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Original Research Article

Artificial Intelligence in Accounting for Revenue Generation in Nigeria: A Post-Covid-19 Impact Analysis

Sani, Abdulrahman Bala PhD¹, Adeyemi, A. Adekunle PhD² & Bakare, Taophic Olarewaju³

¹ Department of Accounting, Usmanu Danfodiyo University, Sokoto, Nigeria, sonyaxle9@gmail.com

² Department of Accounting, Olabisi Onabanjo University, Ago-Iwoye, Nigeria, kunleadeyemi01@gmail.com

³ Department of Accounting, Usmanu Danfodiyo University, Sokoto, Nigeria.

For correspondence, email: abubackrie@gmail.com

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Abstract

Contemporary developments in the wake of lockdown as a result of a covid-19 pandemic have birthed fresh discoveries in the application of information technology to the production and delivery of services and products globally. Artificial intelligence (AI) and other robotic technology are now commonly used in both industry and government for the generation and collection of revenues and payment for input costs. It is in this light that governments at all levels are now exploring new technological advancements for raising revenue and reducing the cost of governance. In accounting, the evolution of software used for accounting and the more recent inclusion of artificial intelligence has led to a complete transformation of accounting systems. The use of the traditional accounting system has greatly faded and through investments in robotic and other information technology, there have been groundbreaking stories in the application of leading-edge approaches to digitally transform the means of generating revenue, issues of incomplete taxpayer data and multiple taxation can easily be resolved through technology and this will boost taxpayer's confidence in paying their taxes. Unfortunately, the Nigerian revenue generation is still not embracing technology in totality regardless of the enormous potential and advancements in the digital world. This has been impactful on revenue and added value. The objective of this paper is to examine the impact of technology in accounting for revenue generation in Nigeria after the covid-19 lockdown and how the use of AI can be deployed to improve revenue and block leakages in the system. The study concludes that effective utilization of artificial intelligence

and other information technology in accounting for revenue generation in Nigeria will become ready tools for government, therefore, increasing revenue generation. The study, therefore, recommends that technology, particularly AI, is an important opportunity for Nigeria and if the government can successfully navigate the challenges, it can be a driver for economic growth and development.

Keywords: Artificial Intelligence, Information Technology, Accounting for Revenue, COVID-19.

JEL Classification Code: H20

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1. Introduction

With advancements both within and beyond the profession, the dynamic nature of accounting and its continual evolution is becoming a game-changer. The recent experience of lockdown caused by the Covid-19 pandemic has brought this to the fore. While the epidemic is widely seen as a game-changer in many aspects of mankind, its impact on accounting practice and procedure is considered in the short term. The use of information technology (IT) in accounting pre-covid cannot be claimed to be wholly new. With advancements both within and beyond the profession, the dynamic nature of accounting and its continual evolution is becoming apparent. The recent experience of lockdown caused by the Covid-19 pandemic has brought this to the fore. While the epidemic is widely seen as a game-changer in many aspects of mankind, its impact on accounting practice and procedure is considered in the short

term. The use of information technology (IT) in accounting pre-covid cannot be claimed to be wholly new.

However, the current adoption of artificial intelligence (AI) and robotic process automation (RPA) in accounting and finance has resulted in a full overhaul of accounting systems. The traditional accounting method is slowly but steadily being phased out. Artificial intelligence (AI) has an impact on numerous sectors of accounting, auditing, and finance, and it has been stated that there have been groundbreaking events in the deployment of cutting-edge ways to digitally alter revenue generation (Russell, 2019). The rapid emergence of artificial intelligence technology in the wake of the coronavirus outbreak has sparked widespread interest. Artificial intelligence applications can readily fix issues such as incomplete taxpayer data and multiple taxation,

boosting taxpayer confidence in paying their taxes.

Artificial Intelligence is being implemented in almost every facet of society, including taxation. The advantages of using Artificial Intelligence to generate money cannot be overstated, as its implementation will ensure accuracy, reliability, and long-term revenue creation while also positively impacting taxpayer behaviour (Samuel & Rhuoma, 2020).

2. Historical Development of Artificial Intelligence

Alan Turing released the seminal paper "Computing Machinery and Intelligence" (Turing 1950) 1950, which addressed the fundamental question "Can computers think?" Turing devised an imitation game, later known as the Turing test, in which if a machine can carry on a conversation that is indistinguishable from a conversation with a human being, then the machine is intelligent. The Turing test was the first attempt to quantify artificial intelligence (European Union, 2020).

The first "AI period" began in 1956 with the Dartmouth meeting, where AI's name and objective were established. McCarthy invented the term "artificial intelligence," which has since become the scientific field's name. "Every aspect of any other feature of learning or intelligence should be adequately documented so that the machine may replicate it," was the main conference assertion (Russell & Norvig 2016). Ray Solomonoff, Oliver Selfridge, Trenchard More, Arthur Samuel, Herbert A. Simon, and Allen Newell were among those who attended the meeting and went on to become important players in the AI field (Bizzaro & Dorrain, 2017; European Union, 2020).

3. Concept of Artificial Intelligence

Because all human behaviour has been attributed to intellect, intelligence has been regarded as one of the most significant qualities of human beings. Humans, according to Kumar (2018), are the most intelligent of all created animals on the planet. This is demonstrated by the way they demonstrate supremacy behaviour over other animals by subjecting them to desired control. When human behaviour interacts with nature and the human environment, human intelligence is revealed. The capacity for logic, comprehension, self-awareness, learning, emotional knowledge, reasoning, planning, creativity, and problem-solving are all examples of intelligence (Reagan, 2018).

The term intelligence is often used to allude to 'problem-solving,' and an intelligent system is defined as one that takes the best feasible action in a given scenario. Although artificial intelligence is not a new concept, there has been a recent surge in activity and interest in the field, owing largely to developments in machine learning and the related discipline of 'deep learning.' These are computer programs that learn from their mistakes and improve over time (Brown & Sandholm, 2018; Dean, Patterson & Young, 2018; Mitchell, 1997). Machine learning advancements have enabled the development of more adaptable AI systems that can perform effectively across a variety of activities.

Artificial Intelligence (AI) is the ability of a digital computer, computer-controlled machine, or robot to do tasks that would normally be performed by intelligent entities such as humans (Reagan, 2018). In contrast to natural intelligence expressed by humans and other animals, artificial intelligence, often known as machine

intelligence, is intelligence demonstrated by machines (Ding, 2018; McCorduck, 2004). This means that machines can be programmed to undertake jobs that are normally performed by intelligent beings such as people and animals. Artificial intelligence (AI) is the emulation of human intelligence processes by machines, including information gathering and rules for its use, reasoning, and self-correction (Samuel & Rhuoma, 2020).

Artificial intelligence, according to Dinesh, Kashmira, and Vaishnavi (2019), is any task completed by a computer or machine that would normally require a human to use intelligence to complete. It is the science of creating robots that can display intelligence in the form of humans, such as speech recognition, decision-making, visual perception, and language translation. Artificial intelligence (AI) is a method of making computers intelligent by using automation to mimic human intellect to increase machine analysis and decision-making capabilities (Zhuowen, 2018). Artificial intelligence (AI) is the computer emulation of human intelligence processes.

This comprises knowledge representation, perception, manipulation, and creativity, as well as learning, reasoning, planning, self-correction, problem-solving, and knowledge representation (Dinesh, Kashmira & Vaishnavi, 2019).

It's a science and a collection of computational approaches inspired by how human beings use their nervous system and bodies to feel, learn, reason and act. Artificial intelligence appears to be on the verge of profoundly altering how modern cultures live and work (European Commission, 2018). With the advent of AI comes the question of how businesses, consumers, and the economy as a whole will be affected (Russell & Norvig, 1995). Employees are becoming more interested in learning what AI means for their job and income, while businesses are eager to learn how to take advantage of the opportunities presented by this powerful phenomenon. Governments are also leveraging this advancement in technology known as artificial intelligence to boost revenue generation and meet their obligations.

Table 1: Some definitions of AI, organized into four categories

A system that thinks like a human	Systems that think rationally
“The exciting new effort to make computers think ... machines with minds, in the full and literal sense” (Haugeland, 1985)	“The study of mental faculties through the use of computational models” (Chamiak and McDermott, 1985)
"The automation of activities that we associate with human thinking, activities such as decision-making, problem-solving, learning ..." (Bellman, 1978)	“The study of the computations that make it possible to perceive, reason, and act.” (Winston 1992)

A system that acts like humans	A system that acts rationally
“The art of creating machines that perform functions that require intelligence when performed by people.” (Kurzweil, 1990)	“Computational Intelligence is the study of the design of intelligent agents.” (Poole et al., 1998)
"The study of how to make computers do things at which, at the moment, people are better." (Ritch and Knight, 1991)	“AI ... is concerned with intelligent behaviour in artefacts.” (Nilsson, 1998)

Source: Russell and Norving, (2016) as cited by European Union (2020)

4. Artificial Intelligence in Accounting

AI applications in the accounting field have a long history dating back to the 1980s (Eleonora, 2018). The development and application of expert systems (ESs) in accounting is arguably the most researched topic (Baldwin, Brown & Trinkle, 2006). Expert systems are software programs that aim to emulate the behaviour and expertise of human experts, store human knowledge and experience, and translate it into rules to solve accounting problems and perform certain accounting jobs (Suton, Holt & Arnold, 2016). For the investigation of accounting-based decision processes, certain ES has been created (O'Leary, 2003). Early ESs, according to O'Leary (2003), did not live up to their potential since they were built on logic, if-then rules, and decision trees.

They may repeat the same mistakes because they are incapable of learning (Makridakis 2017). Aside from these early, even crude attempts at automation, accountants have always been eager to increase the efficiency and effectiveness of their work and provide more value to their clients. The recent technological breakthroughs in AI are now opening a new chapter in accounting, refocusing research from ESs applications to some new perspectives on revenue generation: how could government benefit from AI capabilities, what is the long-term vision for AI in improving revenue

generation, and how will AI change accounting roles in the organization (ICAEW 2017). The influence of this new generation of machine learning algorithms on economics and business is significant (Dirican 2015).

Artificial intelligence in revenue generation accounting is fast evolving, and it is predicted to gradually take over fundamental responsibilities as cost reductions and operational efficiencies become more apparent. There have been ground-breaking stories about the use of cutting-edge technologies to digitally transform the ways of earning money, and challenges like double taxes and missing taxpayer data can be easily rectified using artificial intelligence. Despite the vast benefits of AI, the Nigerian government has yet to take advantage of these benefits, despite the promise and improvement in technology that it may bring, as progressive governments across the world have already used AI to develop and strengthen their country's income base.

5. Benefits of Artificial Intelligence

In light of the coronavirus epidemic, the rapid growth of artificial intelligence technology has attracted worldwide interest and demonstrated significant achievement. Artificial intelligence is becoming increasingly significant in our lives and economy, and it is already affecting our

environment in a variety of ways. The race to enjoy its benefits is fierce around the world, and industrialized nations such as the United States of America, European countries, and the United Kingdom have risen to the top (Ding, 2018).

The opportunities for organizations to use AI seem limitless as AI continues to imitate human intellect in robots. With this and the continuous rate of AI adoption in mind, many executives are wondering if they should start investing in AI technology as well (Spendesk, 2020). AI is viewed as a source of increased productivity, revenue, and economic progress. Analyzing enormous amounts of data can improve the efficiency with which things are done and dramatically improve the decision-making process.

A government may join for a variety of reasons, but the one that should stand out the most is the income generation benefit. According to a 2017 PwC survey, 72 per cent of company decision-makers believe AI will give them a competitive advantage in the future, resulting in more income for the government. In this study's opinion, AI can be an effective tool for generating government revenue if properly used. Spendesk (2020) proposes the following important ways in which artificial intelligence directly generates revenue today:

- i. As time passes and the technology used to imitate human intelligence improves, artificial intelligence (AI) will gradually become one of the most potent tools in a company's armoury. With the use of AI, the issue of tax evasion will be greatly reduced, if not completely eradicated, because enterprises that use AI will be easily tracked in terms of tax owing to

them, and the problem of double taxation will be resolved.

- ii. Government revenue agencies will be better prepared to fulfil the future needs if they are early adopters of modern technology that leverages powerful AI. AI can assist decision-makers in focusing on areas for improvement to increase revenue earned through focused awareness methods.
- iii. AI will improve information by enhancing efficiency and assisting people in creating new opportunities, new revenue streams, and increasing savings. The advancement of technology has resulted in the improvement of humanity's condition throughout history. Consider the use of power in the home and the automobile. Artificial intelligence (AI) has the potential to surpass these because machines will be able to assist people in solving more critical and complex social problems. Innovation will rule supreme, and people's quality of life will improve.
- iv. In terms of the economy, AI can help with the evolution of work. Robots and artificial intelligence will assist people in performing their responsibilities more effectively, not replace them. Man and machine working together will be unstoppable. AI will also lower the likelihood of human error and analyze past data to save money.

6. Challenges in the application of Artificial Intelligence in Nigeria

Despite the immense benefits that would be garnered from implementing artificial intelligence, some hurdles may stymie artificial intelligence's advancement in Nigeria as a revenue generator. The following are some of the obstacles that could stymie Nigeria's adoption of artificial intelligence.

Investment: AI is an expensive technology that the Nigerian government may not be able to fully adopt due to the costs of installation, expert installation, and maintenance, and that not every business owner or manager can afford to invest in because a large amount of computing power will be required, and sometimes hardware acceleration with GPU, FPGA, or ASIC will be required to run machine learning models effectively. Even though AI adoption is on the rise, governments and businesses have yet to completely incorporate it into their value chains at the scale that it should. Furthermore, when the government or companies that have incorporated as a method of income generation are still in the early stages, this has resulted in a slowdown in the adoption of AI technology at scale, depriving them of the cost-benefit of scale. Also, incorporating artificial intelligence into the practice of taxation for revenue generation may not be cost-effective and as such, would exceed the potential gains in setting up and applying artificial intelligence to tax law (Kuznaicki).

Software Malfunction: Because AI is controlled by machines and algorithms, decision-making power is automatically delegated to code-driven Black Box tools. It's tough to pinpoint the source of errors and malfunctions due to automation. Furthermore, human beings have little or no control over the system because of their inability to study and grasp how these tools work, which is made more complicated as automated systems become more common and complex.

Lack of Political Will: In Nigeria, a lack of political will to transition from analogue to digital ways of doing things may be a barrier to AI adoption due to inconsistencies

in policy formation and implementation. Because governments change from one election to the next, no matter how beneficial a policy is, it is changed or those in charge of implementing it are changed and given tasks based on their political allegiance. Furthermore, because robotics may require electricity to perform properly, a weak electrical supply network and the ongoing reform in the power sector are significant hurdles (Dike, 2019).

Limitations: AI, like any other technology, has limitations; it simply cannot perform all tasks. However, it will result in the emergence of a new job domain with multiple job profiles of varying quality.

High Expectations: Artificial intelligence research is carried out by a large group of technologists and scientists with a variety of goals, motivations, and interests. Understanding the underlying basis of cognition and intelligence is the main focus of research, with a heavy emphasis on solving the mysteries of human intelligence and cognitive process. Not everyone understands how AI works and may have unrealistic expectations of how well it will work.

Data Security: AI and artificial intelligence applications' machine learning and decision-making capabilities are built on massive amounts of classified data, which is often sensitive and personal. As a result, it is subject to major problems such as data breaches and identity theft. Often, governments and corporations seeking to enhance income, profits, or power use AI-based tools, which are generally globally networked and difficult to regulate or rein in.

Algorithm Bias: Data and algorithms are at the heart of AI. AI's decision-making accuracy is solely determined by how well it has been trained and by using authentic and unbiased data. If data used for training is tainted with racial, gender, communal, or ethnic biases, unethical and unfair repercussions are inherently present in critical decision-making. As many AI systems continue to be taught with faulty data, such biases will likely become more pronounced. The failures of successfully deploying artificial intelligence include expected rationality in dealing with ambiguities, complexities, or simple interpretation of difficulties.

Lack of Technological Advancement: Nigeria's artificial intelligence advancement may be hampered by a lack of infrastructure and well-trained personnel.

7. Conclusion and Recommendations

This study concluded that the effective application of artificial intelligence in accounting for revenue generation is a panacea for increased revenue, and the Nigerian government will fulfil its obligation of providing infrastructural facilities that are in poor condition, resulting in growth and development for the country. Especially now that the government's revenue is insufficient to pay salaries and satisfy social obligations as a result of the drop in the price of crude oil on the global market and economic damage already unprecedented in Nigeria as a result of the coronavirus outbreak. As a result, the study suggests that artificial intelligence is a significant opportunity for Nigeria and that if the government can effectively handle the hurdles, AI may be a catalyst for economic growth and development.

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