reliability is very strong and acceptable.

Independent Variables – The independent variables in this study were the individual characteristics of accountants. The study measured seven individual characteristics which included:

- Gender – This was divided into two groups, male and female.
- Age – This was divided into five groups (20-30 years), (31-40 years), (41-50 years), (51-60 years), and (61 and above).
- Level of education – This was divided into six groups, Ph.D., Master's degree/Postgraduate Diploma, Bachelor's Degree, OND/HND, Secondary Education, and Others
- Area of Accounting – This was divided into seven groups, Financial Accounting/Reporting, Internal Auditing, External Auditing, Management Accounting, Tax Accounting, Advisory/Consulting, and Others
- Work Experience – This was divided into five groups, Less than 1 year, 1-3 years, 4-6 years, 7-10 years, and more than 10 years
- Qualification Status – This was divided into three groups, Yes, No, and currently studying to become a Chartered Accountant

- Professional Body – This was divided into ICAN, ANAN, ACCA, CIMA, Other, and N/A.

3.5 Hypothesis Development

This study aimed to understand the perception of Accountants in Nigeria on the use of artificial intelligence in accounting and test if the individual characteristics of accountants influence their perception towards artificial intelligence. The following hypothesis were formed:

Hypothesis 1

H₀: There is no significant difference in accountant's perception on the use of artificial intelligence in accounting based on gender

H_A: There is a significant difference in accountant's perception on the use of artificial intelligence in accounting based on gender

Hypothesis 2

H₀: There is no significant difference in accountant's perception on the use of artificial intelligence in accounting based on age

H_A: There is a significant difference in accountant's perception on the use of artificial intelligence in accounting based on age

Hypothesis 3

H₀: There is no significant difference in accountant's perception on the use of artificial intelligence in accounting based on level of education

H_A: There is a significant difference in accountant's perception on the use of artificial intelligence in accounting based on level of education

Hypothesis 4

H₀: There is no significant difference in accountant's perception on the use of artificial intelligence in accounting based on area of accounting

H_A: There is a significant difference in accountant's perception on the use of artificial intelligence in accounting based on area of accounting

Hypothesis 5

H₀: There is no significant difference in accountant's perception on the use of artificial intelligence in accounting based on years of experience

H_A: There is a significant difference in accountant's perception on the use of artificial intelligence in accounting based on years of experience

Hypothesis 6

H₀: There is no significant difference in accountant's perception on the use of artificial intelligence in accounting based on qualification status

H_A: There is a significant difference in accountant's perception on the use of artificial intelligence in accounting based on qualification status

Hypothesis 7

H₀: There is no significant difference in accountant's perception on the use of artificial intelligence in accounting based on their professional body

H_A: There is a significant difference in accountant's perception on the use of artificial intelligence in accounting based on their professional body

3.6 Approach to Data Analysis

As this research adopted a quantitative strategy, statistical methods were needed for analysis. Both descriptive and inferential statistics were used to analyze the data gathered. Descriptive statistics were used to answer the first research question, "What is the level of awareness on the use of artificial intelligence in accounting among accounting professionals in Nigeria", and the second research question "What is the perception of accounting professionals in Nigeria regarding the use of artificial intelligence in accounting?" The frequency and percentages were reported. While inferential statistics were used to answer the third research question "What is the

effect of the individual characteristics of accounting professionals in Nigeria on their perception of artificial intelligence?”.

SPSS software was used to analyze the data. The first step of the data analysis after all the responses was gathered was to encode the data into SPSS. The independent T-test was used to test the effect of gender on the perception of accountants regarding AI, as it has only two groups. The differences in perception according to age, level of education, years of experience, area of accounting, qualification status, professional body, will be analyzed using the one-way ANOVA.

4. PRESENTATION AND DISCUSSION OF FINDINGS

4.1 Overview

This chapter presents the results of the statistical analysis that were performed in the study. The data were analyzed using IBM SPSS. Descriptive statistics were performed for every question, and the Independent sample t-tests and one-way between groups analysis of variance were used to test for significant differences between the different individual characteristics of accountants.

4.2 Findings

4.2.1 Response

The questionnaire was administered for 24 days, between the 16th of July and the 8th of August 2020. A total of 423 responses were gathered, 24 responses were screened out, and a total of 399 valid responses were used for the analysis.

4.2.2 Characteristics of Respondents

The individual characteristics of the respondents are shown in **Table 1**. From a total of 399 accountants, 64.4% of the respondents were male and 35.6% were female. Majority of the respondents were aged between 20 – 30 years (47.9%), 19% were aged between 31 – 40 years, 22.3% were aged between 41 – 50 years, 9.3% were aged between 51 – 60 years and only 1.5% of the respondents were 61 years and above. This is consistent with their years of working experience as the two highest groups were 1 – 3 years (36.8%) and more than 10 years (32.8%), followed by 4 – 6 years (12.5%) and 7 – 10 years (12.3%), only 5.5% of the respondents had less than one year of experience. Regarding their highest level of education, 52.6% of the accountants concluded their academic training after their bachelor's degree, 39.8% held a master's degree or postgraduate diploma, 1.8% held a Ph.D., 4.5% graduated with only an OND/HND, and 1.3% held other qualifications.

Regarding their area of specialization, 43.6% of the respondents work in Financial Accounting/Reporting, 14.5% work in External Auditing, 8.8% work in Advisory/ consulting, 7.5% work in Internal Auditing, 7.8% work in Management Accounting, 6.8% work in Tax Accounting, and 11% of the accountants work in other departments. Of the total respondents, 61.9% are chartered accountants, 27.6% are studying towards their professional qualification,

and 10.5% are not chartered accountants. With regards to professional bodies, 66.4% of them are members/students of ICAN, 14.5% are members/student of ACCA, 6.5% are members/student of ANAN, 1.0% are members/student of CIMA, 3.8% are members/student of other professional bodies, and 7.8% of them are not affiliated with any professional bodies.

Table 1: Individual Characteristics of Respondents

		N	%
Gender	Female	142	35.6
	Male	257	64.4
	Total	399	100.0
Age	20 - 30 years	191	47.9
	31 - 40 years	76	19.0
	41 - 50 years	89	22.3
	51 - 60 years	37	9.3
	61 and above	6	1.5
	Total	399	100.0
Highest Level of Education	OND/HND	18	4.5
	Bachelor's degree	210	52.6
	Master's degree/PGD	159	39.8
	Ph.D	7	1.8
	Other	5	1.3
	Total	399	100.0
Area of Accounting Specialization	Advisory/Consulting	35	8.8
	External Auditing	58	14.5
	Financial	174	43.6
	Accounting/Reporting		
	Internal Auditing	30	7.5
	Management Accounting	31	7.8
	Other	44	11.0
	Tax Accounting	27	6.8
	Total	399	100.0
	Work Experience	1 - 3 years	147
4 - 6 years		50	12.5
7 - 10 years		49	12.3
Less than 1 year		22	5.5
more than 10 years		131	32.8
Total		399	100.0

Qualification Status	Currently studying to become a chartered accountant	110	27.6
	No	42	10.5
	Yes	247	61.9
	Total	399	100.0
Professional Body	ACCA	58	14.5
	ANAN	26	6.5
	CIMA	4	1.0
	ICAN	265	66.4
	N/A	31	7.8
	Other	15	3.8
	Total	399	100.0

4.2.3 Level of Awareness on the Use of Artificial Intelligence in Accounting

Of all the respondents, 89.7% are aware of the discussions surrounding the use of AI in the Accounting Profession, while 10.3% are not aware of the discussions surrounding the use of AI in the Accounting Profession (see **table 2**). As for how they became aware of the discussions surrounding the use of AI in accounting, the distribution showed that the most common source of information was from personal readings (45.1%), and the media (40.1%). 33.9% of the respondents stated they became aware of it from publications from their professional bodies, 33.1 % from social media, 13.7% stated that artificial intelligence is currently being used in their workplace, 7.6% stated that they were taught about artificial intelligence in school, and 2% stated that they heard about artificial intelligence in accounting from other sources (see **table 2**).

4.2.4 Perceptions on the Use and Impact of Artificial Intelligence

There was a broad agreement that artificial intelligence has useful applications in accounting (87.2%). However, the respondents seemed to be divided on their views about the capabilities of artificial intelligence being superior to that of human accountants, 40.4% of the respondents disagreed that artificial intelligence capabilities are superior to that of human accountants, 34.1% agreed that artificial intelligence capabilities are superior to that of human accountants, while 25.6% were neutral about it. An overwhelming majority agreed that artificial intelligence will improve the way accountants carry out their work (88.4%), reduce the time accountants spend on

repetitive tasks (92.3%), and allow accountants to focus on more strategic roles in the workplace (92%). Many respondents believed that the use of artificial intelligence in accounting will lead to the emergence of new roles in the accounting profession (78.5%), and accountants would need to develop new skills to adapt to new AI trends (94%). Again, almost all the respondents agreed that accounting curriculums in universities should include appropriate IT skills (97.5%), and accounting curriculums in universities should focus more on the consulting and strategic areas of accounting and not just technical accounting knowledge (81.9%).

The results show that they were contrasting views on whether human accountants will be replaced by artificial intelligence in the foreseeable future, 36.6% of the respondents disagreed with the notion, 34.1% agreed with the notion, and 30.3% were neutral about it. When asked if they were personally worried that artificial intelligence could replace them in their job, a little over half of the respondents (54.4%) expressed no worries about being replaced by artificial intelligence, 24.6% of the respondents were neutral about it, and 21% of the respondents expressed worries about being replaced by artificial intelligence in their jobs. Despite the divided views on the job displacement tendencies of artificial intelligence, the vast majority of the respondents stated that they support the development of artificial development in accounting (84.9%), expressed excitement about the changes artificial intelligence will bring to the accounting profession (80.2%), and stated that they are adequately prepared to work alongside artificial intelligence (76.7%). The results can be seen in detail in **Table 3**.

A large majority of the respondents believe that AI would be most useful to accountants in the areas of analyzing large volumes of structured and unstructured data (74.4%) and automating repetitive tasks (73.7%). They also believe AI would be useful in the areas of forecasting revenues and cash flows (61.7%), fraud detection (60.7%), and Identifying and extracting relevant information from documents (58.1%) They seem to believe that AI will be least useful to accountants in the area of interacting with clients (15.3%).

The respondents consider technological literacy the most important skill for accountants today (75.7%). They also believe that is it important for accountants to possess the ability to interpret financial information (71.7%), possess business advisory skills (68.7%), communication skills (56.9%), and learn to build relationships (44.1%). (See **table 4** for detailed results).

Table 2: Level of Awareness on the Use of AI in Accounting

		N	%
Are you aware of the discussions surrounding the use of AI in the Accounting Profession?	Yes	358	89.7
	No	41	10.3
	Total	399	100.0
How did you hear about Artificial Intelligence?	From my personal readings	161	45.1
	From the media	143	40.1
	Publications from my professional body	121	33.9
	Social media	118	33.1
	Artificial Intelligence is currently being used at my workplace	49	13.7
	I was taught in school	27	7.6
	Others	7	2.0
	Total	357	

Table 3: Perceptions on the use and Impact of Artificial Intelligence

	Strongly Disagree n(%)	Disagree n(%)	Neutral n(%)	Agree n(%)	Strongly Agree n(%)
Artificial Intelligence has useful applications in Accounting	1(.3%)	12(3%)	38(9.5%)	203(50.9%)	145(36.3%)
Artificial Intelligence capabilities are superior to the capabilities of human accountants	33(8.3%)	128(32.1%)	102(25.6%)	100(25.1%)	36(9%)
Artificial Intelligence will improve the way accountants carry out their work	4(1%)	16(4%)	26(6.5%)	216(54.1%)	137(34.3%)
Artificial Intelligence will reduce the time accountants spend on repetitive tasks	1(.3%)	7(1.8%)	23(5.8%)	175(43.9%)	193(48.4%)
Artificial Intelligence will allow accountants to focus on more strategic roles in the workplace	3(.8%)	10(2.5%)	19(4.8%)	180(45.1%)	187(46.9%)
The use of artificial intelligence in accounting will lead to the emergence of new roles in the accounting profession	3(.8%)	30(7.5%)	53(13.3%)	195(48.9%)	118(29.6%)
Accountants would need to develop new skills to adapt to new AI trends	1(.3%)	5(1.3%)	18(4.5%)	202(50.6%)	173(43.4%)
Accounting curriculums in universities should include appropriate IT skills	2(.5%)	0(0.0%)	8(2.0%)	106(26.6%)	283(70.9%)

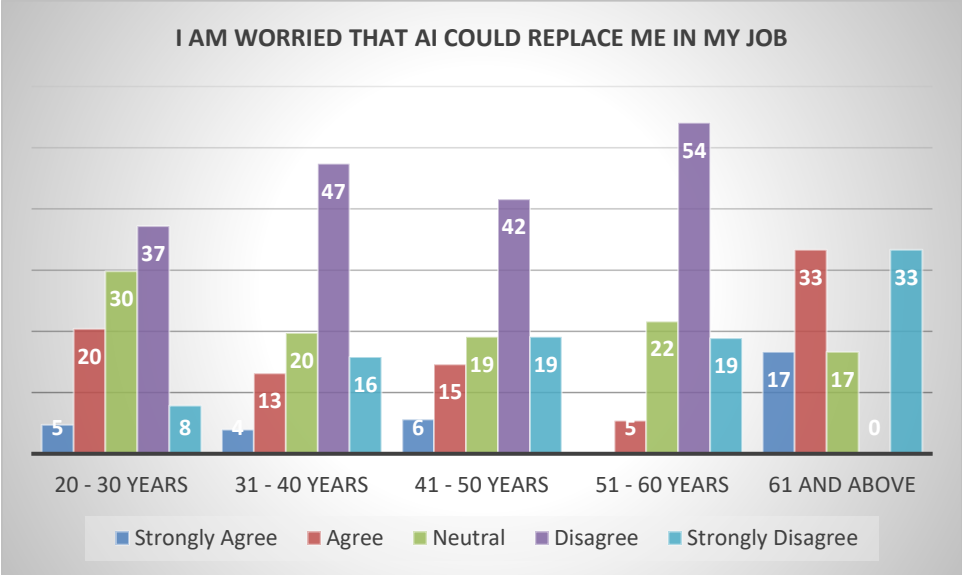
Accounting curriculums in universities should focus more on the consulting and strategic areas of accounting and not just technical accounting knowledge	3(.8%)	30(7.5%)	39(9.8%)	151(37.8%)	176(44.1%)
Human Accountants will be replaced by Artificial Intelligence in the foreseeable future	25(6.3%)	121(30.3%)	121(30.3%)	89(22.3%)	43(10.8%)
I am worried that Artificial Intelligence could replace me in my job	53(13.3%)	164(41.1%)	98(24.6%)	66(16.5%)	18(4.5%)
I support the development of Artificial Intelligence in Accounting	3(.8%)	7(1.8%)	50(12.5%)	228(57.1%)	111(27.8%)
I am excited about the changes that Artificial intelligence will bring to the accounting profession	4(1%)	12(3%)	63(15.8%)	228(57.1%)	92(23.1%)
I am adequately prepared to work alongside Artificial Intelligence	2(.5%)	18(4.5%)	73(18.3%)	211(52.9%)	95(23.8%)

Table 4: Potential Applications of AI

		N	%
Which of the following potential applications of AI do you think would be most useful to Accountants?	Analysis of large volumes of structured and unstructured data	297	74.4
	Automation of repetitive tasks	294	73.7
	Forecasting Revenue, cash flows, etc.	246	61.7
	Fraud Detection	242	60.7
	Identifying and extracting relevant information from documents	232	58.1
	Interacting with clients	61	15.3
What of the following skills do you consider most important for accountants today?	Technology Literacy	301	75.7
	Business advisory skills	274	68.7
	Communication skills	227	56.9
	Relationship Building	176	44.1
	Interpretation of Financial Information	286	71.7

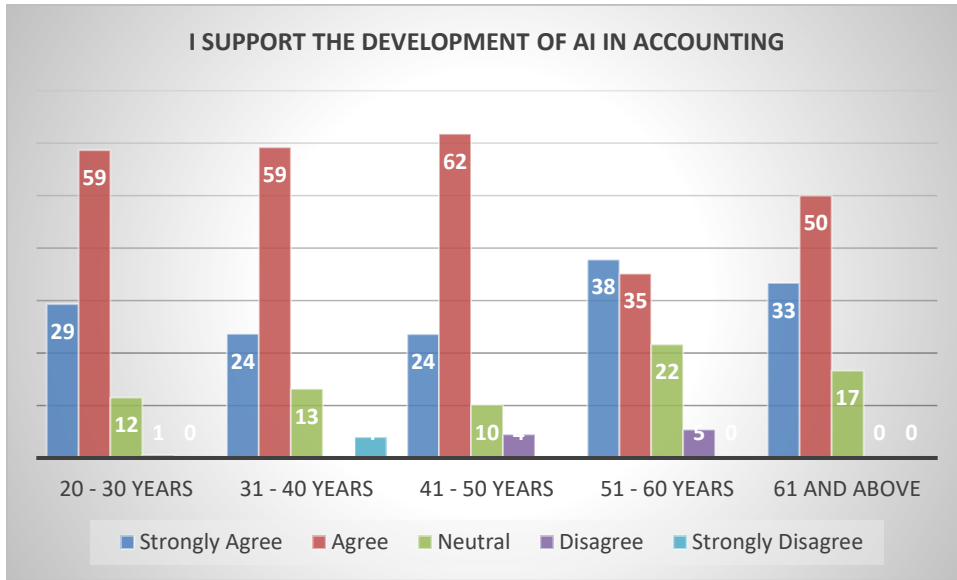
Statistical tests were used in section 4.2.5 to determine whether individual characteristics of accountants influence their perception on the use of AI in accounting. However, the following charts describe how accountants of different ages, experience, and years of specialization responded to being worried about AI replacing them in their jobs and support for AI. The charts are presented in percentages to give a more representative view.

Fig 5: Job displacement and age



From fig 5 above, it is evident that the views on job displacement due to AI are quite similar across all ages. However, there seems to be a higher rate of disagreement among the older accountants, this can be justified as older accountants possess more years of experience and are more established in the profession than younger accountants and therefore have more confidence in their abilities.

Fig 6: Support for AI and Age



From fig 6 above, it is evident that there is immense support for AI across accountants of all ages with very few accountants showing displeasure in the development of AI in Accounting.

Fig 7: Job displacement and experience

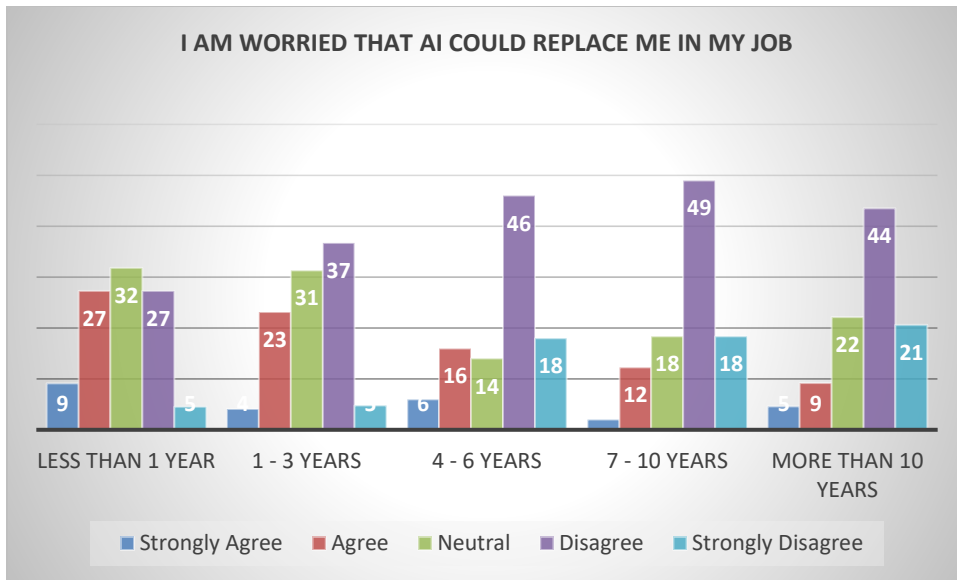


Fig 7 above shows that there seems to be a higher rate of disagreement among accountants with more years of experience, this is expected and in line with fig 5 as older accountants will typically have more years of experience than younger accountants.

Fig 8: Support for AI and age

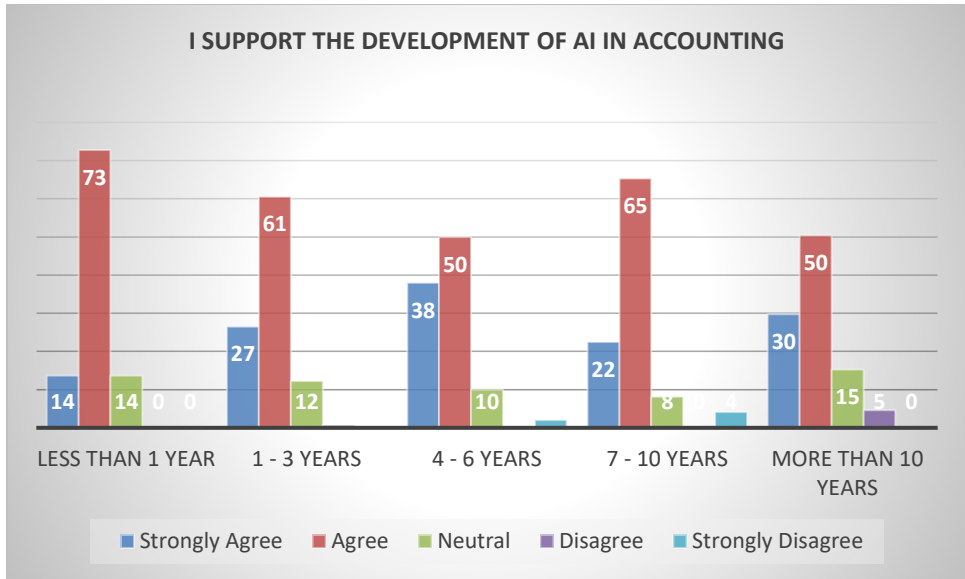
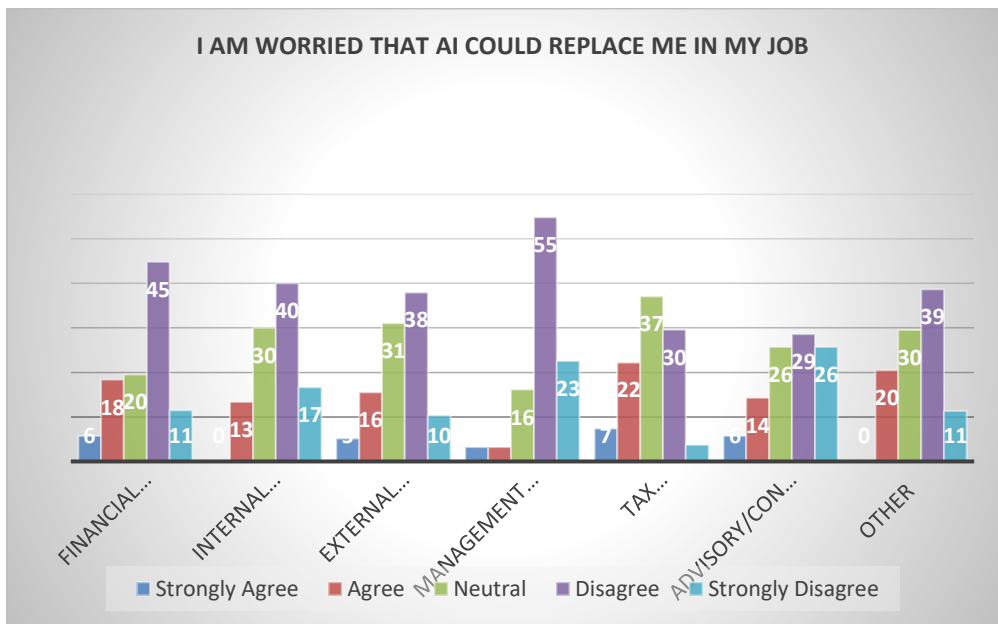


Fig 8 also shows that accountants support the development of AI in accounting regardless of their work experience.

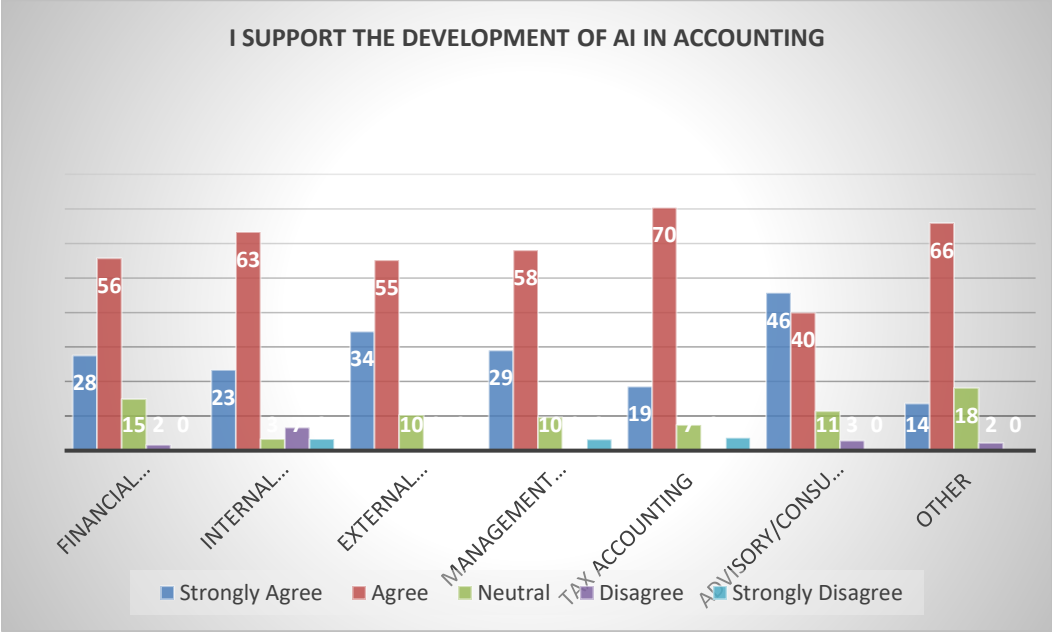
Fig 9: Job displacement and Area of Specialization



Management accounting seems to have a higher rate of disagreement than other specializations. In the literature reviewed, (Shaffer et al., 2020) argues that management accounting will face little impact of AI, while auditing, financial accounting, and tax accounting will be more

impacted. This is because they are involved in the decision-making process and give advice to management.

Fig 10: Support for AI and Area of Specialization



In Fig 10 also, it is evident that accountants showed support for the development of AI in accounting regardless of their area of specialization.

4.2.5 Hypothesis Testing

An Independent sample t-test and a one-way between groups analysis of variance were used to test the effect of the individual characteristics of accounting professionals in Nigeria on their perception of artificial intelligence. The independent sample t-test was used in the case where the independent variable had only two groups i.e. gender, while the one-way between groups analysis of variance (ANOVA) was used when the independent variable had more than three groups.

Hypothesis 1 - The Effect of Gender on the Perception of Accountants on the use of Artificial Intelligence in Accounting.

H₀: There is no significant difference in accountant's perception on the use of artificial intelligence in accounting based on gender

H_A: There is a significant difference in accountant's perception on the use of artificial intelligence in accounting based on gender

An Independent sample t-test was conducted to compare the perceptions of male and female accountants on the use of artificial intelligence in accounting. The mean and standard deviation for each of the groups can be found in **table 5** The Levene's Test for equality of variance was conducted to ascertain if the groups had equal variances, it showed $F = 4.387$, $p = .037$. This was compared to $\alpha = .05$, therefore it showed significance, and as such equal variance was not assumed, and second line was reported. There was a statistically significant difference between the perceptions of male and female accountants on the use of artificial intelligence in accounting, $t(256.734) = 2.261$, $p = .025$. Males ($M = 38.6420$, $SD = 8.1952$) tend to hold a more favorable opinion on the use of AI in accounting than females ($M = 36.5000$, $SD = 9.5051$). Therefore, the null hypothesis is rejected, and the alternative hypothesis which states that "there is a significant difference in accountant's perception on the use of artificial intelligence in accounting based on gender" is accepted.

Table 5: Mean and Standard Deviation of Gender

Gender	N	M	SD
Female	142	36.5000	9.5061
Male	257	38.6420	8.1952

One-way between Groups Analysis of Variance

A one-way between groups analysis of variance was conducted to explore the effect of individual characteristics of accountants (with more than two levels) on their perception on the use of artificial intelligence in accounting. Kolmogorov-Smirnov and Shapiro-Wilk's test was conducted to examine the normality of the data, the tests indicated that the data were not normally distributed as $p < 0.05$. However, the Anova is a robust test that can handle violations of normality, also, the sample size is large enough to generate stable means regardless of the violations (Piovesana and Senior, 2018). Levene's F test was used to test for Homogeneity of variance between the groups. Post hoc tests were conducted in cases of significant differences to ascertain where the differences lie. An alpha level of .05 was used.

Hypothesis 2: The Effect of Age on the Perception of Accountants on the use of Artificial Intelligence in Accounting.

H₀: There is no significant difference in accountant's perception on the use of artificial intelligence in accounting based on age

H_A: There is a significant difference in accountant's perception on the use of artificial intelligence in accounting based on age

A one-way between groups analysis of variance was conducted to explore the effect of accountant's age levels on their perception on the use of artificial intelligence in accounting. Based on age, participants were divided into 5 groups (20 – 30 years, 31 – 40 years, 41 – 50 years, 51 – 60 years, and 61 and above). The mean and standard deviation for each of the groups can be found in **table 6**. Levene's F test was used to test for homogeneity of variance between the groups and it revealed that the homogeneity of variance assumption was met, $p=.236$.

There was no statistically significant difference in the perception on the use of artificial intelligence in accounting for the five groups: $F(4,394) = .485$, $p=.747$, which implies that accountants of different ages do not differ in their perceptions on the use of artificial intelligence in accounting, therefore the null hypothesis which states that “there is no significant difference in accountant’s perception on the use of artificial intelligence in accounting based on age” is accepted.

Table 6: Mean and Standard Deviation of Age

Age	N	M	SD
20 – 30 years	191	38.31	8.53
31 – 40 years	76	37.08	8.78
41 – 50 years	89	37.73	9.56
51 – 60 years	37	37.22	8.22
61 and above	6	40.67	4.63

Hypothesis 3: The Effect of the Level of Education on the Perception of Accountants on the use of Artificial Intelligence in Accounting.

H_0 : There is no significant difference in accountant’s perception on the use of artificial intelligence in accounting based on level of education

H_A : There is a significant difference in accountant’s perception on the use of artificial intelligence in accounting based on level of education

A one-way between groups analysis of variance was conducted to explore the effect of the level of education of accountants on their perception on the use of artificial intelligence in accounting. Based on their level of education, participants were divided into 5 groups (Bachelor’s Degree, OND/HND, Master’s Degree/Postgraduate diploma. Ph.D., and Other). The mean and standard deviation for each of the groups can be found in **table 7**. The Levene’s F test was used to test for homogeneity of variance between the groups and it revealed that the homogeneity of variance assumption was met, $p=.101$.

There was no statistically significant difference in the perception on the use of artificial intelligence in accounting for the five groups: $F(4,394) = .867$, $p=.484$, which implies that accountants with different levels of education do not differ in their perceptions on the use of

artificial intelligence in accounting, therefore the null hypothesis which states that “there is no significant difference in accountant’s perception on the use of artificial intelligence in accounting based on level of education” is accepted.

Table 7: Mean and Standard Deviation of Level of Education

Level of Education	N	M	SD
Bachelor’s Degree	210	38.94	6.80
OND/HND	18	37.95	8.27
Master’s Degree	159	37.40	9.64
Ph.D	7	43.29	3.99
Other	5	38.60	7.16

Hypothesis 4: The Effect of Area of Specialization on the Perception of Accountants on the use of Artificial Intelligence in Accounting.

H₀: There is no significant difference in accountant’s perception on the use of artificial intelligence in accounting based on area of specialization

H_A: There is a significant difference in accountant’s perception on the use of artificial intelligence in accounting based on area of specialization

A one-way between groups analysis of variance was conducted to explore the effect of accountant’s areas of specialization on their perception on the use of artificial intelligence in accounting. Based on their area of specialization, participants were divided into 7 groups (Financial Accounting/Reporting, Internal Auditing, External Auditing, Management Accounting, Tax Accounting, Advisory/Consulting, and Others). The mean and standard deviation for each of the groups were reported in **table 8**. The Levene’s F test was used to test for homogeneity of variance between the groups and it revealed that the homogeneity of variance assumption was met, $p=.299$.

There was no statistically significant difference in the perception on the use of artificial intelligence in accounting for the seven groups: $F(6,392) = 1.689$, $p=.122$, which implies that accountants in different areas of specializations do not differ in their perceptions on the use of artificial intelligence in accounting, therefore the null hypothesis which states that “there is no

significant difference in accountant’s perception on the use of artificial intelligence in accounting based on area of specialization” is accepted.

Table 8: Mean and Standard Deviation of Area of Specialization

Area of specialization	N	M	SD
Financial Accounting	174	37.85	9.41
Advisory/Consulting	35	41.17	9.02
Management Accounting	31	37.97	8.14
Tax Accounting	27	36.70	6.79
Internal Auditing	30	37.70	8.98
External Auditing	58	38.62	6.08
Other	44	37.88	9.48

Hypothesis 5: The Effect of Years of Experience on the Perception of Accountants on the use of Artificial Intelligence in Accounting.

H₀: There is no significant difference in accountant’s perception on the use of artificial intelligence in accounting based on years of experience

H_A: There is a significant difference in accountant’s perception on the use of artificial intelligence in accounting based on years of experience

A one-way between groups analysis of variance was conducted to explore the effect of accountants’ years of experience on their perception on the use of artificial intelligence in accounting. Based on years of experience, participants were divided into 5 groups (Less than 1 year, 1-3 years, 4-6 years,7-10 years, and more than 10 years). The mean and standard deviation for each of the groups were reported in **table 9**. The Levene’s F test was used to test for homogeneity of variance between the groups and it revealed that the homogeneity of variance assumption was met, $p=.316$.

There was no statistically significant difference in the perception on the use of artificial intelligence in accounting for the five groups: $F(4,394) = .321, p=.864$, which implies that accountants with different years of experience do not differ in their perceptions on the use of artificial intelligence in accounting, therefore the null hypothesis which states that “there is no significant difference in accountant’s perception on the use of artificial intelligence in accounting based on years of experience” is accepted.

Table 9: Mean and Standard Deviation of years of Experience

Years of Experience	N	M	SD
Less than 1 year	22	36.72	9.56
1 – 3 years	147	38.26	7.92
4 – 6 years	50	38.52	9.52
7 – 10 years	49	37.80	9.11
More than 10 years	131	37.43	9.08

Hypothesis 6: The Effect of Area of Specialization on the Perception of Accountants on the use of Artificial Intelligence in Accounting.

H₀: There is no significant difference in accountant’s perception on the use of artificial intelligence in accounting based on qualification status

H_A: There is a significant difference in accountant’s perception on the use of artificial intelligence in accounting based on qualification status

A one-way between groups analysis of variance was conducted to explore the effect of the qualification status of accountants on their perception on the use of artificial intelligence in accounting. Based on qualification status, participants were divided into 3 groups (Chartered Accountants [Yes], Non- Chartered Accountants [No], and Currently studying to become a chartered accountant). The mean and standard deviation for each of the groups were reported in **table 10**. The Levene’s F test was used to test for homogeneity of variance between the groups and it revealed that the homogeneity of variance assumption was met, $p=.431$.

There was no statistically significant difference in the perception on the use of artificial intelligence in accounting for the three groups: $F(2,396) = .792$, $p=.454$, which implies that accountants with different qualification status do not differ in their perceptions on the use of artificial intelligence in accounting, therefore the null hypothesis which states that “there is no significant difference in accountant’s perception on the use of artificial intelligence in accounting based on qualification status” is accepted.

Table 10: Mean and Standard Deviation of Qualification Status

Qualification status	N	M	SD
Yes	247	38.25	8.37
No	42	36.52	10.39
Currently Studying	110	37.57	8.86

Hypothesis 7: The Effect of accountant’s professional body on the Perception of Accountants on the use of Artificial Intelligence in Accounting.

H₀: There is no significant difference in accountant’s perception on the use of artificial intelligence in accounting based on their professional body

H_A: There is a significant difference in accountant’s perception on the use of artificial intelligence in accounting based on professional body

A one-way between groups analysis of variance was conducted to explore the effect of accountant’s professional body on their perception on the use of artificial intelligence in accounting. Based on qualification status, participants were divided into 6 groups (ICAN, ANAN, ACCA, CIMA, Other, and N/A). The mean and standard deviation for each of the groups were reported in **table 11**. The Levene’s F test was used to test for homogeneity of variance between the groups and it revealed that the homogeneity of variance assumption was met, $p=.052$.

There was a statistically significant difference in the perception on the use of artificial intelligence in accounting for the six groups: $F(5,393) = 2.437$, $p=.034$, which implies that accountants affiliated with different professional bodies differ in their perceptions on the use of artificial intelligence in accounting.

Post hoc comparisons using the Turkey HSD test indicated that the mean score for ACCA ($M=39.19$, $SD = 6.20$) was significantly higher than for ANAN ($M= 33.23$, $SD = 9.85$). Accountants that are members of ICAN ($M=38.31$, $SD = 8.40$) did not differ significantly from any other group. Accountants that are members of CIMA ($M = 40.50$, $SD =8.23$) did not differ significantly from any other group. Accountants that are members of other professional bodies ($M= 34.80$, $SD = 10.86$) did not differ significantly from any other group.

Therefore, the null hypothesis is rejected and the alternate hypothesis which states that “there is a significant difference in accountant’s perception on the use of artificial intelligence in accounting based on professional body” is accepted.

Table 11: Mean and Standard Deviation of Professional Body

	N	M	SD
ICAN	265	38.31	8.40
ACCA	58	39.19	6.20
ANAN	26	33.23	9.85
CIMA	4	40.50	8.23
Other	15	34.80	10.86
N/A	31	36.84	12.06

4.3 Discussion

The purpose of this study was to assess the level of awareness on the use of artificial intelligence in accounting among accounting professionals in Nigeria, assess the perceptions of accounting professionals in Nigeria on the use of artificial intelligence in accounting and analyze the effect of the individual characteristics of accounting professionals on their perception of artificial intelligence. Seven hypotheses were tested using the independent samples t-tests and one way between group ANOVA. The discussion was arranged in order of the research questions stated in section 1.1.

4.3.1 Level of awareness on the use of artificial intelligence in accounting

A good number of the accountants are aware that artificial intelligence is a hot topic in accounting (86.7%), this is consistent with prior research as 75% of the accountants had some understanding about AI in the study carried out by (Peng and Chang, 2019). Most of the accountants became aware of it through their personal readings and the media. Only 13.7% of the accountants stated that artificial intelligence is currently used in their workplace, this implies that although the majority of the accountants are aware of the use of AI in accounting, they do not have a working knowledge of artificial intelligence and the level of their knowledge is purely theoretical. This is consistent with the findings from (Rîndașu, 2017), as only 11% of the

accountants surveyed in the study stated that they had working capabilities of the technologies mentioned in the study. It also suggests that artificial intelligence has not been fully adopted and implemented in the accounting sector in Nigeria. This is also consistent with expectation as prior research states that developing countries would face challenges in adopting AI (Chukwudi, 2018; Ukpong *et al.*, 2019), these challenges might be the reason for the minimal adoption rate. As stated earlier on AI is not just automation technology but a technology with cognitive capability and the ability to think to learn, with 13.7% stating that AI is currently used in their workplace, it is evident that the accountants surveyed clearly understood the phenomenon and did not misinterpret artificial intelligence as automation or accounting software. The results also show that only 7.6% of accountants acknowledged that they were taught about artificial intelligence in school, this suggests that artificial intelligence has not been fully incorporated into accounting curriculums. Professional bodies have also been instrumental in educating their members about the growing trends of artificial intelligence as 33.9% of the respondents stated that they became aware of the use of AI in accounting through publications from their professional bodies.

4.3.2 Perceptions of accounting professionals in Nigeria on the use of artificial intelligence in accounting

One of the aims of this study was analyzing the perceptions of accounting professionals in Nigeria on the use of artificial intelligence in accounting

The respondents regarded artificial intelligence as useful in the accounting profession and believed that it would be most useful in the areas of analyzing large volumes of structured and unstructured data and automating repetitive tasks. They however did not feel like AI would be very useful in the area of interacting with clients, and this might be because they feel that clients might not be receptive to the idea. The accountants also showed great support for the development of AI in accounting which suggests that they might like to cede some of their current roles to AI. Their support for artificial intelligence in accounting could be tied to their belief that AI could greatly enhance accountants performance and bring convenience to accountants by improving the way accountants carry out their work, reducing the time they spent on repetitive tasks and allowing accountants to focus on more strategic roles in the workplace.

The respondents however had contrasting views on the capabilities of artificial intelligence being superior to that of human accountants with 40.4% of the respondents disagreeing with the statement, and 34.1% agreeing with it. This is consistent with the findings of (Oh *et al.*, 2019) as fewer than half of the doctors surveyed considered AI's diagnostic ability superior to that of human doctors. The accountants might have felt this way because they do not have a basic understanding of the technologies underlying AI, or because they believe that certain accounting tasks cannot be performed by artificial intelligence.

There was also a broad agreement that the use of artificial intelligence in accounting will lead to the emergence of new roles in the accounting profession, this is consistent with existing literature as it is predicted that new roles will begin to emerge as artificial intelligence becomes more integrated into accounting. From the literature, one of the major impact of artificial intelligence in accounting is job displacement, when asked what they felt about the possible replacement of the accounting profession by artificial intelligence, 34.1% of the accountants examined felt that human accountants will be replaced by artificial intelligence in the foreseeable future, 36.6% of the accountants were confident that artificial intelligence could not replace human accountants and 30.3% were neutral about it. The study went on to ask if the accountants expressed worry of job displacement due to AI over their own jobs, and more than half of the accountants surveyed expressed no worries (54.4%) that AI could replace them in their jobs, while only 21% of the respondents expressed worries over being replaced by AI. This implies that although some of the accountants might think that artificial intelligence might be a threat to the accounting profession, they do not think that it would affect their own jobs but lower-level accounting jobs. This is consistent with the findings of (Brougham and Haar, 2018) as they found that STARA awareness (a measure of employee's feelings towards job displacement due to "Smart Technology, Artificial Intelligence, Robotics, and Algorithms (STARA)) was generally low among the employees surveyed. It is also consistent with (Peng and Chang, 2019) as the study established that 40% of the accountants surveyed do not have a sense of crisis, 32% have a sense of crisis and 28% of them were neutral. It is also consistent with the results from (Oh *et al.*, 2019) as the majority of the physicians that were examined did not believe that AI could replace them in their jobs. The confidence among accountants in Nigeria that AI could not replace them in their jobs might be due to ignorance about the capabilities of AI, or it might be because they feel the stage

of adoption of AI in Nigeria is not yet at a level where it can pose a threat to their jobs. They might also feel like they have enough capability of meeting any challenge that AI can bring.

The respondents believed that to adapt to new AI trends, accountants would need to develop new skills, and they felt that technological literacy is one of the most important skills for accountants today, this further iterates the point that accountants would need to brush up on their technological skills. Also, they believe that technical skills for accountants should not be ignored because accountants still need to have the technical skills to interpret the data that artificial intelligence will provide. Another important thing to note is that majority of the respondents believe that Accounting curriculums in universities should include appropriate IT skills and should focus more on the consulting and strategic areas of accounting and not just technical accounting knowledge which suggests that accounting education is becoming grossly inadequate for the skills that accountants need today, and this is consistent with the literature reviewed.

Overall, it appears that accounting professionals in Nigeria have a positive view towards artificial intelligence, and do not view artificial intelligence as a threat but as an opportunity to reduce rote tasks and focus on more value-adding activities in the organization, and are ready and willing to embrace the technology and adapt to whatever challenges may come with it. Their perceptions seem to be more in line with the job augmentation scenario, rather than the job displacement scenario as the majority believe that AI would enhance accountant's performance.

4.3.4 The Effect of Accountant's Individual Characteristics on their Perception on the Use of Artificial Intelligence in Accounting

Another aim of the study was to find if the individual characteristics of artificial intelligence influence the perception of accounting professionals in Nigeria on the use of artificial intelligence in Accounting.

It was hypothesized that there is no significant difference in accountant's perception on the use of artificial intelligence in accounting based on gender, the independent T-test was used to test this hypothesis, and it was found that males tend to hold a more favourable opinion of AI than females. This is consistent with prior research the findings of (Pinto dos Santos *et al.*, 2018), as they found that male medical students were more confident on the impact of AI in medicine, it was also consistent with (Sarwar *et al.*, 2019), as male physicians were more optimistic and felt

more comfortable on the adoption of AI in medical practice. It is also consistent with (Dafoe and Oxford, 2019) which found that support for AI was higher among males than females in America.

In the case of age, the one way ANOVA was used to test the hypothesis that there is no significant difference in accountant's perception on the use of artificial intelligence in accounting based on age and it was found that accountants of different ages do not differ in their perception on the use of AI in accounting. This is not totally in line with expectation, as it was expected that younger accountants might hold a more favourable opinion of AI than older accountants, however, this is consistent with prior research as (Abdullah and Fakieh, 2020) also tested for a difference in perception of artificial intelligence among employees in health care sector based on age and didn't find any difference.

For level of education, the one way anova was used to test the hypothesis that there is no significant difference in accountant's perception on the use of artificial intelligence in accounting based on level of education and it was found that accountants with different level of education do not differ in their perception on the use of AI in accounting. This is consistent with prior research as (Abdullah and Fakieh, 2020) tested for differences in perception of artificial intelligence among employees in the health care sector based on level of education and didn't find any difference.

It was also hypothesized that there is no significant difference in accountant's perception on the use of artificial intelligence in accounting based on their area of specialization, the one way anova was used to test this hypothesis and it was found that accountants in different areas of accounting do not differ in their perception on the use of AI in accounting, and as such the area of specialization of an accountant does not have an effect on their perception on the use of artificial intelligence in accounting. This is not consistent with prior research as (Oh *et al.*, 2019) tested for differences in perception of artificial intelligence among Korean doctors and medical students and found that Korean doctors and medical students do not differ in their perceptions of artificial intelligence based on their area of specialty.

To test if the years of work experience of an accountant has an effect on their perception of artificial intelligence, the one way anova was used and it was found that accountants with

different years of experience do not differ in their perception on the use of AI in accounting, and as such the years of experience of an accountant does not have an effect on their perception on the use of artificial intelligence in accounting. It was also found that the qualification status of an accountant does not influence perceptions of artificial intelligence, as the accountants with different qualification status did not differ in their perception on the use of AI in accounting. However, it was found that accountants differ in their perception of artificial intelligence based on their professional body, however, the post hoc test showed that the difference was only found between accountants who are members of ACCA and accountants who are members of ANAN, as accountants who are members of ACCA tended to show a more favourable opinion of AI than those who are members of ANAN.

In conclusion, gender and accountants' professional body has an effect on the perception of accountants in Nigeria with regards to the use of artificial intelligence in accounting, while age, level of education, area of specialization, years of work experience, and qualification status do not have an effect on accounting professionals in Nigeria's perception on the use of artificial intelligence in accounting.

5. CONCLUDING THOUGHTS ON THE CONTRIBUTION OF THIS RESEARCH, ITS LIMITATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

5.1 Implications of Findings

This study sought to find out the level of awareness on the use of artificial intelligence in accounting among accounting professionals in Nigeria, how accounting professionals in Nigeria perceive the use of artificial intelligence in accounting, and if their individual characteristics affect their perception on the use of artificial intelligence in accounting. The results of this study show that there is a high level of awareness on the use of artificial intelligence in accounting among accounting professionals in Nigeria, although their knowledge is mainly theoretical as many organizations in Nigeria have not introduced artificial intelligence into their accounting process. This is evidenced in the number of accountants that acknowledged that artificial intelligence is currently being used in their workplace (13.7%). The accountants generally showed positive attitudes and perceptions towards the use of artificial intelligence in accounting, they believe that artificial intelligence would be useful in accounting, will enhance the

performance of accountants, and showed great support and willingness to work alongside AI. The study also found that accounting professionals in Nigeria do not express so much worry about losing their jobs due to artificial intelligence (50.4% expressed no worries). An interesting fact, however, is that although some of the accountants (34.1%) acknowledge that artificial intelligence would affect the demand for human accountants, only a few of them (21%) are worried that it would affect their own personal jobs. This could be viewed as good or bad, it could be that they fully understand the effect that artificial intelligence can have on the profession and are adequately preparing themselves by continuously developing appropriate skills to ensure that they do not fall victims of job displacement due to AI. It could also be that they are ignorant of the full effect that it can have on their jobs or they simply feel that only lower level jobs will be affected.

The results also showed that male accountants held a more favourable opinion of artificial intelligence than female accountants, and as mentioned in section 4.3.4, this finding is consistent with prior research. Accountants who are members of ACCA also differ in their perception on artificial intelligence to accountants who are members of ANAN, all other professional bodies did not report significant results. The research also found that age, level of education, years of experience, area of specialization, and qualification status does not influence accountants perception on the use of artificial intelligence in accounting.

It is encouraging that the accountants examined have a positive view about using AI and do not view it as a threat, as this might make it easier to introduce artificial intelligence into accounting processes in Nigeria as opposed to if the accountants do not support or are not willing to work alongside the technology. It is important to note however that although artificial intelligence is being currently applied to accounting processes in some places, nobody knows with certainty the extent to which artificial intelligence will affect the accounting profession and the nature of the impact, right now it is all just potential. Considering this, it is noteworthy to mention that the perception of the accounting professionals might change as time passes, as artificial intelligence begins to see more advancement in its capabilities, and as they become more exposed to the technology.

5.2 Contributions and Limitations of the Research

5.2.1 Limitations

The limitations of this study are highlighted below:

1. The use of self-reported data – the data used in this study was self-reported, as self-administered questionnaires were used to gather data from respondents. One of the downsides to this is that the respondents could have misinterpreted some of the questions and secondly, there is no way to confirm that all the questionnaires were answered by the intended target population. However, the advantage of using self-reported data is that the data is objective and free from the influence of the researcher.
2. The respondents were asked if they were aware of the use of AI in accounting and how they became aware of it, this means that they were asked to self-assess their knowledge of AI, and sometimes there are usually gaps between self-assessed knowledge and actual reality. Future research should ask background questions to objectively assess respondents' level of knowledge as different respondents might have different ideas or notions of what AI is.
3. Social desirability bias – The respondents might have chosen options they consider as socially desirable, and their responses might not reflect how they feel. There is no way to get around this when administering questionnaires, however, it is worth mentioning.
4. Due to the method employed in the distribution of the questionnaires, it was not possible to compute the response rate of the study
5. The instruments that were used in the study were not previously validated. The researcher came up with her own measures for the study although some questions were adopted from previous studies. However, the reliability of the items was very strong with a Cronbach alpha of 0.806. Future research should strive to adopt a more validated instrument.
6. The results from the study cannot be completely generalized because of how fluid or dynamic technology can be, and people's perceptions and attitudes may change as artificial intelligence continues to evolve, and they become more exposed or more involved with the technologies. As at now, 86.3% of the accountants examined have not worked with AI, different organizations, and different countries are at different stages of AI adoption and as such might hold different opinions on the use of AI. Finally, the

sample might not have been totally representative of the population, although a large sample was gotten which included accountants of different ages, genders, educational attainment, years of experience, qualification status. Further research should try and obtain access from the main professional body in Nigeria (ICAN), so that emails can be sent randomly to their members, and thus give a more representative sample. Considering all this, it might be difficult to make statistical inferences to the entire population of accountants in Nigeria based on this study. their perceptions of it now might change when they begin to work with it.

5.2.2 Contributions

This study assessed the level of awareness and perceptions on the use of artificial intelligence in accounting among accounting professionals in Nigeria. To the best of the researcher's knowledge, there is no research on the opinions and views of accounting professionals in Nigeria on the use of artificial intelligence in accounting, this research study has filled that gap, thus, paving the way for further research on the subject. Also, it used a quantitative approach and tested for differences in opinions based on several demographic variables.

5.3 Recommendations for Practice

5.3.1 Recommendations for Accounting Professionals

Artificial intelligence and technology, in general, are here to stay, and although the current stage of adoption in Nigeria might not pose a threat right now, advancement in technology is always bound to happen. The majority of the accountants acknowledged that accountants need to develop new skills to adapt to new AI trends, this implies that they are not just aware of the use of artificial intelligence in accounting but also aware of the challenges it might bring. That is, they are aware that there is a possibility of job displacement, and that accountants need to brace up, continuously improve on their existing skills and develop new skills to keep up with the changing profession. Accounting professionals should continue to strive to improve on themselves because accounting is a dynamic profession, and with the introduction of new technologies into accounting, the skills required for a successful accountant today might look very different in the next five or so years. According to the literature review, it can be seen that the majority of the new roles that would emerge as a result of the use of AI would be tech-

dependent for example, supervision of intelligent machines, collaborating with vendors in the development of new AI technologies, monitoring the performance of AI technologies. These roles are not normally within the skill set of accountants and as such, accountants would need to go out of their way to ensure that they place themselves in a position to take up these new roles.

5.3.2 Recommendations for Professional and Academic Education Policy Makers

Accounting education is becoming grossly inadequate in equipping aspiring accountants with the digital skills needed in accounting today, and as such a reform in accounting education is needed to incorporate the necessary digital skills needed in accountancy today.

In a country like Nigeria where federal universities do not have a lot of funding and limited access to infrastructure, it might be difficult to incorporate technological skills into the accounting curriculums. This is where the Institute of Chartered Accountants of Nigeria (ICAN) can intervene. ICAN could liaise with the government to make sure that accounting departments in universities get the funding they need to incorporate the appropriate technological knowledge needed into the curriculums and ensure that fresh accounting graduates are technologically sound.

Professional bodies should also continue to educate their members on the changing trends by holding workshops, conferences, seminars and including technological knowledge as part of the requirements for their continuous professional developments

Accounting employers should also try to retrain their accounting staff so that they can be adequately prepared for the challenges that might lie ahead.

5.4 Recommendations for Further Research

1. Since this study has analyzed the perceptions and views of accountants, further research could explore the opinions and views of accounting clients on artificial intelligence being used in accounting.
2. Further research could also focus on one area of accounting e.g. auditing or tax and ask technical questions on specific applications of AI in that area and assess how artificial intelligence will affect that area of accounting. This might be beneficial to providers of

accounting AI solutions as it would give them an insight into how exactly artificial intelligence can be applied in that area.

3. Further research could also assess the perception and views of accounting students across universities in Nigeria to gain insight into how they feel about the use of artificial intelligence in accounting.

5.5 Conclusion

It is expected that technology will continue to advance, and the continuous advancement in technology would continue to affect our lives. It is our duty as humans to make sure we keep up with the pace of advancement, as advancement in technology is not something that can be wished away. Many accountants would be affected by emerging technologies in the near future; therefore, they must be prepared for the changes that lie ahead and are willing to use artificial intelligence and other emerging technologies to their advantage.

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APPENDIX A

Accountants' Perception of Artificial Intelligence in Accounting

Dear Participants,

I trust you are doing well.

This questionnaire is being used as part of my research for my MSc Accounting and Finance Management Programme at the Graduate Business School, Griffith College Dublin.

The purpose of this research is to explore the perception of Accounting Professionals on the use of Artificial Intelligence in Accounting. This questionnaire is meant for accounting professionals in Nigeria.

Participation in this research is completely voluntary. Your responses will remain fully anonymous and will be used exclusively for this research study only. The questionnaire consists of a few questions and would take no longer than 10 minutes to complete. The completion of the questionnaire will be taken as informed consent to use the information you provide for this study.

Thank you so much for taking the time to answer this questionnaire, your responses are highly valued.

If participants have concerns about this study and wish to contact an independent person, please contact Dr. Garrett Ryan at garrett.ryan@griffith.ie

* Required

I have read and understood the above information, and I choose to participate in this research *

- Yes
- No

Are you an accountant currently working in Nigeria? *

- Yes
- No

Section A

1. Gender *

- Male
- Female

2. Age *

- 20 - 30 years
- 31 - 40 years
- 41 - 50 years
- 51 - 60 years
- 61 and above

3. Highest Level of Education *

- Ph.D
- Master's degree/Postgraduate Diploma
- Bachelor's degree
- OND/HND
- Secondary Education
- Other

4. What area of Accounting do you currently work in? *

- Financial Accounting/Reporting
- Internal Auditing
- External Auditing
- Management Accounting
- Tax Accounting
- Advisory/Consulting
- Other

5. Work Experience (in years) *

- Less than 1 year
- 1 - 3 years
- 4 - 6 years
- 7 - 10 years
- more than 10 years

6. Are you a Chartered Accountant? *

- Yes
- No
- Currently studying to become a chartered accountant

7. Which of the following professional bodies are you a member/student of? *

- ICAN
- ANAN
- ACCA
- CIMA
- Other
- N/A

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Section B

Artificial Intelligence or (AI for short) refers to the ability of a system or machine to perform tasks that would normally require the intelligence of a human being like decision making, speech recognition, visual perception, etc.

In the context of accounting, AI can be referred to as a system that can perform tasks that would normally require the intelligence of a human accountant.

Artificial Intelligence is currently being widely discussed in Accounting

8. Are you aware of the discussions surrounding the use of AI in the Accounting Profession? *

- Yes
- No

9. How did you become aware of this? (Choose all that apply) *

- From the media
- Social media
- I was taught in school
- From my personal readings
- Publications from my professional body
- Artificial Intelligence is currently being used at my workplace
- N/A
- Other

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Section C

Please indicate the extent to which you agree or disagree with each of the following statements by clicking on the appropriate boxes

10. Artificial Intelligence has useful applications in Accounting *

- Strongly Agree
- Agree
- Neutral
- Disagree

- Strongly Disagree

11. Artificial Intelligence capabilities are superior to the capabilities of human accountants *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

12. Artificial Intelligence will improve the way accountants carry out their work *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

13. Artificial Intelligence will reduce the time accountants spend on repetitive tasks *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

14. Artificial Intelligence will allow accountants to focus on more strategic roles in the workplace *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

15. The use of artificial intelligence in accounting will lead to the emergence of new roles in the accounting profession *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

16. Accountants would need to develop new skills to adapt to new AI trends *

- Strongly Agree
- Agree
- Neutral
- Disagree

- Strongly Disagree

17. Accounting curriculums in universities should include appropriate IT skills *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

18. Accounting curriculums in universities should focus more on the consulting and strategic areas of accounting and not just technical accounting knowledge *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

19. Human Accountants will be replaced by Artificial Intelligence in the foreseeable future *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

20. I am worried that Artificial Intelligence could replace me in my job *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

21. I support the development of Artificial Intelligence in Accounting *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

22. I am excited about the changes that Artificial intelligence will bring to the accounting profession *

- Strongly Agree
- Agree
- Neutral
- Disagree

- Strongly Disagree

23. I am adequately prepared to work alongside Artificial Intelligence *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

24. Which of the following potential applications of AI do you think would be most useful to Accountants? (Choose all that apply) *

- Fraud Detection
- Forecasting Revenue, cash flows, etc
- Analysis of large volumes of structured and unstructured data
- Automation of repetitive tasks
- Identifying and extracting relevant information from documents
- Interacting with clients
- Other:

25. Which of the following skills do you consider most important for accountants today? (Choose all that apply) *

- Technological Literacy
- Business advisory skills
- Communication skills
- Relationship Building
- Interpretation of Financial Information
- Other:

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