Automation of Accounting Processes: Impact of Artificial Intelligence

Dr. Chukwuani, Victoria Nnenna[1], Dr. Egiyi, Modesta Amaka[2]

[1]*Department of Accountancy, Enugu State University of Technology*
[2]*Department of Accountancy, Godfrey Okoye University, Nigeria*

Abstract: **Artificial intelligence (AI) is rapidly bringing change to the way financial institutions are operated and this change is expected to take over the core aspects of the accounting industry. The accounting profession has changed its focus from paper and pencil era to software and computer era. The aim of this study is to examine the impact of artificial intelligence on the accounting industry and the level of advancement of the accounting industry in automating the accounting process. Also, to understand the concept known as Artificial Intelligence, Robotic process automation, and how the 21st-century accountant can adapt to automation in the accounting industry.**

Keywords: **Artificial Intelligence; Accouting Automation; Accounting Processes**

I. INTRODUCTION

Accounting has undergone several developments over the years with the last major innovation being the creation of double-entry bookkeeping over 500 years ago. The 21st century heralds Information and Communications Technology (ICT) – based technologies that have changed ways of doing business in many industries. Accounting is transcending traditional ways of entry and preparation of accounting books to automation. The 21st century is the age of automation and accounting happens to be one of the industries at the forefront. Accounting automation addresses the total lifecycle of accounting, not just as part of a firm's financial management department. This implies that the whole accounting process, the recording, manipulation, and interpretation of transactional data, is done by software, with minimized reliance on manual transactional entries by people. Accounting today is handled by a system called, 'Robotic Process Automation (RPA)'. According to AIIM (2018), Robotic process automation (RPA) is a term that denotes software tools that partially or fully systemize human activities that are repetitive, manual, and rule-based. Boulton (2018) sees RPA as an application of technology, directed by business logic and arranged inputs, aimed at automating business processes.

Artificial intelligence covers a number of interlinked technologies including speech and image recognition, data mining, semantic analysis, and machine learning. AI is still in its very early stages of adoption for broad society changing use. This partially caused by the cost related to the adoption of the needed technologies and also lack of technical know-how within companies. However, the huge potential rewards of using AI and RPA technologies make it all worth it for the companies.

1.1 Statement of the Problem

In recent years, the rapid advancement of artificial intelligence technology has attracted worldwide attention and displayed great success. As a consequence, to this, you will find that artificial intelligence has made its impact on almost every aspect of life, ranging from the replacement of human labor to gradually becoming part of people's daily life. In the accounting industry, the evolution of the software used for accounting and the more recent inclusion of artificial intelligence has led to a complete transformation of the accounting systems. The use of the traditional accounting system has greatly faded and with the automation of the accounting process, it has led to a lot of changes but are these changes beneficial to the accounting industry and how do accountants fit into the equation.

1.2 Objectives of the Study

To identify the impact of Artificial Intelligence on the accounting industry
To evaluate the automation process of the accounting system

II. CONCEPT OF ARTIFICIAL INTELLIGENCE

John McCarthy coined the name "Artificial Intelligence". (Yadav, Gupta, Sahu, and Shrimal, 2017). Artificial intelligence (AI) is the academic field of study that deals with the technical know-how on creating computers and computer software that are capable of intelligent behavior or the study of programming computers do things better and more accurately than humans (Elaine, 2000). In another perspective, artificial intelligence can be seen as the capability of a programmable device to perform activities that can be expected of the human brain. These activities include; knowledge and the capability to acquire it, the ability to judge, produce original thoughts, and understand relationships. Artificial intelligence is mostly aimed at making intelligent machines that can respond in ways similar to humans. Artificial intelligence can be divided into four different aspects which include; intelligence, business, research, and programming dimensions (Carol and O'Leary, 2013). Artificial intelligence: It entails constructing machines to behave as humans are expected to. Business and research dimensions: are a powerful tool used in solving human and

business problems better than human solutions. Lastly, programming dimension: covers symbolic programming. Expert system software can be developed for any kind of problem that involves a selection from a group of choices especially if the decision is based on logical steps. Hence any area where a person or group of persons has special expertise needed by others is a potential area for creating an expert system. (Taghizadeh, Mohammad, Dariush, and Jafar, 2013).

2.1 Major Technologies of Artificial Intelligence

Expert Systems

An Expert system shell is a software programming system that enables the creation of expert or knowledge-based systems. This system is easily implemented. Expert systems are the most widely used artificial intelligence technology. This artificial intelligence program was adopted in the 1980s, and it was programmed to achieve a level of expertise that is capable of replacing human dominance in a particular field of decision making. They are developed often with expert system shells. Hence, this implies any area in which a person/group has special capabilities needed by others. This is a potential area for an expert system.

Neural Networks

This is an aspect of artificial intelligence that deals with electronic models of human brain neural structures (Taghizadeh, Mohammad, Dariush, and Jafar, 2013). Neural network installs the ability to learn into a computer program and the imitation of the human brain through structural simulation by any machine is rendered possible due to neural network (Shukla and Jaiswal, 2013). This was in line with the findings of other artificial intelligence researchers that neural network is one of the chief aspects of artificial intelligence and it is of great interest because it mainly enables any machine to execute the functions of the human brain (Greenman, 2017:Taghizadeh, Mohammad, Dariush, and Jafar, 2013:Kuma, and Thakur, 2012).

Robots

This aspect of artificial intelligence technology deals with the science and technology that is behind designing, manufacturing, and application of robots (Graetz and Michaels, 2015). The Robot Institute of America in 1979, defined a robot as a programmable, reprogrammable, multifunctional manipulator that is designed to move parts, materials, tools, or specialized devices through several programmed and reprogrammable motions to carry out a variety of tasks. Robots are built and equipped with the ability to sense their environment in a way that is similar to human sensing their surroundings. Robots can sense their environment, power itself, and move around utilizing sensors: pressure sensors (hands), light sensors (eyes), sonar and hearing sensors (ears), chemical sensors(nose), and task sensors (tongue) hence appearing smart.

Fuzzy Logic

Fuzzy logic is an aspect of artificial intelligence that deals with a process of reasoning that resembles that of humans. Fuzzy logic imitates the approach of decision making in humans. It usually involves partial truth which ranges between completely false and completely true (Taghizadeh, Mohammad, Dariush, and Jafar, 2013). Fuzzy logic is based on the fuzzy set theory which is a generalization of the classical set theory, which states that "an element either is or is not a member of the set" (Taghizadeh, Mohammad, Dariush, and Jafar, 2013). In artificial intelligence, fuzzy logic is very useful for practical and commercial purposes. It can control machines even though its reasoning may not be accurate, it gives acceptable.

III. ROBOTIC PROCESS AUTOMATION

Robotic process automation makes use of end-users to configure a software robot to employ existing applications to manipulate data, execute transactions, and communicate with other systems (Introduction to Robotic Process Automation, a Primer, 2015). RPA is a technology solution that automates rule-based and standardized activities using scripts. The use of RPA has become more popular in the last 20 years, software robots can be easily trained or programmed to perform rule-based, repetitive, high-volume tasks by replicating human actions when accessing multiple systems, documents, and applications (Embracing robotic automation during the evolution of finance, 2018). The robots can operate the user-interface in the same way humans do, which eradicates the need to modify applications (e.g. ERP, software warehouse, accounting, payroll) or the essential information technology infrastructure (Internal Controls, 2018). Each robot operation is logged and tracked this is done to meet audit requirements and ensure data integrity. RPA has become a very useful and important tool in all categories of business administration tasks. Typical work operations that software robots can undertake include: opening, reading, and sending emails, searching, extracting, updating, validating, and entering data across multiple applications, opening, reading and sending emails, data processing and formatting, decision-making. Human involvement is very necessary to manually feed the robot with processed data because robots are not yet capable of handling or processing unstructured data e.g. scanned documents etc. They're also a limitation in automating cognitive tasks. There is a lot of existing task that cannot be automated with present technology because these cognitive tasks have rules that can't be modeled because they require the experience of staff (Perrier, 2018). The two technologies do not replace each other but can be used separately or together. AI and RPA tools may increase the value of each other.

IV. AUTOMATION OF ACCOUNTING PROCESS

Artificial Intelligence (AI) and Robotic Process Automation (RPA) are two very different but closely-knit terms that have had and shall continue to have a big impact on the automation

of auditing and accounting practices. AI and RPA are both on two opposite sides of an intelligent automation field. Automation is quickly evolving from a process-driven to a more data-driven direction. Although RPA is highly process-driven (automating rule-based tasks), AI needs good-quality data for the AI to be able to learn and know how to function (CFB, 2018).

The processes most often chosen for RPA are internal performance reporting, purchase-to-pay, and record-to-report (Embracing robotic automation during the evolution of finance, 2018), as they are usually routine-based and do not require complex decision-making and judgment. There is a prediction that automata have taken over up to 40% of current transactional accounting (Axson, 2015). Robots are projected to replace humans in manual bookkeeping and aid them in multifaceted, complex processes (Professional accountants – the future: Generation Next, 2016). The accounting tasks and processes that could benefit from automation e.g. accuracy and performance include (Le Clair, 2017; Robotic Process Automation, 2015; Internal Controls, 2018): Reporting (monthly, quarterly close, management, and internal performance reporting, regulatory and external statutory reporting), Accounts payable and accounts payables(automating approvals, maintaining (vetting, updating) supplier/customer data, validating and posting payments, creating/processing/delivering invoices, billing, collections, matching invoices against purchase and sales orders), Period-end closing (sub-ledgers closing, validation of journal entries, general ledger, consolidation, low-risk accounts reconciliation), General ledger accounting, Cash management, inventory accounting, intercompany transactions, travel and expenses, document expense reports, reimbursement requests, audit, payroll, tax accounting, fixed asset accounting.

The most developed segment of artificial intelligence in the accounting discipline is the use and development of expert systems. The expert system was developed for the purpose of advising the accountant on a variety of issues. The accountant (auditor) who monitors, understand and improve cognitive and analytical processes and systems would thrive while the eye shaded accountant who meticulously checks and cross foots credit and debit entries will most likely cease to exist especially with the advent of cognitive and analytics technology to audit (Davenport, 2016). The use of expert systems is more valuable to the accountant than to a technological displacement (Alex, Fogel, Wilbank, Benard, and Serge, 2014). In the past, the accountants of business owners would take decisions based on figures that were most often outdated but with invent of Experts system and automation of the data processes, there is now direct access to up-to-the-minute information about any business and this enables the formation of much more informed decisions and things affecting the business profitability and performance would be easily established. Also, necessary rectification procedures can be easily adopted.

The application of expert systems in accounting can be categorized under the following: (a) Financial accounting (b) Taxation (c) Auditing (d) Management accounting (f) Personal financial planning (Yang & Miklos, 2008). The expert system integrates the knowledge of one or more human experts and with this be able to help accountants improve the quality of the services they provide in the areas of internal control, identification, and evaluation of audit risk and audit planning. In regards to an internal audit, expert systems are used for verifying and screening transactions susceptible to fraud and for processing and authorization of claims. AI is also utilized in financial accounting in terms of cash flow. The result of Yang and Miklos (2008) study, showed that expert system has a vital functionality in the area of financial accounting, an area like the determination of financial status by ratios, cash-flow evaluations, analysis of mergers acquisitions and other investment decisions, leases, and analysis of financial reports filed with SEC are also other areas in financial accounting where expert systems are applied. In addition, O'Leary (2003) further verified the use of expert systems in taxation. This system has the right aptitude for tax treatment on stock investments (O'Leary, 2003). The expert system provides guidance for value-added tax, corporate tax accrual, the planning process, corporate tax planning, and tax preparation system for the oil and gas industry. For international taxation, there also are expert systems available for optimization of international corporation tax position and international tax planning and this type of expert system includes ala and Intuit's (chip-soft) expert systems.

Automation with both RPA and AI will bring about significant changes to the accounting industry. Repetitive and mundane tasks usually done by junior staff will be replaced by robots and human expertise will be needed at a higher level for decisions that require judgment (Gotthardt et al., 2019).

V. THE PLACE FOR ACCOUNTANTS IN AUTOMATION

Smart Organizations do not just acknowledge, appreciate, or adapt to the uncertainty technology brings to business practices. They instead act with every sense of proactiveness, turning a seemingly unreal change to other business practitioners into a competitive advantage.

Like most business practices in this information age, accounting has been evolving. With most businesses shifting systems of recording and storing information from paper-based to automation, accounting still holds on to manual recording tools in managing daily transactional and financial information. The usage of manual tools e.g. spreadsheet, limits access to real-time and current data and leaves little or no room for reporting to be done until the conclusion of the books and the new month begins. There is always a case of Heavy overtime during the financial close, along with heavy reliance on the detective, manual controls rather than preventive, automated controls. Spreadsheets reduce efficiency while simultaneously increasing the occurrence of

errors. For any accounting team, managing uncertainty begins with the eliminating of tools that cause it. This highly indicates to integrating more automation into every process. Automating repetitive, manual, tedious tasks not only increases accuracy and efficiency but opens opportunities for accountants to become less volatile and more visionary. New possibilities to generate a competitive advantage arises all the time. This may appear overwhelming, but technology presents an opportunity for accountants to evolve, attain, and add a higher level of value to their organization. Automation modernizes most routine, manual work, and unlocks the door to Continuous Accounting, this approach will ultimately result in better-utilized resources.

Continuous Accounting changes the way finance and accounting teams work by including control, automation, and period-end tasks within daily activities. This grants accountants the visibility needed to provide accurate reports at any time of the month, and help encourage more informed decisions for the organization. When accountants are no longer trying to cram weeks of work into one and no longer need to perform remote tasks, accuracy invariably improves and valuable employees are better utilized. Tasks that were set aside only for the end of a period are now embedded into daily activities, which then allows the pace of accounting to finally aligns with the pace of running the business.

VI. IMPACT OF ARTIFICIAL INTELLIGENCE ON ACCOUNTING

1. Avoid the Possibility of Financial Fraud

In traditional accounting positions, work positions are not truly separated in the accounting department, this is mostly seen in small and medium-sized firms. All Finance personnel can access both the bookkeeping and cash flow, hence the lack of organization, and this could lead to financial fraud because it gives access to self-serving criminals to benefit themselves. However, with the inclusion of artificial intelligence, a large portion of accounting and other related work will be handled by computers, accounting personnel only need to put in instructions and review it. At the end of the period, the system will automatically settle the bill and execute the trial balance. In the accounting system, each accounting personnel has unique privileges (fingerprint scanner, retina scanner, etc.), and has different passwords and accounts, a clear separation of responsibilities, so to a certain level, this reduces the possibilities of financial fraud. The accounting system, however still cannot stop financial fraud from happening completely because systems still need human personnel to control it, but it's a great start especially because digital footprints can be tracked and monitored and this is all thanks to artificial intelligence (Jędrzejka, 2019).

2. Improve the Quality of Accounting Information

In traditional accounting positions, starting from the registration of accounting books, making of accounting vouchers, to the formation of statements, etc. Accounting

personnel will have to monitor procedures and this traditional way of accounting involves a lot of manpower, financial resources, and material resources, the efficiency is low, accomplishing task will not follow a set scheduled, although it might be completed on time, it results in overtime working, long hours of work, fatigue, and mistakes; all this invariably results in the distortion of accounting information. While on the other hand, when an enterprise uses accounting software for all financial procedures, it saves time and improves the efficiency of the work. Financial personnel only need to do the auditing and accounting personnel need input data, then leave the process to the computer to complete. Even though, errors could occur when the accounting personnel tries to input the necessary data, the accounting software system will automatically report the error as a wrong data entry, which can be corrected to improve the quality of the accounting information (Jędrzejka, 2019).

3. Promote the Reform of Traditional Accounting and Auditing

In the traditional accounting profession, the job portfolios of each accounting personals are matching a division of the business process, but with the inclusion of artificial intelligence, this will lead to a change in the method of separation of traditional accounting and auditing work. This reform will improve work efficiency greatly and help accounting personnel to improve their own workability and quality, optimize the structure layout, optimize the setting of accounting posts, and change the traditional financial and practical working modes. As the implementation of artificial intelligence in the accounting industry becomes more extensive, there is no more need for many employees, which is also an obvious change.

VII. HOW COULD 21ST CENTURY ACCOUNTANT ADAPT AUTOMATION

Although artificial intelligence cannot completely replace accounting, accountants should also actively respond to the impact of artificial intelligence. To be able to adapt efficiently to the change of change due to artificial intelligence, accountants to have this equip themselves with some abilities and skills

1.   *Professional skills*: As an accountant, if your professional skills are not updated or the professional quality is not standard, it will pose as a big is a problem. Therefore, it is very important for accountants to keep learning and improving their abilities.

2.   *Management Skills*: Learning management skills may not have an immediate effect on the accounting system in the short term, but this skill comes in handy to accountants when they take on positions of financial manager or positions that involve managing and directing a group of people.

3.   *Computer Skills*: Computerization is the present hallmark of the current era of big data. The importance of computers has been recognized in the past paper accounting

system, the present paperless system, and computerized accounting. Hence it is advisable that accountants should in addition to mastering simple computer operations, master certain computer programming techniques that enhance their current data processing capabilities.

4.   Analytical Skills: Accountants analyze through accounting statements a lot of financial information. Therefore, it is very important to evaluate and analyze risks reasonably, accurately, and efficiently.

5.   Decision-making Skills: This is the ability to efficiently evaluate the quality of a project, the tools needed to execute the project, and deliver the decision-making quickly. Financial personnel need accurately evaluate the economic environment they find themselves in and determine the condition of the competition, finance condition, offer a reference for any enterprise's short-term and long-term project decisions.

Also, the ability to predict and follow the future economic trend and risk degree for any enterprise. This will allow managers to see your value to the business and invariably the accounting industry thus, allowing the accountant to remain relevant. of the financial information. Accountants should actively be ready to alter their thinking process, abandon the accounting function of traditional accounting, adapt to the current trends, and make a good prediction of current and future economic prospects of various enterprises. The need for interdisciplinary talents has increased greatly. Accounting personnel should not only understand how to use artificial intelligence but also master corresponding financial data analysis ability.

VIII. CONCLUSION

The use of AI technology cannot be avoided by firms, especially if they want to remain relevant in business in the nearest future. The efficiency, speed, and accuracy of Artificial Intelligence are yet to be matched. Accountants just have to welcome the AI technology and integrate it into maximizing professional output. Accounting Firms and accountants who are better equipped to adopt and implement AI technology in their accounting processes will become more valuable both to their clients and the world at large. Institutions of learning are already integrating AI into their accounting learning modules. This implies that students graduating from such universities will come into the workforce with the necessary skills for working in an automated accounting environment. Nevertheless, it is paramount that already practicing accountants strive to acquire AI skills in order to remain relevant to their employers or clients. These IT skills can be obtained by attending seminars, attending college-level courses, or even using self-learning online programs. It is especially important for accountants to always remain up-to-date on the latest accounting trends, industry news, and emerging technologies. Hence, allowing them not only to keep their jobs but to also render more quality services to their clients. Rather than give

into worry about AI taking over their positions and jobs, accountants should learn to embrace this technology as an important tool (solution) to enhance customer services. With the right training and skills, accountants are assured of a lucrative and sustainable career that will last well into the future.

IX. RECOMMENDATION

1. Accounting firms and accountants should strive to improve their knowledge about Artificial intelligence as this will help enhance their performance of various accounting functions, thereby eliminating unwanted certain accounting costs.
2. Research on AI for any accounting task can be improved if AI researchers and accounting researchers cross disciplinary lines and begin to work together.
3. There is potential for further improvement through the use and development of more complex AI applications, such as neural networks, expert systems, fuzzy systems, genetic programming, and hybrid systems and this possibility should be investigated to the fullest extent possible.
4. Cyber-defense should be strengthened in other to adequately protect and support the system's security and safety.

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